

General Assembly of the Alphasat Aldo Paraboni Propagation Experimenters

Future broadband satellite communication systems shall offer terabit capacity and very high data rates as requested by the current market both for broadcast and multimedia applications. The goal is to offer satellite-based solutions competitive to the ones provided by the terrestrial network, with in addition the ability to reach directly any end user, whichever his location. This requires the use of high carrier frequencies in the Ka or Q/V bands and beyond in order to achieve the large bandwidth requested.

The utilization of millimetric waves (Ka, Q, V bands and above) in satellite communications requires the use of Propagation Impairments Mitigation Techniques (PIMT) to counteract severe atmospheric phenomena without excessive power expenditures. The possibility to design and exploit profitably these techniques is based on the knowledge coming from the propagation **science**, i.e., on accurate models for the space- and time-distribution of attenuation and on measurements for their validation.

From 2014 a new European measurements campaign at Ka and Q band is possible thanks to the **Alphasat Aldo Paraboni payload**, in name of the scientist who conceived it. The payload implementation, launch and operations are supported by the Italian Space Agency (ASI) as contribution to the Technology Demonstration Payload of Alphasat project, implemented by the European Space Agency (ESA) in the framework of the ARTES 8 Telecom programme.

The **Alphasat satellite was launched successfully on July 25, 2013**. The Aldo Paraboni Scientific (propagation) payload is operational since the end of 2013 and it allows simultaneous long-term measurements of attenuation and depolarisation at 19.701 and 39.402 GHz all over Europe.

In 2019 ASI and ESA extended the operations of the Alphasat Aldo Paraboni payload until the end of 2022.

In addition to the initial network, including the main ASI stations installed in Tito Scalo and Spino d'Adda, Italy, and the Joanneum Research ground station, installed in Graz, Austria, several research centres and space agencies (NASA and CNES) have joined the scientific campaign and now it includes up to 24 stations. This is expected to provide to the scientific community new experimental data allowing the validation, among the others, of models of space-time correlation of rain/attenuation fields, of site diversity at small and large scale, and of spatial correlation of cloud fields. All these developments shall contribute to radio regulations and support the implementation of new satellite communication systems.

In order to achieve these objectives, a strong coordination of the experimenters is essential, as demonstrated by previous projects (COST 205 project on OTS and Sirio satellites, the ESA OPEX for Olympus, the NASA NAPEX for ACTS, the ASI CEPIT for ITALSAT and, more recently, the COST IC0802 for Ka band campaigns) and by contributions to ITU-R Study Group 3, Radiowave Propagation, and ITU-R-P recommendations for SatCom systems.

For these purposes, in 2014 ASI and ESA promoted the constitution of the collaborative **Group of the AlphaSat Aldo Paraboni propagation Experimenters (ASAPE)**, which is an open forum of researchers performing propagation campaigns with the Aldo Paraboni payload and other satellite payloads at Ka band. Topics include: instruments, design and execution of campaigns, data analysis, use of remote sensing and meteorological data and use of numerical weather products.

The group intends also to be a reference on the use of measurements for the development of models and theoretical advances and to actively pursue transfer of results to industry and into radio regulations. The group held its previous General Assemblies on 2014, 2015, 2016, 2017 and 2019 during the Ka and Broadband Communications Conference. In addition, since 2015 the Group organises periodic intermediate meetings and a WG and Programmatic Workshop was held in Erice in October 2016.

The **Seventh General Assembly of ASAPE will be held online on September 30, 2021**, during the 26th Ka Band Conference, and will have the main objective to report and discuss the main results of the Working Groups activities and to plan ASAPE activities for the following period.

Group of the Alphasat Aldo Paraboni Propagation Experimenters (ASAPE) The 7th General Assembly

Thursday, September 30, 2021, 09:30-12:00 CEST

Online event

Held in collaboration with the *Conference Organizing Committee* of the *26th Ka and Broadband Communications Conference*.

Preliminary Agenda:

1. Opening of the Meeting
2. Report on the ASAPE campaign
3. Presentations of ASAPE Experimenters
4. ASAPE Working Groups: scientific contributions, discussion and planning
5. Planning for ASAPE activities in 2022
6. Conclusions/AoB

All participants interested to contribute to the meeting are invited to contact Carlo Riva (cc Antonio Martellucci) to submit **by 10 September 2021** their proposal for the meeting.

Project Name: ASAPE Group of the AlphaSat Aldo Paraboni Propagation Experimenters