

FINAL REPORT

TEA-IS Network Meeting in Vienna, April 18, 2015.

Summary

The meeting was a network-wide meeting which brought together 51 participants representing countries that participate in TEA-IS (32) and that are outside TEA-IS (19), but collaborate with us. We are particularly pleased to report that participants came as far away as from Israel, Japan, USA, and Taiwan.

The meeting had four themes:

- 1) discussion of past collaborations sponsored by TEA-IS,
- 2) status of the observational programmes (ground- and space-based),
- 3) new directions and opportunities, and
- 4) proposals for new collaborations

The meeting was held at the 'Haus der Ingenieure' which is closely affiliated with the Vienna University of Technology. The meeting lasted a full day from 8:30-17:30 and was followed by a network dinner. Although Austria is not participating in TEA-IS, we had great local support from Gerhard Diendorfer, who is leading the ALDIS lightning detection network in Austria, and his secretary Petra Pohl-Fakler, who helped localize and contact the venue and the catering during the day.

Description of the scientific content of the meeting

The presentations during the meeting covered four different aspects of this area of research.

- (1) Study reports on ESF exchange visits
- (2) Invited presentations on novel aspects in the research area
- (3) Updates on satellite missions, ground based observations and modelling activities
- (4) Proposals for new ideas toward collaborations
- (5) Informal discussions

(1) Study reports on ESF exchange visits

Six reports of scientific missions between members of the TEA-IS network were reported. The subjects covered ionospheric measurements during thunderstorms, infrasound emissions from thunderstorms, modelling of electrical discharge processes in planetary atmospheres, streamer simulations, thermal properties of streamers in the upper

atmosphere and identifying principal pathways in plasma chemical models. All the study reports, mainly given by early career researchers were very well received by the audience.

(2) Invited presentations on novel aspects in the research area

Five invited talks were presented, mainly by colleagues who were new to the TEA-IS network. The subjects covered lightning detection in Italy for aircraft safety, streamer simulations with adaptive grids, laboratory experiments on streamer fields in low pressure environments, the generation of energetic radiation from laboratory sparks and results from the GLIMS missions on the International Space Mission. All the invited presentations were very well received by the audience and open pathways for novel collaborations.

(3) Updates on satellite missions, ground based observations and modelling

Three updates on TEA-IS activities were presented by several members of the network. The ASIM payload for the International Space Station is awaiting launch on a Space-X vehicle, the micro-satellite TARANIS is now in the integration phase, ground based observations have been extended from northern Spain to the Caribbean and Columbia and ground based observations will be conducted during the next summer in south-eastern France and novel modelling on electric fields inside thunderclouds affecting cosmic ray showers and filamentary structures in space plasmas are put forward on the modelling side. All the presented updates were well received by the audience and demonstrated the use of novel capabilities developed by the scientific community.

(4) Proposals for new ideas toward collaborations

Four new collaborations were suggested to maximise the impact of the TEA-IS network in future activities. The leader of the ARISE network engaged in the research of the upper atmosphere suggested to establish closer links with the TEA-IS network, the cosmic ray observatory LOFAR would benefit from a collaboration with expertise within the TEA-IS network to enhance the science return during thunderstorms, a novel link with the South African National Space Agency was considered to be beneficial toward a collaboration with the square kilometre array SKA, and a novel Horizon 2020 proposal entitled CINPES was presented which solicits collaborations with members of the TEA-IS network. All the presented proposals for new ideas were very well received by the audience and discussed in detail.

(5) Informal discussions

The last part of the TEA-IS meeting consisted of informal discussions on future scientific missions between members of the TEA-IS network, a discussion on the final TEA-IS show case conference in Copenhagen in Denmark and the workshop dinner in the skybar in Vienna. It is expected that the workshop and the informal discussions will lead to numerous scientific missions and novel results in preparation of the forthcoming space missions ASIM, TARANIS, LIS and MTG.

Summary

The TEA-IS workshop in Vienna stirred lively discussions between the members of the network where numerous new scientific results were reported and novel promising directions for research and collaborations were identified.

TEA-IS 2015 Workshop: 18 April 2015 at 08:30 to 17:30

Eschenbachgasse 9, 1010 Vienna,

<http://www.palais-eschenbach.at/haus-der-ingenieure/kurzbeschreibung>)

8:30 – 9:00 Sign In

9:00 – 9:10 Welcome / Torsten Neubert

Session 1 / Martin Füllekrug

9:10 – 9:20 **Study report:** Ionosphere measurements during thunderstorms/ Veronika Barta

9:20 – 9:30 **Study report:** Infrasound from thunderstorm activity / David Applebaum

9:30 – 9:50 **Invited talk:** Daniele Biron: The Italian LAMPINET network and the applications of lightning data

Session 2 / Ute Ebert

9:50 – 10:00 **Study report:** Models of electrical discharges in extra-terrestrial atmospheres / Alejandro Luque Estepa

10:00 – 10:10 **Study report:** 1.5D coupling of fluid and particle model for streamer simulation / Olivier Chanrion, DTU Space

10:10 – 10:30 **Invited talk:** Streamer simulations in 3D with adaptive grids, Jannis Teunissen, CWI

10:30 – 11:00 Coffee Break

Session 3 / Elisabeth Blanc

11:00 – 11:10 **Study report:** Chemical and thermal influence of sprite streamers in the mesosphere/ Francisco C. Parra-Rojas

11:10 – 11:20 **Study report:** PumpKin: A tool to find principal pathways in plasma chemical models, A. Markosyam, A. Luque, F. J. Gordillo-Vázquez and U. Ebert

11:20 – 11:40 **Invited talk:** Experimental work on streamer fields at low pressure, Tomas Hoder, Masaryk University

11:40 – 12:00 **Invited talk:** Vernon Cooray: X-ray generation from long laboratory sparks

Session 4 / Francisco Gordillo-Vazquez

12:00 – 12:20 **Invited talk:** Results from the GLIMS mission / Mitsutero Sato:

12:20 – 12:30 **Update:** ASIM and TARANIS status and plans / Jean-Luis Pincon, Torsten Neubert

12:30 – 12:40 **Update:** Ground observations status and plans / Ferran Fabro Tapia / Martin Füllekrug

12:40 – 12:50 **Update:** Modelling status and plans / Ute Ebert, Sebastian Celestin ,Olivier Chanrion, Nikolai Lehtinen

12:50 – 14:00 Lunch

Session 5 / Torsten Neubert

14:00 – 14:30 Discussion on new relevant results, directions and ideas / All

14:30 – 15:00 Proposals ideas for new TEA-IS funded visits and workshops / All

15:00 – 15:15 CINPES H2020 proposal submitted 13/1/2015/ Torsten Neubert

15:15 – 15:30 Funding opportunities / All

15:30-16:00 Coffee Break

Session 6 / Torsten Neubert

16:00 – 17:00 Formulation of new TEA-IS funded visits and workshops (to be submitted by the end of the day – and will be evaluated by the SC meeting the following morning) / All

17:00 – 17:30 Final show case conference in Denmark, 2016, and CINPES / Torsten Neubert

17:30 Adjourn

19:00 Dinner (Location: SkyBox, Kaerntner Str. 19, 1010 Wien)

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