ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY

ICAO WRC-27 Preparatory Workshop
Agenda item 1.17: Space weather sensors

Guillaume Novella

Direction Générale de l'Aviation Civile

ICAO

EUR/MID WRC-27 (World Radiocommunication Conference 2027) Workshop
(Paris, France, 06-07 October 2025)

Presentation Overview

01 **Background**

02 **Potential Issues**

03 **ICAO Position**

04 **Conclusion**

ICAO

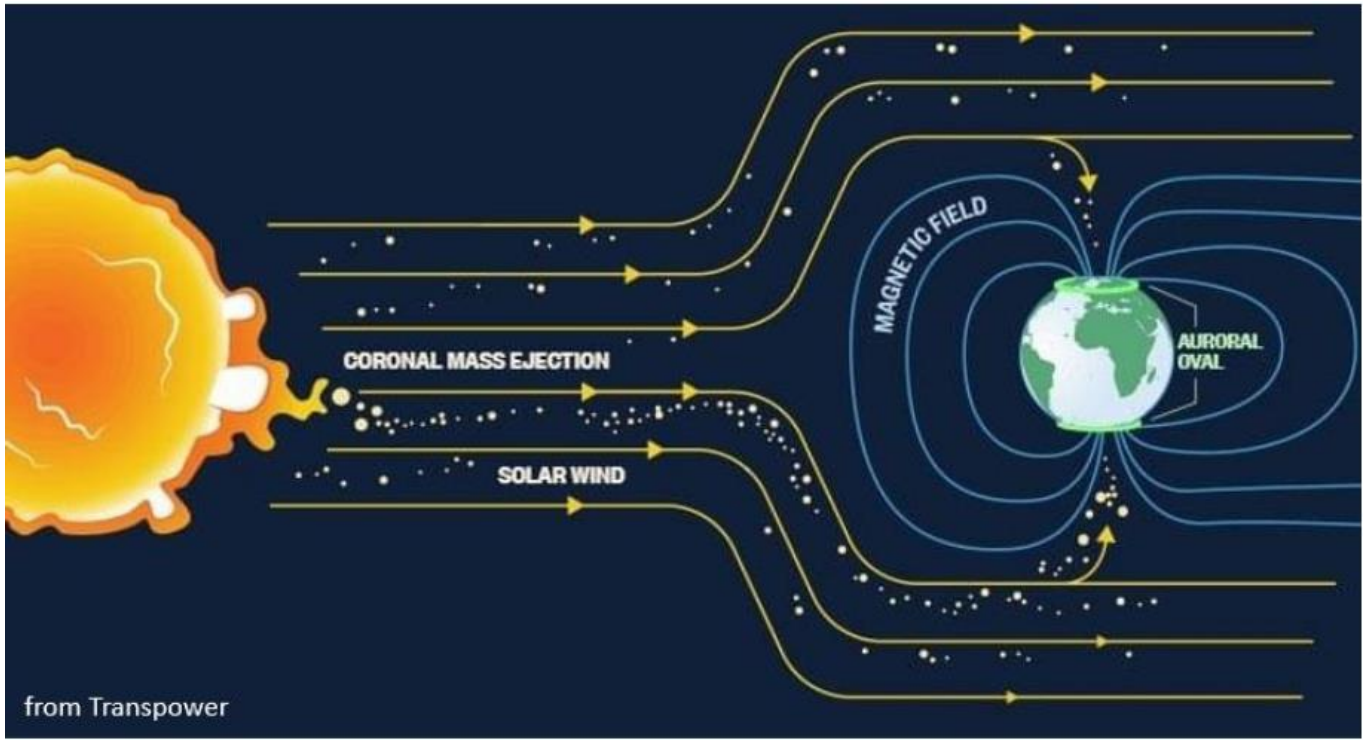
Background

WMO definition of space weather: "*The physical and phenomenological state of the natural space environment, including the Sun and the interplanetary and planetary environments*."

Definition from ITU-R Resolution 675: "*Natural phenomena, mainly originating from solar activity and occurring beyond the major portion of the Earth's atmosphere, that impact Earth's environment and human activities*".

Space weather phenomena include:

- Geomagnetic storm
- Solar radiation storms
- Solar flare radio blackouts
- Solar radio bursts
- Cosmic radiation



Background

Space weather sensor frequency needs:

- Relative Ionospheric Opacity: observe ionospheric absorption events that can degrade or obscure HF communications lasting minutes to several days, potentially disrupting aeronautical communications on polar and high-latitude flights

- Solar radio flux monitor / solar spectrograph: Monitor short term solar radio burst.

Frequency band under consideration in Res 682 (receive-only sensors):

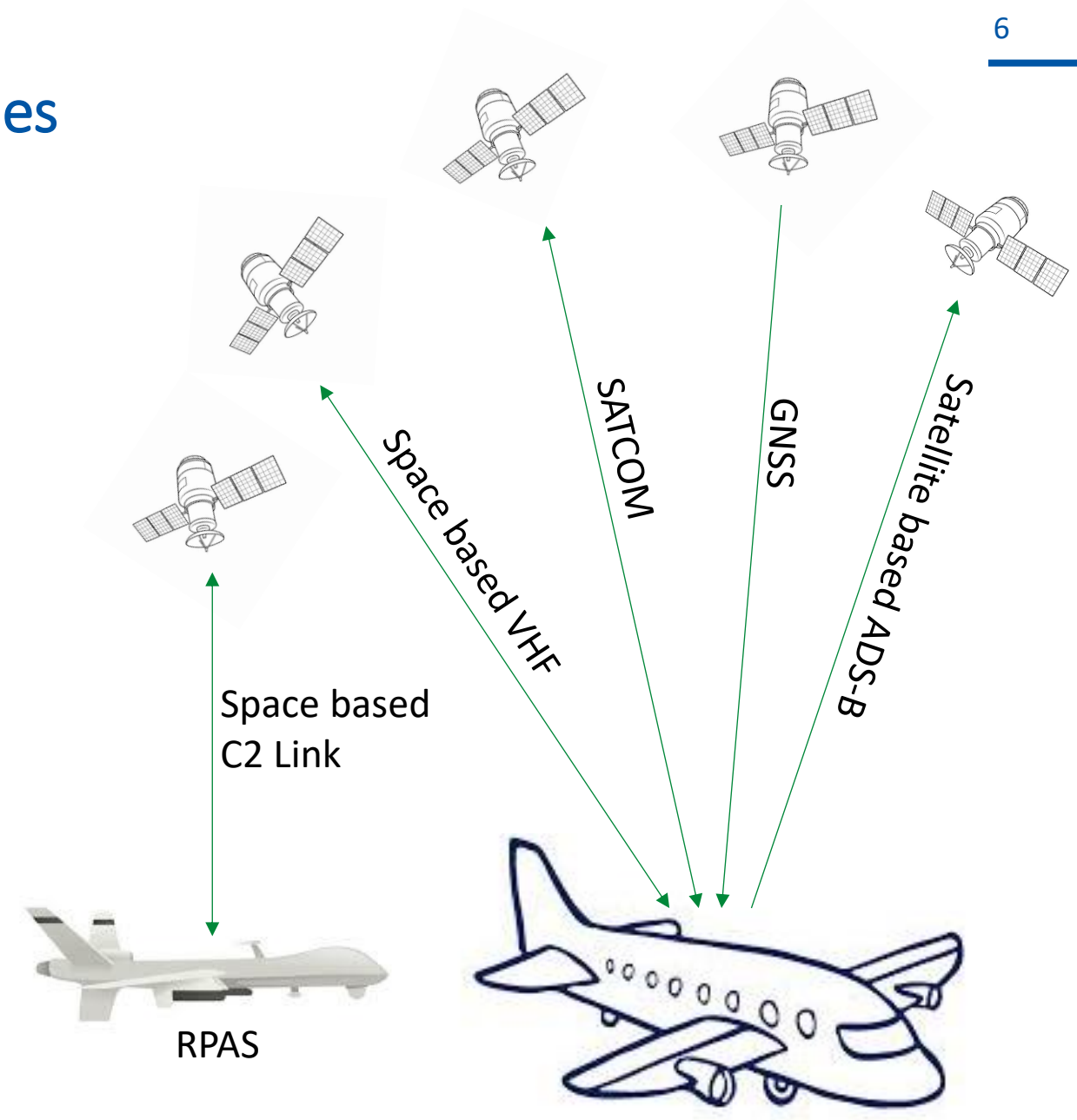
- 27.5 – 28 MHz
- 29.7 – 30.2 MHz
- 32.2 – 32.6 Mhz
- 37.5 – 38.325 MHz
- 73 – 74.6 MHz
- 608 – 614 MHz

Potential issues… or opportunities

Impact of space weather on civil aviation:

- Degradation of satellite communications
- On-board system failure due to radiation
- Higher ionizing radiation dose
- Degradation of magnetic equipment (e.g, compass)
- Degradation of electrical systems

Civil aviation benefits from space weather forecast
➔ ICAO Doc 10100: *Manual on Space Weather Information in Support of International Air Navigation*



On-going work within ITU-R

Agenda item 1.17 is addressed by ITU-R WP-7C.
Several documents are under development:

Working document toward a preliminary draft new Report ITU-R RS.[SW_STUDIES] - Studies on possible primary allocations to the meteorological aids service (space weather) for receive-only space weather sensors

- Contains the sharing studies as well as intended applications.

Working document towards a preliminary draft new Recommendation ITU-R RS.[RXSW_PROTECT_CRITERIA] - Protection criteria of receive-only space weather sensors in the meteorological aids service (space weather)

- Proposes protection criteria for the systems under consideration by agenda item 1.17, in terms of max tolerable power or maximum power spectral density.

Draft CPM text for WRC-27 agenda item 1.17

- Method A:
  - ➔ New primary allocations to MetAids
  - ➔ footnote to limit to ground-based receive-only sensors
  - ➔ modifications to RR Appendix 4 to allow for registration of space weather stations in the MIFR
- Method B:
  - ➔ New primary allocations to MetAids
  - ➔ Footnote stipulating that these new MetAids (space weather) allocations shall not claim protection from, nor constrain the future development of, incumbent existing services in these frequency bands or in adjacent bands

1.17

ICAO position

To support the appropriate radio regulatory changes for receive-only space weather sensors (excluding active sensors) while ensuring, based on the ITU-R studies as called for by Resolution 682 (WRC-23), any changes would not impose any technical or regulatory constraints on aviation safety systems.

Conclusion

This agenda item explores regulatory provisions and potential primary allocations to the meteorological aids service (space weather) to accommodate receive-only space weather sensor applications in the Radio Regulations

Civil aviation would benefit from space weather monitoring and forecast

As a consequence, ICAO supports this agenda item, provided that any changes would not impose any technical or regulatory constraints on aviation safety systems.

Thank You

ICAO