



Geoscience and Remote Sensing Society

Frequency Allocations in Remote Sensing Technical Committee (FARS-TC)



Paolo de Matthaeis
Chair

Roger Oliva and Yan Soldo
Co-chairs

Annual Meeting

Yokohama, Japan
July 29, 2019

Introduction

The Frequency allocations in Remote Sensing Technical Committee goal is to ***interface between GRSS and the radio-frequency regulatory world*** by

- ❑ educating the remote sensing community on spectrum management processes and issues
- ❑ promoting the development of radio frequency interference detection and mitigation technology
- ❑ organizing technical sessions at conferences, workshops, etc. on the above processes, issues and technologies
- ❑ providing spectrum managers and regulators with technical input and perspective from remote sensing scientists and engineers
- ❑ fostering the exchange of information between researchers in different fields, such as remote sensing, radio astronomy, telecommunications, etc. with the common scope of minimizing harmful interference between systems

FARS-TC Chair Election Results

- **Paolo de Matthaeis** is confirmed **TC Chair** with **58.3%** of the votes
- **Co-chairs: Roger Oliva and Yan Soldo**
- New internal position of **secretary** will be covered by **Tobias Bollian (DLR)**



RFI 2019 Workshop

- RFI 2019 will be held in Toulouse (France) on September 23-26, 2019
- organized in cooperation with Radio-Astronomy community
- co-sponsored by several organizations: IEEE GRSS, NASA, ESA, CNES, URSI, NRAO, CSIRO, COMET and CESBIO
- proceeding will be on IEEE Xplore
- currently defining the technical program with 40+ oral presentations
- high profile invited speakers from ITU-R will give presentations and participate in panel discussion



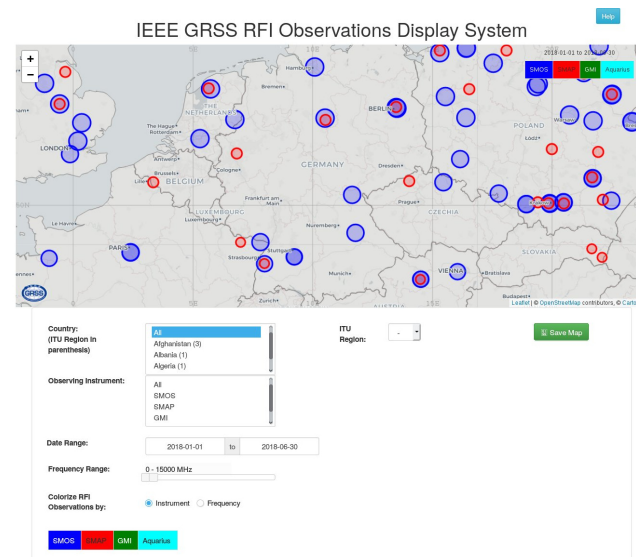
<http://www.rfi2019.org>

FARS Online Tools

GRSS FARS-TC database of available on the GRSS website at

<http://www.grss-ieee.org/fars-tools/>

- **Data currently available:**
 - all SMOS and SMAP now regularly updated
 - three months of GMI (10 and 18 GHz)
- **Graphic User Interface improvements:**
 - choice of time span
 - multiselect of entries
 - circle diameter on map indicates localization accuracy
 - addition of legend and GRSS on map
- **Next:**
 - all data available with regular uploads for GMI
 - AMSR-2 (also C-band)
 - Aquarius radiometer and scatterometer RFI locations



FARS-TC chapter in China

- **Widespread RFI observed over China and large number of new remote sensing instruments planned by China in the near future provide good motivation**
- **New chapter will act as a liaison between the main FARS TC leadership and the Chinese technical/scientific community;**
- **goal is to raise awareness of RFI and spectrum management issues within the local scientific community and enabling it to more effectively initiate change from within China itself**
- **A Spectrum Management and RFI Seminar will be held on August 5, 2019 at Xidian University in Xi'an, China, to inaugurate the chapter**
 - **Topics: Spectrum management and RFI in active/passive remote sensing or other related radio science disciplines that consider how interference affects their respective fields, with a focus on China**
 - **expecting approximately 80 participants**
 - **local organizers:**
 - » **Feng Zhou (Xidian University)**
 - » **Mingliang Tao (Northwestern Polytechnical University)**

Spectrum Management Meetings Update

- ITU-R Study Groups / Geneva, Switzerland

September 2018 + May 2019

- **Working Party 3J (Radiowave Propagation)**

- meeting attended by FARS-TC co-chair Yan Soldo and Thomas von Deak
- proposed an updated scattering model for ocean surface at 18 GHz for use in RFI report by Working Party 7C – many thanks to Joel Johnson for his help!
- WP 3J is now planning to develop a wind velocity model to incorporate into the scattering model

- **Working Party 7C (Remote Sensing Systems)**

- meetings attended by FARS-TC chair Paolo de Matthaeis
- new material added to the ITU-R draft Report on *Analysis of interference received by EESS (passive) sensors in the 18.6-18.8 GHz band*

Spectrum Management Meetings Update

Space Frequency Coordination Group (SFCG-38)

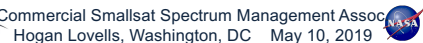
Berlin, Germany - July 2019

- meeting attended by FARS-TC chair Paolo de Matthaeis and Thomas von Deak
- FARS-TC presented four documents:
 - SFCG39-49D: inclusion of link to GRSS RFI database on SFCG website → Action Item 39-8
 - SFCG39-50D: report on activities related to RFI at 18 GHz → Action Item 38-16
 - SFCG39-51D: update on document to support participation of individuals in ITU regulatory processes → Action Item 39-15 + Report SFCG 39-3
 - SFCG39-68I: update on development of FARS tools → Action Item SFCG

Other Meetings

- **CSSMA-SFCG Workshop**
Washington, DC / May 10, 2019
 - hosted by the Commercial Smallsat Spectrum Management Association (CSSMA)
 - planned by SFCG with involvement of FARS-TC
 - focus on coordination and interaction between CSSMA and SFCG
 - Steve Reising contributed a presentation on IEEE GRSS and SmallSats for remote sensing
- **National Spectrum Management Association (NSMA)**
Washington, DC / May 14-15, 2019
 - TC Chair Paolo de Matthaëis attended
 - presentation about GRSS and FARS-TC well received
- **Committee on Radio Frequencies (CORF)**
Washington, DC / May 16-17, 2019
 - continuing cooperation with FARS-TC





Commercial Smallsat Spectrum Management Assoc.
Hogan Lovells, Washington, DC May 10, 2019

**SmallSat Spectrum Issues
Affecting Remote Sensing**

Steven C. Reising¹, TEMPEST-D Team^{1,2,3}, William Blackwell⁴, and
Paolo de Matthaëis⁵

¹Colorado State University, Fort Collins, CO
²NASA Caltech/Jet Propulsion Laboratory, Pasadena, CA
³Blue Canyon Technologies, Boulder, CO
⁴MIT Lincoln Laboratory, MA
⁵NASA Goddard Space Flight Center, Greenbelt, MD

Thanks to NASA Wallops for providing ground station communications support for the TEMPEST-D mission.

Reising et al., CSSMA Workshop on SFCG Hogan Lovells, Washington, DC May 10, 2019 1



Update on WRC AI1.13

AI 1.13: bands for International Mobile Telecommunication 2020 and Beyond (IMT-2020) between 24.5 and 86 GHz

EESS (passive) band	5G (IMT-2020) band
23.6 – 24 GHz	24.25 – 27.5 GHz
31.3 – 31.8 GHz	31.8 – 33.4 GHz
36 – 37 GHz	37 – 43.5 GHz
50.2 – 50.4 GHz	47.2-50.2 and 50.4-52.6 GHz
52.6 – 54.25 GHz	50.4 – 52.6 GHz
86 – 92 GHz	81 – 86 GHz

23.8 GHz and 5 G

- The 23.8 GHz band is particularly at risk due to the vicinity with the 24.25-27.5 GHz band identified for 5G
- Most studies from national administrations confirm that only a significant reduction in unwanted emissions can ensure protection of EESS (passive)
- Different entities have proposed different levels of unwanted OOB:
 - the World Meteorological Organization (WMO) is recommending -55 dBW/200 MHz
 - the ITU-R Task Group 5/1 (TG5) has concluded that the following range of necessary IMT-2020 stations unwanted emissions levels are needed:
 - » For base station (BS): from -42 to -49 dBW/200 MHz
 - » For user equipment (UE): from -38 to -45 dBW/200 MHz
 - the US is proposing a weaker -20 dBW/200 MHz
- The FCC started to auction the 24.25-27.5 GHz band for 5G in March despite opposition from NASA, NOAA and US Department of Defence - auction ended up netting \$2.4 billion
- CPM19-2 has further addressed the CPM text on agenda item 1.13 but produced a highly confusing with an incredible amount of differing views
- CITEL will be meeting at the beginning of August, then it's WRC-19

FARS-TC and Standards for RFI

- **FARS-TC activity with Standards Committee**

- FARS-TC acknowledges that changing the situation with respect to RFI within the Global scenario is very difficult.
- A lot of commercial interests are requesting more and more frequency bands, political situation favors this commercial interests, and even in the remote sensing community, problems related to RFI have been in many cases hidden under the rug.
- With this scenario in mind, FARS-TC is looking for innovative approaches to improve the RFI situations
- FARS-TC is discussing with Standards Committee to initiate activities that can support mitigating the RFI problem by means of standardization.
- A meeting between the two technical committees will take place during IGARSS to advance on this activity

FARS-TC and Standards for RFI

- **Potential proposal for exploring RFI Standards definition**
 - **possibilities open for discussion include standards or recommendations for**
 - » **EMC analysis on antenna/receivers installation**
 - » **RFI reporting**
 - » **RFI information to be made available in missions data products**
 - » **guidelines for missions to include RFI location activities as part of their operations.**
 - » **Any other ideas?**