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Revised	Tirtha Som	KIS	Project Manager	Jan 30 th , 2020
Approved	Rolf Schlichenmaier	KIS	Coordinator	Jan 31 st , 2020
Authorized	Markus Roth	KIS	Project Scientist	Jan 31 st , 2020

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Version 1.0	Jan 31 st , 2020	Initial Issue

Event: SOLARNET's 1st General Assembly Meeting

Date: Thursday, January 23rd, 2020

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Národní 3, 117 20 Staré Město, Prague, Czech Republic

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List of Participants

Serial No.	Name	Institution/ Beneficiary name	Country
1	Alejandra Martin Galvez	Instituto de Astrofísica de Canarias	Spain
2	Pawel Rudawy	Astronomical Institute of the University of Wroclaw	Poland
3	Markus Roth	Leibniz-Institut für Sonnenphysik (KIS)	Germany
4	Luis Bellot Rubio	Instituto de Astrofísica de Andalucía – CSIC	Spain
5	Arnold Hanslmeier	Institut of Physics, Univ. Graz	Austria
6	Robertus Erdelyi	University of Sheffield	UK
7	Rolf Schlichenmaier	Leibniz-Institut für Sonnenphysik	Germany
8	Marianna Korsos	ELTE	Hungary
9	Jana Kasparova	Astronomical Institute of the CAS	Czech Republic
10	Jan Jurcak	Astronomical Institute of the Czech Academy of Sciences	Czech Republic
11	Romanova Daria	Skolkovo institute of Science and technology	Russia
12	Mats Carlsson	Institute of Theoretical Astrophysics, University of Oslo	Norway
13	Manuel Collados	Instituto de Astrofísica de Canarias	Spain
14	Sarah Matthews	University College London	UK
15	Ilaria Ermolli	INAF	Italy
16	Peter Gomory	Astronomical Institute, Slovak Academy of Sciences	Slovakia
17	Yoshinori Suematsu	National Astronomical Observatory of Japan	Japan
18	Carsten Denker	Leibniz-Institut für Astrophysik Potsdam (AIP)	Germany
19	Christoph Kuckein	Leibniz-Institut für Astrophysik Potsdam (AIP)	Germany
20	Meetu Verma	Leibniz-Institut für Astrophysik Potsdam (AIP)	Germany
22	Michele Bianda	Università della Svizzera italiana / Istituto Ricerche Solari Locarno (USI/IRSOL)	Switzerland
23	Jesus Burgos Martin	Instituto de Astrofísica de Canarias	Spain
24	Bernard Gelly	CNRS – THEMIS	France
25	Michal Sobotka	Astronomical Institute of the Czech Academy of Science	Czech Republic
26	Alex Feller	Max Planck Institute for Solar System Research	Germany
27	Tirtha Som	Leibniz-Institut für Sonnenphysik (KIS)	Germany
28	Francesca Zuccarello	University of Catania	Italy
29	Robbe Vansintjan	Royal Observatory of Belgium	Belgium
30	Richard Morton	Northumbria University	UK
31	Dan Kiselman	Stockholm University	Sweden
32	Mary Barreto	Instituto de Astrofísica de Canarias	Spain
33	Salaun Yves	Winlight-System	France
34	Huguet-Chantome Pascal	Winlight-System	France
35	Francesco Berrilli	Department of Physics – University of Rome Tor Vergata	Italy
36	Xavier Verians	AMOS	Belgium
37	Daniele Gallieni	A.D.S. INTERNATIONAL	ITALY
38	Ales Kucera	Astronomical Institute of SAS	Slovakia
39	Uwe Zell	Science Media	Germany
40	Salvo Guglielmino	Università degli Studi di Catania	Italy

41	Michiel van Noort	Max Planck Institute for Solar System Research	Germany
42	Tim Morris	Durham University	UK
43	Matthew Townson	Durham University	UK
44	Javier de Cos Juez	University of Oviedo	Spain
45	Bob Bentley	University College London	UK
46	Nazaret Bello González	Leibniz-Institut für Sonnenphysik (KIS)	Germany
47	Carlos Dominguez	Instituto de Astrofísica de Canarias	Spain
48	A. Berlicki	University of Wrocław (UWR)	Poland
49	Peter Leitner	University of Graz	Austria
50	Oskar von der Lühe	Leibniz-Institut für Sonnenphysik (KIS)	Germany
51	Roman Brajša	Hvar Observatory, University of Zagreb	Croatia
52	Ivica Skokic	Hvar Observatory, University of Zagreb	Croatia
53	Miguel Núñez	Instituto de Astrofísica de Canarias	Spain
54	Pietro Benedusi	Università della Svizzera italiana / Istituto Ricerche Solari Locarno (USI/IRSOL)	Switzerland
55	Luca Giovannelli	University of Rome Tor Vergata	Italy
56	Ricardo Gafeira	CITEUC - University of Coimbra	Portugal

Agenda

(0) 09:00 Welcome (Rolf Schlichenmaier)

(0a) Compilation of partner representatives for the SOLARNET General Assembly.

(0b) Approval of agenda

(1) 09:20 Management: Work Package 1 (Markus Roth)

(2) 10:00 Work Package 2 & 9 (Dan Kiselman)

10:45 *Coffee Break*

(3) 11:15 Work Package 3 (Francesca Zuccarello)

(4) 11:45 Work Package 4 (Richard Morton)

(5) 12:15 Work Package 5 (Nazaret Bello González)

12:45 - 14:00 *Lunch break*

(6) 14:00 Work Package 6 (Manolo Collados)

(7) 14:45 Work Package 7 (Oskar von der Lühe)

15:30 *Coffee Break*

(8) 16:00 Work Package 8 (Markus Roth)

(9) 16:45 Work Package 10 (Mats Carlsson)

(10) 17:00 Any other business

17:30 *Adjourn*

09:00 Welcome

(by Rolf Schlichenmaier)

Rolf Schlichenmaier, the coordinator of SOLARNET welcomes all the participants. He presents the SOLARNET management structure as defined in Section 6 of the Consortium Agreement.

He explains that the General Assembly is responsible for monitoring the project status and progress during the regular General Assembly meetings and the virtual meetings as appropriate.

The General Assembly shall be free to act on its own initiative to formulate proposals and take decisions in accordance with the procedures set out in the Consortium Agreement. In addition, all proposals made by the Executive Board shall also be considered and decided upon by the General Assembly.

The following decisions shall be taken by the General Assembly:

- Content, finances and intellectual property rights
- Evolution of the consortium

On the basis of the Grant Agreement, the appointments can be made if necessary for members to be a part of the Executive Board.

(0a) Compilation of Partner Representatives for the SOLARNET General Assembly.

Quorum: 56 people attend the 1st General Assembly Meeting. The General Assembly is the ultimate decision-making body of the Consortium and should consist of one institutional representative from each beneficiary. 28 members from 28 beneficiaries are present in-person, 1-member is present remotely (via video-conference), 1 member is being represented, while 5 members are absent, i.e. to summarize 30 out of 35 beneficiaries are either present or represented. This attendance corresponds to 86%. Thereby a quorum of 67% is fulfilled. Fulfilling the required quorum empowers the General Assembly to take strategic decisions concerning the project.

Below is the list of General Assembly members/ representatives:

Participant No	Participant organisation name	Country	Presence
1	Leibniz-Institut für Sonnenphysik (KIS)	Germany	P
2	Instituto de Astrofísica de Canarias (IAC)	Spain	P
3	Universitetet i Oslo (UiO)	Norway	P
4	Stockholms universitet (SU)	Sweden	P
5	Centre National de la Recherche Scientifique (CNRS)	France	P
6	Istituto Nazionale di Astrofisica (INAF)	Italy	P
7	Università Roma Tor Vergata (UNITOV)	Italy	P
8	Università Degli Studi di Catania (UNICT)	Italy	P
9	Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC-IAA)	Spain	P
10	Max-Planck-Gesellschaft zur Förderung der Wissenschaften eV (MPG)	Germany	P
11	Leibniz-Institut für Astrophysik Potsdam (AIP)	Germany	P
12	University of Northumbria at Newcastle (NU)	UK	P
13	University of Sheffield (USFD)	UK	P
14	University College London (UCL/MSSL)	UK	P
15	Queens University Belfast (QUB)	UK	A
16	Astronomický ústav AVCR vvi (ASU)	Czech Republic	P
17	Koninklijke Sterrenwacht van België (ORB)	Belgium	P

18	Hvar Observatory, Faculty of Geodesy, University of Zagreb (HVAR)	Croatia	P
19	Astronomical Institute, Slovak Academy of Sciences (AISAS)	Slovakia	P
20	Università della Svizzera italiana / Istituto Ricerche Solari Locarno (USI/IRSOL)	Switzerland	P
21	University of Graz (UNIGRAZ)	Austria	P
22	Skolkovo Institute of Science and Technology (SKOLTECH)	Russia	P
23	Aperio (Aperio)	UK	T
24	ALPAO (ALPAO)	France	A
25	The Science Media Network GmbH (SMN)	Germany	P
26	Winlight Optics (WO)	France	P
27	National Astronomical Observatory of Japan (NAOJ)	Japan	P
28	Assoc. of Universities for Research in Astronomy/National Solar Observatory (AURA/NSO)	USA	A
29	Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung e.V. (IOSB)	Germany	A
30	A.D.S Internation SRL (ADS)	Italy	P
31	BDP Engineering/Opto Service (BDP E&M)	Italy	R
32	Universidad de Oviedo (Oviedo)	Spain	P
33	Durham University (Durham)	UK	P
34	Haute Ecole Specialisee de Suisse Occidentale / Haute Ecole d'Ingénierie et de Gestion du Canton du Vaud (HES-SO)	Switzerland	A
35	Advanced Mechanical and Optical Systems SA (AMOS)	Belgium	P

Acronym: Present (P), Remote (T), Represented (R) and Absent(A)

(0b) Approval of the Agenda

The Agenda is presented and discussed, and then adopted.

All presentations that are presented at this General Assembly meeting will be archived (open-access) and made available at Science Media Network GmbH (science-media.org) and linked to the SOLARNET website. To view the presentations, "Conference contributions" needs to be clicked on.

09:15 Status Report WP1

WP Title: Management

Presented by: Tirtha Som and Markus Roth

Contributors: Tirtha Som, Bettina Schaefer, Rolf Schlichenmaier, Markus Roth

Tirtha Som presents an overview of the achievements of the SOLARNET Project during the past year since the start of the project on Jan 1, 2019.

- Kick-off meeting was held in Brussels, Jan 24th, 2019, thereby fulfilling milestone MS1.
- This was followed by the signing of the consortium agreement. The agreement was drafted (formulated) on Feb14th, 2019 and circulated amongst its beneficiaries. Upon receiving the acknowledgment and signatures from all beneficiaries, the consortium agreement came into force on May 2nd, 2019 thereby fulfilling milestone MS2.
- Funds were transferred to the beneficiaries in Feb 2019.
- The first version of the project website www.solarnet-project.eu came into existence on Mar 18th, 2019 as Milestone MS3. Since then it has been continuously improved and today Uwe Zell from SMN GmbH will present more about the new features added related to project management tools.

- Besides, the Transnational Access Programme had sent out three calls for proposals so far for the different telescope facilities & during the period 2019A & 2019B travel support was given to 8 campaigns with 16 recipients.
- There was also a call for computing time at Piz Daint – the Swiss National Supercomputing Centre
- Mobility Program had two calls and 12 recipients are being given support to conduct their research stays.
- Regarding schools & workshops:
 - The spring meeting was held in Freiburg between 29-30 April 2019 as part of WP8
 - A Week above clouds – which was a training school for solar observers was held between 5-9 August 2019 and was attended by 15 students.
 - The Summer School for Solar Spectro polarimetry was held in Lugano between 9-14 Sept 2019 and attended by 25 students of different nationalities
- 10 deliverables that were all submitted within deadlines and the 3 milestones fulfilled.

Regarding the management structure, the SOLARNET General Assembly is the ultimate decision-making body when it comes to the project. The SOLARNET coordinator, Rolf Schlichenmaier, has presented an update and progress of the SOLARNET project to the EAST Advisory Board on Tuesday, January 20th, 2019. WP1 is responsible for the general management of the project in addition to communicating with EU authorities. The project is supported by its three pillars – Networking Activities, Joint Research Activities, and the Access Programme. The activities within WP2-WP10 support these three pillars.

The project management office is responsible for WP1. The management team comprises of Markus Roth (as Project Scientist), Rolf Schlichenmaier (as Project Coordinator), Bettina Schaefer (as Financial signatory), Tirtha Som (as Project Manager). The project office is located at Leibniz-Institute for Solar Physics (KIS), Freiburg, Germany. Its contact email: solarnet-office@leibniz-kis.de; Tirtha Som can be reached directly at +49-761-3198-224.

The project management office is committed to providing the consortium the necessary administrative and technical support required for the effective coordination of the project, responsible for financial management and reviewing the budget, organization of travel related to the mobility and access programmes, make recommendations to the General Assembly and Executive Board about appropriate allocation of the resources (financial), and collect information from the beneficiaries thereby assisting in preparation of necessary periodic reports.

Markus Roth steps in to explain the structure of the Executive Board. The Executive Board comprises of all WP Leaders, Project Coordinator, Project Manager & Project Scientist. Markus Roth is the chair of the Executive Board.

He explains the functions of the Executive Board i.e. to discuss project progress, ensure proper execution of the WPs and sub-WPs and implement the strategic decisions of the General Assembly. During the year 2019, the Executive Board have met quarterly with three meetings held on 5th April, 30th July, & 17th October 2019 mainly via video conference. The presentations and minutes of the Executive Board Meeting shall be archived and made accessible at the SMN platform for the consortium members. If any concerns arise, risks or bottlenecks foreseen, the consortium members should inform the project office or the corresponding WP Leader and it will be discussed in the Executive Board Meeting with the intension to find a solution.

Markus Roth continues that 2020 will be a vital year because about 1/3rd of the project needs to be delivered this year.

- All the 15 deliverables that were originally due in June 2020 should be completed by May 2020 and should be submitted to the project office along with the summary of the deliverable by 31st May 2019. This step is taken to ensure that the technical part of the first periodic report (RP1) should be completed by June 30th, 2020.

- The project office should receive the financial report by the 1st week of July. The consortium members are expected to inform their financial officers accordingly. Financial information, person-months, etc needs to be incorporated in the technical report in a way (in form of bar graphs, pie-charts, etc) that it should clearly represent the efforts and make things as transparent as possible.
- Financial Reports (Form C) needs to be done mainly online (via participant portal).
- Overall periodic report 1 (technical + financial) should be completed by July 31st, 2020 i.e. before the summer vacation and week above the clouds programme.

Markus Roth presents the 21 deliverables and 7 milestones due between January-May 2020. To meet some of the milestones within the May deadline, the corresponding workshops should be organized as early as possible.

Tirtha Som presents an overview of the finances.

- Total eligible amount of the project €9 995 736.49 (this includes Access Programme costs)
- Pre-financing amount €5 331 059.46
- EU 'Guarantee Fund' 5% = €499 786.82 (from total eligible cost)
- Received 48,3334% = €4 831 272.64
- In kick-off meeting the Consortium had agreed to keep 3.33% at the project office = €333 191.22 (to adapt to different needs during the ramping up of the project)
- 45% of the total eligible amount as pre-financing was distributed to the beneficiaries by the project office.
- Aperio (€72 000) & SMN (€49 600) will be paid up to 85% of their respective eligible cost in Feb 2020 because they have to complete a major part of the project within the year 2020. However, they will receive the remaining 15% only after the completion of the project i.e. after Dec 2022.
- The 'security amount' remaining at the project office = €211 591.22
- Table on maximum grant amount, pre-financing amount and the remaining amount corresponding to each beneficiary were presented.

The project office is responsible for travel bookings related to the TAS programme.

- Eligible cost entitled are:
 - SOLARNET sponsors the cost corresponding to 2 persons per campaign
 - The observers are entitled to travel (flights, trains, local public transport) + accommodation + transportation to observatory (rental car/ taxi) + per diem (26€/day) allowances.
 - The management (project office) emphasizes how important it is to book early flights. In fact, the entire travel should be organized 8 weeks before departure. Therefore, the observers should be instructed to contact the project office immediately once the scheduling is done without any delay. This is to ensure to make use of the cheapest or the most economical flights available and to keep this programme's cost vs performance on the track. Information is also available on SOLARNET website.
- Cost vs Performance for this TAS programme
 - Total Budget allocated for this programme: €108 000
 - Min. quantity of access (days) to be provided (GREGOR+SST+VTT+THEMIS): 383
 - Finances spent in 2019: €25 819 (23.9%)
 - Access days provided in 2019 (8 campaigns): 84 (21.9%)
 - Finances Left: €82 181 (76.1%)
 - Access days yet to be provided: 299 (78.1%)

The project office is also responsible for travel bookings related to the mobility programme.

- Eligible cost
 - Researchers are eligible for travel - one round trip (flights, trains)
 - In addition to subsistence allowances (€250 / week) to cover the cost of accommodation.

- Cost vs Performance:
 - Total Budget allocated: € 120 000
 - Total no of researchers to be sponsored: 45
 - Finances spent in 1st call (Sept 2019 – Feb 2020): € 13 731 (11.4 %)
 - Researchers sponsored in 1st call: 6 (13.3%)
 - Finances Left: € 106 269 (88.5%)
 - Researchers to be sponsored: 39 (86.7%)
- Booking early flights also important for this programme to keep its cost vs performance on the track. Information is available on SOLARNET website.

The training for solar observers at the El Teide Observatory, Tenerife - A week above the Clouds programme was organized by KIS, with the project office taking the responsibility of travel bookings of the lecturers. Students were supported by travel grants, accommodation, etc.

- Cost vs Performance
 - Total Budget allocated: € 60 000
 - Total no of students (expected during 2019 - 2022): 60
 - Finances spent in 1st event (Aug 5-9, 2019): € 16 382 (27.3 %)
 - Students trained under the 1st event: 15 (25 %)

Tirtha Som continues to emphasize the importance of visibility and pitching the scientific research generated in the form of nuggets, research highlights, popular articles, videos, press and media – all of which can be generated from peer-reviewed publications. Besides, the consortium members are requested to inform the project office about their publications in SCI journals, proceedings, posters and talks. This information is required for the periodic report due in June 2020.

Besides, it is important to organize conferences significantly ahead of time. The reasons being:

- Invitation letters for visa applications need to be sent to some participants at least 2 months in advance so that they can make their travel arrangements.
- In the invitation letter, it needs to be mentioned what allowances will be provided. Therefore, allocations of the budget portions become necessary.
- Templates are available. The project office will assist if required.
- Inform the project office at least 4 weeks in advance with complete information about the conference so that the project website can be properly organized with full information about registration, programme schedule, etc and be made available to the applicants and participants. Besides the project office will advertise about the conference in SolarNews, UK Solar Physics News and on social media channels.

Regarding Brexit and its implications on SOLARNET:

- In case of a no-deal scenario, in principle, the UK would no longer be eligible for EU funding but would continue to participate as a 'non-associated third country.
- If the UK leaves with a deal, it is foreseen that the UK would keep paying its EU budget quota to the Multiannual Financial Framework (MFF) until the end of the current budgetary period (ending on 31 December 2020). This would allow the UK to continue to participate in Horizon 2020 (including the bids) until the end of the FP, and for the lifetime of individual projects.
- Following its departure on 31 Jan, the UK will enter a transition period until 31 December 2020. Since the UK government is currently obliged (committed) to pay into the MEF programme till 31st Dec 2020, therefore we can expect full funding of SOLARNET under the H2020 framework till Dec 2022.

Discussion:

Manolo Collados comments that we need to make our publications and data open access.

Markus Roth says yes, we will use the SMN website to upload copies of our manuscripts or published papers, as the case may be, thereby making sure we provide open access to our scientific work. In the next presentation, Uwe Zell will present more about achieving an open access repository.

09:45 Report on Project Website, Project Management Tools and Data Archiving

Presented by: Uwe Zell

Uwe Zell presents the official SOLARNET Horizon2020 website with its features in addition to the Science Media Network platform which shall be used for achieving contents and materials related to the project not only during the lifetime project but also at least for a minimum duration of 10 years thereafter.

- The website www.solarnet-project.eu was created and allows presenting the project, organizing all meetings, schools, workshops, conferences, etc.
- Beneficiaries are requested to provide contents i.e. videos, posters, presentations, publications, any other digital content at solarnet-office@leibniz-kis.de. The project office will post these contents on the SOLARNET webpage.
- Besides, the beneficiaries are asked to register at Science Media <http://www.science-media.org> to be able to use the tools related to
 - Project Management
 - Making Publications 'Open Access' i.e. upload published articles or posters.
 - Register for Conferences with CID or conference identification number
 - Register Projects with PID or project identification number which will ensure all information related to particular projects to be easily identified making its contents always accessible even after the completion of the project.
 - Scientists can create a profile in Science Media and also upload content themselves.
- Regarding the use of project management tools, Uwe Zell demonstrates that the SOLARNET H2020 project has a unique Project Identifier (PID) at the SMN platform. Everyone working for the SOLARNET project can use this PID number to:
 - plan the tasks, sub-tasks, milestones, etc.
 - Main work packages have already been created. All WP leaders should receive an invitation e-mail from the project scientist.
 - WP leaders can invite other project members, sub-WP leaders and task leaders. Sub-WPs can be added as "child" to the main WP, in addition to milestones and events.
 - Use calendar functionality to track work packages or set up meetings or other events.
 - Manage and unite all information, documents, working results which belong to the specific scientific project
 - View Gantt Chart by day or by month, see dependencies and inter-connected tasks on the Gantt Chart, with predecessor & successor tasks, thereby visualize the critical path of the respective work packages.
 - For comments, feedback, and other requests, beneficiaries are requested to get in touch with uwe.zell@science-media.org.

Discussion:

Luis Bellot Rubio asks if it is possible to upload code.

Uwe Zell replies that C-code, etc currently not possible.

09:53 Status Report WP2 & WP9

Presented by: Dan Kiselman

WP2 is 'Coordination for improved exploitation of solar physics infrastructure' while WP9 is the 'Trans-National Access Programme'.

Dan Kiselman starts with WP2. This work package comprises of two different types of activities – activities that do not concern the Access Programme directly, rather focusses on research networking while parts of WP2 concerns activities related to the Transnational Access Programme. There is a total of 22 deliverables under WP2.

Under sub-WP2.1.2, the first 'Forum for Solar Telescopes and Databases' was organized at Albanova University Centre, Stockholm on 26 Nov 2019 with Stockholm University as the leading institute. SOLARNET participants, telescope and database operators anyone with an interest in these observing facilities were invited to join. Attended by 23 attendees, this Forum serves several purposes. Most important has been discussions and evaluation of the Access and Virtual Access programs, and how to serve as a contact point between service providers and users – an interface that has been refined over the years but requires more training in addition to networking concerning telescopes operations and related activities. Minutes of this forum has already been submitted to the European Commission as a deliverable 'D2.4 - Minutes from Forum Meeting 1' on December 20th, 2019.

The second forum will be organised by the University of Oslo in 2020. During the lifetime of the SOLARNET project (2019-2022), four such forums have been planned.

Activities under other sub-packages of 2.1 are ongoing, namely WP2.1.3- Coordinated observations (Lead: AIP, Participants: SU, KIS, CNRS, IAC, AISAS, MPG), WP2.1.4 - Coordination between ALMA and ground-based solar telescopes (Lead: ASU, Participants: SU, KIS, CNRS, MPG, HVAR, Ui) and WP2.1.5 - Service mode observations (Lead: SU, Participants: KIS, IAC, UiO, CNRS, QUB, INAF, UNICT, AIP).

Dan Kiselman continues with the status update of other sub-WPs. WP2.2 concerns joint research activities (JRA) - coordination and dissemination of results

WP2.2.1 concerns networking for instrumentation activities. An email-list will be created and on-line seminars arranged to facilitate communication. A workshop on solar instrumentation representing mainly the activities of WP6 and WP8 will be arranged (Milestone MS4 Workshops on 'Turbulence and Seeing' and 'Instrumentation' will be organized in early 2020). Participants: WP6 and WP8 partners will report on networking activities for instrumentation 1 (D2.11)

WP2.2.2 concerns networking for activities related to atmospheric turbulence and seeing. Networking will be facilitated between the involved partners with email-list and on-line seminars. One dedicated workshop called "MCAO for EST" will be organised (Milestone).

WP2.2.3 concerns the coordination of development of software tools for solar physics. Report on the inventory of existing software and expressed needs for solar physics data tools (D2.17) shall be provided by USFD before June 2020.

Regarding WP2.2.4 Metadata definitions for observational data, one physical meeting has been planned (D2.18, UiO, due June 2020) For WP2.2.5 Metadata definitions and database structure for numerical simulations, One joint meeting with WP2.2.4 will be organized (D2.20, UiO, due June 2020). Concerning WP2.2.6 Big-data storage possibilities, a report shall be provided by KIS before Dec 2021.

WP9 - The Transnational Access Programme involves opening the national research facilities to researchers from other countries. Facilities get paid for providing the access. Researchers get sponsorship for the travel and conducting experiments (observations).

This project aims at integrating the major European infrastructures in the field of high-resolution solar physics. 30% of the eligible cost is therefore dedicated to Access programmes. OPTICON (during FP6, FP7) together with night-time telescopes and SOLARNET FP7 have played a significant role in building the research community in the UK during the past years and also integrating and training the community for the EST. In addition to access to the ground-based solar telescopes, that was previously offered under the FP7 programme, SOLARNET H2020 additionally offers a balloon mission and computing time at the supercomputer. In addition, all acquired observational data under SOLARNET H2020 programme becomes public.

The ground-based telescopes which are currently offered under the SOLARNET access programme are:

- 1) GREGOR – the 1.4 m German telescope at Tenerife, works in PI-visitor mode, new optical instruments will be available 2020 onwards.
- 2) VTT, 70 cm, German telescope at Tenerife, also operating under PI-visitor mode, has been lacking a vacuum window. A new one has just been mounted.
- 3) SST, the 1m Swedish telescope at La Palma, also operating on PI-visitor mode, TRIPPEL (MiHI not the common-user instrument), CHROMIS+CRISP and HeSP, the later to be made available soon. As compared to SOLARNET FP7, the new features of SST under SOLARNET H2020 are sometime offered in service mode and delivery of reduced data to SOLARNET users.
- 4) THEMIS, 90 cm telescope from CNRS, France, also located at Tenerife and working under PI-visitor mode resumed observations in 2019 after installation of adaptive optics.

Other than the above, the SUNRISE 3, balloon mission (lead MPS) have been shifted to 2022. Previously it was scheduled to be held in 2021. It is to be noted that 2022 is the last year of SOLARNET. Piz Daint supercomputer, USI/IRSOL (CSCS), Switzerland has offered computing time in 2020. A major part of the machine is constituted of nodes equipped with GPUs.

The selection panel must base its selection on scientific merit, considering that priority should be given to user groups composed of users who:

- have not previously used the installation and
- are working in countries where no equivalent research infrastructure exists.

EAST time Allocation Committee is responsible for the selection of proposals for access time in SOLARNET and ITP for GREGOR, THEMIS and VTT. The members of EAST TAC are:

1. Dan Kiselman (SU): SST, chair
2. Bernard Gelly (CNRS): THEMIS
3. Lucia Kleint (KIS): GREGOR, VTT
4. Elena Khomenko (IAC): Spanish TAC
5. Andreas Lagg (MPG): SUNRISE
6. Oskar Steiner (USI/IRSOL & KIS): Piz Daint supercomputer

Status update regarding Piz Daint computing time call:

1. Call published (Aug 31)
2. Benchmarking (2 out of 5 who tried benchmarking submitted a proposal)
3. Proposal submission (Oct 24)
4. Scientific evaluation (two referees)
5. Technical evaluation (CSCS)
6. Final decision
7. Start computing (Jan 7)

The problem was CSCS/ IRSOL don't accept students as primary investigators.

WP9 access statistics is also presented to the consortium members:

	Units delivered or <i>committed</i> (2019A & B & PD)	Unit	Budget	Fraction of budget	PI countries
GREGOR	46	d	143	32 %	UK, SK, UK, CZ, UK
SST	14	d	85	16 %	DE, GR, UK, DE
THEMIS	14	d	80	18 %	IT
VTT	10	d	75	13 %	CZ
SUNRISE 3	0	h	11	0 %	none
Piz Daint	375000	node-h	1500000	25 %	DE, SE

Dan Kiselman also educates the consortium with the lessons learned from the first year of SOLARNET’s access programme and time allocation

- The advertisement campaign is lacking and needs to be ramped up.
- Lots of interest in co-observations. This makes scheduling very complicated. We could not satisfy these requests.
- Co-observing proposal should be *one* proposal. If you want to have a chance on a single telescope – submit a separate proposal.
- Piz Daint preparations and application processes are complicated. We need to educate the solar physics community.
- Important to educate the users with webinars, etc so that they are interested and able to apply for call in the correct format.

Discussion:

Dan Kiselman: For Non-EU or associated states, a max 20% is allowed. We can choose whether this quota is to be applied to each facility separately or for the whole ensemble. Should we open the call to 3rd countries?

Markus Roth: Yes, I think we should open. It will foster demonstrate interest internationally. If we can allocate the time, the make Whole ensemble for telescope open

Manolo Collados: I would also suggest opening the telescope to the rest of the world in the most flexible manner.

Other issues:

- Data produced under the Access Programme should be made public after one year.
- Observational data to be made public one year after delivery of reduced data. What about raw data?
- What about computer results being continuously produced during a year?
- What computer data?
- When will the archive for computed data become available?
- Operators are responsible for observational data archiving.
- Who is responsible for archiving the computed data?

Currently, the telescopes’ operators save the raw data and the PI is asked to take care of the data.

Dan Kiselman suggests that we need to find a solution together with WP10 and may be with higher authority. Besides, there are other things to consider. Such as:

- How to reach new users?
- A common proposal format desired
- SUNRISE 3 – what if it is postponed out of the project period?

11:10 Status Report WP3

Presented by: Francesca Zuccarello

Francesca Zuccarello presents the status report of the activities executed under WP3.

WP3 consists of 4 sub-WPs namely:

- WP3.1: Meetings and Workshops
- WP3.2: Mobility Programme
- WP3.3: Training Programme
- WP3.4: Summer & Winter Schools

She starts with WP3.1 Meetings stating:

- Dates & Venues of two meetings have been decided.
- The first announcement about the meetings to be done in 2020 was released in December 2019.

Time	Title	Location	Organizer
Y2/Q3 (5-9 Oct 2020)	Sun and Society	Italy (Venice International University in the Island of San Servolo, Venice)	UNITOV
Y3/Q3 (20 -24 Sept 2021)	The Many Scales of the Magnetic Sun	Germany (Potsdam)	AIP
Y4/Q3 (Sept 2022)	The Sun as a paradigm in astrophysics	Italy (Catania)	UNICT

Details on Meeting ‘Sun and Society’ is provided:

- Organizer (chair): Francesco Berrilli (UNITOV)
- Information about conference organization available at: <http://science-media.org/conference/36>
- Goal of the meeting: To create and tighten links between solar science and society by involving the Heliophysics scientists, stakeholders and economists.
- First announcement on Solar News (mid-December issue)
- SOLARNET budget 20 k€
- Request of support submitted to INAF, ASI, EIE, Telespazio
- Possibility to publish proceedings of the meeting by Springer, (free or ~11 k€ for open access) or by EDPS (free)

Markus Roth suggests here that due to budgetary constraints, open access will be made available via Science Media Network.

She continues that concerning the workshops:

- EC funds, per event (10 k€/Workshop), will be provided to support organizational costs and travel expenses for invited speakers.
- The topics of the workshops will be defined during the execution of the project, in order to ensure timely recognition and reflection of newly emerging topics, enabling to address new opportunity to be shared, discussed, worked-out by the participants, both on a theoretical and observational basis.
- It is foreseen to organize up to 3 workshops with an average duration of 2-3 days. The budget for each workshop is ring-fenced at 10 k€.
- The other part of this budget is used to issue travel grants for young researchers for their participation at other international meetings devoted to high-resolution solar physics.
- The first SOLARNET supported Workshop will be held on March 24–27, 2020 at the Nordita, AlbaNova University Centre on topic ‘The shifting paradigm of stellar convection’. The applicant has been Petri J. Kapyła from the Institut für Astrophysik, Georg-August-Universität at Göttingen, Germany / Computer Science Department, Aalto University, Espoo, Finland. 60 attendees are

expected to participate and SOLARNET support of €4000 will be provided under WP3 of the Grant Agreement.

She outlines the procedure to provide funds for future workshops. Periodic Calls (1 call/year) will be released on Solar News, SOLARNET Consortium. Applicants have to submit a proposal with the following information.

- Title
- Venue and date
- Institute organizing the event
- Contact person (e-mail, telephone number, address)
- Rational and scientific aim of the Workshop
- Preliminary Scientific Programme and a preliminary list of Invited Speakers
- Scientific Organizing Committee (SOC) and Local Organizing Committee (LOC)
- Foreseen number of participants
- Presumed total cost of the Workshop and other sources of support
- Amount requested

WP3.2 involves Mobility Programme for Early Career & Senior Researchers. It is aimed at promoting visits of Ph.D. students, young post-docs and senior researchers at host institutions

- Web-page information with a description of the 27 host institutions is available.
- Two periodic calls are released (2 calls/year).
- Applications can be submitted anytime with two deadlines – May 31st and November 30th.
- Evaluation of the applicant's proposals by a Committee (Mobility Evaluation Committee, MEC)
- Total 120k€ funds available for this activity and 30 ESR and 15 SRs will be funded under this programme.
- First Call: April 30th, 2019
 - Applications received: Young Researchers = 7; Senior Researchers = 1
 - Applications granted: Young Researchers = 5; Senior Researchers = 1
 - Ratio of male: female researchers: 1:1
- Second Call: October 15th, 2019
 - Applications received: Young Researchers = 11; Senior Researchers = 4
 - Applications granted: Young Researchers = 3; Senior Researchers = 3
 - Ratio of male: female researchers: 2:1

WP3.3 involves Training for Solar Observers — A week above the clouds

- Short stays of students and young postdocs at the Observatorio del Teide for one week each year to learn about solar ground-based high-resolution observations.
- Allocated funds: 15k€/ year, to cover accommodation for 15 students and 7 lecturers and to support travel for students.
- KIS provides access to the VTT and GREGOR telescopes for these weeks.
- The first Training activity took place on 5 – 9 August 2019
- Lectures on topics related to data acquisition, calibration, and analysis.
- Real observations at the telescope by groups led by an experienced observer.

Francesca Zuccarello also provides details of the SOLARNET's Summer and Winter Schools (WP3.4) which has been planned (table shared below). In each of these schools about 25-30 early career researchers are expected to participate. EC funds, per event: (20 k€/event), are provided to support organizational costs and travel expenses for young researchers and invited speakers.

Time	Schools	Location	Organizer
Y1/Q2 (9 - 14 Sept 2019)	Solar spectropolarimetry: From real to virtual observations	Switzerland (Lugano) (25 ESRs have already participated and very positive feedback received from attendees).	USI/IRSOL
Y2/Q1 (23 - 27 March 2020)	A holistic view of the solar atmosphere – combining space and ground-based observations	UK (MSSL) Registration ongoing	MSSL/UCL
Y2/Q4 (31 August – 4 September 2020)	High-resolution solar observations	Austria (Graz)	UNIGRAZ
Y3/Q2 (May 2021)	Solar corona - complex research from ground-base and space	Slovakia (Tatranska-Lomnica)	AISAS
Y4/Q2 (May 2022)	Solar atmospheric dynamics - From waves to instabilities and jets	Hungary (GSO, Gyula)	USFD

Regarding fulfilling the milestones under WP3 before the first periodic report deadline (due June 2020), the first week above the clouds - First training week for Solar Observers (MS6) and First school on Spectropolarimetry (MS7) have already been fulfilled in 2019. Regarding the first science meeting (MS5), it had to be postponed to October 2020 to attract a larger number of participants and to avoid overlapping period with European Solar Physics Meeting (ESPM-16 at Turin).

Plan for the next months under WP3 involves:

- Collection of reports from Young and Senior Researchers selected after the 1st Mobility Call (D3.3 due June 2020)
- Young and Senior Researchers selected after the 2nd Mobility Call starts visiting the host institutions
- The second SOLARNET School takes place at UCL/MSSL.
- Start the organization of the 3rd SOLARNET School (by UniGraz)
- Continue with organization of the first SOLARNET Meeting (by UNITOV)
- Release call for workshop support

She thanks all collaborators of WP3 who helps her in organizing the different programmes of SOLARNET, conferences, schools, and meetings.

Discussion:

Markus Roth comments that we should start organizing the conferences early enough to attract the largest number of participants. This would also give us the time to upload the required content materials online. We also need to upload the materials for a week above the clouds.

11:25 Status Report WP4

Presented by: Richard Morton

Richard Morton describes the objectives of WP4. These are:

- Build capacity in the SOLARNET community through public engagement training.
- Share best practice in effectively utilising outreach to engage and educate, engendering changes in attitudes – both amongst consortium members and the general public.
- Share key achievements of the consortium and related science with the wider research community and the general public.
- Develop and maintain the plan for the dissemination and exploitation of the project's results and the data management plan.

He goes on to highlight the achievements under this WP4 during the first year of SOLARNET. These are:

- Task 4.2.1 Development of infrastructure and maintenance of SOLARNET community website i.e. <https://solarnet-project.eu/>
- Milestones MS4.1 and Deliverables D4.1 – which are related to the delivery of the first version of the SOLARNET website.
- Task 4.2.4 Delivery of online content (on-going). Under this, the scientists’ profile of the consortium members is being highlighted (under joint research and networking section) to showcase the community diversity of the people involved in addition to the varied careers in solar physics. <https://solarnet-project.eu/People>
Those consortium members who have not submitted their profiles yet are requested to submit it to the project office.
- Besides, the conference platform (under the event section) in the SOLARNET website is dedicated to maintaining information for all schools, workshops, and conferences organized within the SOLARNET project.
- The ‘News Room’ section of the website enables submission of news, achievements, etc which can be useful to enhance visibility. It will be fantastic to have a short story after:
 - each SOLARNET event,
 - milestones the are met,
 - Research publications
 - Any other exciting developmentand advertise these new more widely in social media.
- Based on feedback questionnaires from the participants of the week above clouds programme, two attendees were contacted for details comments which were used to publish news articles (<https://solarnet-project.eu/Press-and-Public-Outreach>) and their testimonial about the event will in used to report the socio-economic impact of the SOLARNET project.

As a part of SOLARNET’ WP4.1 Public Engagement Training Workshop

- Two training workshops are planned and aimed at both early career and senior researchers. These will be facilitated by highly experienced and award-winning public engagement professionals, who’ve worked with researchers of all levels.
- The idea is to build confidence, skills & perspective for a wide range of communication activities & situations.
- First workshop will be loosely themed around engagement with schools and will be held between 31st March – 1st April 2020, at Northumbria University, Newcastle, UK
- The second workshop (in 2021) will have elements of collaboration masterclass.
- Under this Task 4.1.1 is aimed towards design Continued Professional Development (CPD) workshops.

Richard Morton continues to provide more details on the 1st SOLARNET Public Engagement Training Workshop to be held between March 31 – April 1, 2020 at NU. This workshop will cover:

- Why do we want to 'engage the public with science?'
- Designing for evaluation, pathways to impact, and writing engagement into research bids.
- Contexts and approaches: the range of opportunities available for science communication.
- How to talk to people? i.e. understanding your audience and the 'communication' part of 'science communication'.
- Unconscious bias: implications and mitigations.
- Empty vessels to science capital and co-creation: developments and trends within the public engagement.
- Besides, NU plans to deliver short sessions on public engagement at least 3 summer/winter schools of SOLARNET in addition to '*An introduction to science communication*' targeted at students and early career researchers. Specific evaluation exercises are to be associated with public engagement training. These schools include, but not limited to:
 - A holistic view of the solar atmosphere (UK 2020)
 - Solar corona - complex research from ground-based and space (Slovakia 2021)
 - Solar atmospheric dynamics - From waves to instabilities and jets. (UK 2022)

Within WP4.1 'Community attitudes to outreach', the activities are involving:

- Collecting data on the 'attitudes towards public engagement' across the member organisations and researchers in EU. We would like to explore how attitudes and activities differ between countries.
- Towards the end of the SOLARNET project, a similar survey will be sent out to look at any changes in attitudes and activities during the SOLARNET project.
- Potential for publication – 'First EU wide survey of attitudes of researchers to public engagement'. REQUIRES community engagement. Consortium members are therefore required to complete the questionnaire: <https://northumbria.onlinesurveys.ac.uk/solarnet-publicengagement-survey-2019-2>
- Along with following up surveys can be put forward as evidence for socio-economic impact.

Activities planned for the year 2020 under WP4 are:

- To provide initial resources for training and outreach for consortium members (Deliverable D4.2, due Month 18)
- Support continued community development and post-workshop activities.
- Workshop content and additional training materials will be made open access online.
- Looking to include presentations/ activities from partners, include sharing by best practices.
- Contacting scientists & individuals who expressed interest in being involved in outreach in schools. Printable cards to be used as part of the engagement with young students.
- Provide an alternative scientist profile to be used in school outreach:
 - Highlight people who work in science
 - Different jobs available
 - Attributes required for scientist
- Provide the 'Exploitation, Dissemination & Communication Plan' (Deliverable 4.5, due Month 18)
- Contribution to 'Sun & Society' Conference. The objective of this meeting is to create and tighten links between solar science and society by involving the Heliophysics scientists, stakeholders and economists. An article for popular science magazine (or editorial) that looks at Sun & Society, including discussions from all parties. Consortium members are welcomed to provide ideas.
- Encouraging consortium members to submit bite-size science articles with 7-8 paragraphs and 2-3 pictures (typically Nuggets) potentially modelled on UKSP nuggets (<http://www.uksolphys.org/uksp-nuggets/>), highlighting (summarizing) recent works. Typical UKSP Nuggets get 100 views in the first week. Over lifetime every nugget gets ~1000 views.

11:46 Status Report WP5

Towards a European Solar Data Centre

Presented by: Nazaret Bello González

Contributed by: Everyone involved in WP5

Nazaret begins by stating the backgrounds and requirements for a European Solar Data Centre. A couple of European ground-based solar observation facilities exist offering a range of different capabilities. In spite of the European participation in the DKIST/US project and the strong efforts by the European solar physics community to build the European solar telescope in the Canary Islands, it is envisaged that a European Open Science Cloud acting as the virtual environment for all researchers to store, manage, analyse and re-use data for research, innovation and educational purposes is one of the most important requirements. However, the biggest challenge is the increasing number of data volumes and the amount of data set flow will continue to rise with the increase of ground-based solar observations. In fact, as part of SOLARNET FP7 efforts towards data dissemination and describing standards for data achieving has been directed, documented and made available at:

http://sdc.uio.no/open/solarnet-20.3/WP20.3%20Deliverable%20D20.4_v1.2.pdf

Therefore, the WP5 focusses on the data centre activities of common interest to the Solar Physics Community for the curation and dissemination of solar data, to boost its use & re-use and thereby optimize its scientific exploitation. With 15 participating institutes and a total of 228 person-months involved, these common efforts can be understood as the first steps towards building up a European Solar Data Centre envisaged for EST.

Four major sequential activities or sub-WPs are involved. These are 1) Data Calibration, 2) Data Archiving, 3) Data Dissemination and 4) High-level Data Products. Under the canopy of 'Data Calibration', the activities involved are the development of data pipelines, Real-time image reconstruction, Image restoration for EST, combining *speckle* & MOMFBD and slit-spectra reconstruction. Activities involved as part of 'Data Archiving' include curation of existing/archived data, Solar database mining technologies and machine learning for identification and classification of solar features. The major activity involved in 'Data Dissemination' is Solar Virtual Observatory (SVO) - from a prototype to an operational VO while actions under 'High-level Data Products' involve the development of visualization tools for multi-instrument and simulated data, basic computational tools, high-level data, and analysis tools.

Regarding deliverables, D5.6 – Assessment report of suitable CNN architectures (lead: AIP) has already been submitted in the EU commission's online portal in Dec 2019. Concerning D5.12 – Release of 'Basic Computational Tools' and high-level analysis tools due in month 18 (lead: USFD), has been completed and currently under discussion on how to release these computational tools, whether to put in on a common platform. Besides, the required hirings have been done. Some institutes found a solution by deploying the personnel already working at the institutes to contribute towards WP5.

Discussion:

Markus Roth: We had a discussion with WP2 how to archive data? Are there considerations on how to archive data coming from solar observations?

Nazaret Bello González says data stays at home institute archive and become publicly available. Regarding computational tools, we are trying to figure things out.

Markus Roth: How to archive the supercomputer data, considering SMN cannot provide for its archiving as of now.

Mats Carlsson: That would be in the range of terabytes or gigabytes

Robertus Erdelyi: At the moment it can be uploaded on github. Each software has its description, how to run.

Markus Roth: We can collect the software in the zip along with the documentation and upload in EU portal for evaluation. We put on the SOLARNET website how we can access the code.

12:03 Status Report WP6

Advanced Instrumentation Development

Introduction presented by Manuel Collados.

This WP fundamental for defining the innovative instrumentation for EST. In a sense it is a continuation of SOLARNET FP7 and GREST. Manuel Collados introduced the different tasks in this WP.

Task 1: Improvements of techniques of image slicers for 2D spectroscopy

With IAC as the lead and Winlight Systems and NAOJ as the collaborators, the goal is to increase the spatial resolution, which can only be achieved by having thinner slicers (reduce the slicers from 100 μm to \rightarrow 30-70 μm)

Two strategies will be followed to that aim:

- glass slicers (to be produced by Winlight Systems)
- metallic slicers (to be produced by NAOJ)

The two alternatives will be pursued and compared in order to decide the best option for EST.

Besides, they will be tested at the lab and the best slicer will be tested at GREGOR telescope.

Task 2: Microlens-fed spectrograph

With MPS as the lead, the goal here is to increase the field of view (FOV) for which the requirements are:

- Larger number and smaller microlenses are needed
- 30k \times 30 k detector would be needed \rightarrow FOV splitting + sensor mosaic
- However, the challenges are data handling, reduction and image restoration

Task 3: Design concept of a Narrow-Band Tunable-Filter Imager for EST

With UNITOV as the lead and IAC, INAF, KIS, SU, BDP and E&M as collaborators, the aim here is to define the optimum configuration of the EST Narrow-Band Tunable-Filter Imagers

1. Configuration trade-offs involved

- telecentric or classical mount
- lens, mirrors or catadioptric system
- plane or 3D set-up

2. Optical design

- optical performance
- stray light analysis

Task 4: Absolute high precision polarization measurements

With USI/ IRSOL as the lead the aim here is to establish the technique to measure absolute (linear and circular) polarisation, with high spatial resolution and applicable to solar telescopes with large aperture technique based on combined slow as well as fast modulation

1. Analytical study of optimum modulation schemes
2. Tests to explore the strengths and limitations of the method
3. Design and construct a prototype system for GREGOR
4. Telescope tests

Sub-WP6.1 Improvements of techniques of image slicers for 2D spectroscopy

Presented by Carlos Dominguez, on behalf of the sWP team

Carlos Dominguez presents the heritage of SOLARNET consortium and previous experience of using integrated optics stating that the prototype for IFU (1st Image slicer) developed in SOLARNET FP7, design for multi-slit IFU developed as part of GREST while in SOLARNET H2020, the objective of this sub-WP is to develop Prototype for thinner slicers.

The current objective is to increase the spatial resolution and feasibility of manufacturing and testing thinner slicers (as prototype). This is done in cooperation with the partners Winlight Systems (previously known as

Winlight Optics) and NAOJ by two approaches – using glass and metallic slicers. Zerodur glass slicers has been thinned down from 100 μm to 70 μm while metallic slicers from 50 μm to 35 μm . In fact, based on the experience from previous designs, these two different types of slicers (metallic and zerodur glass) could be coupled to the spectrograph GRIS.

Carlos presents the optical designs with both zerodur image slicer (70 μm) and metallic slicer (35 μm). Winlight Systems have demonstrated the ability to manufacture thin zerodur slices (50 and 70 μm). These manufactured slicers have already been tested for geometry, surface roughness during processing. The 70 μm slicers exhibit very good results. NAOJ-NINS have also demonstrated their ability to manufacture thin metallic slicers. The metallic slicers have also been investigated by scanning electron microscopy for properties like surface roughness, coating quality with silver, thermal cycles etc. NAOJ have received a Japanese research grant for fabrication of metallic slicers. They will deliver it mid-Feb 2020.

Report on absolute high-precision polarization measurements

Presented by: M. Bianda

Contributors: F. Zeuner, D. Gisler & M. Bianda

Absolute high-precision spectropolarimetry requires to minimize

- seeing-induced cross-talk (SIC)
- telescope polarization
- telescope-induced cross-talk
- post-focus instrument errors

Current set-up at IRSOL is presented with the retarder film and heat reflector in front of the telescope with a motor to rotate. The problems encountered are aperture-size achromatic and unavailability of homogeneous $\lambda/2$ retarders. In general, retardance $\delta(\lambda, x, y)$ depends on wavelength and position within the retarder. IRSOL solution to the above problems involve

- Use of cheap retarder film
- 8 angle positions of TCU (22.5° per step) → to correct for additional cross-talk induced by zero-order retarder
- up to now, only Q and U are correctable
- wavelength range 3800 Å – 8000 Å with retardations 0.4-0.6

The advantages of the above set-up are:

- first correction in front of the telescope
- broad wavelength range with cheap device
- correction of cross-talks and offsets induced by telescope and post-focus instruments, removal of camera-defects.

It thereby allows for absolute high-precision spectropolarimetry

The disadvantages of the above set-up are:

- slow second modulation
- low spatial resolution
- reduction of efficiency
- up to now, only *Q-offset* and *U-offset* are corrected

Work planned for 2020 are as follows:

- Finding optimal modulation scheme by analytically studying the method
- Extensive testing of the method in different wavelength regimes
- Limits of method regarding the spatial resolution
- Extent method to correct for full Stokes
- First planning to extent the novel measurement method with absolute high accuracy to GREGOR telescope

Sub-WP6.2 Reports on the Microlens Spectrograph

Presented by: **Michiel van Noort**

- Optical designs are [more than] 6 months behind due to difficulties in hiring an optical engineer
 - D61: Splitter designed and type selected finished)
 - D61: MLA design (in progress)
- Calibration: forward modelling software exists, can fit coordinates and simplified PSF
 - Forward modelling software (finished)
 - Fit coordinates and simplified PSF (in progress)
 - Obtain good field information (TBD)
- Image restoration:
 - Machine Learning MFBD (in progress)
 - D62: Restore single segment ([mostly] complete)
 - D63: Restore multiple segments (TBD)

Comment:

Carsten Denker: most of the used optics also developed at AIP. We have the optical engineering and micro-photonics expertise. We can step in if you want.

Lunch break: 12:52

14:03 sWP6.3 Design concept of a Narrow-Band Tunable-Filter Imager for EST

Presented by: **Luca Giovannelli**

Contributors: **Francesco Berrilli, Dario Del Moro, Luca Giovannelli, Daniele Gallieni, Fabrizio Liberati, Francesco Bianchi**

Luca Giovannelli give an overview of the activities carried out under this sub-WP during the first year of SOLARNET. These includes:

- Hiring of one post-doctoral research scientist.
- Summoning 4 EST dedicated meetings between BDP E&M and UNITOV in first 12 months
- Executing the required networking activities between UNITOV, ADS int. and BDP E&M

The baseline documents used as a reference for this review are:

- "European Solar Telescope: Conceptual Design Study Report" (CDSR, version RPT-EST-0001 Issue:2.A, 2011)
- Science Requirement Document (SRD) for EST (30 May 2019 version) prepared by the EST Science Advisory Group (SAG) under the H2020 PRE-EST project.

Deliverable D6.12 (UNITOV) has been submitted and D6.13 (UNITOV) due in June 2020.

Parameters to be considered for the trade-off analysis are:

- Instrument Spectral Resolution
- Classic mount vs telecentric mount
- Number of NBIs and light distribution in 5 different bands
- FOV
- Synergies with other instruments
- FOV rotation
- Optical design to have high transparency in preferred lines
- High cadence observations

Technical requirements are being studied and feasibility tests will be carried out and reported in D6.13.

14:13 Status Report WP7

Multi-Conjugate Adaptive Optics for EST

Presented by: Oskar von der Lühe, Miguel Núñez, Javier de Cos Juez

Contributors: Everyone involved in WP8

First of all, Oskar von der Lühe presents the primary objectives under this WP. These are:

- Develop and prototype MCAO systems that represent the EST MCAO.
- Test the prototypes in the laboratory and at the GREGOR solar telescope in Tenerife.
- Develop and test alternative concepts based on neural networks for controlling the MCAO.
- Develop tools to characterize the performance of solar MCAO as an input to WP 5.
- Characterize the high-altitude turbulence at the EST sites and investigate turbulence prediction.
- Develop EST-specific wavefront sensor and deformable mirror technology.

WP8 consists of 4 sub-WPs. These are:

- Prototype development (involving institutes KIS lead, IAC, Durham, Oviedo, ALPAO)
- Neural Network Control (involving institutes Oviedo lead, IAC, KIS)
- Performance characterization (involving institutes SU lead, HES-SO KIS, IOSB)
- Technology development (involving institutes INAF lead, ALPAO)

Oskar von der Lühe continues, the activities at KIS concerning prototype development involve:

- Building, testing, and verification of a version of the EST MCAO system which is scaled down to a 1.5 m pupil
- Performing on-sky testing and verification at GREGOR
 - Goal is to demonstrate compensation of a 1 arcmin field
- Integrating four volume control deformable mirrors (DMs)
 - Use existing pupil conjugate DM at GREGOR
- Use existing GREGOR SCAO and MCAO prototype to test/verify new wavefront sensing and control concepts

As far as the status of MCAO development at KIS is concerned, the optical design has been completed, the O-M layout hinges on the completion of GREGOR lab layout has been finalized, one DM purchased, others to follow this year. Paraxial ray diagrams for the MCAO setup for toric collimator/camera mirrors in addition to the wavefront map error maps are presented. The DM from ALPAO makes it possible for the necessary measurements at high altitude.

14:23 Miguel Núñez presents the developments of the prototype in IAC laboratory.

The main objectives being:

- Develop, validate and optimize stable and robust MCAO strategies that can be used in EST to correct a FOV of 40"x40"
- Validate mathematical models on a real bench (including pupil misregistration)
- Select the optimal deformable mirror and wavefront sensing configuration for EST MCAO
- Test and optimize control strategies in a real system

Miguel provides an update of the present status. These are:

- Cameras have arrived and have been tested
- Phase screens have partially arrived
- MCAO Simulations are in progress
- Optical design and optical integration reports completed and procurement in progress
- Deformable mirrors call for tender complete
- Illumination system design report completed
- Real-time software customization (DARC) in progress

- System engineering updated
- Electronics design report and Mech. Requirements completed

A Gantt Chart is presented showing the activities planned for the next couple of months.

MACO Simulations are currently in progress as well, with a status update as follows:

- Simulations with DASP (telescope 1.5m, limited so far by computer power):
 - Atmosphere configurations. $r_0(500\text{nm}) = 8\text{cm}, 15\text{cm}, 25\text{cm}$
 - Closed-loop integrating simulator and real-time controller (DASP+DARC)
- Simulations with Proper to study pupil distortion (telescope 1m):
 - 2 WFS configurations:
 - 1 WFS right after DM0, another after altitude DMs. Stable but low performance.
 - WFSs after all the DMs. Better performance and it is confirmed that the pupil misregistration is a dominant factor.
 - 2 different reconstruction strategies are being simulated:
 - Classical reconstruction. Only stable with good seeing.
 - Pseudo open Loop. It increases stability for bad seeing
- Telescope configuration for 1m is limited by computing power to be solved with the new RT computers.
- Atmosphere configurations. $r_0(550\text{nm}) = 8\text{cm}, 15\text{cm}, 25\text{cm}$
- 2 WFS configurations:
 - WFS right after DM0. Stable but low performance.
 - WFS after all the DMs. Better performance and it is confirmed that the pupil misregistration is a dominant factor.
- Debugging simulations with real-time controller integrated (DARC+DASP)

14:35 Javier de Cos Juez presents a status update on the activities carried out under sub-WP 7.2 Neural Network Control System

The objectives are:

- Evaluate the feasibility of a tomographic reconstruction based on Convolutional Neural Networks (CNN)
- Take advantage of the high potential of deep-learning techniques which are specially adapted to the problem
 - UNIOVI has already successfully implemented such a technique for night time adaptive optics applications
- Integrate CNN control system into the prototype for on-sky evaluation/verification

Reports of fully-convolutional artificial neural networks (ANN) are presented. The inputs are images whereas the outputs are new images. It combines convolutional layers and deconvolutional layers to obtain a new image. However, the main problems encountered are:

- To generalize, a huge training dataset is needed
- "We need to feed our net, during the training, with many images from different parts of the Sun"

Potential solutions suggested are:

- Simplify the input (correlation images)
- Simplify the output (DM actuators)

Better results are thereby obtained using reconstruction in pre-trained areas of the Sun. Test 1500 different images (500 images from a pre-trained area of the Sun and 1000 images from two different "unknown areas") under different atmospheric conditions demonstrates significantly improved results (improved image quality on a global scale – showing original and reconstructed phase). Images of wavefront sensor simulation with anisoplanatism are also presented.

Concerning sub-WP 7.3 - Performance Characterization and Prediction, the objectives being:

- Develop tools to characterize the performance of the EST MCAO system and to generate the information needed to remove the residual disturbances from observed data (LE-PSF; interface to WP 5)
- Differential Characterization of RdIM and OT sites
- Evaluate forecast techniques for relevant atmospheric parameters

The status report is:

- WF-WFS measurements underway at SST and VTT
 - Issues with low quality at VTT not understood. May be related to the entrance window which so far was missing, but requires further investigation.
- Report on data survey for turbulence prediction has been delivered by INAF (D7.11)
- IOSB carried out observing campaign at RdIM in Summer 2019
- HES-SO is working on MCAO and AO telemetry data

Oskar von der Lühe presents the activities carried out under sub-WP 7.4 Technology Research (lead INAF)

- Strategies to parallelize wavefront sensing for a 4m aperture telescope
 - Distributed wavefront sensing with several cameras
- Deformable mirror technologies
 - Heat management for large format DMs for solar applications
 - Migration of CHARA anisotropic actuator patterns for 45° illumination for solar applications
- Large Format Detectors for MCAO
 - Size and framerate requirements for wide-field WFS cannot be met by current technologies
 - Investigate possibilities for multi-camera designs

Concerning deliverables D7.1 (KIS), D7.11 (INAF) and D7.15 (INAF) have been submitted. In 2020, D7.2 (IAC) is due in June 2020, and D7.12 (INAF) and D7.16 (INAF) are due in Dec 2020.

15:05 Status Report WP8

Solar Physics Research Integrated Network Group SPRING

Presented by: Markus Roth and Luis Bellot-Rubio

Contributors: Markus Roth, Luis Bellot-Rubio, Dirk Soltau, Robbe Vansintjan, Astrid Veronig

Markus Roth describes the needs and demands for Synoptic Observations of the Sun. These are:

- Long term monitoring of the solar magnetic fields
 - to understand solar dynamo
 - evolution with solar cycle (polar and active region fields)
 - Active region evolution for space weather studies
 - surface flows via feature tracking
- Long term monitoring of velocity fields
 - subsurface flows via helioseismology
 - solar cycle variations and relationship to solar dynamo
 - Flows beneath emerging flux regions and active regions for space weather studies
- Context imaging for next-generation high-res telescopes such as DKIST and EST
 - Large scale effects (flares, filament eruptions) of small-scale events such as flux emergence
 - Technically the full disk image could support the pointing system

However, current synoptic facilities cannot serve all these new demands.

The objective of this work package is to translate the technical concept for SPRING (Solar Physics Research Integrated Network Group), a new ground-based network of telescopes developed under SOLARNET during the EU FP7 funding period 2013 – 2017, into a preliminary design. The key scientific areas supported by this facility are:

1. Solar awareness (arc-second resolution context images)
2. Synoptic magnetic fields (activity complexes, solar magnetic cycle)

3. Synoptic velocity fields (surface and interior dynamics, wave phenomena, helioseismology)
4. Transient events (flares, active region evolution, space weather)

The next steps required towards building such a network are

- Design of the mounts.
- Design of telescopes.
- Design and proto-typing of the post focus instruments.
- Definition of the data processing pipelines.

The next steps required towards building such a network (activities ongoing) are:

- WP8.1 Design of the mounting and telescopes
- WP8.2 Design and proto-typing of the post focus instruments
- WP8.3 Definition of the data processing pipelines

Markus Roth proceeds to describe the detailed activities ongoing under each of these sub-WPs.

WP8.1 Design of telescopes and instrument platform

One (50 cm) telescope is required for precise magnetic field measurements of the full-disk which has been optimized for wavelengths between 0.38 to 1.56 microns

Besides, full-disk imaging telescopes in parallel to provide data in white light and in several wavelength ranges in the blue (3933 – 5434 Angstroms), red (5890 – 6768 Angstroms) and infrared (8542 – 15648 Angstroms)

1. Revisiting the technical feasibility document - in this context science requirements were discussed at
 - workshop in Freiburg April 29 & 30, 2019 (materials are available online)
 - videoconference with US partners, May 15, 2019.
 - workshop in Boulder with participants from NSO, HAO, NOAA, Airforce on September 26 and 27, 2019 at HAO and NSO.
2. Updating the design for the front-end telescopes
 - ZEMAX model for small telescopes done at KIS and in consultation with NSO and HAO
 - Meeting with AMOS on December 18th, 2019 to start elaborating details.
3. First thoughts on the pointing strategy were made.

WP8.2 Post-focus instrumentation

1. Creating ZEMAX models for Fabry-Perot system
 - Instruments and detector define the telescope
 - Meeting with ICOS, a company in the UK, to discuss the next steps on the possible size & environment of Etalons
2. Prototype of SPRINGRIDE (FPI-based 2D filtergraph instrument) is ready
 - Setup of Fabry-Perot at the VTT for full-disk observations / various options discussed
 - Collimated mode leads to strong blueshift, which affects cadence
 - Experience with IBIS to be discussed with colleagues at INAF and UTORV
 - Work on concepts for the inclusion of polarimeter started
 - Programming the control system for SPRINGRIDE completed
 - First setup was done on Tenerife in June 2019 at VTT.
 - Observation campaign scheduled for October 2019. But VTT affected by power failure.
3. Telescope mounting and feed

Although the original thought was to place the telescope and instruments on a common mount, however recent developments suggest for a stationary (vertical) instrument table, e.g. large etalons better be on a stationary platform light-feed needed that could feed three telescopes at a time. There have been new considerations for vertical set-up. The advantage would be to move the telescope 6 m above ground seeing level.

Regarding the other sub-WPs of WP8, the following updates have been provided.

D8.3 Data Processing

D8.4 Technical feasibility report on the rationale and results of the quasi-real-time Lucky-Imaging data-reduction pipeline at ORB (Month 42).

D8.5 Report on Demonstration Platform and results of Lucky-Imaging using multi-instrument data (Month 42) Acquisition of a joined data set from KSO and ORB (Obs. campaign)

Investigation of Image Stacking with Deep Learning

D8.8 Software for data calibration, data merging (Month 48)

Acquisition of a joined data set from existing European infrastructure (campaign & archive)

Development of cloud detection algorithm (ongoing)

Solar image enhancement with Deep Learning (ongoing)

Programs for data reduction of CLV and global Inhomogeneities (ongoing)

D8.9 Report on rationale and results of the data homogenization and multi-instrument flare detection developed and tested on archival data (Month 30)

Flare detection with Deep Learning based on H- α images (started)

15:23 sub-WP8.3.2 - Luis Bellot-Rubio explains data calibration, merging and inversions

- Tasks T4, T5 and T6 have been accomplished
- C-MILOS: Stokes inversion code developed and tested
 - Based on 1-component ME atmosphere
 - Instrumental PSF considered
 - Written in C
 - FITS files for I/O, following SOLARNET standard
 - SIR-like control files, to facilitate the use
 - Sequential and parallel versions
 - Parallel code based on MPI

The codes are publicly available on github: <https://github.com/IAA-InvCodes/C-MILOS>

The future plan involves to continue optimization of parallel code, implement and test new parallelization strategies and design GPU implementation.

The participants of WP8 acknowledge the usage of the Skoltech CDISE HPC cluster (Arkuda) for obtaining the results presented here. The computational results presented have been achieved using the Vienna Scientific Cluster (VSC).

Markus Roth concludes by saying that the first deliverables under this WP, i.e. D8.1, D8.4 and D8.6 due on Month 24 of the project might be delivered earlier.

16:07 Status Report WP10

Presented by: Mats Carlsson

- The Virtual Access Programme, aiming to provide the e-Access to Research Infrastructure has 5 institutes participating (UiO, ORB, SU, INAF, and KIS) with UiO as the lead. There are six deliverables, two for each reporting period (i.e. on 18th, 36th and 48th months), which will contain statistics and conclusions out of them.
- The examples from Hinode and SDO-AIA from SOLARNET FP7 will be followed.
- The SVO at Stockholm will have the SOLARNET SST data available in 2020. With IBIS-A (INAF), more data (29 TB) is produced now with 26 campaigns, 152 days (2012-2019). GREGOR (GRIS) data archive with more functionality to be made available such as full automatization of calibration and injection.
- There is a plan to add more calibrated data.

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- Statistics reporting procedures are being implemented - 229 accesses, 123 users (22 Italy, 6 Germany, 2 Spain, 1 France, 83 USA, 4 China, 1 Canada, 1 Korea, 3 Egypt).
 - An external committee will access this virtual infrastructure support.

16:25 Any Other Business

Markus Roth: We need to find a host for the 2nd SOLARNET General Assembly if someone wants to organize it. Besides, we need to agree on the venue and date. It needs to be by the 3rd week of January 2021 because the minutes are connected to the deliverable due January end 2021. We can coordinate with PRE-EST to reduce travel costs.

Manuel Collados: When is your mid-term?

Markus Roth: We need to set-up a date with the project officer. In that case, it is usually in Brussels.

Tirtha Som: Some basic information regarding the recording of (reliable) time-sheets which we gathered from our national contact point.

- For people working on multiple EU projects are required to fill out one time-sheet mentioning all the projects and the WPs they are involved with.
- We should be able to quantify the time spent on project-related task/ WPs (in-kind contributions, project-based remuneration, etc.)
- Holidays, sick-leave, dates of traveling, etc. should be mentioned in the time-sheet (travel-cost should be justifiable).
- Signature, date, countersigned
- Keep a detailed record of everything. Eliminate systematic errors. Cost-breakdown per reporting period needs to be provided.