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For Information

REPORT FROM SCIENTIFIC TECHNICAL COMMITTEE
91st Meeting
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SCIENTIFIC TECHNICAL COMMITTEE
ESO, Garching, 24-25 April 2018

REPORT AND RECOMMENDATIONS FROM THE 91ST STC MEETING


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I Introduction
The STC wishes to thank all the ESO staff for providing the documentation for the STC meeting well in advance and for the clear and up-to-date presentations. The overall organisation of the presentations and discussions in subcommittees, a few days/weeks in advance (ESAC, ESC, LSP), and then in the STC meeting has now reached an efficient stage, permitting a clear focus of the STC activities. The reports from the subcommittees, with additional comments or recommendations, are presented in Appendixes. Conflicts of interest (Personal and Institutional) have been carefully recorded (table in appendix) and checked during the discussions.

The STC congratulates all the ESO staff for the great progresses reported by the Director General on the various Programmes of the Organisation. The STC noted the ongoing efforts at ESO to improve diversity and inclusiveness in the working environment. STC supports this and would like to hear an update on the process and its results in a future meeting.

We address a special thanks to Henri Boffin for his focused introduction on the ESO’s activities in the framework of the Gaia mission and for organising the retransmission of the ESA event on 25 April for the Gaia DR2 release.

Finally, the STC is very grateful to the Council President, Willy Benz, for the discussion in closed session.
II Documents for recommendation

STC-602rev: Status of risk mitigation study for HARMONI AO
The STC endorses the conclusion from the HARMONI LTAO Risk mitigation study (STC-602rev) to continue with H-LTAO as the baseline for the instrument.

The STC re-affirms that the H-LTAO is the top priority in the Phase 2 elements. STC urges ESO to consider every possible solution for securing the funding of this scientifically essential module to enable it to be available at first light.

STC-609: ALMA Development Vision and Projects
STC notes the broad scope and forward-looking strategy laid out in the document.

STC endorses the outlined path forward for implementing the "Band-2" (under ESO leadership), consisting of two EU development projects on the optimisation of "Band-2" critical components and on the "Band-2" vacuum lens.

STC also recommends support for the outlined EU contributions to the phase 1 upgrade project of the ALMA 12m correlator, although notes that the upgrade is currently only foreseen for the 12m array which will limit the opportunities for projects which require combinations of the 12m array, ACA and Total Power antenna to achieve their science goals.

Finally, STC recommends the broad goals of the "ALMA Development Vision Roadmap" which encompasses the most exciting potential mid-term developments needed to ensure that ALMA continues to be a cutting-edge facility for its partner communities.

STC-611: Guaranteed Time Observations for the SOXS consortium
The SOXS consortium is finalising an agreement with ESO which will see them awarded GTO time equal to 50% of the telescope time of the NTT over the first 5 years of operation. The STC believes that the non-GTO time available on this new instrument will represent a scientifically valuable capability for the ESO community. We recommend support to the instrument and GTO arrangements as presented.

STC-612: Science Evaluation of Hosted Telescope Proposals PLATOSpec
The STC concurs with the recommendations by the Hosted Telescopes panel to implement the PLATOSpec instrument on the ESO 1.5m telescope as described in STC-612, and agrees that this project from a scientific perspective follows the principles of STC-545. The STC notes that, as for any other hosted telescope, the implementation should incur no net cost to ESO. The STC requests that the team uses a proprietary period as short as scientific justifiable.

III ELT related affairs

Comments
The STC salutes the ELT team for the excellent progress of the project in the last period, on the programmatic side, the funding of all phase2 M1 items, the good progress on the construction work, and contract management including contract-risk analysis. The STC also congratulates the HARMONI team and ELT project for a successful PDR, on schedule.

The STC wishes to be presented with the AIV plan, Maintenance and Technical plan, and Science Operations plan. The STC would appreciate that these draft plans are presented at the October meeting.
The STC was informed of ongoing studies on mirror coating recipes to improve efficiency of the ELT in the blue, which STC felt was highly desirable for enhancing scientific capabilities for future instruments. The STC would like to be kept informed of progress on these studies.

The STC is concerned about the situation of the ELT instrumentation projects, with the delays of two instruments and the tendency for a general over-cost. We note that ESO is closely monitoring the risk (with respect to cost, schedule, and performance assessment) of individual instrument teams. We encourage ESO to develop a more global plan for approaching those risks, across all instruments, spelling out the decision tree and preferences of possible actions.

**Recommendations**
The STC strongly supports allowing both HIRES and MOS to proceed now, without delay, beyond Phase A. The STC feels that, from a scientific point of view, these instruments should go on the sky to allow the ESO community to benefit from their science on a competitive timescale.

The STC encourages ESO and Council to develop a framework that would allow the HIRES and MOS consortia to bring substantial amounts of additional resources into the projects to allow them to progress.

**IV ALMA and APEX related affairs**

**Comments**
STC congratulates ESO on the successful PDR on the Band 2+3 receiver cartridge as it is a significant step toward an implementation of Band 2 on ALMA in the near future.

STC was very happy to hear that the major overhaul of the APEX telescope has been going very well and science observations have restarted basically in time. STC congratulates the APEX team and all concerned for successfully achieving 2nd light after the significant work involved in the recent refurbishment and commissioning of the telescope.

STC was happy to learn that the data processing and delivery process has significantly improved once the new workflow developed for Cycle 5 could be fully adopted. STC shares ESAC’s concerns that the current measures taken might not be sufficient for a sustainable solution in the long-term future. It expects to receive an update on this matter via ESAC.

**Recommendations**
STC notes the clearly and repeatedly stated scientific concerns of both ESAC and ASAC regarding the possible implementation of a distributed peer review model as the mechanism for time allocation for ALMA. STC recommends that, if a test of the distributed peer review model is undertaken, it needs to have clear measures to judge its merits. STC also recommends that more than one test of the model is performed to ensure that the results are robust. In addition, it recommends that all other routes are considered to reduce the workload on the ARP members.

STC notes the need for replacement of the two EU ASAC+ESAC members who end their second term at the end of 2018. STC recommends that a timely search for replacements is undertaken to ensure that the new members can already participate in the face-to-face meetings early 2019. The selected candidates should ideally have a similar area of expertise (on technical and organizational aspects) than the replaced members in light of the planned activities of the ALMA2030 roadmap capabilities.
V La Silla Paranal related affairs

Comments
The STC congratulates the ESO teams of Garching and Paranal for a number of impressive achievements over the last 6 months, including:

- ESPRESSO appears to be meeting most of its (challenging) science requirements and is now available to the community.
- MATISSE appears, after the first phases of commissioning, to have greatly exceeded many of its specifications, including the critical sensitivity level.
- GRAAL/HAWK-I science verification has gone smoothly, with clear and sometimes very impressive improvements in image quality.
- The narrow-field mode of MUSE, which includes the very challenging LTAO mode of the AOF, is close to being fully commissioned.

The STC was pleased to see the Data Flow System review so soon after the recommendation from the STC-90.

The pre-phase A study for a Visible multi-conjugate AO Instrument has been completed, yielding elaborated TLRs and timeline presented to the STC. These documents are the basis for a competitive Phase A call to be issued in the near future. STC supports the process and looks forward to the results of the call and the Phase A studies.

Recommendations
The STC notes that there have been both great successes and difficulties with recent public surveys. Given that there will be a continued scientific need for public surveys, we recommend that ESO reports on a lessons learned process from previous VLT, VISTA and VST public surveys in one of the coming STC meetings. We also request that the survey working group reports to the STC on, for example, potential models to incentivise survey teams to deliver effective data products to the community, or methods to maximise scientific impact of previous surveys.

The Paranal Instrumentation Plan remains consistent with planning seen at previous meetings, and the STC was pleased that the new instruments (named “New V” and “New VI”) have not been delayed. STC notes that there are already some ideas for these two new instruments, including a UVES upgrade. We recommend that the “VLT in the ELT era” workshop planned next year explicitly includes new instrument concepts in its mandate, and that the STC is not asked to recommend specific instruments or upgrades until after this workshop.

Given the decommissioning of AMBER, a visitor focus becomes available in the VLTI Lab. STC recommends to advertise the availability of a VLTI visitor instrument focus in the next CfP.

VI Science Prioritisation exercise
STC is pleased that ESO is willing to consider an ongoing scientific prioritization process that tensions projects against each other. Moreover, STC appreciates being consulted on the design of this process and would like to play a major role in its implementation.

However, STC had serious concerns regarding the conceptual design of the process as presented at the meeting. STC is unclear regarding the Terms of Reference of this process and how the prioritisation would be used in practice. It is understood that it will somehow aid ESO in its decision-making processes for the allocation of resources, but the details of this remain unclear. Given the information presented, STC was unable to reach a consensus on this matter. To progress on the Terms of Reference, STC encourages ESO to set up a working group, including some members of the STC.
Appendix-1: ESC Report

Report from the ESC Meeting, ESO Garching, 11 April 2018

Attendance:
ESC: A. Alonso-Herrero (STC); B. Carry; S. Esposito; A. Fontana; U. Heiter (remote); V. Hill (Chair, STC); J. Liske (STC); S. Longmore (remote); J. Miguel Rodriguez Espinosa; S. Sousa (STC).

Conflicts of interest: A. Alonso-Herrero: HARMONI (inst); B. Carry: HIRES (inst), MICADO (pers); S. Esposito: MAORY (inst & pers, Col MAORY); A. Fontana: MAORY (inst., through INAF supervision); U. Heiter: HIRES (pers+inst); V. Hill: HIRES (inst), MOS (pers: formally science team); J. Liske: HIRES (phase A study, WG leader); S. Longmore: (UK E-ELT oversight committee, close interaction with HARMONI); J.M. Rodriguez Espinoza: HARMONI (inst); S. Sousa: HIRES (inst + pers)

The ESC took place on 11 April at ESO. Fact sheets about the telescope, and the four instruments and AO modules, were provided by ESO beforehand. ESO staff presented telescope and instrument progress. Discussion took place with the ESO staff in open sessions and within the ESC in closed sessions. A conclusion of the “Risk mitigation study for Harmoni AO” was submitted to the ESC and a recommendation was requested.

The ESC thanks ESO for very instructive presentations and open discussions. The ESC would like to suggest that presentations are also released to the committee at least 3 working days in advance. This will greatly help the meeting preparation on the ESC side, in particular on topics where no fact-sheets are available, and to alleviate the lack of the “ELT Project 6 Month Update” report availability. This could be coupled with shifting the ESC meeting by one week (1 week ahead of STC instead of 2 weeks).

4. Item for recommendation: [This recommendation was drafted by the non-conflicted members of the ESC]

The ESC agrees with the conclusions of the HARMONI AO risk mitigation study (STC-602 rev) whereby ESO recommended that the H-LTAO remains the baseline for HARMONI. The ESC re-affirm that the H-LTAO should be the first priority for Phase 2 items. We further urge ESO to make every possible effort for securing the funding of H-LTAO.

The ESC notes that the HARMONI PDR did not seem to reveal any major showstopper or action item that would prevent the recommendation to retain H-LTAO as the baseline for HARMONI.

ELT programme status:
The ESC salutes the ELT team for the excellent progress of the project in the last period: on the programmatic side the funding of all phase2 M1 items (M1 inner rings, 7th sector and second M1 coating unit); on the project side it congratulates the team for contract and cross-contract risk management, and the good progress on the construction work. The ESC is very impressed with the very large amount of work involved in successfully following all on-going and new contracts, and recommends that sufficient FTEs are allocated to these activities.
The ESC reiterates its wish to be presented with a Science and Technical Operation plan. The ESC was told that this is divided into three documents describing the AIV plan (in a near completion phase), a Maintenance and Technical plan, and a Science Operations plan, in a less advanced stages. The ESC would appreciate that all these three plans are presented at the October meeting, even if not in their final stages.

The ESC was informed of on-going investigations to improve the blue response of mirror coating, and acknowledges that a change of recipe is deemed possible at later times with the current M1 coating unit. The ESC would like to be informed on regular basis of ongoing investigations for coating recipes allowing for better performances in the blue, as this could enhance science cases for future ELT instruments.

ELT Instruments:
The ESC observes that there seems to be a global trend towards instruments over-costs, and notes the lack of a global cross-instrument strategy for the actions to be taken when an instrument PDR concludes that the TLRs cannot be met within the resources allocated to the instrument. The ESC would like to see a global view on the decision tree for dealing with these over-costs. These guidelines might, e.g., spell out the relative preference of possible actions, such as allowing the consortium to bring more money, de-scoping the instrument or drawing on ELT project contingency funds. The plan might also spell out the implementation processes of these options, such as e.g. the process by which instrument capabilities are prioritised in a possible de-scope exercise.

The ESC notes with concern that there are significant delays in several of the instruments.

The ESC was pleased to see the results of CAD models of ELT instruments, combined on Nasmyth. This should help in resolving the long-standing issues with masses and operations, on all instruments.

MAORY: [This recommendation was drafted by the non-conflicted members of the ESC]
The ESC salutes the INAF MAORY review that confirmed that there are no show-stoppers in the instrument design but identified areas which require investigations and R&D, and triggered a reorganisation and strengthening of the consortium. The ESC is concerned with the phase A delay encountered by MAORY that, if not absorbed in subsequent phases, would result in MAORY and MICADO being significantly out of sync at the telescope. Although MICADO-SCAO was precisely developed to mitigate this risk, a long delay between MICADO and MAORY first lights would hamper the overall MICADO science. The ESC recommends that ESO closely follows up the MAORY work with the new organisation, to mitigate this risk.

Based on the promising improvements also for MICADO performances, the ESC recommends that the study to cool MAORY for better performance in the K band and overall stability of system be performed. The ESC would like to be kept informed of the outcome of this study.

MICADO: [This recommendation was drafted by the non-conflicted members of the ESC]
The ESC was informed of a proposal from the MICADO-internal activity originating from the MICADO PI institute for “simplifications” of the instrument, that could involve cooling MICADO to warmer temperatures (80K instead of 40K), and a reduction size of the field of view. The impact of these changes on the science cases would have to be evaluated, but in both case are likely to be large. The ESC is of the opinion that any change significantly affecting the science requires STC approval.

The ESC is pleased to see that actions are taken to assess the astrometric performances of the instruments, and reiterates its recommendation that a global analysis, including MAORY be made to estimate the final astrometric precision reachable.
The mass issue with MICADO is on the way to be resolved (not a show-stopper anymore, mass reduced on consortium side, and ESO approved a higher mass).

**HARMONI:** [This recommendation was drafted by the non-conflicted members of the ESC]

The STC also congratulates the HARMONI team for all the hard work for a successful PDR, on schedule.

HARMONI PDR has identified three critical items to be addressed before PDR closure, concerning the over-cost of the project, the mass of the instrument, and its accessibility/maintainability. The ESC looks forward to the resolution of these items in the coming weeks/month to allow a PDR closure and no delays in the start of the construction phase.

As noted in the recommendation for HARMONI AO: *ESC strongly encourages ESO to make every effort for securing the funding of H-LTAO.*

**HIRES/MOS:**

*The ESC supports strongly allowing the HIRES/MOS instruments studies beyond phase A to proceed, without waiting for all ELT construction phase 2 items to be funded.* It is felt that, from a scientific point of view, these instrument should go on the sky to allow the ESO community to benefit from the science in a timely schedule with respect to competition (GMT/TMT).

The ESC encourages ESO to continue discussions with the Council to create a framework that would allow the HIRES and MOS consortia to bring substantial money to the projects, including from outside of ESO member-states.
Appendix-2: ESAC Report

Report of the February 2018 ESAC F2F Meeting

ESO Garching, 19 February 2018

(including follow-up Telecons on 23 March 2018 and 20 April 2018)

ESAC members: Jes Jørgensen, Franz Kerschbaum, Kirsten Kraiberg Knudsen (via videocon), Huib van Langevelde, Roberto Neri, Isabella Prandoni, Eva Schinnerer (chair), Ian Smail (via videocon), Sven Wedemeyer (excused).

ESO participants: Xavier Barcons, Carlos de Breuck, Maria Diaz Trigo, Evanthia Hatziminaoglou, Erich Schmid, Felix Stoehr, Leonardo Testi, Pavel Yagoubov, Martin Zwaan.

1) Summary

There has been no change in ESAC and ASAC membership since the last meeting. Kirsten Kraiberg Knudsen has started her first term as STC member in January 2018 while Jes Jørgensen, Franz Kerschbaum, and Eva Schinnerer have started their second STC term. Jes Jørgensen’s second ESAC term ended at the end of 2017 and he has since served as an observer from the STC.

ESAC was pleased to hear during the meeting about several positive developments from ALMA and APEX. In particular, we note the following:

- First delivery of Band 5 data to a PI.
- Successful PDR of the Band 2+3 receiver cartridge.
- Successful “second light” for APEX as the telescope has been recommissioned after the refurbishment and upgrades, with science observations started in mid-April.
- The strong community interest and participation at the ESO workshop on the AtLAST large submm dish concept in January 2018.

ESAC would like to bring the following issues relating to ALMA to STC’s attention:

- There is a continuing delay in offering an efficient spectral scan mode to the community.
- A path forward for fast implementation of Band 2 has been defined and ESO is preparing to lead this as an EU development project in the near future.
- Several contributions from ESO/EU for the approved phase 1 upgrade of the ALMA correlator are expected (including the potential involvement of member state institutions).
- The two ESAC+ASAC members R. Neri & H.J. van der Langevelde will end their second ESAC+ASAC term in December 2018 and will need replacement.
- ESAC (and ASAC) both strongly favour a 2yr configuration schedule for ALMA in the near future.

The following item is recommended by ESAC to the STC:

1) ESAC recommends the outlined path forward for implementation of Band 2, consisting of two EU development projects on the optimization of Band 2 critical components and on the Band 2 vacuum lens. It also recommends the outlined EU contribution to the foreseen ALMA correlator upgrade as described in ESO/STC-609.

2) ESAC meeting process

ESAC met at ESO Headquarters in Garching on 19 February 2018, one week before the ASAC face-to-face meeting at JAO in Santiago, Chile, on 26-28 February 2018. This meeting was followed up
by two ESAC telecons (prior to STC) on 23 March 2018 to discuss the recommendations from the ASAC face-to-face meeting and on 20 April 2018 to discuss ESO/STC-605 as well as the latest updates from ALMA and APEX. The European ASAC members are Kirsten Kraiberg Knudsen, Huib van Langevelde, Roberto Neri and Eva Schinnerer. Jes Jørgensen, Franz Kerschbaum, Kirsten Kraiberg Knudsen, Eva Schinnerer and Ian Smail are also STC members.

The ESAC meeting has been decoupled from the STC schedule to ensure informed and timely input to the ASAC face-to-face meeting.

ESAC was provided with sufficient information by ESO (including documents prepared by JAO, the NA and EA ARC) to discuss all ASAC charges and ESO specific items. The documentation was comprehensive and generally informative. ESAC would like to thank Martin Zwaan for organizing the ESAC meeting and acting as the interim contact for ESAC/STC, Leonardo Testi for providing a response to points raised in the last ESAC report, and all of the ESO ALMA staff for a very productive meeting.

However, the committee also feel they must note to ESO that the full documentation was only made available to the committee two working days before the meeting. The committee believe that to allow them to properly prepare for the meeting all the documents and presentations must be made available a minimum of two weeks in advance of the date of the meeting. In future, if documents or presentations arrive substantially after this deadline, the committee will reserve the right to direct its complaints to the Director of Science.

A brief summary of the telecons is attached to the end of this report as Appendix 1. The agenda for the 19 February 2018 meeting is also attached as Appendix 2. In addition, the ASAC charges for the 26-27 February 2018 meeting are attached as Appendix 3.

3) ESAC assessments and concerns for STC regarding ALMA

Regarding the current ALMA operations and the ALMA development programme, ESAC notes the following issues that will impact ALMA’s efficiency and productivity in the near to mid-term future:

i) ESAC was happy to learn that the data processing and delivery process has been significantly improved once the new workflow introduced at the beginning of Cycle 5 could be fully adopted. ESAC remains concerned that the current measures taken are not sufficient for a sustainable solution in the long-term future. It looks forward to hear an update at its next face-to-face meeting.

ii) ESAC was happy to learn that there is now a path forward for the implementation of Band 2 at ALMA. ESAC agrees with the next steps forward as outlined in ESO/STC-609 (for more detailed comments see ASAC Permanent Charge #6). It notes that having the downselecting on the final receiver bandwidth only at the gate review carries some risk. ESAC is expecting to receive an up-date at its next face-to-face meeting.

iii) ESAC supports ESO’s plan to contribute to the approved phase 1 of the upgrade of ALMA’s correlator as outlined in ESO/STC-609 and expects to hear a more detailed plan about the anticipated work at its next meeting(s).

iv) ESAC is very concerned about a possible implementation of the peer distributed model as the primary model for time allocation for ALMA. While it views the idea of testing it on the smaller number of ACA standalone proposals a proper step before making a major change, it is worried that no alternative options remain, should this turn out to be not a workable solution. ESAC agrees that the current total number of submitted ALMA proposals is a challenge putting a significant stress on the current model. ESAC feels that the further 10% increase seen at the Cycle 6 deadline is real and might be partly driven by resubmissions (of either rejected/rank C projects or higher rank B projects that will not
be carried-over). Further there might be an attitude in the community where several smaller proposals are preferred over larger proposals, i.e. using a shotgun approach. Again leading to an increase.

v) ESAC would like to note that both Huib van Langevelde and Roberto Neri will end their second terms on ESAC and ASAC by the end of 2018. Replacement of new members with similar expertise (esp. on the technical and organizational side) on both committees is highly desirable in ESAC’s view to ensure that the committees have sufficient expertise to cover all aspects, in particular those related to the upcoming implementation of capabilities described in the ALMA 2030 roadmap.

vi) ESAC would like to point out that it fully agrees with ASAC’s strong preference to keep a 2yr schedule for configurations in the near future that offers a wider range of science capabilities every year.

vii) ESAC followed up on the issues raised by the EU solar community and decided to revisit this issue at its next face-to-face meeting when more experience with Cycle 4 data, the outcome of the Cycle 5 observations and the Cycle 6 proposal statistics are available.

ESAC was impressed to learn that the first set of Band 5 data was delivered to the PI early 2018. The significant increase of about 10% in the proposal submissions demonstrates the community’s continue strong interest in exploiting ALMA for their science.

4) ESAC assessments and concerns for STC on other items

AtLAST (Atacama Large Aperture Submillimeter/millimeter Telescope) Workshop

ESAC was reported about the AtLAST workshop held at ESO on 17-19 January 2018. With more than hundred participants, this workshop showed that there is a significant interest in the community for a large aperture (sub-)mm telescope. ESAC was informed that four working groups have been established at the workshop, to address scientific or technical aspects of relevance for such a telescope and for its location near ALMA. ESAC looks forward to see the outcomes of these working groups. While ESAC understands that ESO has no possibility to support such an endeavour at this point in time, ESAC nonetheless encourages ESO to pay attention to these developments.

ARO Public Surveys - Call 2015-2018 and future Call for Proposal:

ESAC was reported on the outcome of the second ARO call, and agrees with the proposed way forward for the last call. In addition to the usual channels, ESAC suggests to distribute the call for proposals to the AtLAST workshop participant list. This will increase visibility towards an ad-hoc targeted audience and potential users who would bring their own instrument.

APEX Status:

ESAC received a report on the ongoing activities on APEX refurbishment. ESAC congratulates the APEX team and all concerned for successfully achieving 2nd light after the significant work involved in the recent refurbishment and commissioning of the telescope. They note that good weather conditions are required to fully assess the performance of the new dish surface, but it appears that this has been a highly successful project.
5) ESAC recommendations and concerns on ALMA (response to ASAC charges for ASAC February 2018 meeting)

In the following ESAC’s response and concerns regarding the ASAC charges (see Appendix 3) are summarized and its recommendations to the ALMA Observatory (through the European ASAC members) and/or ESO are provided. ESAC discussed the recommendations by ASAC at its 23 March 2018 telecon and agrees with the points raised. Note that the charges consist of six standing charges (from the ALMA board) and two ad-hoc charges (from JAO/ALMA board).

**Permanent Charge #1 – Performance of ALMA Scientific Capabilities**

ESAC notes that there seems to be good progress on the QA2 process, although a backlog is building up. The backlog has likely been caused by the introduction of new tools in the processing; the backlog is expected to be significantly reduced during February 2018 when no data are taken. In the descriptions, the backlog is now clearer described in the combination of ‘overdue’ and ‘workload’. Furthermore, a new workflow analysis has given clarity on the processes and single-point failures. A new Data Management Group (DMG) lead is now in place and this seems to have had a potential positive impact. ESAC is happy to see that long-term goals have been agreed upon (more details below under ‘Charge 2’). However, there is no clear end date for the optimization process, and ESAC notes that ESO should be prepared to invest longer to make sure the process is seen through. ESAC would like to receive an update at its next face-to-face meeting.

The ACA appears to be under-utilised and is likely to run short of projects around April. Options for improving the situation have been discussed. Different possible solutions were presented, among a suggestion for a delta-call. While this solution has been used once before in Cycle 4, this is not considered a viable solution, partly because of the extra workload and partly because of the timing (in spring it will conflict with the ordinary ALMA deadline, in the fall potential gaps in the schedule might not yet be known). ESAC considers it more important that relevant information is presented prominently in the CfP (e.g. ACA standalone, typical weather and typical undersubscribed LST ranges), and also the possibility that ACA proposals are not triaged during the proposal reviews. For Cycle 5 some ACA+12m project might potentially only get ACA data, and this is a way to still utilise the ACA time; potentially contact the PIs to ask if they think the observations using ACA alone has scientific value (for example, in some cases ACA alone will still yield interesting results even if not reaching the original science goals, and could potentially help for further proposal writing).

ESAC acknowledges the update on the raw data release. The opinions previously expressed by ESAC remain. A pilot programme has been developed with the aim of assessing the potential impact of a ‘raw data release’. In the pilot programme, a random list of PIs will be selected and given the option to retrieve their data before QA2. Feedback from PIs will be collected and used to measure the scientific impact together with measures on the operational load. ESAC is concerned that there is no clarity on how the scientific impact will be measured from the pilot study.

ESAC has some concerns about the low observing efficiency in the fall during the extended configurations (in particular in the period Oct-Nov). ESAC understood that some hour angles had little proposal pressure in these configurations and would like to consider measures to avoid this in the future. At the same time, it understands long baselines to be an important aspect of ALMA’s unique capabilities and wants to encouraged its use. The observatory should ensure that sufficient information is available in the CfP to encourage more proposals for the capability.

**Permanent Charge #2 – Technical Aspects of ALMA performance**

ESAC welcomes JAO’s re-affirmation of its commitment to executing on the long term 90% of the data processing through the pipeline (currently at the 39% level). In a related move, the committee
is also pleased to learn that JAO’s Data Management Group is in the process of intensifying efforts to improve the data processing workflow. Yet, recognizing that the processing backlog has already been largely mitigated with the provision of additional resources (aided by poor observing conditions), the committee remains concerned about the pace of progress towards a sustainable data processing model. The committee is also of the opinion that the problem is all the more important that the number of overdue MOUSs is increasing since the beginning of Cycle 5 and that there is no contingency plan to respond to potential events such as a network failure.

The committee is concerned about the large amounts of time the 12-meter array has been idling in Cycle 5 (16%) but takes note of, and encourages, efforts being made by JAO to drive idle time to zero. These efforts are deemed critical to improve the productivity of the Observatory, in particular at the highest observing frequencies and on the most extended baselines for which observing time is more limited and potentially less efficiently allocated. The committee was also informed that upcoming JAO activities, such as the ten-year overhaul programme and upcoming preventive system maintenance activities, are likely to negatively influence the observing efficiency of the Observatory.

ESAC received a lessons-learned report on the Solar observing campaign in Cycle 4. As a consequence of an incorrect use of the Observing Tool, most of the Solar projects were observed with the wrong coordinates. The committee takes note that not all the projects could be re-observed, in particular a number of Band 6 projects, but is relieved to hear that corrective actions have already been implemented and that the Solar observing mode has now formally been validated. The committee recommends that procedures and data processing scripts for a timely reduction of Solar observations are made available to the community.

ESAC is pleased to hear that progress is being made in the integration of the Band 5 cartridges. The committee applauds JAO for performing the first Band 5 observations with ACA, for the seamless processing of the Band 5 data through the pipeline and for their full delivery to the users. The committee also notes that the implementation of the integrated alarm system is progressing well and without delays.

As a final, but significant point, ESAC is extremely concerned that the improved spectral scan mode has not been offered in Cycle 6 and has not been included in the plan presented to the panel (although the committee notes that the objectives in the array capabilities plan for Cycles 7 and 8 are consistent with ALMA’s long-term requirements). Given the high user demand for this important observational mode and the priority given to it by ESAC and ASAC, the committee seeks to understand the reasons for deferring this capability.

**Permanent Charge #3 – Assessment of Science Outcome**

ESAC received a summary of the ALMA publication statistics, up to the end of 2017. ESAC is pleased to see the continued good development of publications, over a wide variety of science topics. It is noteworthy that the increase in publications per year is still super-linear suggesting that ALMA produces exciting results. Two-thirds of the publications fall in roughly equal proportion to the categories: ‘Disks and Planets’, ‘ISM and Star Formation’, and ‘Active Galaxies’. The categories immediately following are: ‘Galaxy Evolution’ and ‘Stars and Stellar evolution’.

About three-quarters of all publications use data from ALMA Band 6 or 7 (with roughly equal share between the two bands). Publications utilizing Band 3 data contribute about 1/6th, while Band 9 are used in 1/12th of all publications to date. The recommended upgrade of receivers as part of the ALMA2030 roadmap is in line with this distribution. Most (~90%) results are published in three major journals, namely ApJ (~50%), A&A (~25%) and MNRAS (~12%).

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The median time between data delivery and first publication has slightly increased to about 16 months. This is not unexpected as the average observing time per project as well as ALMA's capabilities have increased over the cycles leading to more rich datasets. It is worth to point out that three years after data delivery more than 80% of all projects have at least one publication.

ESAC is also pleased to see the continued interest of the community into archival data. In 2017 the volume of downloaded public data has doubled compared to the previous years. The number of files downloaded are roughly constant back to Cycle 2 data, and science products (delivered since Cycle 1) are more than twice as popular than raw data. Up to now about one quarter of publications uses archival data with most of these publications relying on archival data alone. Similarly two-thirds of all projects result in two or more publications. The ALMA archive has the potential to become a significant resource for science, and an important channel for amplifying ALMA's scientific output.

In addition to band-split publications, it would be useful to have graphs illustrating the statistics of publications for different array configurations. This information would allow ESAC to understand which bands and configurations are most successful in leading to publications and which bands and configurations should be reviewed. Finally, it would be helpful to receive the statistics not only as graphics but also the numbers in tabular form.

**Permanent Charge #4 Maximizing Science Impact**

ESAC discussed new models for the review of ALMA proposals, possibly introduced in future cycles. The panel recognises the challenges with the current model, including the costs with organising the face-2-face panel meetings and the general workload on the individual panel members. Still, ESAC stresses that any changes to the system have to be made with the aim of optimizing the scientific outcome and quality of the review process, while ensuring that the community is fully behind the new model and that it is well-tested. Also, ESAC feels that the current number of proposals and oversubscription of ALMA demonstrates a healthy interest in the facility by the community and any changes should not be done with the aim of lowering the number of proposals.

ESAC was presented with a number of different models: these included a summary of possible “less drastic” changes such as decentralising the face-to-face panel review meetings or skipping them altogether – but focused on the more radical change in the proposed distributed peer-review model. Within the committee there were some differences in opinion about this model and a number of severe concerns were raised. The panel felt that it would have been good if the document would have included a more extensive discussion of some of the other options as well, including their merits and issues. Before proceeding to decisions, ESAC encourages that other alternatives are investigated and presented in better detail.

In the following concerns and comments that arose during ESAC’s discussion of the distributed peer-review model are presented. It was unclear to the committee how the distributed peer-review model would affect the number of submitted proposals: an argument could be made that requesting proposers to review a number of proposals scaled by the number they submit may work to limit the number of proposals by any given PI. However, the fraction of PIs submitting more than two proposals is already low.

ESAC was concerned whether the number of people involved in the distributed peer-review model would still allow ALMA to maintain the confidentiality of the proposal process and whether the work done by individual reviewers would be sufficiently thorough and honest. While arguments can be made that these issues also apply in the current panel-based models, a number of these problems are mitigated since the individual reviewers are directly accountable to a group of their peers participating in the panels’ face-to-face meetings and by publishing their names after the review
process. Also the number of reviewers involved would increase by a factor of 10 compared to the current model.

The committee was further concerned about how the scientific breadth of the reviews in the distributed models would be addressed. With fewer proposals per reviewer it would be necessary to match the expertise of the reviewers more closely to the scientific topic of the time application. However, this would make it more difficult to cross-compare proposals with focus on different issues within the same overall scientific category. In the current model, the range of expertise within any panel ensures such a discussion and makes it possible to tension proposals against each other – including those from smaller communities.

Using only ALMA PIs as reviewers would exclude a pool of potential reviewers who work with similar scientific problems either at other wavelengths or theoretically. It was the opinion of the committee that such reviewers often provide important input for the evaluation of proposals. Also, although it might be more easy to get younger researchers involved in the process in the distributed model, this model lacks the “training” element where the individual reviewer gets feedback on her/his evaluation of a given proposal through the discussions in the scientific panels.

Finally, the committee notes that the current model appears to remove some of the biases in the proposal review process – e.g., with respect to region and gender. It is not clear how the distributed peer-review model would work in this respect.

**Permanent Charge #5 – Operational or Scientific Issues Raised by (Regional) Communities**

ESAC was informed about about the findings of the EU development study on ALMA Re-Imaging of Cycle 0 to 4 data and is overall excited about the potential of such an undertaking. The study outlines a possible EU ALMA development project of three year length that would provide homogenous imaging products for about 70% of all Cycle 0 to 4 projects in the ALMA archive. A now envisaged proposal for such a development project should include a clear and transparent strategy on priorities for the processing strategy and the types of data products that will delivered. The success of the project critically relies on quality assessment and a proper treatment of calibration issues that are likely to arise. ESAC stresses that it has to be guaranteed that the project does not impact regular QA2 efforts.

The foreseen ARC node network review is seen as a very important way to assess the 2020+ perspectives for the network and its relation to the user communities. The extension of PACE is seen as very positive in this context and ESAC looks forward to following the continued development of PACE and the network as a whole.

**Permanent Charge #6 – ALMA Development**

ESAC was presented with the progress on the Band 2(+3) receiver and welcomes the statement that the observatory is moving towards a single project to cover Band 2. It was informed about two smaller EU ALMA development projects that are defined to test critical components and optimal material for the warm lenses. Although some of the technical details are beyond the expertise of the committee, ESAC recommends that these projects (Band 2 vacuum lens, Band 2 component optimization) progress.

ESAC notes that the discussion on the various band 2 implementation options has reached a point where apparently the observatory is heading for a band 2 plus 3 solution. ESAC is happy with the outcome, but notes it would have been preferred if this decision was reached before or at PDR. The
proposed scheme in which some technical decision are to be taken at a Gate review as part of the production process carries in principle some formal extra risks.

Additionally, it should be noted that ESAC expects to provide input on the scientific evaluation of the up-coming band 2 (+3) decision.

ESAC was presented with an analysis on the impact of a correlator upgrade on the areas that are maintained from Europe. It was noted that there is extra support needed from ESO for the correlator upgrade. Still, an analysis of the system wide implication of a correlator upgrade is needed.

The Hardware-in-Loop project will deliver very desirable functionality that can positively impact the science time of the array, notably also in preparation of the correlator upgrade. The plan is attractive, however ESAC has some concerns with respect to the manpower required to sustain the project.

**Ad-hoc Charge #1 – High level science goals for ALMA (current and new)**

From the material presented to the committee it was not possible to make a quantitative statement about whether the “current” high level science goals had been achieved (tracing the gas dynamics of star forming regions and protoplanetary disks for instance remains problematic). The committee was presented with the new high level science goals as part of the ALMA2030 roadmap. These goals were also not more extensively discussed in the presented material.

**Ad-hoc Charge #2 – Configuration schedule: 2yr vs. 3yr cycle**

ESAC carefully reviewed the provided documents on a 2yr vs. 3yr configuration schedule. After its discussion ESAC uniformly concluded that a 2yr configuration schedule is the scientifically preferred option. In the committee’s view JAO have not provided any compelling evidence to support the scientific advantage of a three-year cycle, which would outweigh the repeatedly stated disadvantages, compared to a two-year cycle. As such ESAC retains their very strong preference for a two-year configuration cycle.

The downsides of a three-year model include concerns on the scientific competitiveness of carried-over A-ranked projects (as well as the mismatch of the cycle with PhD durations of typically 3yrs), the potential additional delays to the completion of Large Programmes and most critically the fact that for one year in three the Observatory will be dedicated to a very narrow range of baseline configurations, with a corresponding loss of access to a significant fraction of the user community (e.g. Cosmology, VLBI, Solar and monitoring programmes).

In contrast for the two-year model, the weaknesses include the relatively small amount of time spent in 1–5 km baseline configurations, especially during the March–August time window of interest to Galactic science, including studies of star formation and protoplanetary disks. It was not clear to ESAC to which degree the array could be usable in the May “Major relocation” window in the two-year model if certain constraints (e.g. number of available antennas, inclusion of TP antennas) were to be relaxed or if other tweaks to the schedule, such as a move outwards after the maintenance window (where the array has to be in a compact configuration) rather than inwards as is foreseen in the current schedule, could alleviate this shortcoming of the two-year model. It was noted that the time available for science operations (in the same fixed calendar period) appeared to be higher for the two-year model, compared to a three-year model.
Appendix 1: Summary of the ESAC telecon on 23 March 2018 and 20 April 2018 (TBD)

ESAC held two telecons on 23 March 2018 and 20 April 2018 after the ASAC face-to-face meeting and prior to the STC meeting.

At the first telecon the European ASAC members informed ESAC of the discussions and recommendations at the ASAC face-to-face meeting. ESAC was particularly interested to hear about the progress regarding the possible implementation of a Band 2 receiver and to learn about the ASAC discussion regarding the distributed peer review model as an option for the ALMA proposal review.

Further ESAC discussed the status on solar observing. It appears that several measures have been taken that ensure a better communication with this community and that the international development team is now functioning well. Implementation of new capabilities is slow as, e.g., more work on software for a proper analysis of the data is required and progress relies on best effort from a small group of people. Overall ESAC has the impression that the issues raised in its last report have been resolved.

ESO updated ESAC on various items regarding ALMA (open positions, planned changes in ALMA software development, defining of European priorities for phase 2 of the ALMA correlator upgrade).

Lastly, ESAC was informed by ESO on the basically on-time progress of the APEX upgrade and learned about the unfortunate accident involving the SEPIA instrument.

At its second telecon, ESAC was informed about discussions and decisions at the last ALMA Board meeting (that took place 2018 April 11-13 at JAO, Santiago/Chile) pertaining the scientific aspects of ALMA operations and development (approved correlator up-grade phase 1, approved small ESO Band 2 projects, decision on 2 vs. 3yr configuration schedule will be taken by JAO, proposal review model modifications, pilot project for raw data release).

Further ESAC learned that the data delivery is currently working well with most data being delivered within the goal of 30 days. ESAC was informed about further improvement steps and tests underway towards a sustainable solution for the data quality assurance and delivery. ESAC was happy to learn about these promising developments and would like to receive an update and assessment of the QA2 process at its next face-to-face meeting in order to understand if indeed a sustainable solution has been found. This is also in light of the additional temporary resources that ESO has allocated.

ESAC discussed the STC-609 document summarizing the planned ALMA development (ALMA Development Roadmap), the envisioned way forward towards a fast implementation of Band 2, and the overview of required ESO/EU contributions to the just approved Phase 1 of the ALMA correlator. ESAC views the implementation of Band 2 as the last missing original Band as an important addition to ALMA capabilities with significant science impact and strongly supports ESO leading this effort. The approved correlator upgrade will add critical scientific capabilities to ALMA ensuring that it remains state-of-the-art over the next decade. ESAC thus supports the envisioned contributions by ESO and is prepared to provide feedback on more concrete proposals in the near future. ESAC members agreed to present comments on the ALMA Development Roadmap at the STC face-to-face meeting, if such should exist.

Further items discussed included the upcoming ESO Users Committee face-to-face meeting, the planned ARC node review and the recent ALMA Cycle 6 deadline. ESAC expects that ESO will bring to its attention any items that arise from the scheduled session on ALMA user support that ESAC
should be aware of. ESAC suggests that the potential large increase in data rate associated with the ALMA correlator upgrade should be addressed in the upcoming ARC node review.

ESAC learned that the ALMA Cycle 6 deadline resulted in a 10% increase in the number of submitted proposals with the expectation of more than 1800 proposals for review. ESAC views this as a clear demonstration that the community is still very interested in using ALMA and that ALMA’s scientific capabilities are very attractive.

ESAC received an update on the progress of the APEX refurbishment. It is pleased to learn that the progress has been very successful and that first science observations were taken in the days before the telecon. ESAC congratulates all involved on this success and looks forward to hear an update about the new scientific capabilities of APEX at its next face-to-face meeting.

Appendix 2: ESAC meeting agenda

Monday, 19 February 2018

09:00 - 09:15 closed session
09:15 - 09:20 Opening, adopt agenda
09:20 - 09:40 ALMA and EASC news (L. Testi)
09:40 - 09:50 Update on EU development studies (C. de Breuck)
09:50 - 10:00 Summary of development projects (L. Testi)
10:00 - 10:10 Band 2 update and plan (P. Yagoubov, L. Testi)
10:10 - 11:00 Discussion on Charge #6 (Development)
11:00 - 11:30 coffee break
11:30 - 11:40 Proposal review model (M. Zwaan)
11:40 - 12:30 Discussion on Charge #3, 4, and 5 (publication stats, review model, solar, pipeline mitigation)
12:30 - 12:45 Closed session

12:45 - 13:45 lunch (with EASC staff)

13:45 - 13:55 Data processing update and future (M. Zwaan)
13:55 - 14:05 2yr vs. 3yr configuration schedule -- ESO’s view (L. Testi)
14:05 - 14:35 ALMA operations (E. Humphreys)
14:35 - 15:15 Discussion on Charge #1 and 2 (Observing efficiency, completion rates, QA, raw data release)
15:15 - 15:45 coffee break
15:45 - 15:55 AtLast meeting report (C. de Breuck)
15:55 - 16:15 Discussion on ESO-only topics (AtLAST, APEX, ARO) and ad-hoc charges (configuration schedule)
16:30 - 17:00 Closed session
17:00 - 17:15 exit report
17:15 End of meeting
Appendix 3: Charges for ASAC meeting February 2018

**Permanent Charge #1.** Assessment of the performance of ALMA scientific capabilities: The ASAC shall indicate what information is required from the Joint ALMA Observatory (JAO) to perform this assessment.

**Permanent Charge #2.** Assessment of the technical aspects of the ALMA system performance: The ASAC shall indicate what information is required from the JAO to perform this assessment.

**Permanent Charge #3.** Assessment of the science outcomes from ALMA: Statistics on publications, citations, press releases, web sites, etc. collected by the Executives shall be collated by the JAO, and analyzed by the ASAC.

**Permanent Charge #4.** Recommendations of ways to maximize ALMA’s scientific impact: This includes review of the scientific effectiveness of the Proposal Review Process after each Proposal cycle.

**Permanent Charge #5.** Reporting on operational or scientific issues raised by the wider community as communicated by the three regional Science Advisory Committees (ANASAC, ESAC and EASAC).

**Permanent Charge #6.** Assessment of the scientific impacts of the ALMA Development Programme, and particularly of new projects that are proposed.

**Ad-hoc Charge #1.** ASAC assess whether ALMA’s level one science goals have been met and whether the proposed new fundamental science drivers as stated in the ALMA Development Roadmap are appropriate.

**Ad-hoc Charge #2.** Deeper Assessment of the scientific motivation for 2-year versus 3-year configuration schedule.
Appendix-3: LSP Report

Report from the LSP Meeting, ESO Garching, 23 April 2018

The LSP congratulates the ESO LSP teams of Garching and Paranal for a number of impressive achievements over the last 6 months, including:

- ESPRESSO appears to be meeting most of its (challenging) science requirements and is now available to the community. We hope the throughput issue will be solved soon.
- MATISSE appears to have greatly exceeded many of its specifications, including the critical sensitivity specification.
- GRAAL/HAWK-I science verification has gone smoothly, with clear and sometimes very impressive improvements in image quality.
- The narrow-field mode of MUSE, which includes the very challenging LTAO mode of the AOF, is approaching being fully commissioned.

Remarks on Recommendations from previous LSP Meetings

- The LSP was happy to see the VLTI Roadmap published as an extensive ESO messenger article in order to publicise these plans. As roadmap-relevant components of the VLTI instrumentation project are completed, the LSP encourages ESO to publish both progress and challenges, for example in SPIE articles like Woillez (2016, Proc SPIE, 9907E).
- The updated ESO public Guaranteed Time Observations web page is a welcome improvement on communication to the ESO community. The LSP encourages ESO to keep this up to date, and to augment the information with predicted future period GTO fractions (calculable from the available information). Given the extensive pressure on GTO, the LSP also expects to remain informed if the target maximum of 15% is likely to be exceeded, especially where this is likely to have significant impact on a particular telescope’s non-GTO programmes.
- Publicly available information on guidelines for hosted telescopes could still be improved, for example the Guidelines component of STC-545 could become web accessible.
- The LSP was very happy to see data flow review as a result of previous STC recommendation.

Recommendations from this LSP meeting

- The LSP was pleased to hear that a significant number of participants in the recent users’ workshop did so remotely via videocon. We recommend that remote participation is enabled by default. This could even involve screen sharing remote videocon for the one-on-one components of users workshops in the future (or, indeed, when responding to complex user queries).
- The LSP noted that there was little detail yet on the in-principle plan to decommission FLAMES to make way for a visitor focus around 2020. We recommend that in the context of likely Gaia follow-up demand, no final decision is made on a date for this unless there are either serious technical issues with FLAMES, there is a compelling visitor instrument proposal (e.g. through a RFI), or 4MOST is commissioned.
- The Paranal Instrumentation Plan remains consistent with planning seen at previous meetings, and the LSP was pleased that the new instruments (named “New V” and “New VI”) have not been delayed. We noted that there are already some ideas for these two new instruments, including a UVES upgrade. We recommend that the “VLT in the ELT era” workshop planned next year explicitly includes new instrument ideas in its mandate, and that the STC is not asked to recommend specific instruments until after this workshop.
Now that VIMOS is decommissioned, the LSP recommends “mothballing” the instrument wherever consistent with operational requirements (e.g. spares not needed for other instruments) rather than disassembling in a completely irreversible way.

The LSP welcomes the proposed planning process for the UV Instrument (previously known as the CUBES concept) in response to the STC’s recommendation at its last meeting. We recommend that as part of the renewed Phase A, any instrument consortium is asked to comment on the scientific impact of this instrument in the context of both the existing capabilities of UVES, and any order of magnitude improvements that may be possible from a UVES upgrade. We also note that the STC’s approval of this instrument should be conditional on it being of intermediate scope (in cost and schedule). If it were to become a large facility scale instrument, it would have been appropriate to have a more robust prioritisation process.

The latest hosted telescope proposal presented to the LSP was PLATOSPEC. We concur with the recommendations of the panel in STC-612, and that this project should be approved from a scientific perspective based on the principles of STC-545. We note that there is an ongoing technical assessment of the project, and that like any hosted telescope, there should be no cost to ESO.

The LSP welcomed the progress on the phase A for the FORS2 upgrade. It is clear that completing the full list of potential upgrades could be seen as scientifically compelling, but could also result in an upgrade project approaching the scale of the full instrument. We encourage a clearly constrained budget and schedule at the end of phase A (possibly at the level of no more than half a usual VLT instrument) to ensure that this upgrade doesn’t undergo scope creep and cause excessive delay to other PIP projects.

(A. Finoguenov did not participate due to a conflict) The SOXS consortium is approaching an agreement with ESO where they will have GTO equal to 50% of the telescope time of the NTT over the first 5 years of operation. The LSP considers that the remaining time during the 5 years remains a scientifically valuable capability for the ESO community. This consideration was made in the context of the relatively low operations cost of La Silla, and the context of X-Shooter and other international facilities. In addition, the LSP is excited about the science that will be enabled by the GTO team within the ESO member states, and the possibilities beyond this 5 year period. We recommend support to the instrument and GTO arrangements as presented.

(M. Ireland and W. Couch did not participate due to a potential institutional conflict) The ESO pre-phase A study for a Visible multi-conjugate AO Instrument has been completed, yielding the elaborated TLRs and timeline presented to the STC. These documents are the basis for a competitive Phase A call to be issued very soon. The LSP support the process and look forward to the results of the call and the Phase A studies.

(M. Ireland and S. Kraus did not participate due to a potential personal conflict) Given the decommissioning of AMBER, a visitor focus becomes available in the VLTI Lab. The LSP supports the suggestion to allow VLTI visitor instruments in the next CfP.

Requests for the subsequent meetings

- Given the importance of Paranal as ESO’s primary observatory, we recommend that the PIP resource planning into the future is presented in current year Euros. If the default position is that PIP investment is not indexed or declining (as appears to be the case when comparing plans from Cou-1625 onwards), this should be made clear to the STC and council.
- To explore the potential for exploiting the full baseline range and sky coverage of VLTI (including the 200m baseline), we ask for a report on the feasibility to double the Delay Line stroke by folding the beam path and the resources/timeline that would be needed to realise this.
- The LSP noted that there have both been great successes and also difficulties with recent public surveys. There are many reasons to plan for future public surveys, including the possibility of co-ordinated Gaia follow-up, and exploiting the survey
Capabilities of MOONS, but this would best be done in a coordinated way. We recommend that a combination of ESO and the survey working group report to the STC (via the LSP as required) for discussion in an upcoming meeting on:

- Lessons learned from VLT, Vista and VST surveys.
- Potential models to incentivise survey teams to deliver effective survey products, including for example selection functions and final data products.
- Methods to maximise scientific impact of previous surveys.

Appendix-4: 91st Meeting Agenda

24 April

08:30 Closed session with Council President
09:30 Closed session with Director General
10:00 Welcome
   1. Adoption of the Agenda
   2. Approval of the Minutes of the 90th STC Meeting
10:45 Coffee Break
11:00 4. European ELT-related business
   4a. ELT project overview (R. Tamai)
   4b. ELT science and instruments update incl. MAORY/HARMONI LTAO study (M. Cirasuolo)
   4c. Report from the ELT sub-panel (V. Hill)
   4d. Discussion
12:45 Lunch
13:45 Closed session STC only
14:15 5a. Science prioritisation (M. Kissler-Patig)
   5b. Discussion
15:00 6. ALMA-related business
   6a. ALMA Science Operations update (M. Zwaan)
   6b. ALMA Development Vision and Projects (L. Testi)
   6c. Discussion
16:15 Coffee Break
16:30 6d. Report from the ESAC sub-panel (E. Schinnerer)
   6e. Discussion
17:15 Closed session STC only (incl. TLRs for AO instrument and SOXS GTO)
18:00 End of Day 1

25 April

08h30 7. LSP-related business
   7a. LPO Operations (A. Kaufer)
   7b. Data Flow System Review (M. Sterzik)
   7c. Paranal instrumentation update (L. Pasquini)
   7d. PLATOSpec hosted telescope proposal (B. Leibundgut)
   7e. Discussion
10h30 Coffee Break
10h45 7f. VLTI update, incl. NAOMI and Visitor Focus (A. Mérand)
   7g. Report from the LSP sub-panel (M. Ireland)
   7h. Discussion
11h30 Break in Auditorium (Gaia DR2 release)
12h05 8. Questions regarding Fact Sheets
12h15 Closed session STC only
12h45 Lunch
13h30 Closed session STC only
16h30 Feedback with Director General and Directors
17h15 End of Day 2
## Appendix-5: STC#91 April 2018 Conflicts of Interest

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I: Institutional conflict  
P: Personal conflict