



Report from the event supported by RadioNet

TITLE *INTERNATIONAL SPECTRUM MANAGEMENT MEETING: CEPT SE 40*

DATE: *27 APRIL, 2018*

LOCATION: *PARIS, FRANCE*

MEETING WEBPAGE: *<https://cept.org/ecc/groups/ecc/wg-se/se-40/client/introduction/>;
expected webpage, no public report has been posted yet*

HOST INSTITUTE: *CEPT (EUROPEAN CONFERENCE OF POSTAL AND
TELECOMMUNICATION ADMINISTRATIONS)*

**RADIONET
BENEFICIARY / NO:** *01 / MGT*

Report:

1. SCIENTIFIC SUMMARY

This was not a scientific meeting. The goal of WP4.2 (spectrum management) is the protection of radio frequency bands allocated to the Radio Astronomy Service. The organizing body, the CEPT (European Conference of Postal and Telecommunication Administrations) deals with radio spectrum management within the 48 CEPT countries. At this meeting of its Working Group SE40 (Space Service compatibility issues) I represented CRAF, the Expert Committee on Radio Astronomy Frequencies of the European Science Foundation, which represents the European radio astronomical community in matters of radio frequency protection at the CEPT.

One recurring topic in the SE40 is the IRIDIUM satellite system, which is known to cause severe radio interference for radio astronomy. Measurements of the interference were previously made at the Leeheim satellite monitoring station. Methods and software to evaluate the interference situation and to perform an EPFD simulation were developed by SE40 with the help of CRAF. The software is described in ECC Report 247, which was prepared during the previous SE40 meetings. Currently, IRIDIUM is rolling out a new generation of satellites ("IRIDIUM Next") and it is claimed that these will have much lower impact on RAS.

New Leeheim measurements indeed show that IRIDIUM Next satellite leak less power into the RAS bands, but EPFD simulations based on the new numbers still lead to a data loss percentage that significantly exceeds the acceptable 2% value. However, this is in part to the existing software package, which was never designed for processing of relatively faint emission. Several effects, such as the increase of system temperature at lower elevations (due to ground and atmosphere) have to be considered. Furthermore, improvements with regards to the statistical handling of the data seem appropriate to avoid systematic biases that could lead to wrong claims.

2. AGENDA OF THE EVENT

SE40 had a dedicated one-day meeting in Paris with participants from IRIDIUM/Thales, Leeheim station and RAS, as well as representatives of administrations, to discuss potential shortcomings and possible solutions with respect to different observational strategies or new data processing methods, which could be implemented in the software package. All involved parties had prepared detailed contributions to be discussed at the meeting, which in part need new Leeheim measurements - because a different observing strategy is needed, while other possibilities can be applied to existing data sets.

For CRAF, I presented a prototype implementation of an iterative running- median filter, which can be used to separate the ground/atmospheric contribution to the system temperature (noise floor) and the IRIDIUM emission. Based on another proposal by CRAF, Leeheim station had done measurements with an additional Empty-Sky-Track, which could also be used to remove the ground contribution. IRIDIUM/Thales proposed to incorporate the distance-dependent path propagation loss between satellite and Leeheim station, as well as accounting for the satellite antenna pattern. Furthermore, IRIDIUM/Thales is of the view that the "zero-clipping" feature of the current software package introduces a systematic bias, which should be replaced with a bias-free procedure. Some viable alternatives were identified during the meeting.

In the next weeks, all of the proposals will be tested and carefully examined. The next SE40 meeting will evaluate the results and propose appropriate changes to the software package.

3. PARTICIPANTS



In total 11 participants from several administrations (France, Germany, Switzerland, CEPT/ECC European communications office), industry (IRIDIUM/Thales), the Leeheim Monitoring station, and CRAF were present. The attendance list published for this meeting by the CEPT is not publicly available.

No conference picture was posted online by the ITU.

4. RADIONET FINANCIAL CONTRIBUTION

The RadioNet support was used to pay for the attendance of the CRAF member, Benjamin Winkel (MPG) with up to 550€.

5. PUBLICATIONS

This meeting will not result in scientific publications. CRAF's input to SE40 meetings consists of technical compatibility studies on the protection of the radio astronomy service from satellite systems, technical advice, and contribution to ECC reports. None of the input and output documents are publicly available. The CEPT has not yet posted a publicly available summary of the meeting; it should later be published at <https://cept.org/ecc/groups/ecc/wg-se/se-40/client/introduction/>.