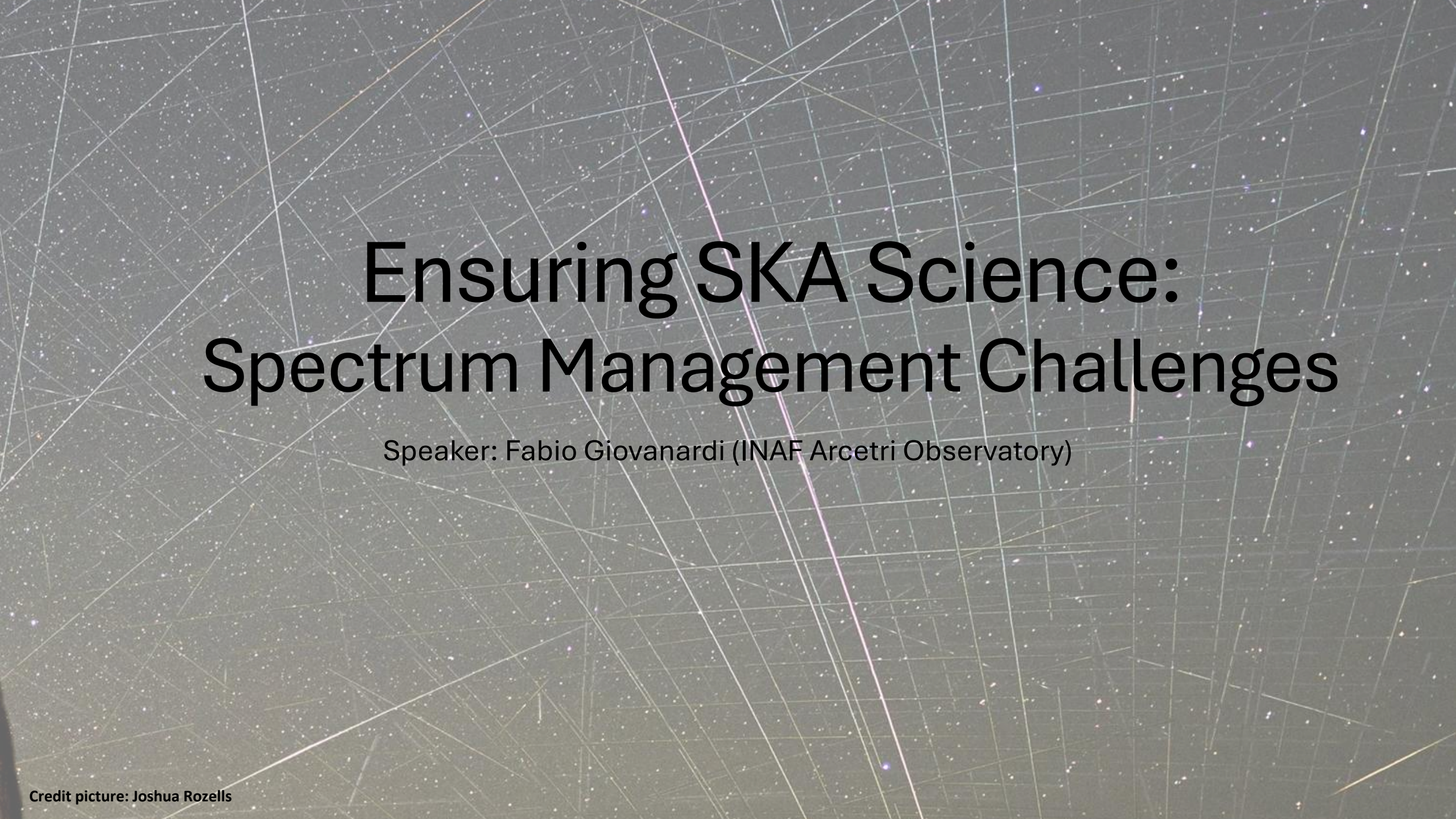
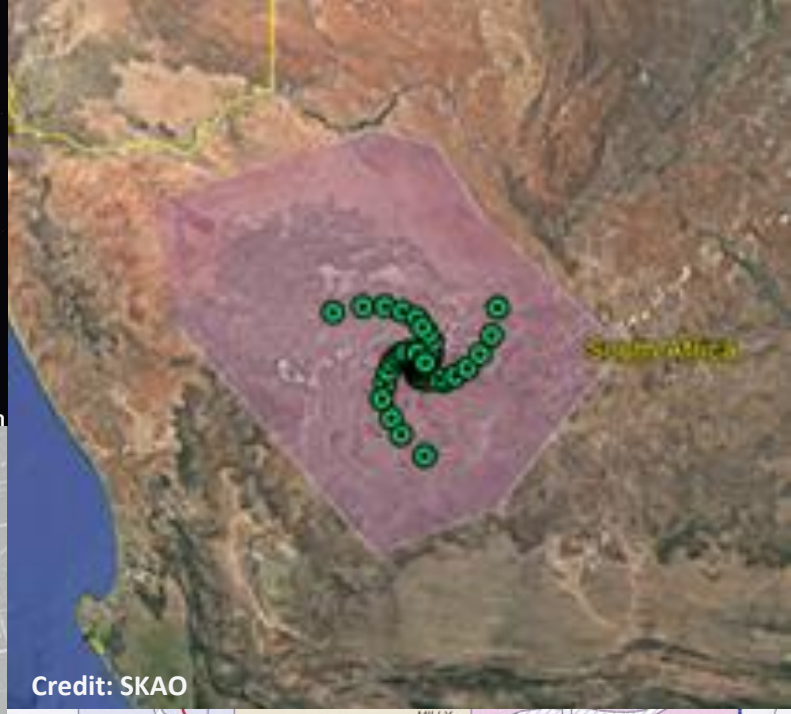
Ensuring SKA Science: Spectrum Management Challenges

Speaker: Fabio Giovanardi (INAF Arcetri Observatory)



Credit picture: Joshua Rozells

Background



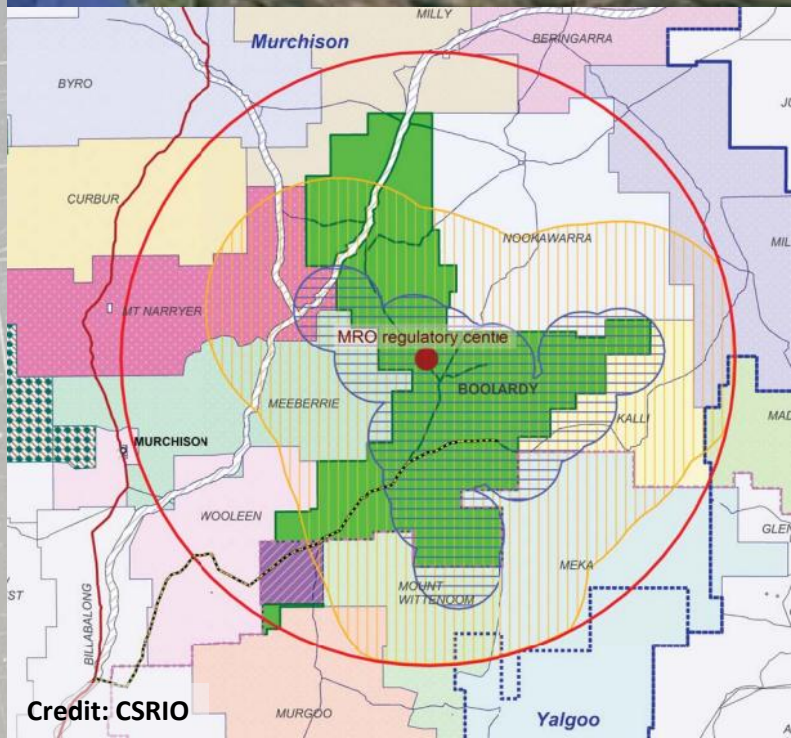
- To enable SKA-low and SKA-mid to achieve high-quality science, a clean radio spectrum is required

  → spectrum management

- **SKA-low** and **SKA-mid** are well protected from terrestrial interference thanks to established **Radio Quiet Zones** (RQZs) under national legislation

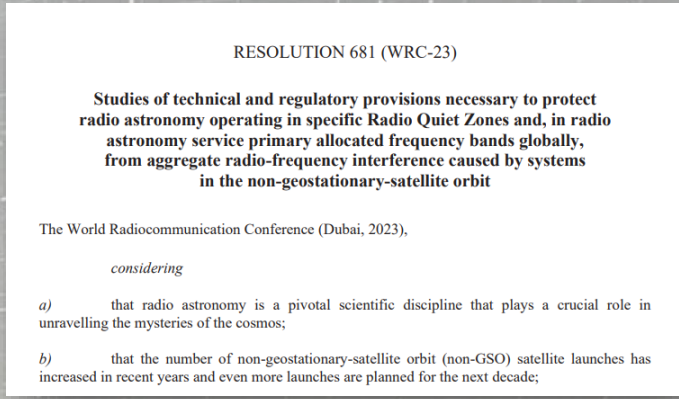
- National legislations does not apply to space

- **LEO satellite** are now +11000 satellite in obit (~ 9000 from Starlink alone)



Spectrum effort to protect SKA

- Unlike its optical counterpart, radio astronomy (RAS) is regulated by the **ITU** (International Telecommunication Union), part of the **United Nations**.
  - ITU-R RA.769-2 provide **protection criteria** to safeguard RAS
- CRAF coordinates European efforts to keep frequency bands used by radio astronomy free from interference.
- CRAF and SKAO are working together to:
  - Protecting SKA requires progress on **AI 1.16 (WRC-27)**:
    - Procedures to assess RAS compatibility before satellite launches (via EPFD calculations)
    - Recognition of national **Radio Quiet Zones** (RQZ) of SKA-mid and ALMA at international level
  - **UEMR** (Unintended Electromagnetic Radiation) from satellite electronics can interfere with RAS allocated bands (typically below 1 GHz).
    - Raise international recognition of UEMR issues (ITU, COPUOS)
    - Develop **EMC standards** for satellites to protect radio astronomy



RESOLUTION 681 (WRC-23)

Studies of technical and regulatory provisions necessary to protect radio astronomy operating in specific Radio Quiet Zones and, in radio astronomy service primary allocated frequency bands globally, from aggregate radio-frequency interference caused by systems in the non-geostationary-satellite orbit

The World Radiocommunication Conference (Dubai, 2023),

considering

a) that radio astronomy is a pivotal scientific discipline that plays a crucial role in unravelling the mysteries of the cosmos;

b) that the number of non-geostationary-satellite orbit (non-GSO) satellite launches has increased in recent years and even more launches are planned for the next decade;


Thanks!