FOR APPROVAL

SCIENTIFIC TECHNICAL COMMITTEE

74th Meeting

ESO, Garching, October 19 & 20, 2010

DRAFT MINUTES
Draft Minutes of the 74th meeting of the Scientific Technical Committee held at ESO, Garching, on October 19 & 20, 2010.

The STC convened in the following composition:

Chair: W. Benz (Switzerland)

Members: J. Hron (Austria)  
J. Blommaert (Belgium)  
L. Bronfman (Chile)  
M. Prouza (Czech Republic)  
J. Fynbo (Denmark)  
L. Haikala (Finland)  
Y. Mellier (France)  
T. Herbst (Germany)  
A. Marconi (Italy)  
M. de Vos (Netherlands)  
J. Afonso (Portugal)  
G. Olofsson (Sweden)  
S. Arribas (Spain)  
D. Queloz (Switzerland)  
R. Ivison (United Kingdom)

Members at Large:  
E. Sadler (Australia)  
D. Crampton (Canada)  
L. Tacconi (Germany)

On behalf of the ESO Executive:  
T. de Zeeuw (Director General)  
M. Casali  
L. Christensen  
F. Delpleanche  
E. Emsellem  
R. Gilmozzi  
N. Hubin  
A. Kaufer  
M. Kissler-Patig  
B. Leibundgut  
J. Melnick  
M. Peron (Day 1)  
S. Ramsay (Day 2)  
M. Romaniello  
A. Russell  
J. Spyromilio (Day 2)  
R. Tamai  
L. Testi  
W. Wild

Minutes: L. Cortese
19 OCTOBER 2010

1. Opening of the meeting and adoption of the agenda (STC-474)

The chair W. Benz welcomed the participants to the 74th STC Meeting. The agenda of the meeting was approved.

2. Approval of the minutes of the 73rd (extraordinary) STC Meeting (STC-473)

E. Sadler pointed out that she had been present at the meeting while on the first page of the minutes it was indicated that she had attended via teleconference. W. Benz apologized for this error. The minutes were approved without additional changes. W. Benz thanked ESO for providing the minutes.

3. Report of the Director General

W. Benz thanked the DIRECTOR GENERAL for a very clear and important presentation.

D. Queloz asked whether the DIRECTOR GENERAL was of the opinion that there were still major risks associated with ALMA. The DIRECTOR GENERAL answered that until two or three European antennas would be fully tested and accepted it was not possible to consider the project without risks. He remarked that all signals were positive and that there had been a lot of progress in the past six months. He reminded the STC that in the past there had been some delays in the commissioning and science verification due to the difficulties inevitably associated with such a large project.

E. Sadler inquired about the vision presented in 2009 to open a new funding wedge for major projects in 2020. She had the impression that at that moment some of that money was being diverted to the E-ELT construction and wondered whether the vision was still there and the timescales changed. The DIRECTOR GENERAL replied that the vision was still there. He pointed out that if only one additional member state joined ESO, the wedge would move a couple of years more distant as the construction of the E-ELT would take a little bit longer. Any additional country that would join would automatically bring the wedge forward again.

M. de Vos requested a clarification regarding the time scales for the construction of the E-ELT. It was not clear whether the additional two years for the construction of the E-ELT included the recommendation of the external review committee. The DIRECTOR GENERAL answered that the time scale encompassed the recommendation of the review committee. He clarified that ESO had already realized that a stretching by two years would be very helpful from a financial point of view and that the review committee had reached this conclusion independently.

M. de Vos asked whether ESO was still looking for savings options to compensate possible additional costs induced by additional cost mitigation measures. The DIRECTOR GENERAL replied that if the upper limit in the construction cost was taken into consideration, ESO might not be able to construct the E-ELT in 11 years. This was something they were looking into at that moment. It did not affect the forward look in the budget since it included only the following three years.
M. de Vos had a question regarding the instrumentation programme. The presentation mentioned a vision for a wide instrumentation programme for both the VLT and the E-ELT but it was not clear how this was reflected in the financial plan. The DIRECTOR GENERAL clarified that the instrumentation and construction costs had been clearly separated for the E-ELT. ESO had a lot of experience in building instruments. Therefore, any issue with the instruments would be solved without affecting the construction costs.

M. de Vos inquired whether this implied that ESO would keep a forward look programme for the VLT. The DIRECTOR GENERAL confirmed that this was the case and added that the idea was to continue to replace VLT instruments in the future.

4. **ALMA**

4a. **Project Status Report (W. Wild)**

4b. **Discussion of ALMA Fact Sheets (STC-475D-ALMA)**

T. Herbst asked for some details as to the problems in recruiting personnel for ALMA Commissioning and Science Verification (CSV). W. Wild replied that he was concerned about recruiting in general, not only for CSV. L. Testi added that it was difficult to find expert personnel within ESO. The number of staff in Chile with ESO contracts was fairly high, but there were not many experts at ESO that could be sent on missions to Chile, at least not as many as NRAO had. The ESO contribution, on top of the people hired in Chile, was based on finding and supporting people in European institutes to go to Chile. Although this activity was going well, it did not provide continuity. He stressed that it was a real concern which had also been discussed at the ESAC meeting.

J. Fynbo inquired how the reliability problems could be solved. W. Wild responded that this depended on how quickly the different issues could be brought under control. In the past months it had become obvious that if the problems were related to a single specific area, they were dealt with very efficiently as the communication and responsibilities were clear. On the other hand, ALMA could improve and was already improving solving multidisciplinary problems (e.g. calibration device) since the diagnosis was often not straightforward and took much time. He also pointed out that to some extent ALMA was paying the price for not having a strong system engineering group in the early days.

W. Benz appreciated all the progress made by ALMA and was amazed by how much had changed in the past six months.

4c. **ALMA development proposals (L. Testi)**

D. Crampton asked how the selection of the proposals would be coordinated with other initiatives and whether there was a plan to involve other competitive studies. L. Testi replied that within Europe there was only one overlap with two proposals focused on the development of Band 2. If that project emerged as a priority, it would become necessary to decide how to proceed since there was not enough money to fund two independent studies. This would be considered as part of the proposal evaluation. L. Testi clarified that the plan was to feed the output of the competitive studies to JAO in order to harmonize with the studies produced in the other ALMA regions and thus to produce a coherent ALMA plan. W. Wild added that it was important to understand that the ESO call for study proposals was to prepare the European science community to be ready for the call for proposals to be issued by
JAO. This was exactly what other ALMA regions were doing (or planning) as well. He pointed out that it was not a selection but it was to enable European groups to properly compete.

W. Benz reminded everybody that the STC had explicitly requested the call to prepare the European ALMA community for the next step.

4d. Report from ESAC (L. Tacconi)
4e. Discussion

W. Benz suggested merging the discussion on L. Tacconi’s presentation with any other issues related to ALMA.

T. Herbst asked whether the APEX extension would be discussed at the STC meeting. W. Benz reminded everybody that the DIRECTOR GENERAL had indicated in his presentation that the APEX extension had been added to the budget outlook.

W. Benz inquired what the realistic time-scales for ALMA Early Science were. L. Testi responded that discussions were still ongoing and that a final decision would be taken at the ALMA Board meeting. The time frame discussed at that moment for issuing the call was the first part of 2011. L. Tacconi pointed out that it was not going to be in December 2010.

W. Benz wondered if the STC should recommend receiving an indication of the exact time scale in order to remove any confusion created within the community during the past few months. W. Wild stated that this would happen anyway after the Board meeting in November. W. Benz stressed that it was very important to give an accurate timeline to the community. He added that the delays were understandable but it was important to ensure that the community was informed.

J. Blommaert inquired how much time would be dedicated to science verification (SV) and whether there was going to be an open call. L. Tacconi clarified that SV was an open call for ideas, not for proposals and that no priority access to the data would be given to the people involved in SV. The data would be verified by the project and then released to the community. She indicated that up to that moment it was not clear whether the call would be open to the public or whether it would just be within the project.

J. Blommaert asked what arguments had led the ASAC to ask for an open call, while the ESAC preferred to restrict the call to within the project. L. Tacconi answered that the reason was mainly to involve the community.

W. Benz inquired why ESAC recommended giving priority to small, high quality proposals for ALMA Early Science. R. Ivison explained that it was not intended as a mechanism to keep out non-expert. The idea was to avoid many small proposals asking for the same science since the proposals were not yet at the level hoped for science verification. E. Sadler pointed out that the people handling the proposals were the same people who at that moment tried to get the systems ready for observations. She added that the danger of having them dealing with too many proposals would impede to get the system ready on time. L. Tacconi noted that the input the ASAC had received from the ARCs was that during early science the ARCs would not be able to provide the users with fully verified ALMA data products. There were several early science reliability issues for which the users would have to interact with the
ARCs. R. Ivison mentioned that there was a lesson learned from the EVLA, where it was emerging that if one had a large amount of data, one could certainly obtain some results while if one just got a few hours, there would not be much one could do.

W. Benz asked whether the ALMA schedule was realistic given all the constraints. W. Wild replied that, if everything went well, the first European antenna should be ready in March or early April 2011. The idea was to have two or three additional European antennas for SV and if everything worked to plan, that should be in June 2011. He explained that the crucial elements for the antenna testing were the pointing, the surface and the metrology system. He also expressed his optimism that by June, even if the antennas were not accepted by then, enough information would be available to plan the next steps. He acknowledged that if by June 2011 it was not clear whether the antennas worked, it would be a big problem for ESO.

5. **Directorate of Operations**
5a. **Directorate of Operations Overview (A. Kaufer)**

Y. Mellier inquired why the coating of VISTA degraded so quickly. A. Kaufer replied that the suspicion was that the mirror had not been properly washed, but the analysis was still ongoing. From the VLT it was known that the water quality was very important for washing mirrors. The coating would have to be redone and VISTA science operations would have to be stopped for two weeks.

J. Afonso asked whether this was an ESO procedure. A. Kaufer answered that it was not and that for that reason ESO was asking the VISTA project to evaluate what went wrong. T. Herbst noted that the same coating was applied to one of the ATs and wondered what the impact of having mixed coatings in an interferometer would be. In theory all coatings should be identical. F. Delplancke pointed out that the AT coatings of mirrors M2 to M8 were already silver in all telescopes, as of delivery. So the types of coating were not mixed. Moreover, with silver (non-dielectric) coatings close to normal incidence, slight differences in the coating batches should not be a problem.

W. Benz asked for a clarification as to the kind of weather that prevented the use of the laser guide stars at Paranal. Since weather patterns did not change, he wondered whether there was a way to improve the laser guide star to be used under a wider range of weather conditions. A. Kaufer responded that the laser guide star was scheduled in blocks so that adjustments for weather conditions were not possible. W. Benz inquired about the fraction of good weather when block scheduling was not taken into account. A. Kaufer replied that good seeing was available 50% of the time and when additional constraints were included (i.e. cirrus clouds), the weather allowed the use of the laser guide star 40% of the time. That matched the statistical expectations. W. Benz wondered whether it was possible to improve that number and whether these were natural or technical limitations. A. Kaufer stated that a few things could be improved such as replacing the launch telescope to provide better spots on the sky and thus relaxing the seeing constraints. W. Benz asked how this related to what would be possible with the E-ELT. J. Spyromilio explained that the E-ELT would have a laser with over 20 Watts power. That would produce a brighter star and ease the constraints on seeing and cirrus. He explained that if heavy cirrus were excluded, these numbers would represent a learning experience but not a guide on how the laser would work for the E-ELT. It was already clear that it would not be possible to achieve 100% time of laser operations. A. Kaufer added that if the power of the current VLT laser could be increased to ~10 Watts on sky, it would certainly be possible to improve the efficiency.
D. Crampton was struck by the low numbers and wondered what the equivalent numbers for Mauna Kea were, as he had the impression they were higher. A. Kaufer assured that the VLT achieved the same efficiency as Mauna Kea. J. Spyromilio confirmed that the difference was just of the order of a fraction of a night.

W. Benz asked if, in the light of the savings to come within ESO, the Directorate of Operations was comfortable with its budget and able to run the telescopes without problems. A. Kaufer replied that the Directorate of Operations had a flat budget. The Observatory budget mostly depended on exchange rates and energy costs. Up to that moment the Directorate was within 5% of the approved budget.

5b. **Update on survey data delivery (M. Romaniello)**

Y. Mellier acknowledged the efforts and thanked the team for the prompt and quick solution for the problem raised at the last STC meeting. W. Benz remarked that the issue was solved and thanked the team again.

5c. **Discussion of Directorate of Operations Fact Sheets (STC-475A-DOO)**

J. Hron asked what the reason for the decommissioning of the MIDI+FINITO instrument modes was and what the effect of the lack of software support meant. A. Kaufer answered that the MIDI+FINITO mode was decommissioned due to the lack of use. He explained that the consequence of the lack of software support was that the VLTI projects would simply be slowed down.

L. Tacconi inquired whether numbers regarding the improvements of Strehl ratio for SINFONI after the commissioning of the new STRAPs were available. A. Kaufer replied that the commissioning report done after the installation showed improvements but that the detailed characterization was still pending.

J. Blommaert noted that in the past there had been a lot of issues with the ATs. A. Kaufer stressed that the reliability had improved significantly. There were still problems with the maintainability but these were being addressed. He added that overall the statistics of the ATs was very good.

D. Crampton asked if the laser science time indicated in the graphs was open-shutter time. A. Kaufer clarified that it was the OB execution time and that it therefore included the overheads. D. Crampton mentioned that the statistics for Keck was 31% open-shutter time but acknowledged that the issue was not how well ESO was doing at that moment but how all this would work for the E-ELT.

W. Benz acknowledged the usefulness of Fact Sheets and thanked everybody involved in their preparation.

6. **Directorate for Science**

6a. **Directorate for Science Overview (B. Leibundgut)**

6b. **Discussion of Directorate for Science Fact Sheets (STC-475C-DSC)**

Y. Mellier had a question with regard to the idea of sharing technologies and data archive with ESA. In particular, whether real data should be shared or similar architectures for the archives were envisaged.
B. Leibundgut replied that at that moment there was nothing concrete but just ideas. M. de Vos noted that it was not entirely clear what collaboration with ESA would imply in practice. He wondered if it implied that an ESA endorsed proposal would automatically receive a higher ranking. B. Leibundgut answered that it still had to be decided. Up to that moment the list of observations had been received and the panel chair in the OPC had been informed of the situation. The next space missions would require a different scale of ground-based support observations. Should a concrete proposal emerge, the STC would be involved in any case.

R. Ivison was impressed by the publication record and asked how many students and post-docs contributed to the publication records. B. Leibundgut answered that there were approximately 30 students and 30 post-docs and mentioned that thanks to that exercise ESO had a better view of how the research staff was performing.

L. Tacconi asked what fraction of the fellowship offers had been accepted in the last couple of years. B. Leibundgut replied that in Chile all fellowship offers were accepted while in Garching approximately half of the first round offers were accepted. E. Emsellem added that when offers were declined, this happened after long negotiations and usually because the applicant had been offered a very prestigious fellowship or a faculty position. E. Sadler inquired whether the increase in fellowship applications was mainly driven by an increase in application outside Europe. B. Leibundgut answered that in general there was a good mix of nationalities in the applications but up to that moment he had not received the numbers for 2010.

W. Benz had a question with regard to the science assessments. He wondered what weight was given to the overall appraisal of the personnel. B. Leibundgut replied that that exercise had always been done in connection with contract renewals and that it carried a significant weight. He stressed that such an evaluation had always been part of the career path in ESO and that a discussion on how to fold it into the annual performance review had started.

6c. Report from the La Silla Paranal Subpanel (Y. Mellier)

6d. Discussion

A. Kaufer clarified that ESO had presented the INAF-provided schedule for the VST. Until commissioning started it was impossible for ESO to control the scheduling. Y. Mellier remarked that he completely appreciated the situation. A. Kaufer added that it would be difficult to have the start of service in June 2011.

D. Crampton mentioned that at the SPIE meeting in June the big news were the results from the LBT which had successfully installed an adaptive secondary and obtained much better results than expected reaching H-band Strehl ratios of 85%. The LBT had 0.8 arcseconds seeing and the Strehl ratio was far better than anybody else had ever achieved. Other telescopes reached typically 40% Strehl in K band. If this was really true, the AO performance would improve and future instruments would have to build on this. This might change the way people thought how to do AO. He wondered if it was the moment to think of how to integrate these results in post-NACO facilities. T. Herbst confirmed that the LBT had achieved that performance. However, he also pointed out that it was not unexpected since it was not so far from XAO. He added that these results were based on relatively bright stars.
W. Benz had a question regarding the schedule of decisions which needed to be taken until April 2011. The intention of creating a science team had emerged from Y. Mellier’s presentation. However, in April 2011 the STC would be supposed to provide a ranking of instruments. He was not sure whether the time scales were compatible. The STC needed to have an idea of post-NACO capabilities before being able to decide. Y. Mellier pointed out that if the STC was supposed to prioritize, a science team to indicate priorities for instruments would be helpful. If the decision was going to be taken in April 2011, then the science team would need to be set up before February 2011. W. Benz asked if everyone in the committee agreed with this idea. D. Crampton stressed that it was necessary to be able to set priorities. T. Herbst added that it was also important to show the community involvement. He asked whether a public call would be issued as up to that moment everything appeared to come from ESO. A. Russell indicated that the intention certainly was to create an opportunity to talk about all the different options in April 2011. W. Benz appreciated that it was fair to request priorities from the STC but that could only be done with concrete proposals. D. Queloz added that the confusion came from the fact that the STC had requested a list of possibilities from ESO.

W. Benz concluded that the STC would assess the situation in April 2011 but that it might be complicated.

M. Romaniello requested a clarification as to the recommendation made to the Phase 3 consortia to provide documentation in order to make the pipelines maintainable in the future. Y. Mellier explained that the recommendation was to provide documents which described the data products, the algorithm and the physical meaning of the parameters extracted from the data processing. M. Romaniello suggested rephrasing the recommendation since at that moment it said “the pipeline has to be maintainable in the future”. Y. Mellier clarified that what he had shown was the recommendation of the Public Survey Panel (PSP).

7. **ESO Budget 2011 discussion (FC 1827)**

W. Benz stressed that it would be good to have a one-page executive summary of the budget plans. He noted that some savings had to be made and asked the DIRECTOR GENERAL for a summary of the savings, the areas affected and what would be the consequences for ESO and the community. The DIRECTOR GENERAL responded that ESO had an overrun in its personnel costs in 2010 which was absorbed and that ESO would stay within the overall allocated budget. The DIRECTOR GENERAL indicated that ESO would have to contribute to the pension fund to return it to healthy state. He added the APEX extension and the costs for E-ELT delta Phase B. By doing that ESO needed to save in personnel and material costs. Therefore, ESO would sell land and buildings in Chile and had postponed the construction of the HQ extension to 2012. ESO also reviewed future programmes to find savings and might have to stop non-critical programmes. The DIRECTOR GENERAL clarified that despite the fact that ESO published a call for wide-field spectroscopy it was not clear up to that moment whether ESO would be able to afford it. On the personnel side, the DIRECTOR GENERAL assured that there was no plan or intention to let staff go. Some staff members would retire and their positions might not be filled again. The DIRECTOR GENERAL stated that the amount and quality of support to the user community would not suffer but that adjustments would have to be made. He concluded by saying that ESO would try to be careful with spending money as much as possible.

W. Benz had the impression that 2011 was going to be bad whereas 2012 would be better and wondered how realistic this assumption was. The DIRECTOR GENERAL clarified that 2012 would
not be much better. 2011 would be difficult as all Member States were worried about the economic situation.

A. Russell stressed that ESO had to provide its share of the 300 million € for the E-ELT. Anything that was not a number one priority could be cut. He stated that any money for instrument upgrades had been removed from the budget at that moment and admitted that that situation was worrying. He explained that ESO would disengage from the OPTICON programme after 2011.

It was not clear to M. de Vos where the 3 million € increase in costs for Paranal came from. He felt very uncomfortable about that since if cuts had been made, it was not obvious why the costs had increased. A. Kaufer clarified that the reason why part of that increased in 2011 was due to the fact that some projects on the site were running late. However, the operations cost was not carried over to the coming year. He stated that cost and FTE allocations were actually flat and would decrease in the future. M. de Vos noted an increase in FTE costs on page 65 of FC 1827. B. Leibundgut clarified that the budget decreased from 2010 to 2011 and that the projection was based on exchange rates that had changed. The DIRECTOR GENERAL stated that it would not make sense to lay off staff if in one year there was a spike in the exchange rate. However, if there was a three-year trend in the wrong direction, it would be clear that something would need to be done.

T. Herbst asked whether the stop of the instrument upgrades meant upgrades for current instruments or for new instruments. A. Russell clarified that the ongoing upgrades of VIMOS and VISIR would continue. Y. Mellier inquired whether the stop of any new upgrade also included the new ALMA developments. A. Russell replied that it was only for La Silla and Paranal. The DIRECTOR GENERAL added that the three executives in ALMA were holding the ALMA project very carefully to version D2 of the operations plan.

W. Benz had another question with regard to the upgrades. On page 18 of FC 1827 the top paragraphs described the importance of upgrades but then the decision was not to start any additional upgrade. He asked what that actually meant. A. Russell explained that that situation hurt but it was the current scenario. M. de Vos suggested clarifying the strategy since it seemed in contradiction with what the DIRECTOR GENERAL had said about an integral programme for both E-ELT and VLT instrumentation. The DIRECTOR GENERAL reminded everybody that Council had not yet approved the E-ELT construction neither the instrumentation plan. Therefore, no provision for the E-ELT could be made in the budget for 2011. This would be part of the construction proposal. M. de Vos wondered whether in that case there was a need to clearly state that there were no plans for upgrades since it might get a particular message across to Council. The DIRECTOR GENERAL responded that many countries had financial problems at that moment. These countries needed to know that ESO was careful with the money. W. Benz wondered if it implied that all plans for upgrades would be stopped. A. Russell clarified that the line about new instruments remained in the budget. W. Benz stated that the discussion about a balance between upgrades and new instruments was of direct interest to the STC. M. de Vos stressed that it would be necessary for the STC to prioritize down something else in order to keep the balance.

J. Fynbo asked which instruments would need upgrades in the near future. M. Casali responded that one or two instruments, e.g. the main slit in CRIRES would need some work but this could be covered by maintenance. There was nothing else at that moment.
M. de Vos had another question regarding the E-ELT budget. He mentioned that in the previous projection (page 40 of FC 1827) 77 million € were listed but now they had been removed. The DIRECTOR GENERAL replied that it was nothing to be alarmed about. For ESO it would be easier to have the money in the bank at the beginning of construction but in order to help the member countries it would grow a little bit more gradually. He clarified that all the integrals were clear but how to build them could still change. M. de Vos asked whether the 77 million € were obtained assuming additional contributions from the member states which the DIRECTOR GENERAL confirmed.

R. Ivison inquired what level of support from outside was expected for the construction of the new HQ. He indicated a contradiction when in times of austerity money was spent for a new building. The DIRECTOR GENERAL replied that ESO would have to move out of the IPP buildings in the coming years and house 200 staff members in its own buildings. Therefore, a solution needed to be found and ESO was not allowed to keep portacabins by the town of Garching. ESO would have to build a new building. The DIRECTOR GENERAL stated that one had tried to keep the work done up to that moment cheap. ESO had received 10 million € from the German government and had started activities to obtain additional money. There was a chance to start in 2011. However, ESO had decided not to move too fast. As ESO needed a solution to house its staff, ESO would anyway have to issue a call for tender in order to see whether the building could be afforded. The DIRECTOR GENERAL mentioned that these issues had come up in the discussion with Council but that there was no questioning to have all staff in one place. He clarified that there was no one who wanted to build something in Garching and cut Paranal.

J. Fynbo inquired whether the necessity for additional payments for the pension fund could happen again. The DIRECTOR GENERAL explained that the pension fund was governed by CERN. The contributions to the fund were too low and at that moment the number of active contributors was the same as people receiving the pension. Many years after having recognized that problem a package of measures was in place intended to restore the system. The packages would make significant changes and both organizations had been asked to provide a lump sum over a certain number of years. The DIRECTOR GENERAL clarified that it was a problem created in the past which needed to be solved. If ESO was asked for a reasonable contribution, it would need to be reasonable. Despite the fact that the CERN Council would take the decision in mid 2011, ESO felt prudent to plan for it in the budget. M. de Vos asked for how long the contribution was supposed to last. The DIRECTOR GENERAL replied that it could be for a 20-year period.

W. Benz stated that the strain of the budget was coming from the E-ELT. Without E-ELT there would not be a problem and the E-ELT had not even been approved. He therefore wondered whether it was the right time to start the construction. The DIRECTOR GENERAL replied that it was a fair question. The main problems at that moment were short term issues and it would be unwise to risk the entire long term programme for that. The E-ELT had gained such a momentum that it was important not to lose it. W. Benz wondered how long one could postpone it without losing the other programmes. The DIRECTOR GENERAL clarified that ESO had already accepted the recommendation to extend the construction of the E-ELT to ~ 10 years and had postponed the first payment for the E-ELT by a year but not the decision to go ahead.

D. Queloz had a question regarding the projections for 2012, 2013 and 2014 for the E-ELT. He wondered whether it was correct to say that it had been saved from the other items. The DIRECTOR GENERAL replied that a very small amount had been saved from the regular income. The bulk came
from extra payments from the member states plus Brazil which would be very interested in ESO membership, if the E-ELT was built. D. Queloz remarked that the money was missing due to the variation in the exchange rate, to the pension fund and in general to external events not related to the ESO programme. The DIRECTOR GENERAL answered that because of these external events ESO had exceeded the predictions of the previous year and that ESO had defined a very clear line in order to be able to pay its part of the E-ELT.

L. Tacconi asked whether it would be possible to save some money for the upgrades by stretching the commissioning of next generation VLT instruments. A. Russell replied that the current programme had already been stretched and ESO examined the programme each single year.

J. Fynbo inquired whether the extended Phase B presented another extra cost. The DIRECTOR GENERAL confirmed that by saying that ESO was trying to absorb the extra cost while keeping the project moving also to reduce the cost. T. Herbst asked if the bulk was personnel cost. A. Russell answered that it was evenly split between personnel cost and contracting to explore cost saving parameter space. M. de Vos stated that it seemed as if delta Phase B was targeted at a cost reduction. He asked whether the expectation was to achieve a cost reduction from the optics. A. Russell replied that it was not that simple. The dome, optics and structure had approximately the same price and ESO needed to explore how to save money in each of those areas.

A. Marconi inquired whether it was more difficult to find money for the E-ELT from the Member States or from new members. The DIRECTOR GENERAL replied that both were difficult. Even so the Council delegates were excited about the project.

R. Ivison stressed that the fact that the E-ELT construction started before ALMA was completed scared people and wondered how much it affected the current financial problems. The DIRECTOR GENERAL replied that ESO was evolving towards an organization with several major projects and regarded the E-ELT as an extension of Paranal. There was no plan to move to anything else at that stage.

T. Herbst asked whether there was a possibility to protect against currency fluctuations. The DIRECTOR GENERAL responded that ESO had a simple way to estimate its income which took only inflation into account. The contribution of each Member State was based on its average income of the last 3 years. That method had served ESO for many years and the DIRECTOR GENERAL’s view was that it had many advantages. Eight member states were in the Euro zone and the other six had to deal with the exchange fluctuation. T. Herbst inquired what happened with the operations since they were in Chile and affected by the fluctuation of the Chilean peso. The DIRECTOR GENERAL replied that the Chilean costs were included in the formula used to estimate the contribution.

W. Benz closed the session.
20 OCTOBER 2010

6. Directorate for Science (cont.)
6e. Report on the OPC Working Group (B. Leibundgut)

W. Benz asked whether there was a relation between the top ranked proposals and the scientific impact of their publications. B. Leibundgut replied that there was a long chain between a proposal being accepted and a paper published.

A. Marconi inquired if the OPC panel members filled a form for their evaluations. B. Leibundgut explained that there was an online form that the reviewers filled in and that their evaluation was recorded into the proposal database. He also pointed out that each referee usually graded differently so that the grades had to be renormalized.

L. Tacconi asked whether it would be possible to pass the finished report to the ALMA Board to which B. Leibundgut agreed.

T. Herbst was not sure whether the results shown implied that the face-to-face meeting worked and suggested to check the number of citations to have a confirmation of that.

E. Sadler mentioned that in order to overcome the problem in the delay between proposal and papers being published a useful information could be the past productivity of the proposers. B. Leibundgut noted that it was certainly something one could consider.

6f. Spectroscopic Surveys (B. Leibundgut)

E. Sadler inquired how much time was available for the spectroscopic surveys. B. Leibundgut clarified that at that moment ESO did not commit to anything and that ESO had just set an upper limit of 300 nights. E. Sadler pointed out that it meant that the oversubscription was more than a factor of 10 at that moment. B. Leibundgut stated that the plan was not to have two surveys looking at the same area of the sky. There could also be surveys with La Silla telescopes.

J. Fynbo asked whether it was possible that none of the submitted proposals would be approved which B. Leibundgut confirmed.

W. Benz remarked that the STC did not have the intention to replace the OPC or PSP but they would like to discuss in detail the procedures applied for the selection of the spectroscopic surveys given the large number of nights involved. B. Leibundgut agreed to do this.

6g. Report on the VST workshop (J. Melnick)

G. Olofsson asked what the required seeing limit for the KIDS survey was. J. Melnick clarified that it requested seeing better than 1 arcsecond for the r band only.

W. Benz inquired whether the STC was expected to comment on the possibility to give 80% of the time to the surveys during the first two years of operations. J. Melnick replied that he expected the
STC to comment on that strategy in order to allow the VST to remain competitive. He stated that if the telescope was delayed by another year, it would become a very serious problem because two of the three surveys would have to be rethought and even cancelled. He also pointed out that ESO did not have a detailed plan for commissioning and that the PSP had recommended that plan to be prepared as soon as possible. D. Queloz had a few questions concerning the need of scheduling 80% of the VST time for surveys. He wondered if it meant that any open call would be delayed and if it was justified by the fact that the surveys captured the whole science possible with the VST. He asked whether ESO considered ranking the various surveys. Finally, he wondered if the surveys would really be at risk if the telescope was delayed. J. Melnick started replying to the last question. He outlined that the Dark Energy Survey (DES) would start in 2011 on the CTIO Blanco 4m telescope and that in the first year DES would observe the entire ATLAS. Thus, if the VST were to be delayed, the ATLAS survey would no longer be competitive. VIKING would also have problems since DES planned to use the VISTA Hemispheric Survey data as well. Thus, in case of delays, the PI of VIKING would state that they would have to seriously rethink their survey. With regard to the Galactic plane he mentioned that Skymapper, which was in the horizon, would be a problem. As to the survey ranking he clarified that the surveys were organized in such a way that they did not compete at the telescope and that there was no survey-space overlap. In addition, the PSP ranked the surveys above the GTO. He explained that the number of 80% was proposed as the PSP recommendations were to give as much time as possible to the surveys in the first two years and that it referred only to the areas of the sky covered by the public surveys. B. Leibundgut clarified that VISTA was fully dedicated to surveys for the first year and reminded everybody that the wide field imager remained at the 2.2m on La Silla. E. Sadler stated that the other surveys competing against the VST were going to start in the following year so that the situation was probably less critical.

J. Afonso had a major concern with regard to the management plan of the VST surveys. He pointed out that people usually moved from place to place and wondered whether the teams had the human resources to achieve the science. J. Melnick clarified that the various survey teams came to the meeting with several collaborators and that they were very enthusiastic so that it should not be a problem. Y. Mellier added that the management plans had been discussed in the meeting. All the PIs had asked to have a proper estimate of the overheads. They would have to wait until April 2011 for accurate information about overhead, and after that there would be a review of each single management plan.

8. Directorate of Programmes
8a. Directorate of Programmes Overview (A. Russell)
8b. Discussion of Directorate of Programmes Fact Sheets (STC-475B-DOP)

D. Queloz had a question with regard to the High Order Deformable Mirror (HODM). He wanted to know whether Finance Committee had to be asked for approval as the project was too expensive and wondered whether the compound had been selected. A. Russell replied that the existing mirrors could be used for testing but could not be delivered. ESO was preparing a call for tender and had agreed with the consortium on a cost share. However, it required approval by Finance Committee. M. Casali added that the last slide in the presentation clarified the situation and that the mirror could be used for the integration of the components but it was not suitable for science use in the instrument. They needed a better component.

L. Tacconi pointed out that the next VLT instruments were three very big instruments and that at that moment they were spaced by only six months. She wondered whether it meant that a commissioning in
six months was really feasible for Paranal. A. Russell outlined that the schedule was being reviewed constantly and that if the planning of two instruments clashed, ESO would have to do something about it.

R. Ivison was surprised by how dramatically KMOS was delayed. M. Casali explained that the delay was due to the fact that Durham had taken some time to perfect the diamond turned optics, and that the first spectrograph delivered from Oxford had not been properly aligned and had been out of specifications for flexure. He added that the spectrograph was still not properly aligned, with image quality toward the edges of the field unacceptable.

W. Benz asked where the next upgrade was expected and when. A. Russell clarified that, as discussed in the session of the previous day, at that moment nothing was planned. W. Benz wanted to know when the CRIRES upgrade was due. M. Casali explained that it was probably not an upgrade and that the money was in the budget. The true upgrade would involve the cross-dispersed mode and at that moment it was not approved.

T. Herbst had a question as to the Fact Sheets. He asked for a clarification regarding a contract with the University of Arizona Detector Labs for the curved of CCDs which offered cost savings in the area of the optics of seeing limited E-ELT instruments. M. Casali explained that matching seeing limited images to available pixel scales on an E-ELT was quite a problem. Curved focal planes would help. They had found a company interested in that and had started a small contract. T. Herbst asked if seeing limited meant GLAO, which M. Casali confirmed.

W. Benz asked for more details about the possibility to create a synergy with ESA for detector development. M. Casali stated that ESA was conducting a programme to develop large format infrared detector in Europe and if that happened, ESO would be happy to help with the testing or in other ways, but could not help with capital funding.

8c. Update on VIMOS upgrade (M. Casali)

T. Herbst inquired if the time used to estimate the efficiency was shutter time which M. Casali confirmed. Y. Mellier asked why the technical problems had not been detected earlier and wondered if it was a failure of the validation tool. A. Kaufer clarified that the problems had been identified in the quality control data but were not flagged to the user since priority was given to quick release of the data to the user. Y. Mellier fully agreed but stated that it should not happen, if VIMOS was used for wide field surveys and that it should be a concern for the LSP. B. Leibundgut outlined that these problems should be solved when the surveys would start.

W. Benz asked if the team was confident that the instrument would be working properly. M. Casali answered that the phase one improvements were evident. He explained that the phase two improvements should come the following year and that they should be in place before the start of the spectroscopic surveys. He also acknowledged that there might be something to do even after the surveys had started. W. Benz replied that, if the reliability were not there, the frustration would surely increase. A. Russell understood the pressure from the community but the quality of the instrument was paramount at that moment.
D. Queloz inquired at what stage the instrument would be considered good enough to start the surveys. M. Casali answered that phase 2 needed to be completed. At that point VIMOS would have a performance better than at that moment and at that stage it would be possible to discuss whether the surveys were feasible. J. Melnick reminded everybody that without Phase 3 the surveys could only be run in visitor mode.

T. Herbst pointed out that he had heard concerns about geometric inter-pixel cross-talk and asked whether any evidence of that had been detected. M. Casali replied that he did not know anything about that.

M. Romaniello commented on the quality control. He outlined that the preimaging set-up was done in order to bring the data to the user as fast as possible. As soon as the degradation was caught ESO reacted but by then the user had received the bad data. It was made clear to the users that since the data were made available very soon, not all the checks had been done. He also pointed out that it was not necessarily an issue for the wide field surveys.

8d. Wide-field spectrograph letters of interest (M. Casali)
8e. Discussion

D. Crampton was surprised that there were no letters of interest focused on high-resolution spectroscopy. M. Casali noted that some of them did have high-resolution options but he had not included that information in the presentation. D. Crampton explained that the reason for his question was his involvement in the WFMOS review for Subaru and that the science involving resolution greater than 20000 was considered the most exciting. M. Casali stated that he did not want to list all the possible options but mentioned that all the Galactic archeology projects included high-resolution mode.

D. Queloz asked why some instruments were for non-ESO telescopes. M. Casali replied that for some there were just historical reasons, the instruments were already in the drawing stage and the teams were looking for additional money. E. Sadler stressed that NG2DF had been proposed for the AAT in a competition a few years ago. She mentioned that in the end a spectrograph for Galactic archeology with high resolution had been selected. Y. Mellier inquired if it was feasible to accommodate two kinds of surveys. E. Sadler replied that in principle it could be done.

W. Benz noted that some of the letters of intent came from the same groups and wondered how realistic it was for these teams to exploit so many projects. M. Casali clarified that a detailed management plan would be requested with the proposals.

E. Sadler inquired whether asking for a 70 pages proposal in March was not too ambitious. M. Casali explained that it was the maximum and that it included general information pages (names, addresses, etc). For example, the science case alone had a maximum limit of 20 pages which was not so large.

T. Herbst wondered why NACO and multi-object spectroscopy (MOS) instruments were replaced in a different way and asked whether there was a plan to ask the community for ideas for NACO replacements. M. Casali explained that the situation was different: the MOS was at a proposal stage while the NACO replacement was at a conceptual design stage. ESO made the commitment that it would do a conceptual design for a NACO replacement. There could be synergy with other
instruments and ESO had the knowledge to do that. On the other hand, ESO did not have the expertise for MOS. He clarified that it did not automatically imply that ESO would build a NACO replacement.

D. Crampton had a question regarding MCAO capabilities since the presentation mentioned that other observatories had more ambitioned plans than a single conjugate adaptive optics system. M. Casali replied that all the possible MCAO options were explored and that it was considered asking external groups for some aspects of the MCAO. He admitted that up to that moment it was not clear what the real approach would be. D. Crampton was of the opinion that it would be good to have the bigger picture in April. M. Casali replied that at that moment it was quite difficult to put real time constraints.

T. Herbst noted that in the schedule shown in the presentation there was no place for a NACO replacement. M. Casali explained that the need for NACO to continue had been identified in a brainstorming with Paranal. There were various possibilities, e.g. substituting HAWK-I. The usage statistics were not spectacular and now that VISTA was operating there were fewer reasons to use HAWK-I.

R. Ivison asked how secure the schedule was. M. Casali replied that he had presented the worst-case scenario. R. Ivison wondered whether the comparison in terms of cost was fair since it was not clear which part of the costs needed to be taken care of by ESO. M. Casali clarified that the costs shown were the costs for construction and that the limit was 6 million € for ESO.

9. **E-ELT**

9a. **Report from the Programme Office (R. Gilmozzi)**

D. Crampton requested a clarification regarding the schedule since it was not clear whether it included the instrument and AO commissioning. R. Gilmozzi replied that these were part of the instrumentation plan.

9b. **E-ELT External Review (A. Russell)**

W. Benz congratulated the project team for passing the review so well.

J. Fynbo asked how phase B fit with the degree of readiness that the project experienced. A. Russell replied that at that moment Phase B exceeded the budget but in his view the need for exploring cost parameter space was necessary before committing a billion €. Everyone felt that a delta Phase B was necessary. He pointed out that the positive attitude of the Council members considering the economic climate was really amazing.

E. Sadler was impressed by the report and asked to which level the report was confidential. A. Russell replied that the executive summary was public while the detailed comments were for the private use only. It was hoped that the summary could be circulated more widely but ESO still needed to see the final report.
9c. **Report from the ESE Subpanel (T. Herbst)**

W. Benz felt that the talk had raised a few important points. He was not sure that the document reflected the way of reasoning of the STC and stated that he had been approached by people from the community. He mentioned the line stating that once EPICS/XAO and MOS capabilities were demonstrated feasible they should have a priority had disappeared. He added that the statements about METIS apparently did not entirely reflect the recommendation of the STC.

**9d. Discussion**

D. Queloz asked for clarification concerning mid-infrared instruments on the E-ELT and wondered about the possible impact of the high emissivity. T. Herbst clarified that the team had presented a believable report but the numbers were too high. There was a commitment to re-evaluate the situation. He added that the idea not to pursue complex solutions might be revisited at some point. J. Blommaert noted that the METIS instrument team had already studied that high emissivity and that the science requirements were at that moment still met. He was of the opinion that new ways of cleaning had to be investigated.

W. Benz clarified that the recommendation the STC had made in the past was based on the available data at that time. If facts changed, the recommendation could change, too. The idea was to choose the most useful instrument. He reminded everyone that the E-ELT documents were under a non-disclosure agreement. J. Spyromilio explained that emissivity requirements were defined for the telescope and that the project had decided not to evolve them while the phase A instrument design process was ongoing. However, he acknowledged that the top-level requirements for emissivity were not met. The situation now needed to be re-evaluated. W. Benz pointed out that all instrument studies needed additional work, not just METIS but also the first light instruments. He stated that it was an ongoing process to define the instruments and added that he was not particularly worried about the situation. The other reason why the STC pushed METIS was that there was the need for an instrument that did not rely on AO.

Y. Mellier had a question with regard to the M4 mirror. He wanted to know what the opinion of the review panel on the crucial role played by the M4 mirror on the E-ELT was. J. Spyromilio replied that the review board had recognized that the telescope would not operate without an adaptive mirror and recommended that risk mitigation activities be included in the construction phase. He pointed out that in principle the engineering had been done during phase B and that scale prototypes had been built and were tested. He mentioned that that issue had also been raised by the DIRECTOR GENERAL in his presentation. What the most appropriate mitigation strategy was, whether to procure additional units or high risk components depended on the final assessment of the risk. He stressed that there was agreement between the project and the panel that what was achieved during phase B was what was necessary for the design phase.

T. Herbst had a related question. He inquired about the budget documents in which it was stated that to mitigate the risk it would be looked for additional suppliers for petals. J. Spyromilio outlined that in the supply of deformable mirrors one of the challenges was the supply of the glass petals and that the strategy of the project was to seek suppliers also from outside the member states.
J. Blommaert asked if the team was worried about the coating since this was going to be a VISTA-like coating and inquired about the experience on how frequently to wash mirrors. J. Spyromilio clarified that the VISTA problem appeared to have been caused during the removal of the previous coating. He pointed out that Gemini had the same coating and seemed not to have these problems and therefore it was not a structural problem with silver coatings. As to the washing he explained that experience had been collected on La Silla and Paranal but not with silver coatings. This was something to be tested on Paranal.

W. Benz inquired whether there was a particular reason why the sentence about the priorities of EPICS-like and MOS instruments had been omitted in the instrumentation proposal. M. Casali replied that one could argue that the instrumentation plan should have included only the first-light instruments. The reason why METIS was included had to do with the argument that it was not too far away. They also felt that the statement made by the STC was pretty strong and therefore they considered it an important line to put in the report. W. Benz stressed that the problem was how the report was perceived from the outside.

T. Herbst asked for a clarification regarding the indication in the budget document where the project considered the possibility to get a smaller dome for the E-ELT. J. Spyromilio replied that they had been asked to look at ways to reduce costs and to understand the risks imposed by the design. He explained that it was necessary to take significant steps to reduce costs and risks. He clarified that it would be difficult to significantly reduce the costs by reducing the size of the dome but keeping the current size of the mirror.

D. Crampton inquired whether there were areas where significant changes might still happen. He was of the opinion that not all pre-focal station capabilities were necessary. J. Spyromilio replied that even if the pre-focal capabilities could be removed, the cost saving would not be of a magnitude that would significantly change the overall financial situation.

D. Crampton asked if there was a list of what exactly could be obtained for 1 billion €. J. Spyromilio responded that there was a list with detailed costs and all breakdowns.

M. de Vos asked whether it implied that the costs for second generation instruments were not the total costs for making the science capabilities available. M. Casali clarified that everything was covered and nothing was left out on purpose.

W. Benz thanked everyone at ESO and closed the session.