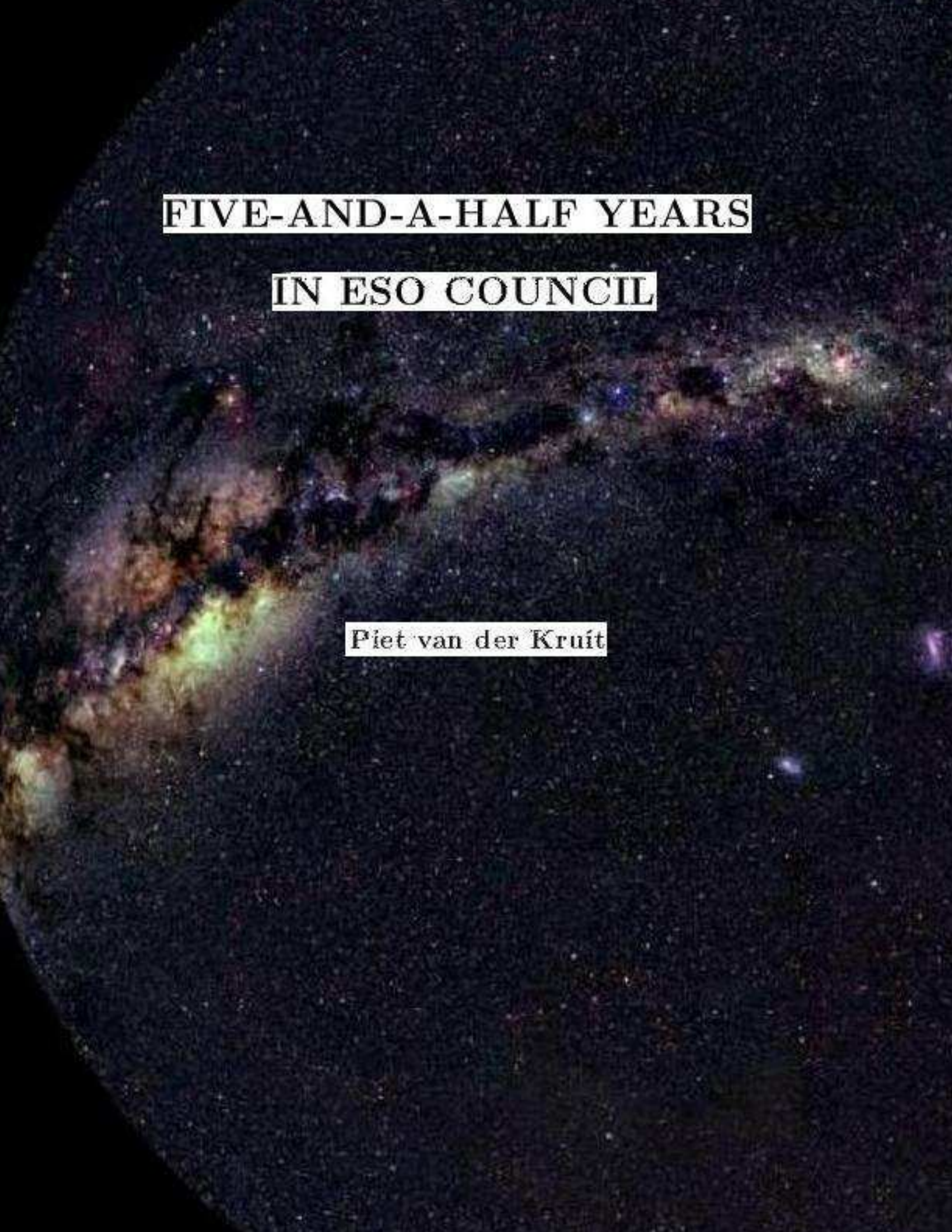

FIVE-AND-A-HALF YEARS IN ESO COUNCIL

Piet van der Kruit

FIVE-AND-A-HALF YEARS

IN ESO COUNCIL

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'Astronomen zijn pas tevreden als er
op elke molshoop een teleskoop staat.'

'Astronomers will not be satisfied until
they have built a telescope on every molehill.'
Jan Bezemer (1938–2012)

Cover: The southern sky.
Adapted from http://home.arcor.de/axel.mellinger/images/mwpan_polar2_s.jpg.

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1. Introduction

In the summer of 2000 I was designated astronomical delegate to ESO Council on behalf of the Netherlands. I really looked forward to that, since the European Southern Observatory was in a very exciting period. The Very Large Telescope (VLT) with its four 8.2-meter telescopes had been opened at Paranal (although only two were operating at that time) and was quickly establishing itself as the best ground-based optical/near-IR observatory in the world. VLTI (interferometry[1] with the VLT unit telescopes and a few smaller auxiliary telescopes[2]) was expected soon. ESO had just completed negotiations with Portugal to join ESO.[3] At the same time the UK had expressed interest to join and a decision to go ahead and build the Atacama Large Millimeter Array (ALMA), an array of 64 12-meter (sub)millimeter antennas at 5000 meter altitude together with North-America (USA and Canada), was expected soon. Japan might also join in the ALMA project. It seemed a very interesting time in Council and the prospect to be associated with these significant developments was very exciting indeed.

My association with ESO had been on and off. Of course I had used the La Silla telescopes; in the eighties I had traveled to Chile myself a few times to observe, later it were mainly my graduate students and collaborators that went and performed the observations. At the committee level I had in the seventies been a member of an *ad hoc* advisory committee on the desirability to build a long-slit, intermediate-dispersion spectrograph for the 3.6-meter telescope. In the eighties I was for five years (1983 to 1987) the Dutch national member of the Observing Programs Committee (OPC) and from 1986 to 1989 chairman of the User's Committee of the ESO/ESA Space Telescope European Coordinating Facility (before the launch of HST[4] really a general advisory committee to the ECF) and in 1995 chairman of an *ad hoc* advisory Working Group on Large Programmes. I had been part of the Netherlands delegation when the VLT was inaugurated in 1999, when I also visited Chajnantor, the site where ALMA was expected to be constructed.

My expectation was, based on what I knew from other Council members, that the time it would take me was not too much. Two regular Council meetings per year and if I wanted to go two so-called Committee of Council meetings (meetings originally intended for the non-astronomer delegates; the meeting could not take decisions). And two meetings per year of the national ESO committee in preparation of the Council meeting. A very modest investment of time indeed. It proved to be completely different, but also much, much more exciting than I had anticipated!

Before me my Amsterdam colleague Ed van den Heuvel was the astronomical delegate for the Netherlands to Council. The diplomatic delegate from the Ministry of Education, Culture and Science was Jan Bezemer, who had been in ESO Council for many years (and also in that of CERN, as a number of the other diplomatic delegates of Council). Jan was a geologist by training, but had been at the Ministry for a long time. I knew him reasonably well for a number

[1] Interferometry is the technique to combine the signals from a few telescopes to simulate a telescope with the dimension (diameter of the primary mirror or dish; the so-called aperture) of the separation of the telescopes. Since the angular resolution is inversely proportional to the aperture this technique produces high resolution images. Interferometry has been applied already many decades in radio astronomy. e.g. in the Westerbork Synthesis Radio Telescope.

[2] Eventually the VLTI will encompass four 1.8-meter telescopes in addition to the four 8.2-meter VLT unit telescopes

[3] Portugal formally joined ESO on January 2001 after signing an agreement in June 2000 with ESO, followed by parliamentary ratification of the ESO convention in Portugal. ESO had been supporting the development of astronomy in Portugal under a co-operative agreement since 1990.

[4] The Hubble Space Telescope is a joint observatory, funded by NASA and the European Space Agency ESA. ESO and ESA together have established a European Coordinating Facility at the ESO Headquarters in Garching to support use of the HST by European astronomers.

Figure 1: The homepage of ESO in early 2006 (http://www.hq.eso.org/about-eso/).

of years from whenever I had to do with the Ministry in various capacities. I had talked a lot to Jan when we were both on the trip to Chajnantor after the VLT inauguration in 1999 and I had told him at the time that I would be interested to take Ed van den Heuvel's place if ever Ed and/or the Ministry decided not to extend Ed's term. Jan and I seemed to go along very well and he said he actually liked the idea. I also mentioned this to Ed at some later time, but he was somewhat reserved; it turned out that he felt that there were other possible candidates as well (he mentioned Leiden but was not more specific than that). Before it makes an appointment of the astronomical Council delegate the Ministry usually asks the Netherlands Committee for Astronomy (NCA) for advice, which is a body coordinating astronomical affairs in the Netherlands, comprising the directors of the university institutes and other institutions in the country. Ed was chair of the NCA and I was vice-chair. Jan, however, seemed to have decided he would prefer me. He suggested to me that he write a letter to the NCA saying that the Minister proposed to appoint me as representative for the Netherlands and would ask the NCA what it thought about that. As far as I am aware this letter was only sent in draft form. But it ended the whole discussion and the NCA agreed that I should become the astronomy delegate to ESO Council. Afterward Jan Bezemer called me about the outcome and when he heard the effect of his draft letter he burst into a roaring laughter.

The President of Council in 2000 was Arno Freitag, a diplomat with a legal background from Germany. Interestingly, Council had decided that year (2000, Arno's first as President) not to

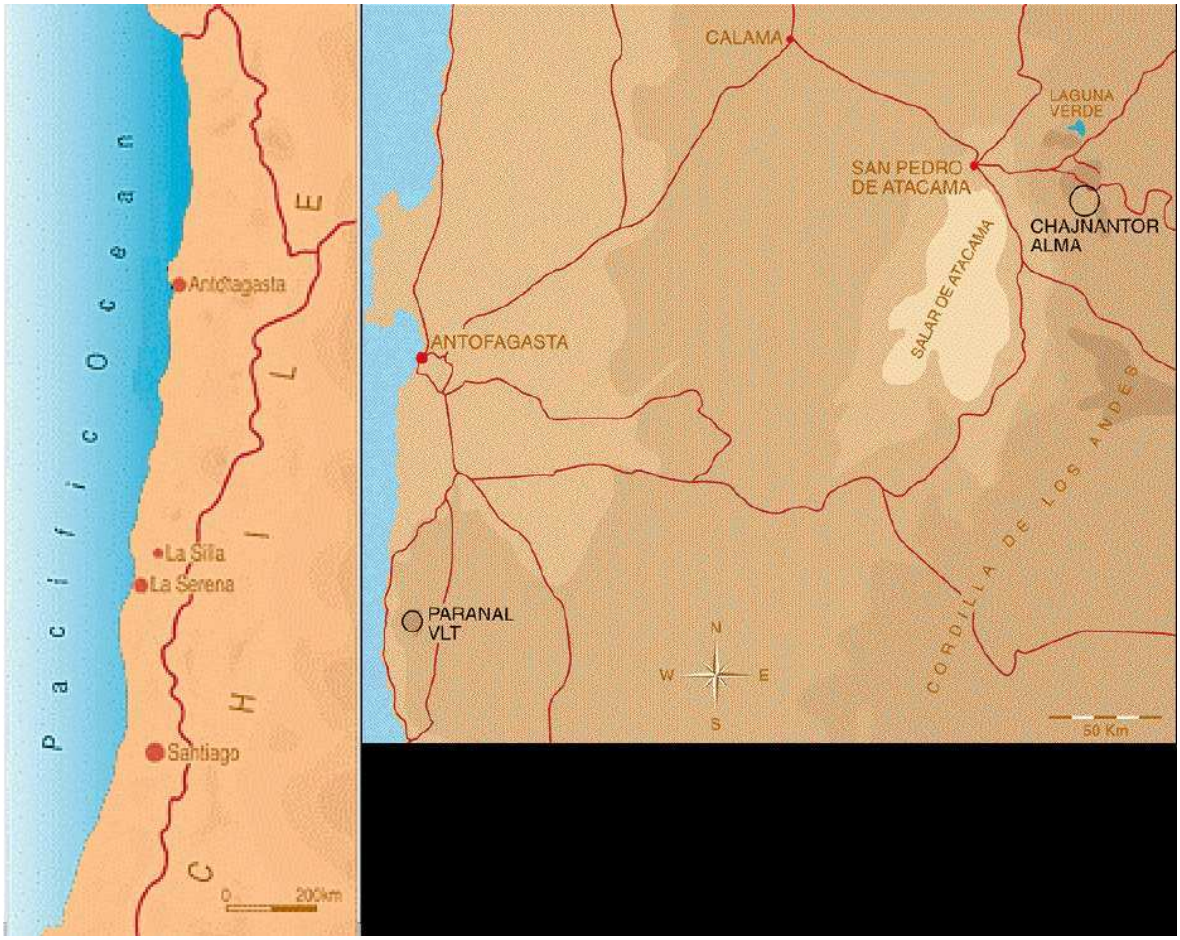


Figure 2: The location of the various ESO facilities in Chile. The map on the left shows the location of La Silla, roughly halfway between Santiago and Antofagasta. The map on the right shows the location of the Paranal Observatory and the site of ALMA at Chajnantor, close to San Pedro de Atacama, relative to Antofagasta.

elect a Vice-president. I think I know the background of this, but will not elaborate. Catherine Cesarsky was the Director General, a position she had assumed in the summer of 1999. I knew her from a few occasions, such as from a period we were delegates on behalf of ESA on the Visiting Committee for the Space Telescope Science Institute in Baltimore.

These notes, in which I describe the developments during my $5\frac{1}{2}$ years in Council, have been written in 2006 and serve in the first place for my own entertainment and as a record for me of what happened when. I will write them as if telling the story to one not associated with ESO or ALMA and add a few explanatory notes here and there. It is not entirely chronological and is arranged by broad subject. I will not cover issues concerning personnel matters, such as pension fund problems (these were many; ESO employees take part in the CERN Pension Fund, which of course uses Swiss Franks), staff rules and regulations, collective bargaining, appointments and promotions at senior levels, salary scales, renumerations and allowances, etc.

I collect in Appendix I some notes from other sources on the history of ESO.

2. Vice-president and the ESO/UK In-Kind Working Group

My first meeting was a Committee of Council meeting on October 6, 2000. It was clear that there was much work to be done, mostly by a few individuals. There was a Negotiating Team with the UK that was having initial meetings and then a process of negotiating the in-kind contribution had to work out details of the accession. In ALMA there were many details to be worked out before a decision could be made to go ahead with construction and before that was possible an agreement with Spain had to be negotiated for their participation. All of this had to be completed before the end of Arno's presidency, which would normally last until the end of 2002. The participation of Japan in ALMA was not an urgent issue, since the Japanese government had not provided the required funding.

On December 6 and 7, 2000 I had my first regular Council meeting. I must admit that I was put off by the slow proceedings of the meeting, the large number of attendants from the ESO organization and in particular the fact that the diplomatic delegates dominated the meeting and that therefore astronomy itself was not a prominent part at all of the discussions. During the meeting I was approached by Arno and he asked me if I would accept to be elected Vice-president[5], and then head the In-Kind Working Group from ESO's side to negotiate with the UK. He knew that I had been chair and vice-chair for a long period of the Joint Steering Committee, the 'Board' of the UK-NL Isaac Newton Group of Telescopes at La Palma, Canary Islands. Consequently I had extensive experience dealing with the UK and in particular the Particle Physics and Astrophysics Research Council (PPARC, previously it was the Science and Engineering Research Council, SERC) and the head of the UK part of the Working Group, Ian Corbett. Ian and I had been opposite numbers in the ING for many years and knew each other quite well at a working and negotiating level. I agreed. A few meetings would be fun and I was very honored to be elected Vice-president (which actually happened the second day of the Council meeting).

In the end the In-Kind Working Group had meetings in Garching (January 15, 2001), London (February 15, 2001), Amsterdam Airport (March 30, 2001, when I returned from the US early in the morning), London Heathrow Airport (May 4, 2001) and Garching (May 17, 2001). I also attended a meeting of the Negotiating Teams in Oxford (June 5, 2001) and we had a final meeting of the Working Group in Garching (24 September, 2001). The Negotiating Teams met again in Garching on October 1, 2001 and on October 8, 2001 we had a meeting of the ESO team with delegations of the Finance Committee and the Scientific Technical Committee, in Garching, in preparation for the meetings of these bodies and Committee of Council, where the outcome of the negotiations would be discussed.

In the Working Group we proceeded very smoothly. Ian and I had developed before a mutual level of trust and consequently were able to work constructively; even when we were not in agreement on particular issues we were able to work out useful compromises and constructive ways to proceed. The total special contribution (as the 'entrance fee' is officially called) of the UK was 240 million DM (German Mark)[6], being the UK-share in the investments in Paranal without depreciation. They would get access to La Silla and the other ESO facilities in Chile and Europe for free. The Negotiating Teams had also agreed that at most half of the special contribution could be as in-kind contributions.[7]

[5] I told Jan Bezemer during that evening, who said "what will they now say in Leiden", then burst once more into a roaring laughter, and then urged me to accept for "Koningin en Vaderland" (Queen and Nation).

[6] The total investment in VLT/VLTI since 1989 up to the expected UK accession on July 1, 2002 was determined to be 1150 MDM. Here the costs covered by consortia, such as the one that built the instruments, was included in this, since this was paid back by ESO in the form of observing time. The UK share in ESO was estimated to become 20.9%, which resulted in an amount of 240.350 MDM for the entrance fee. This corresponds to about 123 M€.

[7] The ESO convention spells out that extra income from a new member state would be used to lowering of the

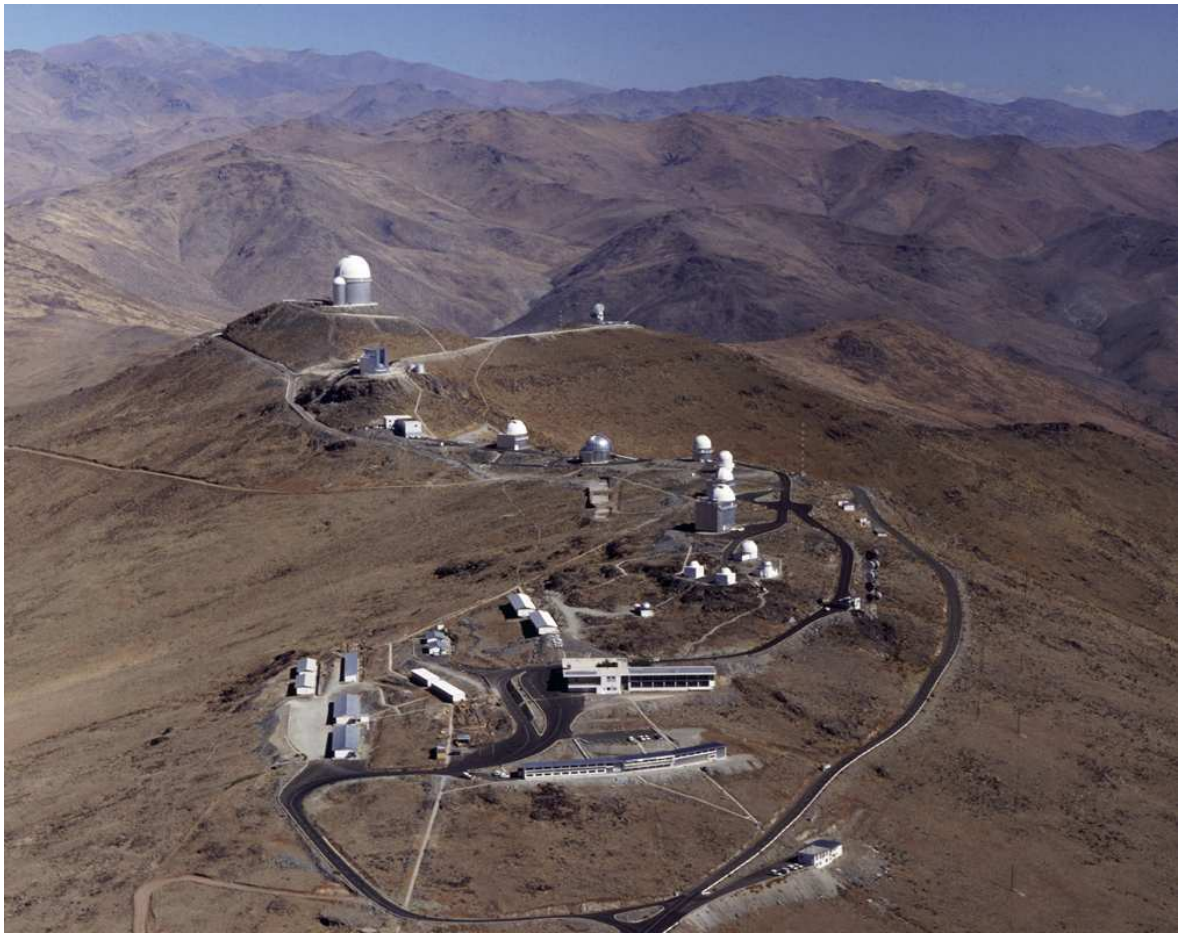


Figure 3: Overview of the La Silla Observatory.

We established the principles of in-kind contributions that we have since then also applied in negotiations with Finland and Spain. In-kind contributions had to be by definition additions to the existing ESO program that were very desirable, but not affordable to ESO at the present time. This was to avoid that the special contribution could be used as a kind of pre-emptive bidding on existing or shortly expected industrial and instrumentation contracts, which was unfair to the industries and laboratories in the existing member states. The contributions would be assigned a *'value'* in cash, and then it was up to the delivering country, the UK in this case, to provide what was agreed without further change in the value. At the first meeting we reviewed the possible contributions from the UK, which involved among others access to every observing facility on the ground on both hemispheres that the UK either owned or had a share in, and very quickly decided that there were only four possibilities for the special contribution that I felt would be acceptable in principle by ESO Council. One of these of course was VISTA, the Visual and Infrared Survey Telescope for Astronomy, which had already been identified by the Negotiating Teams. The other ones were some specific contributions in software manpower, access to the

contributions of the current members unless Council decides otherwise. The UK had made it a condition that their annual contribution would be in addition to the existing ones in order to make ALMA possible.

Figure 4: The major telescopes at La Silla with the 3.6-m middle-top, New Technology Telescope (NNT) to the left and below, and the 2.2-m telescope at the right.

Gemini-North telescope[8] and/or the new wide-field camera on UKIRT[9], and contributions to VLTI, such as an additional auxiliary telescope.

VISTA was an approved project within the UK, selected in a special fund created to improve the situation concerning scientific infrastructure in the UK, called the Joint Infrastructure Fund JIF, for which I had actually been on an advisory body within PPARC that recommended the selection of VISTA. It had been agreed already between ESO and the UK that it would be placed at Paranal on a peak nearby the VLT. It was to be optimized for the optical, but with near-IR capabilities for later. That was the opposite of what ESO needed; it was going to have already the VST (VLT Survey telescope) at Paranal, which was being built by consortium led by the Capodimonto Observatory in Naples, as an optical survey telescope. It is true that the VST is a 2.5-meter class telescope and VISTA a 4-meter class one, but the duplication is evident. We quickly saw that it was to our mutual benefit if VISTA were actually constructed as a near-IR survey telescope. When that included a silver coating plant[10] for mirrors up to the VISTA

[8]The UK, together with the USA and a few other countries, was building two 8-meter class telescopes, one in the north on Mauna Kea in Hawaii and one in the south on the (US-owned) Cerro Tololo Observatory in Chile, not too far from La Silla. These twin telescopes were named Gemini.

[9]The United Kingdom InfraRed Telescope is a 4-meter class telescope optimized for the near infrared. The camera, called WFCAM, is a survey camera that is important for the effective use of Gemini-North.

[10]A mirror in an optical telescope is usually coated for reflectivity with aluminum. However, in the near infrared coating with silver is much more effective; at these wavelengths the reflectivity of silver is better. A silver coating

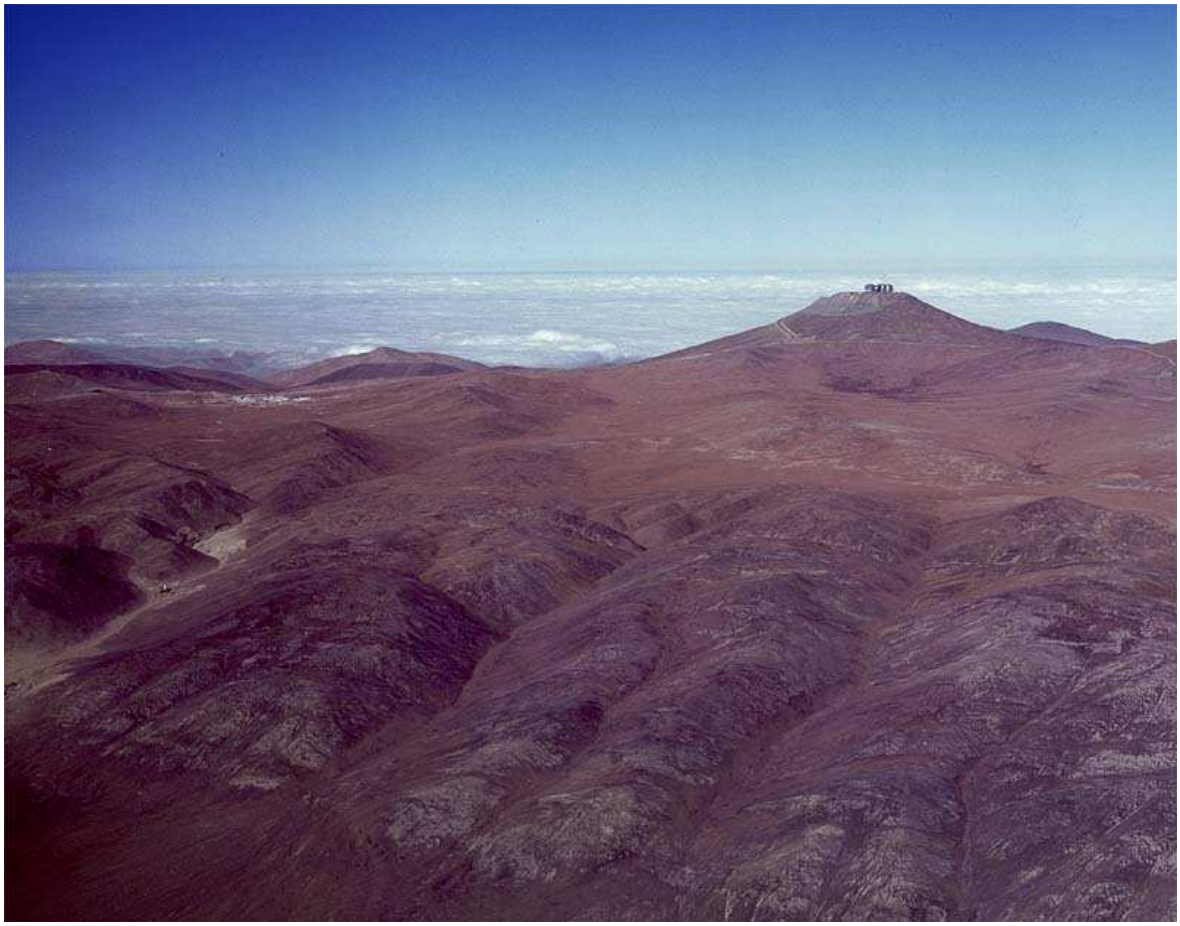


Figure 5: The Paranal Observatory and surrounding landscape from the air.

primary (4 meters) then this would in addition make it possible to silver-coat all VLT mirrors, except the primary 8-meter ones, and improve VLT performance in the infrared.

A major point of discussion was the fact that we on behalf of ESO insisted on the principle that if VISTA were an in-kind contribution then it would from then on be an ESO telescope, owned and operated by ESO with the operation and off-line pipeline reduction software and archiving requirements of ESO. There could be a joint Survey Planning Group or sub-panel of the OPC[11] to oversee the deployment of VISTA. At first there was talk of an enhanced VISTA, the enhancements being the IR capabilities and the silver coating plant. This, and any possible contribution to VLTI, would require additional, new money in the UK.

It must have been difficult internally in the UK, where a whole community that had been involved in VISTA now would have to 'give away' control over the telescope to ESO, while the execution of 'their' survey would become an enterprise jointly with ESO astronomers. The additional funds required for enhancements of VISTA and VLTI contributions were very difficult to get and in the end there was no VLTI component to the in-kind contribution, while VISTA did loose its optical capabilities. From an optical telescope with near-IR options for later en-

then has the effect of reducing the emissivity and therefore the thermal background radiation that affects the sensitivity of telescopes in the near infrared.

[11]The Observing Programmes Committee of ESO reviews all observing proposals for telescope use and recommends to the DG which to award time. It has representation from the astronomical communities of the ESO member states.

Figure 6: The progress in the building of the Very Large Telescope at Paranal.

hancements, it became an exclusively infrared telescope. With the important help of Massimo Tarenghi[12], we succeeded in agreeing on a value for VISTA, a timescale of delivery and a set of penalties in case of late delivery.

The software manpower was also not straightforward. The UK of course wanted to send people employed already in the UK, but we felt that to qualify for an in-kind contribution it had to be positions that were available for persons in at least all ESO member states. This was a fundamental point and the UK accepted this in the end. I think that the formal EU requirement for equal employment opportunities throughout the union made this possible. Another problem was that ESO wanted positions in Garching and the UK preferred manpower to be contributed from UK institutions. This was solved by requiring that the persons involved spend a significant fraction of their time at ESO.

The access to Gemini-North was never realized. UK astronomers wanted to give us no more than a part that we felt was too little and we also could not agree on a value. The UK had its own value for internal accounting, we had one for a VLT unit telescope and the two were different. These values were a little more than 100,000 DM per night and differed by about 10%. After many tries we abandoned that contribution.

The further negotiations with the UK were relatively straightforward. We only had a difficult session about the actual time when the UK astronomers would start having regular access to the VLT, since the payment of the special contribution would not start immediately. We compromised in the end over this issue. Also the VISTA project was delayed and in return ESO astronomers would obtain early access to the results of the UKIRT surveys and these would be with priority done at low declinations, such that the surveyed areas could be seen from the southern hemisphere.

The final agreement was that VISTA would consist of a telescope plus IR camera, silver coating plant and spare parts, valued at a total of 90 MDM (46 M€). ESO would have immediate access to the WFCAM/UKIRT survey data. The software (also referred to as E science) program was valued at 10 MDM (5.1 M€). The UK would become ESO member on July 1, 2002, and would have access to all ESO facilities from then on, except to the VLT, for which UK access would start April 1, 2003. The UK would pay a cash amount of 120 MDM (61.358

[12]Massimo was a member of the VISTA Board on behalf of ESO related to the fact that it would be built near Paranal.

Figure 7: The Very Large Telescope VLT.

M€), corresponding to half the special contribution, according to a schedule starting with an installment of about 3.23 M€ in 2004, followed by annual installments of 9.688 M€ up to 2010. Finally the UK would pay an additional 10.4 M€ (the remaining part of half the special contribution for which no in-kind component had been found) as soon as possible, but no later than 2011. The payments were agreed to be subject to cost variations as applied to the ESO contribution as from 2002.

Towards the end of the negotiations (but after we completed those for the in-kind contribution) Ian Corbett was appointed by ESO as Head of Administration. Working relations between the earlier Head of Administration, Norbert König, and Catherine were not going too well and at the end of his term Norbert's contract was not renewed. Ian of course kept away from the issues of the UK until it had formally joined.

3. Accession of the UK and the ALMA decision

The discussions in Council took more time. Some of that was already evident during the discussions in the June 18 and 19, 2001 meeting in Porto (to celebrate the accession of Portugal on January 1, 2001[13]), where the French delegation warned that it might not be able to get a mandate arranged from the French authorities in time for the vote on the UK, which was scheduled for later in the year. The time schedule that the negotiators had agreed involved a decision in ESO Council well before the end of 2001, such that sufficient time would be available for parliamentary ratification in the UK for the accession to take place per July 1, 2002. To that end the meeting of the Committee of Council on October 8, 2001 was used as a means of informally discussing the resolutions and annexes (which contained all the details on the in-kind contribution) and then have a special Council meeting on November 16, 2001.

However, when this extraordinary Council meeting convened it turned out that the French delegation still did not have a mandate to vote for the accession. This is a vital requirement, since such a decision obviously requires unanimity. Partly this problem with France probably has to do with the fact that, contrary to most other countries, their participation is through three ministries (Foreign Affairs, Finance, and Science and Education) and it is not straightforward to get instructions (and the same ones) from each of these. In any case, we all came to Garching in November 2001 to vote on the accession, only to find out France was not prepared to vote yet. The delegation did not even have a mandate to vote *'ad referendum'*. We had to go home and return in two weeks in order to vote and accept the UK as an ESO member state. I felt that the UK might easily feel seriously insulted by this. Maybe it was, but there were fortunately no consequences; in any case I felt that it was embarrassing for ESO and Council. For my period in Council this behavior of France would not be restricted to this single incident; in many instances the French delegation does not get instructions in time how to vote on important issues. Where this happens internally in France and for what reason, I do not know or understand. But it makes life difficult in Council.

During 2001 another difficult issue was resolved by Arno, which was vital for an agreement on the accession of the UK and that had to do with the maximum percentage of the national contributions to the ESO budget. I will return to this extensively later since it has again been a problem in the next two accessions (Finland and Spain), but the issue was that when a new nation would join this would automatically result in a much increased (in real money) contribution from in particular Germany. This is because there is a maximum percentage a member state can contribute to the budget. Arno succeeded in getting an agreement with the major countries that involved a slow change of that maximum percentage such that Germany would over a few years adapt to a higher contribution and the other countries accepted a slower decrease of their contribution.

In the end Council voted in an extra-ordinary meeting on December 3, 2001 and the UK formally joined ESO on July 1, 2002. Council had its regular 'spring' meeting in London a few days later on July 8 and 9, 2002 (for this purpose it was delayed from the usual first half of June). This also was a major celebration with a formal presentation and press conference at the original Royal Greenwich Observatory and followed by an excellent formal dinner at the Tower of London castle, hosted by the Minister and a boat trip on the Thames.

The business at the London meeting was mainly related to ALMA. The European consortium (comprising ESO and national agencies in France, Germany, the Netherlands and the UK) had signed Memoranda of Understanding on ALMA in 1998 and 1999 with the US National Science

[13]There was a formal celebration in Porto attended by Minister Gago and other high officials from Portugal and we were offered among others a very good dinner with much excellent port.

Figure 8: The signing of the Portugal-ESO Agreement on June 27, 2000, at the ESO Headquarters in Garching (Germany). At the table, the ESO Director General, Catherine Cesarsky, and the Portuguese Minister of Science and Technology, José Mariano Gago. On the left is Fernando Bello, Portuguese delegate to Council and Vice-president in the period I served as President and in the middle Arno Freytag, my predecessor as President of Council.

Foundation (NSF) on a joint Phase A design and development study. This combined the existing US and European efforts to build a large millimeter array. At the same time an agreement had been signed with Japan with the intention to explore ways for Japan and the bilateral project to be combined. Soon there was further expression of interest for contributions from Sweden[14], Canada and Spain. For ESO the accession of the UK was essential; with the UK the role of Europe in an enlarged ESO could be comparable to that of the USA and the income of ESO (including the UK entrance fee) would make this financially possible. At the Council meeting of December 7, 2000 a resolution was adopted that noted the progress in the negotiations with the UK and asked the Executive to prepare a proposal for ESO's specific role in ALMA.

There was a Committee of Council meeting on March 19, 2001 (which I missed), where a target date for the decision on ALMA Phase B (construction) was envisaged as December 2001. This actually was a statement of intent to proceed with ALMA. This was re-enforced

[14] An extra contribution from Sweden in the end resulted in their participation in APEX; see below.

Figure 9: At the high-level ESO presentations on the occasion of the Council meeting in Porto in June 2001: the Portuguese Minister of Science and Technology, Professor J.M. Gago speaks about development of science in Portugal and the importance of international collaboration. In the background a direct link to the Paranal control room.

at another meeting of Committee of Council on May 23, 2001[15]. Early in 2001 drafts of the Phase B proposal and the Operations Plan were available and extensively discussed at the Porto meeting. Also there the Visiting Committee, chaired by Jeremy Mould, reported and strongly endorsed the efforts of ESO related to ALMA.

At the regular Council meeting of December 18 and 19, 2001 much time was devoted to ALMA, but also to the so-called Long Range Plan, which would show how ESO would cope within the budget with the various projects it was involved in. The initial MoU's concerning ALMA had a end-date of December 2001 and had to be extended. Council proceeded to go ahead with this. Further discussions took place in two meeting of Committee of Council on March 14 and May 24, 2002. It had become clear that Japan would not be in a position to join at that time because of lack of funding and therefore a bilateral rather than a tripartite agreement was going to be proposed. This involved agreements between Canada and the US and between ESO and Spain for the North-American and the European partnerships respectively, followed be a bilateral agreement between ESO and NSF for the construction of ALMA.

It should be noted here that the ALMA that was envisaged at that time consisted of 64

[15]The summary of conclusions of this meeting did not list me as a participant, but the text does note my summary of the progress of the UK in-kind negotiations.

Figure 10: Gathered in the historic Octagon room, Royal Greenwich Observatory, London, Ian Halliday (CEO, Particle Physics and Astronomy Research Council) stresses the benefits to British astronomers of belonging to the European Southern Observatory. The panel consisted of (from left to right): Roy Clare (director of the National Maritime Museum), Arno Freytag (President of ESO Council), Lord Sainsbury (Science Minister), Gerry Gilmore (University of Cambridge), Ian Halliday, Catherine Cesarsky and Pat Roche (Oxford University).

antennas[16] of 12 meter diameter each, that could be moved around on Chajnantor over an area with dimension between 150 meters up to 18.5 km using over a total of 216 antenna stations. There were to be four frequency bands for observations, which was a significant scaling down compared to the ten originally proposed to cover the whole (sub-)millimeter part of the spectrum.[17] The cost estimate was about 550 million Y2k (year 2000) US$ and the expected year of start of full operation was 2011.

By the time of the London Council meeting on July 8 and 9, 2002, the drafts of the agreements with Spain and the NSF were available and extensively discussed and here also it was clear that getting France to vote for these on the desired timescale would be difficult. Also the negotiations with the Spanish were not easy. There was a long discussion so that the Council meeting lasted much longer than expected. I had to leave before the end of Council to go to Baltimore for a meeting of an *ad hoc* committee at the Space Telescope Science Institute. Council agreed unanimously (although France did initially vote *ad referendum*) on a resolution specifying the European share in ALMA at 50% and authorising further negotiations with Spain (which was prepared to take a 7.5% share in the European part of the project) and NSF, and establishing a Working Group to review the outcome of Phase A. The Long Range Plan 2001-2006, which was vital for an agreement to proceed with ALMA, was unanimously endorsed. In August Council endorsed in written procedure an 'Acuerdo' with Chile on the possible construction of ALMA on Chilean territory so that further preparations at Chajnantor could take place.

In the end Arno succeeded in getting an agreement that was acceptable to all ESO states

[16]I will use the word 'antenna' throughout, although 'dish' is often used in view of the form and as is more common in radio astronomy.

[17]The highest frequency of the four was the so-called Band 9, in which the Netherlands was playing an important part. This band will provide the highest angular resolution in addition to being the frequency where the altitude of 5000 meters is absolutely necessary.

and Spain. No small accomplishment. Further discussions on the draft agreements and related negotiations, interim reports from the Phase A Working Group, composition of ESO delegation to the ALMA Board and the composition of the European ALMA Board (to advise Council on ALMA related matters) took place at the meetings of Committee of Council on October 15[18] and November 11, 2002. Arno even invited a representative from the Spanish Ministry of Science and Technology to the December 17 and 18, 2002 meeting of Council to try and force a way out of an impasse in the negotiations with Spain that divided the ESO delegations. In the end the agreement with Spain was adopted with Germany and Portugal abstaining (and France voting *ad referendum*!). The resolution for the bilateral agreement was adopted unanimously (again France voted *ad referendum*[19]). The European ALMA Board would have representatives from all member states. Catherine and the next President of Council were selected to represent ESO at negotiations with Japan that were going to start in 2003.

In preparation of ALMA two prototypes antennas were built, one funded by North-America and one by Europe and later there would be a selection between the two based on performance and price. ESO commissioned a consortium led by Alcatel (mostly based in France and Italy) and North-America another consortium led by Vertex (but this had consisted for an important part of a German company). Earlier during the year Council had agreed (also in written procedure) on ESO participation in APEX, the ALMA Pathfinder Experiment. This was a copy of the Vertex ALMA prototype that would be put at Chajnantor for early experience with the site and sub-millimeter astronomy. It was funded by the Max Planck Institut für Radioastronomy in Bonn and the Onsala Space Observatory in Sweden and ESO was providing the operations. This was a very good idea, but there had been some political obstacles, since France and Italy were afraid that this would bias towards that prototype.

The December 2002 meeting of Council was also Arno's last one and a new President had to be elected. Earlier during the year I was approached to see if I would be available as President, both in the sense of willing to do the work and having the time to do so. I felt I could do it, although I was warned that ALMA would also take a fair bit of my time. And indeed it did. As a matter of fact much more than the work for ESO Council itself – and much more than I expected. In any case, I was elected unanimously. I was not in the room when the election took place, of course, but was asked in after some minutes, being greeted with an applause. I accepted and promised to give it the best I had.[20]

Fernando Bello, a diplomat from Portugal, was elected Vice-president. Interestingly Fernando and I were born on exactly the same day (September 18, 1944); he a few hours earlier than I, but since it depended on the use of daylight saving time, which we were not sure about during WWII (we did have it in the Netherlands) we were not able to determine how many hours. There actually was a secret vote necessary for this in Council, since there was also another person proposed. The vote resulted in a majority for Fernando. As a result of my election as President of Council I would *ex officio* be a member of the ALMA Board and the European ALMA Board.

Another thing that was arranged before Arno left was the extension of the appointment of Catherine until the summer of 2007, half a year before her retirement at age 65. That meant that I did not have to worry about the process of finding a successor except for initial planning of the timescales of the process towards the end of my term as President in 2005.

[18]The evening before was a major celebration of the fact that September had marked the 40th anniversary of the original signing of the ESO convention. There was a big party with many guests and a movie on the history of ESO was presented.

[19]This *ad referendum* was only lifted at the June 2003 meeting of Council!!

[20]NOVA, the Netherlands Research School for Astronomy, that integrates much of the astronomical research at the universities, brought out a press release that is reproduced in Appendix II.

It was custom not to be President and delegate for a member state at the same time. I proposed to the NCA that Tim de Zeeuw would succeed me, also because I felt this was beneficial and natural in view of his national function as director of the Netherlands Research School for Astronomy (see footnote 50), which coordinated among other instrumentation developments and participation in consortia for ESO instruments. In addition, Tim and I had a very good personal and working relationship, e.g. in his capacity as director and me as chairman of Board of NOVA, and as directors of sister research institutes in our universities. So, Tim took my place. Not long after this, Jan Bezemer retired and was succeeded by Jan van den Donk as diplomatic delegate.

4. ALMA Search Committee and the ALMA Board

Already in the second half of 2002 we had to start recruiting persons for the Joint ALMA Office (JAO). This was the leadership of the ALMA project and a 'Search Committee for Key-personnel' was formed to recruit a director, project scientist, project manager and project engineer. It was chaired by Anneila Sargent (director of Owens Vally Radio Observatory and of CARMA, the Combined Array for Research in Millimeter Astronomy, both in California) and I became co-chair. We mostly had teleconferences during the summer and fall of 2002. Advertisements had gone out, but we did not have very many promising responses to that. We decided that head-hunting was the way to go (as it usually is for positions like these) and that we would start with the director, so that he/she could have a say and play a role in the recruitment of the project scientist, engineer and manager.

In the end we ended up with two candidates that were in position to do such a job. It was not trivial, since we almost always encountered a position where a person seemed of the right quality and had the right experience, but it then turned out impossible to ask him (the ones we were considering at the time all were men) to move his family to Santiago and then be traveling more than half the time in Europe, North-America or northern Chile (and Japan). We extensively discussed the option of considering persons that had their families living in North-America or Europe, but decided in the end that such a way of proceeding would be a mistake for the project. But we did worry, also because Paul VandenBout was already well beyond the date for which it was agreed he would end his temporary position of interim director. Fortunately, he agreed a few times to extend this appointment and saved the project.

In January of 2003 we had finally two candidates that seemed promising and who were prepared to move to Chile. We decided that for an important position as this one we would have to have oral interviews and did so the same month in Washington. It was obvious that the most suitable candidate was Massimo Tarenghi. He not only had led in a very impressive way the construction of ESO's New Technology Telescope[21] on La Silla and the Paranal Observatory with the Very Large Telescope, but he also was already interim project manager of ALMA and was therefore very familiar with the project. Most importantly, he was available.

The first meeting of the European ALMA Board took place on February 20, 2003 in preparation for the first Board meeting. Each member state of ESO plus Spain had a representative on the EAB. I chaired the meeting. The ESO rules stipulated that the President of Council would chair the EAB unless he/she was chair of the ALMA Board. Other members of the ALMA Board on behalf of Europe were Catherine and myself (both *ex officio*), Richard Wade and Roy Booth. Roy was director of the Onsala Observatory, but not a delegate to Council. This has sometimes led to some deficiencies in his information. This by the way also held for those members of the EAB that were not in Council. For the Spanish delegate this was to some extent alleviated by the fact that he was an invited attendant at the ALMA Board meetings. Both Europe and North-America would have four members in the Board.

The structure of the ALMA project is strange in that the two partners do not put their budgets together to form a joint budget. Instead they run their own finances and hire their own personnel, which is awkward for the director, who has no own budget. Also the North-American structure is complicated. Formally the ALMA project resides under the National Radio Astronomy Observatory NRAO, but the NRAO gets its budget from Associated Universities, Inc. (AUI), who in turn get their funding from the National Science Foundation NSF. All these parties keep a strong involvement in ALMA and as a result all want to be represented in the

[21]The NTT was build with the entrance fees of Italy and Switzerland, which joined ESO in 1982. It pioneered the concept of a thin mirror that was actively controlled to keep the correct shape by servomotors at the back. This allows for much lighter mirrors and support structures and is the basis for the technique used in the VLT to operate large mirrors.

Figure 11: The ALMA prototypes at the VLA site. The Japanese prototype is in the background.

ALMA Board. Formally the North-American members are a senior person from NSF, which was Bob Dickman, who for many years did work as a millimeter astronomer, and the President of AUI, which was Riccardo Giacconi. Riccardo had been Director of the Space Telescope Science Institute in Baltimore and Director General of ESO. An attendant to the Board (really as an alternate to Riccardo) was Fred Lo, the director of NRAO, but he insisted on being present at all sessions, even closed and confidential ones. With the help of Bob Dickman I was able to solve this situation eventually (I return to it below), but only –with my consent– after Riccardo had been replaced as President of AUI. Although it never was a problem (and I was keen to ensure it never became a problem) the result was that in closed Board sessions there always was one more person present from North-America than from Europe (but there were of course equal numbers of votes). The other two North-American members were Anneila Sargent and Jim Hesser from the Herzberg Institute of Astrophysics in Canada.

On February 24 and 25, 2003 the first meeting of the new ALMA Board took place in Washington at the offices of the National Science Foundation (NSF). The agreement of ESO with Spain had been signed (as had the one between the NSF for the USA and the National Research Council for Canada) and during the meeting the formal signing of the 'Bilateral Agreement' between ESO and NSF took place. This was on 25 February and the signatories were Catherine Cesarsky for Europe and the director of the NSF, Dr. Rita Colwel, for North-America. It was an impressive moment. I gave a short speech in which I tried to underline the importance of the agreement and the many contributions that had been made by many people. The joint press release by ESO and NRAO is reproduced in Appendix III.

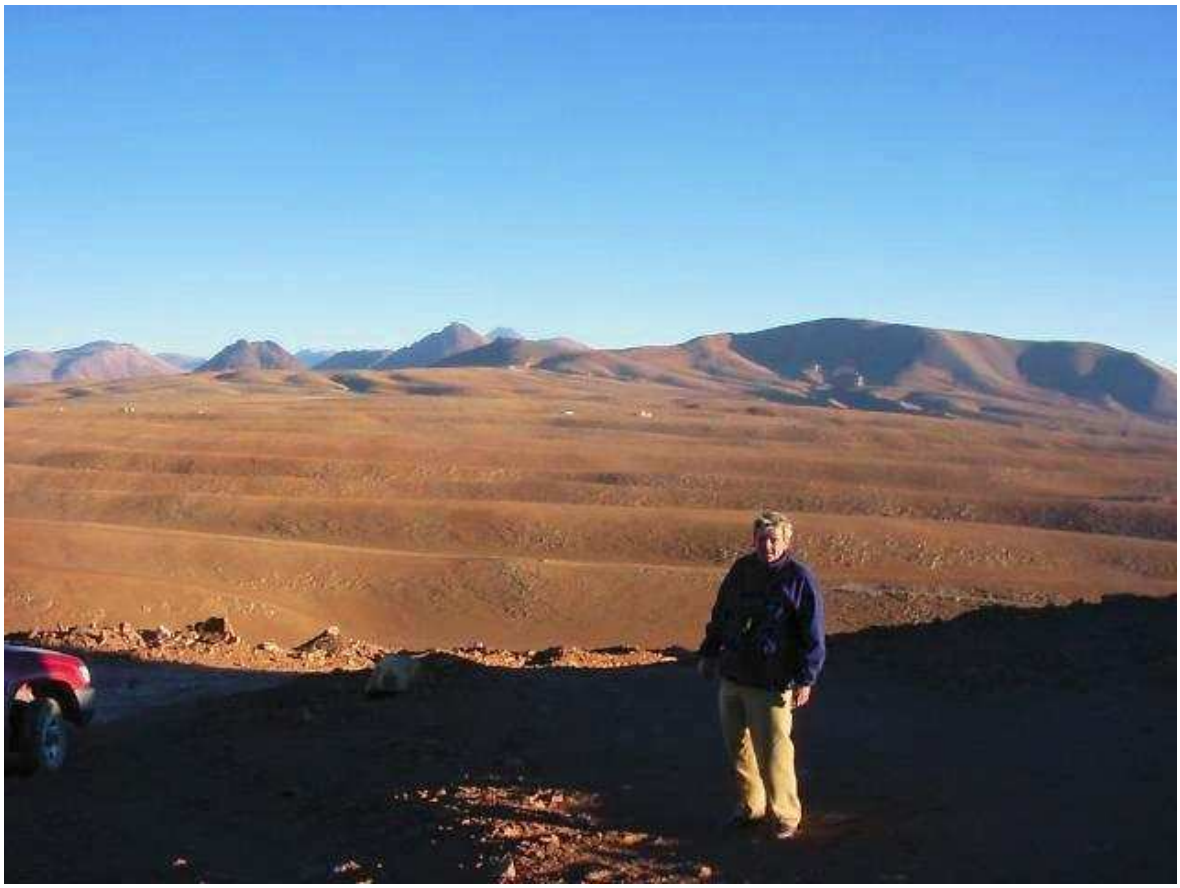


Figure 12: The ALMA site at Chajnantor. This picture is taken from a nearby peak at over 5100 meters above sea-level.

At the start of the meeting I was chosen as chairman of the ALMA Board. This was not unexpected as the agreement spelled out that the chair and secretariat would rotate every two years between Europe and North-America and that Europe would start. Ian Corbett became the executive secretary and Bob Dickman from NSF the vice-chairman. These elections were our first business. Our second business was to hear the report from the search committee for key personnel about the progress and the committee proposed that the Board appoint Massimo Tarenghi as director of ALMA. This unanimous recommendation was taken over by the Board and Massimo was called in. He accepted, being a wise man, under the condition that negotiations on employment and relevant conditions would come to an acceptable conclusion.

The business at the first Board meeting was dominated by the process for antenna procurement. The original idea was to have two prototypes built to the same specifications but with independent design, one commissioned by NRAO and one by ESO[22], erect these at the same site (which ended up being the VLA-site in New Mexico) and then choose between these on the basis of extensive tests and on the basis of bids by industry. Then two contracts for 32 antennas by each of the partners would be placed. This of course is a vital step in the ALMA project, not only because it determines everything else (can ALMA be built to the specifications necessary for the scientific case), but also the most expensive part (about 250 M€ in current prices). Moreover, the prototypes were much delayed and it seemed that is was necessary for

[22]This resulted in the use of misleading references to expressions as the 'American antenna' and the 'European antenna', in spite of the fact that industries from both continents were involved in both prototypes.

Figure 13: Close-up of the ALMA site. The huts in the distance indicate the location of the center of the Array.

the project to stay on track (not to miss so-called 'level-one milestones') the procurement should start during delivery and testing of the prototypes on the basis of specifications. The choice also has a political background both in ALMA and in ESO (industry from which ESO countries would be visible in the project) and tensions ran high. Massimo did succeed in defining an acceptable procedure and timescale over extensive and not always reasonable opposition from Riccardo Giacconi, which would lead to the placing of contracts in September of 2004.

The meeting ended on time (I was starting a reputation for keeping meetings well on schedule) with not many other difficult issues. From then we were going to have monthly meetings by telecon, conducted at 5 pm in my local time in the Netherlands, lasting for about two hours. A few months later we did institute meetings of the European ALMA Board face-to-face at ESO a few days before face-to-face ALMA Board meetings after we had found a way of involving the EAB. For the cases of Board telecons we started to have preparatory EAB telecons preceding the Board ones. These then started at 3 pm. I often did these from home. The rules stipulated that the President of Council would chair the EAB, unless he/she was chair of the ALMA Board. I did chair the first meeting, because it was just before the Board meeting itself and I was not yet chair. After that Richard Wade was, at my proposal, elected by Council to be chair of the EAB. The routine of the ALMA Board was to have a meeting in North-America in the spring (March or April), in Europe in the summer (June or July) and one in Chile in the fall (October or November). This routine was kept for the first three years until Japan invited the Board to Japan in 2006.

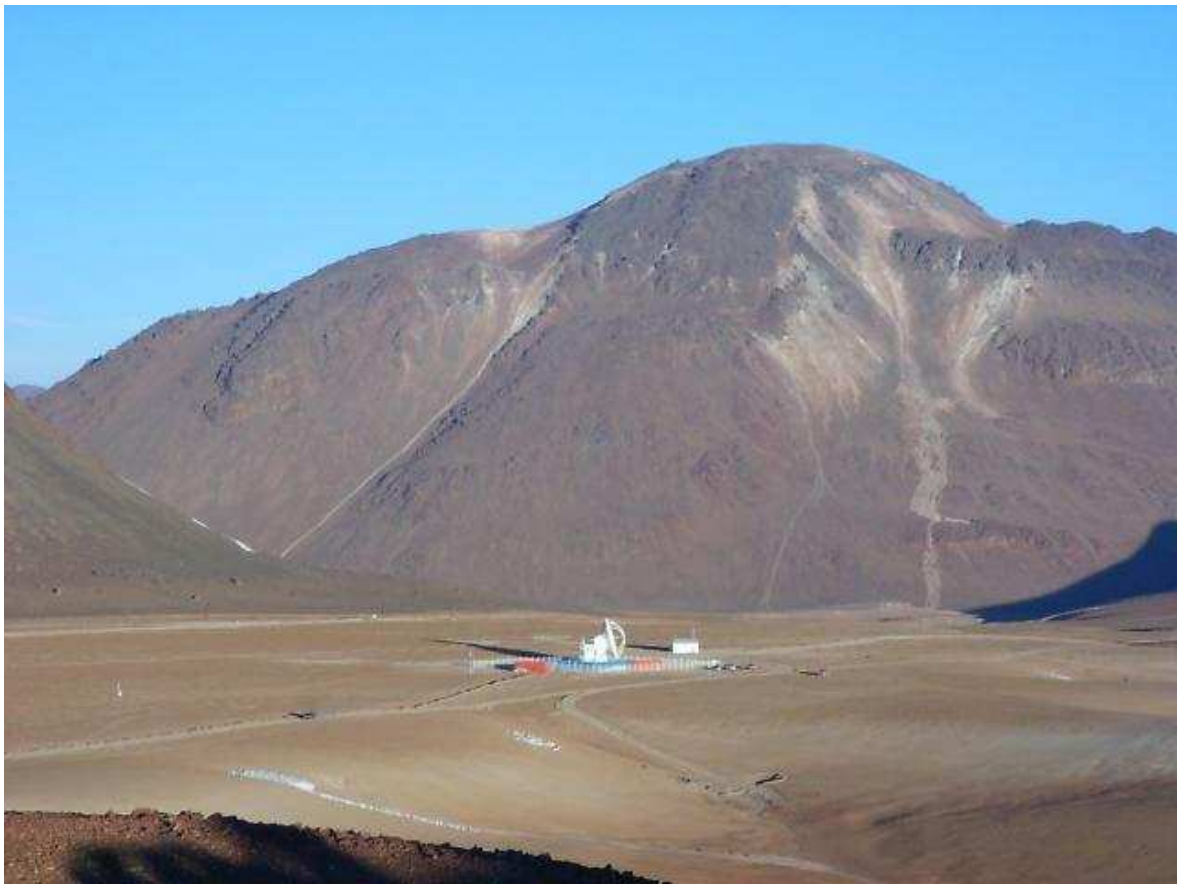


Figure 14: The APEX dish at Chajnantor.

The most important item during 2003 was the securing of the necessary agreements in Chile to proceed with ALMA. The first one was a 'supplementary agreement' between ESO and Chile to get overall approval to build ALMA and to get access to the land at Chajnantor. This was critical as it required ratification by the Chilean parliament and there was always the possibility of demands by fractions of Chilean astronomers that would hold it up. It was important to get this done before the southern summer started so that ground work could start in 2003 and not be delayed by a year. Fortunately, due to the efforts of Daniel Hofstadt and others, the Chilean parliament unanimously ratified on time (but only just) on June 4, 2003. There were further agreements with Region II and CONICYT[23]. Both would receive support of various kinds from the project.

These issues were important items during the second meeting of the ALMA Board on May 26 and 27, 2003 at ESO in Garching. It was preceded by a meeting of the European ALMA Board at ESO on May 12. Other items discussed were the reports from the ALMA advisory bodies AMAC (ALMA Management Advisory Committee) and ASAC (ALMA Scientific Advisory Committee). AMAC concentrated on the process of antenna procurement, generally supporting the approach chosen. ASAC concentrated on the desirability of having a single antenna design. There was also progress in the negotiations with Japan, but I will discuss this issue in a separate section below.

A curious incident occurred. Meetings at ESO are usually recorded on (audio)tape in order to help later with the preparation of the minutes. This has proven very helpful in finding

[23]CONICYT stands for Comisión Nacional de Investigación Científica y Tecnolígica.

out precisely what has been said. There is a microphone in front of each person where you have to press a button when you speak. I asked at the start of the meeting that everyone use these buttons in order to be better understood by everyone else and for the recording. The next morning Riccardo Giacconi objected to recording the meeting as this was unlawful; people should not be confronted with recording later when they were not aware that these are being taken. I was very surprised since Riccardo of course had been Director General of ESO and knows the habit very well. So I objected to him and reminded him of my statement at the start of the meeting. I explained the purpose and the practise that the tapes are destroyed when the minutes are adopted. With this promise we did continue with the recording.

5. The Science Strategy Working Group and the Extremely Large Telescope

My first meeting of ESO Council as President was a Committee of Council meeting in Chile in March of 2003. The idea was to have a discussion on how to proceed further with ESO on a longer timescale, now that the accession of the UK was accomplished and ALMA decided. In addition Council members had the possibility to visit Paranal and see the VLT and VLTI, and to go to Chajnantor. I chose to go only to Paranal, since I had been at Chajnantor and would go there again in November with the ALMA Board for the groundbreaking ceremony. The meeting of Committee of Council itself took place in Antofagasta. The evening before the meeting we had a dinner which was attended by the 'intendente', the political head of the Region II, the 'province' in which Antofagasta, but also Paranal and Chajnantor are located. I was sitting on a table with him, Catherine and a few others and everybody was speaking Spanish.

After the Council had its meeting in the hotel in Antofagasta most of the Council members visited Paranal, where I gave a speech in the evening to the personnel, which was translated into Spanish sentence for sentence. From there I returned early to Santiago to meet the Dutch ambassador in Chile. ESO is formally represented in Chile at diplomatic levels by the ambassador of the country of which the President of Council is a citizen. That meant that this would be for the next three years (if I were re-elected) the Dutch ambassador, Mr. Hinkinus Nijenhuis. We were in the process of obtaining the relevant agreements with various authorities to proceed with ALMA at Chajnantor and might very well need his help. We had a extremely good dinner at Hinkinus' residence in Santiago, together with Catherine and Daniel Hofstadt. Daniel had been in Chile for a very long time working for ESO, at that time as the formal and senior representative of ESO in Chile and in that position heavily involved in getting the ALMA agreements negotiated and approved. It turned out that Hinkinus and I were raised in the same town in the Netherlands (Schiedam), although we did not go to the same secondary school (he studied at a similar high-school as I, but in the next town Vlaardingen). Hinkinus was a geologist by training and therefore an exception among ambassadors who usually come from law school.

We discussed in the Committee of Council in Antofagasta various issues at what I felt was a rather relaxed meeting, in particular how to deal with the scientific priorities for ESO. I announced when I summed up the discussions that I would propose a Working Group be set up by Council at its next formal meeting, advising on issues related to long-term strategies for ESO. This was indeed what I did at the next meeting of Council (June 10 and 11, 2003 in Garching[24]). I asked Ralf Benders to chair the Working Group, which he agreed to do, proposed a few astronomical members from Council, the chairman of the Science Technical Committee (STC), a few other members of the STC and a few people from the senior ESO staff. Catherine was not a member, but she was invited to all meetings of the Working Group. I asked the Working Group to give a first report at the next meeting of Committee of Council in October 2003 for a general and preliminary discussion. Separately the Executive would start preparing an update of the Long Range Plan, which would then cover the period 2003 to 2008.

A main purpose for the Working Group was to examine the scientific balance between the various options ESO had[25]. On the one hand it was clear that VLTI would need large amounts of funding over the next years and that La Silla was also still consuming a significant part of the ESO budget. But for the UK involvement in the next generation of optical telescopes, an Extremely Large Telescope or ELT, was a major drive behind their joining ESO. After all, they

[24] Actually this was the 100th meeting of Council, but we decided that we had more important things to do than set up a special celebration of this landmark.

[25] The official charge of the Working Group was to *"prepare and assess options for ESO's long term program, taking a broad view of ESO's role in world astronomy [...]. In doing so, the Group shall consider ESO's long term scientific goals and objectives. To this end, current and future developments and the possible implications of further external collaborations and enlarged membership may also be considered".*

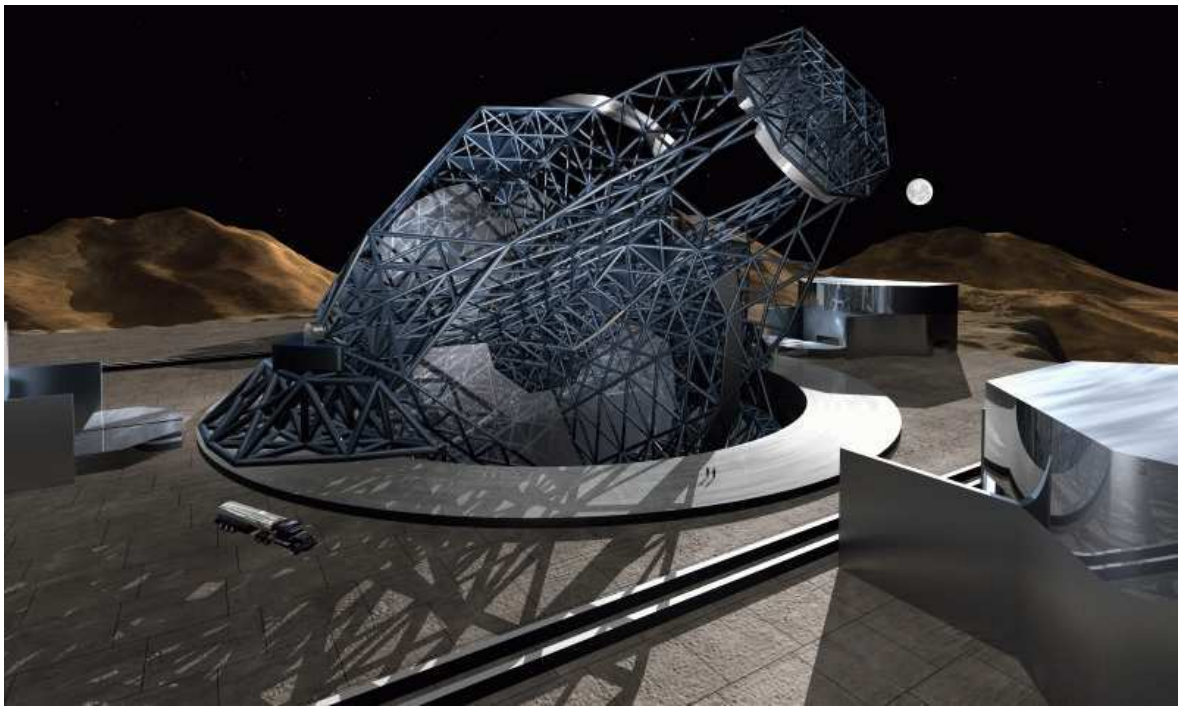


Figure 15: The OWL 100-meter concept for an Extremely Large Telescope.

already did have the funding for a share in ALMA, but were concerned to get into a situation where they were not playing an important part in an ELT. ESO did have a design study for a 100-meter class ELT, which was called OWL (originally standing for Overwhelmingly Large Telescope, but later so-named for sharp night vision) and which did have an official status within ESO. Pressing ahead with an ELT might involve curtailing VLTI and closing La Silla.

In fact there was a small committee investigating the future of La Silla and at the June 2003 meeting of Council a report, entitled 'La Silla 2006+' was discussed. This committee had important representation from member states that were still major users of La Silla rather than the VLT, such as Switzerland and Belgium. There was major pressure from these countries to keep La Silla open, at least for the major telescopes, well beyond 2006. In the end Council did not endorse the report and asked the Executive to develop plans to economize the operations at La Silla and keep at least the 3.6-meter and NTT operational (and maybe the 2.2-meter as well, if the owner –the Max Planck Gesellschaft, which gets half the time– would continue it). In the end Catherine joined the operations of Paranal and La Silla into a single division and the cost of the joined operation is indeed significantly less than that of the two observatories added together.

The next meeting of Committee of Council, scheduled for October 6, 2003, could not be held in Garching because of the Oktoberfest; there were absolutely no hotel rooms available anywhere near München. The French delegation invited us to Paris to meet in the famous old building of the 'Observatoire de Paris'. This started a tradition that I have kept up. I turned the meeting of the Committee of Council into a brainstorming meeting of the full Council and have kept it as much as possible away from Garching. Also I made it the routine to start it in the afternoon and run until a little after lunch the next day. Since no decisions can be taken it really is a good means of finding some time to reflect on issues without the pressure of having to do business and arrive at decisions.

The meeting in Paris was mostly dedicated to future scientific priorities, which was a clear

Figure 16: The ESO headquarters in Garching bei München in Germany.

break with past procedures and it did not immediately work for the non-astronomy Council delegates. Not only was science usually discussed very little in Council, also the scientific priorities were not much a matter that the diplomatic members were interested to consider. They were used to leave that to the scientists. The preliminary report by the Working Group therefore was much too detailed and I asked the chair to reconvene his group and come up with a more general report with a resolution that we could vote on. It was agreed that this would be for further discussion for the meeting of Council in December.

At that meeting, held on December 9 and 10, 2003, however there was still much discussion about detail and obviously Council was not at all ready to vote on a resolution. Also the non-astronomy delegates were not very happy to discuss science which they felt was not within their competence and should not be part of extensive deliberations of Council, leaving that to the STC. Furthermore, the future of La Silla was mentioned prominently in the draft report and the suggestion to economize as much as possible on that observatory did not get much support from some member states. But, since I did get a feeling from the meeting that there was at least consensus on the important issue of ESO participation in an Extremely Large Telescope, I took the opportunity to get Council to record in the minutes that participation in an ELT at a leading level was the next priority for ESO after ALMA. This was supported and duly recorded[26]. I felt it was an important accomplishment to have this formally accepted and constituted a major step forward.

During the first half of 2004 the Working Group did not make much progress, probably because of other duties and interests of the chairman. In the September 2004 meeting of Committee of Council in Rome, we agreed that the Working Group would prepare a resolution for the December Council, and it was accepted that that would be the last task of the chairman. After this final effort, Tim de Zeeuw would take over and it would get a new charge related to the committee structure of ESO.

[26]The text in the minutes read : *"There was a consensus that ESO should seek to lead in the development of an ELT on the shortest possible timescale".*

Figure 17: L'Observatoire de Paris; the historic building where the meeting of Committee of Council was held in October 2003

In the end Ralf on behalf of the Working Group presented in December 2004 a draft report and a draft resolution on this issue, which were accepted and approved unanimously. It has featured prominently on the ESO homepage for about a full year and is reproduced as Appendix VII to this report. I regard this as a major accomplishment of Council during my presidency.

Late in 2005 the OWL conceptual study went through a very thorough and detailed review. The results of that were that the team was praised for a successful study showing that technically a 100-meter telescope was feasible. However, doubts were raised about the risks involved in pursuing this design, both on the grounds of technical issues (two segmented mirrors) and particularly the costs. The latter would for a telescope of the size of OWL be at least 1.2 G€, well above what ESO could afford on any reasonable time scale, considering the resources. The panel recommended that ESO concentrate on a smaller size ELT, reducing the complexity and therefore the technical and financial risks.

In the mean time ESO was leading and coordinating a consortium of European astronomical institutions and industrial partners, that performed an ELT design study, financed for a large part by the European Commission in Framework Program 6. The total budget for this activity was about 30 M€, of which a bit more than 8 M€ was provided by ESO, of course with the consent of Council. The EC contribution was less than expected and the necessary contribution from ESO higher than anticipated, but Council –probably also in view of the resolution adopted– felt it was important to proceed anyway and had given its approval earlier in 2005.

At the end of 2005, and also following the recommendations of the OWL review panel, the Director General proposed that five working groups be created, that would report on a short

time scale. The areas of these working groups were science, telescope design, instruments, site characteristics and adaptive optics. These should be formed out of the European community together with ESO members. The reference point would be a telescope with an aperture of 42 meters diameter. In the course of 2006 these would report and ESO Council would then decide on going ahead with a final design study. This was adopted by Council at the December 2005 meeting. The possibility that Europe would be involved in an ELT on a competitive timescale was very much open. This was another gratifying outcome at the end of my term.

6. ALMA Groundbreaking

On November 3 and 4, 2003 we had the meeting of the ALMA Board in Chile (Santiago) and immediately following that a 'groundbreaking' ceremony on November 6 to mark the official start of the construction of ALMA. The agreement with CONICYT had been signed so there was a formal member from Chile (Leo Bronfman); Japan still had only a few observers. Bob Dickman and I decided that the text in the agreement that Chile could not vote on financial matters needed a wide interpretation (in view also of sensitive matters in the antenna procurement) and that he would be excluded from all sessions where financial matters were discussed.

The meeting in Santiago progressed very satisfactorily in the beginning (we accepted the ALMA logo that was proposed by Massimo as a combination of elements in the NRAO and ESO logo's) until Riccardo Giacconi arrived. Then again arguing started over the selection of the antenna type. The main business was the report from AMAC by its chairman John Credland (John worked for ESA). The most important criticism was the lack of working relations at the top level and the slow implementation of a Project Management & Control System PMCS. The top level management here was the directors (general) of ALMA, NRAO and ESO. The attitudes of AUI were contributing to this also. In the end the directors instituted a monthly telecon and things improved, but it did take a long time to get things going as they should. But also working relations with the regional project managers was not optimal. The problem seemed particularly difficult with the North-American one, Mike Rafal, rather than Dick Kurz from ESO. Mike and Massimo were often at shouting level and I asked Bob outside the meeting to have a close look at relations within NRAO and AUI. In the end Mike resigned from the position (but did stay in NRAO working on ALMA related business).

The PMCS was coming on line much too slowly. This meant that surprisingly little information was available about the project, such as cost estimates and how the progress corresponded to the time schedule. I don't think it was a specific error an someones part, but largely due to the under-staffing of the JAO. We had in the search committee failed to identify viable candidates for the positions of project scientist, manager and engineer, although we did actually interview two candidates for the position of project scientist. We kept headhunting but for the moment remained unsuccessful.

After we concluded the difficult meeting in Santiago we traveled to Calama, where we stayed in a hotel with many more participants to the groundbreaking ceremony, among which ambassadors from countries participating in ALMA, high Chilean officials, etc. The next day we went to see the ALMA site, both the OSF (Operations Support Facility at about 2900 meters altitude)[27] and the actual high site (Array Operations Site or AOS). The OSF is the site from which observations are conducted. Even the antennas will be maintained here after being transported with special transporters (the same as used at the high site to rearrange the array) down along a special road. Afterward we had lunch in the tent that was to be used the next day for the official ceremony. My wife was accompanying me and she did not cope well with the altitude (she already did not feel well during the visit to the high site) and actually briefly needed medical attention after lunch. She received oxygen and some medication to lower her blood pressure. The day ended with a visit to the 'Valley of the Moon', where we watched sunset.

The day of the groundbreaking was a beautiful day. We traveled from Calama to the site of the OSF, where many people were gathered. There were first interviews outside for various Chilean television channels. My English was translated on the fly into Spanish, the translator listening to me, translating and saying the Spanish text all at the same time. Very impressive to find that people exist that can do this.

[27] This altitude just below 3000 meters is such that Chilean labor law does not require any extra allowances for working at high altitude.

Figure 18: The day before the groundbreaking we visited the ALMA high site at 5000 meters altitude. Here I am near to where the center of the array will be located with my wife Corry. The bottles we are carrying contain oxygen.

After that we gathered in the tent, where a number of speeches were held by representatives from Chile (the intendente of the Second Region and the mayor of San Pedro), of the participating organizations (Catherine Cesarsky and myself on behalf of Europe and Wayne VanCitters, Riccardo Giacconi and Fred Lo on behalf of North-America) and of the ALMA project (Massimo Tarenghi). My speech is reproduced in Appendix V. We then proceeded to do the actual groundbreaking, which consisted of digging a small hole in the ground (which was loosened to make this possible) by Massimo Tarenghi, Wayne VanCitters and myself and the placing of a symbol.[28] This has in the mean time disappeared. Then we had a good meal in the tent and returned to Calama and flew back to Santiago. Corry and I spend a nice few days relaxing at the beach in Zapallar, which was suggested to us by Hinkinus, a beach resort a few hours driving north of Santiago.

[28]See Appendix IV for the press release about the groundbreaking.

Figure 19: Top: The flags of all countries participating in ALMA at the occasion of the 'groundbreaking' in November 2003. This and further pictures of the ceremony are taken at the site of the 'Operations Support Facility' at about 2900 meters altitude. Bottom: People gathering near the tent where the official speeches were delivered.

Figure 20: Top: Interview for Chilean television. Bottom: The speakers at the ALMA groundbreaking ceremony. On top from left to right: Jorge Molina – Intendente of the Region II, Sandra Berna – Mayor of the San Pedro, Catherine Cesarsky – ESO Director General, Wayne VanCitters – Director, Astronomical Sciences Division, NSF, and Fred K. Y. Lo – NRAO Director. At the bottom: Riccardo Giacconi – AUI President, Massimo Tarenghi – ALMA Director and Obispo Guillermo Vera – Bishop of Calama. The picture of myself during my speech is in Appendix V.

Figure 21: Top: From the site of the OSF there is a good view of the Andes. The volcano in the background is called Licancabur; its peak is at 5916 meter altitude and is located at the border between Chile and Bolivia. Bottom: The actual groundbreaking. From left to right: Myself representing ESO, Dr. Wayne VanCitters from the US National Science Foundation and Prof. Massimo Tarenghi, director of ALMA, and three Chilean assistants.

7. The accession of Finland

Already for some time Finland had expressed interest to join ESO. Finnish astronomy was already of good quality; they participated in the Nordic Optical Telescope with the other Scandinavian countries on La Palma and in radio astronomy they were part of the European VLBI[29] Network. And of course, Finland does have quite developed industry, especially in electronics (Nokia). The Fins had in the process leading up to a formal request to join ESO had an external visiting committee that actually recommended this.

After their formal approach Council requested a review of Finnish astronomy, which was duly provided from the documents for and the report of the visiting committee. Council did request a statement of why they wanted to join and why it was beneficial to them but also why to ESO. This arrived fairly soon. In May 1999 Council had already appointed a Negotiating Team, consisting of the President of Council, the Director General and the Head of Administration, but no actual negotiations had taken place in early 2002. Then in a meeting of Committee of Council in March the Negotiating Team was extended with myself (as Vice-president of Council and ESO-chair of an In-Kind Working Group that was foreseen) to talk with them further. We did so in Garching in June of that year. It appeared that it was not clear to them what an in-kind contribution to the special contribution constituted and felt that at least half of their entrance fee (of about 12.5 M€) would be reasonable. We did not hear from them until early in 2003.

A meeting took place eventually in April 2003, again in Garching. The Finnish delegation had a surprising composition; it were actually persons that expected to be briefed by ESO on the projects they would supervise as part of the in-kind contribution. By that time I was President of Council, so I chaired the ESO delegation and explained again in great detail the principles behind in-kind contributions. Catherine actually suggested that Finland provide a desalination plant so that water from the ocean could be used at Paranal. Now every day a few trucks are bringing fresh water to Paranal, where an enormous stock has to be kept, not only for use but as a safety measure in the case of a fire. This is very expensive. The ocean is not very far away (only 12 km in a straight line) and in principle water from the ocean could be desalinated and then pumped up to the Observatory. In the end this was not attractive to Finland and the whole concept is so much of an investment that it has still not been possible to realize.

The delegation went back to Finland, but in May 2003 the Finnish minister of Science and Education wrote to express interest to join ESO by July 1, 2004. and confirmed that in another letter in November 2003. Now it was serious and we went with our small committee (Catherine, Fernando, Ian and myself) to Helsinki on November 27, 2003 to conclude the negotiations. We had not been able in our preparation for this meeting to identify in-kind projects that could be usefully discussed except for a relatively small software contribution, similar to the one we had agreed with the UK.

The meeting did not take very much time. We did quickly agree on the software project (the development of a distributed data analysis system for extensive astronomical data) and valued it at 2.5 M€ at 2004 prices. The problem was the rest of the special contribution. They were claiming that Finland was poor and did not have much high-tech industry, which caused us to smile. Also they were concerned that the remaining 10 M€ or so could be found in time. We contemplated a payment schedule in three parts between 2004 and 2006. The Finnish delegation (chaired by a charming lady, Mirja Arajärvi from the Finnish Ministry) at a particular stage started talking for a number of minutes among themselves in Finnish. Suddenly Mirja looked

[29]Very Long Baseline Interferometry, which combines observations from radio telescopes over large distances to achieve unprecedented angular resolution.

at me and said that Finland accepted and was prepared to pay the remaining entrance fee in a single installment, if it were done in 2005.

We were surprised that suddenly there was no further negotiating to be done, but of course we had no reason to do anything but accept. The special contribution after allowing for the in-kind contribution was agreed at 10.353 M€ in 2004 prices and they would pay it in 2005. With that we went to have lunch. In the afternoon we were taken to the Helsinki Technical University, which has a campus of a large number of beautifully designed and rather new buildings. It was presented as one of the largest concentrations of high-tech laboratories in Europe[30]. The University aims at (and, I hear, is or at least is getting close to) being in the top ten technical universities in Europe.

The necessary resolutions came before Council in the meeting in Garching on December 9 and 10, 2003. The discussions were not very difficult. However, the French delegation was not mandated again on a possible vote; they even stated that the matter of the Finnish contributions being additional to the current budget needed more discussion in France. There also was some discussion on how to calculate the contributions of 2005 and 2006 in view of the compromise reached at the time of the accession of the UK. I explained that I felt that we should not try to change this now and simply keep the Finnish contribution additional so the present ones, which would leave the contributions as they would have been without Finland. We would be starting negotiations with Spain soon and this whole matter had to addressed in 2005 when we expected to conclude negotiations with Spain[31]. In any case this important and sensitive issue needed more attention in general and would have to be dealt with separately and extensively (see below). In this respect there also was a threat by France and the UK (that was already stated in the Committee of Council meeting in Paris) that a way of weighted voting in Council needed to be considered before major new member states (read Spain) were being allowed to join ESO. Fortunately no country seemed willing to use the Finland accession as a way of forcing this issue, but is was a serious matter for the future. I solved the issue of the level of contributions for the moment by the appointment of another Working Group that would report on this matter (see also below).

Council decided in the end that this would be the way to proceed and Ian would prepare an explanatory note for discussions in the member states and in Finance Committee. Then Council would convene for an extraordinary meeting at the end of January 2004 to vote on the matter. Indeed this meeting took place on January 30, 2004. A problem developed when we heard that the only Danish delegate that was planning to attend (Henrik Grage) was getting delayed by weather in Copenhagen and decided after a while that there was no point in trying to reach Garching. Of course, his presence was essential, as the resolution on the accession had to be adopted unanimously. I was afraid that if we allowed him to participate by phone, some delegations might claim that the credentials of Denmark were not in order and the vote illegal. The solution I adopted, was that he cast the Danish vote by phone and send us a written confirmation of this afterward.

In the end both resolutions (one on the actual accession and its conditions and one on the contribution in 2004 and the fact that all contributions were additional to the current budget) were adopted unanimously and Finland would join by July 1, 2004.

On February 9, 2004 in Garching, the Finnish Minister of Education and Science, Ms. Tuula Haatainen and Catherine Cesarsky, signed the agreement and after parliamentary ratification

[30]This caused me to whisper to Ian, who was standing next to me that this was a bit in contradiction to the statement on the lack of high-tech industry in Finland that we had heard that morning.

[31]The negotiations were due to start early in 2004 and Council actually appointed a Negotiating Team for Spain and an In-Kind Working Group.

Finland indeed joined ESO on the agreed date. In Appendix VI the press release on the signing ceremony is reproduced. The Minister, Catherine and I gave speeches and we toasted champagne and had an excellent lunch. The accession of Finland had been accomplished without much problems, but the discussions in Council on the effects of new member states on the relative contributions and on the voting procedures showed that before we could contemplate to approve an accession of Spain still much work needed to be done.

8. Japan and ALMA

Although Japan failed to secure funds to participate in ALMA at the time of the signing of the bilateral agreement between North-America and Europe, there still was an association and Japanese astronomers were hopeful they could soon join the project. Already at the first ALMA Board meeting in Washington there were two Japanese observers (Masato Ishigura and Tetsuo Hasagawa) and we did have a telecon with the director of the National Astronomical Observatory of Japan (NOAJ), Norio Kaifu. Bob Dickman headed the bilateral delegation, which consisted of the chair and vice-chair of the Board (myself and Bob Dickman) and representatives from the executives (Catherine Cesarsky and Riccardo Giacconi, although Fred Lo was mostly in attendance even though he was only alternate member of the Board for Riccardo). Not much was accomplished except exchanging niceties. The same happened in a telecon, which I chaired from Leiden a few weeks later. I had difficulty understanding the Japanese and at the next Board telecon I suggested that Bob Dickman take over as head of our Negotiating Team.

The greatest step forward was taken at a face-to-face meeting of the Negotiating Team with the Japanese, which took place at Schiphol Amsterdam Airport on May 8, 2003. The contribution to ALMA that Japan proposed consisted of three elements that were seen as important enhancements to the bilateral project. The first and most important of these was a 'Compact Array' consisting of twelve 7-meter and four 12-meter antennas. The 7-meter antennas form a small array measuring the signals of sources in the sky at small separations. This is important, since it provides the large angular structure and therefore is needed to derive the full flux from an extended source and the large-scale component of the structure. The four 12-meter antennas are to be used simply to measure the total power in order to find the total amount of emission (so-called 'zero spacing' or 'total power').

The second contribution from Japan would be three more frequency bands on both the Compact Array and the full 64-antenna array. The bilateral project had had to cut for reasons of funding the original plan of ten frequency bands back to four. The Compact Array would of course be outfitted with the same frequency bands as the bilateral ALMA. With the Japanese contribution the 'Enhanced ALMA' would both have provisions to measure short and zero baselines and have seven of the original ten frequency bands. The Japanese contribution would involve the so-called Band 10, which would be the highest frequency for ALMA; however the technical expertise for this frequency was still mostly to be developed. In addition, Japan would provide receivers for the Compact Array in the four bands of the full (bi-lateral) array.

The final contribution was a correlator[32] for the Compact Array based on a new concept. This was contentious, since the concept was also developed outside Japan and it might not work; and if it worked Japan would have an advantage in the selection of who would build a second generation correlator for ALMA. It would be much easier and cheaper to simple extend the current ALMA correlator to cope with the Japanese antennas.

It was agreed that the Japanese contributions would be 'valued'; that is a value for each component would be agreed that it would have costed had the bilateral partners built it. That was of course not favorable for Japan in some cases, in particular for the case of the correlator if they would stick with their concept. The outcome of the values would then determine the Japanese share of observing time, which would be somewhere around 25%.

The other principles were that Japan would construct their contribution without increasing the cost or the timescale of the bilateral project and would take upon them a share of the operations that was equal to what was required in addition to the bilateral project. This could be a larger fraction than the share in the observing time. And Japan would provide a cash contribution for the costs made by the bilateral project that were profitable to Japan but not

[32]The electronics that actually bring the signals from the various antennas together.

Figure 22: The logo at the Japanese homepage of ALMA (http://www.nro.nao.ac.jp/alma/E/)

covered by the valued contributions.

The interaction with the Japanese was not simple. Their documentation was not easily accessible to Massimo and the ALMA staff, since it was mostly in Japanese and often not made public. They did get along reasonably well at an 'ALMA week' of technical people in Victoria later in May. But the values did deviate between Massimo's estimates and the Japanese claims. In the end the agreement was to value the Japanese correlator as if it were an extension (an additional quarter) of the bilateral correlator.

At the Schiphol meeting it was agreed that Bob, Massimo and I would visit Tokyo and meet with official(s) from MEXT, the body that would fund the Japanese ALMA construction. This might help the Japanese to get the enhanced ALMA funded and would reassure the higher officials in Japan that it was still very welcome to join the project. In the end Massimo was not able to go and Bob and I visited Tokyo on June 30. I went for only one day, arriving in the morning and returning the next morning. The Japanese were very concerned that I would arrive delayed for the talks (we saw their laboratories before we were meeting with a person from MEXT) and Tetsuo actually met me at the airport to ensure that I got to Tokyo itself without any delay. The meeting with the official went well and we ensured him that we would do all we could to make it possible for Japan to join ALMA. The Japanese told us they were about to submit a proposal to MEXT. MEXT seemed confident ALMA-J (as the enhancement was sometimes called) would be funded. The visit produced another worry and that was the Japanese insistence on developing a hybrid local oscillator[33] that would work independently of the planned local oscillator for bilateral ALMA. The recurring problem with negotiations with the Japanese was that at every meeting they seemed to have forgotten (or for some reason acted like that) what was concluded at the previous meeting, so that you did get the feeling of having to start all over again every time.

During August 2003 the Japanese proposal was included in the request of MEXT to the Japanese government for funding in their FY2004 budget. They expected in the end to be funded at a level of 260 M$. The advising body to the government (Committee on Science and Technology Policy), accepted it as a national project that should be completed as soon as possible. Funding indeed was granted in the FY2004 budget in Japan with actual funds becoming available starting April 2004.

In the mean time the cash contribution of Japan was discussed in terms of the delivery of a

[33]A local oscillator is a device that generates a signal which is mixed with the signal from the telescope to be transform it to a lower frequency for further detection. It is an important standard against which all measurements are calibrated.

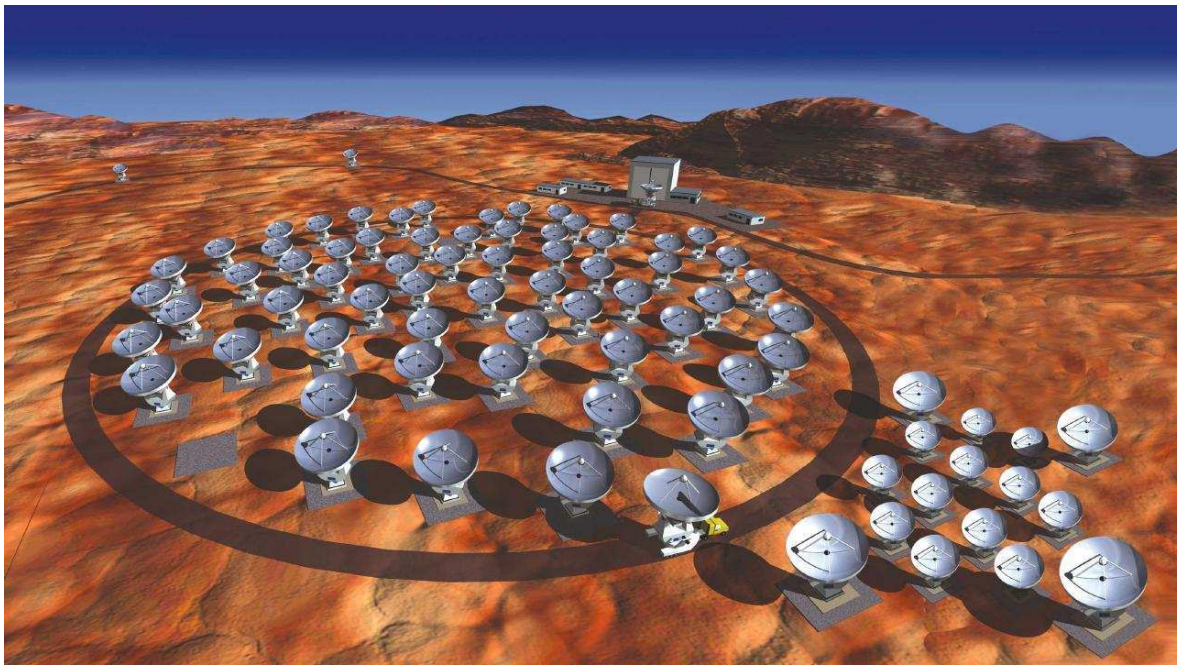


Figure 23: Japanese animation of ALMA with the Compact Array added.

power plant. This was not included in the construction funding, since it was agreed that this had to be paid out of an operation budget. In the US the two are strictly separated (but not of course for ESO) and it was expected that NSF would get their part funded there. The ALMA Negotiating Team as a whole would go to Tokyo to work out the further details of the ALMA-J contributions and the manner to integrate Japan in the project. This actually took place on February 25 and 26, 2004. It was a difficult and memorable meeting.

During the first day everything seemed to go fine and the Japanese seemed to accept our demands, but we were never sure about what was really happening. During the second day the whole thing broke down. They completely failed to give us the confidence that they could deliver on the schedule planned, nor that they had the budget, the manpower and the experience and knowledge available. For example, they seemed to have only one professor and a few junior people available to develop the techniques for Band 10. We felt that going along now with an integrated approach would be too great a risk to the project.

The Japanese were feeling insulted by this. Senior people that attended clearly felt that Japanese honor required that we trust them. We had lunch at separate tables. In the afternoon we did hold our position and the meeting ended with our suggestion that we sign an agreement in which we would do construction separately but with the aim to integrate the resulting contributions into a single observatory. That left the basic principles of a joint ALMA observatory unchanged and was in the end accepted. But for the moment it was a collaboration and not a partnership.

An agreement between NINS (similar to what MEXT was after a reorganization of structures in Japan) and bilateral ALMA was drawn up and approved by the various parties (NINS, NSF and ESO) and signed (at a number of dates each partner signed; ESO Council agreed it in written procedure). The final signature was that of the President of NINS on September 14, 2004. The agreement had no binding financial implications and was needed for Japan in order to place contracts. It stipulated that a final agreement (in the form of an amendment) be signed by the end of the year on the construction phase and one year later on the joint operations. These

dates have slipped since and the agreement has been amended with the date of the amendment to the agreement changed into June 30, 2006. The provisional values included a cash contribution of 15 million Y2k US$ to the Common Infrastructure Fund. On band 10 the only statement was that it was in an R&D phase and would only be taken in production after ALMA Board approval and be valued later.

Since the agreement Japan has a formal Board member. This was the director of NAOJ, Norio Kaifu. He would have no vote on financial issues in the bilateral project. This is similar to the Chilean member, who we actually excluded from all discussions on issues with financial implications. We did the same thing initially at the Board meeting on November 2 and 3, 2004 with Norio, but he seemed very unhappy and after Bob and I conferred on it we let him in on all meetings (not giving him any voting rights of course).

At the end of my term as President of Council and (vice-)chair of the ALMA Board very little had developed. The Japanese have ordered at least three of the four 12-meter antennas; the fourth one will be the dish erected at the VLA site and will be transported to Chile and refurbished.

There still is a major uncertainty over the joint project, having to do with the fact that in the mean time the bilateral project has dropped from a 64-antenna ALMA to a 50-element one. The principle of the value might result now in an increase in the Japanese share of the observing time, since their contribution to the whole is now a larger fraction of the completed facility and the Compact Array a larger fraction of the actual total number of antennas. It does not help to revalue the antennas of course since the value of theirs will go up as well.

9. Visiting Committee and committee structure.

Every few years ESO invites a Visiting committee of people of stature to give an outside evaluation of ESO. There had been one in 2000/2001 under the chairmanship of Jeremy Mould who reported at the Porto Council meeting of June 2001. The next Visiting Committee would be reporting at the June 2004 meeting of Council and during 2003 we had to think of a composition of the committee. Catherine suggested when the time came to ask Bob Williams, the previous director of the Space Telescope Science Institute[34] STScI in Baltimore as chairman. That was an excellent suggestion. I knew Bob from the time I (and also Catherine) had been part of the Visiting Committee of STScI, when Bob was director.

One curious thing was that when I got to see the charge that the previous Visiting Committee had had, I noted that it actually reported to the Director General, while I really felt that such a committee should report to Council. Catherine was not fully in agreement with this and I brought it up in Council, where the delegates generally agreed with my point of view. In the end the text of the charge mentioned that the Visiting Committee would report to both Council and the DG. In a sense that is a good compromise, as we planned to ask Catherine later to comment on all things the Visiting Committee had made statements and recommendations on (at least the ones that needed action from her; leaving things that were really not matters for the DG to Council).

The standard charge had of course things like asking the Visiting Committee to comment on the performance of ESO, future planning, etc. But there are usually also a few things in a charge of a specific nature that Council felt were important to have advice on from an independent outside viewpoint. The most important one here was the matter of the representation on ESO committees. Longstanding committees are the Finance Committee (FC), the Science Technical Committee (STC) and the Observing Programmes Committee (OPC). Recently the European ALMA Board had been added to these. And in Council I had appointed the Science Strategy Working Group that was extending its scope beyond the limited aim of the discussions leading up to the Council resolution on long-term strategy that has already been discussed.

The Finance Committee has a single representative from each member state and that works well. Of course the FC is important in that it awards contracts and advises Council on financial matters. It is necessary that each member state has a say and a vote in that body. The OPC also had been developing from a committee with a delegate from each country to a committee that worked with panels to decrease the workload of the individual national delegates. In fact it is now modeled mostly on such other committees such as in particular the Time Assigning Committee for Hubble Space Telescope. It still had national delegates, but the DG did appoint (in consultation and consent with the OPC chair, who is appointed by Council) a large number of 'members at large' for the panels (and chairs thereof) and the final committee. This assured the availability of all the necessary expertise. It was not obvious that this principle of having national delegates was still necessary or even desirable.

I have myself been the OPC delegate from the Netherlands for five years from 1983 to 1987, meeting twice a year together with the other 7 persons from the other member states plus one astronomer from ESO. We reviewed more than 350 proposals each time. In the beginning the workload was not too large[35], but during my regular term it was of the order of three or four

[34] Actually Bob still was and is associated with STScI.

[35] I have been the alternate member for the Netherlands in the five years preceding my term as member and actually once attended a meeting of the OPC in May 1978 in Aarhus, Denmark. It lasted for three days and the committee mover at slow speed, discussing each proposal in some detail. The French member (G. Wlérick; he had done early work on quasars) usually spoke French (many proposals were written in French), except when he was defending a French proposal that he was very keen to receive telescope time. I did upset the committee by giving a poor evaluation of the only Danish proposal for the new 3.6-meter telescope on abundance gradients in elliptical galaxies. It did get time anyway (the OPC really advises the DG, who was then Lo Woltjer) since

Figure 24: The entrance to the ESO Guesthouse in Santiago.

working weeks per year. Each member read and graded about a third of the proposals and only those were discussed during the two-day meeting that had a large discrepancy between the preliminary grades. When the SEST (Swedish - ESO Sub-millimeter Telescope) arrived at La Silla and Lo Woltjer (the DG at the time) added a few astronomers with millimeter astronomy expertise.

The STC has one member per member state. Since it advises on technical matters (mostly) it does consist of astronomers experienced in instruments or instrument building. But here comes the problem of conflicts of interest when for example the choice of proposed instruments, as for the VLT, comes up and when Principal Investigators or Co-investigators on proposals are delegates to the STC. This by the way is not restricted to the STC and instrument PI's have been delegates to Council. This can be handled by leaving the person involved outside the room when the instrument for which they are competing is being discussed, but there is an obvious advantage in being close to the action.[36]

Denmark needed to get its share.

[36]The other side of the coin is that the most knowledgeable persons are often also the ones with conflicts of interest. Leaving those out of such committee results in committees with less expertise and sometimes even deprived of that entirely. I was once on a committee for the European Commission that advises on award of grant proposals. A diplomat came in one day and stated that we as members from now on where not allowed anymore to propose ourselves. He said that the committee had been too self-serving, the members having been rather success full. We explained that of course a good committee has good people that write good proposals. Actually the data were not carefully examined and conclusions drawn too quickly; they had found for example that I had a proposal awarded, but that was before I joined the committee! After we threatened to resign *en masse*, the rule

Figure 25: The courtyard in the back of the ESO Guesthouse.

In some countries there was concern with the proceedings in particular concerning the STC, especially the UK. I had noted the problems myself also and we wrote a charge for the Visiting Committee to comment and advise on the issue.

The committee visited the ESO sites in Chile and Garching and talked to a large number of people. I had a session with them also in Garching in January 2004. I stressed that I wanted from them a recommendation on the committee structure as clear as possible, especially the matter of each country being represented at the STC and OPC. I preferred committees with expertise as the most important qualification and not nationality.

Their report was sent in March and Bob Williams presented it to Council at its meeting of June 7, 2004. In general they gave a highly favorable report, also stressing the importance of the DG and her accomplishments as stimulator to the staff. They commented on many items, such as the projects and the fact that the building in Garching urgently needs to be extended. As to the projects, they warned that ALMA needs to be watched carefully; it may easily turn out to be more expensive and take longer to complete. Also the staffing is not up to needs. They agreed with the managerial fusion of the La Silla and Paranal operations and the intent to keep the major telescopes at La Silla operational at a reduced funding level. Also the goal and path to a leadership in ELT/OWL was endorsed strongly. Catherine replied to all these things and it was all very useful.

As to committee structure the Visiting Committee made some important statements. First

was abandoned.

Figure 26: The joint living room in the ESO Guesthouse in Santiago.

they were impressed with the outcome of the Science Strategy Working Group, applauded its existence and urged to continue it. Also they felt that there was a duplication between the EAB and the STC, in which it was possible for ALMA to talk to Council bypassing the STC. Most importantly, they commented on the matter of the committee compositions, saying that *"ESO had matured to the point where guaranteed national representation need not be mandated by policy except for the governing Council. The importance of providing for adequate national representation is by now sufficiently understood in the organization that it can be trusted to a process that allows more flexibility in dealing with other factors in the make up of committees"*. That is exactly what was needed.

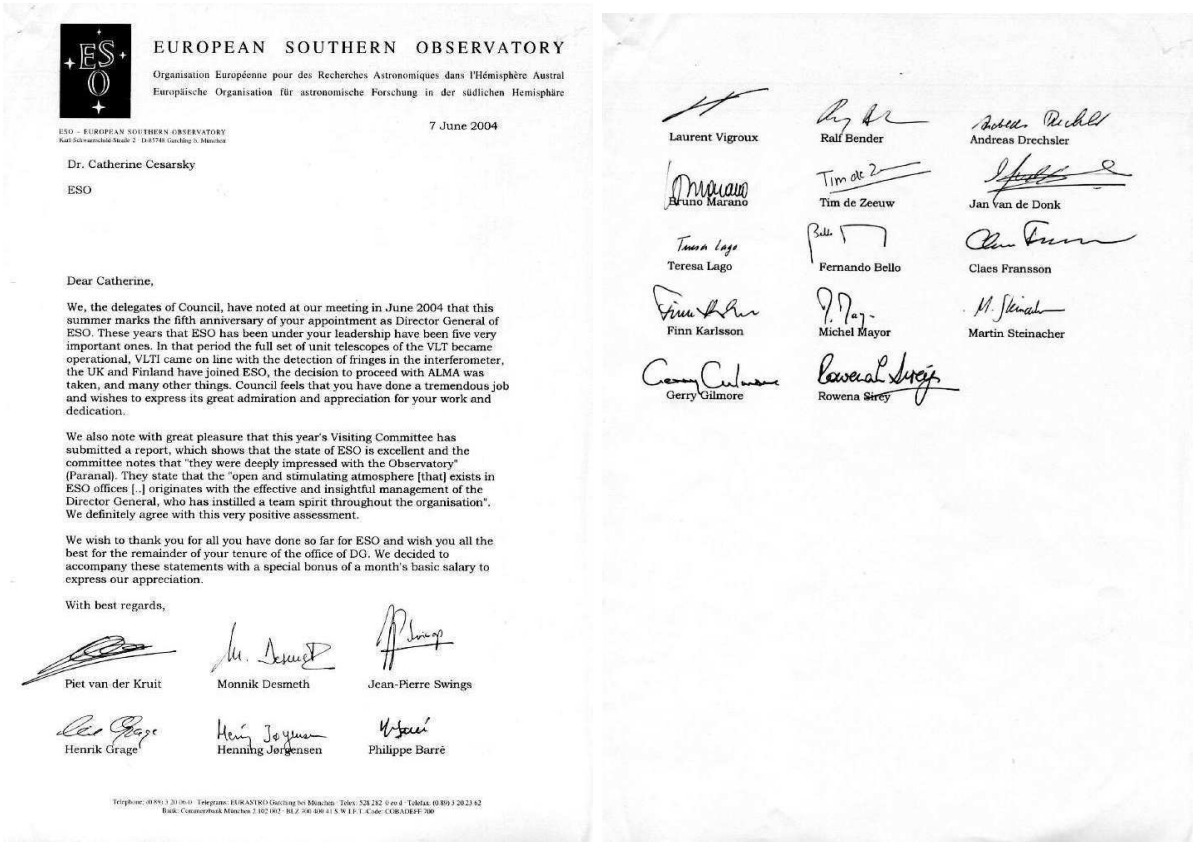
The summer of 2004 marked the fifth anniversary of Catherine's tenure of the office of Director General. I used the opportunity in a very closed session for Council to agree on signing a letter that I had prepared, congratulating her and noting the remarks that the Visiting Committee had made about her performance. I also proposed a bonus (of one months' basic salary) for the occasion. The latter was not immediately agreed by all delegates, some asking what that meant in Euros. I explained that the salary of the Director General was a matter of agreement between the President and him/her and that I felt I should not reveal that. When some still insisted I remarked that as a delegate I would not want to know and that was echoed by a few more delegates and the discussion ended there. We all individually signed the letter, Catherine was asked back in, I read the letter to her and gave it to her. She was very moved indeed.

Figure 27: This is one of the rooms in the Guesthouse; I (and Corry) been given this one a few times while I was President of Council.

At the following meeting of Committee of Council in September 30 and October 1, 2004 in Rome the matter of the recommendation on committee structure and national representation came up again. Of course this was not a matter for the Director General to pick up and we agreed that it should be the next matter to be considered by the Science Strategy Working Group. After all, the Visiting Committee had recommended that it be continued and that generally met with approval. The discussion in Rome did show that some of the smaller countries (in particular Belgium and Switzerland) were not happy with it and some political maneuvering would be required. Ralf Bender indicated that he wished to be relieved of the chairmanship of the Working Group and fortunately Tim de Zeeuw agreed to take over. He was provisionally appointed, awaiting formal confirmation at the Council meeting in December.

It was not an easy matter, but the Working Group did come up with a good set of recommendations. The OPC was large enough (about 50 people when the eight panels are included), such that when all expertises were covered (and recruited worldwide) and when rapid rotation among the membership was enforced, there was hardly a chance that any country was not represented at some level. The selection was to be done by a Nominating Committee of 5 persons (of which at most 3 ESO employees) appointed by the Director General, which advises him/her on the membership from a list solicited from the astronomical community of ESO. Council at the Helsinki meeting of June 6 and 7, 2005 "looked favorably" at the proposal and left it to Catherine to work out the procedures.

The STC was more subtle. The matter of the duplication with the European ALMA Board (EAB) and the European Science Advisory Committee of ALMA (ESAC) was left open for the moment, the STC concentrating first on optical/infrared instrumentation. The recommendation was to appoint a 14 to 16 member STC with a normal term of three years. The selection should



EUROPEAN SOUTHERN OBSERVATORY

Organisation Européenne pour des Recherches Astronomiques dans l'Hémisphère Austral
Europäische Organisation für astronomische Forschung in der südlichen Hemisphäre

ESO – EUROPEAN SOUTHERN OBSERVATORY
Karl-Schwarzschild-Straße 2 · D-85748 Garching b. München

7 June 2004

Dr. Catherine Cesarsky

ESO

Dear Catherine,

We, the delegates of Council, have noted at our meeting in June 2004 that this summer marks the fifth anniversary of your appointment as Director General of ESO. These years that ESO has been under your leadership have been five very important ones. In that period the full set of unit telescopes of the VLT became operational, VLTI came on line with the detection of fringes in the interferometer, the UK and Finland have joined ESO, the decision to proceed with ALMA was taken, and many other things. Council feels that you have done a tremendous job and wishes to express its great admiration and appreciation for your work and dedication.

We also note with great pleasure that this year's Visiting Committee has submitted a report, which shows that the state of ESO is excellent and the committee notes that "they were deeply impressed with the Observatory" (Paranal). They state that the "open and stimulating atmosphere [that] exists in ESO offices [..] originates with the effective and insightful management of the Director General, who has instilled a team spirit throughout the organisation". We definitely agree with this very positive assessment.

We wish to thank you for all you have done so far for ESO and wish you all the best for the remainder of your tenure of the office of DG. We decided to accompany these statements with a special bonus of a month's basic salary to express our appreciation.

With best regards,

Piet van der Kruit
Monnik Desmeth
Jean-Pierre Swings
Henrik Grage
Henning Jørgensen
Philippe Barré

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Jan Van de Donk
Teresa Lago
Fernando Bello
Claes Fransson
Finn Karlsson
Michel Mayor
Martin Steinacher
Gerry Gilmore
Rowena Sirey

Figure 28: Council letter to Catherine on the occasion of her five-year tenure of the office of DG. Italian diplomatic member Vincenzo Dovì was absent.

be done by a five member Nominating Committee, appointed by Council, which will select prospective members from various nominations (by Council, the Executive, STC chair) and propose a membership of the STC to Council to vote on. Of the Nominating Committee no less than two and no more than three of the members should be Council delegates. In the end the terms of reference of the STC were adopted with only one abstention (Switzerland) and the rules of procedure for the Nominating Committee were adopted unanimously.

Finally there was a new set of rules adopted for dealing with conflicts of interests on ESO committees. Tim, as chair of the Working Group, and others have done an excellent job. I am very pleased that all this was accomplished during my term as President of Council.

10. Portugal's delayed payments

We had a serious and unprecedented problem when the end of 2003 approached and Portugal had not paid its contribution (both the annual one of 1.578 M€ and an installment of 0.818 M€ of the entrance fee). Catherine and Ian raised it of course first informally with the Portuguese delegates in Council, Fernando Bello and Teresa Lago, but this was followed by only a token payment of a little over 28 k€ just before Christmas. There was an outstanding amount of about 2.367 M€! The end of the year came and nothing more arrived from Portugal. This had actually as far as we were aware never happened before. Some countries pay late[37] and this can result in a cash-flow problem, but no payment at all was a new phenomenon.

Ian found out that there were similar problems with Portugal in other European organizations, such as CERN. The Financial Rules and Regulations spell out that from January 1 of the next year (2004 in this case) ESO will charge interest, since it has to borrow money for the shortfall. The current rates were 3% per year and this was charged to Portugal. All this was done with a letter from Catherine to the Portuguese Minister of Science and Education (Maria de Graça Carvalho) on January 15, 2004. The convention says that in principle Portugal can be denied access to telescopes or can be denied award of industrial contracts when it fails to meet its obligations.

The situation was discussed in Committee of Council of January 30, 2004. There was no news from Portugal and it was also in doubt that the 2004 contributions (1.635 M€ annual and again 0.818 M€ special contribution) would be paid. There was no precedent to see how to act in such situations. Fernando Bello had nothing to say except that he believed that Portugal would honor its obligations, but could make no statement on the timescale. I did not want to deny access to the telescopes to Portuguese astronomers (a position Teresa really appreciated), but awarding contracts to Portuguese industry might very well be put on hold. I also took the point of view that I felt that Portugal should be deprived of its vote in Council and other ESO bodies. Of course any decision would have to await a formal Council meeting. In the mean time, I suggested that the best way to proceed was to let the Dutch ambassador to Portugal approach the Portuguese authorities. This could be no-one else than the Foreign Minister of Portugal, which is the only point of contact for an ambassador.

This was interesting for us in the Netherlands also. Our Ministry of Foreign Affairs had never had much to do with ESO and the whole thing was completely new to them. Of course they were not aware that during my presidency of Council the Netherlands formally represented ESO at diplomatic levels. Jan van de Donk succeeded in explaining things to our diplomats at the Ministry of Foreign Affairs and indeed a letter from me (drafted as usual by Ian) went through the Dutch embassy in Lisbon to the Portuguese Minister of Foreign Affairs dated March 12. In the mean time Catherine had had a reply to her letter on February 12, but this only acknowledged the situation and stated it would be dealt with.

No payment was still received by the time of the Committee of Council meeting, hosted by the Dutch Minister of Education, Culture and Science in the Hague on April 15 and 16, 2004[38]. Council was very concerned and asked me to keep the pressure up and write again if nothing happened before April 30. I wrote again to the Minister of Foreign Affairs (Teresa Patricio Gouvaie) through the same channel and received a letter back from her on May 30 through the

[37] That year (2003) Italy paid in July, but the others paid early (mostly in February) and all their contributions had been received by April. Italy and Switzerland had initially paid an amount based on preliminary numbers –presumably for internal reasons they need to fix the budget well before the end of the preceding year– and both paid a small correction in August.

[38] Ironically the meeting room at the Ministry where we met, was called the 'Lissabonzaal'.

Figure 29: The Ministry of Education, Culture & Science is located in the 'Hoftoren' near the Central Railway station in the Hague.

Portuguese ambassador in Berlin, saying that she had sent it on to the Minister of Science and Higher Education. But still nothing had happened by the time of the next Council meeting on June 7 and 8, 2004.

I started the meeting by notifying Council that no payment had been received from Portugal (neither for 2003 nor for 2004). The Portuguese delegation announced, acting on written instruction, that Portugal assured Council it would pay. That was not seen as sufficient assurance by me or the rest of Council. And as I had announced in the Hague, I therefore proposed that Council suspend the voting rights of Portugal in all ESO bodies until the contributions for 2003 and 2004 were paid in full. This was accepted unanimously (which was necessary for it to be effected), that is with Portugal included![39]. Ian drafted a letter from me to Minister Carvalho

[39]The actual way I handled it was to ask for votes against and then for abstentions and when no delegation

Figure 30: The Hoftoren consists of two towers. The meeting of Committee of in June 2004 and of the ALMA Board in July 2005 took place in the Lissabonzaal at the top of the tower on the left.

informing her of the suspension of the voting rights and to inform her that I was asked to organize a meeting between her and Catherine and myself in Lisbon. And I announced that Council was next prepared to exclude Portugal from industrial contracts if no payments would be made soon.

The Minister replied on June 17, stating that she perfectly understood the actions of Council, but that administrative procedures for the payments had been started and the contributions for 2003 and 2004 would arrive soon. Catherine wrote to the Portuguese Minister Carvalho on the same day, proposing that she and I visit her in Lisbon in the second week of July. Minister Carvalho replied on June 29 that coming to Lisbon was unnecessary, since the problem had

said anything I concluded that it was adopted unanimously.

Figure 31: The Lissabonzaal at the top of one of the towers of the Hoftoren, where the Dutch Ministry of Education, Culture and Science is located. From this meeting room at the 16th floor one has a beautiful view of the Hague and surroundings.

been solved. Catherine wrote back on July 6, saying that if indeed the payments were made by the end of July there was no urgency in our visit, but maybe she was interested to visit ESO. In her letter in reply, Minister Carvalho notified us that the Minister of Finance had approved the payments and that she would be happy to visit ESO at some later stage, but was not able to come in the near future.

Still payments did not arrive and Catherine, Ian and I in our frequent contacts decided to keep the pressure up. So, on August 6, Catherine wrote again and said that she and I would come to Lisbon well before the next Council meeting (Committee of Council on September 30 and October 1). The date September 17 was suggested and on August 19 the secretary of Catherine called to arrange a meeting with both Ministers (separately) in Lisbon on that date. She was called back immediately by the Head of Cabinet informing us of Minister Carvalho's vacation and her return by September 1. Also he felt that the visit was really not necessary since payment procedures had started and payment was expected before September.

But still nothing happened and Catherine this time directly called the Minister and we were invited to Lisbon to discuss the issue. On September 17 Catherine wrote to accept the

invitation and to suggest the date of November 12. This was accepted by the Minister in a letter on October 4.

Then suddenly on October 14 an amount of a little more then 3.999 M€ appeared in ESO's bank account. Except for 7 € of bank charges and the interest over September and the first two weeks of October (of order 5000 €) that was the full contribution for both 2003 and 2004. Catherine thanked the Minster in a letter on October 18 and on October 26, I informed Council by letter, stating that in my opinion this ended the suspension of the voting rights. For completeness I informed the Dutch Ministries on October 21, thanking them and the ambassador for their help. This ended a bizarre incident.

This whole episode must have been really hard for the Portuguese delegates in Council. I talked with them informally too, but there was of course nothing they could do. Teresa did try to approach the Minister, but apparently could not get even an appointment in first instance. In the end she succeeded and this must have helped considerably. Clearly there was a financial problem in Portugal[40] and maybe relations between finance and research ministries had become far from perfect. I am not aware of how CERN solved all this (I think they also sent letters through an ambassador). But in the end for ESO it all came to a good end.

[40]We joked among ourselves that the organizing of the European soccer championships in 2003 in Portugal was the cause of all this.

11. Voting procedures in Council

The ESO Convention is absolutely clear in stating that for decisions in Council each member state has one vote. This in spite of the fact that the financial contributions are dependent on economic factors, but I will come back to that below. This had never been a problem, but first France (at the Paris Committee of Council meeting, where it was immediately supported by the UK) stated that they would not endorse the accession of major countries to ESO unless some kind of weighted voting (according to the financial contribution) were adopted in Council. Fortunately the UK stated that this threat would not apply to the case of Finland, which at that time was far advanced in the negotiations and France seemed to be implying that this would hold for them as well. Clearly, it was a prelude to discussion with the possibility in mind of a major (in financial sense) country like Spain joining ESO.

In itself this was not really a bad thing. Indeed, it would be undesirable if a group of small countries, representing a minority of the financial input to ESO, could block major decisions in Council. This was at the time not possible, any majority always having to include at least two of the large countries France (about 19.5%), Germany (22.0% by definition in 2004, see below for an explanation), Italy (about 16.5%) or the UK (21.5%), since the smaller countries together only made up for about 20% of the budget. And it was not difficult to see that with Spain among the ESO member states this would be different, since France, Italy and the UK would then constitute a minority (although only just). But it would become even more critical when countries from Eastern Europe were going to join ESO, which was and is a real possibility. Clearly this issue was raised and discussed in Europe at all levels (in particular concerning the representation in the European Parliament and the European Commission in the bargaining over provisions in the European Constitution that was being prepared) and ESO as a relatively small European organization seemed a good testbed for a discussion. So, if we were going to negotiate with Spain (which indeed was imminent) we were having to solve this problem. In the background there was of course the valid point that the whole decision making process in ESO would grind to a halt when the membership would grow to maybe 20 or more nations.

It is of course a political and not an astronomical issue and I felt therefore that the diplomatic delegates to Council were the best to look into this. In the Council meeting of December 2003, I suggested that a Working Group would be formed, consisting of the diplomatic delegate from each of the member states. This was amended such that each member state would be able to nominate one member. I asked the Vice-president, Fernando Bello, to convene the first meeting and have as the first point on the agenda the election of a chairperson. As expected the Working Group did elect Fernando himself, which as Vice-president of Council seemed the natural choice indeed.

It was obvious that it was not an option to change the Convention, since that would involve parliamentary ratification in each member state and would surely either take a long time or simply fail. In the Finance Committee some kind of weighted voting was actually already in force, any decision requiring that the countries voting in favor would represent a majority of at least 55% of the contribution to the budget. It would be impossible of course to adopt such a rule in Council in a formal sense, since it was in contradiction with the Convention, although adhering to it by consensus is not ruled out, and of course nothing prevents such rules from being adopted in other bodies such as the Finance Committee. Of course, the desire to have weighted voting was mostly related to financial issues.

In the end the Working Group met four times, coming up with a solution of the issue for the December 2004 meeting of Council. The full resolution starts with setting out the principle in the preamble, namely that *"no coalition of small countries should be able to outvote two big contributors and there should be no possibility of two big contributors to impose their will on*

the smaller countries". Also *"the organization must be able to work smoothly with these two constraints".*

The procedure adopted then consists of two steps. The first is a rule of procedure in the Finance Committee. Recommendations of the Finance Committee to Council shall be taken by double majority and should be based on a majority (defined below) of the annual financial contributions of the member states for the current year. This in particular applies to the annual budget and all other important recommendations. The financial majority required is set at the level of 100% of the contributions minus the sum of the percentages of the two largest contributors. These two are currently Germany and the UK and this financial majority now is about 55.5% and after accession of Spain it becomes 58%. This part of the process represents a change, but not a fundamental one, from current practise in the Finance Committee.

The second part of the procedure is the agreement by Council that it will give recommendations from the Finance Committee "*including full details of the vote, all the consideration they deserve"* and *"that it will normally take financial decisions in accordance with the recommendations of the Finance Committee".*

This procedure was accepted with little discussion by Council, except that the UK stated its position was that nothing had been solved for the case of a large expansion of the number of member states. The resolution in which it was all spelled out was adopted unanimously. This cleared one obstacle on the road toward further extension of ESO membership and in particular for negotiations with Spain. Maybe the point will return in the future if the membership of ESO grows to double the current number or so.

12. Level of contributions

The financial contribution is of course an important piece of the business for Council, although details are usually first discussed and arranged in the Finance Committee. But each year there is a discussion on the level of contribution by the member states and an adoption of a budget. These matters particularly become prominent in Council at times when a new state joins the organization. The easiest of the political issues related to that is the question whether or not the contributions of the new member state will be additional to that of the existing members. The convention says that if no resolution on this is adopted automatically the total budget remains the same and the contribution from each member state diminishes. So up till now always a resolution has been adopted first to the effect that the contributions of the current member states will not be reduced as a result of the increased membership. This requires a 2/3 majority and has not been a matter of much discussion. Actually, the UK made it a condition for their accession and we agreed with Finland to do the same thing. It has also been applied at the time of the accessions of Italy and Switzerland in 1982, and will be in the case of Spain.

The most important effect is that the relative contributions of the existing member states can be affected by the addition of a new one. The reason for this is in the so-called 'cap' or 'ceiling' in the level of contribution. At the time of the founding of ESO in 1962 there were five member states: Belgium, France, Germany, the Netherlands and Sweden (Denmark joined some time later). Had the relative levels of the contributions been determined by some economic measure, such as the *'Net National Income' (NNI)* that is still in use today at ESO and comparable European organizations, the result would have been that France and Germany together would have paid more than two-thirds of the budget. Already in the years before the convention was signed, France and Germany were put at one-third each of the funds provided in the preparation for the establishment of the organization and the rest was distributed among the remaining states on the basis of economic measures.

At the time of the accession of the UK the relative levels of the contributions were calculated with the NNI's, but with a ceiling of 26.75%. The problem of course is that when a new nation joins and the total budget goes up, the actual amount of cash to provide by a country to which the cap applies, goes up also since it will be the same percentage of a larger amount. E.g. the accession of the UK did result in an increase in the total budget of ESO by about one quarter and as a result the German contribution would have risen from roughly 20.3 M€ per annum to about 25.0 M€. This was unacceptable to Germany and at the time the compromise had been reached that the cap would go down to 21.16%, then increase in a few steps to 24% in 2006 and remain at that level, so that the increase in cash for Germany would be about half of that mentioned. With the accession of Finland I proposed when it came to Council that the matter was left to be solved later; it was agreed that the Finnish contribution would be additional and would leave those of the other ten member states unaffected until 2006, when the compromise with Germany would end. This was also the time at which Spain would probably join if negotiations would be successful. At the Council meeting in December 2003 I therefore announced that I would propose in the next Council meeting to set up a Council Working Group to investigate the matter; this was fortunately sufficient to get agreement on the accession of Finland and the associated interim arrangement.

The question came up again at the meeting of Committee of Council in April, 2004 in the Hague in connection with the status of the negotiations with Spain that had started. At the request of Council, Ian attached a table to the Summary of Conclusions, showing what the effect would be when Spain joined and when Finland and Spain were treated as all others. I then wrote a letter to all Council delegates on May 17, 2004 outlining the options that I saw were available on the basis of these numbers.

With the NNI's then applicable, simply treating all countries equally would mean that the German contribution would drop below the ceiling of 24%, actually going down to about 23.5%. But with Spain and Finland coming into the equation this still translated into an increase of the German contribution by 2.25 M€ from 25.38 to 27.73 M€. That was substantial, but of course this was to be a saving to the other member states and therefore these would be keen to realize it as soon as possible. The obvious compromise was to get Germany to agree that the ceiling would be left as it was and to take again a few years to adapt.

I pointed out that there was a good justification for an increase in the German contribution. Not only is Germany after the re-unification definitely the largest member state with the largest population, NNI, size of the astronomical community and industry that competes for contracts, it actually gets the largest percentage of VLT time: about 33% of all the time that goes to member states, compared to about 20% for France and Italy[41], while the financial shares are 24% for Germany (because of the cap) and about 19.3 and 16.0% for France and Italy respectively.

I also linked it with another sensitive issue, namely the urgent need to extend the ESO Headquarters building in Garching. The feeling in Council was that Germany should provide that, just as they provided at the time the current building. This would cost, however, at least 20 M€ and the German central government was not prepared to provide that. Germany as a whole benefits very much from the presence of ESO in Garching. I pointed out that each year about 40 M€ of the ESO budget is reintroduced into the German economy through industrial contracts (about 10 M€) as well as the money spent by the international staff and fellows and on the operations of the headquarters. Even if the contracts are left out (since Germany would have obtained these even if the headquarters were located elsewhere) that still leaves about 30 M€, which is more than the actual German contribution to ESO! I brought this up several times with the German delegates, but the usual response was that the economic benefit of the location of the headquarters in Garching actually goes mostly to the Bavarian economy rather than the federal German government.

I concluded that the principle of the cap could be terminated, such that Germany after some transition would be treated similarly as all other member states and of course the extra income from Finland and Spain should be used to increase the ESO budget. I urged that the matter of the extension of the ESO building in Garching be solved at the same time.

The German delegate, Andreas Drechsler, replied on May 29. This was a very constructive reply, firstly because it acknowledged the need for Germany to increase its contribution after an interim arrangement. But he did object to the fact that I linked the issue of the Garching building to this. I have kept it separate since then, since I think I did make my point. Andreas did propose a profile for the interim arrangement, which started with a slow increase in the German contribution with a much faster one towards the end of the period in 2010. The cap would remain at 24%.

At the next Council meeting in June 2003, I proposed we form a Council Working Group on Member State Contributions to investigate the possibilities and make recommendations to

[41]These shares can be calculated in various ways. Council gets annually a listing of the statistics of the use of telescope time. This gives information on the requested and allocated time per member state (and from astronomers elsewhere and from ESO staff), calculated by assigning the proposal either to the PI alone or dividing it between all proposers. The tables also give percentages, but these are always of the total time requested or available. I have made it a point for a long time (actually since I was on the OPC), also in our internal discussions in the Netherlands, that a comparison to the financial contribution should be done on the basis of the share of time gone to astronomers in the member states only and not the percentage of the *total* use of telescope time. The values I quote here are the averages of those based on PI's only and on all co-I's. I have often pointed out that the share Dutch astronomers get out of ESO is often twice (or more) than the financial share, which is about 5.5% since the accession of the UK. For a more detailed discussion see the last part of this section.

Council how to proceed after 2006. I was prepared to chair the Working Group myself and the German, French and Swiss diplomatic delegates were members plus the chair of the Finance Committee (Rowena Sirey from the UK). The first thing I did was ask Ian to make some more model calculations, among which one following the proposal by Andreas. The models left Finland and Spain additional in the start and then in a linear way integrated them with the other member states over a number of possible timescales.

Over the summer we did discuss these possibilities. The differences were mostly in the gradient. The positions were that the linear increase was favored by Martin Steinacher (Switzerland), Rowena Sirey and myself; Andreas favored his more delayed increase and France did not reply. Although I had actually proposed to simply do away with the cap, since it would be meaningless, the others felt that it should be left even if it did not have an effect. This was also done at CERN, they told me, and politically it would be a good symbolic rule even if it were never applied. I had no problem with that.

There things stood until the meeting of Council in December 2004 (nothing much was done at the Rome meeting of Committee of Council, since France still had not taken a position). At that time France actually had replied, officially taking the position that Germany should adapt immediately and that there should be no interim arrangement. That was not very helpful. It was true that in the mean time the economic situation had changed significantly, the German national income declining rather sharply. So, I took it upon me to make a new proposal on the basis of the up-to-date values for the NNI's. This I did in an email to the Working Group members on December 21. The calculations did include a 2% indexation and in the linear model the German contribution was over most of the period lower (in Euros) than the simulation of half a year earlier based on Andreas' proposal and even was leveling off at fewer Euros. If the algorithm was acceptable in Germany's planning process half a year ago, these new ones should still be acceptable now. The state of the German economy, the position of the Euro, the strength of the British Pound and the deficit in the US budget (George W. Bush had just been re-elected) indicated that the trend would not reverse and the German contribution in Euros would most likely only go down.

The Working Group now did accept the outcome as a reasonable compromise and in the end I prepared a paper for Council in Helsinki in June 2005. In 2005 Finland would be kept separate and the cap would be 23%; in 2004 Finland would still be left separate, but the cap would be 24 % and would remain that from then on (although it would no longer have an effect); Finland would be fully integrated in the methodology by 2007 and Spain would be kept separate when they joined until 2008, when they would be integrated. The new NNI's showed that this did not make major jumps in any of the contributions of Germany or the other nine member states in Euros and was accepted unanimously in Helsinki. This difficult issue was thus solved to everybody's satisfaction mostly thanks to economic developments; the problem simply disappeared. The development of the contributions by the member states is listed in Table 1, where it has been assumed that Spain accedes per July 1, 2006. The final column is the situation when every member state pays according to its NNI in 2008, where those NNI's for 2006 have been used as indicative and a 2% indexation has been assumed.

In the mean time there still was another issue that had been lying around for a while and that had to do with the UK contribution. What had happened was the following. The arrangement with Germany on the adaption to the new cap of course does affect the UK contribution, since they were not treated separately (as was done in the case of Finland). In effect, in the budget for 2003 (the first full year of UK membership), the contribution of the UK was higher than that of Germany, although the NNI of the UK is significantly lower than that of Germany. But the

Table 1: Comparison of contributions by member states to the ESO budget.

Country	2001		2003		2005		2006		2008	
	%	M€	%	M€	%	M€	%	M€	%	M€
Belgium	4.79	3.68	3.49	3.51	3.31	3.48	3.12	3.51	2.92	3.41
Denmark	3.04	2.33	2.29	2.31	2.12	2.23	2.03	2.27	1.90	2.21
Finland					1.68	1.67	1.51	1.69	1.43	1.67
France	25.49	19.58	19.40	19.53	18.47	19.42	18.04	20.22	16.90	19.72
Germany	26.75	20.54	21.16	21.30	22.62	23.79	22.56	25.29	22.62	26.39
Italy	21.78	16.73	16.54	16.65	16.63	16.44	14.55	16.32	13.64	15.91
Netherlands	7.22	5.54	5.83	5.87	5.33	5.61	4.80	5.38	4.49	5.24
Portugal	2.06	1.58	1.61	1.62	1.49	1.57	1.31	1.46	1.22	1.43
Spain							4.51	5.06	9.02	10.52
Sweden	3.66	2.81	3.01	3.03	3.23	3.40	3.05	3.41	2.85	3.33
Switzerland	5.21	4.00	4.53	4.56	3.74	3.93	3.85	4.32	3.60	4.20
UK			22.17	22.32	22.38	23.53	20.71	23.22	19.41	22.64
Total	100.00	76.796	100.00	100.678	100.00	105.160	100.00	112.139	100.00	116.666

UK, although aware of the problem with Germany and the cap and of how it was solved, was not party to the compromise. It did not object when the 2002 and 2003 budgets were discussed (at the time the 2002 budget was discussed UK had observers in the Finance Committee and Council), but started doing this in the course of 2003, first informally to the Executive, then to me and finally formally in Council. The total difference over the full period added up to something like 3.8 M€. A second issue was that they thought indexation[42] from 2001 to 2002 should not be applied to the special contribution. This also was a significant amount of money, estimated by the UK at about 1.6 M€.

The second issue was dealt with by asking Arno Freytag to evaluate the situation, who after all had chaired the ESO Negotiating Team. He wrote a good evaluation concluding that the wording *"of the ESO-UK agreement as well as the logic and self-consistency lead to the conclusion that indexation must be applied using the CVI agreed annually by Council, with 2001 prices index first to 2002, then to 2003, 2004 and so on."* In the end this was accepted by the UK, although grudgingly and without agreeing to it.

The first issue was much more difficult. The UK delegates had not flagged the issue until some time in 2003 and had voted for the 2003 budget[43]. And the UK delegation remained insistent on this issue, of course claiming that internal pressures made it difficult for PPARC to concede on this matter. They did state for the record at the Helsinki Council meeting (June 2005) that they would block the accession of Spain if this issue were not solved to their satisfaction. In fact in September 2005 they sent me two draft resolutions for me choose from how to reimburse the UK (either all in 2005 or spread out over a few years). In the accompanying letter they did refer again to the Spanish vote expected in the December 2005 Council meeting, saying that they were *"anxious to avoid being put into the position of having to make our agreement to Spanish accession contingent upon resolution of the subscription question"*.

In the Committee of Council meeting of September 16, 2005 I informally talked to Richard

[42] ESO Council annually agrees on a Cost Variance Index CVI, usually following CERN in these matters.

[43] As a sideline I note that contrary to what one might expect there usually is not a unanimous vote on the budget! For 2003 France abstained, for 2004 France voted against, Germany and Portugal abstained (because of their national budgetary situations) and the UK voted for *ad referendum*, for 2005 Germany and France voted against and for 2006 France abstained. So, I have not witnessed France voting for the budget in the last four years. I don't think that all of this is a satisfactory situation.

Table 2: Share in requested and allocated observing time (nights of telescope time) over Periods 63 to 73 (1 April 1999 – 1 October 2004). In the case of 'PI' all nights are awarded to the country of the Principal Investigator; in case of 'All' it is divided over all Investigators.

	Total	B	DK	F	D	I	NL	P	S	CH	UK	ESO	RCH	Oth
Requested telescope time P63-P73 in percentages of the total														
Paranal–PI	10669	1.8	1.3	13.5	20.2	13.7	6.6	0.6	2.3	2.3	7.7	17.3	6.7	6.2
Paranal–All	10669	1.7	1.3	12.3	17.3	12.2	4.9	0.6	2.2	2.1	8.2	14.1	3.6	19.6
LaSilla–PI	11175	3.1	0.9	14.5	17.6	17.7	3.9	0.7	2.3	4.7	8.1	13.4	7.0	6.1
LaSilla–All	11175	2.7	1.1	12.9	14.8	15.7	3.4	2.2	2.3	3.5	8.2	10.2	3.7	10.3
Allocated telescope time P63-P73 in percentages of the total														
Paranal–PI	3650	1.9	1.7	13.8	21.4	11.7	7.9	0.6	2.4	2.1	6.0	17.8	8.3	4.6
Paranal–All	3650	1.6	1.4	13.3	18.0	11.2	5.4	0.6	2.6	2.2	6.2	14.0	4.0	19.5
LaSilla-PI	4170	3.0	0.7	14.8	18.3	18.5	4.2	0.3	2.9	3.9	5.8	14.2	8.5	4.8
LaSilla–All	4170	2.6	1.1	13.6	15.5	16.1	4.0	1.3	2.4	2.7	7.1	11.5	4.9	17.7
Acceptance rate P63-P73														
Paranal–PI	0.342	0.42	0.46	0.34	0.39	0.30	0.43	0.36	0.35	0.35	0.27	0.35	0.40	0.26
Paranal–All	0.342	0.32	0.43	0.37	0.37	0.30	0.38	0.39	0.40	0.38	0.28	0.35	0.36	0.34
LaSilla–PI	0.373	0.39	0.24	0.45	0.41	0.40	0.41	0.26	0.45	0.29	0.27	0.42	0.43	0.30
LaSilla–All	0.373	0.37	0.37	0.43	0.41	0.39	0.45	0.36	0.41	0.39	0.33	0.46	0.47	0.34

Wade and suggested that maybe a compromise was possible whereby Council acknowledged (but would not concede) the situation and agree that the UK demand was honored starting with the budget of 2004 (the first one after the UK had brought up this matter formally), in that way splitting the cash involved. And I informally outlined this possibility in the Committee of Council session later. After this meeting I was taken out of action for urgent and unexpected heart surgery and would not return to Council meetings for the rest of my term as President.

However, the matter remained unsolved, while the vote on the accession of Spain was getting close. Only days before the December 2005 Council meeting did Ian succeed in setting up a teleconference to negotiate this issue. I was still recuperating from surgery, but Catherine and Ian urgently requested that I join the discussion, which I did. It was very difficult to convince Richard Wade that PPARC had to accept the compromise as I had proposed; he instead wanted to be reimbursed from the time he *in*formally raised it with ESO, but that would give the UK 2/3 of the difference and that I felt would never be accepted by Council. After about an hour of talking he finally conceded and sent a letter (actually drafted by Ian) to suggest that Council accept the compromise. So, the matter was resolved in the end by Council accepting the proposal in December 2005 and the UK was able to vote for the accession of Spain later during that meeting.

In Tables 2 and 3 I list some statistics on the distribution of telescope time. Table 2 shows a longtime average (from roughly the beginning of Paranal) and Table 3 shows the numbers for a recent year. The latter table shows percentages of the time awarded to member states rather than percentages of the total, as is the case for Table 2.

We see in Table 2 that in terms PI's of order 6% of all telescope time goes to proposals with PI's from countries outside the ESO member states, Chile (RCH) or from the organization itself. In terms of astronomers involved (see the 'All' statistics) almost 20% of VLT time goes to such scientists, while for La Silla the percentage is about 10. For the more recent year in Table 3 the numbers are for PI's 14.7% (Paranal) and 7.1 % (La Silla), while for all investigators these are 44.3% and 33.7%. Especially for the VLT it is clear that international collaboration is a major feature, but that only about one in six projects has a PI from outside ESO countries, Chile and ESO itself. I find these numbers very gratifying since I strongly believe that collaborations should not be limited by country or continent borders or be related to funding percentages.

Table 3: Share in allocated observing time in percentages of the total time awarded to astronomers from member states over Periods 74 and 75 (1 October 2004 – 1 October 2005) compared to the level of contribution (so the columns 'B' to 'UK' add up to 100%. The column '%' has the percentage of time awarded to astronomers in the member countries. The values for ESO staff and Chile are also in percentages of the total time for the member states.

	Total	B	DK	FI	F	D	I	NL	P	S	CH	UK	%	ESO	RCH
Allocated telescope time in P74-75 in percentages of the total to the member states															
Paranal–PI	1127	3.0	1.6	0.6	16.4	28.6	15.7	7.2	0.9	2.7	5.5	17.9	73.0	12.7	9.6
Paranal–All	1127	2.7	2.1	0.6	16.8	23.0	17.8	9.8	1.1	2.3	4.3	19.5	58.9	19.8	5.7
LaSilla–PI	804	2.0	1.2	3.8	10.2	18.4	15.2	3.8	1.6	2.3	25.5	16.1	76.9	9.5	13.4
LaSilla–All	804	3.3	0.9	2.7	16.2	17.0	13.5	3.5	7.2	1.4	14.8	19.6	63.0	17.2	7.9
Percentage of contribution to the budget in 2005															
		3.5	2.2	1.7	19.4	23.8	16.4	5.6	1.6	3.4	3.9	23.5			

Modern times show a large increase in the sharing of facilities, just as we in Europe profit much from the Hubble Space Telescope, where ESA countries regularly get more than the 15% that was agreed (and ESA did contribute in the end much less than that percentage to the integrated cost of the HST observatory).

We see that acceptance rates are of the order of 40%. However that does not mean that the over-subscription is only a factor two or so. Many proposals receive significantly less telescope time than has been requested. Actual over-subscriptions are more like 3 to 5. I am surprised by the acceptance rates for the UK. The Netherlands does very well in this respect.

The UK does not have a meaningful percentage in Table 2, since it joined later during the period involved and its shares cannot be compared easily to its financial contribution. Table 3 is for the most recent years that I have available. Here I calculate the percentages with respect only the nights allocated to astronomers from member states. We see that the UK still does not get its full share according to their contribution. I am sure that will pick up soon. The share for the Netherlands on Paranal is significantly higher than the relative contribution. That has been a phenomenon that has been seen over a much longer term. Switzerland is also doing very well, in particular at La Silla due to the exo-planets searches with the Swiss-build HARPS instrument. Note that France is somewhat low compared to its financial contribution and that the same seems to hold for Sweden. Chile does well in P.I.'s (almost its 10%), but apparently there are many other astronomers from outside Chile as co-I.'s on proposal led by Chilean astronomers.

Telescope time is being awarded strictly on the quality of observing proposals. Of course there are two other measures for the return a member state receives and that is in the form of industrial contracts awarded and in personnel employed by ESO either in Garching or in Chile. These measures are monitored also and provided to Council and the FC, but I will refrain from discussing these here.

13. Spain and ESO

There had been contacts with Spain on possible membership of ESO for some time at an informal level. Of course Spain did contribute to ALMA through an arrangement with ESO and at the time the agreement between ESO and Spain was negotiated the possibility of accession was always kept in mind. It started to become serious when a formal letter arrived from the Secretario General Cientifica of Spain, dated November 18, 2003. Council set up a Negotiating Team, consisting of the myself as head, the Vice-president Fernando Bello, Catherine, Ian, Gerry Gilmore for the UK, Max Mezger for Germany and a person to be confirmed from France (later Phillippe Barré was designated). This choice had Fernando and me from small countries and I felt having three of the major countries involved would be useful. Also an In-Kind Working Group was appointed, chaired by Gerry Gilmore. Members were four astronomical Council members (Tim de Zeeuw from the Netherlands, Claes Fransson from Sweden, Bruno Marano from Italy and Michel Mayor from Switzerland) and from ESO Guy Monnet and maybe a few others depending on the contributions involved.

There were two mandates or boundary conditions that Council gave along to the Negotiating Team and In-Kind Working Group and these were that Council put an upper limit of 25% on the part of the special contribution that could be accepted as in-kind and ESO would not consider ownership of the 10-meter GTC (Gran Telescopio Canarias, sometimes also referred to as GranTeCan). The GTC was a segmented mirror telescope that was being erected at the Observatorio del Roques de los Muchachos on La Palma, Canary Islands. It was obvious that Spain wanted to have some deal with ESO on the GTC, since it had had difficulty finding partners in Europe to provide instruments and share in the use and operation[44]. Early on indeed the option of transferring ownership to ESO was mentioned informally, but I felt that would be unwise for ESO to do and that there was absolutely no chance Council would accept responsibility for the project.

The first meeting of the Negotiating Teams took place in Garching on March 4, 2004. The Spanish delegation was chaired by Dr. Gonzalo León Serrano, the Secretario General de Politica Cientifica at the Ministry of Science and Technology. This high-level presence showed the importance to get the negotiations started on a good basis for the Spanish. The date was important, since general elections were imminent in Spain[45] and the Spanish were very concerned to have actual talks with ESO ongoing so that it would not be halted by a new government, that would be in place in a few months and might stop anything not committed in order to review future plans. Gonzalo León was actually about to end his appointment with the elections (then still depending on the outcome of the elections, as I recall) and he was determined to leave the issue taken care of as best as he could and the process solidly underway.

The meeting went well. We noted that a document on the status of Spanish astronomy and the mutual benefits of Spanish membership of ESO had been sent and received in February (the date on the cover letter actually said February 5, 2003). We brought to the attention the points given to us by Council. The most vehement objection came on the upper bound of 25% for the in-kind contribution. Clearly Spain was counting on much more. In addition to access to GTC they did mention possibilities to contribute to ALMA, maybe even in the form of an additional frequency band. I from ESO's side explained the principles of in-kind contributions as we had defined them with the UK and Finland and replied to the matter of the percentage of in-kind components that it was up to Spain then to come up with proposals that were too good to be rejected by Council.

[44] In the end the University of Florida and two institutions in Mexico were found to provide support.

[45] These actually occurred a month later, preceded by the terrorist attacks on the Madrid Metro system.

Figure 32: The dome of the Gran Telescopio Canarias (GTC or GranTeCan). This 10.4-meter segmented mirror telescope is being erected at the Observatorio del Roque de los Muchachos on La Palma, Canary Islands. GTC played an important role in the negotiations concerning accession of Spain to ESO.

The time schedule they envisaged was membership by January 2006 and we drew up a time schedule to accomplish that. We also gave them our preliminary estimates for the annual contribution for Spain (just under 10 M€) and the special contribution if accession occurred per January 2006. The latter is based on all investments in VLT, VLTI and ALMA and then corrected for the Spanish contribution to ALMA. It came to about 60 M€ of which at least 45 M€ according to our position would have to be in cash.

From ESO's side I mentioned the two problems that we needed to solve before a unanimous vote on Spanish accession was possible, namely the matter of weighted voting in Council and of the level of contributions. I sketched the background of these and promised I would try my best to solve these as soon as possible and to keep them informed.

On July 16, 2004 we had a second meeting and this one was held in Madrid at the Ministry. The Spanish delegation was in fact headed by Carlos Alejaldre Losilla, Director General of Technical Policy, but some of the time the new Under-minister for Science, Salvador Barberá, was present; he had his office actually next door. We were informed that the Spanish position had not changed after the change of government. Again they asked us to be flexible over the matter of the 25% in-kind limit to the special contribution. The In-Kind Working Group had identified only a few potentially interesting candidate projects, namely scientific and technological use of GranTeCan and a software contribution to ESO. The possibilities for ALMA were not very promising, since the whole project was still uncertain in the sense that it had to be redefined as

Figure 33: The GTC on La Palma during construction.

soon as the antennas were procured and very little could be said until this had been accomplished. The Spanish side also was insistent on some kind of recognition for political reasons of the Canary Islands as a potential site for an Extremely Large Telescope. We agreed to meet again on September 28, 2004.

The meeting of September 28 took place in Garching. The discussions mostly concerned the in-kind contribution. The Spanish delegation (again chaired by Carlos Alejaldre) argued for a 40% in-kind contribution and proposed that the actual payment be spread over 8 years with an increase towards the later years. We felt that to be much too generous. In particular the increase in the amount was opposite to what was acceptable for ESO. The in-kind projects identified by the Working Group were software support (provisionally estimated at maybe 2 M€), technical access to GTC (maybe 3.5 M€), scientific access to GTC (5 to 10 M€) and possibly some contribution to ELT design studies (possibly 4 M€). The Spanish thought about possibilities in the form of production of amplifiers and antenna subcontracts for ALMA (expected possibly already on the basis of industrial competition, but we felt then it could not easily qualify as in-kind contribution). The intention to aim for an accession date of January 1, 2006 was reconfirmed.

This was reported at the meeting of Committee of Council in Rome on September 30 and October 1, 2004. There also was a report from Gerry Gilmore on behalf of the In-Kind Working Group. This had a list of no less than ten options offered by the Spanish, of which most were not considered interesting to ESO or outside the definition of what an in-kind contribution could be (such as access to other radio and optical telescopes, provision of instruments, etc.). There had also been some suggestion from Spain that there might be an in-kind contribution from them to the ELT project that was financed through Framework Program 6 (FP6) of the

European Commission, but Council felt this was not possible. Also the set of projects suggested as possible in-kind contributions were seen by Council as somewhat meager, considering the much more urgent need for ESO to have cash. In particular the scientific access to GTC was of interest as an important research tool, but was not such a high priority as the future projects that ESO wanted to undertake, in particular of course ELT. Council reconfirmed that the in-kind contribution should under no circumstance exceed the 25% earlier given as an upper limit, and that the payment schedule for the special contribution should be weighted towards the earlier years rather than the Spanish wish of the opposite.

The following reaction from Spain came on October 13 in the form of a letter from the Deputy General for Promotion and Technological Infrastructures and Large Facilities, Ernest Quingles Soteras. The letter noted *"with great astonishment and disappointment"* that the recalculation of the special contribution now stood at 5.4 M€ more than originally estimated. This had to do to some extent with the fact that the initial estimate was simply an extrapolation of the Finnish situation and in the mean time there had been investments in the form of the UK special contribution, which were not held against the Finnish contribution as they did provide the cash in a single installment. A letter signed by me went back on October 18, stating only that ESO Council reaffirmed its commitment to the goal of Spanish membership. Of course there was also email contact with Ian on the details of the calculations.

There was a reply to me on December 1, 2004, this time by Carlos Alejaldre, in which he stated that he felt that a 25% limit to the in-kind contribution was unacceptable, since higher percentages had earlier been accepted by Council in the case of other countries (meaning the UK). He even stated that if no higher percentage could be discussed the continuation of the negotiations would be very difficult for Spain. My reply of December 10, 2004, stressed the importance to continue negotiating. I pointed out that the NNI figures had changed and that we had always stressed that the figures quoted were provisional estimates. The Spanish were invited to meet again with us in January and I actually proposed a few dates. My point of view (not stated in the letter) was that it was entirely acceptable to set the upper limit at 25%, since after all the contribution to ESO from Spain was in between the UK and Finland, where in-kind fractions of about half and about one-tenth had applied.

In the end a meeting was scheduled for February 23, 2005, but later this was postponed (at the request of Spain) to April 28. In the mean time the In-Kind Working Group continued talking. A new possibility had come up, namely a power plant for ALMA[46]. And Ian sent a document on February 16, outlining the calculations that had been followed for the special contributions of the UK and Finland, together with the detailed texts of the agreements with these two countries and the details of the 2005 budget.

We met on April 28, 2005 in Madrid. It was preceded by a meeting of the In-Kind Working Group the day before. It was reported to be a difficult meeting, but did in the end produce a package that seemed a good basis for further negotiations. The option of an ALMA power plant was dropped from the list at the request of Spain. The ESO team agreed to propose to Council that the in-kind contribution would be the full 25% of the special contribution, and would consist of the elements agreed earlier (software development, science time and technical access to GTC). There was considerable uncertainty on the actual way the science access to GTC was going to be organized. The Spanish side strongly felt that an active involvement of the instrument teams was necessary. We on the ESO side wanted to involve the whole ESO

[46]In the ALMA construction no power plant was foreseen, as the provision of power was left to the operations phase. Of course it was a concern for the ALMA project that power would become a major cost later on. ESO could shift between construction and operation funds, as it came from the same ESO total budget, but this was not possible in North-America, where there was at the time not even an operations budget.

community. It meant that still a lot of discussion was necessary in the In-Kind Working Group and internally in Spain.

For the schedule of payment Spain would make a specific proposal, possibly with the option of a single prompt payment and the possibility of then giving Spain a discount on this. The latter was a good way out of an impasse. It avoided for the Spanish side to have to insist on what they felt was a matter of principle, namely that they would be treated similarly as Finland in that the UK special contribution was ignored in the calculation of the entrance fee. And for us it was acceptable to then give a discount in the case of a prompt payment, since the reduction in interest on loans would easily make up for it. We proposed to meet again in Garching on September 3 and try to make progress toward a Council approval of the accession in October or the scheduled meeting of December, such that Spain could join by July 1, 2006.

We also agreed on another sensitive issue, namely the Spanish wish of including a text in the preamble of the agreement on the suitability of the Roque de los Muchachos site for a future ELT and the technical potential of the GTC in the development of extremely large telescopes. The Canary Islands site can of course certainly be considered in case an ELT would come to the northern hemisphere.[47]

All this was duly reported at the Council meeting in Helsinki on June 6 and 7, 2005. In a letter of June 1, Carlos Alejaldre had again stressed that Spain did prefer a payment schedule over eight years, although now somewhat flatter, but noted again the Spanish concern over the effects of inclusion of future UK installments of their entrance fee. He confirmed that Spain was investigating the option of a single installment and suggested that in that case a reduction of 20% would be appropriate. Council did agree that the current status of the negotiations was an acceptable basis for further discussions, but ruled out a reduction of the amount suggested by Spain in case of a prompt payment. My reply of June 22, 2005, to Carlos Alejaldre welcomed his opening, but stated that a discount of the magnitude he suggested was unacceptable, but that Council would probably look favorably upon one of the order of 5%.

In the end the next meeting took place on September 7 in Garching, and would prove to be the final meeting of the negotiating process. We had received a letter from Carlos Alejaldre, dated September 1, in which he stated that the 5% reduction in the cash part of the contribution was too low for Spain to accept. I started the meeting by stating very clearly that Council felt that with the acceptance of the 25% level of in-kind contributions and the content of the parts of it and a possible reduction for a prompt cash payment, it had done enough in terms of compromising. Also I expressed as a hard position that if scientific access to GTC were to be an in-kind contribution that then became telescope time belonging to ESO and ESO therefore would decide what it was to be used for. It was clear that both things were difficult for the Spanish delegation in view of their internal situations.

We did discuss all aspects, but these last issues in particular. It was agreed that the In-Kind Working Group would before the end of the month work out the principles and details of what was now called the 'Scientific Legacy Programmes'. Also Spain would before September 16 propose a payment schedule for the cash part of the entrance fee. ESO's position remained that it was either a prompt single installment with 5% reduction of the cash part or a longer schedule weighted towards early years, but then with future installments of the UK special contribution a part of it. The only small concession we did was that the best estimate of the total value of the special contribution was made on the basis of OECD data as available by September 21.

[47] The final text in the preamble said as the last of the items recognized, *"that the Observatorio del Roque de los Muchachos (ORM) is accepted as the premier optical/infrared astronomical observing site in Europe and could therefore offer a possible, extremely valuable site to ESO members for an European Extremely Large Telescope built in the northern hemisphere."*

This alleviated some internal Spanish problems. The draft agreement was to be presented to Committee of Council scheduled for September 29 followed by possible approval at Council on December 8 and 9, 2005. The accession was to take effect no later than July 1, 2006.

At the special Committee of Council meeting on September 16, 2005 I explained the results of the meeting to the Council delegates and as I was just saying that we had no response yet from Spain on the cash contribution issue, Ian entered the room (returning from checking that indeed nothing had arrived) with a fax from Carlos that Spain accepted. The letter, dated September 15, essentially says that Spain was accepting our terms and accepted a 5% reduction in the understanding that future UK cash contributions would be disregarded. Catherine and I returned a letter, expressing our appreciation for the efforts and informed Carlos that we were putting the draft agreement and resolutions before Committee of Council before the end of the month. I had stated to Committee of Council on September 16 that we would do so in the hope that all delegations, but in particular France would thus get sufficient time to prepare a mandate for the delegates at the December Council.

The only further difficulty that arose in the weeks following this, was that the Spanish position was that the 5% should be taken from the full special contribution, while we felt that it should apply to the cash part of it. It was a difference of 1.2 M€! Then they rejected the use of latest OECD figures, even preliminary ones. OECD figures were getting more and more unfavorable to Spain because of its economic growth and development. In this way they did try to recover another roughly 2 M€. Committee of Council did not accept that. In the mean time, I was taken out of action because of a heart surgery I had to undergo.

Catherine wrote Carlos Alejaldre on October 20 with the best estimates of the special contribution using the agreed principles about a reduction and the UK cash contributions as summarized above. It was a total of 76.38 M€, of which 7.40 M€ was deducted for the Spanish contribution to ALMA. The in-kind contribution was set at 25% and amounted to 17.24 M€ and a deduction of 5% was applied to the cash element. The cash contribution would then amount to 49.15 M€. Carlos wrote back on December 5, accepting these numbers. However, he also wrote that his Finance Ministry *"had reservations"* against the single installment and suggested that Council would once more consider his earlier proposal of a eight year period with slightly increasing installments. The details of the 'Legacy Programmes' on the GTC were also worked out and agreed well in time for the meeting of Council on December 8 and 9, 2005.

At Council, presided over by Fernando Bello, the matter was discussed and Council agreed only to the principle of a single installment, rejecting the long payment schedule. And at the same time it adopted the necessary resolutions to make the accession of Spain possible on July 1, 2006. The only proviso was that Spain would accept the terms no later than December 31, 2005. If not the negotiations were to be re-opened on the cash installments, but then the UK cash contributions would not be disregarded. I was informed that Spain accepted these terms on the last day possible.

On February 13, 2006, Catherine signed the agreement in Madrid. Although I missed the final vote in Council, we succeeded in finalizing the Spanish accession to ESO just before the end of my presidency. The occasion was marked by a press release that has been reproduced in Appendix X.

14. Minister van der Hoeven's visit to Chile

Jan Bezemer and in particular Jan van de Donk had for some time tried to find interest in the Ministry for a visit of the Netherlands Minister of Education, Culture and Science to Chile to see the installations. This would be difficult to organise as a separate trip, as it would appear as a not very efficient spending of money and time and it would have to be combined with something else. There appeared a chance first when there was talk about a meeting of European and South-American minsters of research somewhere in Argentina. That was actually not realized. But it was recognized that it would be a good thing to do this during my tenure of the office of President of Council. Another important reason was internal to the Netherlands. The Minister had been very involved in the decisions to fund LOFAR[48] and optical astronomy and ESO were less visible and discussed within the Netherlands. This in spite of the major contributions of the Netherlands to ESO. It was very important to focus attention on ESO and NOVA (the Netherlands Research School in Astronomy; see footnote 50 below). The extra funding for NOVA, which was for a significant part used for participation in ESO instrumentation projects for the VLT, VLTI and ALMA, was ending by 2008 and for the future of Dutch astronomy in general and its involvement in ESO in particular it was important to have this extended.

Jan van de Donk was able to arrange that a meeting of Committee of Council took place in the Hague at the Ministry in April 2004 and use for this the 'Lissabonzaal' at the 16th floor with a beautiful view of the city and surroundings. Before the meeting Catherine, Ian and I met with Minister van der Hoeven at her office for an introduction and brief conversation. Catherine stressed the importance of the Netherlands for ESO, among other things pointing at me and mentioning my presidency. The Minster looked at me with an impressed view and clearly she appreciated the point. The meeting was particularly useful in that it provided Catherine the chance to extend an invitation to visit Chile and see the ESO installations. The Minister said she would look for an opportunity and I promised her that if it occurred during my term as President I would come also and welcome her. She did stress also that it had to be in combination with another visit in the general area.

The occasion arose in May 2005, when the Minister was planning to make a visit to the Dutch Antilles on matters that concerned education. Her background actually is in elementary school education, but she did develop a keen interest in scientific research. It did take a lot of effort from Jan van de Donk, but he succeeded in making the trip a reality. However, his health prevented him from joining on the trip, for which I felt very sorry. The Dutch delegation, accompanying the Minister, consisted of the Dutch ambassador to Chile (Hinkinus Nijenhuis, whom we met above), Cornelis van Bochove, the Director of Science at the Ministry, Mr. Leo Leduc from his directorate, and from Leiden University Tim de Zeeuw (as Dutch delegate to Council) and Ewine van Dishoeck (present on many ALMA bodies and past interim European project scientist for ALMA). From the ESO side there was Catherine Cesarsky, Felix Mirabel (ESO representative in Chile) and myself. My wife was also joining us.

We combined the trip with a tribute to Daniel Hofstadt, who had retired some months before as the senior representative of ESO in Chile. Daniel had worked for ESO for many years and had been instrumental in keeping relations with Chilean authorities in good order and in securing for example in recent times the permits to proceed with ALMA at Chajnantor. So, Corry and I arrived in Santiago on May 12, 2005.[49] We proceeded to the ESO Guesthouse and from there with Catherine and Felix we went to a ceremony (entirely in Spanish) where Daniel received a

[48]The LOw-Frequency ARray; a distributed (of order 100 km) radio telescope for low frequencies; see www.lofar.org.

[49]We were met by Felix at the airport, rested for a while in the VIP-room, while our customs formalities and securing of our luggage was taken care of. Daniel had treated me before this way and I must say it is convenient.

Figure 34: In the small plane that carried Minister Maria van der Hoeven and those accompanying her between Santiago, Paranal and San Pedro, when she visited ESO in Chile in May 2005.

high distinction by the Republic of Chile. After that we went to the Dutch Embassy to meet the Minster, who had in the mean time arrived from the Antilles.

The next morning we set off for Paranal with a special plane the Minister had chartered. This was necessary, since she would not be able to do what she intended to do in the time available with commercial air travel and she invited the ESO delegation (Catherine, Felix, Corry and myself) along. It was a very convenient trip, since we did not have to do the long transport over the ground between Antofagasta and Paranal (mostly over dirt road), but landed close to the observatory on a make-shift airstrip next to the road. We were met by Jason Spyromilio, the local director of the combined Paranal and La Silla Observatories.

We were shown the observatory, going into one of the VLT unit telescope domes. The Minister, Catherine, Jason and I also went on the basis of an exception into the interferometer tunnel, where the so-called delay lines are located. This very high precision instrument is produced by Fokker Space in the Netherlands and is an impressive sight, especially when you know that the positioning of the optics has to be extremely accurate (of order microns). It made

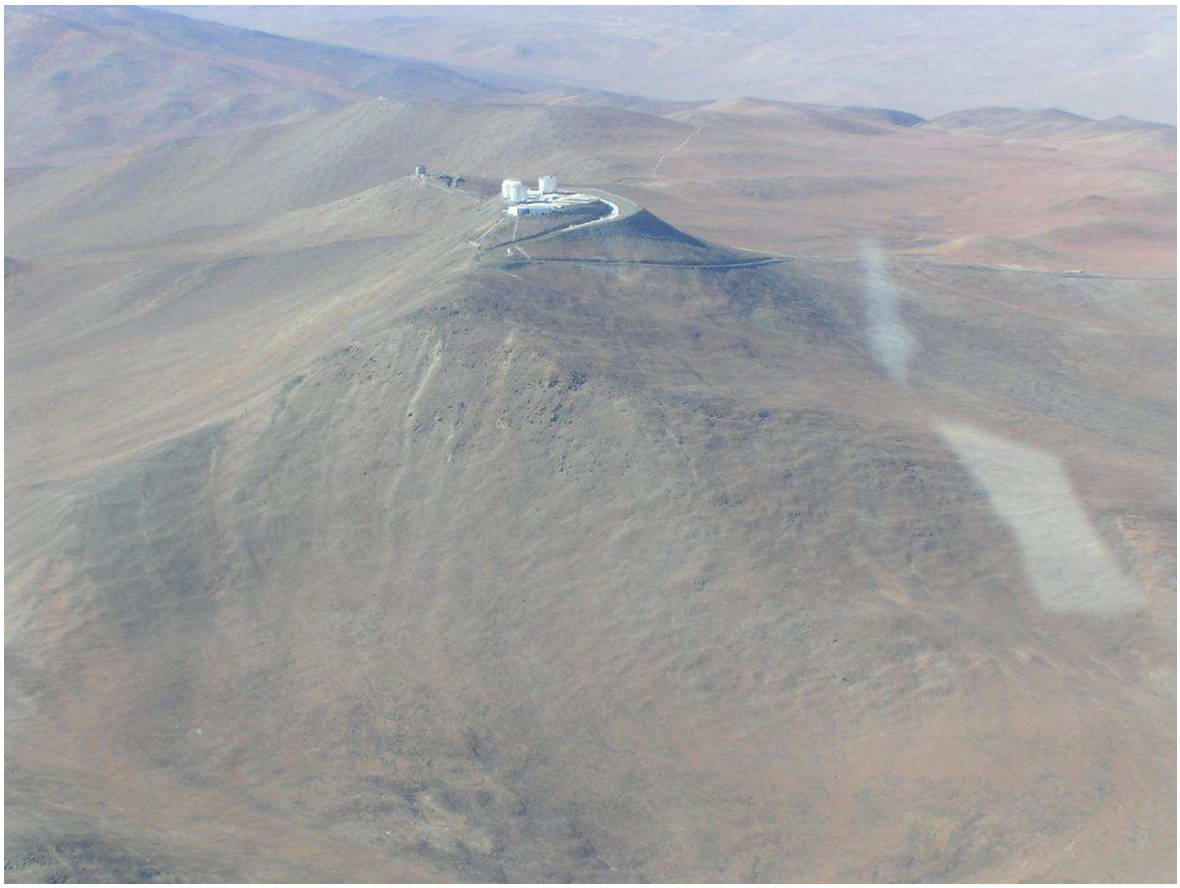

Figure 35: Paranal and the VLT seen from the air as we approach the site.

an enormous impression on the Minister. Before dinner we had a small reception, where the Minister spoke a few words and I replied to her on behalf of ESO[50]. In the evening we visited the VLT control room, where observers were busy collecting their data.

The next morning we flew to the small airport at San Pedro de Atacama, where Jörgen Eschwey, the head of the site IPT[51] and some of his staff met us. From there we were taken

[50] As I already mentioned above, this visit by the Minister of course was very important for Dutch astronomy. The university research institutes are organized in the Netherlands Research School for Astronomy (NOVA; for 'Nederlandse Onderzoekschool Voor Astronomie'), which coordinates the research at these institutes. In 1998 a new initiative by the Ministry (under the previous Minister Jo Ritzen, the Bonus Incentives Scheme) was launched. This initiative re-allocated a small fraction of the universities' research funding to research schools on the basis of quality, such that these would for some time have extra funding. NOVA came out as the number one 'top research school' in the country (only six were funded in total) and the extra funding has been instrumental in a number of area's, one of which is participation in instrumentation efforts in ESO projects, such as instruments for the VLT and VLTI and receiver developments for ALMA. The program was originally for 5 years with extension to 10 years after an international evaluation. But after 2008 the program was going to end and that would be very detrimental to Dutch astronomy. NOVA had started to discuss this with the Ministry. The visit was used to talk further to the Minister and her senior staff on this issue. In particular Tim (who is the director of NOVA) and Ewine were involved in this. In her speech the Minister said how impressed she was with ESO and spoke about her concern that the NOVA funding was not guaranteed beyond 2008. Then she announced that she would extend the Scheme in order to protect what had been accomplished. In my reply I first put on my hat as chairman of the NOVA Board and thanked her, before I expressed the appreciation of ESO for her visit and her support of European astronomy.

[51] The ALMA work force is organized in so-called Integrated Product Teams or IPT's. The site IPT comprised

Figure 36: Minister Maria van der Hoeven in one the domes of the VLT unit telescopes.

immediately to the Observing Support Facility (OSF) just below 3000 meters and shown the progress in the construction of ALMA. We then had lunch in San Pedro and visited the center with its very nice museum. Before dinner we made the almost obligatory visit to the 'Valle de la Luna' (the Valley of the Moon), where we saw a beautiful sunset.

The next morning we rose early and went up to the high site. Originally the planners in the Ministry had wanted to speed up the visit and provisionally planned this for the previous afternoon. But there is a very strict rule at ESO that no-one is allowed to go up to 5000 meters directly from sea level and everybody has to spend at least one night at 2500 meters or so. By that time we had spent a night at Paranal and one at San Pedro, so this requirement was fulfilled. Interestingly, the Ministry had checked with me, that indeed this was a strict rule. After these precautions every visitor to the high site has to sign a declaration of good health and to take responsibility for undertaking the trip. It was cloudy weather (at least during the morning) and at 5000 meters it was freezing and very windy. The Minister was dressed a bit too lightly and when it was noted she was not coping well with the circumstances she was quickly given an extra coat, after which she felt quite a bit better. In view of the effects of the previous visit at the time of the groundbreaking, my wife did not come along to the top.

After returning to San Pedro, we flew back to Santiago in what in the first part turned out to be a very bumpy ride. The Minister was taken to her flight back to the Netherlands by the

mostly the local team in Chile that is concerned with the coordination of the construction work in the Chajnantor area.

ambassador and Corry and I were taken back to the ESO Guesthouse. The next day we attended a big party in the evening, where Daniel Hofstadt said goodbye to the various ambassadors in Chile and other Chilean officials. For this purpose the patio of the Guesthouse a big tent was erected. All speeches, except mine, were in Spanish. The next day Corry and I still had a very nice private lunch at the home of Daniel and his wife Sonia and in the afternoon we left for a leisurely private return trip with visits to Lima (Peru) and to Bonaire and Curacao in the Netherlands Antilles.

The press release concerning the Minister's visit has been reproduced in Appendix VIII. This contains some more pictures of this remarkable trip.

Figure 37: Top: The Dutch delegation posing in front of the flag of the Netherlands at the site of the ALMA OSF. Bottom: Minister van der Hoeven watching sunset at the Valley of the Moon. Tim de Zeeuw on the left en Cornelis van Bochove on the right.

Figure 38: Top: The Chajnantor plane at 5000 meters during out visit with the Minister. Bottom: Minister van der Hoeven just before she kissed me on my cheeks, thanking me at the end of her visit to Chile and presents a beautiful pen-drawing of the 'Ridderzaal' near the Dutch parliament in den Haag to me.

15. ALMA antenna procurement and other ALMA matters

After the groundbreaking in November 2003, the next ALMA Board meeting had been held at NRAO, Soccoro, New Mexico on March 30 and 31, 2004. This was a relatively quiet meeting. Already at the previous meeting in November in Chile there had been a formal representative from Chile, Leo Bronfmann, as had been stipulated in the agreements. The most heated discussions were the matter of the location of the ALMA offices in Santiago and the manner in which to hire local staff. None of these were resolved. ESO had offered a piece of land on the premises of the ESO Vitacura offices, but AUI did not like this option, as it would in their opinion associate ALMA too much with ESO. The fact that there would be a fence in between the two buildings and ALMA would have a different entrance and address (even a different street name) did not help. There was also an offer from the Universidad de Chile at Cerro Calan. Only in the course of 2005 did AUI agree to the Vitacura option. The Board asked Massimo to look into options for a temporary renting of office space in Santiago in the mean time. The other issue was the hiring of local staff, which could proceed by hiring of half by each of the partners with the difficulty of different hiring conditions and legal status among the Chileans, hiring of all personnel by one of the partners with financial compensation from the other or the establishment of a separate company, financed jointly by ESO and NRAO that would hire local staff according to local conditions. This issue also generated much tension. In fact it was still not solved when I came to the end of my term as Council President!

During the meeting the search committee for key personnel had a few interviews, one for project manager, one for project engineer and two for project scientist. The first after a few months led to the hiring of Tony Beasley (an Australian, who was project manager for Anniela's CARMA project in California) as Project Manager and Rick Murowinski from Canada as Project Engineer. The interviews for project scientist led to one offer, but the person concerned eventually declined for private reasons. In Europe in the mean time Dick Kurz (who was already beyond his retirement) had been replaced by John Credland, who retired from ESA and had actually chaired the AMAC in the previous year.

Afterward we were shown the prototype antennas (both the bilateral ones and the Japanese one) and were informed on the progress of the tests that were ongoing at the time. Corry had come along on the trip again (the previous week I was at a meeting in Baltimore, where the proposal for Hubble Space Telescope were selected and we had met on Saturday before the Board meeting in San Francisco) and we had a leisurely trip from New Mexico to Los Angeles by car, from where we flew back home.

The next Board meeting took place on June 22 and 23, 2004 at the headquarters of the Max Planck Gesellschaft in central München. The Board did agree on most issues in a new version of the ALMA Project Plan, which would be approved at the next Board telecon (June 8) and made good progress on the discussions of a draft Operations Plan, that Massimo and others had been working on.

The meeting was chaotic. The fact that Massimo in fact was the only senior person in the Joint ALMA Office (JAO) resulted in a very late arrival or often even absence of meeting papers. Very little was accomplished and it was clear that in this way the project would be in serious trouble. It was hoped that the arrival of Tony Beasley and Rick Murowinski would help setting things straight soon.

The procurement of ALMA antennas moved on a long and torturous road. In 1999 a call for tenders was issued for the construction of two prototypes based on identical specifications. North-America (AUI) had chosen for Vertex RSI (USA) as contractor and Europe (ESO) a consortium led by Alcatel (France) and EIE (Italy). Originally in the Proposal for Phase 2

(December 2000) the prototypes were planned to arrive at the VLA site in Soccoro, New Mexico (USA) toward the end of 2001. Then a joint Antenna Evaluation Group (AEG) would be set up to extensively test the prototypes and on the basis of tenders AUI and ESO would each order 32 antennas, preferably from the same contractor. In fact, the Vertex prototype was only available for testing in March 2003, while for the Alcatel one it was as late as January 2004. The executive summary of the AEG report was published on May 28, 2004. This concluded that both designs were likely to meet the technical specifications, although there were some doubts about the Alcatel prototype concerning the pointing performance, but this could not be investigated as a result of an accident with the motors what made the antenna inoperable.

The procurement procedures at AUI and at ESO were separate and under quite different legal regimes. It would result in two separate contracts for 32 antennas each, preferably from the same contractor for scientific, operational and financial reasons. But the two procedures were conducted by AUI, ESO and the JAO in close mutual contact and exchange of relevant information on a basis of strict confidentiality. The tenders were opened on May 3, 2004 in a teleconference between ESO, AUI and the ALMA director. They did find out that the price per antenna was much higher than anticipated, such that each partner could afford only 25 or so of these. Of course, this remained for the moment strictly confidential and I also found out much later (actually during the summer, when Catherine felt that with all the things that needed to be done I had to be informed). Next ESO and AUI established a Joint Technical Evaluation Team (JTET) to evaluate the management proposals, project plans and schedule proposals from the bidders. This submitted its report in June 2004.

All these things were done in strictly confidential procedures by the executives. I (even though I was President of Council and chair of the ALMA Board) did not learn much more than a few general pieces of information until some time during the summer of 2004, when I did hear the broad picture. The members of the ALMA Board were only informed in some detail during the fall of 2004. Also the delegates to Council were not informed at any level, which is usual procedure in ESO, as such matters are treated by the Finance Committee and details on contracts are only made available to Council after the FC approves the proposals that the Director General makes. Normally the FC decides on contracts to award, but in this exceptional case (both in money involved and in scientific and other impact) Council wished to give the final go-ahead.

On September 3, 2004, Ian reported on behalf of Catherine, by email to Council, FC and EAB, that the executives had decided that *"in order to accommodate funding profiles, it may be necessary to consider procurement approaches that provide for the possibility of less than 32 antennas"*. The new European Project manager John Credland reported at an EAB Telecon on September 23, 2004, that AUI (Ethan Schreier had taken over from Riccardo as President of AUI) might seek approval from NSF to place a contract in advance of any submission of a proposal to Council and the FC. In the USA there was very much concern, that failing to place a contract soon (the offers were valid only until October 1) would seriously endanger the ALMA funding in NSF or even to the extent that the US Congress would scrap it altogether. Also there always was a risk in a further escalation of the prices if it were tried to extend the validity of the bids. In the end AUI did agree in an extension of the bids until December 15, which was allowed by all bidders.

At the Committee of Council meeting of September 30 - October 1, 2004 in Rome, Council delegates were informed only in very general terms about the progress of the procurement. This was met with concern by the delegates, who wished to be informed in more detail. Prior to this Catherine and I were invited to have a meeting with the Italian Minister of Science, which I could not make when it was put a few hours earlier than anticipated. In this meeting the

Figure 39: This picture shows part of the Observing Support Facility. It was taken during the meeting of the ALMA Board in November 2004 at that facility. On the first day we enjoyed a barbecue at lunchtime on this patio.

Minister put a lot of pressure on ESO to sign a contract with the French-Italian consortium. Clearly, the whole issue (after all a contract well in excess of 100 M€) was dividing Europe. Tensions started to run high, also in Council.

Catherine did give Committee of Council a more detailed report the second day to satisfy the requests by the delegates. First she reported that the outcome of the tests was that both designs seemed to be able to deliver antennas to ALMA specifications. She also did mention that the prices quoted (and valid until October 31, 2004) we higher than expected and at the present prices a full set of 32 antennas by each partner was not affordable. The possibility of purchasing less than 32 antennas each was explored by both ESO and AUI. The time-line expected was that both parties would try to extend the validity of the bids to December 15. ESO would then prepare a proposal for the FC towards the end of October. To this end there would be a Council telecon on October 25, at which Catherine would seek approval of sending a proposal to the Finance Committee, which would then meet on November 15 and 16, followed by final approval in the December Council. In the mean time there would be an ALMA Board meeting in Chile and in the course of November also a meeting of the EAB.

Here it should be remarked that in the USA the process is rather different than the European one. On the basis of the tenders, AUI made a choice of the most promising contractor and would start negotiations with that bidder only towards a contract. The other bidder (AUI had two bidders) was then informed of this and told that if the process with the other bidder would

Figure 40: Looking back into the valley with the salt-lake (the Salar de Atacama) from the OSF.

prove to be unsuccessful they would hear again. In Europe the negotiations are done with all bidders and a final choice made on the basis of the outcome of all these negotiations. AUI had chosen for Vertex in early September (it had concluded that the other bid was non-compliant), but that was at that time information that was not public. There was also concern in Council that the process would lead to a different choice by the two partners. It was also revealed that ESO had received three bids.

The reason for the (as it turned out) sharp increase in prices for the antennas had to do with economic developments. The antennas are made from considerable amounts of steal and fiber and since the budget for ALMA was drawn up (after consultation of course with industry) in late 2000, the prices of crude oil and steel had gone up appreciably. It was sometimes suggested that the costing for ALMA was done rather sloppily at the time, but the strong increases in antenna costs certainly had been to a large extent been due to factors at work beyond the control of the executives.

The AEG executive summary and final report did state the limitations of the tests and had concluded that it was not able to definitely *confirm* that the designs would satisfy the ALMA technical specifications. Additional measurements under identical conditions could not be taken. AUI and ESO convened an Antenna Technical Working Group, which reported on September 29, advising that additional measurements be taken. An addendum was issued on November 17, 2004. The conclusion was that the results were not unambiguous and a new set of measurements on both prototypes was necessary. This meant that the time-line had to be revised. Already Catherine had decided that she could not in time prepare a report for the FC by the end of

Figure 41: This picture was taken during the meeting of the ALMA Board in Chile in November 2004 when we visited the Valley of the Moon to observe sunset. From left to right: Catherine Cesarsky, Richard Wade, Lewis Knee, Bob Dickman, myself, Ethan Schreier(?), Jim Hesser, Massimo Tarenghi, Mrs. Lo and Fred Lo.

October and had planned an extra meeting of the FC just before the Council meeting. Preceding that there would be a Council telecon on November 19 where Council would decide that the proposals prepared by Catherine would go to the FC. But even that now had to be abandons.

The sixth meeting of the ALMA Board (the last one that I chaired before Bob Dickman would take over as chair and I would become vice-chair) was held at the OSF in Chile on November 2 and 3, 2004. Before this there was a small ceremony in Santiago at the opening of the ALMA offices. These were on a single floor, which was rented in a tall office building. I missed this occasion but did pay a visit on my return trip after the meeting as I was coming through Santiago. At the Board meeting it was noted that at the current prices only 25 antennas per partner would be affordable. In the mean time we did have a JAO that consisted of more than only a director among the key personnel and it obviously helped enormously. The most important item was the overview of the project and the need for an in-depth look at the costing. Tony Beasley proposed that a thorough review of all cost items be performed followed by a 're-baselining' of the project, which meant seeing what the actual cost would be and what was necessary in terms of de-scoping. It was obvious that the arrival of a manager was a great step forward. The Board also decided to prepare for an 'invasive review' of the whole project after the re-baselining was completed; this was a necessity in the US system in order to report back to congress and apply for funding in future years.

Figure 42: The ALMA offices in Vitacura, Santiago are located on the 18th floor of this 21-floor building. These are the temporary offices that have been rented until permanent ALMA headquarters have been build.

An incident occurred early on in the meeting. Bob and I had decided that the Chilean member (who would not be allowed to vote on issues with a financial implications, which in fact were all important decisions) would also leave the room when financial issues, in particular antenna procurement, Santiago offices, local labor, were discussed. Bob Dickman and I felt that there was no way we could avoid applying the same rules to Norio Kaifu, who in this meeting for the first time was present as a Japanese member with the same status. We actually did ask Kaifu-san to leave at some stage, but it was clear he resented this and was somewhat insulted. We quickly decided that it was important to change these proceedings and from then on we have left both Leo and Norio in the room, except when issues concerning negotiations or other sensitive issues with Chile or Japan were on the table.

On antenna procurement the formal position was reconfirmed that the executives should negotiate with the bidders towards a contract for *"up to 64 antennas, with a minimum number of 50"* and that the aim still was to place contracts with the same bidder and for the same number. The aim was to complete the procurement exercise by December 15, 2004.

Council did hold a teleconference on November 9, where we reported on the Board meeting. There were now bids for 25 + 25 antennas with options to increase this to 32 on each side. Council agreed in a resolution that Catherine should proceed to prepare a proposal for the FC to place a contract for 25 with the option for more. It was planned that there would be

Figure 43: The view of Santiago from the office of the ALMA director.

a teleconference on November 18 by the EAB, followed by one of Council on November 19, where the decision of placing a proposal before the FC should be taken. In fact, at a meeting of the EAB in Garching on October 19, 2004 a resolution was adopted endorsing the principle of contracting first for fewer antennas, but stating that the minimum number was 50 *working* antennas at any time.

In the end the Council telecon of November 19, 2004 did take place, but it was then already clear that there would be no chance that a contract would be placed before the end of the year (from either side!). In the period leading up to this telecon there had been a number of emails on issues relating to the process of the procurement. In particular, Bruno Marano, astronomical ESO Council delegate from Italy, partly privately and partly on behalf of Italy, raised many objections. In particular he complained that Council was withheld information it should have received, in particular the executive summary of the AEG report. It was, I felt, information that was too sensitive to be spread among many individuals at a time when the bidding and negotiating process with potential contractors was still going on. Also, he argued for a slower and careful process and objected to the fact that AUI had already chosen for one vendor[52].

All of this upset me, as I was very afraid that this would undermine the process and was a threat to a successful end of the procurement exercise. After all, some confidential material was

[52]Informally it was known that this was Vertex, as the Alcatel consortium were informed by AUI. There was much pressure in Italy to chose for the Alcatel option. Bruno argued furthermore, that Italy had in recent years had a much too low share of the ESO industrial contracts. This was true, but they had much more than their share in the VLT construction phase.

coming in the public domain and there was always the possibility of legal action by the loosing consortium. So on November 19, 2004, in the afternoon following the Council telecon I sent an email to all Council members. Ian also copied it to all members of the Finance Committee. I reproduce that here in full (with some minor editing):

Dear colleagues at ESO Council,
Leading up to our telecon this morning there has been a number of communications by email, fax and regular mail. In view of this and the current situation I thought it would be useful to review where we are at least as seen from my position as your President, with some additional insight as Chair of the ALMA Board. This may at the same time help inform those of you who were unable to attend this morning's telecon.

The process of antenna procurement for ALMA is the most important step in the realization of the project in that it determines the scope, timescale and capabilities of the telescope. The decision to produce two prototypes was an important step in making sure that the best telescope possible will be built. In the preferred situation these prototypes would have been produced, carefully tested and examined and then the procurement process would have started. Due to delays in the delivery and commissioning of both of the prototypes, the procurement process actually had to start even before both prototypes were delivered and went parallel with the testing and evaluation. And even then further delays in the availability of the prototypes for testing were a major difficulty.

In that ideal case there would have been sufficient time for the FC to consider the contract and approve its award. Council had given a very clear boundary condition, namely that each side would order 32 antennas and that these would be identical. That last condition was a very important one for Council (and I fully support it) and indeed was also endorsed by the ALMA Board and the ALMA director. Clearly no deviation from Council's boundary conditions is possible without the consent of Council. And although usually contract awards are covered by the Finance Committee only, it was decided that Council would review and decide on the procurement after the FC had done its work. I believe that for such an important contract this is absolutely the way to go.

It should also not be forgotten that Council has instituted the European ALMA Board as a body that on behalf of Council advises and gives mandates to the European members of the ALMA Board. This is also the way Spain is involved in the European part of the project at a Board level. Before a (in fact any) important decision concerning ALMA can be made in Council the advice of the EAB needs to be sought. The EAB would also have to advise Council before a decision to go ahead was possible.

So, in Europe the process involves three bodies and that is in my opinion a good thing, since we need to be absolutely sure that we do the correct thing when we place a contract for antennas. However, it takes time and involves quite a number of individuals. Also it means that any relevant information is spread around a fair number of people.

Originally the plan was to conclude a contract award in September. It was not possible to meet that deadline. What complicated the situation even more was that of course the outcome of the antenna evaluation and the bidding process had to be done in confidentiality until a proposal for an award was going to the FC. It did mean that the progress of the procurement procedure could be reported on only in general terms and that reports on antenna evaluation and bids could not be released to members of FC, EAB and Council (and to non-executive members of the ALMA Board!) until it was clear what would be proposed to the FC. The competitive nature of the ongoing tendering process normally requires even less information being disclosed than has been the case here and there is now concern that too much information is getting into the public domain and is now being rather widely discussed.

What complicated the process was that it became clear that within the allocated budget it was impossible to place contracts for 32 + 32 antennas, while there also remained concerns with the technical aspects of the prototypes. And the DG is of course only ready to send a proposal to the FC when it is absolutely clear that contract is right, the prototype concerned within the specifications and all technical, financial and managerial aspects are satisfactorily resolved. As you were informed in our Rome Committee of Council meeting, there was at that time still a possibility that all these conditions could be met before the regular meeting of the FC in November. And we agreed that we needed a series of telecons to keep Council informed and agree that a proposal for less than 32 antennas could be sent to the FC. I supported that since I was convinced that it was to the benefit of the project if indeed this process could be concluded in time. But from the outset everyone involved agreed that only then could a contract be placed if the scientific goals and the specifications of the antennas were not compromised.

Eventually the bidding process progressed such that there was a real possibility to sign contracts for 25 + 25 identical antennas with an option to order more at a later stage. The contracts then would have to be signed by December 15. At the ALMA Board it was agreed that this should be aimed for, but that contracts would only be placed when there was no doubt that the antennas would live up to specification and expectation. Up to a few days ago this still was a real possibility and the time schedule that we agreed on, including today's telecon, would allow for an extraordinary meeting of the FC on December 6 and a contract date of December 15. But there never was any doubt that a proposal to the FC would only go forward if it was absolutely clear that it was complete, firmly based and and that the antennas were within specification. I think the DG has done an excellent job and has insisted always on the integrity of the decision. That no proposal is going now to the FC is precisely the result of insisting on this integrity, just as you and I are determined that we will only move forward when we absolutely believe we are making the right choice.

Now that the DG does not have the required full confidence that a contract can be signed we are faced with a difficult situation. The North-American side is worried that the funding of the project in the US is in jeopardy. With the passing of the December 15 deadline any future bids may very well result in a higher cost per antenna, and of course in addition to these uncertainties we are faced with a serious delay in the project as a whole. The ALMA Board has called for a "re-baselining" of the project in view of the antenna procurement process, which will be completed in the first half of 2005 and will involve consultation of advisory bodies such as AMAC and ASAC.

The process forward is that the executives (ESO and NRAO/AUI) and the Joint ALMA Office will meet probably 30 November. They will report to the ALMA Board in the next scheduled telecon on 2 December (which is preceded by a telecon of the EAB). Following that there will be an oral report at the meeting of Council on 7 and 8 December.

The outcome reported today is of course disappointing. Still I am very grateful to all persons who have worked so hard and long to try and make the very tight schedule.

I hope to see you all on December 7 in Garching. With best regards,
Piet van der Kruit

To conclude this phase of the proceedings regarding antenna procurement, Catherine wrote a letter to Bruno Marano, commenting on his points raised in various emails. In particular she referred to my email above for the general issues, but did address in detail some of his general points. This letter was copied to Council members. Bruno sent a courteous note back to her on November 26. We had also received (on October 28, 2004) a letter from the Italian Minster of Education, Universities and Research, addressed to me and faxed through the Italian ambassador in the Netherlands. Attached was a letter sent to Catherine by Piero Benvenuti,

Figure 44: The meeting of th ALMA Board in April 2005 was held on the Caltech campus. The actual room is in the center of this picture at the bottom of the Millican Library, where the Board of Trustees of Caltech and other high committees of Caltech meet.

the head of the 'Istituto Nazionale di Astrofisica' (INAF) and senior spokesman of the Italian astronomical community. Both expressed their concern on the process of the procurement. We answered these letters politely, stressing the need for a careful process and ESO's commitment to do the best for European astronomy and industry.

At the December meeting, John Credland summarized the situation at that time, the most important item being that a new plan for a set of measurements and tests of the prototypes was being set up and would be carried out the next few months. In the mean time the re-baselining would proceed and the costs of operation would also be considered as Council felt that an important element in the discussion was also the so-called life-cycle costs, which meant both construction costs and maintenance and operation over a reasonable period of time. The timescale envisaged was completion of the tests by February or March, after which there would be requests for new or extended bids valid to July 1, 2005, and for a number of 25 for each partner with an option to extend this to up to 32. This latter addition left ALMA a 64-antenna project, so that no new fundamental decision or change to the bilateral agreement was necessary for the moment. I regard this as an end to the first phase of antenna procurement. It would remain silent for some time, while the detailed tests were carried out.

As far as I am concerned the second phase started with the meeting of the ALMA Board on April 6 to 8, 2005, in Pasadena, California. Again Corry went along an we had made a visit to people we knew near San Francisco and taken a beautiful drive through Yosemite National Park

back to the Los Angeles area. Afterward we spent another nice week near the coast between Los Angeles and San Diego. At the Board meeting we heard progress on both the antenna testing, which was almost completed, and the re-baselining effort, which was progressing to the point where some likely outcomes were taking shape. Effectively, the situation was that both antennas seemed to conform to specifications, while the first estimates in the increase in cost for ALMA construction were in the neighborhood of somewhere around 80 M$ for all parts except the antennas (and assuming a 64-antenna array).

Various de-scopes were considered, among which drastic things like limiting the maximum baseline for the moment and deferring 2 out of 4 sub-arrays or one or two frequency bands. Of course, if the number of antennas went down, so would the number of receivers. The analysis presented indicated that the project could afford a 50-element ALMA with roughly the same science capabilities, if an additional 80 M$ were allocated to the project. The Board adopted a resolution, which read: *"The ALMA Board endorses the procurement of at least 25 antennas by each ALMA Executive. The Board recognizes that concomitant de-scoping may be required. The Board identified possible options."*

The Joint Antenna Testing Group (JATG), which the JAO had generated, reported back by middle of April, stating that both designs were likely to meet the ALMA Technical Specifications. Consolidated offers were asked again and received. At the meeting of Committee of Council of March 1 and 2, 2005, in Garching, there was not much progress yet to report, so Council had a teleconference on April 27, 2005 at which the delegates were informed of the developments. At this meeting also the outcome of a written procedure for the appointment of a new European Project Manager was reported (Hans Rykaczewski was subsequently appointed).

At the time of this telecon the proposal from Catherine which vendor to select and which contract to sign concerning the antenna construction, had been sent (actually on April 15, 2005) to the Finance Committee that would meet on May 10 and 11, 2005. On the basis of the bids and the estimates for the life-cycle costs the Vertex design and bid was preferred and the FC was invited to approve the contract with the Vertex consortium for the purchase of 25 antennas with the option to buy more up to a total of 32. AUI was at the time working on the details for a similar contract for their share. The deadline for signing the contracts was July 1, 2005 and the time-line foreseen was Finance Committee on May 10 and 11, Council on June 6 and 7 in Helsinki, EAB on June 8 in Helsinki and final approval by the ALMA Board on June 21 and 22 in the Hague.

The first step was the Finance Committee in May. I was not present myself (I was traveling to Chile in connection with the visit of the Dutch Minister), but this is what was reported to me. The meeting was chaired by Rowena Sirey and during the first day there were various issues raised about the process, the increase in costs for the construction of ALMA and the uncertain outcome of the re-baselining and possible de-scoping of ALMA. From what a later heard, the consensus seemed to be that it was very uncertain to what extent ALMA was affordable, which was of course a matter for Council and not for the FC. More time was supposed necessary before a decision could be made. On the second day the FC decided on the following. It adopted resolutions to the extent that it first needed assurance from Council that ALMA were affordable and second that if a vendor was selected then on the basis of the offers received it would go to Vertex. Council would have to adopt a resolution on the affordability in Helsinki and there would then be sufficient time for the FC to give final approval for the signing of the contract in time for the deadline of July 1. Everything seemed to be moving in the right direction. I was informed of this by Catherine upon my arrival in Chile (Corry and I had traveled via Sao Paulo, where we stayed overnight and Catherine had left immediately after the FC, arriving about the same time as we in Santiago).

After the Minister's visit Corry and I spend a 10-day vacation in Lima and on the Islands of Bonaire and Curacao in the Netherlands Antilles. There seemed little problem in the period leading up to the Council meeting in Helsinki until a few days before the meeting started. Catherine and Ian had prepared a final version of a paper that outlined the costs of ALMA in view of the preliminary outcome of the re-baselining and the bid for the antenna production. The rough figure was that ALMA would need another 70 M€ or so, but the paper showed that with the assumption of Spain joining ESO there was no danger for the program ESO had in mind, including an important share in ELT developments. I had asked all delegations to let me know if there would be any problems with the preparation for the meeting. France and Italy never replied to me, but I was not counting on them at all to vote for the awarding of the contract (technically to vote positively on the affordability of ALMA). I also had some indication that Portugal was having difficulty to agree to an increase in the ALMA cost, but with these three countries opposed there seemed no reason not to expect a positive outcome of the Helsinki meeting, especially when I was informed that the UK was in favor.

Then on the Wednesday before the meeting (June 1, while the meeting was to start on Monday June 6) Andreas Drechsler called me with the news that Germany would not support the affordability resolution. This was completely unexpected, since after all German industry would profit considerably from the contract. I don't know what went on behind the scenes, but the formal German position was, that they could not support the affordability of ALMA unless there was more certainty that it would not escalate. And that certainty could only be obtained after the final outcome of the re-baselining and possible de-scope. I heard this as I was about to leave for a national strategy meeting in Utrecht, and quickly sent an email to Catherine.

In the next few days we did all we could to try and change the German position. Both Tim, Catherine and I talked to the German astronomer on Council (Ralf Bender) and Catherine got some very senior German astronomers (Reinhard Genzel, Karl Menten and others) to contact their Ministry. But on Friday the news came that the German position would not change, even though it brought their position the antenna contract, and as a matter of fact the whole ALMA project, into jeopardy. There was some indication that a change in senior people had had an effect on this as well, as these were not willing to stick out their necks on a project that they were unfamiliar with and which was not carefully costed. Germany felt that a delay of a few months would help build a much more convincing case financially. I felt it might very well be the end of ALMA.

The Helsinki meeting was dramatic. I did make a 'tour de table' on the issue and clearly there would not be a majority. Even had there been one in terms of number of countries, there would have been three major countries voting against, and I certainly would not have allowed such a vote to take place. Tensions really ran high and the Italian delegation claimed that the whole procedure had been handled incorrectly and even in a illegal manner and they threatened legal action by the Alcatel consortium and even for Italy to pull out of ESO! And all of this in an open session! The argument that the total price of ALMA would not be known with any accuracy as long as it was unknown what the antennas would cost (after all the largest single item in the construction budget) and that therefore the outcome of re-baseling would not result in a more reliable estimate of the total expenditure as long as there was no antenna contract, did not convince anybody. I was in a very sad mood and was very concerned that the whole ALMA project would come to an end. Council in the end adopted a resolution in which it *"re-affirmed its strategic commitment to ALMA, would base its procurement of ESO's share of the antennas on a sound financial basis which requires progress in re-baselining, and that is was therefore unable to offer Finance Committee the assurances on affordability that it had requested and requested the ESO Executive to report as soon as possible on the options open to ESO and*

Figure 45: The 'Alcatel', 'Vertex' and 'Mitsubishi' prototype antennas at the test-site near the VLA in New Mexico, U.S.A.

on possible ways forward".

We spent quite a bit of time in closed session reviewing options on how to proceed from here. It was felt that simply asking for an extension of the bids until September (the report of the re-baselining effort by the JAO was expected in September) would be difficult and could easily lead to legal action from whichever consortium would loose in the process. In any case it was felt that at least half a year was a safe delay with the start of a new tender and then it was necessary to essentially start the whole process from scratch. And it would without much doubt result in a further increase in the cost of ALMA in addition to a considerable delay. It was acknowledged by many delegations informally that this might actually be the final blow to the project.

This prediction was also not unrealistic in view of the situation in North-America. After all, AUI was getting ready to sign a contract with Vertex, but of course would have to count on ESO signing a similar contract, since the price AUI would have to pay for their antennas did depend on whether or not a contract with the same vendor would be signed in Europe. And there still was the real possibility that if no contract were signed before July 1, either higher levels in NSF or Congress itself would simple scrap ALMA. The ALMA Board would have to give the final approval of any procurement decision and if North-America would be willing to go ahead by themselves and sign a contract for their antennas the Board would have to concur. During the meeting of Council I asked Council to give us as European members of the Board the mandate to not oppose a possible wish of North America to go ahead. Fortunately Council did give us that mandate. Had Council refused that we would have been in even more trouble.

We did have a meeting of the EAB immediately after Council, also in Helsinki. The members

Figure 46: The 'Alcatel' prototype antenna at the VLA site.

of the EAB that were not in Council drafted a statement that said among others: *"The EAB is profoundly disturbed by the inability of Council to move forward with the ALMA antenna procurement. Council's resolution will have a strong negative impact on the ALMA project, both in terms of its significant delaying effect and, more seriously, on the credibility of ESO as an ALMA partner. Indeed, it may put the very existence of the project at risk!"* [...] *"ALMA is an important forerunner for future large global projects in astronomy and its success is imperative if such projects are to come to fruition. Council's resolution on ALMA will jeopardize ESO's position as a world leader in such projects and will undermine the perception of Europe as a stable long-term partner."* It was a very glum meeting.

It should be mentioned that I believe that indeed the Italian delegation was under great pressure. Not only was the outcome of a lucrative contract at stake. It was also true that the design by the Alcatel consortium was more innovative and in that sense important for European industry. Also there was much concern in Italy on the industrial return it had from ESO. Over the previous years this was indeed well below their share in ESO. Bruno Marano did stress this and I can see that his superiors had a point from their position. However, they seemed to forget that Italy had had very major contracts in the construction of the VLT; politics has a short memory. The other thing that distributed me very much at that time and later in the process was

Figure 47: The 'Vertex' prototype antenna at the VLA site.

that representatives from the Alcatel consortium started contacting Council delegates. There were extensive faxes that I refused to read (and mostly have not kept) and even phone-calls. The latter were reported to me by other delegates, but I myself was never contacted by phone. Mostly the delegates refused to answer these calls, although a few did. I found and still find this highly disturbing and inappropriate and on the borderline between legal and illegal. I will not comment more on this, but in the end I am very convened that the whole thing might not have been done in a completely clean, honest and open manner.

It was in a very gloomy mood that we prepared for the ALMA Board meeting in the Hague at the Ministry. The Minister herself had looked forward to this in particular in the expectation that at this meeting the important approval of the ALMA antenna contracts were to be taken. She did welcome the meeting in person after she had received a few of us in her office. In private

Figure 48: The 'Mitsubishi' prototype antenna at the VLA site.

she assured me that she would do anything that could help and I promised I would enlist her help whenever the occasion arose, such as in for example talking to her colleagues from other member states if necessary or helpful. In the end this never occurred.

The relation with NSF was also not easy. At the level of contacts between Bob Dickman and me it was OK. I offered to come to Washington if necessary and talk to whoever was important to talk to, but that was not deemed necessary by Bob and Wayne VanCitters. The person that would have to take the final decision on whether to go ahead unilaterally with an antenna contract was the Assistent Director for Mathematical and Physical Sciences, Michael Turner, who then would have to defend the case in the National Science Board. Michael had been worried about the issue and already at an earlier stage had met with Catherine and me. That was on September 28, 2004 early in the morning at Munich airport. I was there for a negotiating meeting with the Spanish delegation and Michael was on his way to Hamburg. He flew through Munich and I came the evening before and stayed in a hotel at the airport. His concern was of course our commitment to ALMA, the selection of both sides for a single antenna design and differences in the process of procurement between the US and Europe. We did have a discussion of an hour or so and felt that it at least clarified some of the issues. In particular we did explain how the procurement procedures and rules were different from those in the USA because of different legal regimes under which these were carried out. Michael kept a closer grip on the ALMA matters; for example he had wished to come to the Pasadena Board meeting in April 2005, but was unable to and sent Wayne VanCitters (who is in between himself and Bob Dickman in the hierarchy).

But with the inability of Council to close antenna procurement in June 2005, he had to make the choice to go ahead unilaterally with a contract and hope that ESO would follow (and hopefully choose the same design) or not place a contract and have a real chance of the ALMA project to be terminated. Not an easy choice. Michael is a theoretical physicist/astrophysicist from Chicago. He announced that he and his deputy, Judith Sunley, would come to the den Haag meeting of the Board on June 21 and 22, 2005, and proposed that they, Catherine and I would have a dinner before the meeting. We did so indeed (it was an excellent dinner, but we did have other things on our mind) and his business really was to feel us out on the chances of ESO proceeding with ALMA, what choice we would make and on what timescale. He was all the time making up his mind on whether or not to go ahead and sign a contract for ALMA antennas. In the end he left after the first day of the Board meeting and on his way back sent an email in which he indicated that he was still undecided.

The Board of course noted the situation in Europe and the resolution adopted by Council. From its side, AUI presented two resolutions from their Board of Trustees, one in which urged NSF to approve the AUI contract for the North-American antennas and another in which they welcomed *"ESO Council's reaffirmation of its strategic commitment to ALMA and encouraged ESO along with the ALMA Director and the ALMA Board to take all necessary steps to ensure the success of the project"*. Massimo as director of ALMA recommended that in order to move forward with the project AUI would and should proceed and sign the contract for their share in the antennas. His arguments were mostly that further delay would result in a substantial cost increase in the project and urged all parties to proceed as quickly as possible.

In order to make this possible and with the mandate that I had had the presence of mind to have asked from Council, we as European members of the Board made a statement, which said that *"the European members of the Board listened carefully to the Director's arguments and we are now prepared to vote in favor of the Director's proposal to recommend that AUI proceed to contract for antennas. We do so in the interest of the project as a whole and in spite of the fact that ESO is not yet ready to place a corresponding contract"*. The Board then approved a resolution, in which it concurred with the director's recommendation that AUI proceed with the issuance of their contract, noting that this required NSF approval. Also a final resolution that was adopted, which stated that *"the Board notes the ALMA Director's clear concern of the risk to the cost, schedule and viability of the project, and endorses his statement that all concerned must take every possible step to minimize delays in the antenna procurement processes"*.

The Board also addressed the related issues of the re-baselining effort and the preparations for the 'invasive review', which was now renamed the 'cost review'. The results of re-baselining would be available by September 8, 2006. The cost review was to take place in October and Bob Dickman and I were charged to make a proposal for persons on the review panels during the summer months.

In the end Michael Turner did stick out his neck and approved the contract AUI was negotiating with Vertex. We were notified of this by Ethan Schreier as President of AUI and heard that the date of the signing ceremony was being set as Monday June 11 in Washington. I was invited to attend as a courtesy, but had no time to do so. So the summer started with the uneasy situation, where North-America had placed a contract for 25 antennas with an option for more up to 32, and ESO had no idea where it would be going. Ian asked legal advice, since any measure to try an speed up the process (such as re-issuing a call for tenders on a short timescale) might lead to legal action later on and it was not clear at all where ESO stood.

There was a teleconference with Council on June 27, in which we informed Council on the outcome of the ALMA Board meeting. In addition I reported that I had just heard that morning that NSF had approved the contract that AUI had proposed for the purchase of 25 or up to 32

Vertex antennas. Ian reported that legal advice had been requested and the outcome was that in effect every course of action that was possible would have a risk of legal challenge. There was much discussion on whether or not to try and extend the Call for Tenders (CFT), or whether a new CFT was required. It was suggested from a number of sides that a preferred course of action was not to terminate the current CFT, which would certainly involve a substantial delay, but try instead to extend the current offers and try a very quick procedure to get a European contract secured.

This was really interesting and completely different from feelings in Helsinki. It looked as if Council delegates had come to realize what damage really was done in Helsinki and were trying all they could to recover from this. I am sure that the fact that AUI/NSF went ahead and were contracting for antennas must also have played an important role. It was of course necessary to await the outcome of the re-baselining (available by September 8) in order to fulfill the condition so vehemently imposed in Helsinki that a good costing of the project was required to proceed, but there was no insistence on awaiting the outcome of the cost review, while it now did seem to be accepted, that the full cost of ALMA would not really be known until the cost of the antennas were determined. The intention was so strong that on the spot I proposed and it was decided to have another teleconference in three days (on June 30). At that teleconference the course of action was set out as follows: (1) request an extension of the validity of the current offers (to October 31, 2006); (2) provide Council with the outcome of re-baselining as soon as it would become available; (3) let the Executive set out the impact on ESO's in the MITP and LRP[53]; and (4) hold an extraordinary Council meeting in September.

In order to facilitate all this and to ensure a maximum chance of success, Catherine, Ian and I set out a carefully planned agenda or sequence of events for the process. First Catherine and Ian would revise as much as possible the document of May on the affordability of ALMA, such that it could be released almost immediately after the outcome of re-baselining would become public. We envisaged there would first be a meeting of the Science Strategy Working Group on September 6 on the perspectives on the basis of the information then available, then as the results of the re-baselining would become public on September 8 this would be followed by a meeting of the European ALMA Advisory Committee ESAC (eventually took place on September 14), then there would be a face-to-face meeting of the European ALMA Board (September 15) and an extra meeting of Committee of Council on September 16. If all went well then the planned meeting of Committee of Council on September 29 and 30, 2006 in Brussels could be partly turned into a full Council meeting where a vote on the affordability of ALMA could be taken. Then FC could meet in early October to decide on the award of the contract, which could then be signed before October 31 after Board approval by telecon.

The process from then on went smoothly and as planned. The results of the re-baselining were presented on time. The total cost of bilateral ALMA was put at just over 550 M$ (Y2k). This was an increase of 150 M$ compared to March 2002. The sharpest increases were in site development (50 M$), management and administration (30 M$) and system engineering and integration (27 M$). Catherine and Ian prepared a very good paper on the affordability in view of the re-baselining effort and ESO long term scenarios 2005-2025. Effects of delayed operation of ALMA, costs to be contributed to extension of the Garching Headquarters, La Silla/Paranal operations, etc. were taken into account, just as it was assumed that the accession of Spain would take place. The re-baselined 50 antenna ALMA project showed an increase for ESO in the total cost of 90 M€, including 40 M€ contingency (both in current prices). The long term scenario's envisaged significant expenditures on an ELT after 2011 or 2012 at a level of 70 M€

[53]These are the Medium Range Implementation Plan and the Long Range Plan, later called the Long Term Perspectives or LTP.

or more per year.

The EAB and Committee of Council indicated that there would be no further problems with the affordability issue. So, at the September 16, 2005 meeting of Committee of Council it was decided to have a special Council meeting during the meeting of Committee of Council in Brussels on September 29. Shortly after the meeting of September 16, I was taken out of action for heart surgery. Fernando took over my duties as President of Council and Richard Wade those as vice-chair of the ALMA Board and chair of the EAB. In Brussels Council adopted a resolution, which ended with the words: *"[...] decides that the estimated increase* [...] *in the cost to completion of the ESO share of the bilateral ALMA project is affordable and compatible with ESO's strategic priorities, and having considered the legal advice provided by the ESO Executives, requests the Finance Committee to proceed and decide on the proposal to award a contract for production of the ESO ALMA antennas"*. Indeed, on October 5, 2005, the Finance Committee awarded the contract.

The major thing that had happened between the meeting of Committee of Council on September 16 and the meeting of Council on September 29, 2005, was the change in the vendor. At Committee of Council the statement was still made that both bids had been extended, but that important changes had occurred in both offers. However, it was acknowledged that the way things stood the same vendor would probably be selected on the same arguments as before. Vendors might still send a clarification (Vertex on the effects of the contract already secured with AUI on the current one and Alcatel on fixed price possibilities), but it was expected that Vertex would win the contract. The communication from Alcatel appeared early the next week and it made the Alcatel consortium bid suddenly more attractive than the Vertex one. It is not clear why this occurred at this particular time, but it did happen after the Committee of Council meeting where it was stated that if things would remain as they stood, Vertex would win. This was very confidential information of which we must trust that it did not go beyond the Council room. In any case, the communication from Alcatel was just in time to tip the balance in their favor and change the vendor in the proposal that Catherine sent to the Finance Committee on September 21. Under the rules and procedures of ESO she had no other option than to choose for the Alcatel consortium. It will always remain unknown whether or not information provided confidentially at Council ended up with Alcatel, but everything is consistent with that.

In the end the Finance Committee approved the proposal to sign a contract with the Alcatel consortium and this was done on December 7, 2005 (see Appendix IX for the press conference). It did give rise to major difficulties in the relation with AUI, which now was faced with an increase in their costs for antennas, because that there would be no possibility for recurrent costs to be saved. At the ALMA Board meeting in Santiago on November 1 and 2, 2005, this was all explained in great detail. There was a long and involved discussion of the effects of two different designs, especially on the science. It was concluded that these effects at the moment were not seen to be very large, risks being small although it was also uncertain how small. In the end a resolution was adopted, in which *"the ALMA Board concurs with the Director's recommendations that the European Executive proceed with the issuance to procure its share of the ALMA antennas"*. NSF did however state that it wished a 'delta cost review' concerning the impact of procuring two different designs for the antennas.

The Cost Review took place in October. During August Bob Dickman and I had various exchanges and in the end we proposed to the Board that the Cost Review Committee be chaired by Steve Beckwith and that the vice-chair would be Thijs de Graauw. Steve had not long before ended his term as director of the Space Telescope Science Institute and Thijs was active as P.I. on an important instrument, HIFI, for the ESA infrared mission Herschel. Interestingly, I first suggested Steve and Bob first mentioned Thijs. Steve and Thijs together with input from Board

members drew up a membership list and a distribution of tasks. The Committee met for four days (October 13 to 16, 2005) in Garmisch-Partenkirchen. The final report was very positive. In brief terms the committee concluded that: *(1) The science capability of ALMA remains compelling. As designed, ALMA will be one of the most important next generation facilities for astronomical research and will remain so for several decades. (2) ALMA's technical readiness level is high. There is little risk that the project will be delayed because of technical issues. (3) The overall management structure is adequate to carry out the project, if each part executes its functions expeditiously. (4) Each Integrated Product Team (IPT) is being managed well. Each IPT has developed robust plans to deliver the individual elements of the observatory. (5) The detailed project plan is realistic, contains adequate detail and contingency for cost and schedule in most areas. There are no obvious impediments, major items overlooked, lack of coordination, or lack of planning among the major work elements. (6) The estimated operations costs appear to be adequate and not excessive. At an annual rate of approximately 7% of the capital investment cost, the cost is comparable to that of other astronomical observatories scaled to the size of ALMA.*

At the end of 2005, when I ended my term as President of Council, therefore ALMA seemed back on track. The ALMA Board was functioning well, antennas had been ordered, construction had been started, the JAO was staffed and functioning[54] and the involvement of Japan was secured. From the European side the accession of Spain was decided, which was absolutely necessary for ALMA to be affordable on the one hand and for important initiatives for ELT activities by ESO to be possible. Also we had succeeded in solving the important issues of the level of contribution and of weighted voting in time for this. And ESO had committed itself for a major involvement in an ELT. I had missed the final meetings where some of the important decisions were formally taken. It is always a pity to be absent at the *moment suprême*, but it was gratifying to know that the things I knew had to be brought to a successful completion before the end of 2005, were indeed resolved and completed.

There were three important ALMA items that still needed attention and were not concluded by the end of my term. The first was the matter of the location of the ALMA headquarters and the second was local labor in Chile. The first had been discussed and there was a consensus that a permanent building would be put on the ESO premises in Vitacura with a different address and no connection between the buildings. The local labor issue was still an open one, which was of great concern to everybody. Both NRAO and ESO had started to hire Chilean labor on temporary contracts until this matter was solved. Late in 2005 (when I was not involved anymore) the two issues were linked as part of a single issue with compromises from two sides. In January 2006 a delegation of Council traveled to Washington and there a compromise was reached whereby AUI conceded on the issue of the location of the headquarters (although my understanding is that this concession had been done months earlier) and in return ESO would allow AUI to hire all local staff. And the third is that we were unable to find a Project Scientist, even though we did interview two more candidates during the den Haag meeting of the ALMA Board. For the moment the tasks rotated among the regional project scientists.

[54] Although Bob Dickman and I had had to come to Santiago in August 2005 because of severe difficulties between two persons in the JAO. This visit (only about 24 hours in Santiago for me) was kept secret; ESO staff in Chili never knew about this. It was all organized quietly by Catherine's office. It did solve problems for a while, but Bob and I were far from confident the persons would be able to collaborate well on a long timescale.

16. Conclusion

In this account of five and a half years in ESO Council, I have not mentioned any of the exciting scientific developments, nor many ongoing developments at Paranal. During my term in Council the full set of four unit telescopes of the VLT came into operation, the suite of first generation instruments came on line, interferometry started on the VLTI, the first auxiliary telescopes appeared on Paranal, there was progress with the VST (VLT Survey Telescope) and the construction of VISTA was underway. I have not discussed that in any detail, and of course it is part of the public record in the form of press releases, articles in the *Messenger*, annual reports, etc. But the one story that I would like to mention here is the incident with the VST mirror.

During transport of the VST mirror in May 2002 to Chile there had been an accident along the route. During a stop-over the ship that was transporting the mirror was being partially unloaded when apparently an accident occurred involving the death of a person. In that process the container with the VST mirror had to be displaced quickly and apparently this was done in an incorrect manner and the contained had been dropped. The mirror was completely destroyed in this process. When Council visited Paranal in March 2003 we saw the container and I asked if we could look inside. The container was opened and indeed the mirror was broken into many larger and smaller pieces. I have never seen a more sorrow sight as an astronomer.

In addition to the many issues described here I think I also could take credit for two changes in the procedures at Council. The first has been mentioned and is the introduction of more scientific discussion in Council and the formation of the Science Strategy Working Group. But also astronomical arguments became an important part of any deliberation where they are a genuine part of the pros and cons. The second thing is that I insisted on less formality. So, I addressed during meetings everybody by his or her first name and as a result I started to be addressed as *"Piet"* rather than *"Mr. President"*. So, Martin Steinacher used to say, when I invited him to speak: *"Thank you, Mr. President"* and this became *"Thank you, Piet"*. The older, very formal way of addressing each other was common during the period under Arno Freytag (he addressed the German delegate as *"Herr Mezger"*) and, I assume, before that. I believe informal procedures help to move along to consensus and arrive at decisions.

I already alluded a few times to the fact that I was taken out of action by a heart problem in September 2005 and missed the activities during the last months of my presidency. I have kept ESO and Council informed of this by email, while I was awaiting surgery and recovering from it. I reproduce (with some minor editing) some of the emails I sent.

September 23, 2005
Dear Members of Council,

I am very sorry to have to inform you that I will have to be out of action for some period due to a serious medical problem. I have documented it in more detail below. I will not be in Brussels, and Ian should have contacted Fernando already that as a result he, as Vice-president, will have to chair the meetings. I know this is a very unfortunate timing, but that is beyond my control. I will also not be able to travel to Garmisch for the ALMA Cost review and the ALMA Board in Santiago in November, and the status of my possible attendance at the December Council meeting is uncertain.

It is true that the doctors predict a full recovery and return to normal life, but it will take a few months.

I wish you wisdom in resolving the important issues that I had hoped to help resolve as your President.

With best regards,

Piet van der Kruit

Since the late nineties I have been involved as volunteer in a project that monitors people to study the effects of increased levels of proteins in urine on in particular the functions of the kidneys. I am in the control group with normal concentrations of proteins. This project, called Prevend, has been extended in the course of time. In the mean time they found that for about 200 of the about 5000 participants the electrocardiograms show a feature that has been found to be associated with a twice or three times higher risk for coronary disease. I was one of these and they have done further research with this group. After further tests I still remained among the people with increased risks and for these they propose to perform catheterizations; in about half the cases up till now they found that something was wrong that could either be corrected immediately or treated with medicines.

Yesterday I visited a cardiologist to discuss if and when we would do this catheterization. In the mean time they had heard some murmur in my heart and took the opportunity to investigate that as well by taking an echo-cardiogram. This showed increased levels of Calcium, but also a major problem with one of the valves in my heart. I had to immediately avoid all physical and mental stress. On a short timescale they will perform a catheterization to see whether there are problems with my coronary arteries. And shortly after that I will have to undergo heart surgery to replace the valve. This is all completely unexpected as I have had no indications at all that something was wrong. In particular I have still done a workout in the gym last Monday without a trace of a problem and have not been unusually tired of a day's work. I feel very well and the problem would have gone unnoticed had I not participated in this volunteer project.

I therefore have not today left for Chile for the APEX dedication and will not go to Brussels next week for ESO Council. This morning the cardiologist informed me that the catheterization will take place in the first week of October. The timescale of things after that depends on the outcome of this. He did ensure me that after full recovery from the operation I will be able to live without any restrictions, but did not want to quote a timescale.

It became clear during the catheterization that my coronary arteries were in excellent shape, but the problem with my valve turned out (as often in these cases) to be the result of a birth defect. In 1 to 2% of the cases (for males twice as frequently as for females) a person is born with an aortic valve consisting of two rather than three cusps. This is often not a problem, but since it is a worse design it can give rise to damage and as a result calcification occurs. In my case the valve worked less well (the name of the problem I had is aortic valve stenosis); in my case the opening was only about 1 cm^2 rather than the full 3 cm^2 and it would not close properly when the chamber of the heart is expanding. So the heart muscle must work much harder, first pumping blood through a small opening and next having some of it return. There actually was a difference in pressure between inside my chamber and inside the aorta of no less than about 100 mm Hg, so comparable to blood pressure itself.

November 1, 2005
Subject: Piet's surgery
Date: Tue, 01 Nov 2005 21:11:31 +0100
To: Bob Dickman, Catherine Cesarsky, Felix Mirabel, Fernando Bello, Ian Corbett, Iris Ostaschek, Karin Hansen, Ken Freeman, Patrick Donahoe, Richard Wade
Aan: Albert Jan en Maya Scheffer, Annejet Meijler, Annemieke Hamstra, Auke en MariAnne Hummel, Benne Holwerda, Berber Miedema, Dick Klepper, Douwe Wiersma, Ed van den Heuvel, Elja Roskam, Eugene de Geus, Ewine van Dishoeck, Frans Zwarts, Geert en Greet Hoornveld, George Miley, Gerard en Marianne van den Hooff, Gerrit Scherphof, Greta de Vries, Harvey Butcher, Henk en Els Weber, Henk en Willy de Kock, Hennie Zondervan, Herman en Hennie

Figure 49: This shows a model of the artificial valve that was placed in my aorta during surgery. It is produced by ATS Medical, Minneapolis, U.S.A. The 'ATS Open Pivot Heart Valve' is composed of an orifice ring, two leaflets, and a polyester sewing cuff. The orifice ring is pure pyrolytic carbon for exceptional durability and maximal flow area. The leaflets incorporate a graphite substrate impregnated with 20% tungsten for enhanced radiopacity. The strengthening ring, lock rings, and lock-wire surrounding the pyrolytic carbon orifice are made of titanium for enhanced strength and radiopacity. It measures in my case 25 mm in diameter and should work for at least 30 years, which corresponds to 1 billion (10^9) times opening and closing.

van der Kruit, Jan Lub, Jan van de Donk, John van der Linden, Jonathan Heiner, Kirsten Groen, Leonie van Putten, Lourens Boomsma, Lou de Leij, Ma Arends, Lubbert Dijkhuizen, Manfred Horstmanshoff, Maurits van der Kruit, Michiel van der Klis, Nico Kos, Paula Poiesz, Peter Barthel, Peter en Hanneke Leeflang, Peter Katgert, Roel en Truus Arends, Roelof de Jong, Ron Allen, Sander Tichelaar, Sylvia van der Kruit, Thijs de Graauw, Thijs van der Hulst, Tim de Zeeuw, Tjeerd van Albada, Vera van der Kruit, Wilfried Boland, Wim Mook, Wim Vaalburg, Wolfgang Wild
Cc: vdkruit@astro.rug.nl, cvdkruit@hotmail.com

Dear all,
This is to let you know that Piet's surgery has been done and has gone well.

Best regards,
Beste allemaal,

Piet heeft zijn operatie ondergaan en hij maakt het op dit moment redelijk. Hij ligt nu nog op de intensive care. Als hij de nacht goed doormaakt gaat hij morgen aan het einde van de ochtend terug naar de afdeling Thorax Chirurgie.

Hartelijke groet,
Corry van der Kruit

November 9, 2005
Dear all,

This is my second day home and things are fine. So, the surgery was last week Tuesday afternoon and went well. After I had been taken to Intensive Care there was a complication with an internal bleeding, but that could be stopped with medication (not so easy when your blood is supposed to be kept thin). That was very tense for Corry who was at the IC and for more than an hour was sitting next to me worrying and hoping the medication would work. I was moved from IC on Wednesday morning.

In general the surgery was much less stressful in a physical and mental sense that I expected. Pain is treated very effectively and the whole thing is unpleasant and uncomfortable, but not much more than that. For the partner it is a much more difficult process with all the waiting and hoping and worrying involved. I found it even interesting to observe proceedings at the IC, especially since this was something new for me.

Everything is fine now; I take it very easy and feel very well, but I have no idea what my possibilities are. It is better not to try and find my limits and take the time to recover. I am also in the process of getting a procedure established to permanently thinning my blood (which will have to be monitored regularly) and my normal blood pressure is also somewhat high for a person with an artificial valve and this also will need structural attention. I lost about 4 kg of weight and am now at a healthy BMI of about 25. As I mentioned yesterday there still remains a process of recovery including supervision from a physiotherapist and cardiologist. I will take the time for it and will slowly pick up doing some work from home and later every now and then from the Institute.

I will keep in touch. Best regards, also from Corry,
Piet van der Kruit

PS for members of ESO Council and ALMA Board: It seems unlikely that my cardiologist will allow me to travel to Garching for the December Council; certainly it is unwise for me to try to chair what is my last Council. I very much regret that, but that is the way it is. Maybe I can call in by phone some time during the second day. Also later that day is what was to be my last ALMA Board telecon and also there I might call in for a short period. In this way I can still have the opportunity to say a few words of thanks after an extremely interesting period in these two bodies.

February 8, 2006
Dear friends,

It is now a little more than three months since my heart surgery on November 1 and this is the last time I am sending you as a group an email on the developments. Starting today (February 8) I have been formally declared fully recovered.

The recovery went very fast; already two weeks after the surgery the surgeon told me I could drive my car and go to work at the Institute for an hour or so every now and then and further work from home as much as I felt fit. I had to avoid lifting heavy things, but apart from that I was busy doing whatever I wanted all day. In fact I had the opportunity to read up on astronomical

literature, which I had neglected over the last few years due to lack of time. During December last year I officially worked half of the time, partly at the Institute and partly at home. I have already been working most of the time since New Year, but officially it was 32 hours a week, of which at least 20 at the Institute and the rest at home. The other 8 hours I was doing a rehabilitation program two mornings a week, involving fitness exercise, sports (badminton, soccer and basketball) and relaxation. Yesterday I had the last session of the program and I was formally declared fully recovered.

Except for a (permanent) anti-coagulation medication (and a steadily improving slight high blood pressure) I have, as my cardiologist promised me, no limitations and I can do everything I did before the surgery. It all ended very well indeed.

I thank all of you for your support and interest over the last months.

Best regards,
Piet van der Kruit

Already in the spring of 2005 I had urged Council to prepare for the election of a new President of Council. I had done that by sending an informal email to all delegates. I was prepared to lead and coordinate that effort, but needed input from others. One delegate responded by saying he was available and Fernando responded by pointing out that his mandate as Vice-president was ending at the same time.

At various times I did informally talk to delegates but I did not get the impression that things were moving at the required pace. I talked informally in the corridors during the Helsinki Council meeting in June to a number of delegates, but it seemed that no progress was being made. In a group of three people that I was talking to during a lunch break, it was asked why it was not possible that I be re-elected for another (fourth) year. I replied that the three year term was actually in the convention. They said that they felt I was doing such a good job, that they were prepared to work towards a unanimous decision by Council to give me a fourth year. The only thing I said was that I would think about it. Before the meeting of Committee of Council on September 16, I sent the following email.

September 2, 2005
To the delegates to ESO Council.

Dear colleagues,

I am sure that you are all thinking about the question who will succeed me next year as your President. I have emailed you before about this and I have informally talked to a few of you in Helsinki and on other occasions and there have been a few responses. I suspect that you are among yourselves discussing this issue, but I would like to be reassured that this process is concluded in time and this is why I am sending this email.

Just to be sure that we will be prepared for a decision in the December Council meeting I suggest that again I approach you informally during our two meetings in September. And if necessary I will make a round of phone calls in October to a representative of each member state. If there is no need for me to coordinate this matter further, that is fine too of course, but for the moment I assume responsibility to assure that it proceeds.

For definiteness, and at the risk of being unnecessarily repetitive, I list the following issues:

1. The formal text in the Convention on the President is Article V.8: "The Council shall elect a Chairman from among its members for a term of office of one year. The Chairman may not be re-elected for more than two consecutive terms."

2. The Vice-president is not mentioned in the Convention. The current Vice-president is ending his third year at the end of 2005. He may of course be re-elected, but you should consider the choice of Vice-president along with that of President. Also, it has been understood (and was

pointed out to myself very explicitly then I became Vice-president) that the Vice-president does not naturally become President when that position becomes vacant.

3. As I reminded you before, the office of President does involve automatically membership of the ALMA Board and the chair of the European ALMA Board. In the last three years I was put forward by ESO as chair or vice-chair of the ALMA Board. Although this is not formally required and any other delegate from ESO could in principle be put forward, I believe that it should be considered the natural course of events. For 2006 Europe (ESO) will provide a vice-chair and in the following two years the chair. When the Council President is chair of the ALMA Board, he/she will be vice-chair of the EAB. At these early stages of ALMA construction I feel that it is advantageous that the President of Council has at least a background in astronomy.

4. The office of Council President takes much time. In my three years (assuming no more meetings come up than foreseen now until the end of the year) a quick count in my agenda's reveals that I will have been away from home for a total of 128 nights. I will have made 45 trips within Europe, 7 to Chile, 6 to the USA and 2 to Japan.[55]

5. Specific activities that the next President should expect in addition to the 'normal' workload will be the selection of the next Director-General, the finalizing of negotiations for the agreement with Japan for integration into ALMA, possibly negotiations with prospective new members (Eastern Europe?), any discussions on partnerships in ELT preparation, etc. This assumes of course that ALMA antenna procurement, ALMA re-baselining and accession of Spain to ESO are concluded before the end of the year; otherwise these have to be added to the list.

I am sure you all are considering this as an important issue, but I felt it my duty to make sure that it is progressing.

With best regards,
Piet van der Kruit

When the meeting of Committee of Council was drawing to a close on September 16, I did remind the delegates of my email and this matter. Most persons felt that we should have an informal, confidential discussion at that time as there was sufficient time left. During that discussion the Danish delegation suggested that I would get a fourth term by a unanimous decision of Council in December. A number of other delegations concurred and I promised I would think very seriously about it, send them an email from Chile (where I was going to be in ten days or so for the APEX dedication) and we could come back to it at the meeting of Committee of Council in Brussels on September 29 and 30. I did email to Council delegates, but due to my heart problem from home rather then from Chile.

September 26, 2005
Dear Members of Council,

I had promised you an email on Monday on the issue of the next President of Council. My medical situation has of course changed this as far as I myself am concerned, but I was preparing some general observations that I want to share with you anyway. I have thought of commenting on the other issues that will be before you this week in Brussels, but I think that I should follow the advise of my cardiologist and not do so. Also I feel I should not enter in a discussion in which I will not be able to fully participate. I do wish you all wisdom and I hope the outcome is favorable.

As to the matter of President of Council in the first place the following. It is highly uncertain, I would even say unlikely, that I will be able to chair the December meeting. That means that my medical situation has effectively forced me to end my term of President as of last week. I am very sorry for this, not only for leaving you at this critical time, but also because I had hoped

[55] In the end I made 2 trips less to Chile and 2 less in Europe.

to help move things like the ALMA antenna procurement and re-baselining and the accession of Spain to a final conclusion. I regret that, but still feel honored to have been involved in it for so far and so long, missing only the moment supreme. At this time I think it is not opportune to think about extending my term as President as you requested me to think about in terms of my availability. I realize that you in no way came to a consensus to ask me.

The task of President is very time-consuming, as we discussed in Committee of Council. There has been some suggestions of dividing tasks, etc. and I would like to comment on that. The main problem is of course the extent of the ALMA related work, which means the ALMA Board and the European ALMA Board as structural matters. The additional things on top of that I had to cope with (search for key-personnel in the Joint ALMA Office, antenna procurement issues, the setting up of the Cost Review, and negotiations with Japan in particular), are nearing resolution, although some work remains. In the near future, as ALMA construction moves into a more routine phase, I do not expect many extra tasks (except the annual review of the JAO personnel in January), but you never know.

The most straightforward solution seems to be to split up the President's tasks related to ALMA and the rest of ESO and divide it it over two persons, e.g. by instituting an office of a Vice-president (similarly as the present office of President in addition to the delegates) who takes the ALMA matters on his/her shoulders. That, however, is only a partial solution, since that Vice-president would have to attend all ALMA Board and EAB meetings and telecons, but in addition all Council and Committee of Council meetings. And that still is a very large investment of time, not all that much different from the present situation.

I also think it is important to realize that the problem extends beyond that of the time investment of the President. Just look at the present situation: Council appoints four members, one of which is the DG, and one assessor to the ALMA Board. The other four (leaving the DG out of the discussion from here on) are by default also member of the EAB. Now, one or two of these might be not Council delegate at the same time, as is the case currently with Roy Booth. He has indeed been able to attend most Board and EAB telecons and (I think) all face-to-face meetings of these two bodies. But he has also at times felt detached from the process and lacking much information as a result of not being Council delegate, so this should really be restricted to only one or at most two of these persons. Richard Wade has had difficulty finding the necessary time and has had to miss face-to-face meetings, at least of the EAB and Council. Henrik Grage, who is assessor for this year, actually has had major problems finding the time to attend and has in fact missed all face-to-face meetings (although I recall in one instant it was due to illness).

So, you have a major problem already in having to find four people for the ALMA Board, of which at least two and maybe three would also have to be Council delegate. One of these, which can in principle be the Council President, a new-style Vice-president or any other Council delegate, will in addition have to do the extra things (chair or vice-chair of the Board and of the EAB, JAO personnel matters, any other things). All you can do is dividing these duties among these people. The problem remains that whatever you decide, you will need two or three people that attend all ALMA related and all Council related meetings.

In my term there were also non-ALMA related things, such as in particular the negotiations with potential new members. I think here you can accomplish some reduction in tasks of the President by delegating such things more among Council members. For example, one could think of appointing a Council member as head of the ESO Negotiating Team (maybe the same person that leads the In-Kind Working Group).

My conclusion is that you need two or three people to sit on the ALMA bodies in addition to Council, one of which could be the President, and all of these need to be able to devote the necessary time to it, which is a significant part of what a person has available. All additional tasks, including those for and independent of ALMA, could be delegated among the other Council

members.

Although I indicated that it is really no longer opportune, there is the matter of my availability for a fourth year as your President. Although not of relevance anymore I would still like to convey you my thoughts on it.

As was remarked by, I think, Martin two weeks ago, my end of term has clear aspects of a natural break, if indeed before the end of the year the ALMA antenna procurement, ALMA re-baselining and the accession of Spain are realized. With ALMA well on track after the first three years and the new memberships of Finland and Spain secured it seems a good time to give the job to someone else. And I agree with that as such; to make an exception to renew a President for a fourth term requires some special circumstances. I have not been able to identify any compelling ones and my inclination a few days ago, before I was aware of my medical problem, was to say I was available, but to advise you not to make use of it. There are two things, however, that I would like to mention.

The first has to do with the ALMA Board, where I worry about the role of NSF. Bob Dickman, the present chair (and vice-chair when I was chairman), is obviously under great pressure from his superiors. The difficulties of the procurement and the cost increase of ALMA have prompted higher levels in NSF to take a much more active role in the Board. E.g., Bob's immediate superior, Wayne VanCitters, has been observer at the Pasadena Board meeting in April, while even higher up Michael Turner and his deputy have been attending the den Haag meeting in June. They are very likely also present at the November Board meeting in Santiago. I know Turner leaves at the end of the year, but I can see pressures from his successor and well as challenges to the position of Bob Dickman and I think my continuity could have been helpful. Others will have to attend to this, and I think that with Catherine, Richard and Roy it is in good hands.

The second point is the matter of the selection of the next DG, which will have to be completed by the end of next year or shortly after that. The timescale that I presented to you is a discussion in Committee of Council next spring resulting in an advertisement and a composition of the selection committee finalized no later than the June/July meeting of Council, but preferably before that by written procedure. It is the task of the selection committee to make a shortlist for interviews by full Council, to take place during the fall with a decision before the end of the year or shortly after. Those members of Council that are considering to put themselves forward as candidates might be reluctant to be available now for President. Of course, as soon as one declares one's candidacy he/she would be expected to leave Council and be replaced as delegate. Continuing my presidency might have helped to avoid mixing the matters of President and next DG.

None of these two matters I was considering as compelling enough to extent my term, and that is why I was taking the position described above. But in the present situation I can suggest the following. Let no delegate feel taking on the presidency now has any repercussions for the process for next DG. If my health permits it (and that certainly is the expectation) and if the then sitting President decides that he/she wants to be available for the position of next DG, he/she can simply step down and if Council wishes so, I can return for half a year as President during the selection procedure.

Hopefully, I can at least attend some of the meeting of Council in December to say goodbye to you in person. In any case, I wish you all the best and much wisdom. It has been a privilege to be involved in these very important and exiting matters and I enjoyed very, very much working with all of you.

Best regards,
Piet van der Kruit

At the Committee of Council meeting in Brussels there has been much discussion on the issue of the President and Jan van de Donk was charged to investigate the options. That led to the election of Richard Wade from the UK as my successor and Monnik Desmeth from Belgium as Vice-president.

In the end I did not go and attend the meeting of Council on December 7 and 8, 2005. I did send an email around to all persons that I worked with within ESO, on Council, ALMA Board and EAB and that has been reproduced in Appendix XI. On December 8 I joined the Council meeting for a brief teleconference, where I expressed my thanks to all and said goodbye. Later that day I did the same at the regular teleconference of the ALMA Board.

The final paragraph of the 'Summary of Decisions' of that Council meeting says:

Other Business
Prof. van der Kruit
"In a telephone conference the President, Prof. van der Kruit, thanked the Vice-president for taking over. He said how much he had enjoyed working with colleagues in Council and thanked them for their continued support. He congratulated ESO on its achievements and offered his best wishes for the future. In reply Council expressed its gratitude to Prof. van de Kruit not only for his outstanding leadership of the Council over the last three years but for his exceptional dedication to the organization and his tremendous contribution for instance in leading the ESO Negotiating Team regarding accession of Spain."

The minutes of the ALMA Board teleconference had the following note:
"Prior to the commencement of business, P. van der Kruit addressed the Board and thanked everyone that sent him messages of support during his convalescence. Noting that his term as ALMA Board member was ending, he also stated that it had been a privilege to have served on the Board."

In Appendix XII I show the covers of Annual Reports, the memberships of Council, the reports on the proceedings in Council over the years I was associated with Council, the Forewords that I wrote as President and the Foreword and Introduction to the 2005 Annual Report. From the latter I quote Richard Wade: *Finally, I wish to thank warmly Prof. Piet van der Kruit for his wise leadership of Council at the time of such important decisions and indeed for his unrelenting commitment to ESO and its goals."*, and Catherine Cesarsky: *I wish, however, to extend special thanks to Piet van der Kruit for his whole-hearted efforts as President of Council to pave the way for great futures for this organization".*

Addendum (added summer 2007)

I wrote the above during the first half of 2006. As it turned out, I did briefly return to Council as a delegate to Council for the Netherlands and in this addendum I describe what happened after the December 2005 meeting of Council.

As it happened, Jan van de Donk was visiting Groningen in December of 2005, a few days before Christmas. I was already well on the way in the recovery from my heart surgery less than two months prior to that and was actually working 4 days a week (I needed two mornings for the rehabilitation program described in the previous chapter). Jan came to the Kapteyn Astronomical Institute, talked to some people and afterward he and I went out for a dinner in the center of Groningen. One of the issues we discussed was a major clash between him and Catherine that had occurred during the last Council meeting. Catherine had actually called me up about this a few days after the meeting. It concerned the advertisement, that Catherine had published for the position of deputy Director General after Ian Corbett would leave the organization upon his retirement in June 2006.

There was quite a bit of misunderstanding about this, many Council delegates being under the impression that it was first to be discussed in Council whether indeed there would be such a position. The advertisement had gone out only a few days before Council would meet. The matter had indeed been discussed in the March Committee of Council meeting and Catherine was under the impression that she was asked to start recruitment for the position. She and I had also between us talked about it some time before the summer and my understanding was indeed that we would discuss it again at the Committee of Council meeting in September in Brussels. Unfortunately there were no written records of the March meeting an I was absent at the Brussels meeting and the months after that. Some delegates even were under the (incorrect) impression that I had personally authorized Catherine to go ahead and advertise. What confused the issue was that apparently Catherine mentioned in Council that she had discussed it with me; indeed she had, but well before the summer, but her statement left the impression, at least that is what Jan told me, that I had agreed to it very recently.

So Jan –and apparently also quite a few more members of Council– was under the clear understanding that the whole issue of the succession of Ian was unresolved as far as Council was concerned and would come up in Council before any further action was to be taken. I think what went wrong was that Catherine left the March meeting with the impression that Council wanted her to prepare *both* the appointment of Ian as Deputy Director General *and* to arrange for procedures for his succession, while Council only meant the first of these. And when the date of the the December meeting of Council came closer she realized that she still had this action to complete and therefore wanted to do it before Council would query her why she had not done what she had been asked to do. Against that background the appearance of the advertisement a few days before the Council meeting was not only a surprise to the delegates but was actually viewed as an inappropriate action. Jan used in Council some strong words to express his strong feeling of inappropriate action and Catherine took this as an implication of deliberate misconduct on her part. Jan and I reviewed it during our dinner and we agreed that I would send an email to Catherine containing my point of view and with a copy to Jan. I did so and I think the matter rested there.

The other thing Jan and I discussed was the matter of the next DG. At the end of 2005 it was already known to a few persons that Tim de Zeeuw was considering to be a candidate for the position of DG when Catherine would come to the end of her term at the end of August 2007. Although Tim had not made the final decision, Jan asked me to come back to Council as delegate if indeed Tim would be considered. I agreed that I would return, but only for as long

as the selection would last. During the spring of 2006 Council set up the procedures for the selection and formed an advisory search committee under the chairmanship of Bob Williams to identify possible candidates. Tim was (of course!) invited by the committee to apply and he decided indeed to do so. During the summer of 2006 the committee agreed on a shortlist of three persons to propose to Council to be interviewed. Apparently they had been considering of order twenty persons and in addition had been in contact with a person that they also found very well suited. This person (of whom I do not know the identity, but I am quite confident I know who it is) in the end did not apply. The names of the three persons were given to the President of Council in the course of September 2006. He (Richard Wade) decided already halfway through September to reveal the names to the members of Council.

It took very little time for the names of the three candidates to be known to the whole world. Actually Bob Williams did inform these persons that they were selected for the shortlist, as he informed the others that were not selected for the shortlist. It is not surprising that the names were known to almost everybody in such a short time, when one considers the fact that it really is a compliment to be regarded suited for this job by a strong search committee and presumably a strong set of contenders. Of course Tim was one of the candidates, the other ones being Rolf Peter Kudritzky from Hawaii and Steven Beckwith, the former director of the Space Telescope Science Institute. The latter was surprising to many persons as there were many rumors and indications that Steve had not voluntarily stepped down. Interestingly, the DG search committee was chaired by another former STScI director (Bob Williams) *and* the current one (Matt Mountain) was a member!

The rules that Council had adopted were that any delegate that would have applied would step down at the time when the shortlist was announced, even if one did not end up on the shortlist. Clearly this all in view of possible conflicts of interest. There is probably one example of a person that violated this agreed rule, and there are clear indications that he did try to influence the procedures in a manner that certainly is less than appropriate. The president apparently did not formally know the full list of candidates that were considered, but he might very well have known informally. In addition two Council delegates were members of the search committee. It should have been flagged. I later did talk to these two persons, but at least one had a different interpretation of what were to me clear and well-formulated rules and procedures.

Originally, the expectation was that the shortlist would be revealed to Council during the meeting of Committee of Council in Santiago on September 27. Tim would there then announce that he would be leaving Council for the rest of the procedure. However with the names known well before this meeting he decided that it was better to resign right away and then I should be going to Santiago. As it turned out I was on a short vacation in the middle of September; Corry and I had been in Prague for the General Assembly of the IAU in August, and although we had taken a few days traveling through Germany in the way, we had not had a full summer holiday. We therefore went a few days to Gent in Flanders, among other things to celebrate my anniversary on September 18. So I was completely out of touch. When we returned to Groningen, the whole thing was organized for me to go to Santiago in a few days, including a plane reservation with Air France, obtained with apparently much effort. Jan and Karin Hansen had correctly guessed that I was not interested at such short notice to visit Paranal or ALMA. So, I left for Santiago on September 24, exactly one year and one day later than the date of my canceled trip to the APEX dedication and one year and two days after I was notified I needed heart surgery.

The meeting was nice. Jan and I met the new Dutch ambassador in Chile, Hero de Boer, who had been an undergraduate in physical chemistry in Groningen. Jan and I (and Jan's daughter Marieke, who traveled with him) were invited for a very good dinner at the residence of the

ambassador. The Council dinner took place in a winery outside Santiago; this was Ian Corbett's last dinner with Council and of course much attention was given to this in the speeches. As it turned out, Catherine, Richard and Ian spent a considerable part of their speeches on me, making good for the fact that they were not able to address me at the end of my presidency.

The business at the meeting was focused on three issues. The first was the progress of the initiative for European Extremely Large Telescope (E-ELT, the successor of OWL; see below) and the second the major problems with the VST (VLT Survey Telescope), that was now very seriously delayed and actually seemed to move in the direction of a disaster. Catherine had decided to sent ESO engineers to Naples to investigate the issue. The last item was the preparation for the interviews with the three DG candidates. It was agreed to do this in October and that all delegates would sent possible issues to be addressed during the interviews to Richard.

The interviews took place on October 17, 2006 at Munich Airport. The three candidates were each interviewed for an hour an a half with discussions in between and at the end of the day Council decided (unanimously, but after a straw vote of 8 versus 3) that the president should negotiate a contract with Rolf Kudritzky. It was also clearly established that Tim was an equally viable candidate and if the negotiations with Rolf would fail Richard would continue with Tim without a new decision by Council. It was also decided not to consider Steve Beckwith any further at this stage.

The negotiations with Rolf Kudritzky went on for a few weeks and Richard sometimes reported in very general terms on the progress in confidential emails. It seemed that the process was converging, until all Council delegates received an email from Richard Wade on November 23, in which he informed us that Rolf had decided to decline ESO's offer. In Richard words: *"I moved a very long way during the negotiation to try to meet Rolf's demands and in the end made what I considered to be an extremely attractive offer. Unfortunately Rolf's current employer, the University of Hawaii, were very keen to keep Rolf and in the end made him an astonishingly good retention offer."* He included the email from Rolf in which he announced his decision. An interesting fact is this was that it was known to many people (news travels fast by email) that there had been a champagne party in Honolulu the evening before to celebrate Rolf's decision. This was before he informed ESO and I feel this was really inappropriate.

Curiously in this email Richard suggested, since we were at that time so close to the regular Council Meeting in December, that in view if the fact that this was such an important decision, Council might delay further action until the meeting in Garching, and discuss then whether it would indeed wish to look at the Search Committee's long list, to approach Tim or re-open the search. This in spite of the fact that he did acknowledge that the conclusions of the Munich meeting was that Council had an agreed reserve candidate. Jan van de Donk and I sent immediately an email with a very strong protest. However a majority of ESO delegations favored postponing any action until the Council meeting and Richard did inform Tim of this.

At the same time the preparations for an E-ELT decision by Council in December were also progressing. After an extensive OWL review in the fall of 2005 a recommendation had been made by an OWL Concept Review Committee under the chairmanship of Roger Davies that ESO move on to an preliminary design of an ELT, but also noted that there were significant concerns such as that the choice of aperture was not optimum in terms of the balance between returns, competitiveness, risk and performance within an affordable cost. Although the conceptual design of OWL was that of a 100-meter telescope and although this was by the review committee judged as being feasible, possible to build and operate, the committee advised that the choice of aperture would probably have to be reduced to make the project affordable, technically less risky and the timescale competitive. At the suggestion of Catherine, five working groups were established Council in December 2005 on science aims, instruments, site characteristics, telescope design

and adaptive optics to report as soon as possible, which would then result in an overall study that would converge towards a realistic design. This also meant that for the moment ESO would strive for a single European approach. The review committee would continue as an ELT Standing Review Committee.

The results of these studies in the working groups were presented at a large conference in Marseille during the period November 27 to December 1, 2006. Council delegates were invited to attend and I did so for the first three days of the meeting. In the meeting of Council on 5 and 6 December 2006 a momentous decision was taken, namely to approve that the E-ELT project move to Phase B (Final Design Study) and to allocate 57.2 M€ for this phase. ESO involvement in an Extremely Large Telescope is well underway. It was notable that Gerry Gilmore, who was an important force behind the ELT project, actually was absent in Marseille and at this Council meeting. Many suspected that the selection of DG had something to do with this.

The matter of the selection of the next Director General did not take up much time at the Council meeting. Jan van de Donk and I had polled informally other delegations and little problems were expected. Richard actually apologized for confusing the issue (acknowledging that it had been under the influence of another person) and it was unanimously reconfirmed that Tim was the automatic candidate to be approached. It so happened and on January 3, 2007 Richard informed Council by email that Tim and he had reached agreement over a contract. This was unanimously approved by a special (restricted) extraordinary Council meeting by teleconference on January 10, 2007. I attended from Dwingeloo where the Netherlands Committee for Astronomy (that I chaired) would meet after conclusion of this telecon; Tim attended this as well and I was therefore in the special position to inform him informally of this.

In addition to the DG and E-ELT decisions a number of other important matters were agreed at the December 2006 Council meeting. The first had to do with the accession of Spain. As it turned out, Spain that had not been able to complete the necessary procedures (leading up to parliamentary approval) in time. However, it remained willing to formally join in retrospect by July 1, 2006 and to accept the same terms. Council unanimously agreed to extend the period necessary to complete the parliamentary approval in Spain. In the end Council was informed on February 15, that the French Ministry had received Spain's 'instrument of accession' the day before, while the full entrance fee and regular contribution for the second half of 2006 had been deposited in ESO's bank account on February 13.

Following talks with the Czech Republic, Council approved resolutions to agree to its accession by January 1, 2007. I will not discuss this in any detail, since I was not involved in the negotiations. Also a *'Medium Range Implementation Plan'* and a document *'ESO's Future Perspectives'*, laying out the financial planning associated with the activities accepted in the implementation plan were adopted.

A meeting of the 'government representatives' had reviewed options for funding an European ELT on the morning before the actual meeting; although nothing very specific resulted it was clear that there was certainly the momentum required to pursue possibilities when these would arise.

Normally this would have been my last meeting of Council, since the selection of the new DG was now finished. However, the Spanish delegation invited Council to have the next June meeting in Spain, probably in Barcelona (as indeed occurred). As this would celebrate the accession of Spain it was thought to be appropriate (by Catherine, who suggested this to Jan van de Donk, who also approved) that I remain an extra half year in Council in order to be present at that occasion.

From half January until half March I spent eight weeks working at the Vitacura offices of

ESO in Santiago. To this end Corry and I were both supplied by ESO with business class tickets, ESO rented a very nice apartment and gave us a generous per diem. We had an excellent time; I did some research, organized some administrative matters for Dutch astronomy, gave a full lecture course on galaxies and prepared a new course on galactic dynamics to be given later in Groningen. We had a very good dinner with the Dutch ambassador, his wife and a few other Dutchmen living in Santiago. But above all we had a very quiet time and I consider this a very nice present for the time I had spent on ESO matters and for Corry to have had to cope with my frequent absence from home.

Since I expected to have left Council I did not participate in the selection of the date for the next meeting of Committee of Council, which was to take place in Potsdam. It was planned for 19 and 20 March, 2007 and I had committed myself already for the Hubble Space Telescope Time Assigning Committee as member of the full committee and chair of a sub-panel in Baltimore that same week. So I missed the Potsdam meeting. One thing happened there that did involve me; ESO was preparing a request for a contract with the European Commission in relation to the E-ELT: *'Preparing for the construction of the European Extremely Large Telescope'*. This needs a so-called 'E-ELT Prep Steering Committee', actually a sub-committee of ESO Council, and at the Potsdam meeting Council nominated me as its chair. I have accepted that.

My final meeting of Council then took place in Barcelona on 5 and 6 June, 2007. I will not discuss any items in detail. I noted for myself the excellent position that ESO was in. There was again a very positive report by the Visiting Committee, the Strategy Working Group was considering projects in Europe in which ESO might play a role (among which the Square Kilometer Array SKA and a Large Solar Telescope), the reports from VLT, VLTI, ALMA and E-ELT were very encouraging, negotiations with Austria on accession had finally started (Ireland is still missing) and there seemed now finally good possibilities for the extension of the headquarters in Garching.

Richard Wade gave a short speech at the start of the second day of the Council meeting to say goodbye to me.[56] The 'Summary of decisions' note: *"Having returned for a few meetings, Prof. P. van der Kruit would now leave Council. He had played a major role in the work of Council in particular in negotiations related both to the UK entry and the Spanish entry into ESO and had also played a key role in ALMA."*

After the end of the meeting (halfway through the afternoon of the second day) I did stay an extra night in Barcelona. It was beautiful weather and after a little site-seeing in Barcelona I found a nice bar where I could sit quietly outside in the shadow. I ordered a very cold bottle of dry white wine and I drank this while quietly reminiscing over my years in ESO Council. And this marked the end of my efforts as a Delegate, Vice-president and President of ESO Council.

PS. I have decided to make these notes public in the fall of 2012. I have added a quote from Jan Bezemer on the back of the title page; Jan died earlier in 2012. He was very important for ESO and Dutch astronomy.

My further associations with ESO have been as chairman of the FP7 ELT-prep. Steering Committee from 2007 up to mid-2010. A very rewarding experience occurred when I chaired

[56]Gerry Gilmore was also at his last meeting, while Ralf Bender had left Council in between this and the previous meeting. Richard also noted that Catherine would join Council at dinner in September during the Committee of Council to say farewell to her.

the E-ELT Phase B External Mid-term Design Review Committee in 2009. The latter consisted of high-level professionals that critically reviewed the design of the European Extremely Large Telescope and reported that it *'has not found any concerns that could potentially seriously or fatally impair the feasibility of the project as a whole. The Board commends all concerned with the project for the excellent progress and recommends the Director General to vigorously move ahead with the Phase B Design Study.'*

Appendix I

The history of ESO

The following is reproduced from a paper in the *Astronomische Nachrichten*, **232**, 555 (2002) with some very minor editing. Only the first three sections are taken here and the figures have been omitted; the remaining of the article is not relevant to my story.

ESO and European astronomy: four decades of reciprocity

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1. The founding of ESO

The early history of the European Southern Observatory is very well documented in *'ESO's Early History'* by Adriaan Blaauw, one of ESO's early Directors General (published by ESO in 1991), and most of the historical facts mentioned in the present paper were taken from that source.

Observational astronomy in Europe in the 1950s was carried out at national and university observatories and at some modest observational facilities in the southern hemisphere. Belgium, Germany, Ireland and Sweden participated at the Harvard Observatory Boyden Station in South Africa, The Netherlands (Leiden University) had an observing station in Hartebeespoortdam, and Great Britain had access to observing facilities at Radcliffe Observatory, Pretoria and Cape Town. But there was not a single southern or northern observatory equivalent to the Californian observatories which had provided several breakthroughs in observational astronomy. The reason for this backlash was threefold: the economic post-WW II situation in Europe, the lack of suitable climatic conditions in the regions where the major astronomical research was carried out, and the absence of a maecenate culture in Europe.

In June 1953, a number of prominent astronomers met in Groningen (NL) and followed up on Walter Baades earlier suggestion to create a southern observatory. This meeting led to the ESO founding statement signed at Leiden in 1954 by Heckmann (FRG), Unsöld (FRG), Bourgeois (B), Couder (F), Danjon (F), Redman (UK), Oort (NL), Oosterhoff (NL), van Rhijn (NL), Lindblad (S), Lundmark (S) and Malmquist (S). This statement underlined that

- most large telescopes (like Palomar Mountain) are located in the northern hemisphere
- the southern hemisphere is much less studied
- the Galactic center, the major globular clusters and the Magellanic clouds are inaccessible from the northern hemisphere
- the realization of a large project cannot be done by one single country
- the participation by all IAU adhering countries, on the other hand, would be impractical
- they express the wish to establish an observatory in South Africa with a 3-m telescope and a 1.2-m Schmidt (like those of Lick and Palomar).

Remarkable is the direct comparison that is made with the existing Californian observatories, and the desire to duplicate their instrumental facilities, in particular a large telescope complemented with a wide-field survey imaging telescope.

Bannier (NL) very wisely stressed the absolute necessity of a convention between governments instead of a contract between universities or scientific organizations. Still, it was not easy to

convince a handful of governments to join, but the Ford Foundation's promise of a US$ 1,000,000 grant was the catalytic agent that persuaded the French government to join in creating ESO (Edmondson 1991). In 1960 Great Britain withdrew from the ESO project. The ESO Convention between the governments of France, Germany, the Netherlands, Sweden and Belgium was signed on October 5, 1962 in Paris. A sixth member, Denmark, joined a couple of years later, followed by Switzerland, Italy, Chile, Portugal and recently the UK.

From 1955 to 1963 site testing was undertaken in South Africa and a comparison was made with available data from tests in Chile. It appeared that the nightly temperature range in Chile was much smaller than in South Africa, that the image quality was better and that Chile had also many more photometric hours per year. So from 1960 on, the interest for Chile grew rapidly.

2. ESO in Chile.

AURA (Association of Universities for Research in Astronomy) offered close collaboration to ESO and in 1963 proposed a 50-year lease of part of Cerro Morado which houses Cerro Tololo Observatory, but ESO preferred to acquire a site and an agreement with Chile on government level. From this moment on, ESO and AURA followed separate developments in Chile.

In October 1963 Otto Heckmann went to Chile for discussions with the Chilean Ministry of Foreign Affairs with the help of Erich Paul Heilmeyer (Universidad Católica) and Father Bernhard Starischka (Liceo Alemàn). These negotiations resulted in an agreement (the 'Convention') that was signed in a time span of less than one month.

Subsequently two sites were acquired: the Santiago Vitacura headquarters (property donated by the Chilean Government), and the La Silla observatory site, about 100 km north of La Serena. La Silla, selected from a list of government properties in the La Serena region, is to be regarded as one of the world's top astronomic sites.

3. Phases in the history of ESO

Blaauw (1991) outlines four major phases in the history of ESO:

1. 1964-69: deployment of La Silla and the Santiago headquarters
2. 1969–76: construction and operation of the Schmidt and 3.6-m telescopes
3. 1976–87: the Garching headquarters
4. 1987–present: the VLT era.

The nucleus of ESO –the large telescope and the Schmidt– would be surrounded by three middle-class telescopes, viz. a 1.5-m spectrographic telescope, a 1-m photometric telescope, and a 40-cm double-astrograph, the 'Grand Prism Objective'. One additional small telescope was added to the ESO telescope park: the ESO 50-cm, which was to serve as a test bed in the design of telescope control systems for the 3.6-m. Until the commissioning of the 3.6-m telescope in 1976, these four instruments were the only ESO telescopes available to visiting astronomers. The 1-m telescope was the first ESO telescope with digital output (photomultiplier output printed on computer listings). The Schmidt telescope was not designed for operations by visitors, it also had quite some problems during the commissioning phase (Blaauw 1991).

The following is taken from the La Silla homepage at the ESO Website.

About La Silla

La Silla is a 2400-m mountain, bordering the southern extremity of the Atacama desert in Chile. It is located about 160 km north of La Serena. Its geographical coordinates are: latitude 29° 15' south, longitude 70° 44' west. Originally known as Cinchado, the mountain was renamed *La Silla* (the saddle) after its shape. It rises quite isolated and remote from any artificial light and dust sources (astronomy's worst enemies). La Silla was the first ESO observatory built in Chile. Its history is full of optimism and disappointments, ups and downs, since its beginnings in the 50's until the middle of the 70's when the observatory became a reality.

The idea of the European Southern Observatory is born
The idea of establishing a common large observatory that joined the European astronomers was born in the spring of 1953, in the mind of the renowned astronomer Walter Baade. This suggestion was then discussed, for the first time, by a group of astronomers at Leiden on June 21, 1953, after which they were invited to discuss it with their colleagues at home. Some months later, on January 26, 1954, twelve leading astronomers from six European countries: Belgium, France, Germany, Great Britain, the Netherlands and Sweden gathered in the Senate Room of Leiden University to discuss the idea of the recently suggested joint European observatory. Here, they issued a historical statement, which expressed the wish that the scientific organizations in their respective home countries recommended the establishment of a joint observatory in South Africa, equipped with a 3-m aperture telescope and a Schmidt telescope of 1.2 m aperture. The project was conceived to be completed over the next ten years and would need a convention between learned societies or between governments. In order to develop this project, an ESO Committee (EC) was formed.

The ESO Convention
A first proposal for the convention between organizations was drafted in November 1954. Some of the most important features in that draft described the fact that financial contributions had to be proportional to the national income but only up to a fixed limit. Besides, the draft stated that the observatory should be located in the southern hemisphere and should have a large optical telescope and a Schmidt telescope as 'Initial program', considering a future extension with any kind of other instrumentation. The southern hemisphere was the ideal choice, since most interesting objects of research could be reached from this hemisphere. In October 5, 1962, after years of meetings and struggles, the ESO Convention, between five of the first six countries was finally signed (Great Britain went its own way, as explained below). The required ratification, however, was only completed in January 17, 1964, when parliamentary and financial commitments had been ensured. Hence, ESO was finally on solid grounds to begin its long-term building project.

Great Britain abandons the ESO project
By 1960, the EC President was informed that the British had turned its interest towards a Commonwealth telescope in Australia in preference to the ESO project. The British new views diverged from those among the ESO partners, and those points never reached a negotiating stage. After 1961 there were no more British representatives in the EC meetings.

South Africa: The first choice to settle the observatory
Over more than seven years -until the middle of 1963- many European astronomers and their assistants were engaged in the search for a site in Southern Africa, where many European

Figure 50: This map shows the mountains that played a role in ESO's search for a site (taken from A. Blaauw's book: "ESO's Early History").

communities had observing facilities. South Africa -in particular- was chosen because it had the best astronomical climate known at that time. However, by the end of 1963, it was clear that the observatory could not be built in this continent, mainly because of the deterioration of the atmospheric seeing in the course of the night, as a result of the decrease in the temperature.

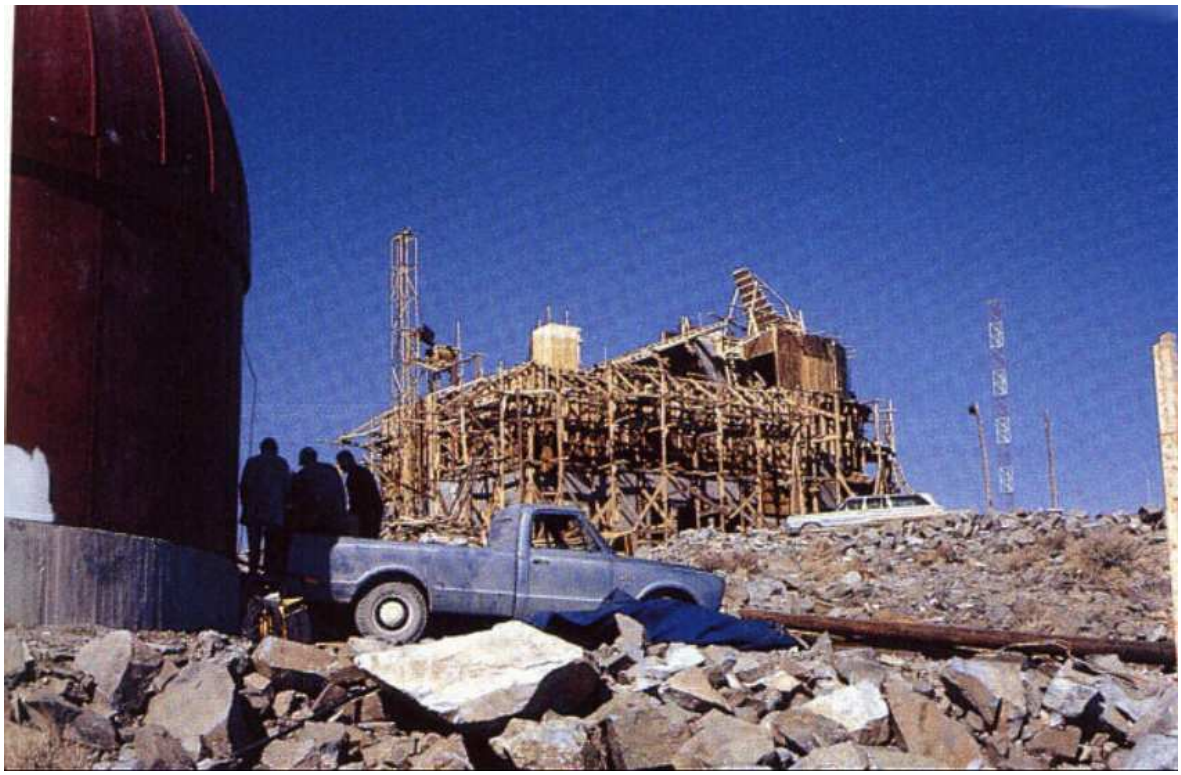

Figure 51: May 1967: The building for the 1.5-m Telescope. On the left, part of the provisional dome for the 1-m telescope.

The Andes versus South Africa
The first explorations in the Andes had been already performed in March 1959 by G. P. Kuiper, followed in April 1959, by the astronomer Jürgen Stock, whose site survey for an AURA project grew in importance when outstanding conditions appeared to be found to the north of Santiago. During 1962, towards the end of the site testing in South Africa, ESO became more interested in the possibilities offered by the Andes Range in South America. By June 1963, a small group of members of the EC was sent to Chile to carry out further investigations. Thus, on June 6, two groups formed by members of ESO and AURA visited Santiago and La Serena areas, where they worked on two mountains on the AURA territory: Tololo and a mountain named Morado. This last mountain was suggested -by AURA- as a suitable location for the ESO observatory because of its large surface and well-tested favorable observing conditions. At this point, a principal subject of discussion was the possible relation between the AURA and the ESO projects in case ESO should decide to settle in Morado. In a new meeting of the EC in November 15, 1963, a report was prepared on behalf of the Site Selection Committee, which showed a comparison of the data collected in South Africa and Tololo. Finally, the EC decided unanimously to choose the South American site over South Africa for the location of the ESO observatory, based on the superiority of the climatic and observing conditions.

La Silla mountain is chosen by ESO
Early in 1964, there was still a possibility of having a combined AURA-ESO settlement. Thus, in February 1964, in preparation for the final decision on the site for the ESO observatory, a group of 4 people was appointed in order to explore a variety of potential sites within the AURA domain, as well as in the general vicinity. Three mountains were inspected by helicopter and by car: Guatulame (southeast of Ovalle), Cinchado (a mountain within AURA territory) and

Figure 52: December 1967: La Silla's earliest Residential Quarters, Office Buildings, Catering Facilities for night and day workers, etc.

Cinchado-North (outside the AURA domain). The latter turned out to be the most interesting one, from the point of view of accessibility, climate (dry), proximity of a flat area to be used for landing, and for being government property. Finally, on May 26, 1964, the final choice for ESO's site was the Cinchado-North mountain, also known as La Silla – a name used at that time by the charcoal burners to refer to this mountain after its shape. With this, the prospect of a combined AURA-ESO settlement was finally terminated.

ESO signs the contract to purchase La Silla
In October 30, 1964 a contract was signed in Santiago between ESO and the Government of Chile, for the purchase of an area of 627 km^2 including the mountain La Silla. The relatively low price paid by ESO, showed the interest on the part of the Chilean Government in having the observatory established in Chile.

The growth of La Silla during 1964-1966
At the end of 1964, ESO had an office in La Serena functioning with five people, and had already a road project from Pelícano camp to the top of La Silla. The year 1965 saw much more progress, since apart from the road construction, Pelícano camp began to take its more definite shape. Similarly, a small temporary camp was constructed at La Silla, which included a storage room, some living quarters, a powerhouse and a temporary workshop. A year later, in 1966 a second, and more definite camp, was constructed near the top of La Silla. In January of that same year, the road connection to La Silla was completed; then, on March 24, 1966, the dedication of the road took place with the presence of many authorities and guests, such as the Archbishop of La Serena and the ESO's President G.W. Funke.

The inauguration

Three years after the dedication of the road, the first stage of the constructions had been finally completed, the middle-size telescopes had become operational while the hotel, the dormitories, a workshop, a storage space –among other facilities– had been completed as well. On March 25 1969, La Silla Observatory was inaugurated, with an audience of more than 300 people among Government officials, representatives of AURA and CARSO (Carnegie Southern Observatory, at Las Campanas), besides staff members of ESO, and other guests. After two decades of growth, since the first initiatives towards La Silla creation in June 1953, the dream had become a reality.

La Silla telescopes

In 1958 the EC appointed an Instrumentation Committee (IC), which should be in charge of the future instrumentation in La Silla. The IC was given two main tasks: preparing all technical and financial aspects of the instrumentation so as to enable the EC to take the necessary decisions, and making all necessary technical and instrumental decisions within the frame of the budget. Hence, one of the IC's first assignments was the specification of the telescopes in La Silla; thus in 1961, they recommended the construction of the **middle-size telescopes**: **1-m** and **1.5-m**, both erected only in the second half of the 1960s. In 1968, the **GPO (Grand Prism Objectif)** was installed in La Silla to resume its work after eight years of service in the site testing activities in South Africa. In 1971, the **1.2-m Schmidt** was finally installed in La Silla, as was the **ESO 50-cm** –a duplicate of the Copenhagen 50-cm. Then, in November 1976, the largest telescope foreseen in the 'initial program' the **3.6-m** saw 'first light'. Subsequently, a **1.4-m CAT (Coudé Auxiliary Telescope)** would feed a high-resolution spectrograph within the 3.6-m telescope building. In 1984, the **2.2-m** began its operations, while in March 1989, the **3.5-m New Technology Telescope (NTT)** saw 'first light'. Last, but not least, the **SEST (Swedish ESO Sub-millimeter Telescope)** is the only large sub-millimeter telescope (15-m diameter) in the southern hemisphere. It was built in 1987 on behalf of the Swedish Natural Science Research Council (NFR) and the European Southern Observatory.

National telescopes

An extension of the telescope park not foreseen in the early days constituted the so-called National Telescopes. These are "telescopes which are property of one of the member states -or of an institute in one of these states- which are placed on La Silla and, as compensation for ESO services, ESO obtains a fraction of the observing time". The first telescope built under this category was the **Bochum 61-cm**, installed in September 1968. The second one was the **Danish 50-cm** (or SAT, for Strömgren Automatic Telescope) from the Copenhagen University Observatory in Denmark, whose operation began in 1971. A third one, the **Danish 1.5-m**, became operational in October 1979. The **90-cm Dutch Telescope**; the 'Light Collector', property of the Leiden Observatory in the Netherlands, was removed from its site at the Leiden Southern Station in South Africa, and re-erected at La Silla during 1978 and 1979. Lastly, ESO has granted full operational nights to a number of projects run by their patronizing institutes. These are: **Marly 1-m (Marseille Observatory)**, the **Geneva 1.2-m (Geneva Observatory)** and the **DENIS** (Côte d'Azur and Paris observatories).

Nowadays, only a few telescopes are in operation. The ESO 50-cm, Schmidt, CAT 1.4-m and Bochum 61-cm, have been decommissioned. *Note added*: Now (2006) ESO only offers the 3.6-m, the NTT and the 2.2-m to ESO observers.

ESO Press Release

18 March 1998
For immediate release

UT1 first light event photos

VLT Milestones

In December 1987, the ESO Council decided to embark upon the **Very Large Telescope (VLT)**, Europe's astronomical flagship facility for the early 21st century.

Now, just over ten years later, the first of the four giant VLT Unit Telescopes is about to open its eye towards the Universe. This moment of celebration is known among astronomers as the *VLT UT1 First Light Event* and will be accompanied by various media events at ESO and in the member countries.

The present collection of 15 photos is issued on this occasion in order to provide all interested parties with some important images from the VLT project. They illustrate some of the major milestones that were passed during the past decade. Starting with the far-sighted Council decision and the crucial casting of the 8.2-meter primary mirrors, a daunting task never attempted before, they also include selected images from the construction sites in Europe, as well as from the remote location of the new VLT Observatory, on the Paranal mountain in the Chilean Atacama desert.

Europe decides to build the world's largest optical Telescope (1987)
On December 8, 1987, the ESO Council gave the green light to the 'ESO 16-meter Very Large Telescope (VLT)', an extraordinary astronomers' dream and an amazing engineering challenge. The VLT was to become the largest optical telescope in the world and Europe's superior eye to the Universe.

The delegates of the eight member states (Belgium, Denmark, the Federal Republic of Germany, France, Italy, the Netherlands, Sweden and Switzerland) agreed that the European Southern Observatory shall embark upon the realization of this marvelous instrument. They stressed that *"this decision expresses Europe's confidence in the ambition of her astronomical community and the ingenuity of her high-tech industry; together they will ensure that Europe will be second to none in the exploration of the Universe for a long time to come"*.

It was further stated that the VLT is to be considered as an essential complement of Europe's astronomical research activities from space vehicles.

On the photo (Fig. 53) in the foreground (left to right), Prof. K. Hunger (President of the ESO Council), Prof. L. Woltjer (Director General of ESO) and Professor P.O. Lindblad (Chairman of the ESO Scientific Technical Committee).

Casting the world's first 8-m mirror (1991)
The first test run for the manufacture of mirror blanks in the 8-meter class was successfully performed at the *Schott Glaswerke* (Mainz, Germany) in early 1991. Completely new manufacturing techniques had to be developed in order to produce blanks of this size, a process never attempted before.

With a temperature of $1,400°$ 45 tonnes of molten glass were poured into the specially designed mold. Immediately thereafter, the mold was moved to a rotating platform. During the first cooling, the mold was spun on the rotating platform. With the centrifugal forces created by the spin - in combination with the curved bottom of the mold - the glass gradually assumed the rough meniscus shape required for the VLT mirror blank.

Figure 53: Europe decides to build the world's largest optical telescope (1987)

During the subsequent manufacturing stages, the glass blank was slimmed down to its final weight of 23.5 tonnes through precision grinding. The glass was then transformed into *Zerodur glass ceramic* (a material that undergoes no dimensional changes with changing temperature and is therefore ideal for astronomical purposes), making it the world's largest Zerodur blank.

Cerro Paranal - the exceptional site for the VLT (1991)

Cerro Paranal is a 2,635-m high mountain, about 120 km south of the town of Antofagasta and 12 km inland from the Pacific Coast. It is situated in the middle of the Chilean Atacama desert, in what is believed to be the driest area on Earth. The geographical coordinates are 24° 40' S, 70° 25' W.

ESO had been searching for the best possible site for its new super telescope already since 1983. The Paranal mountain early became one of the candidate sites. The mountain and the surrounding area was donated to ESO by the Chilean Government in 1988 on the condition that ESO would indeed build the VLT Observatory there.

Following 8 years of extensive site testing and based on the excellent reports about the astronomical conditions at Paranal, the ESO Council decided to install the VLT at Paranal in December 1990. Indeed, this exceptional site offers up to 350 clear nights a year with unusually stable atmospheric conditions. Test observations have shown that, 15% of the time, local atmospheric turbulence spreads light from a star over an angle of less than 0.45 arcsec, allowing extremely sharp images to be obtained. Moreover, there is very little water vapor in the air over Paranal, greatly increasing the atmospheric transparency at infrared wavelengths. It is generally recognized as being the best, known site for an astronomical observatory in the southern

Figure 54: Casting the world's first 8-m mirror (1991)

hemisphere.

The construction work at Paranal began in 1991.

Polishing the first VLT main mirror (1995)

The first of the four VLT Zerodur blanks was ready at the *Schott Glaswerke* in July 1993. From here they were transported by ship to the *REOSC* workshop in Saint Pierre du Perray near Paris. This new facility, unique in the world, was specifically conceived, built and equipped to polish and test the large VLT mirrors. It is equipped with two machines: one for grinding, the other for polishing, and both with a 150 actuator system in order to support the thin and flexible, 23.5 tons mirrors.

Here the blank underwent a difficult two-year polishing process, at the limits of present technology. Thanks in particular to an efficient, built-in 'learning' process, the new, computerized polishing system progressively optimized the procedures. The optical surfaces of the following blanks were brought into the desired form in significantly less time.

Fig. 56 gives an unusual view of the first VLT primary mirror taken from the top of the impressive test tower at the REOSC facility during optical tests in 1995.

First VLT mirror passes final tests (1995)

This photo (Fig. 57; top) of the first 8.2-meter astronomical mirror for the VLT was obtained in early November 1995, at the *REOSC* factory in Saint Pierre du Perray (France). It shows

Figure 55: Cerro Paranal – the exceptional site for the VLT (1991). This picture is not the one in the original press release, which had only a map.

the giant mirror undergoing the final acceptance tests by ESO, following a two-year polishing phase during which it received the desired, incredibly precise surface figure.

Each mirror has a surface of more than 50 square meters and the measurements showed that the final optical surface is correct to within 0.00005 millimeters. For illustration, this corresponds to an accuracy of only 1 millimeter deviation over a surface with a diameter of 165 kilometers (equivalent to the entire Paris area)!

The first mirror was stored at *REOSC* until it was moved to the site of the VLT Observatory at Paranal in Chile in 1997.

A giant mirror cell for a giant mirror (1996)

Each of the giant mirrors for the four Unit Telescopes of the VLT, with a diameter of 8.2-meters and a total area of more than 50 square meters, is supported by a complex steel structure,

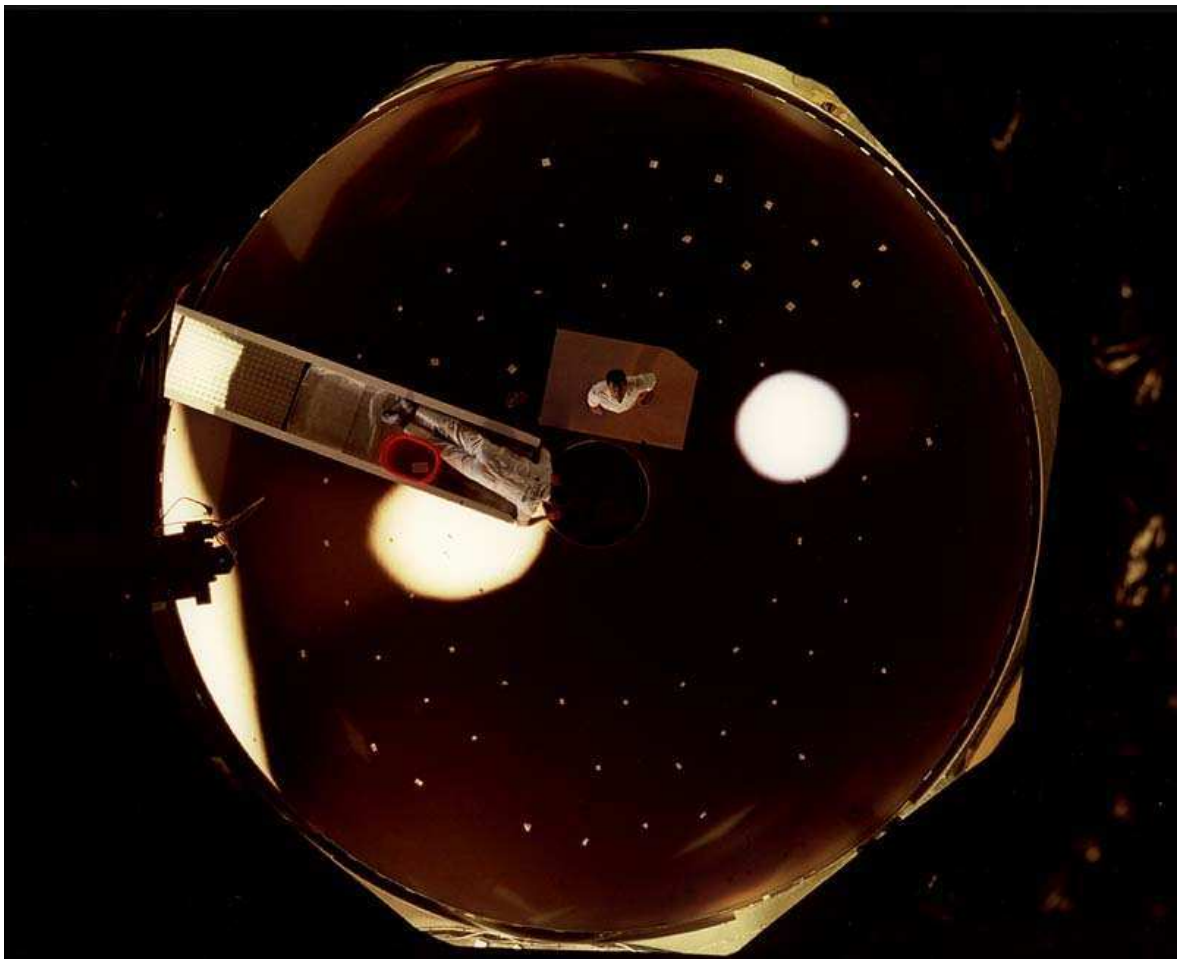

Figure 56: Polishing the first VLT main mirror (1995)

referred to as the *M1 Cell* (Fig. 57; bottom). This structure also supports the *M3 Tower* that protrudes from the central hole of the mirror and carries a flat mirror (M3) that serves to reflect the light towards the Nasmyth platforms on either side of the telescope. On these platforms are placed the heavy instruments that will record the light from celestial objects collected by the telescope.

The M1 Cells were constructed by a consortium of *GIAT Industries*, *Branche GITECH* and *SFIM Industries* (France). Laser techniques were used for cutting and welding the single assemblies of the M1 Cell. This process is fully automatic and allows to generate very light and complex box-type structures starting from thin metal sheets. This also ensures an excellent stability with a comparatively low weight and is therefore ideal for the VLT M1 Cells.

An M1 Cell structure weighs approximately 10 tons, and has a very high stiffness-to-mass ratio.

The first M1 Cell (for UT1) arrived at Paranal in November 1997.

ESO and Chile sign agreement (1996)

On December 2, 1996, the Minister of Foreign Affairs of the Republic of Chile, *Mr. Miguel Insulza* (seated to the left in Fig. 58), and the Director General of ESO, *Professor Riccardo Giacconi* (right), exchanged in Santiago de Chile the Instruments of Ratification of a new *Interpretative, Supplementary and Amending Agreement* to the 1963 Convention between the Government of

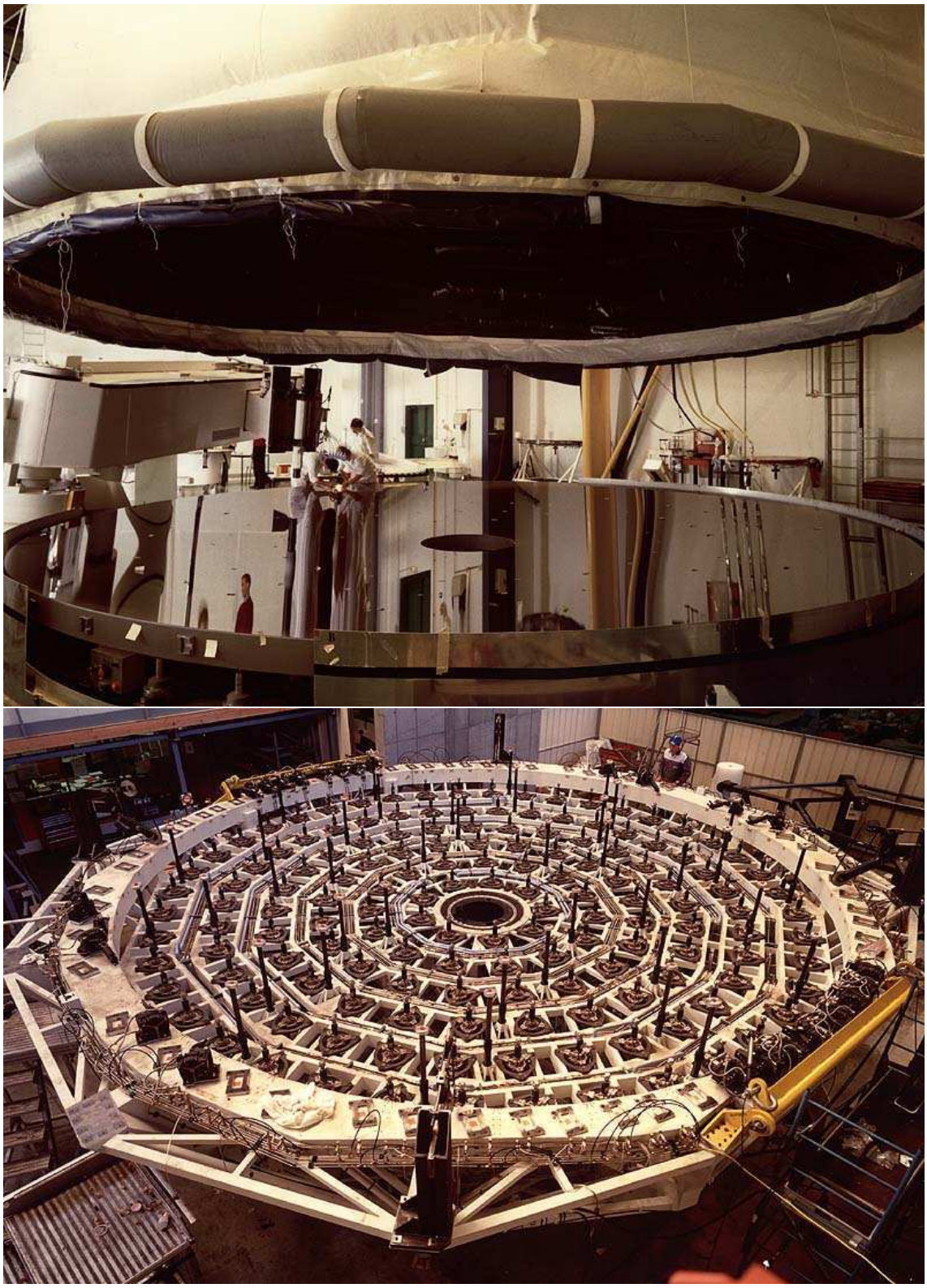

Figure 57: Top: First VLT mirror passes final tests (1995); Bottom: A giant mirror cell for a giant mirror (1996)

Figure 58: ESO and Chile sign agreement (1996)

Chile and the European Southern Observatory.

This agreement opened a new era of co-operation between Chilean and European Astronomers. For ESO, engaged at Cerro Paranal in the construction of the VLT, it signified a pillar of stability for the future activities of this Organization in Chile and thus for the development and operation of the VLT observatory into the next century.

At the same time, the Chilean astronomers, by means of guaranteed observing time, will henceforth obtain direct access to the VLT under the privileged skies of their country.

Celebration at Paranal (1996)

On December 4, 1996, the *Foundation Ceremony* for the VLT Observatory took place on Cerro Paranal, in the presence of the President of Chile, *Mr. Eduardo Frei Ruiz-Tagle*, the Royal couple of Sweden, *King Carl XVI Gustaf and Queen Silvia*, the Foreign Minister of the Republic of Chile, *Mr. José Miguel Insulza*, the Ambassadors of the Member States, members of the of the ESO Executive, ESO staff and the Paranal contractors' workers.

The approximately 250 guests heard addresses by *Dr. Peter Creola*, President of the ESO Council, *Professor Riccardo Giacconi*, Director General of ESO, Foreign Minister *José Miguel Insulza* and President *Eduardo Frei Ruiz-Tagle*.

A time capsule was then deposited by *President Frei* with the works being blessed by the Archbishop of Antofagasta, *Monsignor Patricio Infante*.

On the photo (Fig. 59), seated in the front row (left to right) on the special platform inside the UT1 enclosure, *Mrs. and Professor Giacconi*, *Mr. José Miguel Insulza*, *Queen Silvia*, *President Frei* and *King Carl XVI Gustaf*.

Final tests of the VLT main telescope structure (1997)

The main structure of the VLT was designed, produced and assembled by an Italian consortium composed of *Ansaldo Energia* (Genova), *European Industrial Engineering* (Venice) and *SOIMI*

Figure 59: Celebration at Paranal (1996)

(Milan). A total of four identical structures were built, one for each of the four VLT 8.2-m Unit Telescopes.

In Fig. 60, the VLT mechanical structure for Unit Telescope 4 (UT4) is seen during the tests at the Ansaldo Factory in November 1997.

The movable part of the telescope structure weighs 430 tonnes. It is composed of an azimuthal structure (the telescope fork) which moves on two concentric tracks on oil pads, and of an altitude structure (the telescope tube), also moving on oil pads.

Despite its enormous size and weight, the dimensions of the telescope structure must be extremely accurate and stable. For instance, the stability of the oil film was measured to be better than 100 nm (0.0001 millimeter) over 1 minute. This excellent value was well within the specifications and has contributed to the subsequent near-perfect optimization of the telescope's tracking performance.

The first of the four telescope structures (for UT1) was transported to Paranal already in early 1997.

First VLT 8.2-m mirror arrives at Paranal (1997)

The transport of the first of the four 8.2-meter VLT mirrors from REOSC in France to Paranal (Chile) marked one of the most exciting moments of the VLT project.

In early November 1997, the mirror began its transatlantic journey on-board M/S Tarpon Santiago. It arrived safely in the port of Antofagasta on December 6, 1997. Resting in a special container, the mirror was unloaded from the ship onto a specially equipped heavy-load trailer.

The convoy left the dock for the Paranal Observatory on the next day, accompanied by a substantial escort of local police, shipping agents, press and film crews as well as many interested onlookers.

Figure 60: Final tests of the VLT main telescope structure (1997)

This picture (Fig. 61) was obtained on December 9, 1997 on the desert road known as the "Old Panamerica", at the turn-off towards the Paranal Observatory.

Moving at speeds between 3 and 6 km/h, the mirror finally arrived at Paranal in the afternoon of that day. A detailed technical inspection confirmed that the mirror was in perfect shape.

A lonely outpost in the desert (1997)

The Paranal mountain was chosen as the site of the VLT Observatory because of its excellent atmospheric conditions and, not the least, its remoteness. This will ensure that the front-line astronomical observations to be carried out there will not be disturbed by adverse human activities, e.g. dust and light from roads and mines.

However, this also means that a complete infrastructure must be established at the site before the VLT observations can begin. This includes the roads, housing, electricity, water, communications, etc. All of this was put in place during the years 1991-1997 during a major construction program that also involved the removal of more than 300,000 cubic meters of rock

Figure 61: First VLT 8.2-m mirror arrives at Paranal (1997)

and soil from the Paranal peak to create the large platform needed for the many components of the VLT.

This distant, aerial view of Paranal (Fig. 62, top) and its immediate surroundings in the Atacama desert was obtained in late 1997. The Pacific Ocean is seen in the background. The buildings at the base camp are seen below and to the left of the summit. At the moment of this exposure, the aircraft was located right over the "Old Panamerica" road, some 10 km from the observatory.

The Paranal base camp (1997)
While construction work progressed at the summit of the Paranal mountain, a small town has gradually emerged at the foot of the mountain - the Paranal Base Camp.

The base camp contains important installations for the ESO Paranal Observatory. In the foreground: The power plant and storage facilities. On the left side is seen the 10-m wide entrance to the Mirror Maintenance Building (MMB) with the aluminizing plant for the giant VLT mirrors. The low white buildings behind the storage and MMB contain dormitories and offices. The wide road leads to the summit, as does the utility duct (electricity, water, communications) to the right.

This photo (Fig. 62, bottom) was obtained in the evening, well after the Sun had set behind the Paranal mountain.

The summit platform (1997) An aerial view (Fig. 63, top) of the Paranal summit in late

Figure 62: Top: A lonely outpost in the desert (1997). Bottom: The Paranal base camp (1997)

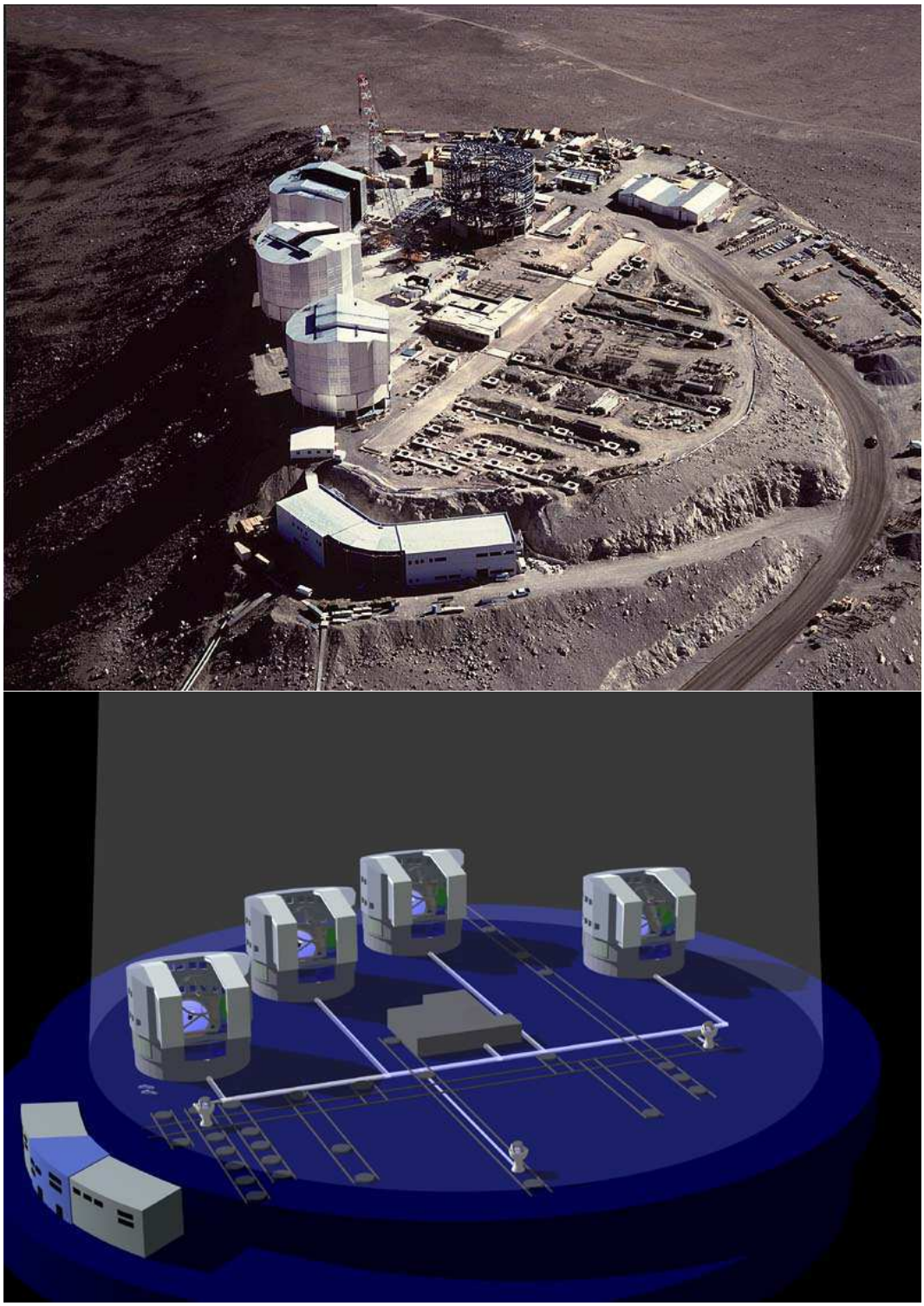

Figure 63: Top: The summit platform (1997); Bottom: Interferometry will produce the sharpest images (1998)

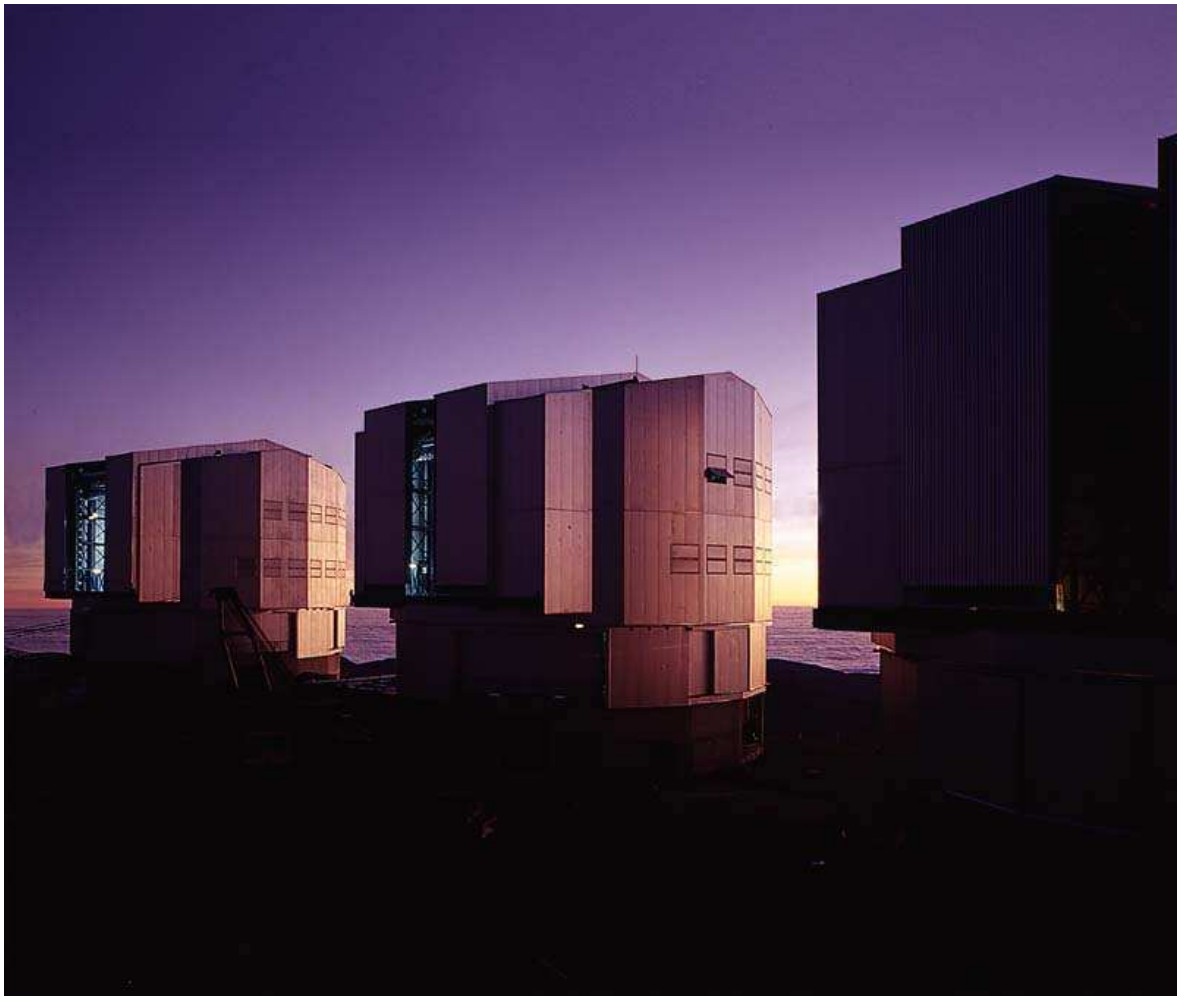

Figure 64: Looking forward to 'first light' (1998)

1997 with the large observatory platform on which the many components of VLT were being installed.

The four enclosures (telescope 'domes') are seen, three of which have been closed. The long, subterranean interferometric tunnel is in the middle. The concrete supports for the smaller, movable telescopes of the *VLT Interferometric Array* are located all over the platform.

The VLT control building, from where the observations with the four large telescopes will be made, is placed on a smaller and slightly lower platform in the foreground.

Interferometry will produce the sharpest images (1998)

Astronomers have long sought to improve the sensitivity and spatial resolution of their observations in order to see as far back in time and as sharply as possible.

One of the most exciting features of the VLT is the possibility to use it as a giant optical interferometer.

The *VLT Interferometric Array (VLTI)* with its four giant telescopes with main mirrors of 8.2-m diameter and several 1.8-m auxiliary telescopes will represent the most sensitive interferometric device in the world. It will have a spatial resolution equivalent to that of a 200 meter diameter telescope covering the complete surface of Cerro Paranal. It would in principle be able to see an astronaut on the surface of the Moon, 400,000 km away.

This schematic representation (Fig. 63, bottom) of the VLTI components shows how light from the telescopes (in the form of collimated beams) is directed underground towards the delay-line tunnel and comes together in the centrally located *Interferometric Laboratory*. This is where the sharpest optical astronomical images of all times will be recorded.

The VLTI is expected to lead to a wealth of exciting scientific results ranging from the direct detection of planets around nearby stars that are separated from the parent star by more than a few milliarcseconds, to the nuclei of active galaxies.

It is foreseen that when VLTI will become fully operational in the 2005 - 2010 time frame, a majority of astronomical observations will be carried out with this unique facility.

Looking forward to 'first light' (1998)

This (Fig. 64) is an evening view towards the west with VLT telescope enclosures 1, 2 and 3. The spectacular sunsets that can be enjoyed from the Paranal mountain are a fitting prelude to the remarkable view towards the southern stars as the Sun gives way to the crystal clear night sky.

The first astronomical images from the VLT will be obtained with the UT1, housed in the enclosure to the left. This *VLT UT1 First Light Event* is likely to happen in late May 1998.

Appendix II

NOVA Press Release on election to Council President

—– Original Message —–
From: "Astronomische Persdienst" ⟨nova@astronomy.nl⟩
Sent: 20 December, 2002 14:17
Subject: -Van der Kruit President ESO

********** NEDERLANDSE ONDERZOEKSCHOOL VOOR ASTRONOMIE *********
********** NOVA **********
********** ASTRONOMISCHE PERSDIENST **********
********** reacties aan: nova@astronomy.nl **********

Nederlander Van der Kruit nieuwe President van bestuur Europese Zuidelijke Sterrenwacht in Chili

De Europese Zuidelijke Sterrenwacht ESO –de grootste sterrenwacht ter wereld, gevestigd in Chili– heeft op woensdag 18 december de Groningse astronoom Prof. P.C. van der Kruit gekozen tot bestuursvoorzitter ('President of Council') . Hij volgt per 1 januari 2003 het Duitse bestuurslid Dr. A. Freytag op in deze functie.

De Nederlandse astronoom J.H. Oort was veertig jaar geleden de grondlegger van de ESO, die sindsdien is gegroeid van 6 naar 10 lidstaten en uitgegroeid tot een van de belangrijkste astronomische organisaties ter wereld met een jaarbudget van ca. 100 miljoen euro.
Nederlanders hebben in ESO vaak een prominente rol vervuld: Oort was President of Council in 1964-65, J.H. Bannier (oprichter van NWO) in 1969-71 en 1974-75.
Daarnaast werd ESO gedurende een periode van 23 jaar geleid door Nederlandse directeuren: van 1970 tot 1975 door A. Blaauw, van 1975 tot 1988 door L. Woltjer en van 1988 tot 1993 door H. van der Laan.

Prof. P.C. van der Kruit (1944) is hoogleraar sterrenkunde aan het Kapteyn Instituut van de Rijksuniversiteit Groningen. Zijn wetenschappelijke werk richt zich vooral op het onderzoek naar de structuur en evolutie van sterrenstelsels.
In 2001 vernoemde de Internationale Astronomische Unie (IAU) de asteroïde (6085P-L) naar hem: Nr.10437 'van der Kruit'.

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Dutchman Van der Kruit elected new President of Council European Southern Observatory

The European Southern Observatory ESO –the largest observatory in the world, located in Chile– has on Wednesday December 18 elected the Groningen astronomer Prof. P.C. van der Kruit as President of Council. He succeeds the German delegate Dr. A. Freytag effective January 1, 2003.

Forty years ago, the Dutch astronomer J.H. Oort was the founder of the ESO, that since then has developed from 6 to 10 member states and become one of the most important astronomical

organizations in the world with an annual budget of about 100 million Euro.
Dutchmen have often played important roles in ESO: Oort was President of Council in 1964-1965 and Bannier (founder of the Netherlands Organization for Scientific Research NWO) in 1969-1971 and 1974-1975.
In addition ESO has for a period of 23 years been in the hands of Dutch directors: from 1970 to 1975 A. Blaauw, from 1975 to 1988 L. Woltjer and from 1988 to 1993 H. van der Laan.

Prof. P.C. van der Kruit (1944) is professor of astronomy at the Kapteyn Astronomical Institute of the University of Groningen. His scientific work is mostly in the area of studies of the structure and evolution of galaxies.
In 2001, the International Astronomical Union (IAU) named the asteroid (6085-L) after him: Nr. 10437 'van der Kruit'.

Appendix III

ESO Press Release 04/03

25 February 2003
Embargoed until Tuesday, February 25, 2003, at 20:00 hrs CET (19:00 hrs UT - 2:00 pm EST)

ESO and NSF Sign Agreement on ALMA. Green Light for World's Most Powerful Radio Observatory

On February 25, 2003, the European Southern Observatory (ESO) and the US National Science Foundation (NSF) are signing a historic agreement to construct and operate the world's largest and most powerful radio telescope, operating at millimeter and sub-millimeter wavelength. The Director General of ESO, Dr. Catherine Cesarsky, and the Director of the NSF, Dr. Rita Colwell, act for their respective organizations.

Known as the Atacama Large Millimeter Array (ALMA), the future facility will encompass sixty-four interconnected 12-meter antennas at a unique, high-altitude site at Chajnantor in the Atacama region of northern Chile.

ALMA is a joint project between Europe and North-America. In Europe, ESO is leading on behalf of its ten member countries and Spain. In North-America, the NSF also acts for the National Research Council of Canada and executes the project through the National Radio Astronomy Observatory (NRAO) operated by Associated Universities, Inc. (AUI).

The conclusion of the ESO–NSF Agreement now gives the final green light for the ALMA project. The total cost of approximately 650 million Euro (or US Dollars) is shared equally between the two partners.

Dr. Cesarsky is excited: *"This agreement signifies the start of a great project of contemporary astronomy and astrophysics. Representing Europe, and in collaboration with many laboratories and institutes on this continent, we together look forward towards wonderful research projects. With ALMA we may learn how the earliest galaxies in the Universe really looked like, to mention but one of the many eagerly awaited opportunities with this marvelous facility".*

"With this agreement, we usher in a new age of research in astronomy", says Dr. Colwell. *"By working together in this truly global partnership, the international astronomy community will be able to ensure the research capabilities needed to meet the long-term demands of our scientific enterprise, and that we will be able to study and understand our universe in ways that have previously been beyond our vision".*

The recent Presidential decree from Chile for AUI and the agreement signed in late 2002 between ESO and the Government of the Republic of Chile (cf. ESO PR 18/02) recognize the interest that the ALMA Project has for Chile, as it will deepen and strengthen the cooperation in scientific and technological matters between the parties.

A joint ALMA Board has been established which oversees the realization of the ALMA project via the management structure. This Board meets for the first time on February 24-25, 2003, at NSF in Washington and will witness this historic event.

Figure 65: PR Photo 06a/03 shows an artist's view of the Atacama Large Millimeter Array (ALMA), with 64 12-m antennas.

ALMA: Imaging the Light from Cosmic Dawn

The Atacama Large Millimeter Array (ALMA) will be one of astronomy's most powerful telescopes - providing unprecedented imaging capabilities and sensitivity in the corresponding wavelength range, many orders of magnitude greater than anything of its kind today.

ALMA will be an array of 64 antennas that will work together as one telescope to study millimeter and sub-millimeter wavelength radiation from space. This radiation crosses the critical boundary between infrared and microwave radiation and holds the key to understanding such processes as planet and star formation, the formation of early galaxies and galaxy clusters, and the formation of organic and other molecules in space.

"ALMA will be one of astronomy's premier tools for studying the universe", says Nobel Laureate Riccardo Giacconi, President of AUI (and former ESO Director General (1993-1999)). *"The entire astronomical community is anxious to have the unprecedented power and resolution that ALMA will provide".*

The President of the ESO Council, Professor Piet van der Kruit, agrees: *"ALMA heralds a breakthrough in sub-millimeter and millimeter astronomy, allowing some of the most penetrating studies of the Universe ever made. It is safe to predict that there will be exciting scientific surprises when ALMA enters into operation".*

What is millimeter and sub-millimeter wavelength astronomy?

Astronomers learn about objects in space by studying the energy emitted by those objects. Our Sun and the other stars throughout the Universe emit visible light. But these objects also emit other kinds of light waves, such as X-rays, infrared radiation, and radio waves. Some objects emit

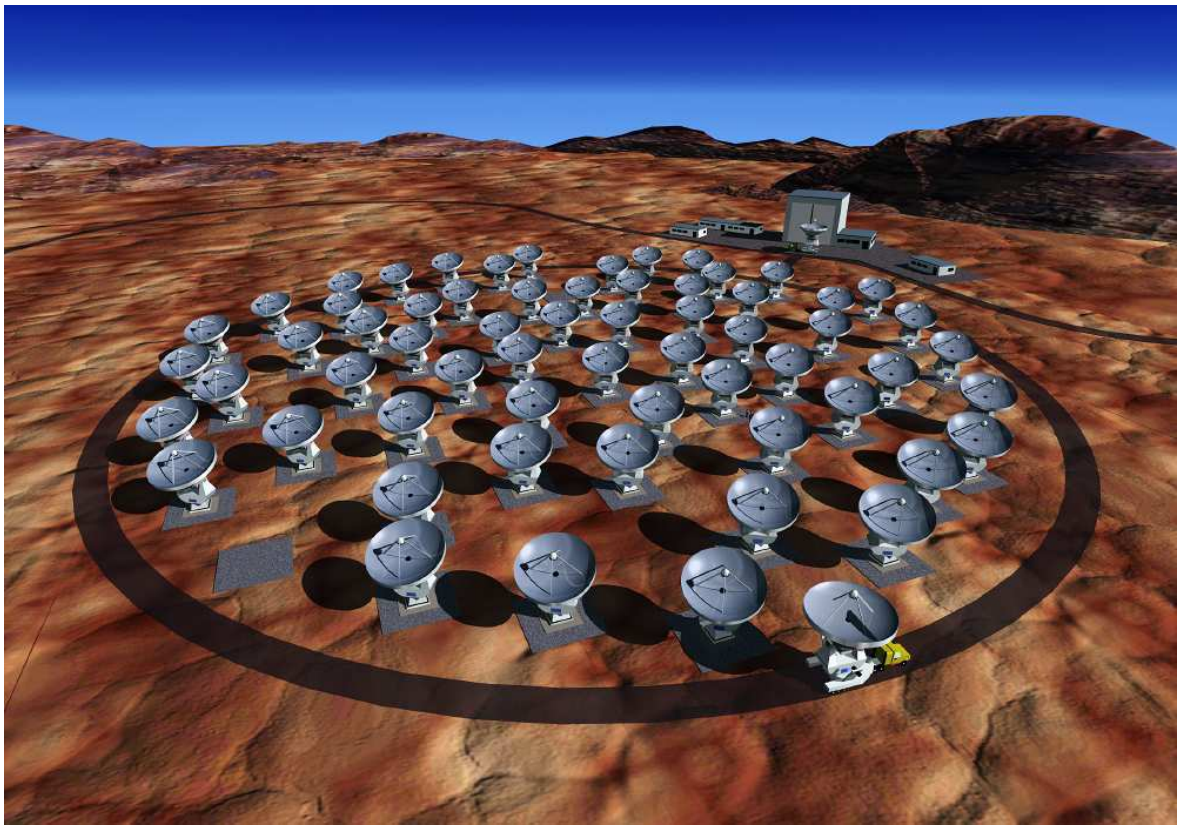

Figure 66: PR Photo 06b/03 is another such view, with the array arranged in a compact configuration at the high-altitude Chajnantor site.

very little or no visible light, yet are strong sources at other wavelengths in the electromagnetic spectrum.

Much of the energy in the Universe is present in the sub-millimeter and millimeter portion of the spectrum. This energy comes from the cold dust mixed with gas in interstellar space. It also comes from distant galaxies that formed many billions of years ago at the edges of the known universe.

With ALMA, astronomers will have a uniquely powerful facility with access to this remarkable portion of the spectrum and hence, new and wonderful opportunities to learn more about those objects.

Current observatories simply do not have anywhere near the necessary sensitivity and resolution to unlock the secrets that abundant sub-millimeter and millimeter wavelength radiation can reveal. It will take the unparalleled power of ALMA to fully study the cosmic emission at this wavelength and better understand the nature of the universe.

Scientists from all over the world will use ALMA. They will compete for observing time by submitting proposals, which will be judged by a group of their peers on the basis of scientific merit.

Figure 67: The ALMA VertexRSI prototype antennas is shown in PR Photo 06c/03 on the Antenna Test Facility (ATF) site at the NRAO Very Large Array (VLA) site near Socorro (New Mexico, USA).

ALMA's unique capabilities

ALMA's ability to detect remarkably faint sub-millimeter and millimeter wavelength emission and to create high-resolution images of the source of that emission gives it capabilities not found in any other astronomical instruments. ALMA will therefore be able to study phenomena previously out of reach to astronomers and astrophysicists, such as:
Very young galaxies forming stars at the earliest times in cosmic history;
New planets forming around young stars in our galaxy, the Milky Way;
The birth of new stars in spinning clouds of gas and dust; and
Interstellar clouds of gas and dust that are the nurseries of complex molecules and even organic chemicals that form the building blocks of life.

How will ALMA work?

All of ALMA's 64 antennas will work in concert, taking quick 'snapshots' or long-term exposures of astronomical objects. Cosmic radiation from these objects will be reflected from the surface of each antenna and focused onto highly sensitive receivers cooled to just a few degrees above absolute zero in order to suppress undesired "noise" from the surroundings. There the signals will be amplified many times, digitized, and then sent along underground fiber-optic cables to a large signal processor in the central control building.

Figure 68: The future ALMA site at Llano de Chajnantor at 5000 meter altitude, some 40 km East of the village of San Pedro de Atacama (Chile) is seen in PR Photo 06d/03 - this view was obtained at 11 hrs in the morning on a crisp and clear autumn day.

This specialized computer, called a correlator - running at 16,000 million-million operations per second - will combine all of the data from the 64 antennas to make images of remarkable quality.

The extraordinary ALMA site

Since atmospheric water vapor absorbs millimeter and (especially) sub-millimeter waves, ALMA must be constructed at a very high altitude in a very dry region of the earth.

Extensive tests showed that the sky above the Atacama Desert of Chile has the excellent clarity and stability essential for ALMA. That is why ALMA will be built there, on Llano de Chajnantor at an altitude of 5,000 meters in the Chilean Andes.

A series of views of this site, also in high-resolution suitable for reproduction, is available at the Chajnantor Photo Gallery.

Time-line for ALMA

June 1998: Phase 1 (Research and Development)
June 1999: European/American Memorandum of Understanding
February 2003: Signature of the bilateral Agreement
2004: Tests of the Prototype System
2007: Initial scientific operation of a partially completed array
2011: End of construction of the array

Note: This is a joint press release by ESO and the NSF.

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Appendix IV

ESO Press Release 29/03

6 November 2003
Embargoed until November 6, 2003, at 16:30 hrs CET (15:30 hrs UT - 12:30 hrs Chilean Time - 10:30 a.m. EST)

Astronomers Break Ground on Atacama Large Millimeter Array (ALMA) - World's Largest Millimeter Wavelength Telescope

Scientists and dignitaries from Europe, North-America and Chile are breaking ground today (Thursday, November 6, 2003) on what will be the world's largest, most sensitive radio telescope operating at millimeter wavelengths.

ALMA - the 'Atacama Large Millimeter Array' - will be a single instrument composed of 64 high-precision antennas located in the II Region of Chile, in the District of San Pedro de Atacama, at the Chajnantor altiplano, 5,000 meters above sea level. ALMA's primary function will be to observe and image with unprecedented clarity the enigmatic cold regions of the Universe, which are optically dark, yet shine brightly in the millimeter portion of the electromagnetic spectrum.

The Atacama Large Millimeter Array (ALMA) is an international astronomy facility. ALMA is an equal partnership between Europe and North-America, in cooperation with the Republic of Chile, and is funded in North-America by the U.S. National Science Foundation (NSF) in cooperation with the National Research Council of Canada (NRC), and in Europe by the European Southern Observatory (ESO) and Spain. ALMA construction and operations are led on behalf of North-America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI), and on behalf of Europe by ESO.

"ALMA will be a giant leap forward for our studies of this relatively little explored spectral window towards the Universe", said Dr. Catherine Cesarsky, Director General of ESO. *"With ESO leading the European part of this ambitious and forward-looking project, the impact of ALMA will be felt in wide circles on our continent. Together with our partners in North-America and Chile, we are all looking forward to the truly outstanding opportunities that will be offered by ALMA, also to young scientists and engineers."*

"The U.S. National Science Foundation joins today with our North-American partner, Canada, and with the European Southern Observatory, Spain, and Chile to prepare for a spectacular new instrument", stated Dr. Rita Colwell, director of the U.S. National Science Foundation. *"ALMA will expand our vision of the Universe with 'eyes' that pierce the shrouded mantles of space through which light cannot penetrate."*

On the occasion of this groundbreaking, the ALMA logo was unveiled.

Science with ALMA

ALMA will capture millimeter and sub-millimeter radiation from space and produce images and spectra of celestial objects as they appear at these wavelengths. This particular portion of the electromagnetic spectrum, which is less energetic than visible and infrared light, yet more energetic than most radio waves, holds the key to understanding a great variety of fundamental

Figure 69: The ALMA logo

processes, e.g., planet and star formation and the formation and evolution of galaxies and galaxy clusters in the early Universe. The possibility to detect emission from organic and other molecules in space is of particularly high interest.

The millimeter and sub-millimeter radiation that ALMA will study is able to penetrate the vast clouds of dust and gas that populate interstellar (and intergalactic) space, revealing previously hidden details about astronomical objects. This radiation, however, is blocked by atmospheric moisture (water molecules) in the Earth's atmosphere. To conduct research with ALMA in this critical portion of the spectrum, astronomers thus need an exceptional observation site that is very dry, and at a very high altitude where the atmosphere above is thinner. Extensive tests showed that the sky above the high-altitude Chajnantor plain in the Atacama Desert has the unsurpassed clarity and stability needed to perform efficient observations with ALMA.

ALMA operation

ALMA will be the highest-altitude, full-time ground-based observatory in the world, at some 250 meters higher than the peak of Mont Blanc, Europe's tallest mountain.

Work at this altitude is difficult. To help ensure the safety of the scientists and engineers at ALMA, operations will be conducted from the Operations Support Facility (ALMA OSF), a compound located at a more comfortable altitude of 2,900 meters, between the cities of Toconao and San Pedro de Atacama.

Figure 70: The groundbreaking of ALMA on November 6, 2003 was performed by (from left to right) Prof. Piet van der Kruit, ALMA Board chairman and ESO Council President, Dr. Wayne VanCitters, Director, Division of Astronomical Sciences National Science Foundation, and Prof. Massimo Tarenghi, ALMA Director.

Phase 1 of the ALMA Project, which included the design and development, was completed in 2002. The beginning of Phase 2 happened on February 25, 2003, when the European Southern Observatory (ESO) and the US National Science Foundation (NSF) signed a historic agreement to construct and operate ALMA, cf. ESO PR 04/03.

Construction will continue until 2012; however, initial scientific observations are planned already from 2007, with a partial array of the first antennas. ALMA's operation will progressively increase until 2012 with the installation of the remaining antennas. The entire project will cost approximately 600 million Euros.

Earlier this year, the ALMA Board selected Professor Massimo Tarenghi, formerly manager of ESO's VLT Project, to become ALMA Director. He is confident that he and his team will succeed: *"We may have a lot of hard work in front of us"*, he said, *"but all of us in the team are excited about this unique project. We are ready to work for the international astronomical community and to provide them in due time with an outstanding instrument allowing trailblazing research projects in many different fields of modern astrophysics"*.

Figure 71: Directions to anywhere from the Observing Support Facility OSF, where the ground-breaking took place.

How ALMA will work

ALMA will be composed of 64 high-precision antennas, each 12 meters in diameter. The ALMA antennas can be repositioned, allowing the telescope to function much like the zoom lens on a camera. At its largest, ALMA will be 14 kilometers across. This will allow the telescope to observe fine-scale details of astronomical objects. At its smallest configuration, approximately 150 meters across, ALMA will be able to study the large-scale structures of these same objects.

ALMA will function as an interferometer (according to the same basic principle as the VLT Interferometer (VLTI) at Paranal). This means that it will combine the signals from all its antennas (one pair of antennas at a time) to simulate a telescope the size of the distance between the antennas.

With 64 antennas, ALMA will generate 2016 individual antenna pairs ('baselines') during the observations. To handle this enormous amount of data, ALMA will rely on a very powerful, specialized computer (a 'correlator'), which will perform 16,000 million million (1.6×10^{16}) operations per second.

Currently, two prototype ALMA antennas are undergoing rigorous testing at the NRAO's Very Large Array site, near Socorro, New Mexico, USA.

International collaboration

For this ambitious project, ALMA has become a joint effort among many nations and scientific institutions. In Europe, ESO leads on behalf of its ten member countries (Belgium, Denmark, France, Germany, Italy, The Netherlands, Portugal, Sweden, Switzerland and the United Kingdom) and Spain. Japan may join in 2004, bringing enhancements to the project. Given the participation of North-America, this will be the first truly global project of ground-based astronomy, an essential development in view of the increasing technological sophistication and the high costs of front-line astronomy installations.

The first sub-millimeter telescope in the southern hemisphere was the 15-m Swedish-ESO Submillimeter Telescope (SEST) which was installed at the ESO La Silla Observatory in 1987. It has since been used extensively by astronomers, mostly from ESO's member states. SEST has now been decommissioned and a new sub-millimeter telescope, APEX, is about to commence operations at Chajnantor. APEX, which is a joint project between ESO, the Max Planck Institute for Radio Astronomy in Bonn (Germany), and the Onsala Space Observatory (Sweden), is an antenna comparable to the ALMA antennas.

Note:
This ESO Press Release is being co-ordinated with the National Radio Astronomy Observatory (NRAO) in the USA, and with the ALMA Office in Chile.

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Appendix V

Speech at the occasion of the Groundbreaking of ALMA

ALMA Groundbreaking Ceremony Presentations:
Piet Van der Kruit, Chairman of the ALMA Board

Mrs. Paulina Saball, Undersecretary of the Bienes Nacionales, Mr. Jorge Molina, Intendente of the Second Region, Distinguished Ambassadors, Esteemed Authorities, Dear colleagues, Ladies and Gentlemen,

We are children of the universe. Actually, we are children of the universe in a very strict sense. Look at our bodies. By weight we are made up for about a 10% or so of hydrogen. The rest is in other chemical elements, of which carbon, nitrogen and oxygen are the major contributors. In contrast, the Universe, when it was about three minutes old and sufficiently cool that atomic nuclei could exist, consisted for three-quarters of hydrogen and one quarter of helium. There was no carbon, no nitrogen, no oxygen or any other chemical element except traces of lithium and boron. We now know that the chemical elements that make up most of our bodies were formed by nuclear reactions in heavy stars that live for a very short while and blow themselves up as supernovae and release the heavy elements into the interstellar gas so that new planets and possibly life can be formed. We are stardust.

Astronomy, astrophysics and nuclear physics have made it possible for us to understand how the chemical elements were formed. I regard this as one of the greatest accomplishments of science in the twentieth century. It is amazing that physical science is so powerful to make it possible for us to appreciate our origin.

Astronomers study our roots and our relation as human beings to the cosmos. But astronomy is an observational science. We will not understand the universe simply by pure thought, but rather we start by looking at it. We presently observe in the optical with giant telescopes, such as the VLT, Gemini, Keck, Magellan, etc., some of which are here in Chile. We use telescopes in space to observe at wavelengths that cannot be observed from the ground, such as in the X-ray region and the far infrared. We have built very large radio telescopes and we have linked these or have constructed arrays, using the same principle as ALMA will use.

In the last few decades, astronomers have realized the richness of the millimeter and sub-millimeter spectrum and the potential for observations there to solve the current questions in astrophysics. Therefore millimeter telescopes have been built, again including one on Chilean soil at La Silla, and arrays have been constructed in particular in North-America, Europe and Japan. These already use the spectral lines that can be observed at millimeter wavelengths to study the chemical composition in regions of star formation, especially in the gas and dust in cool regions.

In spite of progress in the twentieth century, such as understanding nucleosynthesis mentioned above, there are still fundamental questions left. Some important ones among these are the following. When and how did galaxies form and in what way did early star formation and chemical enrichment take place? How do planets form around young stars? To completely solve all aspects of these and other problems we absolutely need to be able to observe at millimeter and sub-millimeter wavelengths.

Figure 72: ESO Council President and ALMA Chairman Prof. Piet van der Kruit delivering his address at the occasion of the ALMA Groundbreaking Ceremony.

I myself had the privilege as a graduate student in Leiden, the Netherlands, to have Professor Jan Oort as my thesis supervisor. This was in the days of completion of the construction of the Westerbork radio telescope and he always stressed that it was the unexpected to look forward to. So it will also be for ALMA.

In order to build an instrument like ALMA we need a site in a very dry climate, at a high altitude and with a relatively flat area with dimensions of order ten kilometers. We have been fortunate that such a unique site is in existence here in Chile at Chajnantor.

After a number of initiatives in various continents to start a project to construct a millimeter array, eventually collaboration grew out of this between North-America (that is, the U.S.A. and Canada) and Europe (the member states of the European Southern Observatory and Spain; ESO states are Belgium, Denmark, France, Germany, Italy, the Netherlands, Portugal, Sweden, Switzerland and the United Kingdom). Unfortunately Japan, which was involved in the definition of the project, is not taking part now and the original plan had to be scaled down to what

we call the "baseline ALMA". But we are very hopeful, and actually heard very encouraging news the last few days at the ALMA Board, that Japan will join us soon to build an even more powerful ALMA than we are constructing now.

I would like to express, also on behalf of the ALMA Board, my gratefulness to:
• the visionaries who believed ALMA was the biggest step astronomy could make at the present time and never gave up to try to convince others;
• the scientists and engineers that believed in it and showed that ALMA is possible technically and financially;
• administrators and politicians that also believed in it and convinced ministers and high officials that ALMA should be funded;
• authorities that solved political and legal problems;
• and last but not least everyone at whatever level, in whatever capacity and from whatever country that contributed in whatever way to the fact that today we can formally start the construction of ALMA.

A los Chilenos y particularmente a la gente de la comuna de San Pedro: Muchas gracias por su cooperación en este lugar tan único y para permitir el desarrollo de la astronomía en su territorio hermoso. Estamos agradecidos y les deseamos todo lo mejor.

Appendix VI

ESO Press Release 02/04]

09 February 2004
For immediate release

Finland to Join ESO

Finland will become the eleventh member state of the European Southern Observatory (ESO).

Today, during a ceremony at the ESO Headquarters in Garching (Germany), a corresponding Agreement was signed by the Finnish Minister of Education and Science, Ms. Tuula Haatainen and the ESO Director General, Dr. Catherine Cesarsky, in the presence of other high officials from Finland and the ESO member states (see Video Clip 02/04 below).

Following subsequent ratification by the Finnish Parliament of the ESO Convention and the associated protocols, it is foreseen that Finland will formally join ESO on July 1, 2004.

Uniting European Astronomy

The Finnish Minister of Education and Science, Ms. Tuula Haatainen, began her speech with these words: *"On behalf of Finland, I am happy and proud that we are now joining the European Southern Observatory, one of the most successful mega projects of European science. ESO is an excellent example of the potential of European cooperation in science, and along with the ALMA project, more and more of global cooperation as well."*

She also mentioned that besides science ESO offers many technological challenges and opportunities. And she added: *"In Finland we will try to promote also technological and industrial cooperation with ESO, and we hope that the ESO side will help us to create good working relations. I am confident that Finland's membership in ESO will be beneficial to both sides."*

Dr. Catherine Cesarsky, ESO Director General, warmly welcomed the Finnish intention to join ESO. *"With the accession of their country to ESO, Finnish astronomers, renowned for their expertise in many front-line areas, will have new, exciting opportunities for working on research programs at the frontiers of modern astrophysics."*

"This is indeed the right time to join ESO;", she added. *"The four 8.2-m VLT Unit Telescopes with their many first-class instruments are working with unsurpassed efficiency at Paranal, probing the near and distant Universe and providing European astronomers with a goldmine of unique astronomical data. The implementation of the VLT Interferometer is progressing well and last year we entered into the construction phase of the intercontinental millimeter- and submillimeter-band Atacama Large Millimeter Array. And the continued design studies for gigantic optical/infrared telescopes like OWL are progressing fast. Wonderful horizons are indeed opening for the coming generations of European astronomers!"*

She was seconded by the President of the ESO Council, Professor Piet van der Kruit, *"This is a most important step in the continuing evolution of ESO. By having Finland become a member of ESO, we welcome a country that has put in place a highly efficient and competitive innovation*

Figure 73: Signing of the Finland-ESO Agreement on February 9, 2004, at the ESO Headquarters in Garching (Germany). At the table, the ESO Director General, Dr. Catherine Cesarsky, and the Finnish Minister of Education and Science, Ms. Tuula Haatainen.

system with one of the fastest growths of research investment in the EU area. I have no doubt that the Finnish astronomers will not only make the best scientific use of ESO facilities but that they will also greatly contribute through their high quality R&D to technological developments which will benefit the whole ESO community."

Notes
1: Current ESO member countries are Belgium, Denmark, France, Germany, Italy, the Netherlands, Portugal, Sweden, Switzerland and the United Kingdom.
2: The ESO Convention was established in 1962 and specifies the goals of ESO and the means to achieve these, e.g., *"The Governments of the States parties to this convention [...], desirous of jointly creating an observatory equipped with powerful instruments in the Southern hemisphere and accordingly promoting and organizing co-operation in astronomical research [...]"* (from the Preamble to the ESO Convention).

Video Clip from the Signing Ceremony (Finland-ESO Signing Ceremony on 9 February 2004 - ESO PR VC 02/04) available at the ESO site (http://www.hq.eso.org/outreach/press-rel/pr-2004/video/vid02a-04.mov)

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Figure 74: ESO Video Clip 02/04 shows some scenes from the ceremony that took place on February 9, 2004, at the ESO Headquarters in Garching (Germany). The ESO Director General, Dr. Catherine Cesarsky, and the Finnish Minister of Education and Science, Ms. Tuula Haatainen, signed the Agreement between the Finnish Government and ESO about the future accession of Finland to the ESO Convention.

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Appendix VII

ESO Council Resolution on Scientific Strategy

Unanimously adopted December 2004

ESO Council, considering the report of its Working Group for Scientific Strategic Planning, ESO/Cou-990, and its recommendations in ESO/Cou-964 rev.2, agrees that

- astronomy is in a golden age with new technologies and telescopes enabling an impressive series of fundamental discoveries in physics (e.g dark matter, dark energy, super-massive black-holes, extrasolar planets), over the last decade, the continued investment of ESO and its community into the improvement of ground-based astronomical facilities has finally allowed Europe to reach international competitiveness and leadership in ground-based astronomical research,
- the prime goal of ESO has to be to secure this status by developing powerful facilities in order to enable important scientific discoveries in the future,
- only the continued investment in cutting edge technologies, telescopes, instruments and information technology will enable such scientific leadership and discoveries,
- ESO will continue to be open to new members and collaborations, following the principle of furthering scientific excellence,

and accordingly adopts the following principles for its scientific strategy:

- ESO's highest priority strategic goal must be the European retention of astronomical leadership and excellence into the era of extremely Large Telescopes by carefully balancing its investment in its most important programs and projects,
- the completion of ALMA is assured and conditions for an excellent exploitation of its superb scientific capabilities should be established,
- the VLT will continue to receive effective operational support, regular upgrading (especially to keep it at the forefront in image quality through novel adaptive optics concepts) and efficient second generation instrumentation in order to maintain its world-leading position for at least ten more years,
- the unique capabilities of the VLTI will be exploited,
- the construction of an Extremely Large Telescope on a competitive time scale is addressed by radical strategic planning, especially with respect to the development of enabling technologies and the exploration of all options, including seeking additional funds, for a fast implementation,
- ESO and its community will continue their successful partnership and seek effective intercontinental collaborations in developing the most important and challenging technologies and facilities of the future.

Appendix VIII

ESO Press Release 14/05

16 May 2005
For immediate release

Dutch Minister of Science Visits ESO Facilities in Chile

Mrs. Maria van der Hoeven, the Dutch Minister of Education, Culture and Science, who traveled to the Republic of Chile, arrived at the ESO Paranal Observatory on Friday afternoon, May 13, 2005.

The Minister was accompanied, among others, by the Dutch Ambassador to Chile, Mr. Hinkinus Nijenhuis, and Mr. Cornelis van Bochove, the Dutch Director of Science.

The distinguished visitors were able to acquaint themselves with one of the foremost European research facilities, the ESO Very Large Telescope (VLT), during an overnight stay at this remote site, and later, with the next major world facility in sub-millimeter and millimeter astronomy, the Atacama Large Millimeter Array (ALMA).

At Paranal, the guests were welcomed by the ESO Director General, Dr. Catherine Cesarsky; the ESO Council President, Prof. Piet van der Kruit; the ESO Representative in Chile, Prof. Felix Mirabel; the Director of the La Silla Paranal Observatory, Dr. Jason Spyromilio; by one of the Dutch members of the ESO Council, Prof. Tim de Zeeuw; by the renowned astrophysicist from Leiden, Prof. Ewine van Dishoeck, as well as by ESO staff members.

The visitors were shown the various high-tech installations at the observatory, including many of the large, front-line VLT astronomical instruments that have been built in collaboration between ESO and European research institutes. Explanations were given by ESO astronomers and engineers and the Minister gained a good impression of the wide range of exciting research programs that are carried out with the VLT.

The distinguished visitors were able to acquaint themselves with one of the foremost European research facilities, the ESO Very Large Telescope (VLT), during an overnight stay at this remote site, and later, with the next major world facility in sub-millimeter and millimeter astronomy, the Atacama Large Millimeter Array (ALMA).

Having enjoyed the spectacular sunset over the Pacific Ocean from the Paranal deck, the Minister visited the VLT Control Room from where the four 8.2-m Unit Telescopes and the VLT Interferometer (VLTI) are operated. Here, the Minister was invited to follow an observing sequence at the console of the Kueyen (UT2) and Melipal (UT3) telescopes.

"I was very impressed, not just by the technology and the science, but most of all by all the people involved," expressed Mrs. Maria van der Hoeven during her visit. "An almost unique level of international cooperation is achieved at ESO, and everything is done by those who can do it best, irrespective of their country or institution. This spirit of excellence is an example for all Europe, notably for the new European Research Council."

Catherine Cesarsky, ESO Director General, remarked that Dutch astronomers have been part of ESO from the beginning: *"The Dutch astronomy community and industry play a major role in*

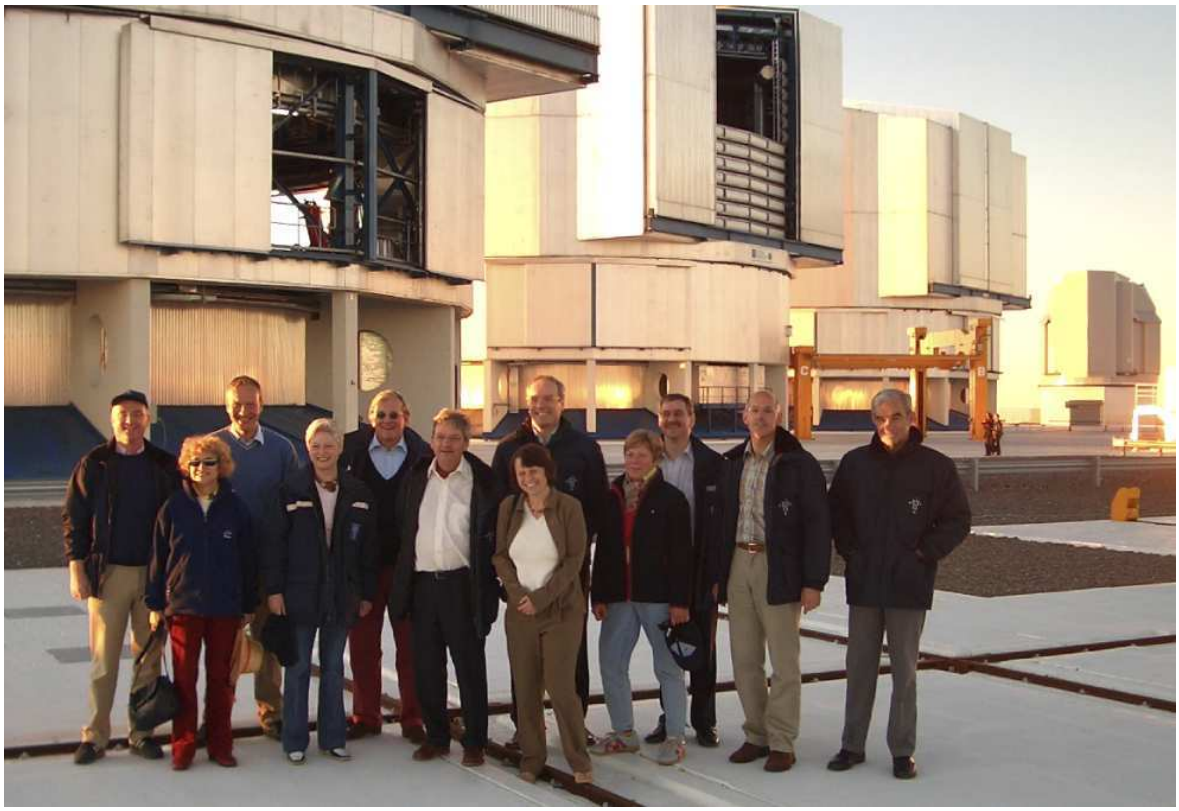

Figure 75: ESO PR Photo 16a/05 shows the Delegation in front of Kueyen (UT2). From left to right: Prof. Tim de Zeeuw, Dr. Catherine Cesarsky, Dr. Cornelis van Bochove, Minister Maria van der Hoeven, Ambassador Hinkinus Nijenhuis, Prof. Piet van der Kruit, Prof. Ewine van Dishoeck, Mr. Hans van der Vlies, Mrs. van der Kruit, Mr. Hans van den Broek, Dr. Leo Le Duc, and Prof. Felix Mirabel.

various aspects of the Very Large Telescope, and more particularly in its interferometric mode. With their long-based expertise in radio astronomy, Dutch astronomers greatly contribute in this field, and are now also playing a major role in the construction of ALMA. It is thus a particularly great pleasure to receive Her Excellency, Mrs. Maria van der Hoeven."

The delegation spent the night at the Observatory before heading further North in the Chilean Andes to San Pedro de Atacama and from there to the Operation Support Facility of the future ALMA Observatory.

On Sunday, May 15, the delegation went to the 5000m Llano de Chajnantor, the future site of the large array of 12m antennas that is being build there and should be completed by 2013. The Minister in particular could visit the 12m APEX (Atacama Pathfinder Experiment) telescope and see the technical infrastructure.

"I am fully confident that the worldwide cooperation in ALMA will be equally successful as the VLT, and I am convinced that the discoveries to be made here are meaningful for the Earth we live in", said Mrs. van der Hoeven. *"History and future are coming together in the north of Chile, in a very special way,"* she added. *"In the region of the ancient Atacamenos, scientists from all over the world are discovering more and more about the universe and the birth and death of stars. They even find new planets. They do that on Paranal with the VLT and soon will be doing that on the ALMA site."*

Figure 76: ESO PR Photo 16b/05 is inside the Melipal (UT3) telescope. Dutch Minister Maria van der Hoeven (right), Dr. Catherine Cesarsky (middle), Dr. Cornelis van Bochove (rear, middle) and Ambassador Hinkinus Nijenhuis (rear) listen to the explanations of Dr. Jason Spyromilio.

The Minister and her delegation left for Santiago in the afternoon.

Figure 77: ESO PR Photo 16c/05: Inside the interferometric tunnel. From left to right: Mrs. Maria van der Hoeven, Prof. Piet van der Kruit and Dr. Jason Spyromilio.

Figure 78: ESO PR Photo 16d/05: In front of the APEX antenna at Chajnantor. From left to right: Prof. Piet van der Kruit, Mrs. Maria van der Hoeven, Prof. Tim de Zeeuw, and Prof. Ewine van Dishoeck.

Figure 79: ESO PR Photo 16e/05 shows the Delegation on the 5000m high Llano de Chajnantor plateau. From left to right: Dr. Leo Le Duc, Prof. Felix Mirabel, Prof. Tim de Zeeuw, Prof. Ewine van Dishoeck, Dr. Cornelis van Bochove, Mrs. Maria van der Hoeven, Mr. Hans van der Vlies, Dr. Jörg Eschwey, Mr. Hinkinus Nijenhuis, Prof. Piet van der Kruit, Mr. Hans van den Broek, and Mr. Eduardo Donoso.

Appendix IX

ESO Press Release 31/05

7 December 2005
For immediate release

ESO signs largest-ever European industrial contract for ground-based astronomy project ALMA

ESO, the European Organization for Astronomical Research in the Southern Hemisphere, announced today that it has signed a contract with the consortium led by *Alcatel Alenia Space* and composed also of European Industrial Engineering (Italy) and MT Aerospace (Germany), to supply 25 antennas for the *Atacama Large Millimeter Array* (ALMA) project, along with an option for another seven antennas. The contract, worth 147 million euros, covers the design, manufacture, transport and on-site integration of the antennas. It is the largest contract ever signed in ground-based astronomy in Europe.

The ALMA antennas present difficult technical challenges, since the antenna surface accuracy must be within 25 microns, the pointing accuracy within 0.6 arc seconds, and the antennas must be able to be moved between various stations on the ALMA site. This is especially remarkable since the antennas will be located outdoor in all weather conditions, without any protection. Moreover, the ALMA antennas can be pointed directly at the Sun. ALMA will have a collecting area of more than 5,600 square meters, allowing for unprecedented measurements of extremely faint objects.

The signing ceremony took place on December 6, 2005 at ESO Headquarters in Garching, Germany. *"This contract represents a major milestone. It allows us to move forward, together with our American and Japanese colleagues, in this very ambitious and unique project"*, said ESO's Director General, Dr. Catherine Cesarsky. *"By building ALMA, we are giving European astronomers access to the world's leading sub-millimeter facility at the beginning of the next decade, thereby fulfilling Europe's desire to play a major role in this field of fundamental research."*

Pascale Sourisse, Chairman and CEO of Alcatel Alenia Space, said: *"We would like to thank ESO for trusting us to take on this new challenge. We are bringing to the table not only our recognized expertise in antenna development, but also our long-standing experience in coordinating consortiums in charge of complex, high-performance ground systems."*

ALMA is an international astronomy facility. It is a partnership between Europe, North-America and Japan, in cooperation with the Republic of Chile. The European contribution is funded by ESO and Spain, with the construction and operations being managed by ESO. A matching contribution is being made by the USA and Canada, who will also provide 25 antennas. Japan will provide additional antennas, thus making this a truly worldwide endeavor.

ALMA will be located on the 5,000m high Llano de Chajnantor site in the Atacama Desert of Northern Chile. ALMA will consist of a giant array of 12-m antennas separated by baselines of up to 18 km and is expected to start partial operation by 2010-2011.

The excellent site, the most sensitive receivers developed so far, and the large number of antennas will allow ALMA to have a sensitivity that is many times better than any other comparable instrument.

Figure 80: From left to right: Mr. Thomas Zimmerer (Head Antennas & Mechatronic, MT Aerospace AG), Mr. Hans Steininger (Chief Financial Officer, MT Aerospace AG), Mr. Patrick Maut (General Manager, BU Observatorion and Science of Alcatel Alenia Space France), Dr. Catherine Cesarsky (ESO Director General), Mr. Giampietro Marchiori (Managing Director, European Industrial Engineering s.r.l.), Mr. Vincenzo Giorgio (Director of Scientific Italian Programmes, Alcatel Alenia Space Italy), and Dr. Ian Corbett (ESO Deputy Director General).

"ALMA will bring to sub-millimeter astronomy the aperture synthesis techniques of radio astronomy, enabling precision imaging to be done on sub-arcsecond angular scales, and will nicely complement the ESO VLT/VLTI observatory", said Dr. Hans Rykaczewski, the ALMA European Project Manager.

Millimeter-wave astronomy is the study of the universe in the spectral region between what is traditionally considered radio waves and infrared radiation. In this realm, ALMA will study the evolution of galaxies, including very early stages, gather crucial data on the formation of stars, proto-planetary discs, and planets, and provide new insights on the familiar objects of our own solar system.

A prototype antenna had already been built by Alcatel Alenia Space and European Industrial Engineering and thoroughly tested along with prototypes antennas from Vertex/LSI and Mitsubishi at the ALMA Antenna Test Facility located at the Very Large Array site in Socorro, New Mexico.

For more information on the ALMA project, please go to http://www.eso.org/projects/alma/.

Figure 81: The Alcatel Alenia Space/ European Industrial Engineering Prototype Antenna

ESO Media Contacts are on the Public Affairs Dept. Contact Page
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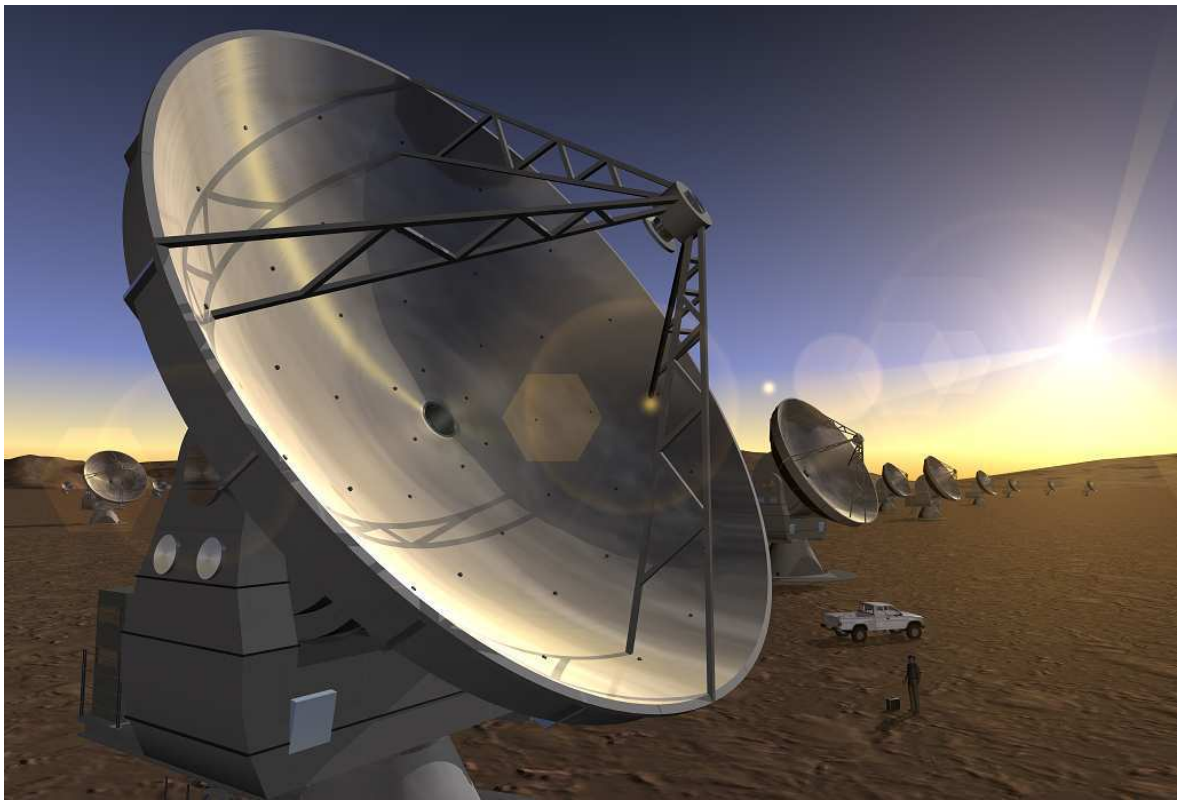

Figure 82: Artist's Impression of the ALMA Project

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Appendix X

ESO Press Release 05/06

13 February 2006
For immediate release

Spain to Join ESO – ESO will welcome its 12th member state on 1 July 2006

Today, during a ceremony in Madrid, an agreement was signed by the Spanish Minister of Education and Science, Mrs. María Jesús San Segundo, and the ESO Director General, Dr. Catherine Cesarsky, affirming their commitment to securing Spanish membership of ESO.

Signature Event in Madrid

Following approval by the Spanish Council of Ministers and the ratification by the Spanish Parliament of the ESO Convention and the associated protocols, Spain intends to become ESO's 12th member state on 1 July 2006.

"Since long Spain was aware that entering ESO was a logical decision and it was even necessary for a country like Spain because Spain is ranked 8th in astrophysical research", said Mrs. María Jesús San Segundo. *"The large scientific installations are not only necessary for research in different fields but are also partners and customers for hi-tech companies, helping to increase the funding of R&D."*

"Spanish Astronomy has made tremendous strides forward and we are delighted to welcome Spain as a new member of ESO. We very much look forward to working together with our excellent Spanish colleagues," said Dr. Cesarsky. *"For ESO, the Spanish accession means that we can draw on the scientific and technological competences, some of them unique in Europe, that have been developed in Spain and, of course, for Europe the Spanish membership of ESO is an important milestone in the construction of the European Research Area."*

Indeed, Spain is an important member of the European astronomical community and has developed impressively over the last three decades, reaching maturity with major contributions in virtually all subjects of astronomy. In addition, Spain hosts, operates or owns a number of competitive facilities dedicated to foster astronomical research, among which the Observatorio del Roque de los Muchachos at La Palma, certainly the premier optical/infrared astronomical observing site in Europe and site of the Spanish 10m GranTeCan telescope now nearing completion.

With the high quality of Spanish astronomical research as well as the technological competence of Spanish industry, it is only fitting that Spain should join ESO, world-leader in ground-based astronomy. Through ESO Spain will enjoy full access both to all of ESO's current facilities and to unrestricted participation in the great projects that ESO is planning for the future. Spain is already an active partner of the Atacama Large Millimeter Array (ALMA), whose construction and operations are led on behalf of Europe by ESO.

ESO's Council approved the admission of Spain at its 107th meeting held in Garching on 7 and 8 December 2005.

Figure 83: ESO PR Photo 05a/06. During a ceremony in Madrid on 13 February 2006, an agreement was signed by the Spanish Minister of Education and Science, Mrs. María Jesús San Segundo, and the ESO Director General, Dr. Catherine Cesarsky, affirming their commitment to securing Spanish membership of ESO.

High resolution images and their captions are available on this page.

Notes for Editors

ESO is the intergovernmental European research organization for Astronomy in the Southern Hemisphere. It is supported by Belgium, Denmark, Finland, France, Germany, Italy, the Netherlands, Portugal, Sweden, Switzerland and the United Kingdom.

ESO operates the La Silla Paranal Observatory. At the Paranal site it runs the world's prime optical/infrared astronomical facility, the Very Large Telescope Array (VLT). Located 130 km south of Antofagasta, this 2,600 m high mountain is in the driest part of the Atacama desert. The VLT consists of four 8.2-meter and four 1.8-meter telescopes. Several of the telescopes can be used in combination as a unique, giant interferometer (Very Large Telescope Interferometer, VLTI). In addition, ESO operates the La Silla site, 600 km north of Santiago de Chile, at 2,400 m altitude where state-of-the-art medium-sized telescopes are in operation. More than 1600 proposals are made each year for the use of the ESO telescopes.

The ESO Headquarters are located in Garching, near Munich, Germany. This is the scientific, technical and administrative center of ESO where technical development programs are carried out to provide the Observatory with the most advanced instruments. There are also extensive astronomical data facilities. ESO is currently engaged in a major new project for the construction of an array of telescopes for observation in the mm/sub-mm wavelength domain. Known as the

Figure 84: ESO PR Photo 05b/06

Atacama Large Millimeter Array (ALMA), this is a joint European/North-American/Japanese project, due for completion in 2012. Furthermore, studies for an extremely large optical telescope are being undertaken by ESO and its collaborating institutes.

The ESO Convention was established in 1962 and specifies the goals of ESO and the means to achieve these, e.g., "The Governments of the States parties to this convention [...], desirous of jointly creating an observatory equipped with powerful instruments in the Southern hemisphere and accordingly promoting and organizing co-operation in astronomical research [...]" (from the Preamble to the ESO Convention).

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Appendix XI

Farewell note to Council, ALMA Board and European ALMA Board

Groningen, November 2005.

To the members and attendees of meetings of ESO Council, the ALMA Board and the European ALMA Board and to those related and/or supporting these.

Dear colleagues and friends,

At the end of this year my term as President of ESO Council is coming to a close and with this my involvement with the ALMA Board and the EAB. As most of you will have heard I did have heart surgery a few weeks ago which prevented me from attending the final face-to-face meetings of the EAB on October 20, the ALMA Board on November 1 and 2 and Council on December 7 and 8, where I had hoped to say a few words of thanks and farewell in person. I will in any case call in next Thursday (December 8) during the meeting of Council and at the start of the ALMA Board telecon to say a few words in person. It will not be possible for me to do the same for the EAB telecon of December 9, unfortunately. But for all of you here a few words of thanks and farewell by email.

For those of you who know little of the details of my medical problem here a very short summery. I am a volunteer in a research program here in Groningen called PREVEND (Prevention of Renal and Vascular End-stage Disease), aiming at effects of proteins in one's urine on the functioning of the kidneys (I am in a comparison sample with no proteins in the urine or kidney problems). From this sample of initially (1997) about 8500 persons they selected 200 with a particular feature in their 2001 ECG and found that problems with coronary arteries in this group occurred two to three times more often than in the rest of the sample. These 200 people (including me) were offered further tests and, if necessary, a catheterization to determine the state of their coronary arteries (and of course treatment if something was wrong). This has been done for me on October 4 with the outcome (as with for the moment about half these people) that there is no such problem. In the course of all this they detected in September that my aortic valve was showing strong effects of wear and calcification (stenosis, since it narrows the opening of the valve) to an extent that replacement with an artificial valve was urgently necessary. It results from a birth defect that actually occurs in about 2% of people, but only in some cases leads to these problems. The defect is that the valve has two rather than three cusps which makes it work less effectively and enhances aging and wear. The surgery took place on November 1 and was very successful. My recovery is very fast, but I will not be able to return to full work before the end of the year. They say on the basis of the catheterization that I have only a very small chance to suffer a heart attack in the next ten years and the artificial valve is expected to work well for at least thirty years. So, in this respect I am in excellent shape.

My time in ESO Council has been extremely exciting. I have been in Council as a delegate for the Netherlands since August 2000, was elected Vice-president for 2001 and 2002 and President for the 2003, 2004 and 2005. When I became President Tim de Zeeuw replaced me as delegate. As Vice-president my most important task was to lead the ESO delegation to the ESO/UK In-Kind Working Group that defined the in-kind contribution from the UK as they joined ESO. My opposite number was Ian Corbett of PPARC, whom I knew well from years we were responsible for the joint operation of the UK-Netherlands Isaac Newton Group of Telescopes on La Palma. Ian and I had an excellent working relationship and mutual respect which led to a successful conclusion of these negotiations that was fully acceptable to Council and to PPARC.

During my term as President I was chairman of the ALMA Board in 2003 and 2004, vice-chairman in 2005 and chairman of the EAB in 2005 (the ESO rules specify that the President of Council chairs the EAB unless he/she is chair of the ALMA Board). These were the important initial three years of the construction of ALMA, leading up to the placing of the antenna contracts. In this period we established the working relations in the Board, selected the director and other members of the JAO, negotiated with Japan to become part of the project, and saw the beginning of the construction of the OSF, the AOS, the the road between these two and of course much other hardware in many places. Also the "re-baselining" and Cost Review together led to a firmer definition of the project. It have been important years and I am honored to have been part of it.

For ESO a number of important things were accomplished also. We concluded negotiations with Finland to join and are on the verge of doing so with Spain. We saw the VLT coming into full operation and the first exciting science results. And VLTI was coming along in an impressive way. In Council we instituted the Science Strategy Working Group which led to the important resolution in December 2004 on Scientific Strategy, the future priorities for the organization, which features prominently on the ESO homepage. Also, partly on the basis of recommendations from the ESO Visiting Committee we implemented a restructuring of the STC and OPC. The role of the EAB still needs to be better defined. Also, the new voting procedures in Council were adopted as well as the manner of determining the level of contributions to the budget, both in view of the possibility of more states joining ESO. And many more things.

It has been an exciting and productive time and I feel honored to have had the opportunity to be involved in all this. I am fully aware that these accomplishments are to the credit of a large group of people and my contribution was only small part of it. Many people that I worked with became personal friends. Many times we had to let constructive attitudes towards a joint goal prevail over interests of individual partners and I am grateful for this. It has been extremely rewarding.

I thank all of you. Members of the bodies for helping me chair meetings and making it possible to come to the right decisions, chairs and members of advisory committees to come up with helpful recommendations and so many members of the executives for working so hard in supporting our work. In particular I thank Catherine and Ian for excellent and extremely pleasant interactions and Bob for jointly and constructively chairing/co-chairing the ALMA Board. And I am very grateful to Karin, Iris, Anna, Priya, Isolde, Elena, Nathalie, Veronica and Mary for the support, including the arranging of my many travels. But in particular I thank everyone for the many pleasant interactions, the understanding and friendship. It was an enormous pleasure working with you all and I will miss you.

I also step down as director of the Kapteyn Institute and expect to find more time now for research and teaching. Hopefully I meet many of you in various other settings.

All the best,

Piet van der Kruit

PS. I made it a habit to try and find some interesting and relevant quotes for my speeches at the dinners we had with Council and ALMA Board. In the attachment I collected these and added some that I think are particularly interesting. I hope you enjoy them.

Quotes used at after-dinner speeches for ESO Council and the ALMA Board – and a few more[57]

P.C. van der Kruit

The opposite of a correct statement is a false statement. But the opposite of a profound truth may well be another profound truth.
Niels Bohr.

There are only two truly infinite things: the universe and human stupidity. But I am not sure about the universe.
Albert Einstein.

Interestingly, according to modern astronomers, the universe is finite. This is a very comforting thought, especially for people, who can never remember where they left things.
Woody Allen.

Earth is like a tiny grain of sand, only much, much heavier.
Anonymous.

Heat is work and work is a curse,
and all the heat in the universe
is gonna cool down.
And there'll be no more work and perfect peace.
Yeah, that's entropy, man!
Michael Flanders & Donald Swann.

Prediction is very difficult, especially about the future.
Niels Bohr.

If you come to a fork in the road, take it.
Yogi Berra.

If we don't succeed, we run the risk of failure.
Dan Quayle.

If you don't know where you are going, you will end up somewhere else.
Yogi Berra.

If everything seems under control, you're not going fast enough.
Mario Andretti.

Obstacles are those dreadful things you see when you take your eyes off your goal.
Henry Ford.

If you are going through hell, keep going.
Winston Churchill.

[57]Here I only reproduce the ones I actually did use.

With both feet on the ground you won't get far.
Loesje.

I always think twice before I say something stupid.
Loesje.

To do great, important tasks, two things are necessary: A plan and not quite enough time.
Anonymous.

You can always amend a big plan, but you can never expand on a little one. I don't believe in little plans, I believe in plans big enough to meet a situation which cannot possibly be foreseen now.
Harry Truman.

A budget is a planned method of worrying.
Anonymous.

No-one goes there anymore; it's too crowded.
Yogi Berra.

If the Creator had a purpose of equipping us with a neck, He surely must have meant us to stick it out.
Arthur Koestler.

2 is not equal to 3, not even for large values of 2.
Grabel's Law.

Nobody goes there anymore; it's too crowded.
Yoggi Berra.

In theory there is no difference between theory and practice. But in practice there is.
Jan L.A. van de Snepscheut.

If only God would give me a clear sign. Like making a large deposit in my name in a Swiss bank.
Woody Allen.

I will go anywhere, as long as it is forward.
David Livingstone.

When I am working on a problem I never think about beauty. I only think of how to solve the problem. But when I have finished, if the solution is not beautiful, I know it is wrong.
Richard Buchminster Fuller.

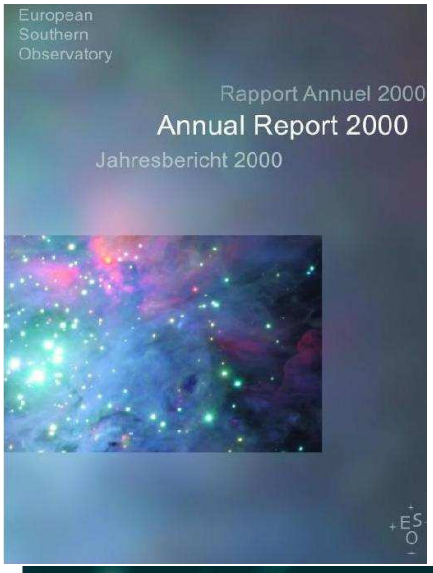
I believe we are on an irreversible trend toward more freedom and democracy. But that could change.
Dan Quayle, 5/22/89 (reported in Esquire, 8/92).

Appendix XII

Parts on Council in the Annual Report for 2000 through 2005

I reproduce in this appendix the covers and parts relevant to Council for those years I was associated with ESO. I also include the Forewords that I wrote and for 2005 I also include the Foreword written by my successor Richard Wade and the Introduction by Catherine Cesarsky.

These, Annual Reports back to 1995 and other ESO publications are available through the ESO homepage at http://www.hq.eso.org/gen-fac/pubs/.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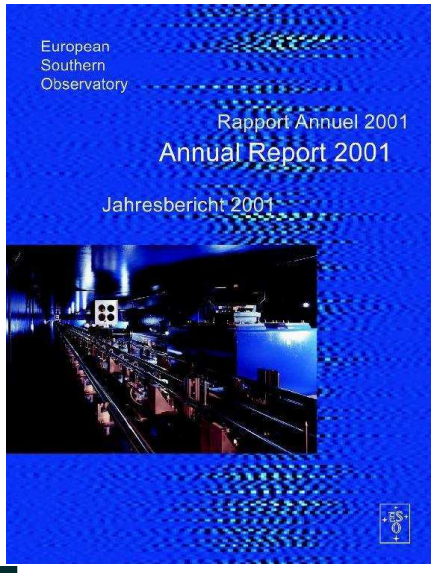
Annual Report 2000
Jahresbericht 2000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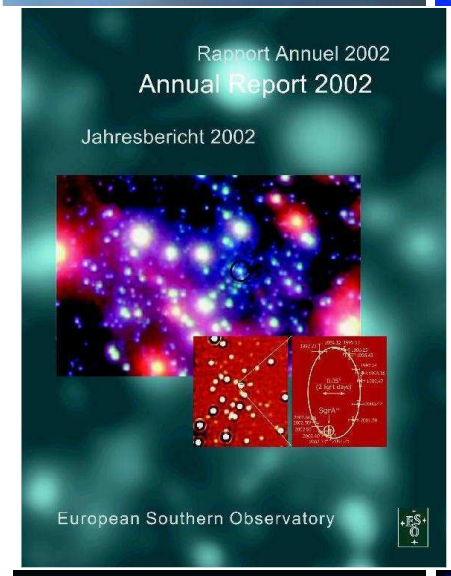
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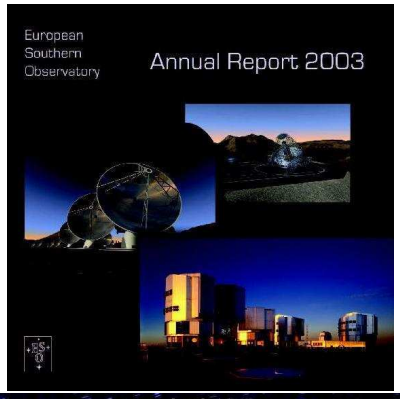
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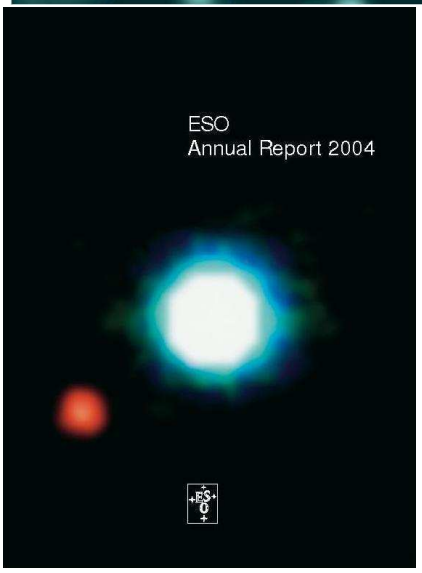
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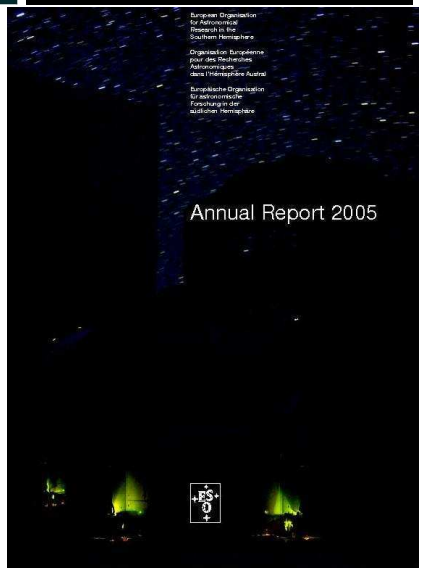
Annual Report 2005

Appendix III – Council and Committee Members in 2000
Annexe III – Membres du Conseil et des Comités en 2000
Anhang III – Rats- und Ausschussmitglieder für 2000

COUNCILAND COMMITTEE OF COUNCIL/ CONSEILET COMITÉ DU CONSEIL / RAT UND UNTERAUSSCHUSS DES RATS

Belgium / Belgique / Belgien:	J.P. Swings M. Desmeth
Denmark / Danemark / Dänemark:	H. Jørgensen H. Grage
France / Frankreich:	O. Le Fèvre G. La Cognata
Germany / Allemagne / Deutschland:	D. Reimers A. Freytag (President / Président / Präsident)
Italy / Italie / Italien:	F. Pacini P. Marietti
The Netherlands / Pays-Bas / Niederlande:	E.P.J. van den Heuvel J. Bezemer
Sweden / Suède / Schweden:	C. Fransson J. Gustavsson
Switzerland / Suisse / Schweiz:	G. Tammann S. Berthet
Portugal:	F. Bello (Observer / Observateur / Beobachter)

SCIENTIFIC TECHNICALCOMMITTEE / COMITÉ SCIENTIFIQUE ET TECHNIQUE / WISSENSCHAFTLICH-TECHNISCHER AUSSCHUSS

R. Bacon (F)	(1999–2001)	N. Piskunov (S)	(1999–2001)
R. Bender (D)*	(1996–2001)	J.-L. Puget (F)	(1999–2001)
G. Burki (CH)	(1998–2000)	H. Quintana (RCH)	(1997–2002)
A. Cimatti (I)	(1999–2001)	R. Sancisi (I)	(1998–2000)
M. Franx (NL)	(1998–2000)	A. van Ardenne (NL)	(1999–2001)
Th. Henning (D)	(1999–2001)	J.-M. Vreux (B)	(1999–2001)
J. Hjorth (DK)	(1998–2000)		

T. Lago (P) (Observer / Observateur / Beobachter)

FINANCE COMMITTEE / COMITÉ DES FINANCES / FINANZAUSSCHUSS

Belgium / Belgique / Belgien:	A. Heynen
Denmark / Danemark / Dänemark:	M. Bennum
France / Frankreich:	P. Laplaud
Germany / Allemagne / Deutschland:	A. Bohn
Italy / Italie / Italien:	U. Sessi* / P. Montanari
The Netherlands / Pays-Bas / Niederlande:	J. van de Donk
Sweden / Suède / Schweden:	G. Leman
Switzerland / Suisse / Schweiz:	M. Steinacher
Portugal:	F. Bello (Observer / Observateur / Beobachter)

*Chairman / Président / Präsident

Council

In 2000, the two regular meetings of Council took place in June and December. Furthermore, the Committee of Council met in April and in October. All meetings took place in Garching under the chairmanship of Dr. A. Freytag.

A major item on the agenda was the entry of Portugal as a new member state as of January 1, 2001 based on a Council Resolution adopted at the meeting in June. Furthermore, negotiations concerning membership were going on with the UK and in that respect a Council Resolution was adopted at the meeting in December. Also Greece had expressed interest in membership and a Negotiating Team had been appointed at the meeting in October.

Council approved the negotiations and conclusions of new agreements concerning the 0.9-m Dutch Telescope on La Silla with the Stichting Leids Sterrewacht Fonds (SLSF) and concerning the 0.5-m Cassegrain Telescope on La Silla with the University of Copenhagen. Moreover, Council approved an agreement with the Max-Planck-Institut für Extraterrestrische Physik on the Laser Guide Star Facility, to be installed on MELIPAL on Paranal.

With respect to the Regulations for International Staff, an amendment was approved concerning the old-age insurance scheme for Fellows. Another staff-related matter was the establishment by Council of a tripartite group, where representatives of the member states, the management and the staff would meet in an informal manner in order to advise Council on matters related to employment conditions and remuneration.

The reports of the chairmen of the Finance Committee, the Scientific Technical Committee and the Observing Programmes Committee were discussed as well as the regular VLT/VLTI Biannual Reports. In December, a Draft Long-Range Plan covering the years 2001 to 2006 was presented to Council for discussion and a final version for approval will be prepared for the meeting in June 2001.

Regarding the ALMA project, Council was informed on the progress within Phase 1 and the possible participation by Japan. Discussions took place concerning Phase 2 and in December a Council Resolution was adopted requesting the ESO Executive to submit a

Le Conseil

En 2000, les deux séances régulières du Conseil ont eu lieu en juin et en décembre. Par ailleurs, le Comité du Conseil s'est réuni en avril et en octobre. Toutes les rencontres ont eu lieu à Garching sous la présidence du Dr. A. Freytag.

Un point important dans l'agenda fut l'entrée du Portugal parmi les nouveaux États membres à partir du 1er janvier 2001, selon une Résolution du Conseil adoptée à la session de juin. Par ailleurs, les négociations concernant l'adhésion du Royaume-Uni se sont poursuivies et une résolution a été adoptée à ce sujet lors de la réunion de décembre. La Grèce a également exprimé son vœu de rejoindre les États membres et une Équipe de Négociation a été nommée lors de la réunion d'octobre.

Le Conseil a approuvé les négociations et la conclusion de nouveaux accords avec le Stichting Leids Sterrewacht Fonds (SLSF) concernant le télescope hollandais de 0,90 m à La Silla ainsi qu'avec l'Université de Copenhague concernant le télescope Cassegrain de 0,50 m également à La Silla. De plus, le Conseil a approuvé l'accord passé avec le Max-Planck-Institut für Extraterrestrische Physik sur le dispositif d'étoile guide laser qui doit être installé à Paranal sur MELIPAL.

Concernant le Règlement du personnel international, un amendement a été approuvé à propos du *schéma* d'assurance retraite pour les Fellows (post-doctorants). Un autre point lié au personnel fut l'établissement par le Conseil d'un groupe tripartite où les représentants des États membres, de la direction et du personnel se réuniraient de manière informelle pour avertir le Conseil des problèmes liés aux conditions de travail et aux salaires.

Les rapports des présidents du Comité des Finances, du Comité scientifique et technique et du Comité des Programmes d'Observation furent discutés ainsi que les rapports bisannuels du VLT/VLTI. En décembre, une ébauche de Plan à long terme couvrant les années 2001 à 2006 a été présentée au Conseil pour discussion. Une version finale sera préparée pour approbation à la session de juin 2001.

À propos du projet ALMA, le Conseil a été informé des progrès sur la Phase 1 et de la participation possible du Japon.

Der Rat

Im Jahre 2000 fanden im Juni und Dezember zwei ordentliche Treffen des Rates statt. Außerdem traf sich der Unterausschuss des Rats im April und im Oktober. Alle Treffen fanden in Garching unter Vorsitz von Dr. A. Freytag statt.

Ein Hauptthema auf dem Programm war der Beitritt Portugals als neuer Mitgliedsstaat zum 1. Januar 2001, wie er in einem Ratsbeschluss auf dem Treffen im Juni angenommen worden war. Außerdem wurden Verhandlungen bezüglich einer Mitgliedschaft Großbritanniens geführt, und in dieser Hinsicht wurde auf dem Treffen im Dezember ein Ratsbeschluss gefasst. Auch Griechenland hat sein Interesse an einer Mitgliedschaft bekundet; bei dem Treffen im Oktober wurde ein Verhandlungsteam benannt.

Der Rat gab seine Zustimmung zu Verhandlungen und neuen Vertragsabschlüssen bezüglich des niederländischen 0,9-m-Teleskops auf La Silla mit dem Stichting Leids Sterrewacht Fonds (SLSF) und bezüglich des 0,5-m-Cassegrain-Teleskops auf La Silla mit der Universität Kopenhagen. Überdies stimmte der Rat einem Abkommen mit dem Max-Planck-Institut für Extraterrestrische Physik über den Laser-Referenzstern zu, der an MELIPAL auf Paranal installiert werden soll.

Bezüglich der Personalregeln für das internationale Personal wurde ein Zusatz angenommen, der die Rentenversicherung der Fellows betrifft. Ein weiteres personalbezogenes Thema war die Einrichtung einer dreiseitigen Gruppe durch den Rat, in der sich Vertreter der Mitgliedsstaaten, des Managements und der Mitarbeiter in informellem Rahmen treffen sollen, um den Rat in Angelegenheiten zu beraten, die Beschäftigungsbedingungen und Gehaltsfragen betreffen.

Die Berichte der Vorsitzenden des Finanzausschusses, des Wissenschaftlich-Technischen Ausschusses und des Ausschusses für Beobachtungsprogramme wurden ebenso erörtert wie die halbjährlich erstellten VLT/VLTI-Berichte. Im Dezember wurde dem Rat der Entwurf eines Langzeitplans für die Jahre 2001 bis 2006 vorgelegt. Für das Treffen im Juni 2001 wird eine endgültige Fassung zur Zustimmung vorbereitet.

Was das ALMA-Projekt betrifft, so wurde der Rat über den Fortschritt in

proposal for ESO's specific role in ALMAPhase 2 for approval at the June 2001 meeting. Council was also informed on the considerations concerning the OWL project where conceptual studies are taking place.

As regards the Visiting Committee, Council took note of the resignation of Prof. R. Kudritzki and designated Prof. J. Mould as new chairman and Prof. A.W. Rix as new member. The Visiting Committee met in Chile in October and in Garching in November and will present its report to Council in 2001.

The President of Council had visited Chile in order to participate in the inauguration of the new President, Mr. Lagos, and had met with ESO staff at Vitacura and La Silla. Furthermore, Council was informed on the ongoing informal talks with the Chilean Ministry of Foreign Affairs concerning certain amendments to the present Local Staff Regulations.

At the June meeting, Council unanimously approved the annual accounts on the basis of the External Audit Report 1999 by the Swiss Federal Audit Office. The Draft Budget for 2001 was approved at the December meeting and Council took note of the Draft Financial Projections 2002–2004 and the Cash Flow Planning. Upon recommendation by the Finance Committee, Council took note of the changes to the Internal Financial Regulations and unanimously approved the proposed changes to the Financial Rules thus concluding an important revision process undertaken by Finance Committee.

Council extended the appointments of Prof. G. Monnet as Head of the Instrumentation Division and of Dr. P. Quinn as Head of the Data Management and Operations Division.

Dr. A. Freytag was unanimously re-elected as President of Council for 2001 and Dr. P.C. van der Kruit was elected Vice-President. Dr. M. Steinacher was elected as new Chairman of the Finance Committee. Prof. G. Burki, Prof. M. Franx, Dr. J. Hjorth and Dr. R. Sancisi were re-elected as members of the Scientific Technical Committee. For the Observing Programmes Committee, Prof. J. Black was elected Chairman and Dr. A. Natta Vice-Chairman for the year 2001.

Des discussions ont eu lieu concernant la Phase 2 et une Résolution du Conseil fut adoptée en décembre, demandant à l'Exécutif de l'ESO de soumettre à approbation en juin 2001 une proposition sur le rôle spécifique de l'ESO dans cette phase. Le Conseil a été également informé sur les considérations quant aux études conceptuelles du Projet OWL.

En ce qui concerne le *Visiting Committee*, le Conseil a pris note de la démission du Prof. R. Kudritzki. Il a désigné le Prof. J. Mould comme nouveau président et le Prof. A.W. Rix comme nouveau membre. Le Visiting Committee s'est réuni au Chili en octobre et à Garching en novembre ; il présentera son rapport au Conseil en 2001.

Le président du Conseil s'est rendu au Chili afin d'assister à l'investiture du nouveau président, M. Lagos. A cette occasion, il a rencontré le personnel de l'ESO à Vitacura et à La Silla. Par ailleurs, le Conseil a été informé des discussions en cours avec le Ministre chilien des Affaires étrangères concernant certains amendements au règlement du personnel local.

Les comptes annuels ont été approuvés à l'unanimité par le Conseil lors de la session de juin, sur la base du Rapport d'Audit externe de 1999 rendu par la Commission fédérale d'audit suisse). Le projet budgétaire pour 2001 a été approuvé à la session de décembre et le Conseil a pris note des projections financières pour la période 2002–2004 ainsi que du plan d'organisation des liquidités. Sur les recommandations du Comité des Finances, le Conseil a pris note des modifications du Règlement financier interne et a approuvé à l'unanimité les changements proposés aux règles financières, achevant ainsi l'importante série de modifications entreprises par le Comité des Finances.

Le Conseil a prolongé la nomination du Prof. G. Monnet comme chef de la Division Instrumentation et du Dr. P. Quinn comme chef de la Division Gestion des Données et Opérations.

Le Dr. A. Freytag a été réélu à l'unanimité au poste de Président du Conseil pour 2001 et le Dr. P.C. van der Kruit a été élu Vice-Président. Le Dr. M. Steinacher a été élu nouveau Président du Comité des Finances. Les Prof. G. Burki et M. Franx, les Dr. J. Hjorth et R. Sancisi ont été réélus membres du Comité scientifique et technique. Le Prof. J. Black a été élu Président du

Phase 1 sowie über eine mögliche Teilnahme Japans informiert. Phase 2 wurde erörtert, und im Dezember wurde ein Beschluss gefasst, in dem die ESO-Geschäftsleitung aufgefordert wird, einen Vorschlag für die spezifische Rolle von ESO in Phase 2 von ALMA zur Zustimmung bei dem Treffen im Juni 2001 zu unterbreiten. Weiterhin wurde der Rat über die Erwägungen bezüglich des OWL-Projekts informiert, für das derzeit Konzeptstudien durchgeführt werden.

Bezüglich des Beratenden ESO-Ausschusses nahm der Rat den Rücktritt von Prof. R. Kudritzki an und ernannte Prof. J. Mould zum neuen Vorsitzenden und Prof. A.W. Rix als neues Mitglied. Der Beratende Ausschuss trat im Oktober in Chile und im November in Garching zusammen und wird dem Rat seinen Bericht in Laufe des Jahres 2001 vorlegen.

Der Ratspräsident reiste nach Chile, um an der Amtseinführung des neuen Präsidenten, Lagos, teilzunehmen, und traf sich mit ESO-Mitarbeitern in Vitacura und auf La Silla. Außerdem wurde der Rat über die mit dem chilenischen Außenministerium stattfindenden informellen Gespräche bezüglich gewisser Änderungen der derzeit gültigen Personalregelungen informiert.

Auf der Basis des vom Schweizerischen Bundesrechnungsbüros erstellten externen Prüfungsberichts für 1999 stimmte der Rat bei dem Treffen im Juni einstimmig der Rechnungsprüfung zu. Der Budgetentwurf für 2001 wurde bei dem Treffen im Dezember angenommen. Der Rat nahm den Entwurf der Finanzplanung 2002–2004 und die Liquiditätsplanung zur Kenntnis. Auf Empfehlung des Finanzausschusses hin nahm der Rat die Änderungen in den Internen Finanzregelungen zur Kenntnis und akzeptierte einstimmig die vorgeschlagenen Änderungen an den Finanzregeln. Damit wurde ein vom Finanzausschuss unternommener wichtiger Revisionsprozess zu Ende geführt.

Der Rat verlängerte die Benennung von Prof. G. Monnet als Leiter der Abteilung für Instrumentierung und von Dr. P. Quinn als Leiter der Abteilung Datenverwaltung und Betrieb.

Dr. A. Freytag wurde für 2001 einstimmig als Ratspräsident wiedergewählt, und Dr. P.C. van der Kruit wurde zum Vize-Präsidenten gewählt. Dr. M. Steinacher wurde neuer Vorsitzender des Finanzausschusses. Prof. G. Burki, Prof.

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Anhang III – Rats- und Ausschussmitglieder für 2001

COUNCIL AND COMMITTEE OF COUNCIL / CONSEIL ET COMITÉ DU CONSEIL / RAT UND UNTERAUSSCHUSS DES RATS

President / Président / Präsident	*A. Freytag*
Belgium / Belgique / Belgien:	J.P. Swings
	M. Desmeth
Denmark / Danemark / Dänemark:	H. Jørgensen
	H. Grage
France / Frankreich:	O. Le Fèvre
	G. La Cognata
Germany / Allemagne / Deutschland:	D. Reimers
	B.-U. Jahn
Italy / Italie / Italien:	F. Pacini
	P. Marietti
The Netherlands / Pays-Bas / Niederlande:	P.C. van der Kruit
	J. Bezemer
Portugal:	T. Lago
	F. Bello
Sweden / Suède / Schweden:	C. Fransson
	G. Leman
Switzerland / Suisse / Schweiz:	G. Tammann
	S. Berthet
United Kingdom / Royaume-Uni / Vereinigtes Königreich:	I. Corbett (Observer / Observateur / Beobachter)

SCIENTIFIC TECHNICAL COMMITTEE / COMITÉ SCIENTIFIQUE ET TECHNIQUE / WISSENSCHAFTLICH-TECHNISCHER AUSSCHUSS

R. Bacon (F)	(1999–2001)	N. Piskunov (S)	(1999–2001)
R. Bender (D)*	(1996–2001)	J.-L. Puget (F)	(1999–2001)
G. Burki (CH)	(1998–2003)	H. Quintana (RCH)	(1997–2002)
A. Cimatti (I)	(1999–2001)	R. Sancisi (I)	(1998–2003)
M. Franx (NL)	(1998–2003)	A. van Ardenne (NL)	(1999–2001)
Th. Henning (D)	(1999–2001)	J.-M. Vreux (B)	(1999–2001)
J. Hjorth (DK)	(1998–2003)		

*Chairman / Président / Präsident

FINANCE COMMITTEE / COMITÉ DES FINANCES / FINANZAUSSCHUSS

President / Président / Präsident	*M. Steinacher*
Belgium / Belgique / Belgien:	A. Heynen
Denmark / Danemark / Dänemark:	E. Bregnbæk
France / Frankreich:	P. Laplaud
Germany / Allemagne / Deutschland:	A. Bohn
Italy / Italie / Italien:	U. Sessi
The Netherlands / Pays-Bas / Niederlande:	J. van de Donk
Portugal:	F. Bello
Sweden / Suède / Schweden:	F. Karlsson
Switzerland / Suisse / Schweiz:	J.P. Ruder
United Kingdom / Royaume-Uni / Vereinigtes Königreich:	C.G. Brooks (Observer / Observateur / Beobachter)

Council

Two ordinary meetings of Council took place in 2001. In addition, Council met for an extraordinary session mainly devoted to discussions regarding the accession of the UK. The Committee of Council met four times during the year, in March, May, October, and November. Except for the meeting of Council in June, which took place in Porto, Portugal, to celebrate the accession of Portugal as the 9th member state as from 1 January 2001, the meetings took place in Garching and were all chaired by Dr. A. Freytag.

The accession of the United Kingdom as a new member state was a major topic on the agenda throughout the year. At the extraordinary meeting of Council in December Resolutions were adopted settling the details of the admission, including the special contribution leading to the expected accession of the United Kingdom on 1 July 2002. Other countries had also expressed interest in joining ESO and informal meetings had taken place in this connection with Austria, Finland, Greece and Spain.

In June Council approved the negotiations and conclusions of agreements over the DENIS Pointed Observations at La Silla with the Observatoire de la Côte d'Azur and the Observatoire de Paris and concerning the Development and Construction of SINFONI with the Max-Planck-Institut für Extraterrestrische Physik. A Memorandum of Understanding between the Max-Planck-Gesellschaft, the Ruhr Universität Bochum, the Onsala Space Observatory regarding the ATACAMA Pathfinder Experiment (APEX) was also approved.

The ESO Tripartite Group established by Council and consisting of representatives of member states' delegations, representatives of management and representatives of the Staff Association held four meetings during 2001. Among the many issues discussed were the salary adjustments and ways to reach a settlement of the pending litigations, advancement reviews, health insurance and other conditions of employment.

Following the discussions in the Tripartite Group, Council adopted a Resolution concerning settlement of the contested salary adjustments for ESO international staff over the period 1996–2000. Appropriate amendments had to

Le Conseil

Deux séances régulières du Conseil ont eu lieu en 2001. De plus, le Conseil s'est réuni en session extraordinaire consacrée aux discussions concernant l'entrée du Royaume-Uni à l'ESO. Le Comité du Conseil s'est rencontré quatre fois pendant l'année, en mars, mai, octobre et novembre. Mis à part la réunion de juin, qui a eu lieu à Porto (Portugal), pour célébrer l'entrée du Portugal en tant que neuvième membre à dater du 1er janvier 2001, les rencontres du Conseil ont eu lieu à Garching et ont été présidées par le Dr. A. Freytag.

L'accession du Royaume-Uni en tant que nouveau membre fut un des thèmes principaux de l'agenda à travers l'année. Au cours de la réunion extraordinaire du Conseil en décembre, des résolutions furent adoptées qui établissent les détails de l'admission, y compris la contribution spéciale conduisant à l'entrée attendue du Royaume-Uni au 1er juillet 2002. D'autres pays avaient aussi exprimé leur intérêt de joindre l'ESO et des réunions informelles avec l'Autriche, la Finlande, la Grèce et l'Espagne ont eu lieu dans ce but.

En juin, le Conseil a approuvé les négociations et conclusions des accords sur les observations pointées DENIS à La Silla avec l'Observatoire de la Côte d'Azur et l'Observatoire de Paris, ainsi que sur le développement et la construction de SINFONI avec le Max-Planck-Institut für Extraterrestrische Physik. Un contrat a aussi été ratifié entre la Max-Planck-Gesellschaft, la Ruhr Universität Bochum et l'Onsala Space Observatory, à propos de l'expérience Pathfinder d'Atacama (APEX).

Le Groupe tripartite de l'ESO, établi par le Conseil et composé de représentants de délégations des États membres, de représentants de la Direction et de représentants de l'Association du personnel a tenu quatre réunions en 2001. Parmi les nombreux thèmes abordés, il y avait l'ajustement des salaires et les moyens d'atteindre un règlement des litiges en cours, les examens de promotions; l'assurance santé et autres conditions d'emploi.

Suivant les discussions du Groupe tripartite, le Conseil a adopté une résolution concernant le règlement des ajustements de salaire contestés par le personnel international de l'ESO pour la période 1996–2000. Les amende-

Der Rat

Im Jahre 2001 fanden zwei planmäßige Treffen des Rates statt sowie ein außerordentliches Treffen, das in der Hauptsache der Diskussion über den Beitritt des Vereinigten Königreiches gewidmet war. Der Unterausschuss des Rats trat im Laufe des Jahres viermal zusammen, und zwar im März, Mai, Oktober und November. Das Ratstreffen im Juni fand in Porto/Portugal zur Feier des Beitritts von Portugal als 9. Mitgliedsstaat zum 1. Januar 2001 statt. Alle anderen Treffen wurden in Garching unter Vorsitz von Dr. A. Freytag abgehalten.

Der Beitritt des Vereinigten Königreichs als neuer Mitgliedsstaat war während des gesamten Jahres ein wichtiger Punkt auf der Tagesordnung. Bei dem außerordentlichen Ratstreffen im Dezember wurden Resolutionen verabschiedet, die die Einzelheiten des Eintritts regeln, einschließlich des Sonderbeitrags, der zum voraussichtlichen Beitritt des Vereinigten Königreichs am 1. Juli 2002 führt. Da auch weitere Länder Interesse an einem Beitritt zu ESO bekundet hatten, fanden informelle Treffen mit Österreich, Finnland, Griechenland und Spanien statt.

Im Juni stimmte der Rat den Verhandlungen und Vertragsabschlüssen über die DENIS Pointed Observations auf La Silla mit dem Observatoire de la Côte d'Azur und dem Observatoire de Paris und bezüglich der Entwicklung und des Baus von SINFONI mit dem Max-Planck-Institut für Extraterrestrische Physik zu. Außerdem wurde zwischen der Max-Planck-Gesellschaft, der Ruhr-Universität Bochum und dem Onsala Space Observatory eine Vereinbarung über Zusammenarbeit in Bezug auf das ATACAMA Pathfinder Experiment (APEX) unterzeichnet.

Die vom Rat ins Leben gerufene und aus Vertretern der Delegationen der Mitgliedsstaaten, Vertretern des Managements und Mitgliedern der Mitarbeitervertretung bestehende dreiseitige Arbeitsgruppe (Tripartite Group) der ESO trat 2001 viermal zusammen. Einige der vielen diskutierten Themen waren die jährlichen Gehaltsanpassungen und Wege zur Beilegung der anhängigen Gerichtsverfahren sowie die Richtlinien für die jährliche Leistungsbewertung und Beförderungen der Mitarbeiter, die Krankenversicherung und weitere die Beschäftigungsbedingungen betreffende Themen.

be made to the Staff Regulations and approved by Council.

Council received regular updates on the continuing talks with the Chilean Ministry of Foreign Affairs concerning amendments to certain parts of the Local Staff Regulations. In December a Resolution was adopted authorising the Director General to enter into collective bargaining and to conclude collective agreements or contracts during 2002.

Discussions took place on the reports by the chairmen of the Finance Committee, the Scientific Technical Committee, the Observing Programmes Committee and the Visiting Committee. Council received the regular VLT/VLTI Biannual Reports and a preliminary draft Long Range Plan 2001–2006 was discussed in December.

Council was informed regularly on the progress within the ALMA Project and of negotiations with Chile. At the meeting in December a Resolution was adopted concerning the preparation of a proposal for Phase 2, construction and operation, as a bilateral ESO/North American ALMA Project.

The annual accounts based on the External Audit Report 2000 by the Swiss Federal Audit Office were unanimously approved at the meeting in June.

At the ordinary meeting in December Dr. A. Freytag was re-elected President of Council and Prof. P.C. van der Kruit was re-elected Vice-President for 2002. Dr. M. Steinacher was re-elected Chairman of the Finance Committee. Dr. J.-M. Vreux, Dr. R. Bacon, Dr. J.-L. Puget, Dr. T. Henning, Dr. A. van Ardenne and Prof. N. Piskunov were re-elected as members of the Scientific Technical Committee. For the Observing Programme Committee Prof. J. Black was re-elected Chairman and Dr. S. Wagner was elected as Vice-Chairman for the year 2002.

ments correspondants durent être apportés aux règlements du personnel et approuvées par le Conseil.

Le Conseil a régulièrement reçu des informations de mise à jour sur les discussions continues avec le Ministère des affaires étrangères chilien concernant l'amendement de certains points des règles pour le personnel local. En décembre, une résolution a été adoptée autorisant la directrice générale à entrer dans des négociations tarifaires et de conclure des accords collectifs ou des contrats pendant 2002.

Les rapports des présidents du Comité des Finances, du Comité scientifique et technique, du Comité des programmes d'observation et du Comité visiteur donnèrent lieu à discussions. Le Conseil a reçu les rapports réguliers bi-annuels VLT/VLTI, et une première version du plan à long terme 2001–2006 a été discutée en décembre.

Le Conseil a été informé régulièrement des progrès du projet ALMA et des négociations avec le Chili. À la réunion de décembre, une résolution a été adoptée concernant la préparation d'une proposition pour la Phase 2, construction et opération, en tant que projet ALMA bilatéral ESO/Amérique du Nord.

Les comptes annuels basés sur le Rapport d'audit externe 2000 par le Bureau fédéral suisse d'audit furent approuvés à l'unanimité à la réunion de juin.

A la séance ordinaire de décembre, Dr. A. Freytag a été réélu président du Conseil et Prof. P.C. van der Kruit vice-président pour 2002. Dr. M. Steinacher a été réélu président du Comité des Finances. Dr. J.-M. Vreux, Dr. R. Bacon, Dr. J.-L. Puget, Dr. T. Henning, Dr. A. van Ardenne et Prof. N. Piskunov ont été réélu membres du Comité scientifique et technique. Pour le Comité des programmes d'observation, Prof. J. Black a été réélu président et Dr. S. Wagner élu comme vice-président pour l'année 2002.

Nach den Diskussionen in der Tripartite Group verabschiedete der Rat einen Beschluss zur Regelung der umstrittenen Gehaltsanpassungen für die internationalen ESO-Mitarbeiter für den Zeitraum 1996–2000. Entsprechende Änderungen an den Personalstatuten wurden vom Rat verabschiedet.

Der Rat wurde regelmäßig über die weiterhin mit dem chilenischen Außenministerium andauernden Gespräche bezüglich Änderungen bestimmter Teile der Regeln für lokale Mitarbeiter informiert. Im Dezember wurde ein Beschluss gefasst, der die Generaldirektorin bevollmächtigt, Tarifverhandlungen zu führen und im Jahre 2002 gemeinsame Abkommen oder Verträge abzuschließen.

Die Berichte der Vorsitzenden des Finanzausschusses, des Wissenschaftlich-Technischen-Ausschusses, des Ausschusses für Beobachtungsprogramme und des Beratenden Ausschusses wurden erörtert. Der Rat nahm die regelmäßigen halbjährlichen Berichte über VLT/VLTI entgegen, und ein erster Entwurf eines Langzeitplanes für den Zeitraum 2001–2006 wurde im Dezember diskutiert.

Der Rat erhielt regelmäßig Berichte über den Fortschritt des ALMA-Projektes und der Verhandlungen mit Chile. Bei dem Treffen im Dezember wurde eine Resolution verabschiedet, die die Vorbereitung eines Angebots für die Phase 2, Bau und Betrieb, als bilaterales ALMA-Projekt zwischen ESO und Nordamerika betrifft.

Der Rechnungsprüfung, die auf dem vom Schweizerischen Bundesrechnungsbüro erstellten externen Prüfungsbericht für 2000 basiert, wurde bei dem Treffen im Juni einstimmig zugestimmt.

Bei dem planmäßigen Treffen im Dezember wurden Dr. A. Freytag als Ratspräsident und Prof. C. van der Kruit als Vizepräsident für das Jahr 2002 wiedergewählt. Dr. M. Steinacher wurde als Vorsitzender des Finanzausschusses wiedergewählt. Dr. J.-M. Vreux, Dr. R. Bacon, Dr. J.-L. Puget, Dr. T. Henning, Dr. A. van Ardenne und Prof. N. Piskunov wurden als Mitglieder des Wissenschaftlich-Technischen Ausschusses wiedergewählt. Für den Ausschuss für Beobachtungsprogramme wurde Prof. J. Black als Vorsitzender wieder- und Dr. S. Wagner für das Jahr 2002 zum Vizevorsitzenden gewählt.

Foreword

Préface

Vorwort

The year 2002 has been a very special one. For the first time all four unit telescopes of the Very Large Telescope were in full operation all year. The suite of instruments of the first generation has been expanded and is getting closer to completion. Commissioning of the multi-integral field and multi-object spectroscopy instruments GIRAFFE and FLAMES instruments was completed. Using UVES the most metal-poor star known was found. ISAAC enabled the imaging of a very young star apparently in the process of formation of a planetary system around it and produced the deepest near-infrared image of the sky. FORS2 made it possible to take images and spectra of the most distant cluster of galaxies. Adaptive optics (NAOS-CONICA) enabled the imaging of a star as it moved near the central black hole in our Galaxy. These are just a few examples of the many exciting scientific results achieved. The impact of the Paranal Observatory is felt in every area of astronomy.

At the same time the La Silla Observatory is still producing first-class results. Instruments like TIMMI2 on the 3.6-m telescope (first observations of a brown dwarf from the ground in the mid-IR) and SOFI on the NTT (identification of young stellar clusters) are state of the art and provide world-class data.

In the area of interferometry two great steps forward were the combining of the light from the four unit telescopes to produce fringes and, towards the end of the year, the commissioning of the first instrument MIDI for the VLTI.

While the VLT was in complete operation with all four telescopes available to astronomers and the VLT Interferometer took significant steps forward, the

L'année 2002 a été très spéciale. Pour la première fois, les quatre télescopes du Very Large Telescope étaient totalement opérationnels toute l'année durant. La suite d'instruments de première génération a été étendue et est quasiment complète. Les mises en service des instruments spectroscopiques à champ multi-intégral et multi-objet GIRAFFE et FLAMES sont terminées. Grâce à UVES, l'étoile la plus déficiente en métaux a été découverte. ISAAC a permis de capturer l'image d'une étoile très jeune se trouvant apparemment dans un processus de formation d'un système planétaire qui l'entoure, et a produit l'image la plus profonde du ciel dans le proche infrarouge. FORS2 a permis de prendre des images et des spectres de l'amas de galaxies le plus distant. L'optique adaptative (NAOS-CONICA) a permis de saisir l'image d'une étoile se déplaçant à proximité du trou noir central dans notre Galaxie. Ce ne sont là que quelques exemples parmi les nombreux résultats exceptionnels obtenus. L'impact de l'Observatoire Paranal se ressent dans tous les domaines de l'astronomie.

Au même moment, l'Observatoire de La Silla produit toujours autant de résultats de première classe. Des instruments comme TIMMI2 sur le télescope de 3,60 m (les premières observations depuis le sol d'une naine brune dans l'IR moyen) et SOFI sur le NTT (identification de jeunes amas d'étoiles) sont à la pointe du progrès et fournissent des données de classe mondiale.

Dans le domaine de l'interférométrie, la combinaison des quatre télescopes produisant des franges et, à la fin de l'année, la mise en service du premier instrument MIDI pour le VLTI, représentent deux grands pas en avant.

Das Jahr 2002 war ein ganz besonderes Jahr. Zum ersten Mal waren alle vier Teleskope des VLT das ganze Jahr über durchgehend in Betrieb. Die Gruppe der Instrumente der ersten Generation wurde erweitert und ist nun fast vollständig. Die Inbetriebnahme von GIRAFFE und FLAMES, Instrumente für Ganzfeld- und Multi-Objektspektroskopie, wurde abgeschlossen. UVES fand den bisher metallärmsten bekannten Stern. ISAAC ermöglichte die Abbildung eines sehr jungen Sterns, um den sich offenbar gerade ein Planetensystem bildet, und produzierte das tiefste Nah-Infrarotbild des Himmels. FORS2 machte es möglich, Bilder und Spektren des entferntesten Galaxienhaufens zu erhalten. Adaptive Optik (NAOS-CONICA) erlaubte die Abbildung eines Sterns, der sich in der Nähe des zentralen Schwarzen Lochs in unserer Galaxis bewegte. Dies sind nur einige wenige Beispiele der vielen aufregenden wissenschaftlichen Ergebnisse. Die Auswirkungen des Paranal-Observatoriums sind in jedem Bereich der Astronomie spürbar.

Gleichzeitig erzielt das La Silla-Observatorium immer noch erstklassige Ergebnisse. Instrumente wie TIMMI2 am 3,6-m-Teleskop (erste Beobachtungen eines braunen Zwergs im mittleren Infrarot vom Boden aus) und SOFI am NTT (Identifizierung junger Sternhaufen) entsprechen dem neuesten Stand der Technik und liefern Daten von Weltklasse.

Auf dem Gebiet der Interferometrie waren zwei große Fortschritte das Kombinieren des Lichts der vier Teleskope, um Interferenzstreifen zu produzieren, und gegen Ende des Jahres die Inbetriebnahme von MIDI, dem ersten Instrument des VLTI.

necessary groundwork for the next large project, the Atacama Large Millimeter Array ALMA, was successfully completed in 2002. The Phase A of the project, leading up to construction in Phase B, came to a very satisfactory end. ESO and Spain negotiated the agreement to form together the European part of the project and ESO and North America completed the preparation of the bi-lateral agreement to build ALMA. ESO Council approved these agreements before the end of the year 2002 and they were signed early in 2003. ALMA at the end of 2002 was ready to enter into construction phase!

This was also made possible by the entrance of the United Kingdom into ESO, which formally took place on July 1, 2002. The negotiations leading up to this were remarkably smooth and, with the UK as one of the leading countries in astronomical research joining forces with ESO, the European Southern Observatory has become the world's major organisation in astrophysics. When Jan Oort and Walter Baade in the 1950s concluded that for Europe's future in astronomy it was vital to join forces and build a southern observatory they could only have dreamed that just after the turn of the century their initiative would result in a European organisation of this magnitude and with such an influence.

The year 2002 was the final year of the presidency of Council for Dr. Arno Freytag. Under his leadership both the entrance of the UK and the decision to participate in the ALMA construction were taken. His diplomacy has been instrumental to bring this about and the communities of astronomers in Europe are extremely grateful to him; 2002 has been a crown on his efforts.

The appointment of the Director General, Catherine Cesarsky, was extended by Council beyond the present mandate. Dr. Fernando Bello from Portugal was elected vice-president of Council.

Piet van der Kruit

President of the ESO Council

Alors que le VLT était entièrement opérationnel avec les quatre télescopes disponibles pour les astronomes et que l'interféromètre VLTI avança de façon significative, le travail préparatoire nécessaire pour le prochain grand projet, le Grand Réseau Millimétrique d'Atacama (ALMA), fut accompli avec succès en 2002. La phase A du projet, conduisant à la construction dans la phase B, s'est terminée de façon très satisfaisante. L'ESO et l'Espagne négocièrent un accord afin de former ensemble la partie européenne du projet, et l'ESO et l'Amérique du Nord ont terminé la préparation de l'accord bilatéral pour la construction d'ALMA. Le Conseil de l'ESO approuva ces accords avant la fin de l'année 2002 et ils furent signés au début 2003. À la fin de 2002, ALMA était prêt à entrer dans la phase de construction !

Ceci fut aussi rendu possible par l'entrée du Royaume-Uni dans l'ESO, qui eut lieu formellement le 1er juillet 2002. Les négociations aboutissant à ce résultat furent remarquablement exemptes de problème et, le Royaume-Uni étant l'un des pays de premier plan dans la recherche astronomique, l'Observatoire Européen Austral est ainsi devenu la plus grande organisation d'astrophysique au monde. Lorsque Jan Oort et Walter Baade conclurent, dans les années 1950, que pour le futur de l'astronomie en Europe, il était vital de joindre ses forces et de construire un observatoire austral, ils ne pouvaient s'imaginer que, juste après le tournant du siècle, leur initiative résulterait en une organisation européenne de cette taille et avec une telle influence.

L'année 2002 fut la dernière année de présidence du Conseil pour le Dr. Arno Freytag. Sous sa direction, à la fois l'entrée du Royaume-Uni et la décision de participer dans la construction d'ALMA furent prises. Sa diplomatie a été instrumentale dans ces réalisations et les communautés d'astronomes en Europe lui en sont extrêmement reconnaissantes : 2002 a été le couronnement de ses efforts.

La nomination de la directrice générale, Catherine Cesarsky, est étendue par le Conseil au-delà du présent mandat. Le Dr. Fernando Bello du Portugal est élu vice-président du Conseil.

Piet van der Kruit

Président du Conseil de l'ESO

Während das VLT mit all seinen vier Teleskopen ständig in Betrieb und verfügbar für die Astronomen war und das VLT-Interferometer bedeutende Fortschritte machte, wurden die notwendigen grundlegenden Arbeiten für das nächste große Projekt, das Atacama Large Millimeter Array, ALMA, im Jahr 2002 erfolgreich zu Ende gebracht. Die Phase A des Projekts, die zur Konstruktion in Phase B führte, wurde sehr zufrieden stellend beendet. ESO und Spanien verhandelten miteinander über eine Vereinbarung, den europäischen Teil des Projekts zu bilden, und ESO und Nordamerika beendeten die Vorbereitung der bilateralen Vereinbarung zum Bau von ALMA. Der Rat von ESO stimmte diesen Vereinbarungen zum Ende 2002 zu, und Anfang 2003 wurden sie unterzeichnet. ALMA war Ende 2002 bereit für die Bauphase!

Dies wurde auch durch den Beitritt Großbritanniens zu ESO ermöglicht, der formell am 1. Juli 2002 erfolgte. Die dazu führenden Verhandlungen waren bemerkenswert reibungslos, und ESO wurde durch den Schulterschluss mit Großbritannien, einem der führenden Länder in der astronomischen Forschung, die größte Organisation der Welt in der Astrophysik. Als Jan Oort und Walter Baade in den 50er Jahren beschlossen, dass es für Europas Zukunft in der Astronomie von entscheidender Bedeutung sei, sich zusammenzuschließen und ein südliches Observatorium zu bauen, hätten sie nur davon träumen können, dass schon nach der Jahrhundertwende ihre Initiative in einer europäischen Organisation von dieser Größe und mit einem derartigen Einfluss resultieren würde.

Das Jahr 2002 war das letzte Jahr unter Vorsitz von Dr. Arno Freytag. Unter seiner Leitung erfolgte der Beitritt Großbritanniens wie auch der Entschluss, ALMA zu bauen. Seine Diplomatie war ein wesentlicher Faktor, dies herbeizuführen, und die Gemeinschaft der Astronomen in Europa ist ihm dafür außerordentlich dankbar: 2002 war die Krone seiner Bemühungen.

Die Ernennung Catherine Cesarskys zur Generaldirektorin wurde durch den Rat über ihr jetziges Mandat hinaus verlängert. Dr. Fernando Bello aus Portugal wurde zum Vizepräsidenten des Rats gewählt.

Piet van der Kruit

Präsident des ESO-Rats

Appendix III – Council and Committee Members in 2002
Annexe III – Membres du Conseil et des Comités en 2002
Anhang III – Rats- und Ausschussmitglieder für 2002

COUNCIL AND COMMITTEE OF COUNCIL / CONSEIL ET COMITÉ DU CONSEIL / RAT UND UNTERAUSSCHUSS DES RATS

President / Président / Präsident	*A. Freytag*
Belgium / Belgique / Belgien:	J.P. Swings M. Desmeth
Denmark / Danemark / Dänemark:	H. Jørgensen H. Grage
France / Frankreich:	O. Le Fèvre Ph. Barré
Germany / Allemagne / Deutschland:	D. Reimers M. Metzger
Italy / Italie / Italien:	F. Pacini P. Marietti
The Netherlands / Pays-Bas / Niederlande:	P.C. van der Kruit J. Bezemer
Portugal:	T. Lago F. Bello
Sweden / Suède / Schweden:	C. Fransson F. Karlsson
Switzerland / Suisse / Schweiz:	G. Tammann M. Steinacher
United Kingdom / Royaume-Uni / Vereinigtes Königreich:	R. Wade (Observer / Observateur / Beobachter)

SCIENTIFIC TECHNICAL COMMITTEE / COMITÉ SCIENTIFIQUE ET TECHNIQUE / WISSENSCHAFTLICH-TECHNISCHER AUSSCHUSS

R. Bacon (F)	(1999–2004)	N. Piskunov (S)	(1999–2004)
R. Bender (D)*	(1996–spring 2002)	J.-L. Puget (F)	(1999–2004)
A. Cimatti (I)	(1999–2004)	H. Quintana (RCH)	(1997–2002)
M. Franx (NL)	(1998–2003)	R. Sancisi (I)	(1998–2003)
Th. Henning (D)	(1999–2004)	A. van Ardenne (NL)	(1999–2004)
J. Hjorth (DK)	(1998–2003)	J.-M. Vreux (B)	(1999–2004)
S. Lilly (CH)	(2002–2004)		

*Chairman / Président / Präsident

FINANCE COMMITTEE / COMITÉ DES FINANCES / FINANZAUSSCHUSS

President / Président / Präsident	*M. Steinacher*
Belgium / Belgique / Belgien:	A. Heynen
Denmark / Danemark / Dänemark:	E. Bregnbæk
France / Frankreich:	P. Laplaud
Germany / Allemagne / Deutschland:	A. Bohn
Italy / Italie / Italien:	U. Sessi
The Netherlands / Pays-Bas / Niederlande:	J. van de Donk
Portugal:	F. Bello
Sweden / Suède / Schweden:	S. Björling
Switzerland / Suisse / Schweiz:	J.P. Ruder
United Kingdom / Royaume-Uni / Vereinigtes Königreich:	R. Sirey (Observer / Observateur / Beobachter)

Council

Council met twice and Committee of Council four times during 2002. These meetings took place at the Headquarters in Garching except the Council meeting in July which, to celebrate the accession of the UK as the 10th member state from 1 July 2002, was held in London. The meetings were all chaired by Dr. A. Freytag.

The completion of ALMA Phase 1 and various aspects of the European participation in ALMA Phase 2 were among the major items on the agenda throughout the year. At the meeting in July, a resolution was adopted approving the European participation through ESO in the baseline bilateral ALMA Phase 2. At the meeting in December, the Director General was authorised to sign the ESO-Spain ALMA Agreement, and the ALMA Bilateral Agreement with the National Science Foundation of the United States.

Council approved the Chilean Local Staff Regulations which subsequently entered into force on 13 April 2002.

In July Council approved the negotiations and conclusions of agreements concerning the upgrade of the SINFONI Spectrograph, the development of the 'Layer Oriented Wavefront Sensor' and the construction of the CAMCAO IR camera. In December the agreement with Belgium concerning the enhancement of the VLT Interferometer with a fourth auxiliary telescope system was approved.

Council received regular updates on the developments in Chile regarding the ALMA Project. In August Council approved the 'ALMA Acuerdo' between Chile and ESO. This was formally signed by the Chilean Minister of Foreign Affairs and by the Director General in October. Council was also kept informed regarding negotiations of the various sub-agreements for ALMA which had to be concluded with various authorities in Chile.

The chairmen of the Finance Committee, the Scientific Technical Committee, and the Observing Programmes Committee had reported to Council as usual twice a year. The regular reports concerning VLT/VLTI were discussed and in July the ESO Long Range Plan 2001–2006 was endorsed.

Based on the External Audit Report 2001 by the Swiss Federal Audit office,

Le Conseil

Le Conseil s'est réuni deux fois et le Comité du Conseil quatre fois au cours de l'année 2002. Ces réunions ont eu lieu au quartier général de l'ESO à Garching à l'exception de la rencontre du Conseil en juillet, qui s'est tenue à Londres afin de célébrer l'entrée du Royaume-Uni en tant que dixième État membre, le 1er juillet 2002. Les réunions ont toutes été présidées par le Dr. A. Freytag.

L'achèvement de la phase 1 du projet ALMA et divers aspects de la participation européenne dans la phase 2 d'ALMA étaient parmi les points principaux à l'agenda durant toute l'année. À la réunion de juillet, une résolution a été adoptée approuvant la participation européenne à travers l'ESO dans la phase 2 bilatérale d'ALMA. À la rencontre de décembre, la directrice générale était autorisée à signer l'accord ALMA entre l'ESO et l'Espagne, et l'accord ALMA bilatéral avec la Fondation nationale américaine pour la Science.

Le Conseil a approuvé les règlements pour le personnel local chilien, qui sont ensuite entrés en vigueur le 13 avril 2002.

En juillet le Conseil a approuvé les négociations et conclusions des accords concernant la mise à jour du spectrographe SINFONI, le développement du détecteur de fronts d'onde orientés en couche et la construction de la caméra infrarouge CAMCAO. En décembre l'accord avec la Belgique concernant l'amélioration de l'interféromètre VLT grâce à un quatrième télescope auxiliaire a été approuvé.

Le Conseil a reçu des mises à jour régulières sur les développements du projet ALMA au Chili. En août, le Conseil a approuvé « l'Acuerdo ALMA » entre le Chili et l'ESO. Cet accord a été signé formellement par le ministre chilien des Affaires étrangères et par la directrice générale en octobre. Le Conseil a aussi été informé régulièrement au sujet des négociations des différents sous-accords pour ALMA qui devaient être conclus avec les différentes autorités au Chili.

Comme d'habitude, les présidents du Comité des finances, du Comité scientifique et technique et du Comité des programmes d'observation ont fait rapport au Conseil deux fois par an. Les rapports réguliers concernant le VLT/VLTI ont été discutés et en juillet le plan

Der Rat

Im Jahr 2002 fanden zwei Treffen des Rats und vier Treffen des Unterausschusses des Rats statt. Diese Treffen wurden am Hauptsitz in Garching abgehalten, mit Ausnahme des Ratstreffens im Juli. Letzteres fand, um den Beitritt des Vereinigten Königreiches als zehntes Mitgliedsland zum 1. Juli 2002 zu feiern, in London statt. Den Vorsitz hatte bei allen Treffen Dr. A. Freytag inne.

Der Abschluss der Phase 1 von ALMA und verschiedene Aspekte der Teilnahme Europas an Phase 2 waren während des Jahres einige der wichtigsten Tagesordnungspunkte. Bei der Zusammenkunft im Juli wurde eine Resolution verabschiedet, in der die europäische Teilnahme durch ESO an der grundlegenden bilateralen Phase 2 von ALMA genehmigt wurde. Auf dem Treffen im Dezember wurde die Generaldirektorin bevollmächtigt, die Vereinbarung zwischen ESO und Spanien sowie die bilaterale Vereinbarung für ALMA mit der National Science Foundation der USA zu unterzeichnen.

Der Rat bewilligte die Personalordnung für das Personal in Chile, die anschließend am 13. April 2002 in Kraft trat.

Im Juli bewilligte der Rat die Verhandlungen und den Abschluss der Vereinbarungen hinsichtlich der Erweiterung des SINFONI-Spektrographen, die Entwicklung des „Layer Oriented Wavefront Sensor", und die Konstruktion der CAMCAO-Infrarot-Kamera. Im Dezember wurde die Vereinbarung mit Belgien bezüglich der Erweiterung des VLT-Interferometers durch ein viertes Hilfsteleskopsystem bewilligt.

Was das ALMA-Projekt betrifft, so erhielt der Rat regelmäßige Aktualisierungen über die Entwicklungen in Chile. Im August verabschiedete der Rat das ALMA Acuerdo zwischen Chile und ESO. Dieses wurde im Oktober vom chilenischen Außenminister und von der Generaldirektorin formell unterzeichnet. Auch über die Verhandlungen der verschiedenen Untervereinbarungen für ALMA, die mit verschiedenen chilenischen Behörden geschlossen werden mussten, wurde der Rat auf dem Laufenden gehalten.

Die Vorsitzenden des Finanzausschusses, des Wissenschaftlich-Technischen Ausschusses und des Ausschusses für Beobachtungsprogramme hatten dem Rat wie üblich zweimal im Jahr Bericht

Council unanimously approved the annual accounts 2001 at the meeting in July.

The ESO Tripartite Group, which was established by Council in 2000, held two meetings in 2002. Among the discussion points were collective bargaining, pension fund arrangements, health insurance, salaries and allowances and performance/advancement reviews. A major item for the meetings had been the settlement of the contested salary adjustments for ESO international staff over the period 1996 to 2000. Despite the measures taken in 2001 the issue was still unsettled. Possibilities to find an overall solution had been discussed and a recommendation was made to Finance Committee and Council. At its meeting in December, Council adopted the resolution on salary adjustment thereby reaching a just and lasting settlement to the issue.

At the meeting in July, Dr. J.-L. Puget was elected Chairman of the Scientific Technical Committee. Furthermore, Prof. A. Eckart and Prof. K. Kuijken and, in view of the accession of the UK, Dr. P. Roche and Prof. R. Hills were elected new members. In April, in the written procedure, Dr. S. Lilly had been elected new member.

At the meeting in December Prof. P.C. van der Kruit was elected President of Council and Dr. F. Bello was elected Vice-President for 2003. Dr. M. Steinacher was re-elected Chairman of the Finance Committee.

Dr. R. Gratton and Prof. Minniti were elected as members of the Scientific Technical Committee. For the Observing Programmes Committee, Dr. S. Wagner was elected Chairman and Prof. Dejonghe was elected as Vice-Chairman for 2003.

à long terme 2001–2006 de l'ESO a été approuvé.

Basé sur le rapport d'audit externe 2001 par le Bureau d'audit fédéral suisse, le Conseil a approuvé à l'unanimité les comptes annuels 2001, lors de la réunion de juillet.

Le groupe tripartite de l'ESO, qui a été établi par le Conseil en 2000, a tenu deux réunions en 2002. Parmi les points de discussion il y avait les négociations tarifaires, les dispositions concernant le fonds de pension, l'assurance santé, les salaires et allocations et les rapports de performance et d'avancement. Un sujet majeur des réunions fut le règlement des ajustements contestés de salaire pour le personnel international de l'ESO pendant la période 1996 à 2000. En dépit des mesures prises en 2001, ce point n'était pas encore réglé. Des possibilités pour trouver une solution générale ont été discutées et une recommandation a été faite au Comité des finances et au Conseil. À sa réunion de décembre, le Conseil a adopté la résolution sur l'ajustement des salaires arrivant ainsi à un règlement équitable et définitif à ce problème.

A la réunion de juillet, le Dr. J.-L. Puget a été élu président du Comité scientifique et technique. De plus, le Prof. A. Eckart et le Prof. K. Kuijken et, étant donné l'accession du Royaume-Uni, le Dr. P. Roche et le Prof. R. Hills, ont été élus en tant que nouveaux membres. En avril, dans la procédure écrite, le Dr. S. Lilly a été élu nouveau membre.

A la réunion de décembre, le Prof. P.-C. van der Kruit a été élu président du Conseil et le Dr. F. Bello vice-président pour 2003. Le Dr. M. Steinacher a été réélu président du Comité des finances. Le Dr. R. Gratton et le Prof. Minniti ont été élus comme membres du Comité scientifique et technique. Pour le Comité des programmes d'observation, le Dr. S. Wagner et le Prof. Dejonghe ont été élus respectivement président et vice-président pour 2003.

erstattet. Die regelmäßigen Berichte über VLT/VLTI wurden diskutiert, und im Juli wurde der ESO-Langzeitplan 2001–2006 gebilligt.

Auf der Grundlage des externen Prüfungsberichts für 2001, erstellt durch das Schweizer Bundesrechnungsamt, stimmte der Rat der Jahresbilanz für 2001 auf dem Treffen im Juli einstimmig zu.

Die dreiseitige Arbeitsgruppe (Tripartite Group), die durch den Rat im Jahre 2002 eingesetzt worden war, hielt im vergangenen Jahr zwei Treffen ab. Diskussionspunkte waren unter anderem Tarifverhandlungen, Vereinbarungen zur Altersvorsorge, Krankenversicherung, Gehälter und Zulagen sowie Richtlinien für die Leistungsbewertung. Ein wichtiges Thema war die Beilegung des Streits um die Gehaltsanpassungen für ESOs internationale Personal über den Zeitraum 1996 bis 2000. Trotz der im Jahr 2001 ergriffenen Maßnahmen war dieses Thema noch immer ungelöst. Es wurden Möglichkeiten für eine umfassende Lösung diskutiert und eine Empfehlung an Finanzausschuss und Rat gegeben. Auf seinem Treffen im Dezember verabschiedete der Rat die Resolution über die Gehaltsanpassungen und erreichte so eine gerechte und dauerhafte Klärung der Angelegenheit.

Auf dem Treffen im Juli wurde Dr. J.-L. Puget zum Vorsitzenden des Wissenschaftlich-Technischen Ausschusses gewählt. Neue Mitglieder sind Prof. A. Eckart und Prof. K. Kuijken sowie, im Hinblick auf den Beitritt Großbritanniens, Dr. P. Roche und Prof. R. Hills. Im April war Dr. S. Lilly im schriftlichen Verfahren zum neuen Mitglied gewählt worden.

Prof. van der Kruit wurde auf dem Treffen im Dezember zum Ratsvorsitzenden gewählt und Dr. F. Bello zum Vizepräsidenten für 2003. Dr. M. Steinacher wurde erneut Vorsitzender des Finanzausschusses.

Dr. R. Gratton und Prof. Minnitti wurden zu Mitgliedern des Wissenschaftlich-Technischen Ausschusses gewählt. Im Ausschuss für Beobachtungsprogramme wurden Dr. S. Wagner zum Vorsitzenden und Prof. Dejonghe zum 2. Vorsitzenden gewählt.

Finance Committee

The Committee met three times during 2002. Two meetings took place in Garching and the May meeting took

Comité des finances

Le Comité s'est réuni trois fois au cours de l'année 2002. Deux rencontres eurent lieu à Garching et la réunion de mai

Finanzausschuss

Der Finanzausschuss kam im Jahr 2002 drei Mal zusammen. Zwei der Treffen wurden in Garching abgehalten,

Foreword

The foreword to an annual report usually starts with the statement that the year concerned has been a very unusual or important one in the history of the organisation concerned. Looking back over the previous year apparently often gives the impression that progress has been exceptional and the accomplishments unusually impressive. Looking back at 2003, for example reviewing the things that were discussed in Council or rereading the press releases that came out, shows that indeed 2003 again was a very important year for ESO.

In February the agreement with Spain and the bilateral agreement with North America concerning construction of ALMA were signed. In November there was a groundbreaking ceremony in Chile that marked the start of the construction of ALMA. Massimo Tarenghi was appointed as director of ALMA and the search went on for further key staff in the Joint ALMA Office. Also negotiations with Japan to join the project and enhance the facility were ongoing. It is clear that ALMA is now well on the way.

In Europe the successful conclusion of the negotiations and the subsequent decision in Council concerning the accession of Finland to ESO was another major landmark. We welcome our Finnish colleagues to the ESO community. Preparations to negotiate with Spain were started towards the end of the year.

Of equal importance were the first lights of various instruments on the facilities, such as MACAO on the VLTI or HARPS on the 3.6m telescope. And then there were the many scientific discoveries; some of these gave rise to press releases, but others that did not were often extremely important for the progress of astronomy. The number of papers coming from data collected at Paranal or La Silla is still growing and ESO telescopes have become a major source of citations in the astronomical literature.

Council has in 2003 established a working group that will advice it on the scientific strategy ESO should follow on the longer timescale. The report was not finalized in 2003, but at the December meeting Council did agree in anticipation of the outcome of the discussions that a leading role in the future construction of an Extremely Large Telescope, such as e.g. OWL, would be ESO's next priority after ALMA. Even though the end of ALMA construction is still far away, it is important to start now thinking about the long-term future and the ambitions and priorities of ESO. And that is what is being done.

So, looking back at 2003 shows that the organisation is further enhancing its leading position worldwide in astronomy. It is a privilege to be associated with ESO and on behalf of Council I commend all concerned for the excellent work that made this possible.

Piet van der Kruit
President of Council

Council

Both Council and Committee of Council met twice during 2003. The Council meetings took place at the Headquarters in Garching. The meeting of the Committee of Council in March was held in Antofagasta, Chile, and the meeting in October took place in Paris. The meetings were all chaired by Prof. P. van der Kruit.

The Accession of Finland to ESO and progress with the ALMA Project were among the major items on the agenda throughout the year.

At the meeting in June, Council took note that the ALMA Agreement between ESO and Chile had been ratified by the Senate of the Chilean Parliament on 10 June 2003. Council received regular updates on the developments in Chile regarding the ALMA Project. On 6 November 2003 the Groundbreaking Ceremony for the ALMA site took place.

Council and Committee of Council 2003

President	P.C. van der Kruit
Belgium	J.P. Swings M. Desmeth
Denmark	H. Jørgensen H. Grage
France	L. Vigroux Ph. Barré
Germany	R. Bender M. Metzger
Italy	F. Pacini P. Marietti
The Netherlands	P.T. de Zeeuw J.A.C. van de Donk
Portugal	T. Lago F. Bello
Sweden	C. Fransson F. Karlsson
Switzerland	M. Mayor M. Steinacher
United Kingdom	G. Gilmore R. Wade

Council established a Working Group on Scientific Strategic Planning whose members were selected from Council, the Scientific Technical Committee (STC), the VLTI Implementation Committee, the European Alma Board and ESO staff in order to prepare and assess options for ESO's long term programme. The working group, chaired by Prof. R. Bender, met twice in Garching and delivered a preliminary report to Council in December.

At the meeting in December, Council decided to set up a Working Group on Weighted Voting. It also established a Negotiating Team to prepare for the possible accession of Spain to ESO.

The reports of the Director General, the chairmen of the Finance Committee, the Scientific Technical Committee and the Observing Programmes Committee were received as usual twice a year as well as the regular VLT/VLTI and ALMA reports.

The ESO Tripartite Group held three meetings in 2003. Dr. J. Bezemer retired as Chairman in March 2003 and was followed by Dr. U. Sessi. Among the discussion points were long term care, salary adjustments and allowances, reports on the Life and Work Working Group, set up by the Staff Association, and performance/advancement reviews. A major topic at the meetings was the pension fund arrangements, and convergence on an overall approach was in sight at the end of the year.
At the ordinary meeting in December Prof. P. van der Kruit was re-elected President of Council and Dr. F. Bello was re-elected Vice-President for 2004. Dr. M. Steinacher left the Finance Committee after serving three years as Chairman. Dr. H. Kjeldsen was appointed as new member of the Scientific Technical Committee. For the Observing Programmes Committee, Dr. T. Maccacaro was elected Chairman and Dr. J. Knude was elected as Vice-Chairman for 2004.

Foreword

There is a well-known quote (I get more than 70 hits when I google it on the Web): "To do great and important tasks, two things are necessary: A plan and not quite enough time". As far as I am aware the origin of this quote is unknown.

In 2004 Finland has formally joined the organisation and has quickly developed into a fully integrated member of the community. We will commemorate this in June 2005, when Council will hold its regular meeting in Helsinki. During the year negotiations have started with Spain for formal accession to ESO; Spain is already participating in ALMA but both sides have expressed that extending this to cover other activities is a productive and desirable way forward.

In a significant move a working group of Council under the able chairmanship of the vice-president proposed a new manner of treating financial issues. This WG on "weighted voting" proposed a scheme to apply in the Finance Committee (FC) that – together with the assumption that Council would normally follow the advice of the FC – established a satisfactory modus operandi for the era of a probably increasing number of member states.

The Paranal Observatory is continuing to produce exciting results. Of the many remarkable findings I mention the mapping of the environment of a black hole in the centre of the active (Seyfert) galaxy NGC 1068 with the MIDI instrument on the VLTI, and the accurate dating of the stars in the globular cluster NGC 6397 and determination of the age of our Milky Way Galaxy. New instruments like SINFONI and AMBER and the start of the arrival and commissioning of the Auxiliary Telescopes for the VLTI were major milestones at Paranal, while the HARPS instrument at La Silla discovered the smallest extra-solar planet ever. A look through the 2004 press releases shows the enormous success of the Paranal Observatory. The increase in the number of papers published in the international refereed literature emphasizes the leading role of the installation.

ESO also played a major part in the outreach associated with the transit of Venus across the image of the solar disc. Council was in a premier position to judge the excellent work of the ESO staff as it was holding its June meeting in Garching during this phenomenon.

ALMA had significant progress and required much attention and hard work. If the quote at the start of this foreword has one application it certainly is ALMA. In spite of this the expected finalisation of the contracts for the antennas had to be delayed, first to December, but then to 2005. The careful analysis of the prototype antennas at the site of the VLA in Socorro in the USA did not result in time to sufficient certainty in the performance of the designs to place the contract with the required confidence, prudence and care. Yet, the project is moving forward with the hiring of two more key-personel in the Joint ALMA Office and activities in Chile on the infrastructure and ongoing work in various laboratories around the world on numerous aspects of the construction. The negotiations with Japan resulted in an agreement that spells out the general contents of the very important enhancement of ALMA. We very much welcome our Japanese colleagues as we move towards an integrated observatory with 6 or 7 frequency bands and an additional array for short-baseline and total power measurements, which will enormously increase the potential of ALMA.

At the end of the year, in its December meeting, Council unanimously approved a resolution that spells out in detail the scientific strategy of the organisation. In this resolution participation in an "Extremely Large Telescope" (of which the OWL concept is one of the possible ones) with a leading role for ESO, but where possible in intercontinental collaboration, is now the next priority of ESO after VLT, VLTI and ALMA. The fact that this resolution, based on extensive discussion in the special working group that prepared the report on which it was based and in Council itself, was adopted unanimously makes it a very significant resolve.

This will have to be translated still in a detailed plan of action. A first version of a revised "Long-Range Plan" (maybe redefined as Medium Range Plan, depending on the period to cover) was discussed in Council and these discussions will continue through 2005. Going back to the quote with which I started I state my belief that ESO is and will remain at the forefront and has a clear vision for the future. It should not have enough time, as we are eagerly looking forward to see new discoveries and enhance our understanding in our exciting science.

Piet van der Kruit
President of Council

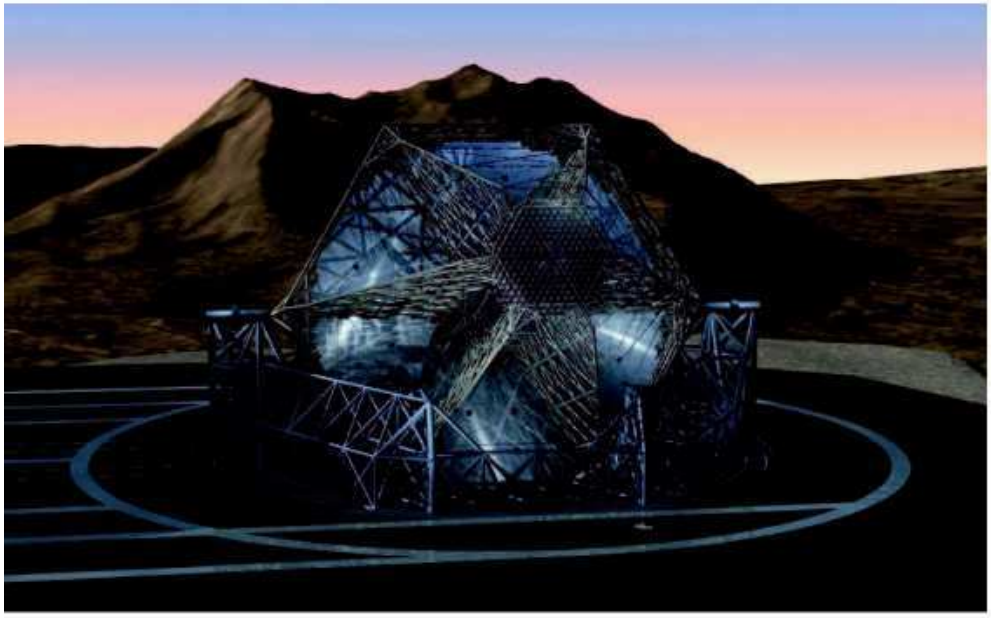
ESO Council Resolution on Scientific Strategy

ESO Council, considering the report of its Working Group for Scientific Strategic Planning, ESO/Cou-990, and its recommendations in ESO/Cou-964 rev. 2, agrees that

- astronomy is in a golden age with new technologies and telescopes enabling an impressive series of fundamental discoveries in physics (e.g. dark matter, dark energy, supermassive black holes, extrasolar planets),
- over the last decade, the continued investment of ESO and its community into the improvement of ground-based astronomical facilities has finally allowed Europe to reach international competitiveness and leadership in ground-based astronomical research,
- the prime goal of ESO is to secure this status by developing powerful facilities in order to enable important scientific discoveries in the future,
- only the continued investment in cutting edge technologies, telescopes, instruments and information technology will enable such scientific leadership and discoveries,
- ESO will continue to be open to new members and collaborations, following the principle of furthering scientific excellence,

and accordingly adopts the following principles for its scientific strategy:

- ESO's highest priority strategic goal must be the European retention of astronomical leadership and excellence into the era of Extremely Large Telescopes by carefully balancing its investment in its most important programmes and projects,
- the completion of ALMA is assured and conditions for an efficient exploitation of its superb scientific capabilities will be established,
- the VLT will continue to receive effective operational support, regular upgrading (especially to keep it at the forefront in image quality through novel adaptive optics concepts) and efficient second-generation instrumentation in order to maintain its world-leading position for at least ten more years,
- the unique capabilities of the VLTI will be exploited,
- the construction of an Extremely Large Telescope on a competitive time scale will be addressed by radical strategic planning, especially with respect to the development of enabling technologies and the exploration of all options, including seeking additional funds, for fast implementation,
- ESO and its community will continue their successful partnership and seek effective intercontinental collaborations in developing the most important and challenging technologies and facilities of the future.



OWL as shown in this artist's view, is one possible concept for an Extremely Large Telescope.

Council

Two ordinary meetings of Council took place in 2004 at the Headquarters in Garching. In January an extraordinary meeting was held in Garching to finalise the terms of accession for Finland. The Committee of Council met twice during the year, in April in the Hague and in September/October in Rome. All meetings were chaired by Prof. Piet van der Kruit.

At the meeting in June, Council took note of the provisions of the ALMA Agreement with NAOJ (Japan). This Agreement was subsequently approved by written procedure.

On July 7, 2004 Finland became the 11th Member State of ESO.

The Working Group on Weighted Voting, chaired by Dr. Fernando Bello, met four times in Garching. At its meeting in December, Council adopted the resolution on weighted recommendations by the Finance Committee.

The Working Group on Scientific Strategic Planning, which was established by Council in order to offer advice on long term priorities for ESO in the context of a European strategic view of ground-based astronomy, met twice in Garching. Its report was presented to Council in December and the recommendations adopted. At the end of the year, Prof. P. Tim De Zeeuw followed Prof. Ralf Bender as Chairman of the Group, with a revised mandate.

A Negotiating Team was established and met with Spanish representatives in Madrid and Garching to discuss the accession of Spain.

In December, Council set up a Working Group to look at the Terms of Reference of the Finance Committee, which form part of the Financial Rules and Regulations, in connection with the work being done by the Finance Committee Working Group on Financial Rules and Regulations.

Council agreed that the four agreements with the X-Shooter Consortium could be completed and signed, noting that the guaranteed observing time awarded should be within the ceilings as set out in the agreements. Council also authorized the Director General to sign the PRIMA/VLTI Enhancement Agreement.

The ESO Tripartite Group chaired by Dr. Ugo Sessi held two meetings during 2004. Among many issues discussed were the possibility of the pension fund being based on the Euro and the ESO basic salary scale, the issue of contributions to the Health Insurance for retired staff, Long Term Care Insurance, changes to Staff Rules and Regulations regarding travel and temporary transfer to Chile, advancement review, progress in implementation of the ERP system and work of the Life and Work Working Group of the Staff Committee, as well as the Cost-of-Living Adjustment.

Discussions took place on the reports of the Chairpersons of the Finance Committee, the Scientific Technical Committee, Observing Programmes Committee and the Visiting Committee. Council received the regular Instrumentation, VLTI and ALMA reports. The ESO Long Range Plan was discussed in December and will be presented to Council in December 2005 for endorsement.

At the June meeting Council welcomed the new External Auditors from Italy.

One of the major topics of concern throughout the year was the urgent need for a new Headquarters' Building in Garching.

At the ordinary December meeting Prof. Piet C. van der Kruit was reelected President of Council for 2005 and Dr. Fernando Bello was reelected Vice-President. Ms. Rowena Sirey was re-appointed Chair of the Finance Committee for 2005.Dr. Tommaso Maccacaro was reappointed Chair of the Observing Programmes Committee for 2005 and Dr. Lutz Wisotzki was appointed Vice-Chairman.

The members of the ALMA Board were reappointed for 2005–2006 (President of Council and Director General (ex officio), Prof. Richard Wade and Prof. Roy Booth). Prof. Piet C. van der Kruit replaced Prof. Richard Wade as Chair of the European ALMA Board from January 1, 2005.

Council and Committee of Council 2004

President	Piet C. van der Kruit
Belgium	Jean-Pierre Swings Monique Desmeth
Denmark	Henning Jorgensen Henrik Grage
Finland	Mirja Anajärvi (until July 2004) Kaveli Mattila (from July 2004) Pentti Pulkkinen (from July 2004)
France	Laurent Vigroux Philippe Barré
Germany	Ralf Bender Andreas Drechsler
Italy	Bruno Marano Vicenzo Dovi
The Netherlands	P. Tim De Zeeuw Jan A. C. van de Donk
Portugal	Teresa Lago Fernando Bello
Sweden	Claes Fransson Finn Karlsson
Switzerland	Michel Mayor Martin Steinacher
United Kingdom	Gerry Gilmore Richard Wade

I am delighted to be able to provide a few words of introduction to this Annual Report for 2005, a truly remarkable year for ESO, during which Council was called upon to decide on matters of great importance for the future of the organisation.

In 2005, two very important steps were taken to secure a bright future for the organisation, namely the successful completion of the procurement procedure for the ALMA antennas and the steps taken towards a European ELT project.

During the year the ALMA project went through an extensive and very careful process of re-baselining followed by an equally thorough four-day baseline cost review in October. Based on the recommendations of the review and a careful examination by the Executive of possible long term funding scenarios, Council agreed that a 50 % share for Europe in a 50-antenna ALMA was affordable in view of ESO's other priorities. This paved the way for the signing of the ALMA antenna contract, which as the press release states is indeed the "largest-ever European industrial contract for ground-based astronomy". Together with the similar contract signed a few months earlier in North America, this was a major milestone for ALMA and ESO.

Council discussed and agreed the recommendations of its Strategy Working Group. A key element of the strategy adopted by Council is the clear desire to move as quickly as possible to the design and development of a European ELT. Late in the year, the review of the OWL 100-m telescope Concept Study took place also with a positive outcome. This enabled ESO to enter the next phase: building on this study as well as Europe's track record in developing and implementing cutting-edge large-scale research infrastructures for astronomy, to move towards a European ELT project that will ensure that ESO member state astronomers can remain at the forefront of our science for the foreseeable future.

I wish also to mention the very promising negotiations with Spain about full membership of ESO. Along with the recent sequence of rapid accessions of Portugal, the UK and Finland, the addition of Spain as an ESO member state provides a very important step in the process to bring European astronomy together. Indeed, with Spanish membership only a few non-ESO countries remain in Western Europe, while new contacts with Central- and Eastern European states are intensifying with a view to extending ESO's coverage to that important part of the continent. Council clearly recognises that the foreseeable growth in member states must be carefully managed.

As in previous cases, Council agreed that the income from Spain should be added to the contributions from the current member states. This is clearly of great importance for ESO's ability to tackle the challenges of the ELT age in a realistic way. Also, the in-kind contributions from Spain in the form of technical and scientific access to the GranTeCan telescope at La Palma, Canary Islands, with its 10-m segmented mirror will be important for ESO and the astronomers in the member states.

These measures, together with the milestone decisions regarding the ALMA and ELT project, make it clear that ESO is doing very well indeed and can look forward to the future with confidence.

Finally, I wish to thank warmly Prof. Piet van der Kruit for his wise leadership of Council at the time of such important decisions and indeed for his unrelenting commitment to ESO and its goals.

Richard Wade
President of the ESO Council

2005 was without any doubt a pivotal and amazing year for ESO in which the Management, together with the Council and the Committees, worked hard to ensure that ESO is on a good track towards the future as set out in the 2004 Council resolution on Scientific Strategy. Mid- and long-term plans have been developed reflecting these priorities, but also in the day-to-day operations, did we pass several crucial milestones for ESO's further development.

For the Atacama Large Millimeter Array (ALMA), the completed re-baselining and the successful cost review, in addition to the confirmation by Council that "... the estimated increase ... in the cost to completion of the ESO share of the bilateral ALMA project is affordable and compatible with ESO's strategic projects", created a sound basis for the continuation of the bi-lateral project, with fifty 12-m antennas (and an option of increasing the number to sixty-four). This, in turn, allowed us to sign two major industrial contracts for ALMA, the contract with the AEM consortium for the procurement of the European antennas and another one for the ALMA transporters. The antenna contract is the largest-ever single contract awarded by ESO to industry and thus marks a significant milestone both for ESO and for the ALMA project. Furthermore, ESO signed a contract with the European Commission for the ALMA 'Enhancement' Project, enabling us to add Band 5 to our instrument suite.

Similarly, towards the end of the year, we concluded the 100-m OWL telescope Concept Study with an international review. The reviewers found that the ESO team had "demonstrated a plausible case that OWL is feasible and that a 100-m telescope can be built and operated" and that "this provides a firm technological basis for ESO to move into the next phase of an Extremely Large Telescope (ELT) project." Yet the reviewers identified a number of technical risks, which might cause serious problems in view of the need to build an ELT on a competitive timescale and with consideration to the present funding scenario. The panel therefore advised ESO to work towards an ELT with a smaller aperture, thereby minimising the risks.

With the recommendations of the reviewers as well as the huge amount of work done in the frame of the conceptual study, we are now ready to enter into the next phase towards the realisation of an Extremely Large Telescope with a primary mirror in the 30–60-m range for Europe's astronomers. We will do so in close collaboration with our user community, by putting in place a series of dedicated working groups and carefully examining the balance between science return, competitiveness and timeliness, adaptive optics performance, instrumentation, site characteristics, risks and cost. A further element is the ELT Design Study, meant to test generic design solutions, a project under FP-6 with ESO and the European Commission as the two largest individual funding bodies, but comprising 25 partners in Europe.

Obviously, ESO's true strength lies in the services it provides to the scientific community in the member-states. Therefore, much effort is being put into optimising our operations and to maintain our current facilities in a state-of-the-art manner.

The merger of La Silla and Paranal into one functional entity was an important step to streamline the operations and exploit synergies. As regards instrumentation, HARPS and VIMOS were upgraded and SINFONI and VISIR, with the corresponding pipelines, were offered to the user community. Also AMBER was offered to the community in Period 76. The year also saw the first use of the visitor focus with UltraCAM, which passed this milestone with flying colours.

For the interferometric mode of the VLT (VLTI), all four UTs are now being offered with the adaptive optics MACAO system while the first two Auxiliary Telescopes were offered to the community, and the third saw First Light. However, the need for a review of the VLTI system had arisen at the end of 2004, to ensure that the most demanding goals of the VLTI could be met. Following this review, we have embarked on a major project, called the 'Immediate Improvement Implementa-

tion Initiative', which has already yielded first results. VLTI is now firmly in the hands of the La Silla Paranal Observatory.

Meanwhile, towards the end of 2005, preparations were made for First Light of the Laser Guide System on Yepun, OmegaCam was completed and the Multi-Conjugate Adaptive Optics Demonstrator (MAD) saw closed-loop operation on the optical bench at Garching.

Following a comprehensive Conceptual Design Review, Council agreed to pursue the Adaptive Optics Facility programme, a six-year project aiming at transforming one of the four VLT Unit Telescopes into an adaptive one, with four sodium laser guide stars, a new secondary unit featuring a deformable mirror as well as wavefront sensing systems for the second-generation VLT instruments. This will also be an important pathfinder for the future Extremely Large Telescope.

The construction of VISTA continued according to plan with all subsystems in the final stage of manufacture. Regrettably the VST project has been marred by several problems and mishaps, and progress was slow.

In 2005, we also took a number of steps regarding the second-generation instruments for the VLT: HAWK-I, X-Shooter and KMOS are now in active development, MUSE was approved and the Planet Finder concept consolidated. A new general detector controller, under the acronym NGC, has been developed for both CCDs and IR detectors.

At Chajnantor, the 12-m APEX submm/mm telescope was inaugurated in September and has already yielded a flurry of interesting scientific data from which we expect many papers soon.

Of course, our user community is keen to reap the scientific 'harvest' from all these developments as it has been in the past. We now receive around 1700 proposals per year for observing time. It is gratifying to see that, in early 2005, the 1000th scientific paper based on VLT observations was published. The La Silla Paranal Observatory is now the world's scientifically most productive facility for astronomy, both in terms of refereed papers and citations.

Another indicator of ESO's standing in the scientific community is a 30 % rise in applications for fellowships.

ESO's telescopes have played several crucial roles in one of the hottest research topic, the study of gamma-ray bursts (GRBs). Observations with ISAAC and FORS2 have enabled astronomers to discover the afterglow of the farthest known ever GRB. With a measured redshift of 6.3, the light from this very remote astronomical source has taken 12700 million years to reach us. Similarly, ESO telescopes have helped resolve a 30-year old puzzle, by observing for the first time the visible light from a short gamma-ray burst. Using the 1.5-m Danish telescope at La Silla, they showed that these short, intense bursts of gamma-ray emission most likely originate from the violent collision of two merging neutron stars. The VLT was also used to constrain the birthplace of two other short GRBs, providing further constraints on the origin of these events.

Observations with VIMOS as part of the VIMOS VLT Deep Survey (VVDS) that started early 2002 allowed astronomers to discover a large population of star-forming galaxies observed when the Universe was only 10 to 30 % its present age (redshift between 1.4 and 5). This showed that the Universe was a more fertile place soon after it was formed than has previously been suspected.

A galore of results in the field of exoplanets confirmed once more that ESO has a unique set of complementary instruments to tackle this important research area. Astrometry measures of the 2M1207 system have conclusively demonstrated that the giant planet, approximately five times the mass of Jupiter, is indeed gravitationally bound to the young brown dwarf, thereby confirming that NACO was the first ever instrument to have imaged an extra-solar planet. HARPS also found a Neptune-sized planet orbiting the red dwarf Gl 581. Although this is not the least massive planet found, the fact that its parent star is a low-mass star – the most common in our Galaxy – is important in the census of other planetary systems.

Increasingly the science archive has evolved as an important tool for our users. With 12 terabytes (TB) of data having been archived in 2005, the ESO Science Archive currently comprises 44 TB of compressed data. We are therefore undertaking considerable efforts, both to maintain the archive in its own right and in the context of the emerging Virtual Observatory (VO) paradigm. VO implies federating archives involving scientists across Europe and indeed the world. It is therefore fitting that the Euro-VO project, in which ESO is a partner, has received financial support from the European Commission. This is also significant from the perspective that the FP-6 contract involves DG Information Society underscoring the importance attributed to VO activities in a wider societal context.

ESO's role as Europe's main organisation for ground-based astronomy was strengthened further by the wish of several countries to join our organisation. To that end negotiations with Spain were conducted. Even if they could not be formally concluded before the end of the year we are optimistic about a Spanish membership in 2006. Also most fruitful initial discussions took place with the Czech Republic.

In May, we were delighted to welcome Maria van der Hoeven, Dutch Minister of Education, Culture and Science, at Paranal and in October, Bertel Haarder, Danish Minister for Education and Church Affairs, paid a visit to ESO Chile.

It is clear that more than ever ESO has become a driving force for European astronomy, which brings a number of obligations with it: it must shoulder a number of complex tasks, stemming from the demands from the current projects, especially the completion of the VLTI and of the VLT second-generation instruments, and the construction of ALMA, as well as the challenges from the ELT-era, now on the horizon, while striving to strengthen the position of European astronomy within the dynamics of the European Research Area.

This is the reason why ESO has engaged in a number of policy-driven initiatives, including the ASTRONET, a network of funding bodies working within the ERA-net scheme, to develop a strategic vision for all of European astronomy by developing a 'road-map' for our science. ESO also decided to join the ARENA network, which will explore the possibilities for astronomy in the Antarctica. ESO and ESA also continued with their working group for joint strategic initiatives in science, which produced its first report on extra-solar planet research. Further reports are forthcoming.

Another important activity for ESO is its participation in the EIROforum partnership. In April, the Directors General of the partner organisations presented a joint science policy paper outlining their common views on how science can contribute to the attainment of the Lisbon goals and the knowledge-based society.

While the number and complexity of European Interactions and Foreign Interactions continues to increase, 'back home' at Headquarters we are faced with serious problems as regards office space. I therefore welcome the decision to extend our Headquarters with a new building to alleviate this problem and to create proper working conditions for our staff and visitors.

An annual report implies stock-taking. In this context, I wish to thank the entire 'ESO community' – the entire staff, members of committees and working groups, and our users – for their dedicated support and continued contribution to our shared adventure: Providing the best tools in the world to the scientists in our member states and thus enabling them to tackle some of the biggest research questions that humankind has ever asked. I wish, however, to extend special thanks to Piet van der Kruit for his whole-hearted efforts as President of Council to pave the way for a great future for this organisation.

Catherine Cesarsky
Director General, ESO

Council

Council held two ordinary meetings, in Helsinki in June and in Garching in December, and also met for an extraordinary session in September in Brussels, adopting a resolution about the overall affordability of ALMA, an essential precursor to placing the ALMA antenna procurement contract. The Committee of Council met three times during the year, in March in Garching, in the middle of September in Garching and at the end of September in Brussels. The meetings in the first half of the year were chaired by Prof. Piet C. van der Kruit, and those from September by Dr. Fernando Bello, the Vice-President.

In December Council adopted a resolution on the accession of Spain to ESO as the 12th Member State from 1 July 2006.

Council commended the OWL team for producing an in-depth Concept Design Study for a 100-m telescope which was presented at the September meeting and reviewed by an external panel chaired by Prof. Roger Davies.

Amongst the important issues addressed by Council and Committee of Council in the course of the year were the status, re-baselining, and affordability of ALMA, the recommendations of the Scientific Strategy Working Group, plans for the ELT/OWL, and the report of the OWL Concept review panel.

Council was informed on the smooth merging of La Silla and Paranal Observatories. The issue of a new Headquarters building in Garching continued to be of concern.

The agreements for the instruments KMOS and MUSE were approved by Council, which noted that guaranteed time was awarded on the basis of the standing rules.

Council received the regular VLT/VLTI, Instrumentation and ALMA biannual reports, and the reports from the Chairs of the Finance Committee, the Scientific Technical Committee, and Observing Programmes Committee. Council also examined the document "ESO Long Term Perspectives 2003–2025" prepared by the Executive.

The Council's Scientific Strategic Working Group met four times in Garching during 2005, chaired by Prof. Tim de Zeeuw. At the May meeting the group produced a report containing terms of reference for STC and OPC, rules for the Nominating Committee, and rules on dealing with conflicts of interest on ESO committees. It also discussed proposed next steps for the European ELT.

The ESO Tripartite Group chaired by Dr. Ugo Sessi met two times during 2005, in March in Garching and in October in Grenoble. Among the discussion points, one very important topic was the CERN Pension Fund, as well as the question of the establishment of a *Kinderkrippe* (nursery) together with the *Max-Planck-Institut*, the improvement of the communication with staff members in Chile and the cost-of-living adjustment in Chile on the household and children allowance.

At the ordinary December meeting Prof. Richard Wade was elected President of Council for 2006 and Dr. Monnik Desmeth was elected Vice-President. Ms. Rowena Sirey was reappointed Chair of the Finance Committee for 2006. Dr. Lutz Wisotzki was appointed Chair of the Observing Programmes Committee for 2006 and Dr. André Moitinho de Almeida was appointed Vice-Chairman. For the Scientific Technical Committee Dr. Linda Tacconi was appointed Chair.

Dr. Ewine van Dishoeck and Dr. Laurent Vigroux were appointed members of the ALMA Board for 2006–2007. Prof. Roy Booth was appointed Assessor to the ALMA Board for 2006. The President of Council and the Director General are members *ex officio*.

Council and Committee of Council 2005

President	Piet C. van der Kruit
Belgium	Monnik Desmeth Jean-Pierre Swings
Denmark	Jens Viggo Clausen Henrik Grage
Finland	Kalevi Mattila Pertti Pulkkinen
France	Philippe Barré Laurent Vigroux
Germany	Ralf Bender Andreas Drechsler
Italy	Vicenzo Dovi Bruno Marano
The Netherlands	P. Tim de Zeeuw Jan A. C. van de Donk
Portugal	Fernando Bello Teresa Lago
Sweden	Claes Fransson Finn Karlsson
Switzerland	Michel Mayor Martin Steinacher
United Kingdom	Gerry Gilmore Richard Wade

The H II region N213C in the Large Magellanic Cloud (NTT/SUSI2).