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1. Hot News

- We proudly announce that AFFECTS has recently released a **project poster** for dissemination issues. The 2 available versions are uploaded on the website: <http://www.affects-fp7.eu/pr/poster/>
- **“Forecasts” reports** are now available at the AFFECTS homepage – <http://www.affects-fp7.eu/forecasts/>
- **July 12, 2012 CME arrived Earth delayed – see AFFECTS “Forecasts” page.**
- The **4th HELIO Coordinated Data Analysis Workshop (CDAW-4)** will be held at the Trinity College Dublin (Ireland) on 4th-7th September 2012. The general science objective of the CDAW is to exercise the HELIO infrastructure by studying use cases that require observations made at multiple points in the Solar System, as e.g. propagation studies of CMEs and SEPs from their solar source toward 1 AU and beyond. Details of the CDAW can be found at http://helio-vo.eu/helio-cdaw/HELIO_CDAW-4.html - there is also a link to CDAW-w on the main HELIO page.

2. News from the European Commission

- On July 10th the European Commission announced the **largest set of calls** ever under the 7th Framework Programme (FP7). The topic space will receive 126 million euro. All information is available here: <http://ec.europa.eu/research/participants/portal/page/cooperation?callIdentifier=FP7-SPACE-2013-1>
- The European Commission has published a paper called **“The 10 Most Recurrent Financial Errors in FP7”** with very helpful examples on how to avoid common financial



errors. The presentation can be downloaded here:

http://ec.europa.eu/research/fp7/pdf/avoiding-errors/error_free_cost_reporting_under_fp7.pdf#view=fit&pagemode=none

- The Space Research and Development Unit of DG Enterprise developed 3 short videos on SPACE DEBRIS, SPACE WEATHER and DATA EXPLOITATION that are now available online (see following links)!
 - SPACE DEBRIS:
http://www.youtube.com/watch?v=GiB9cSnFhKU&list=UUvhco_i3akl_yhKLgsjEcNA&index=1&feature=plcp
 - SPACE WEATHER:
http://www.youtube.com/watch?v=x5XN2GYI2PQ&list=UUvhco_i3akl_yhKLgsjEcNA&index=2&feature=plcp
 - DATA EXPLOITATION:
http://www.youtube.com/watch?v=smSkvxaafF8&list=UUvhco_i3akl_yhKLgsjEcNA&index=3&feature=plcp
- The Unit Space Research and Development of DG Enterprise and Industry of the European Commission is organising the second **FP7 Space Conference in Larnaca, Cyprus on 15-16 November 2012**. The registration for the event has now been opened and you can register by clicking on the following link:
http://ec.europa.eu/enterprise/newsroom/cf/itemdetail.cfm?item_id=5903&lang=en&title=Scientific-conference-presenting-the-results-of-the-FP7-Space-Research-Programme

3. Status of Deliverables

After receiving several helpful comments of the technical reviewer appointed by REA, some deliverables from project year 1 are currently again under revision. Upon their approval they will be published on the project website.

The following nine deliverables are due during project year 2 (March 2012 – February 2013):

D3.3: Provision of final version of Early Warning System (Lead: ROB)

D4.1: Provision of software tool for forecasting indices (Lead: SRI NASU-NSAU)

D4.2: Report on solar EUV characteristics (Lead: FHG)

D4.3: Online provision of auroral alert and tracking system (Lead: UoT)

D4.4: Provision of software tool for forecasting perturbed TEC (Lead: DLR)

D2.2: Online provision of solar activity proxies and solar activity data base (Lead: ROB)

D2.7: SPIS model (Lead: ASTRIMUM)

D3.4: Report on quality control and user feedback (Lead: ROB)

D6.2: International user workshop documentation (Lead: ROB)

All deliverables are progressing. The first 5 will be due at the end of August, the last 4 in February 2013.



4. News from Beneficiaries

- *DLR*: Dr. Claudia Borries, who is managing the AFFECTS work packages at DLR, will go into maternity leave from September 2012 to May 2013. During this time Dr. Jens Berdermann will continue her work.
Jens Berdermann is working at the DLR since 2011. His main task in the DLR team is the work on physical modelling of the ionosphere. In AFFECTS he is involved in the establishment of the ACE module and the early warning message for GNSS users. Jens Berdermann can be reached under the following telephone number and email address: jens.berdermann@dlr.de, phone: +49 (0)3981-480 106.
- *UoT*: One of UoT's responsibilities in the AFFECTS project is to maintain reliable geomagnetic measurements at selected high latitude locations. One of these locations is Longyearbyen, Svalbard. During 2011 the magnetometer in Longyearbyen got a new and more stable foundation and a new sensor. A short time after the improved system was in place, the new sensor malfunctioned. Owing to the amounts of snow and time of year, it was decided to fall back on the original system and wait for summer. In June Chris Hall and two engineers from TGO went to Longyearbyen and changed the malfunctioned sensor. Now the new setup is working properly. In the first picture the old sensor arrangement is being dug out of the snow. In the background the Kjell Henriksen optical Observatory is seen (kho.unis.no). Notice the rifle, owing to the danger of encountering polar bears one needs to be armed when moving



Pic. 1: Removal of old sensor



Pic. 2: Installation of new sensor

around on Svalbard. In the second picture a new sensor is being installed on the new foundation. In the background we see the EISCAT Svalbard radar 32 m (left) and 42 m (right) antennas with the Adventdalen valley behind.



5. Status of Work Packages

5.1 WP1: Management

In the last months the project management was mainly concentrated on the coordination and completion of the first periodic reporting. Besides this, the next project year was planned including the dates for forthcoming project meetings, deliverable reports were reviewed and revised in respect to the comments of the technical reviewer and the project homepage was updated. Additionally, a project poster was released in June, to push the dissemination of the project.

5.2 WP2: Data, Calibration, Maintenance and Instrumentation

The D2.4 and D2.5 reports have been revised corresponding to the review remarks. Adequate information on the data retrieval, storage and access has been added and the description of the geomagnetic indices data base has been improved. Also the issue of establishing the SWACI-AFFECTS website as part of the work for this deliverable is now better described. Additionally, updates of the SWACI-AFFECTS website are in progress in order to get a better impression of the data bases and source institutes and the use of the data within AFFECTS.

5.3 WP3: Early Warning System

On April 1st, ROB welcomed Andy Devos as a new colleague, who is developing statistical quality control routines for the solar and geomagnetic predictions of the Regional Warning Center Brussels at ROB (part of deliverable D3.4). He has worked out an in-depth analysis of F10.7 radio flux forecasts, and will next turn his attention to K index and flaring probability predictions. This study will benefit both AFFECTS and COMESEP, and is funded by both of these FP7 projects.

Another new ROB colleague, Emil Kraikamp, has started working on June 1st on the development of a dimming and EIT wave detector on SDO/AIA data. Based on near real time input of quicklook AIA images, the algorithm will detect and characterize dimmings and EIT waves. This will provide more and earlier information on Earthbound CMEs, helping to improve ROB's ursigram and presto products. This effort is another example of synergy between AFFECTS and COMESEP.

Based on the previous AFFECTS study of the proper construction of Proba2/Lyra proxies for the GOES X ray flux, a tool was developed at ROB in which the GOES curve and these proxies are interactively linked to an automatic flare list, while the flare position is automatically indicated on corresponding SWAP images. This work was performed in collaboration with ESA's Space Situational Awareness program. The tool is accessible at <http://p2web.oma.be/ssa>.

At UGOE, research on the parameterization of CMEs is ongoing. Several CMEs were modeled via a multipoint analysis of CME parameters (speed, width, direction of propagation, size, mass, acceleration, deflection, stream interaction). This work is expected to allow proper CME characterization for input in the ENLIL model which calculates density and speed of the CME as well as its arrival time at Earth.



5.4 WP4: Forecasting Tools and Modelling

Work package 4 (WP4) “Forecasting Tools and Modelling” provides forecasting tools to forecast geomagnetic indices and TEC, mid-term forecast, improved modelling, service for overall forecasting system / dissemination. Lead: SRI NASU-NSAU, Co-lead: DLR.

Current activities in WP4 are centered around the preparation of the deliverable reports due in project month 18. No outstanding issues have been identified.

The progress so far is as follows:

Del.	Due date	Responsible beneficiary	Status	Comments
D4.1	31.08.2012	SRI NASU-NSAU	In preparation (no major delays foreseen)	The geomagnetic forecasting tool will be made available to an outside community as a part of Forecast System Ionosphere, developed in WP5. An offline version will be demonstrated during the AFFECTS User Workshop.
D4.2	31.08.2012	FHG	Unknown (no feedback provided)	
D4.3	31.08.2012	UoT	Submitted to Project Coordinator	An operational auroral tracking and alert service is set up at http://fox.phys.uit.no/AFFECTS/ .
D4.4	31.08.2012	DLR	In preparation (no major delays foreseen)	Preliminary studies in preparation of the TEC perturbation forecast are in progress. These are basically correlation studies between dTEC and geomagnetic indices and solar wind/ IMF parameters for disturbed conditions. Based on these results first modelling options are tested.

5.5 WP5: Forecast System Ionosphere, User Interfaces

The ACE module, designed for providing ACE solar wind and IMF data to the FSI processing modules is in progress. The connection to the E-SWDS of NOAA is established. Now the output of the ACE module has to be adjusted to the needs of the FSI forecast modules. The integration of the Early Warning GNSS, the geomagnetic activity forecast and the TEC perturbation forecast processing modules are in preparation. Their integration will start in autumn.

5.6 WP6: Data and Product Dissemination, Product Sustainability

First preparations have been made for the International User Workshop, and a date for the workshop will soon be decided, taking into account suggestions from ESA’s Space Situational Awareness program.

6. Featured Beneficiary

In each newsletter we will introduce one beneficiary, starting with the coordinator, the Georg-August-University Göttingen, and followed by ROB, SRI NASU-NSAU, FHG, UoT, DLR and ASTRIUM ST. The National Oceanic and Atmospheric Administration (NOAA in Boulder, USA) and the Planetarium Hamburg (Germany) as external collaborators will also have the



opportunity to present themselves. This issue's featured beneficiary is the **Fraunhofer Institute for Physical Measurement Techniques IPM (FHG)** in Freiburg, Germany.

6.1 Fraunhofer Institute for Physical Measurement Techniques in Freiburg

The Fraunhofer-Gesellschaft

Research of practical utility lies at the heart of all activities pursued by the Fraunhofer-Gesellschaft. Founded in 1949, the research organization undertakes applied research that drives economic development and serves the wider benefit of society. Its services are solicited by customers and contractual partners in industry, the service sector and public administration.

At present, the Fraunhofer-Gesellschaft maintains more than 80 research units in Germany, including 60 Fraunhofer Institutes. The majority of the more than 20,000 staff are qualified scientists and engineers, who work with an annual research budget of €1.8 billion. Of this sum, more than €1.5 billion is generated through contract research. More than 70% of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects. Almost 30% is contributed by the German federal and state governments in the form of base funding, enabling the institutes to work ahead on solutions to problems that will not become acutely relevant to industry and society until five or ten years from now.

Affiliated international research centers and representative offices provide contact with the regions of greatest importance to present and future scientific progress and economic development.

With its clearly defined mission of application-oriented research and its focus on key technologies of relevance to the future, the Fraunhofer-Gesellschaft plays a prominent role in the German and European innovation process. Applied research has a knock-on effect that extends beyond the direct benefits perceived by the customer: Through their research and development work, the Fraunhofer Institutes help to reinforce the competitive strength of the economy in their local region, and throughout Germany and Europe. They do so by promoting innovation, strengthening the technological base, improving the acceptance of new technologies, and helping to train the urgently needed future generation of scientists and engineers.

The Fraunhofer-Gesellschaft is a recognized non-profit organization that takes its name from Joseph von Fraunhofer (1787–1826), the illustrious Munich researcher, inventor and entrepreneur.

The Fraunhofer Institute for Physical Measurement Techniques (IPM)

FHG-IPM (the former Institute for Physical Space Research IPW) was founded in 1973 and has actually about 150 staff members. It develops tailor-made measuring techniques, systems and materials for industry. Many years of experience with optical technologies and functional materials form the basis for high-tech solutions in a wide variety of fields: from laser imaging technology, via optical measuring techniques, spectroscopy and terahertz measuring technology, to thermoelectric and integrated sensor systems. The FHG-IPM infrastructure

includes the current laboratory equipment for EUV measurements in ultra-vacuum with several gas discharge lamps and current data



Pic. 1: Freiburg location of FHG-IPM



archiving system from SolACES mission monitoring and managing. It owns also a well-equipped 400m² clean room.

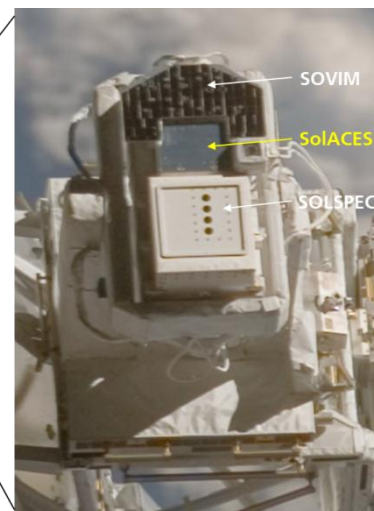
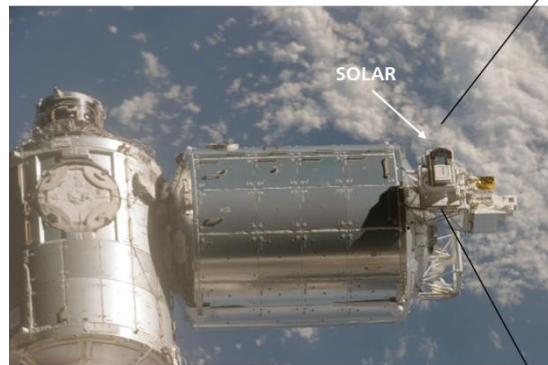
The former institute IPW emerged from the Ionospheric Institute in Breisach founded in 1954 and headed by Prof. Dr. Dr. h.c. Karl Rawer who is one of the German pioneers in space research. Since 1957 EUV spectroscopy for space applications is one of the topics to complement the ionospheric research. Based on more than 40 scientific rocket launches and participation in more than 9 satellite missions IPW/IPM received broad international recognition. The latest project is the Solar Auto-Calibration EUV Spectrometers experiment aboard the International Space Station ISS. A low-cost Spherical EUV and Plasma Spectrometer (SEPS) is under development within the ESA program GSTP. Today Fraunhofer IPM also exploits findings from the analysis of ionospheric plasmas for industrial applications – such as for the characterization of industrial plasmas.

FHG (Fraunhofer IPM) activities within the EU project AFFECTS

Solar EUV data

The solar Extreme Ultraviolet (EUV) radiation is totally absorbed in the Earth's atmosphere and drives the photo-chemistry of the Earth's (and other planets) upper atmosphere. Even though the EUV is only a small fraction of the total solar irradiance, it is highly variable on many time scales from minutes (solar flares), hours (flares and active region evolution), days (solar rotation modulation) and years (solar cycle, the 22 year magnetic cycle). The amount of Total Solar Irradiance variability depends on the wavelength, at the shorter EUV wavelengths

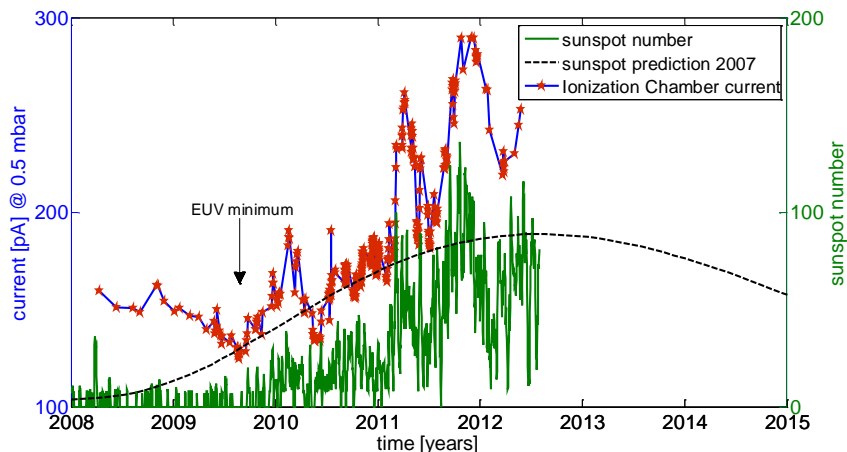
below 50nm the solar cycle variability is a factor of 10 – 100. As the radiation below 200nm is absorbed in the atmosphere it drives the temperature structure and ionization state of the upper atmosphere.



Pic. 2: SolACES onboard the ISS

The evaluation of the SolACES data set Level 1 (16nm – 154nm) can be hopefully be ready by end of 2012. The data set shall be published on the homepage (www.solaces.eu) including the available publications concerning the SolACES instrument and data analysis. One special topic is the analysis of the unusual solar minimum period between the cycles 21 and 24 [1]. Due to the periodically measurement behavior of the SOLAR experiment based on the combination of pointing device capability and IIS orbit behavior the data set cannot provide a continuous sun observation in time.

- [1] B. Nikutowski, R. Brunner, Ch. Erhardt, St. Knecht , G. Schmidtke: *Distinct EUV minimum of the solar irradiance (16-40 nm) observed by SolACES spectrometers onboard the International Space Station (ISS) in August/September 2009*, Adv. Space Res. 48, 899-903, 2011.



Pic. 3: The first ionisation current of the aluminium/carbon filter I4 as an absolute integral measure of the 16–40nm EUV irradiance exhibits its minimum in the middle of September 2009. The comparison of spectra at different activity levels shows that at low lowest activity the EUV irradiance is always the lowest, too.

Several data pools for EUV data sets of available international EUV missions are currently under development. One of them is a public data pool called LISIRD initialized by the LASP/Boulder organization (<http://lasp.colorado.edu/lisird/>) in USA. Another data archive for the SOLAR experiment at ISS is under discussion at ESA's science archive ESAC (Villafranca, Madrid) (<http://www.rssd.esa.int/index.php?project=SH>).

In addition to the regular TIGER Symposia a EUV Working Group has been established. In this context the Solar EUV Irradiance Inter-Calibration and Validation Workshop was held in October 2011 in Boulder/CO USA in order to collect all EUV data available and validate them to elaborate a common data pool for the science community. The aim of the Working Group is to produce an absolutely calibrated measure of the solar EUV irradiance, and to provide a long-term record of the solar EUV irradiance and its variability. This is accomplished by validating the EUV irradiance products from various instruments, understanding their calibration and degradation. A second workshop concerning these topics was held in Mai 2012 at ROB in Brussels.

SEPS sensor simulation

One of the tasks of the SEPS instrumentation shall be the measurement of EUV irradiance between 15 – 200nm. The versatile instrument SEPS enables also the plasma measurements in the altitude regimes of LEO and GEO.

The sensor consists of three metallic spheres/electrodes, the central metallic sphere (MS), a highly transparent inner grid (IG) and an outer grid (OG). In the EUV mode of operation the measured current from the sphere is a mixture of the photoelectrons produced on the sphere as well on the inner and the outer grid. The on-going work is to establish a mathematical tool to model the different contributions to the measured MS current in order to derive the energy distribution of the photoelectrons, hence to determine the incoming EUV spectrum. There are two EUV modes of operation: The total EUV fluxes can be recorded at 10ms repetition rate while the spectral resolved recording required up to 5 min, each. After activation and reconfiguration of the SolACES test measurement equipment in the lab, some tests are planned to verify the model by spectral measurements with SEPS.



7. Press & Media

- See AFFECTS website for updates
- The latest version of the AFFECTS video trailer is available at the following link: <http://www.astro.physik.uni-goettingen.de/~bothmer/AFFECTS/>.

8. Collaborations

- Collaboration with **infoNetwork GmbH**, documented through an official letter of agreement, has been successfully established. In this context a prototype space weather report for television is in progress.
- Collaborations with other EU projects, such as **HELIO and COMESEP**, are progressing.
- Collaboration with **D. Odstrcil at NASA/GSFC** is established to develop CME modelling within the **ENLIL code**.

9. Upcoming Events

- *September 4-7*: 4th HELIO Coordinated Data Analysis Workshop (CDAW-4) in Dublin, Ireland
- *September 10-14*: 2012 5th Solar Orbiter Workshop, in Bruges, Belgium.
- *October 22-24*: 2012 Space Weather and Challenges for Modern Society in Oslo, Norway.
- *November 5-9*: 9th **European Space Weather Week** in Brussels, Belgium
- *November*: 3rd **AFFECTS Steering Committee Meeting** in Brussels, Belgium (during ESWW9)

For more meetings see <http://sohowww.nascom.nasa.gov/community/>