



The effects of Space Weather on Number 1 Remote Sensor Unit's mission

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AIR FORCE



MISSION AND LINES OF OPERATION

“To conduct effective operations in the air, surface and space domains in support of the war fighter and the National Surveillance Effort.”

LINES OF OPERATION



Surveillance of Air and Surface



Surveillance of Space



Missile Warning & Space Launch Detection



Battlespace Characterisation & Awareness

TASKING AND SUPPORT AGENCIES

COLLABORATIONS

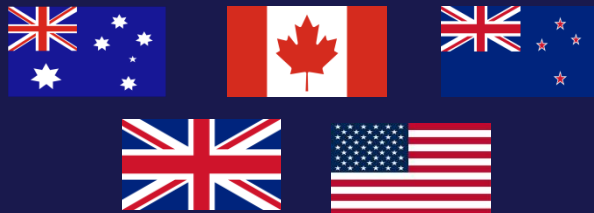
Wide Area and Space Surveillance
Systems Program Office

Defence Science and Technology
Group

Bureau of Meteorology

CO-OPERATIONS

5 Eyes Combined Space Operations



INDUSTRY SUPPORT

BAE SYSTEMS
INSPIRED WORK

LOCKHEED MARTIN

Raytheon

Military/Civil Space Agencies



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1RSU CAPABILITIES



Jindalee Operational Radar
Network



Australian Mission Processor

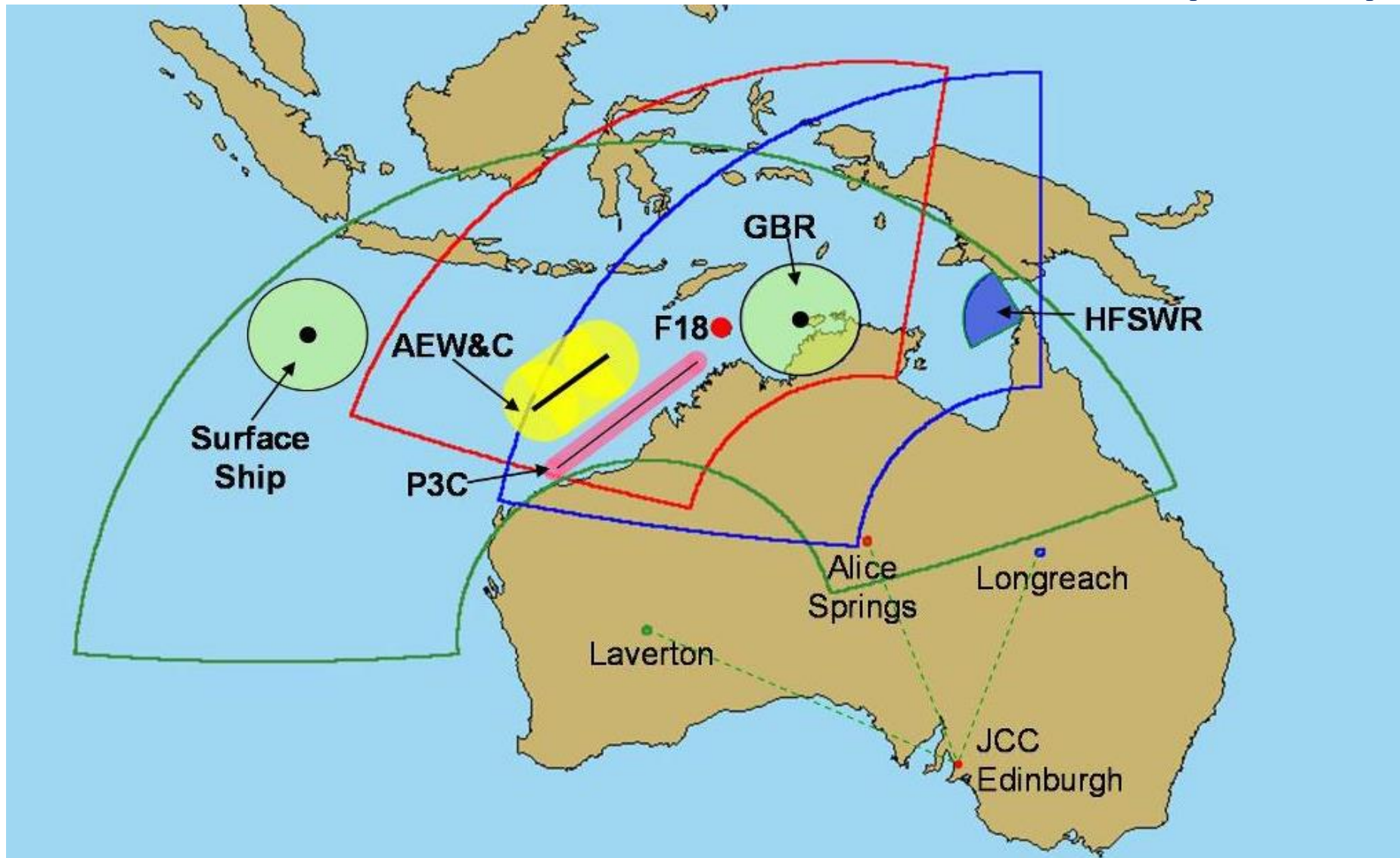


C-Band Radar



Space Surveillance Telescope

JINDALEE OPERATIONAL RADAR NETWORK (JORN)

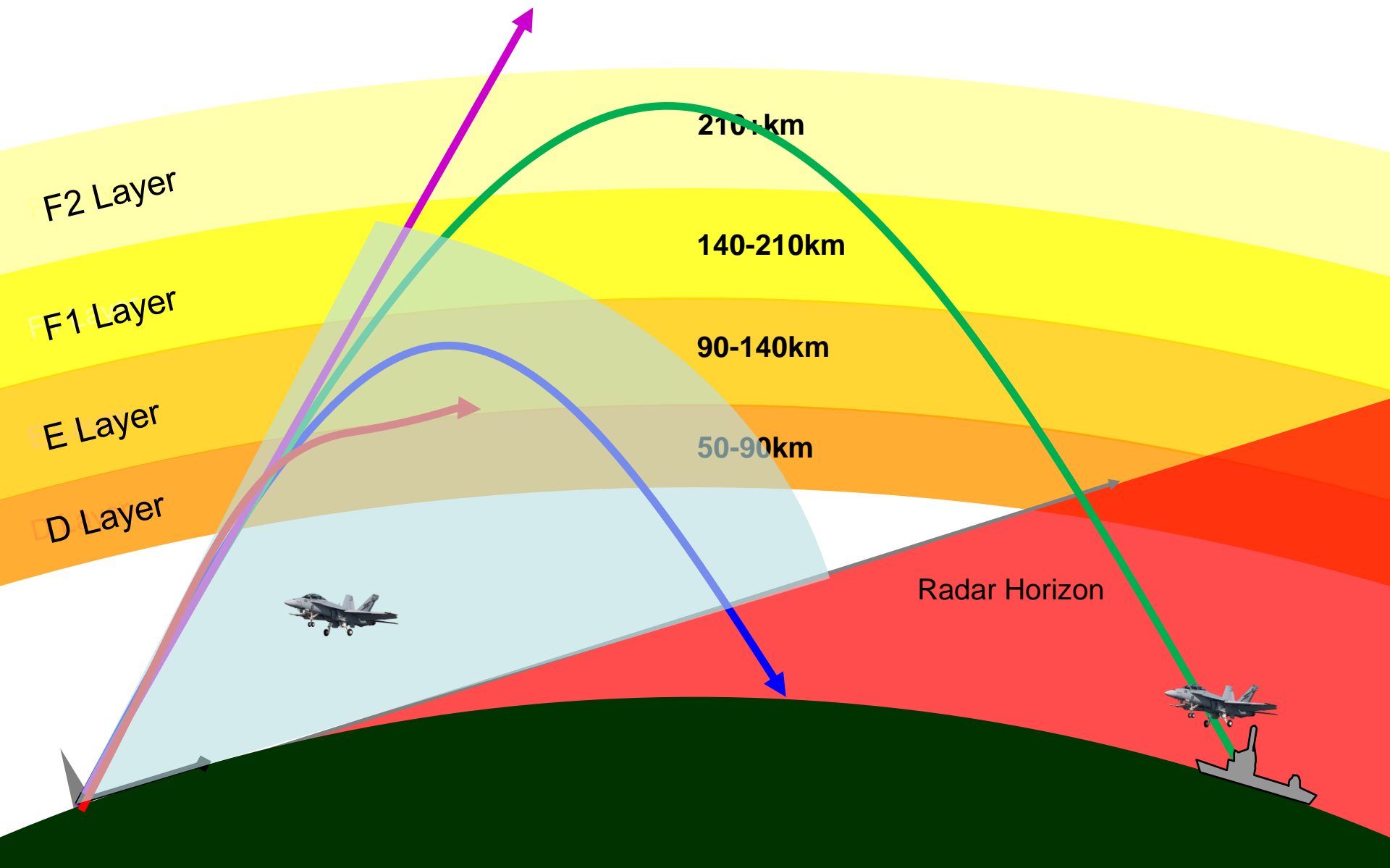


OVER THE HORIZON RADAR (OTHR) CHARACTERISTICS

- Flexible parameters
- Air & Surface mode
- Operators 'juggle' parameters to achieve the mission



OTHR 101



SPACE WEATHER IMPACT - JORN

Reduction in useable frequencies

Limitations in meeting customer requirements

Increase of useable frequencies

Increased probability of target detection

Difficulties mapping targets to the ground

Inaccurate speed and range information on targets

Inaccurate product for customers

SPACE WEATHER MITIGATION - JORN

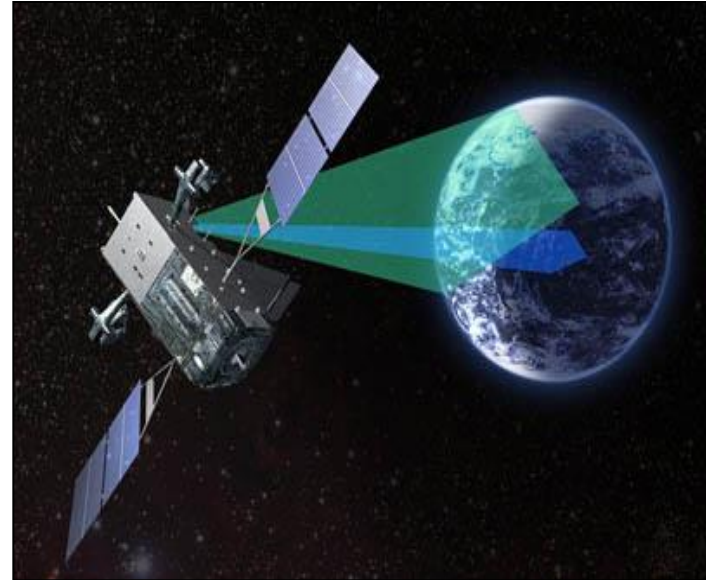
- Forecast of expected daily conditions
 - Wide resources available (BOM, NOAA, SDO and Solar Ham)
 - Recognise role of space weather in anomaly
- Operator selectable parameters to help mitigate conditions
- Inform customers of expected effects on mission
- Record historical data and use for education of operators

AUSTRALIAN MISSION PROCESSOR (AMP)

DEFENCE SUPPORT PROGRAM (DSP)



SPACE BASED INFRA-RED SYSTEM (SBIRS)



SPACE WEATHER IMPACT – AMP

Loss of communication uplink and/or
downlink

Charge the satellite

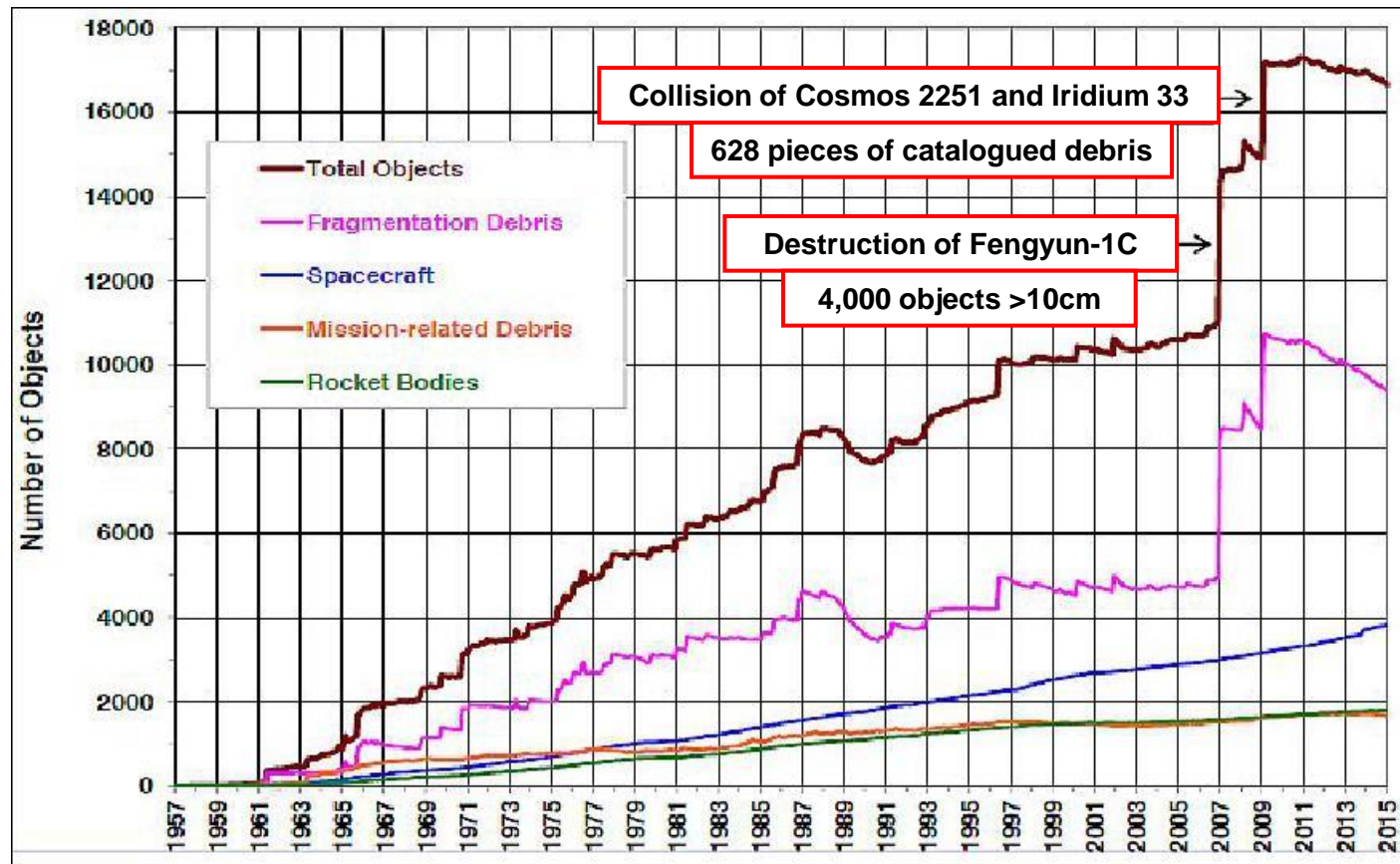
System degradation

System destruction

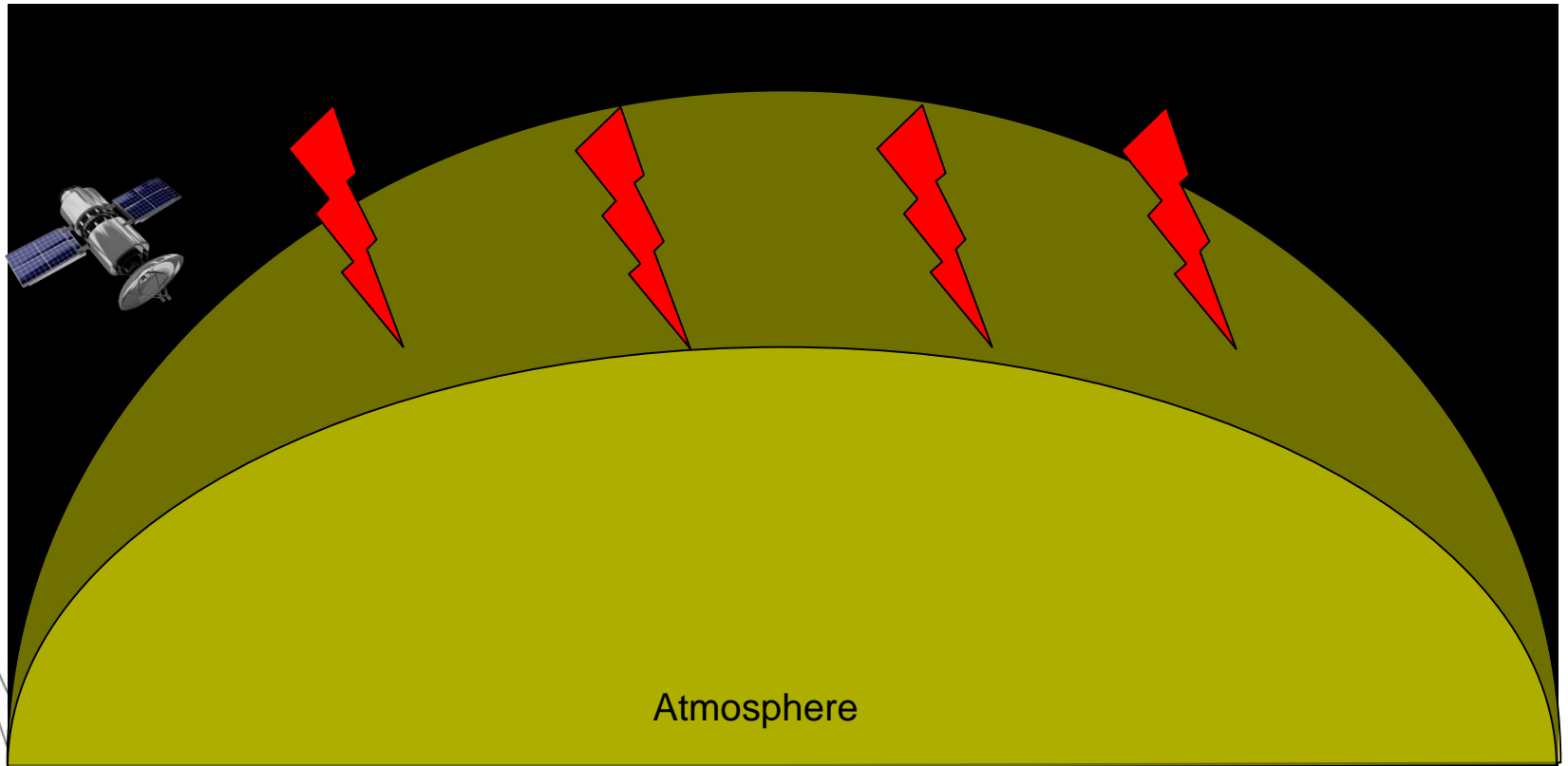
SPACE WEATHER MITIGATION - AMP

- Forecast of expected daily conditions
 - Recognise role of space weather in anomaly
- Improved system architecture

SPACE DEBRIS



ORBITAL VARIATIONS



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DOES SPACE WEATHER AFFECT C-BAND RADAR AND THE SPACE SURVEILLANCE TELESCOPE?

Justifies the 1RSU mission

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C-BAND RADAR



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SPACE SURVEILLANCE TELESCOPE (SST)



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SPACE SURVEILLANCE TELESCOPE MARCH 2017



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1RSU & SPACE WEATHER INTO THE FUTURE

Continued architectural improvements

Continual training of 1RSU operators

Space Weather Information and Forecast Team (SWIFT)

Improving customer awareness

Relationship building with support agencies

CONCLUSION

- 4 key assets operated at 1RSU
- Each asset impacted by space weather
- 1RSU endeavours to increase its understanding of space weather events
- 1RSU continues to develop relationships with the wider space weather community

QUESTIONS



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