

Annual Topical Group Meeting Spacecraft, Aircraft and Launcher Environments (November, 2015)

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Members



Topical Group Chair/spokesperson

Susan McKenna-Lawlor (STIL)

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Topical Group Co-Chairs

Federico di Marco (VEGA)

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Guenther Reitz (DLR)

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There are ~30 general members in the group

Mission Statement



The Group was formed to act as a conduit between the space weather community and ESA, providing in particular inputs on matters concerning Space Situational Awareness (SSA).

The Chairperson (SMcKL) as a member of ESA's Space Weather Working Team Steering Board, can potentially raise SAA related issues with the Agency on behalf of Topical Group members.

Activities



- An annual meeting of the Topical Group takes place during Space Weather Week. These occasions provide an opportunity for all our Members to meet and for new members to join the Group
- Annual reports are provided to the SWWT Steering Board by the Chairperson
- The Executive Members communicate via telecon and e-mail.
- Members have access to the Topical Group website.

SALE Recommendations



- The SALE recommendation that Dr. Andrea Accomazzo (ESA) be invited to present a keynote address on the topic “Rosetta: flying through gas and dust” was accepted by the Organizing Committee and his presentation was made this morning at 09.00 a.m.**

- The SALE Co-Chair Dr. Federico di Marco (Telespazio Vega) will not present his usual address to SALE this year as the talk scheduled for our Group “Gaia: first year flight operation in L2 environment” has now become the subject of a Keynote Lecture to be presented to the SWW community on Thursday, 26 November at 09.30 a.m.**

Keynote Address



We are proud that, overall, two keynote addresses have spun off from the activity within SALE.

Agenda of SALE Meeting

on 25 November 2015 (15.00-16.30)



- 1. S. McKenna-Lawlor** (Chair, 10 minutes)
Opening Remarks, outlining SALE and the outcomes of the last SALE meeting (Space Weather Week in Liege, November 2014). Also, a new general study activity within SALE ‘Space Weather at Comets’ is introduced in which participation from members of the group is invited.
- 2. G. Reitz** (Co-Chair, 30 minutes)
“Update on measurements made by the RAD/MSL instrument on Mars”
- 3. M. Meier** (30 minutes)
“Improving Space Weather Communication: The D-Index for Aviation”
- 4. J. Americo Gonzalez-Esparza** (10 minutes)
“Observations of Interplanetary Scintillation (IPS) using the Mexican Array Radio Telescope (MEEEXART)”
- 5. S. McKenna-Lawlor** (10 minutes)
General Discussion of the topics presented today and Wrap Up

Agenda of SALE Meeting of 2014



- 1. Account of the Rosetta Mission and its Lander Philae on the nucleus of comet 67P/Churyumov-Gerasimenko (S. McKenna-Lawlor/STIL, 15 mins).**
- 2. Account of Space Weather at Comet 67P/C.-G. (B. Jackson/UCL San Diego, 30 mins).**
- 3. ENLIL 3D-MHD modelling support (D. Odstrcil/NASAI GSFCi, 15 mins.)**
- 4. Update on measurements made by the RAD/MSL instrument on Mars (G. Reitz/DLR, 15 mins.)**
- 5. GAIA Launch and Commissioning (F. Di Marco/ESAi, 15 mins.)**
- 6. Wrap-up (S. McKenna-Lawlor)**

Accepted Paper in Acta Astronautica based on SALE related studies



Space Weather at Comet 67P/Churyumov-Gerasimenko before its perihelion

S. McKenna-Lawlor¹, W. Ip², B. Jackson³, D. Odstroil⁴, P. Nieminen⁵, H. Evans⁵, J. Burch⁶, K. Mandt⁶, R. Goldstein⁶, I. Richter⁷, and M. Dryer⁸

- 1. Space Technology Ireland, Ltd., NUI Maynooth, Co. Kildare, Ireland.**
- 2. National Central University. 300 Chung-Da Rd., Chung-Li 32054, Taiwan**
- 3. University of California San Diego, 9500 Gilman Drive, La Jolla, USA.**
- 4. Goddard Space Flight Centre, 8800 Greenbelt Rd., Maryland 20771, USA.**
- 5. ESA-ESTEC, The Netherlands.**
- 6. Southwest Research Institute, 6220 Culebra Rd., San Antonio, Texas, USA.**
- 7. Technische Universität zu Braunschweig, Germany.**
- 8. NOAA Space Weather Prediction Centre, Boulder Colorado, 80305, USA**

Main Results



- **IPS modelling can provide low-resolution velocity and density forecasts of the arrival at various heliospheric locations of time-variable heliospheric structures (CME driven shocks) propagating away from the Sun to a distance of at least 4 AU.**
- **The ENLIL model driven by IPS as well as operated using cone model and Wang- Sheeley- Arge/WSA inputs can also track outward travelling CME driven shocks over approximately 10 days.**

Main Results contd.



- **The predictions of these models of the arrival at Rosetta/Comet 67P/C-G of three CME related disturbances corresponded satisfactorily with strong signatures observed in MAG and IES data, thereby providing confidence that the signatures recorded aboard the spacecraft were solar related and traceable to particular events.**
- **Photon-stimulated desorption and impact vaporization are deduced not to have been important in the sputtering process at the comet when it was located at ~ 3.5 AU. At locations closer to perihelion, despite enhanced shielding of the nucleus from solar wind flux, energetic particles associated with significant solar activity can be expected to stimulate sputtering.**

Follow up Study



We now plan to investigate the probable connections between the phenomenon of the some-times loss of their tails by comets and space weather.

We have a large number of photographs of such cases and now need to provide complementary modelling of travelling solar disturbances to seek evidence of a link between the arrival of such disturbances at comets and their possible morphological response.

Anyone who would like to join in this study can indicate their interest to S.McKenna-Lawlor.