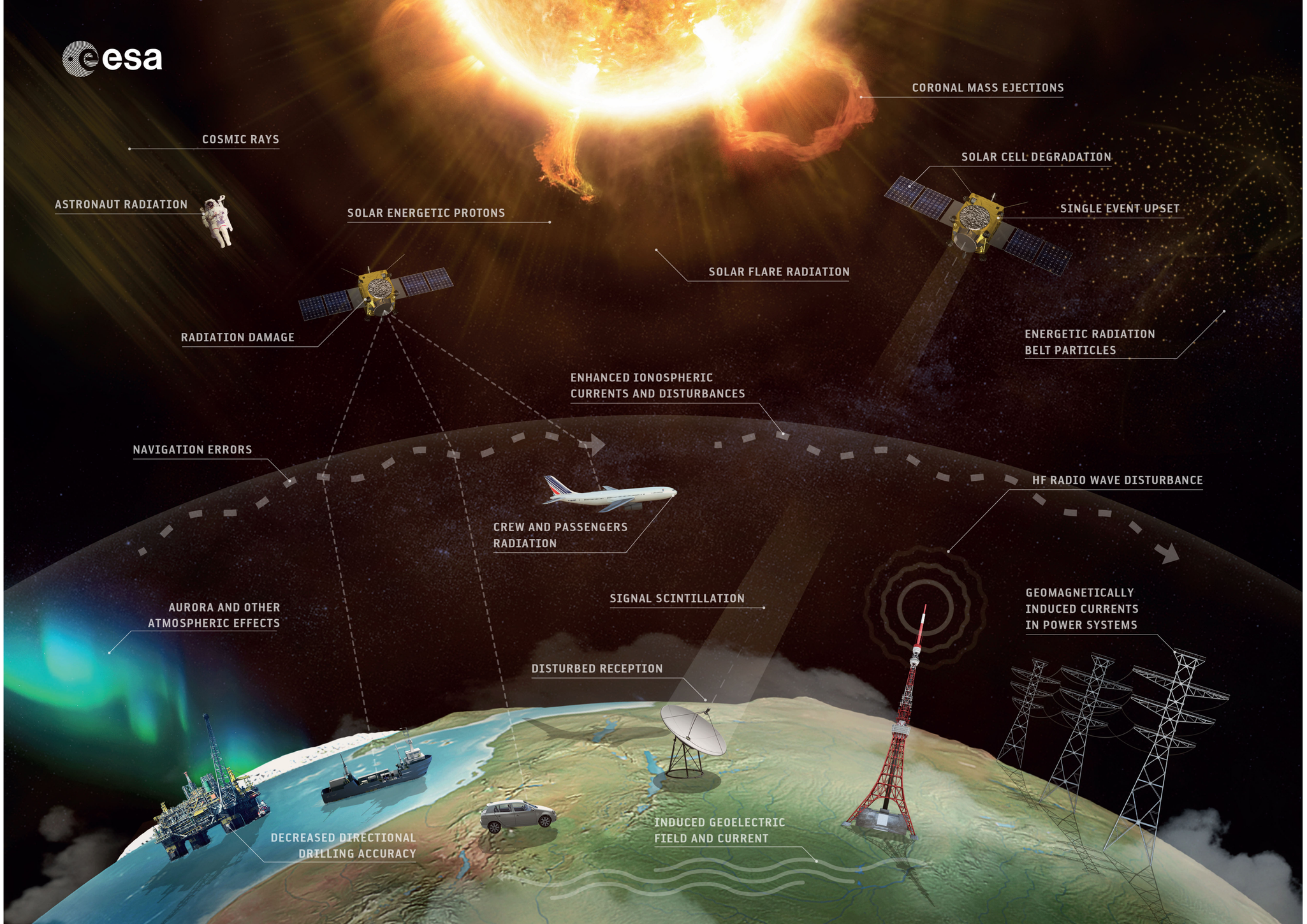
Role of the Ionosphere & SPWx in Military Communications

SWEC
Space Weather Education Center

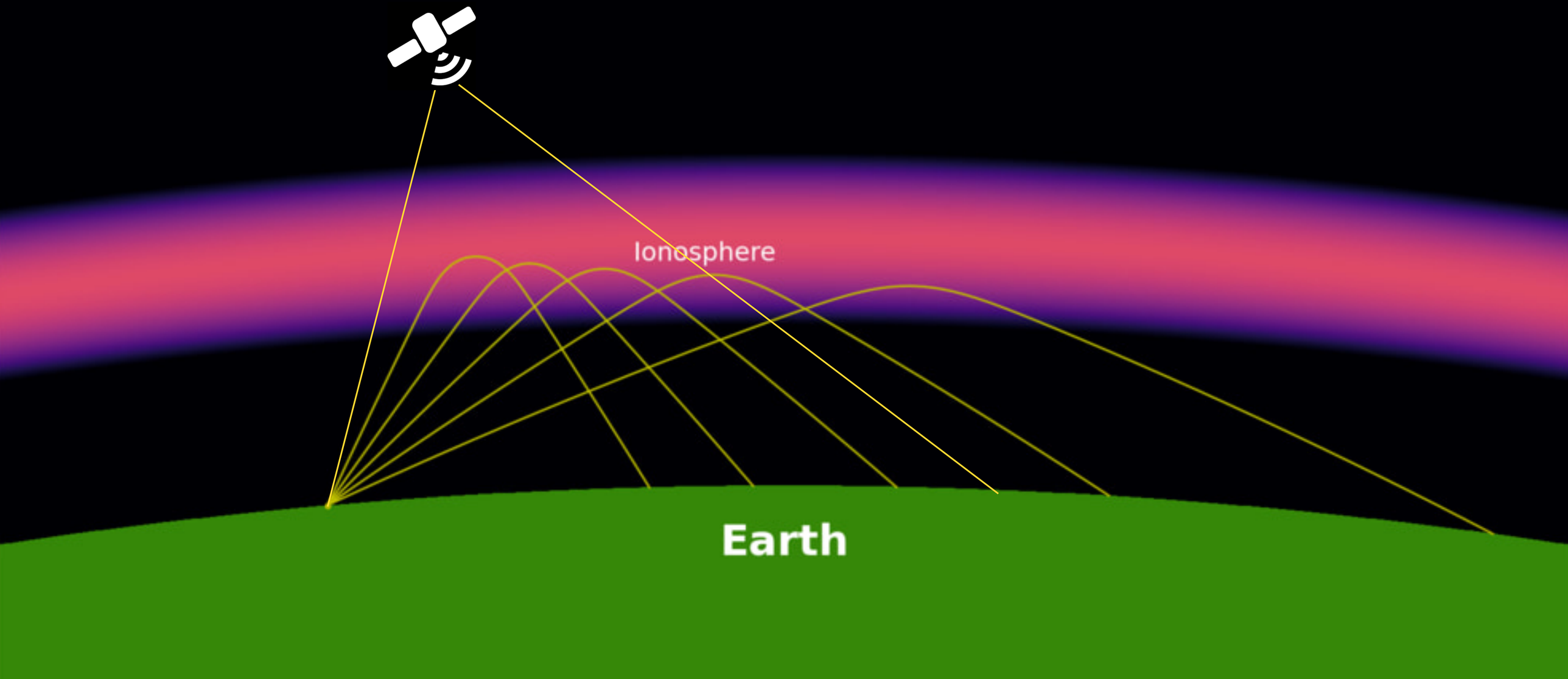
Solar-Terrestrial
Centre of Excellence

Petra Vanlommel
Solar-Terrestrial Centre of Excellence (STCE)


esa
CORONAL MASS EJECTIONS
COSMIC RAYS
SOLAR CELL DEGRADATION
ASTRONAUT RADIATION
SINGLE EVENT UPSET
SOLAR ENERGETIC PROTONS
SOLAR FLARE RADIATION
RADIATION DAMAGE
ENERGETIC RADIATION
BELT PARTICLES
ENHANCED IONOSPHERIC
CURRENTS AND DISTURBANCES
NAVIGATION ERRORS
HF RADIO WAVE DISTURBANCE
CREW AND PASSENGERS
RADIATION
AURORA AND OTHER
ATMOSPHERIC EFFECTS
SIGNAL SCINTILLATION
GEOMAGNETICALLY
INDUCED CURRENTS
IN POWER SYSTEMS
DISTURBED RECEPTION
DECREASED DIRECTIONAL
DRILLING ACCURACY
INDUCED GEOELECTRIC
FIELD AND CURRENT

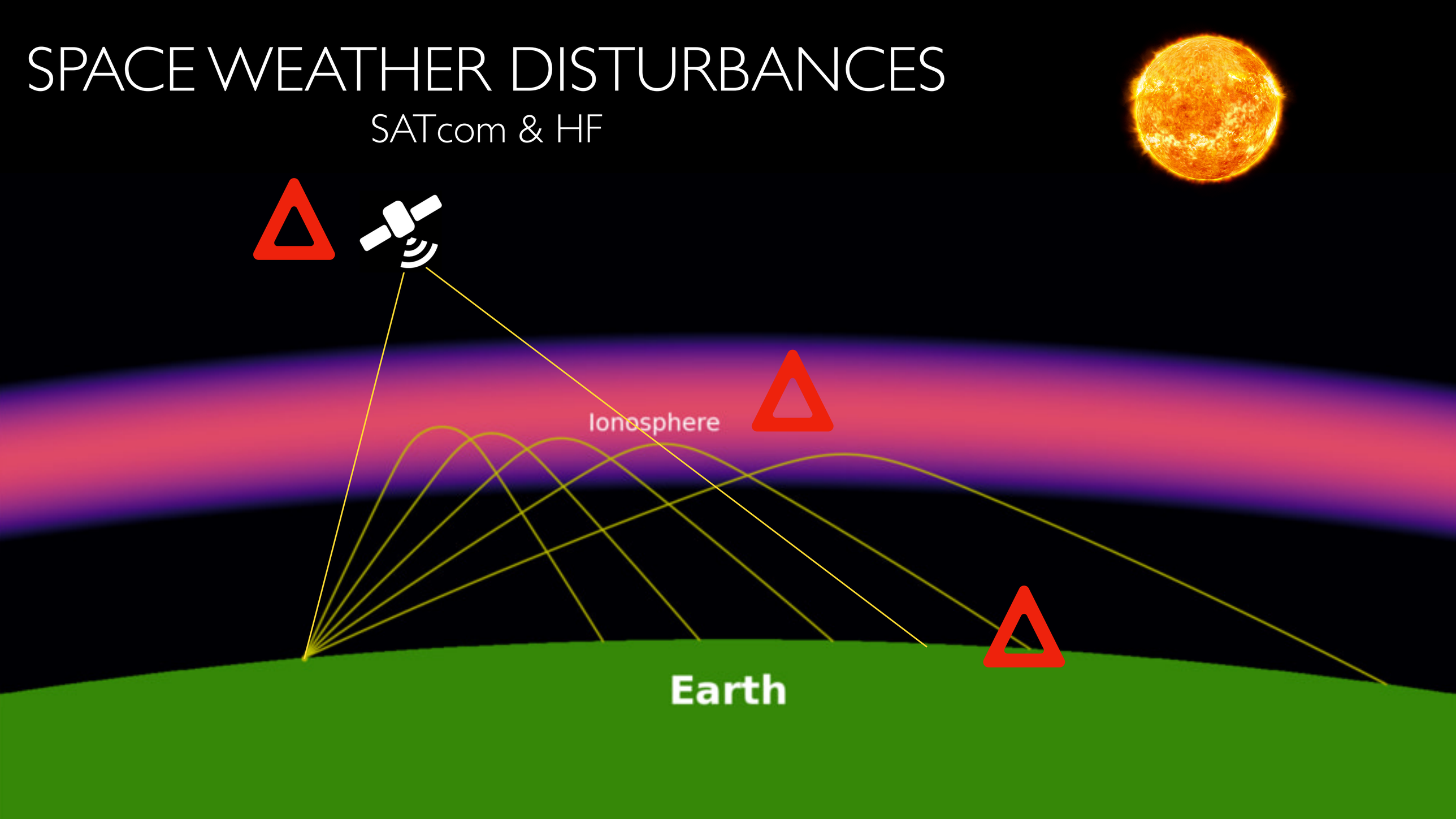
SPACE WEATHER DISTURBANCES

SATcom & HF



SPACE WEATHER DISTURBANCES

SATcom & HF



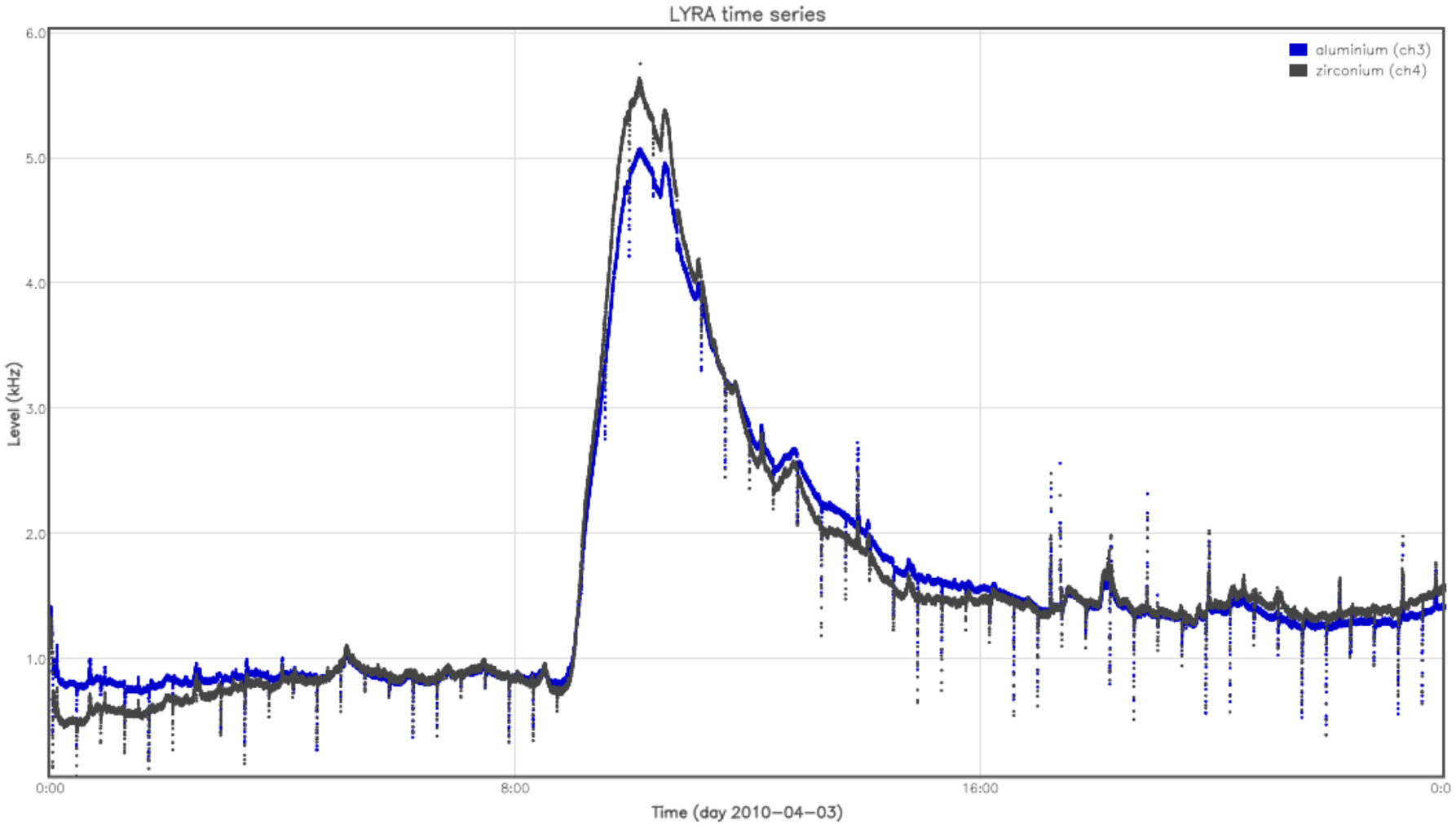
April 2010

As you are aware there was a very interesting geomagnetic storm period over the Easter period this year, this period was particularly significant as the disturbed space environment caused a number of spacecraft anomalies, including the well publicised Galaxy 15 failure suffered by our competitor Intelsat. The Presto Alerts and Daily Bulletins ('URSIGRAM') issued by SIDC at the time were superior to alternative products issued by NOAA SWPC, both in terms of timeliness and content.

In general I find that the level of technical content and commentary included in your Daily Bulletins and other products are exactly what we need as a spacecraft operator, and I find that these products compare very favourably with the alternative products issued by NOAA SWPC. You are tending to include greater detail in your commentary regarding events observed on the sun and the effects likely to be experience at earth, we value this additional detail.

I hope these comments are of use and trust that your team will keep up the good work!

April 3, 2010


LYRA time series
aluminium (ch3)
zirconium (ch4)
Level (kHz)
6.0
5.0
4.0
3.0
2.0
1.0
0:00
8:00
16:00
0:0
Time (day 2010−04−03)


ALERT

August 10, 2022

Broadcasting

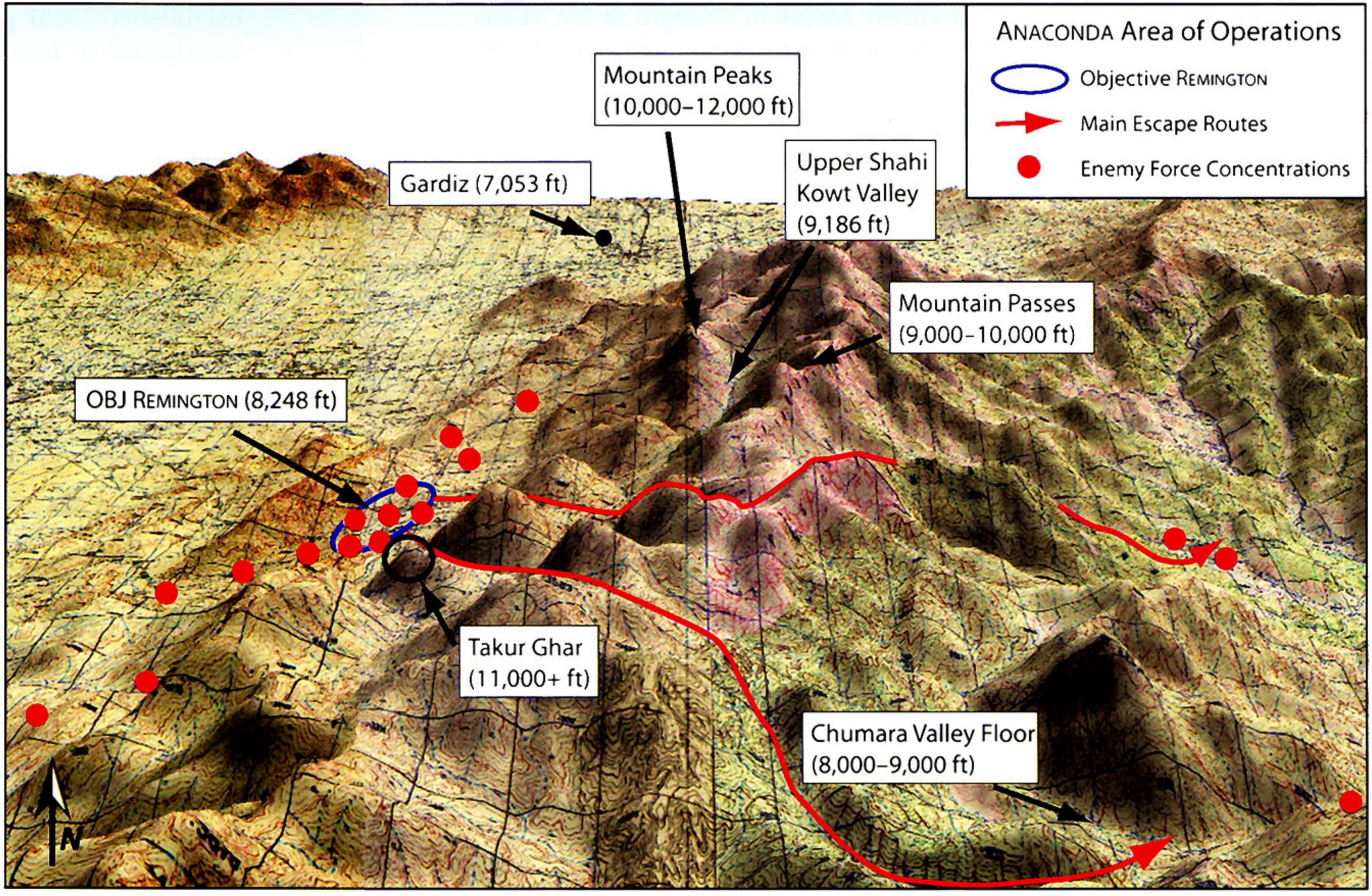
Intelsat Loses Command of Galaxy 15 Satellite

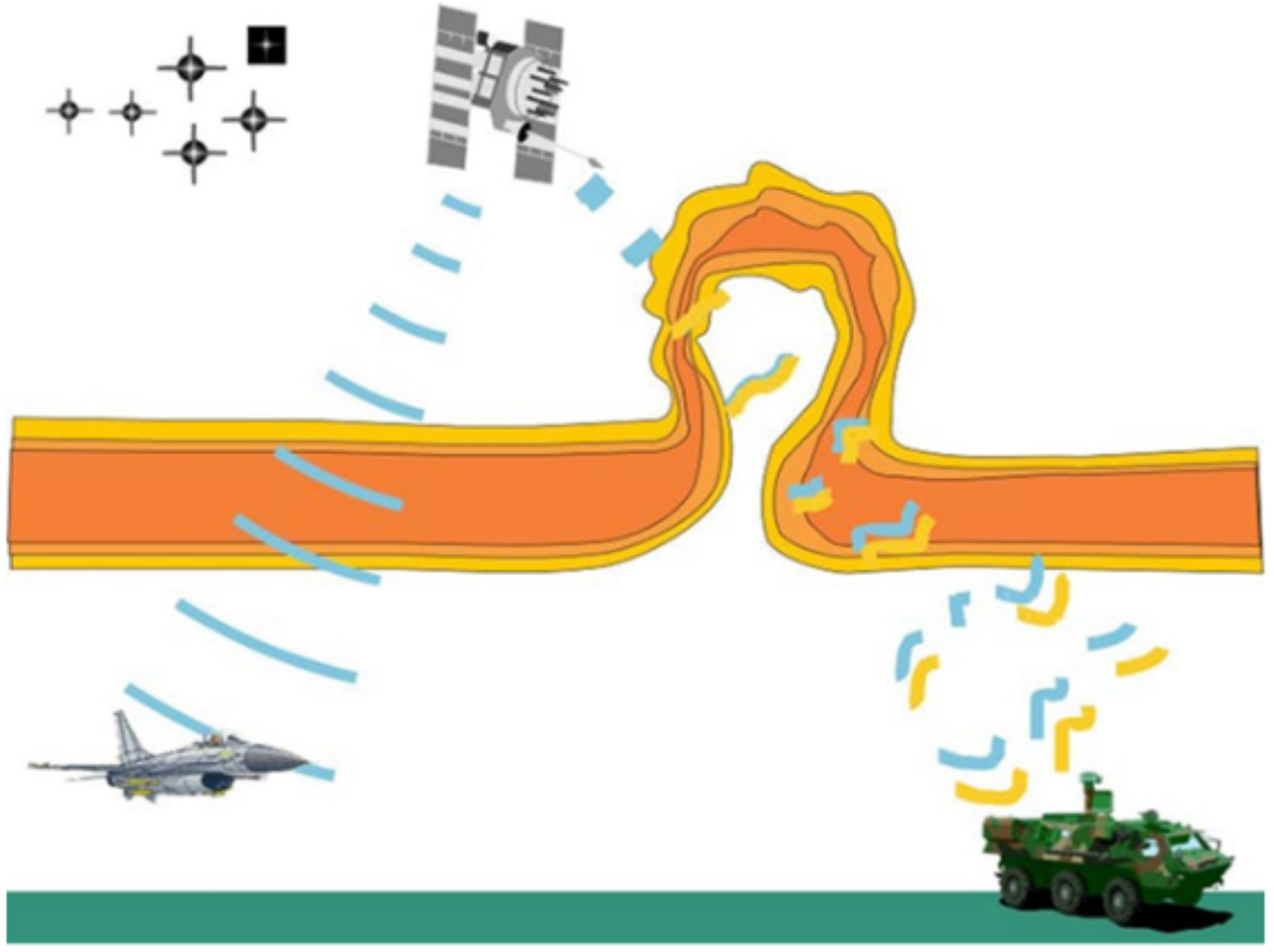
By Rachel Jewett | August 22, 2022

Rendering of the Galaxy 15 satellite. Photo: Intelsat

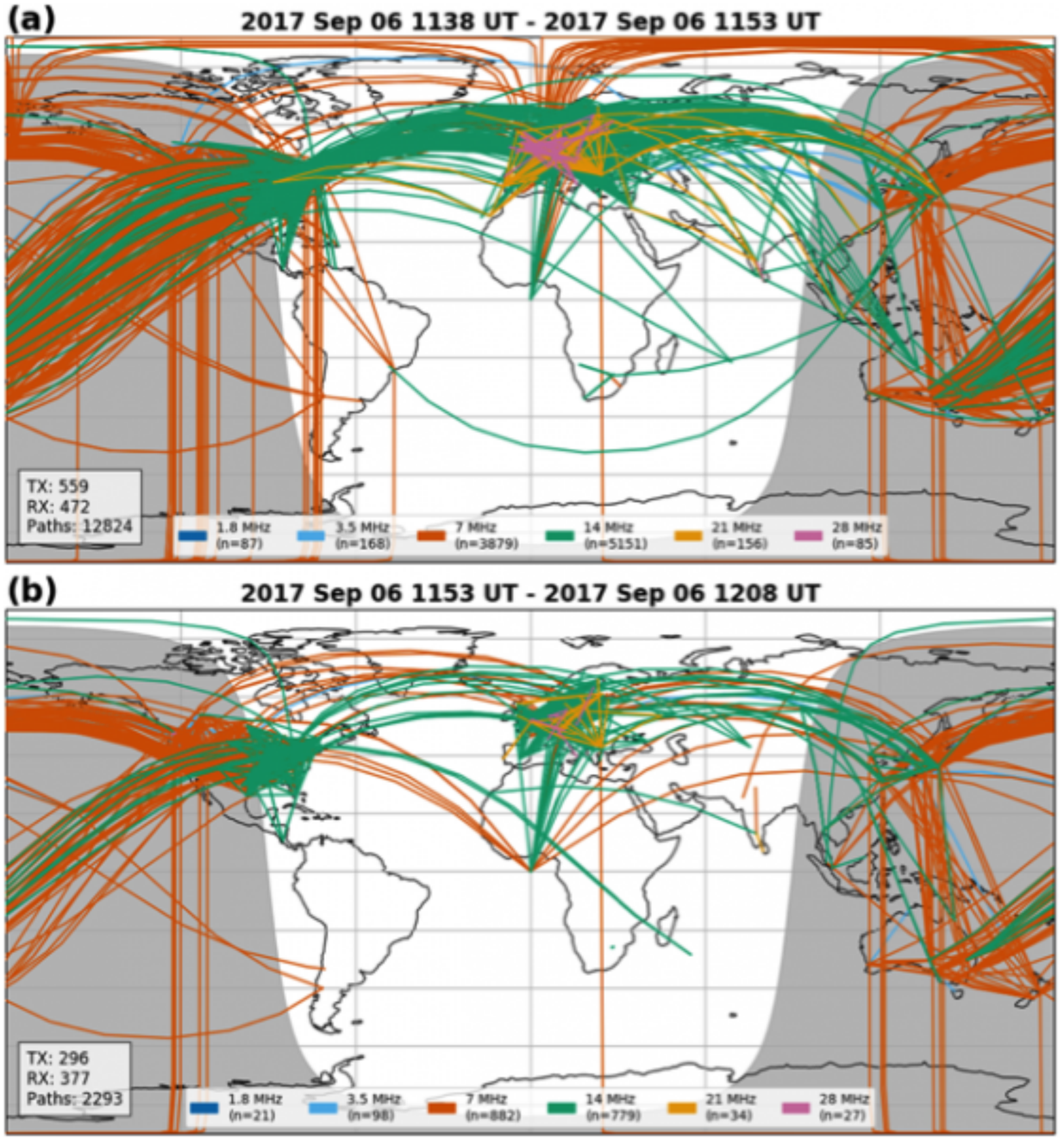
Intelsat has lost the ability to command its Galaxy 15 satellite after an anomaly caused by a space weather event. The anomaly caused the loss of commanding links, which is the signal used to fly the satellite and to receive telemetry data, an Intelsat spokeswoman told *Via Satelite*.

"Intelsat, working with the satellite manufacturer, has concluded that the anomaly is likely due to a lock up of both baseband electronics units triggered by space weather, i.e., solar eruptions of plasma and magnetic fields that can disrupt electronics," the spokeswoman said.

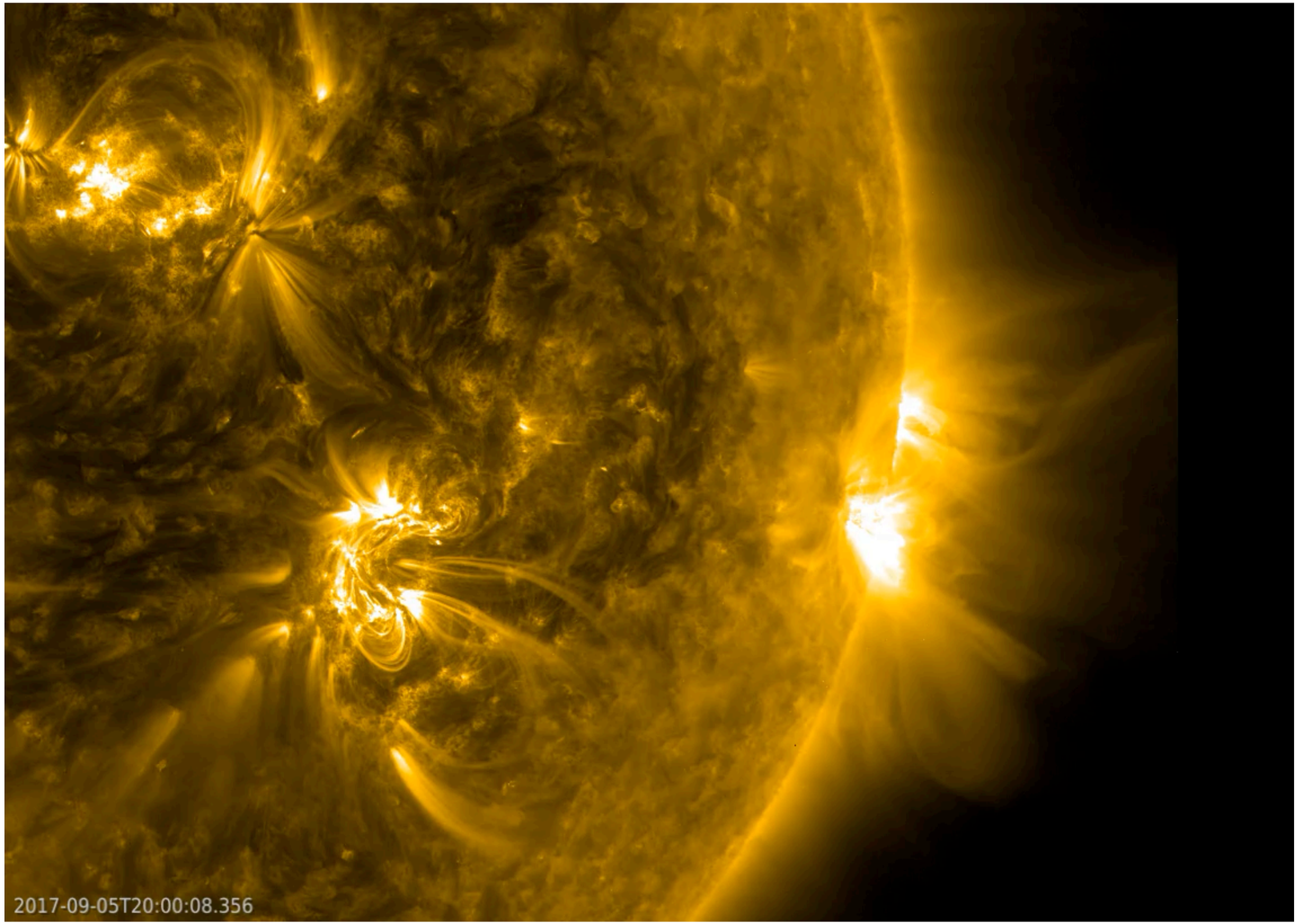

ANACONDA Area of Operations
Objective REMINGTON
Main Escape Routes
Enemy Force Concentrations
Mountain Peaks
(10,000–12,000 ft)
Gardiz (7,053 ft)
Upper Shahi
Kowt Valley
(9,186 ft)
Mountain Passes
(9,000–10,000 ft)
OBJ REMINGTON (8,248 ft)
Takur Ghar
(11,000+ ft)
Chumara Valley Floor
(8,000–9,000 ft)
N

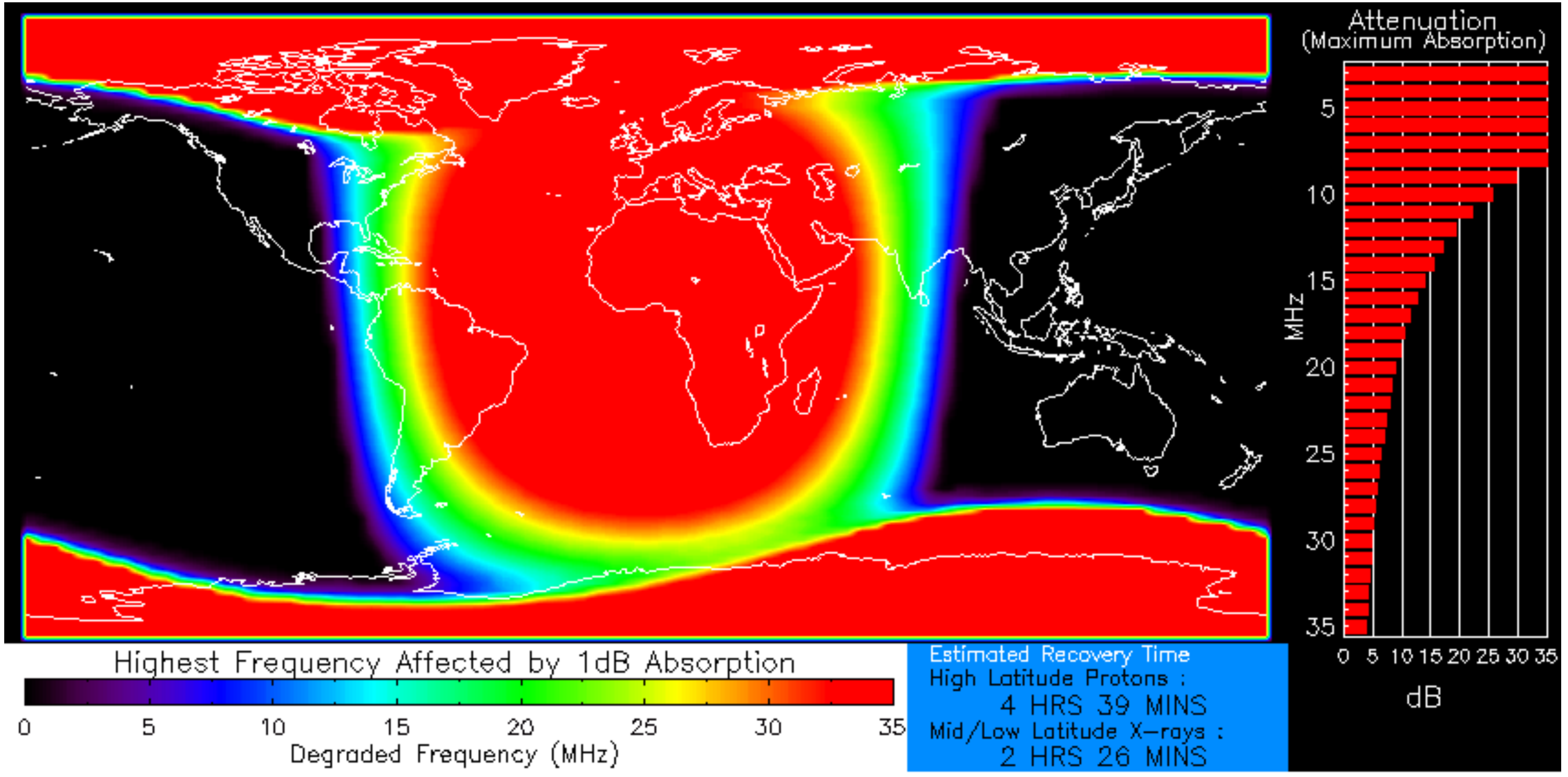


Sept 2017 - Hurricane train


(a)
2017 Sep 06 1138 UT - 2017 Sep 06 1153 UT
TX: 559
RX: 472
Paths: 12824
1.8 MHz (n=87)
3.5 MHz (n=168)
7 MHz (n=3879)
14 MHz (n=5151)
21 MHz (n=156)
28 MHz (n=85)
(b)
2017 Sep 06 1153 UT - 2017 Sep 06 1208 UT
TX: 296
RX: 377
Paths: 2293
1.8 MHz (n=21)
3.5 MHz (n=98)
7 MHz (n=882)
14 MHz (n=779)
21 MHz (n=34)
28 MHz (n=27)

Sept 2017 - Earth and Space weather aligned





Strong X-ray flux
Product Valid At : 2017-09-06 12:03 UTC

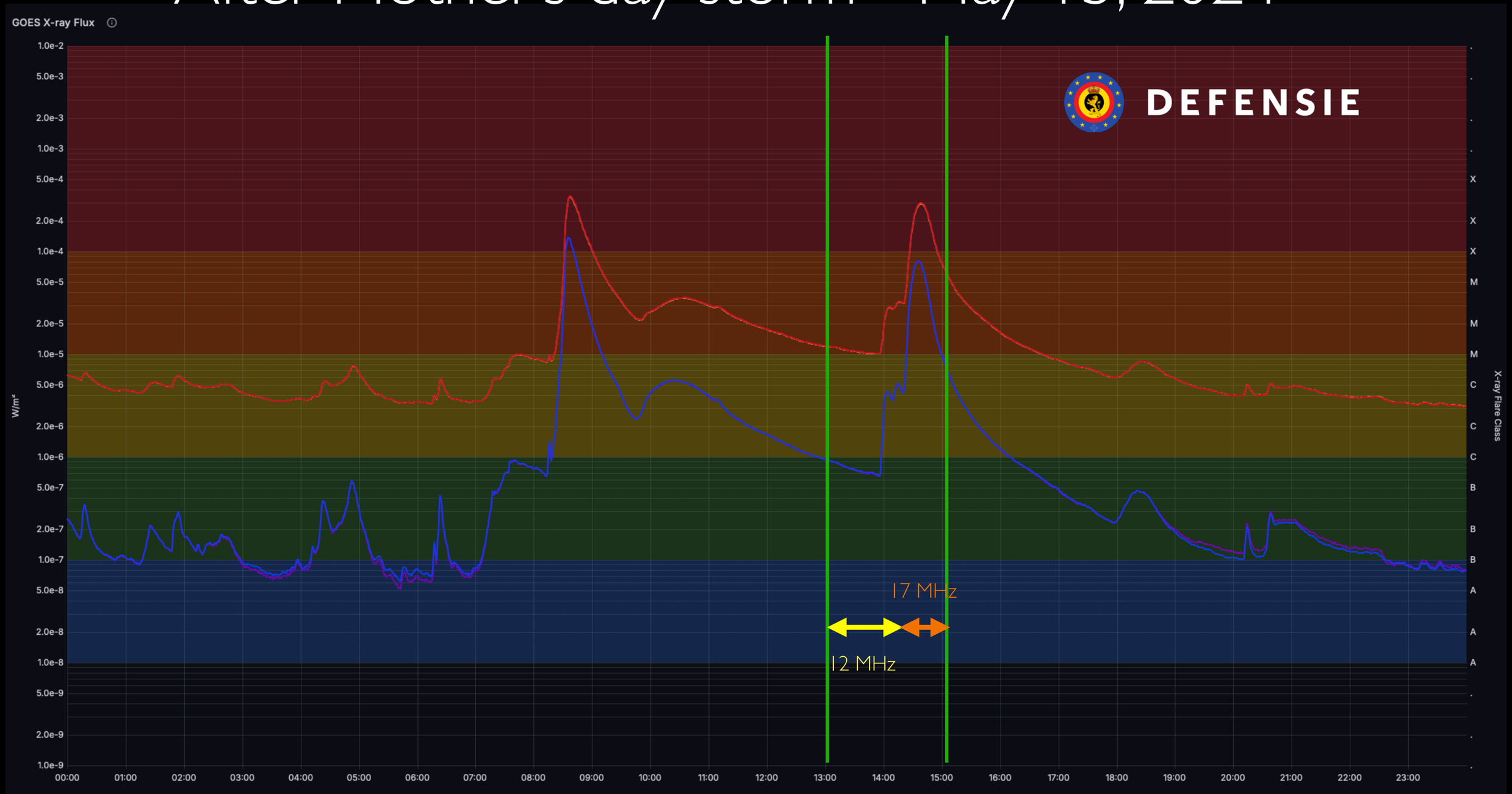
Minor Proton Flux
NOAA/SWPC Boulder, CO USA

After Mother's day storm - May 15, 2024

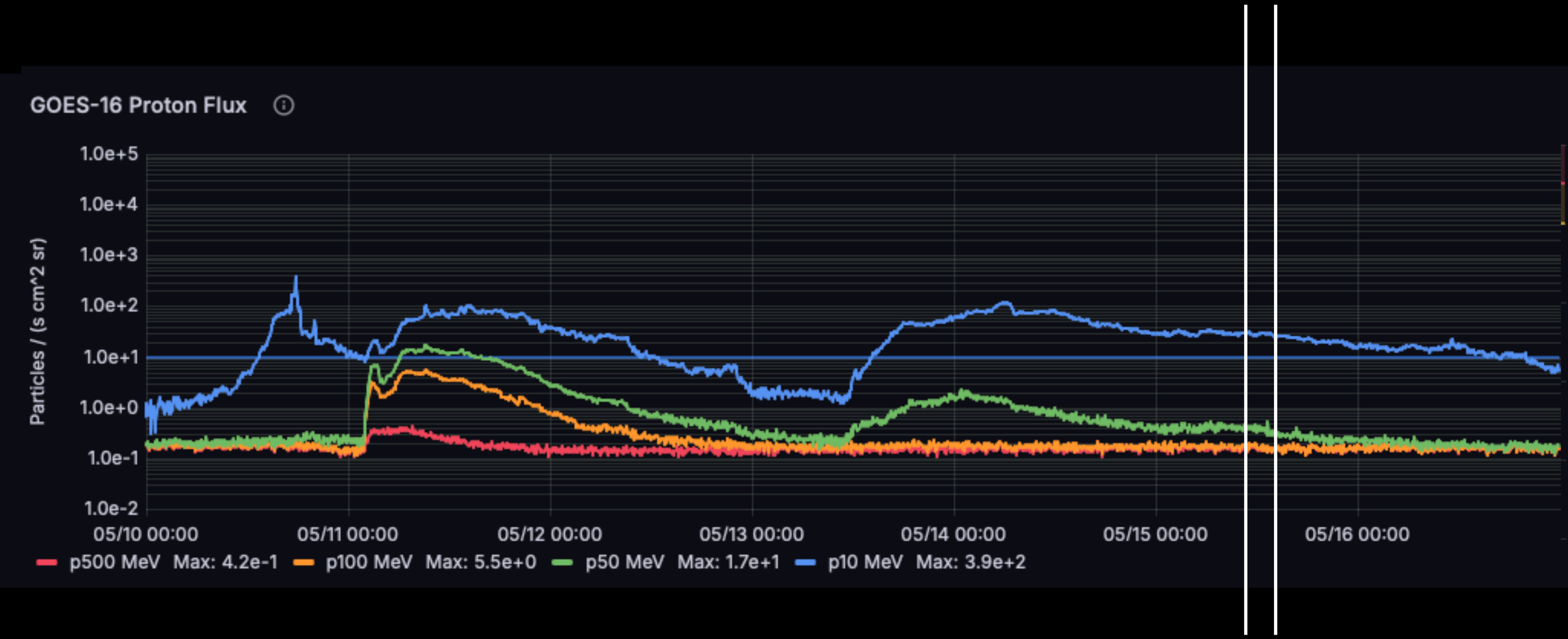
DEFENSIE

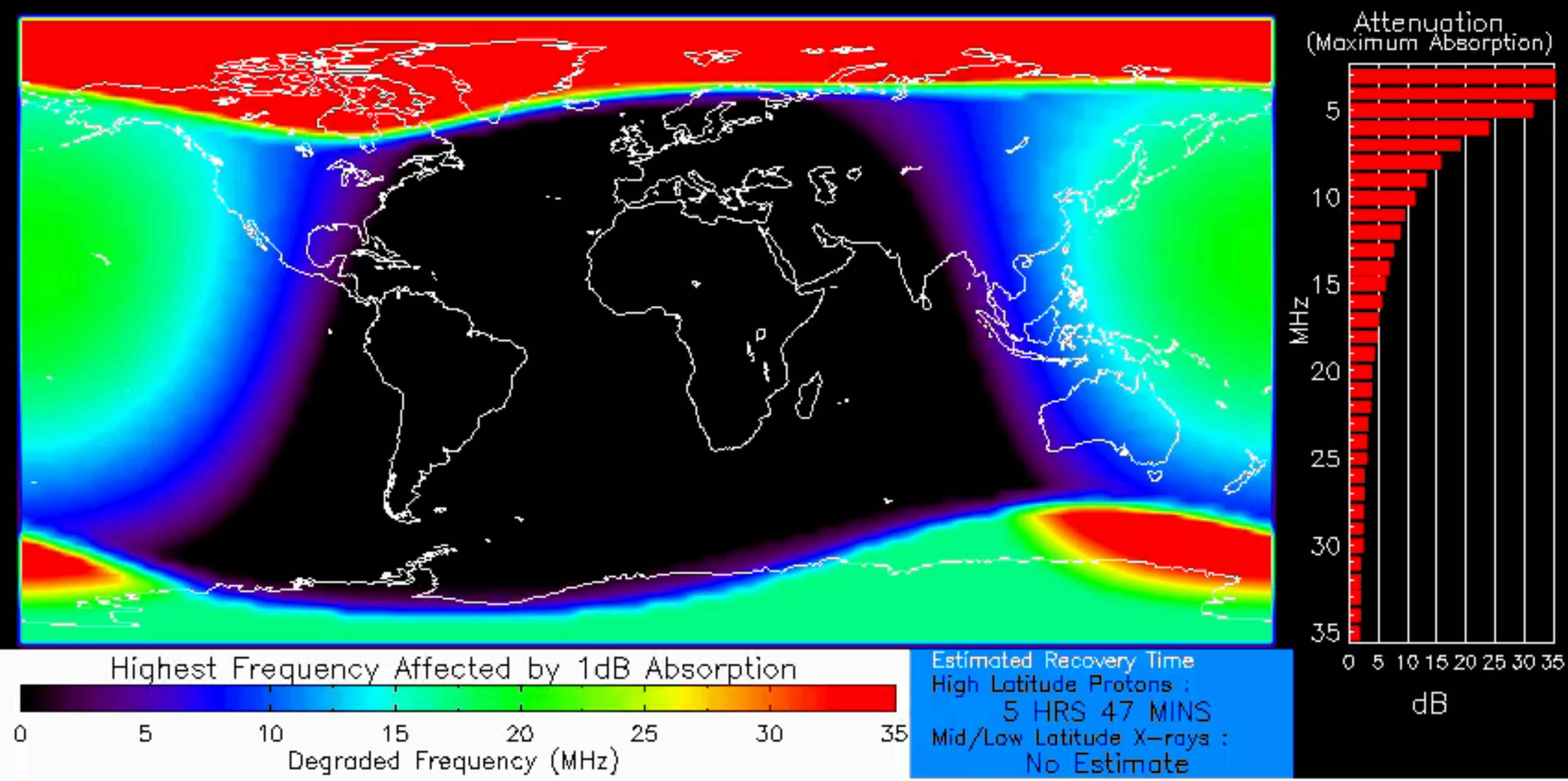
After Mother's day storm - May 15, 2024

After Mother's day storm - May 15, 2024



After Mother's day storm - May 15, 2024





Highest Frequency Affected by 1dB Absorption

0 5 10 15 20 25 30 35

Degraded Frequency (MHz)

Estimated Recovery Time
High Latitude Protons :
5 HRS 47 MINS
Mid/Low Latitude X-rays :
No Estimate

Elevated X-ray flux
Product Valid At : 2024-05-15 00:00 UTC

Minor Proton Flux
NOAA/SWPC Boulder, CO USA