

MINUTES

MID-TERM REVIEW MEETING

Wednesday, October 14, 2015
The Royal Astronomical Society, London, UK

Participants

Bernhard Fabianek – EC Project Officer / Policy Officer
Nikos Vogiatzis – Corallia, Athens, Reviewer / connected by Skype video conference
Arkadiusz Berlicki – UWR
Francesco Berrilli – UT0V
Roman Brajsa – HVAR
Mats Carlsson – UiO
Manuel Collados – IAC
Ilaria Ermolli – INAF
Alberto Escobar – IAC
Alexander Feller – MPS
Bernard Gelly – CNRS
Robert Hammerschlag – HANKOM
Dan Kiselman – SU
Hans Kommers – HANKOM
Ales Kučera – AISAS
Christoph Kuckein – AIP
Oskar von der Lühe – KIS
Jesús Marcos Olaya – TECNALIA
Mihalis Mathioudakis – QUB
Sarah Matthews – UCL/MSSL
Michiel van Noort – MPS/MPG
Arnau Pont – CIMNE
Markus Roth – KIS
Göran Scharmer – SU
Rolf Schlichenmaier – KIS
Richard Seddon – TECNALIA
Michal Sobotka – AIASCR
Lothar Strüder – PNSensor
Robbe Vansintjan – ROB
Francesca Zuccarello – INAF
Jo Bruls – KIS (minutes)

Agenda

09:00 Welcome (Manuek Collados, IAC – Sarah Matthews, UCL)

09:05 Introduction to MTR (Bernhard Fabianek, Project Officer, EC)

STATUS REPORTS ON INDIVIDUAL WPS

Coordination and Management (MGT)

09:15 WP10 – Project organization & Management (Manuel Collados, Alberto Escobar, IAC)

Networking Activities (NA)

09:30 WP20 – Integrated operation and exploitation of solar Physics facilities and coordination with other research infrastructures (Rolf Schlichenmaier, KIS)

09:50 WP30 – Solar Physics networking (Francesca Zuccarello, INAF)

10:10 WP40 – Innovation towards industry (Jesus Marcos Olaya / Richard Seddon, Tecnalia)

10:40 Coffee break

Joint Research Activities (JRA)

11:00 Summary of the work carried out in WP50, WP60, WP70 and WP80 (Markus Roth, KIS)

WP50 – Tools for innovative data handling (Dan Kiselman, SU)

WP60 – Advanced instrumentation development (Hector Socas, IAC)

WP70 – Wavefront control (Manuel Collados, IAC)

WP80 – Synoptic observations (Markus Roth, KIS)

Transnational Access and Service Programme (TAS)

12:00 WP90 – TAS (Transnational Access Programme). Summary (Rolf Schlichenmaier, KIS)

WP91 – VTT. Access Programme

WP92 – GREGOR. Access Programme

WP93 – THEMIS. Access Programme

WP94 – SST. Access Programme

WP95 – IBIS/DST. Access Programme

WP96 – ROSA/DST. Access Programme

12:30 WP100 – Access to Science Data Centres. Summary (Mats Carlsson, UiO)

WP101 – HINODE/IRIS. Access to Science Data Centres

WP102 – BE-WISSDOM. Access to Science Data Centres

WP103 – GSC-SDO. Access to Science Data Centres

13:00 Lunch Break

14:00 Discussion with Project Officer and Reviewer

15:00 Private meeting (only Project Officer and Reviewer)

15:15 Review Feedback (Nikos Vogiatzis, Corallia)

15:45 End of the MTR

9:05 Welcome

Manolo Collados welcomes the reviewer Nikos Vogiatzis and the EC project officer Bernhard Fabianek, and reminds that the purpose of the mid-term review is the assessment of the SOLARNET project, the outcome of which is decisive for the continued funding of the project.

9:10 Introduction

Bernhard Fabianek briefly introduces himself. The project officers are now called policy officers, and “they do not care about projects anymore”. The EC is streamlining its portfolio within the European research landscape and would like to clarify questions concerning the position of SOLARNET and its partners in the European astronomy community from a management standpoint. Scientific details are of secondary importance.

Nikos Vogiatzis formulated a number of questions in writing in advance. The project office provided written answers. These are attached as an appendix to these minutes.

9:15 Project management

Manolo Collados presents an overview of the activities of the project office at the IAC.

The office has been involved in the grant and consortium agreements, the accession of the partners, the handling of the funds, the recruiting of the project manager, the organization of board meetings, the support in the organization of meetings within the individual WPs, the preparation and presentation of documents for the EC, management support for individual WPs, and various outreach measures.

Recently the “Fundación Galileo Galilei” has been included as a third-party partner linked to INAF. Funds required will come from INAF. The GPF and the Annex I (DoW) were updated accordingly.

Milestones MS1 (project kick-off meeting) and MS2 (creation of a project webpage) have been reached as planned in the first few months. The webpage is constantly being updated (e.g., with links to the presentations and proceedings of all meetings organized in the framework of SOLARNET) and the project office collects and analyzes the access statistics. The hits are sorted according to country of origin and the number of pages viewed per session.

In addition to the pure SOLARNET activities the project office has also been working on securing funding for solar physics beyond SOLARNET. A new H2020 project, GRESt, has already been secured for the period 2015-2018. Applications for SOLARNET II (2018-2021) and a training network (2017-2020) are being considered.

The office was also driving force behind the application of the EST to the ESFRI roadmap update.

Bernhard Fabianek inquires about the seven milestones due in 2015. They are not in the report? Manolo Collados responds that those concern minutes of meetings, which are not deliverables of the project office, but of the individual WPs. They are not public.

Bernhard Fabianek also inquires about coordinated observations.

First with respect to coordination with high-profile instruments (ALMA, LOFAR, Hinode, IRIS), whose time seems wasted if the ground-based optical telescopes happen to have bad weather. This argument is countered by several participants who have experience with that: those data are never wasted, they have high value by themselves because they mostly cover wavelength ranges that are not accessible to the SOLARNET telescopes.

And second, regarding priority status of these coordinated observations at the various telescopes. This is not really a problem, since these go through the same refereeing process as all other observing proposals, and, if successful, they are granted a fixed observing period, typically 5 to 10 full days.

Nikos Vogiatzis notes that the use of resources is not in the presentations for this MTR (but they are in the report presented to the EC) and there seems to be a slight misalignment with respect to the initial plan. He would like to know whether at the present resource consumption (in particular personnel spending) it will be possible to realize all goals within budget. Manolo Collados responds that within a few percent margin there will be no problem with the budget and manpower. Most deliverables are on time. Only the technological developments are incurring some delays (up to a year), but none of them are critical.

Nikos Vogiatzis further inquires on the long-term target of the dissemination and ACCESS / Mobility activities. Manolo Collados responds that the aim is a better connection with the space community and a wider dissemination of ground-based data. The statistics show that in particular the UK community plays an important role in that process. Sarah Matthews explains that the UK funding agencies decided to focus on space projects some 30 years ago, but that the community, recognizing the potential of ground-based solar physics, is now pushing the funding agencies to adjust their funding strategy.

Nikos Vogiatzis comments that he would prefer a consolidated presentation of all project results / deliverables on the webpage for easy access and he further likes to know who is using the information on the SOLARNET website, whether the users are predominantly scientists, or policy makers. Manolo Collados responds that most users will be searching the website in terms of subjects not deliverables, and that user information is difficult to obtain and has so far not been collected. The project office will try to improve the presentation and get a handle on the user community.

10:00 WP20 – Integrated operation and exploitation of solar physics facilities and coordination with other infrastructures

Rolf Schlichenmaier reports on the activities in the sub-workpackages, all related to coordination activities. All WPs are proceeding well and deliverables are on track: 4 delivered, 3 due in March 2016, 3 due in March 2017.

An overarching activity within WP20 is the Forum for Access and Services (FAS), where fundamental issues are discussed. A third meeting is planned for December 2015 with particular emphasis on the deliverable D20.3 “Final report on pipeline guidelines”, to be produced within WP20.2, which seems to have some acceptance issues in the community.

Within the framework of WP20.1 the EAST Time Allocation Committee, consisting of members of the institutes providing access to their telescopes and instruments, has granted observing time to 51 projects

from 11 countries so far. The majority of the observers came from countries without ground-based solar observing facilities of their own.

Bernhard Fabianek inquires about the actual percentage of telescope time offered through SOLARNET, whether international access is offered just because the EU is paying for that, whether the community can imagine offering 100%, and what the long-term strategy is. Rolf Schlichenmaier, Oskar von der Lüche, Markus Roth and Ales Kucera reply that about 10% is offered through SOLARNET, but that the international access to national facilities is actually much larger than these 10%. The solar community has a long record of international collaboration and use of facilities in other countries, and the EU funding has helped to intensify that. All existing telescopes are national instruments, and offering 100% of the observing time would require a different level of services (ESO-like), which none of the institutes can offer at current funding levels without sacrificing their own science activities. In the long term current facilities will essentially dissolve into EST, which will have to be operated in a completely different way.

WP20.2 is concerned with the data pipeline development. The deliverables of this WP consist of a survey document (D20.2) listing the existing data pipelines – the diversity of instruments and telescopes necessitates a separate pipeline for each of them – and a final report on pipeline guidelines (D20.3, due March 2016). A preliminary version is available, but the community is hesitant to adopt the guidelines and standards.

Bernhard Fabianek is wondering why the (European) solar community is dealing with pipelines and data standards now, whereas other communities did that 10-15 years ago and even have pipelines online. Rolf Schlichenmaier, Markus Roth, and Mats Carlsson comment that ground-based solar physics (worldwide) has been working in PI observing mode with specialized steadily developing instruments and flexible instrument setups that cannot be covered by standard data pipelines. With a trend towards more service observations at the existing telescopes and eventually a single telescope (EST) there is a growing need for data and pipeline standards.

WP20.3 deals with data archiving and dissemination. A first document on standards for data archiving and virtual observatories (D20.4) has been delivered, but it is continuously being updated based on input from WP50.2 Solar Virtual Observatory, WP50.1 Data Reduction Pipelines, and the wider community. A further deliverable D20.5 on the VO tools prototype developed under WP50 is in progress.

WP20.4 aims at promoting coordinated observations. An overview of the available facilities has been provided as D20.6 and the results of actual coordinated observations in 2016 will be presented in D20.7 by March 2017. Initially only ground-based stations will be involved, since coordination with Hinode or IRIS is more complicated. An operational model for the coordination with satellites should be further developed. The initial 14-day coordinated campaign will be part of the observing proposals for the year 2016, to be evaluated and scheduled by the EAST TAC in February 2016.

WP20.5 seeks to extend the experience with the queue observing mode. So far only ROSA and IBIS at the DST have been operated routinely in queue mode. The SST performed experiments for ten days. Specifications of this observing mode and experiences will be reported in D20.8, due March 2016.

In summary: four out of ten deliverables have been completed, the remaining ones are on track.

11:00 WP30 – Solar physics networking

Francesca Zuccarello reports on the solar physics networking activities.

Under WP30.1 three successful meetings have been organized and a fourth is being planned towards the end of 2016. The meetings aimed at connecting different solar research groups (ground-based vs. space-based), different research areas (solar-stellar), or different parts of the Sun (interior-outer atmosphere). Presentations and proceedings are made available online through the SOLARNET webpage.

WP30.2 Mobility of Young Researchers provides funds for short stays at other institutes. Neither home nor host institute need to be a SOLARNET partner. 15 out of the planned 16 grants have been awarded. Both the young researchers and the host institutes are satisfied with the program.

WP leaders will try to redirect unused SOLARNET funds to this program in order to be able to accommodate more grants. The number of female scientists being granted travel support has been low (20%), roughly in line with the female researcher fraction, but in the next call female researchers will be explicitly encouraged to apply. Same for young researchers from countries outside Europe.

WP30.3 aims at training of the new generation of scientists by means of a combination of training schools immediately followed by thematic workshops. So far three schools/workshops have been organized, with on average 20 school participants. Appreciation of the schools was very good. Two more schools/workshops will follow in 2016.

Nikos Vogiatzis asks about specific measures planned to improve the gender balance and participation of researchers from outside the EU in the Mobility program, and suggests that, in addition to the modification of future calls and the advertisement letters to colleagues outside the EU, female researchers should be contacted directly and that the program should be advertised more aggressively in social media and with radical actions.

11:30 WP40 – Innovation towards industry

Richard Seddon and Jesús Marcos Olaya present the activities towards the transfer of knowledge: identification of technologies, techniques and new concepts in use in solar physics, dissemination of those towards industry, identification of space technologies relevant for solar physics, promotion of collaborations between high-tech companies and research institutes, promotion of synergies with other I3 initiatives.

To this end Tecnalía participated in several meetings to present the technology needs and offers to the appropriate audiences, and organized several events to bring together the parties that can provide knowledge and technologies and those that are in need. As a result steadily growing databases of technology offers and technology needs have been set up. Tecnalía uses its contacts to technology brokers networks – big organizations like CERN and ESA have their own technology transfer departments – to bring offers and needs together. An example of a successful matching of interested partners is a family of nanomaterials with enhanced mechanical and thermal properties developed by the Nanomaterials and

Nanotechnology Research Center (CINN) in Spain. These ultra-stable materials (USM) are now ready for commercialization.

In general the process of matching donors and receivers of technology is slow. In addition, the technologies used by the SOLARNET partners are very specialized and their TRL is generally low. Tecnalia will produce an impact analysis report and plans to organize small workshops focused on establishing contacts between key SOLARNET partners and the local industrial community. Deliverables are well on track.

In response to the question by Bernhard Fabianek concerning the reason for addressing the huge space and fusion communities and their technology brokers instead of specific potentially interested optics companies Richard Seddon answers that these brokers have an enormously broad spectrum of contacts to industry from which to select. They just establish the connections, they do not actively sell the ideas or technology.

11:58 Joint Research Activities

Markus Roth presents a brief overview of the four WPs aiming at improving the research facilities for solar physics, basically encompassing data handling, new instruments, image quality improvements, and context imaging for high-resolution telescopes.

12:00 WP50 – Tools for innovative data handling

Dan Kiselman presents the activities towards innovative data handling tools.

The first part of that concerns the data reduction pipelines, data compression, and image restoration. It appears that most of the data pipeline work is proceeding well within WP20.2, but that D20.2 is not widely disseminated and that the guidelines for metadata from WP20.3 are not yet being implemented because they are seen as preliminary. So far none of the pipelines developed incorporate the treatment of metadata. This is seen as a problem both for the further development of the pipelines and for the subsequent data archiving and dissemination. A FAS meeting to address this issue will be organized in Dec. 2015 in Freiburg (see WP20).

With respect to data compression there is a tendency towards loss-less compression, but the group involved feels isolated. They require more interaction with the user community. This should also be addressed at the upcoming FAS meeting.

Regarding image restoration there are two competing methods: multi-frame blind deconvolution (MFBD) and speckle reconstruction. MS7 calls for a comparison of both methods and a report on improvement strategies (D50.2).

The second part of WP50 concerns the dissemination of data through a solar virtual observatory (SVO). A prototype SVO (D50.6) for ground-based data is under development.

12:15 WP60 – Advanced instrumentation development

Manolo Collados presents the ongoing instrument development. There are 4 sub-WPs, 12 deliverables, 5 milestones.

Under WP60.1 a large-diameter etalon is developed in collaboration with IC Optical Systems Ltd. Progress is as scheduled.

Under WP60.2 an image slicer for 2D spectroscopy at GREGOR is being developed on the basis of the image slicer developed for EST. Design changes required after an initial tolerance study have caused a one year delay. The new schedule foresees delivery of the instrument mid 2016 and tests at GREGOR in fall of 2016, all well before the end of the SOLARNET initiative.

The Microlens Hyperspectral Imager (MiHI) developed under WP60.3 is on track (few months delay). Tests with the microlens array showed close to nominal performance. This will be built into a prototype plugin for mounting on an existing spectrograph to be tested at a solar telescope in 2016.

Under WP60.4 a fast imaging polarimeter (FSP) is being developed. A small precursor system FSP I with a 264 px * 264 px sensor has been tested in 2014. The final 1k * 1k sensor is completed, but a redesign of the system, dictated by the thermal control, caused a delay of 6 months. Nevertheless it will be ready for testing at a telescope by summer 2016.

In conclusion: all instrument developments are on track or have some minor delays, none will be critical in the sense that they will not be ready by March 2017.

Bernhard Fabianek inquires about the fact that some deliverables are not public. Manolo Collados comments that that has to do with confidentiality towards the companies involved.

Bernhard Fabianek also criticizes that the man-months specified for the deliverables of a WP should but do not add up to the total resources planned for the WP. If a deliverable is not produced with satisfaction until the end of the project, the corresponding part of the funding will have to be returned, which in the present calculation is not represented correctly.

12:20 WP70 – Wavefront control

Manolo Collados reports on the various aspects of this WP.

A major piece of work under WP70.1 that has already been finished (MS14) concerns the performance simulation of an EST multi-conjugate adaptive optics (MCAO) system with up to 5 deformable mirrors and various types of atmospheric layers deforming the wave front. The comparative analysis with conventional adaptive optics and conclusions are pending.

Under WP70.1 also a prototype AO system for THEMIS is developed. The installation of an AO system on this telescope requires major reworking of its complex optical design; several mirrors (M2-M5) and the field rotator need to be replaced. The mechanical parts for the transfer optics as well as the new mirrors and the field rotator will be installed in the first nine months of 2016 followed by the integration of the AO bench in Q4 2016 or Q1 2017. The project is a few months behind schedule, but will be finished before the SOLARNET initiative ends.

Under WP70.2 the atmospheric seeing at the OT and ORM is characterized. For that purpose data are collected automatically by means of a suit of different / complementary instruments installed at or near the various solar telescopes. The data analysis is in progress.

Under WP70.3 the expected local seeing at a telescope (EST model) is studied by means of CFD simulations. A number of cases with different parameters and facility configurations have been computed (MS17). The results will be used to optimize the thermal and mechanical properties of the EST structure.

Part two of WP70.3 is concerned with building a prototype innovative heat rejecter for GREGOR that serves as a test bench for heat rejecters needed for next generation large-aperture solar telescopes, where heat dissipation will be a critical issue. In GREGOR, the heat rejecter temperature should not exceed the ambient temperature by more than 3K. The design is finished (D70.5). The heat rejecter is currently being built by an experienced industrial partner with good references. No company has been selected yet to apply the special Cu-Al alloy coating to the heat rejecter for purely organizational reasons, not due to technical problems or lack of suitable contractors. Installation and testing at GREGOR is foreseen for summer 2016. Even though this project is about 10 months behind schedule, it will be finished well within the framework of the SOLARNET initiative. As this is a prototype, it will have to be removed from the telescope in 2017.

12:45 WP80 – Synoptic observations

Markus Roth reports on the activities towards the definition and development of instrumentation for large field-of-view observations of the Sun with a network of synoptic solar telescopes (SPRING). These telescopes will be needed to define the context for observations at high-resolution telescopes, for long-term monitoring of the solar magnetic fields and velocity fields.

The required science data is seen as the driver for the technical requirements for the telescopes and their instrument suite. To this end three workshops have been held and four working groups have been formed to identify the data needs for studying different regimes in the Sun, reaching from the deep interior way into the heliosphere. A key role is played by multi-line high-resolution Doppler and polarimetric observations of the Sun in order to obtain the 3D velocity and magnetic field vectors over a large height range in the solar atmosphere. A science requirement document (SRD) is in progress.

As part of the feasibility study both the instrument design concept and the operational concept are being studied on the basis of an instrument wishlist defined by the science requirements.

A list of spectral lines that should be observed has been compiled, first concepts for the high-speed image processing have been presented, and the implications of the requirement to work in network mode are being considered in the light of experiences with existing networks.

Pros and cons of a filtergraph vs. a spectrograph are being considered, where the former seems to be the more versatile option. The operational aspects of providing high-volume real-time processed data by means of remotely operated stations are being explored.

The final design will most likely be a single telescope per station with multiple instruments and cameras. A maximum of three 3 instruments concepts will be selected for further studies and cost estimates. There will be trade-offs to be made regarding duty cycles, signal-to-noise, and the number of stations, where experience with existing helioseismology networks shows that it is highly desirable to choose sites with good weather and seeing conditions.

Bernhard Fabianek is surprised that the space weather community has a need for SPRING synoptic data as provided by the SPRING telescopes. Markus Roth replies that the space weather community needs an end-

to-end chain from the Sun to the Earth, and part of that has so far been provided by ground-based observations from the aging GONG network. A replacement will be needed in the near future.

Bernhard Fabianek inquires about the cost. Markus Roth answers that based on GONG/SONG experience the development prototype costs about 10 M€, and the copies 2-5 M€ each. This leaves room for contributions from individual institutes.

Nikos Vogiatzis notes that this project is well suited for intense publication activity. Markus Roth confirms that there are several papers in the near-term pipeline.

13:05 WP90 – Transnational Access Programme

Rolf Schlichenmaier reports on the Access programs for the various instruments and telescopes. So far 360 out of the available total of 451 observing days have been appropriated for this program. 51 observing proposals from 11 countries have been allocated. The Access program is well on track, but care should be taken to meet the goals for the coming year. It is planned to improve advertising for the Access program – also proposals from non-member countries are accepted – and to make the application for the next round of Access time (Dec. 2015) more user-friendly.

It is noted that so far the scientific return, measured by the number of papers on the basis of observing time under the Access program, is low. This is attributed to the fact that a significant fraction of the observing time is allocated to PhD students, who require a longer time to produce the papers and may not be familiar with the acknowledgment procedures. Reporting on papers should be improved in order to provide an evaluation of the Access program by the end of the SOLARNET initiative.

The user assessment of the services provided under this program is mostly positive. Negative comments have been evaluated and corrective measures have been taken where appropriate. Also in the framework of this WP so far 44 observers have been supported with travel & subsistence grants, 31 of which would not have been able to carry out their projects without the SOLARNET support. This program is right on schedule (66% of funds used).

Bernhard Fabianek notes that given the schedule for THEMIS the remaining 11 observing days in the Access program cannot be used in 2016. This might require a change of contract. He also suggests contact the home institutions of observers under the Access program to encourage the production of papers and acknowledgment of the Access program.

13:25 WP100 – Access to science data

Mats Carlsson reports on the three science data centers operated under this WP. Science data centers are generally underfunded and SOLARNET provides welcome additional funding (up to 30% of running costs). Data formats and procedures will be standardized in the future.

WP101: Hinode / IRIS (at UiO). IRIS data has been included since 2013. The functionality is continuously being improved.

WP102: BE-WISSDOm (at ROB). Provides SDO-AIA data. This science data center has new hardware and improved user interface.

Wp103: GSC-SDO (at MPG). Provides SDO-HMI data. This data center is fully functional with a new data transfer protocol.

The deliverables of WP100 concern the usage statistics, which are collected continuously. D100.1 has already been delivered; D100.2 and D100.3 will follow as scheduled.

Bernhard Fabianek comments that Amazon offers Astron/LOFAR free use of their computing cloud. Would that be an option for the solar data? Mats Carlsson replies that given the data volume it is in general better to run the data processing pipeline where the data themselves are. Currently the raw data are at the data centers themselves, but in future the raw data will be kept offline or most likely discarded. We will have to live with (lossy) compressed processed data. In fact, only the metadata will have to be kept at the data center, the actual data can be anywhere.

Bernhard Fabianek inquires about the ownership of the data in the data centers. Mats Carlsson cites the example of the solar space data. These are public as soon as they come down from the satellite. Ground-based data has commonly been proprietary for practical reasons, but the situation is rapidly improving. There may still be proprietary periods, but rather short ones, and after that the ground-based data are also public. He further notes that space data became publicly available long before the policy that data acquired with public funds should be public was introduced.

14:30 Discussion with PO and Reviewer

Bernhard Fabianek raises a few peculiar funding issues he found in the mid-term report. He urges the partners to be careful with the financial data. He highlights that there are significant differences between the countries involved, but as long as the local remuneration rules are followed things are fine. In view of the future (EST) the community needs to establish financial trust and to get aligned.

Nikos Vogiatzes has the same concerns and in addition he requests that the partners try to homogenize their reporting (project office should see to that), or otherwise present a good reason for not doing that. Other questions have been answered in an email (attachment to these minutes). He also notes that there is a good working climate in the consortium and that there is consensus among the partners.

Bernhard Fabianek further notes that this consensus among the partners and the alignment of the national science ministries is needed to be successful with EST on the ESFRI list, but on the other hand the amount of money available is decreasing. The solar community is small compared to many competitors and needs to make itself heard.

Nikos Vogiatzis adds Horizon 2020 is all about impact, the metric for measuring science, which is the product of community size and science output impact. Since the size of the community is relatively small, and growth capabilities limited, the impact of the science and the industrial application of technologies used should be high. To that end the community needs to publish excellent science papers and advertise the results as widely as possible by any means. As an example he cites NASA's high-visibility press activity around practically useless satellite data (New Horizons) in 2015.

Bernhard Fabianek concludes the meeting with the announcement that the reviewers will provide their feedback before the end of November.

15:30 END