

# ***Headquarters U.S. Air Force***

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*Integrity - Service - Excellence*

## **U.S. Department of Defense Space Weather Services**



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HQ USAF/A3W  
May 18, 2017**



# Overview

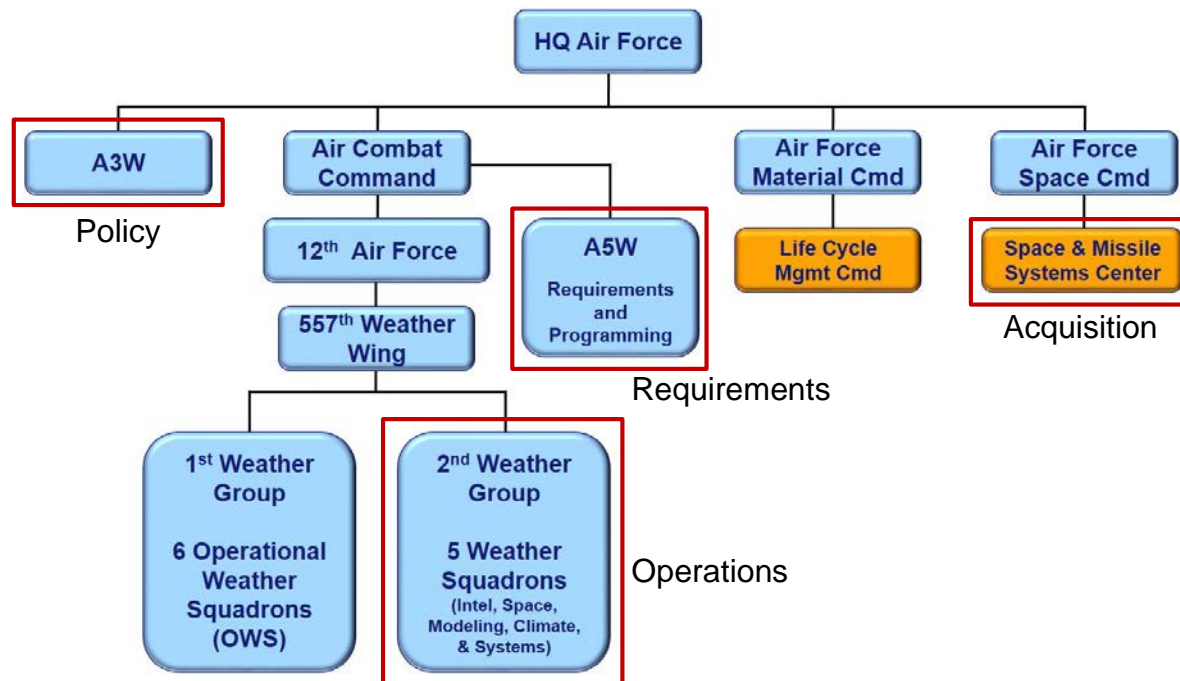
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- **USAF Space Weather Services**
- **Space Weather Application**
- **Space Weather Observing**
- **Space Weather Community**
- **Why DoD Space Weather: Sensor-to-Operator**
- **Summary**



# USAF Space Weather Services

- Chairman of the Joint Chiefs of Staff Instruction
  - Chief of Staff, U.S. Air Force is responsible for: Space weather research, operations, and capabilities in support of all elements of the Department of Defense
  - HQ AF/A3W delegated space weather operational responsibility





# Space Weather Application

## ■ 557<sup>th</sup> Weather Wing Space Weather Operations Center (SpaceWOC)

- Mission-tailored unclassified and classified analysis, forecasts, warnings
- Disseminate system-impacting space weather
  - DoD operators and decision makers
  - National agencies
- Anomaly assessment support



## ■ Joint Space Operations Center (JSpOC)

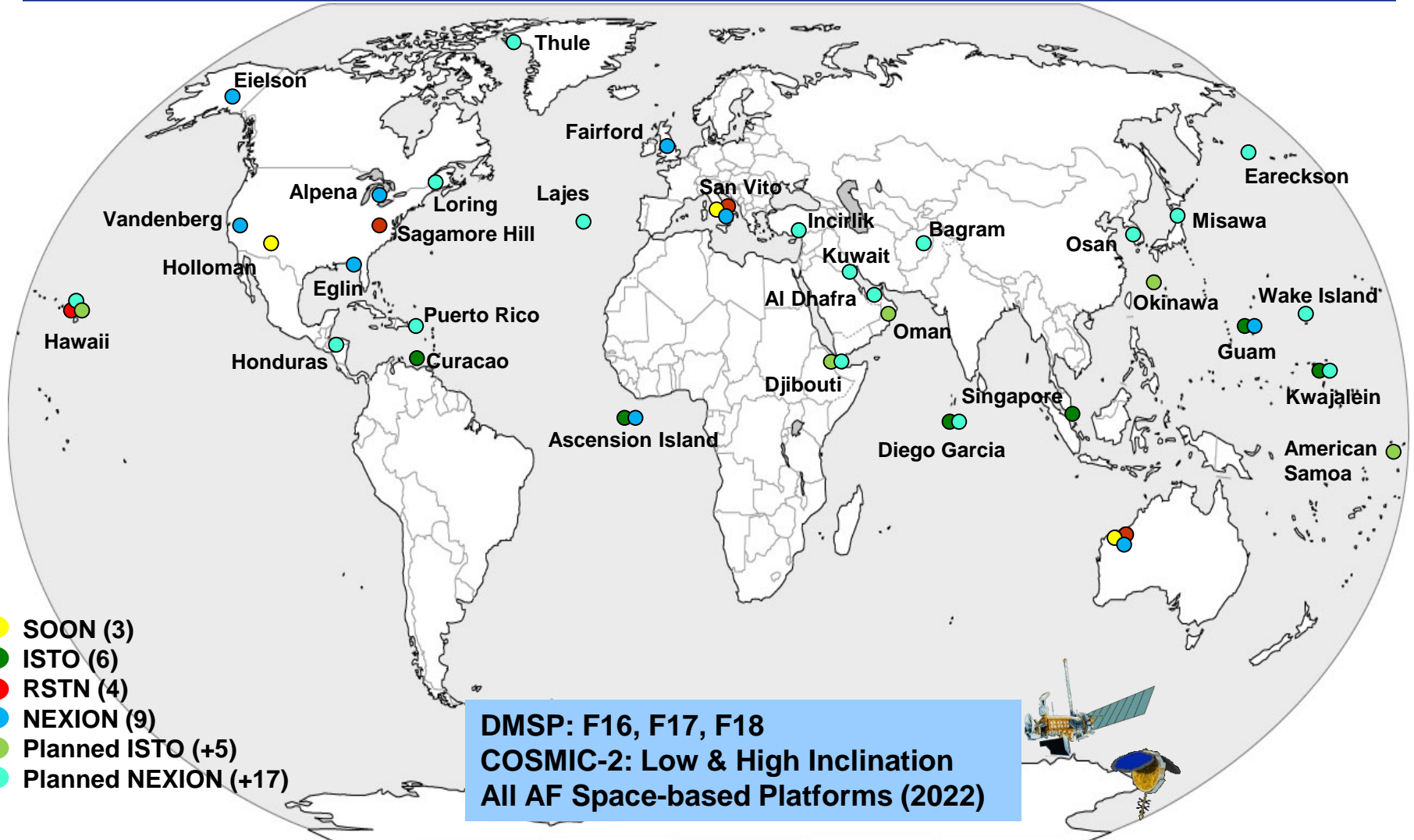
- C2 system executing USSTRATCOM space control mission
- Focal point for space force integration & employment in military ops
- Detect, track, and identify all artificial objects in Earth orbit



**Mission Focused, Operational Support to DoD & National Agencies**



# Space Weather Observing Future



**Relevant, Reliable, Responsive Obs Feeding Sensor-to-Operator Chain**



# *Space Weather Community*

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- **DoD actively engaged in global community**
- **Training**
  - **Offer space weather course (1 week) at 557 Weather Wing**
  - **Students from Italy, France, Netherlands, Germany – working to bring in Japan and South Korea**
- **Cooperating in operations**
  - **NOAA SWPC – analysis and forecasting**
  - **Engaging with UK, South Korea on Ops Centers stand-up**
  - **Data sharing via web services – national & international partners**
- **Energizing research and development relationships**
  - **Government Labs**
  - **Academia**
  - **Commercial Sector**



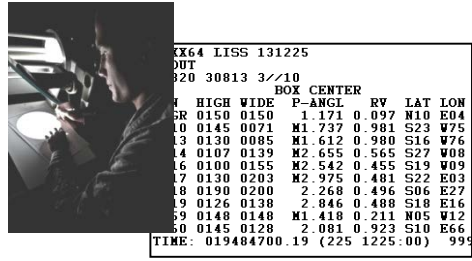


# Why DoD Space Weather: Sensor-to-Operator

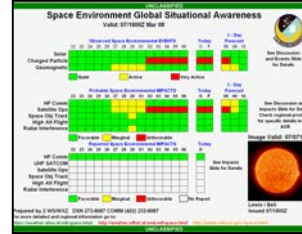
SOON – H $\alpha$



Forecaster analysis & sunspot classification



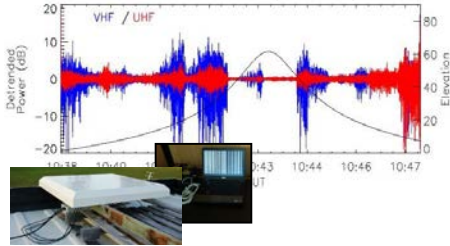
SpaceWOC forecast space wx & impacts



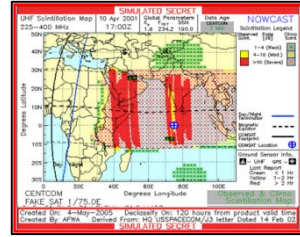
20<sup>th</sup> Space Control Sq alerted to space object tracking impacts



ISTO – Radio Frequency Beacon over flight signals



UHF SATCOM Scintillation Map



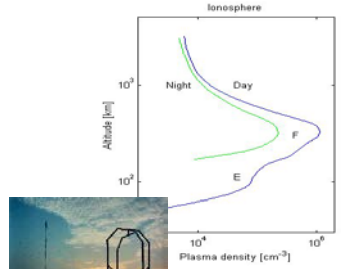
Combined Air Operations Center Theater ISR collection



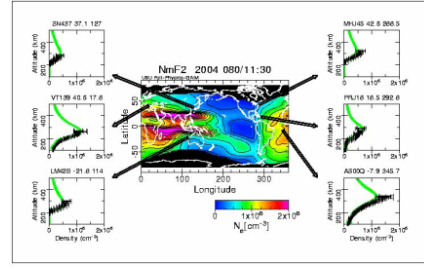
Uninterrupted RPA SATCOM data link to CAOC



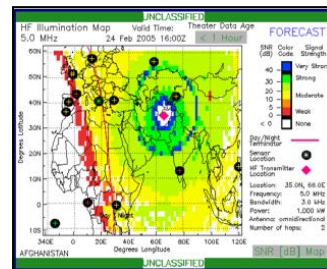
NEXION – derived profiles



Models – Global Assimilation of Ionospheric Measurements (GAIM)



Impact products – HF illumination



Naval Special Warfare RHIB C2 via HF Comm



SENSOR

SPACE WEATHER DATA & PRODUCTS

OPERATOR



# Summary

- Air Force committed to space weather enterprise...now & future
- Team with national & international community for DoD Support
- Sensor-to-Operator – accurate, timely, relevant impacts delivered

Global Power



Global Reach



Air Ops



Agile Combat Support



***“Air Force weather enables Joint Warfighters to anticipate and exploit the weather...for air, ground, space, cyberspace and intel operations.”***

*– AFW Mission*



Army Ops



Global Vigilance



Special Ops



Space Weather

*Breaking Barriers ... Since 1947*