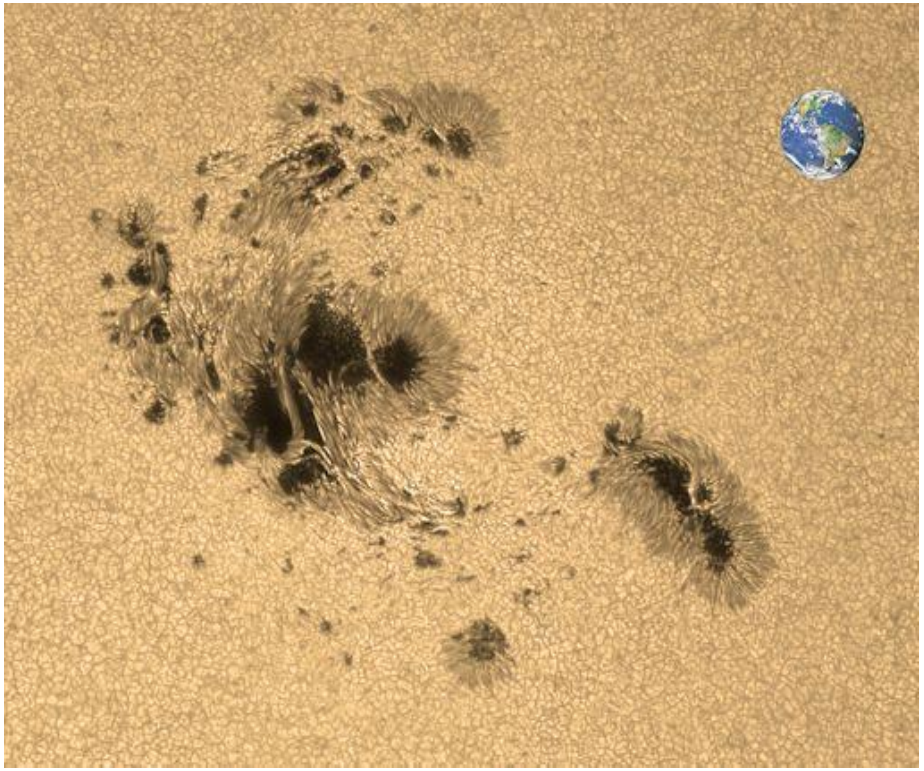
The 557th Weather Wing

Sept 2017 Event Impacts

Capt John Ross
Space Weather Operations Center
Flight Commander

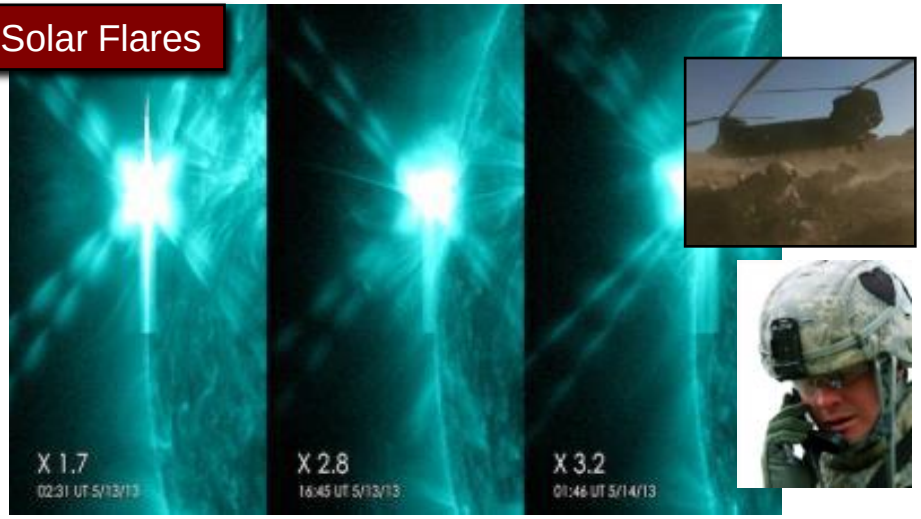
Overview

- Phenomena/Impacts
- Communication Impacts
- Radiation Impacts
- Satellite Impacts
- Impact Summary

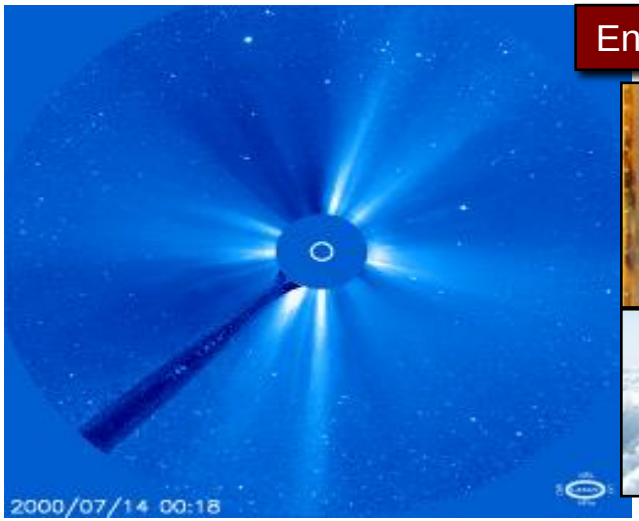


Space Weather Phenomena

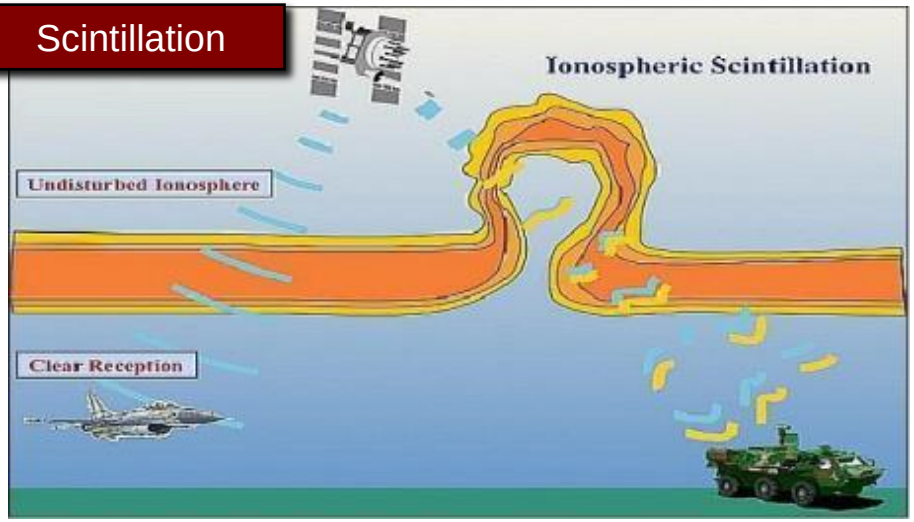
Solar Flares



Energetic Particles



Scintillation



Geomagnetic Storms

Warfighter Impacts

***Tailors Space Weather Information** -- satisfying Warfighter Mission Requirements and Delivers Support to appropriate Classification Level*

X-Rays, EUV, Radio Bursts

Arrival: 8 min / Duration: 1-2 hours

- SATCOM Interference
- Radar Interference
- HF Radio Blackout
- Geolocation Errors
- Satellite Orbit Decay

Energetic Particle Events

Arrival: 15 min to hours / Duration: days

- High Altitude Radiation Hazards
- Spacecraft Damage
- Satellite Disorientation
- Launch Payload Failure
- False Sensor Readings
- Degraded HF Comm (high latitudes)

Scintillation

Daily / Ionospheric Disturbance

- Degraded SATCOM
- GPS Error
  - Positioning
  - Navigation
  - Timing

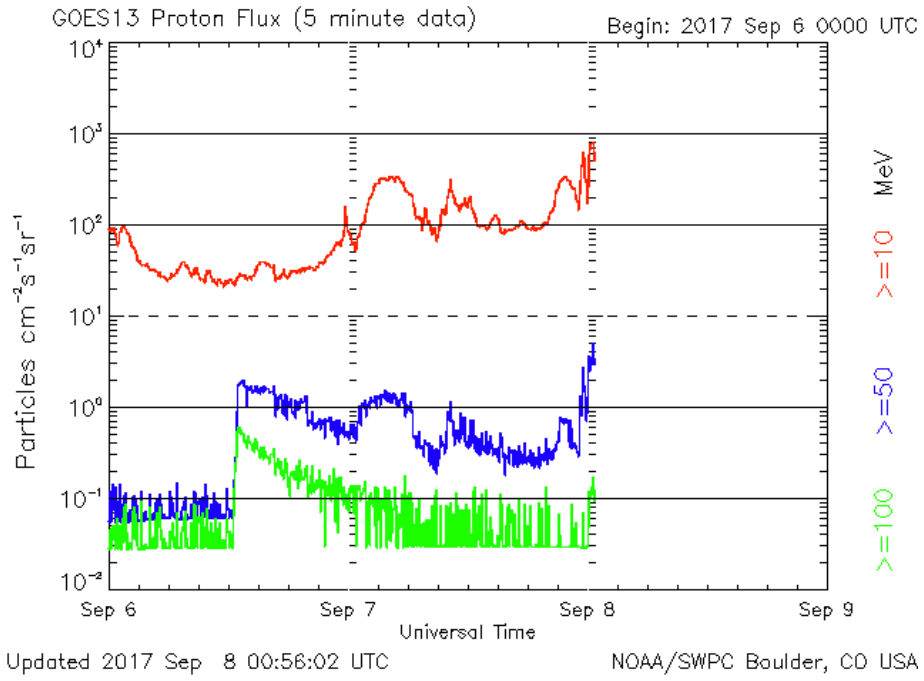
Geomagnetic Storms

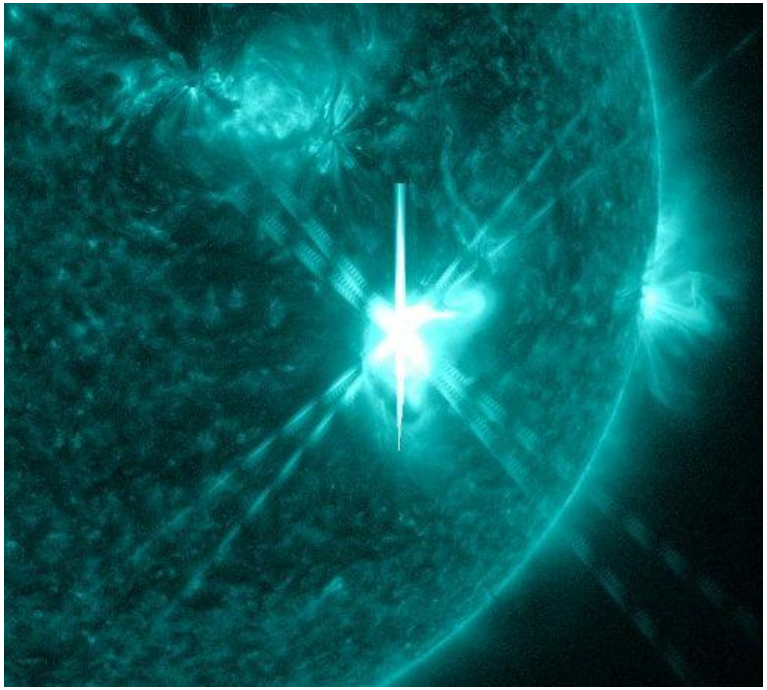
Arrival: 1-3 days / Duration: days

- Spacecraft Charging and Drag
- Geolocation Errors
- Space Track Errors
- Launch Trajectory Errors
- Radar Interference
- Radio Propagation Anomalies
- Power Grid Failures

(Communication) Impacts

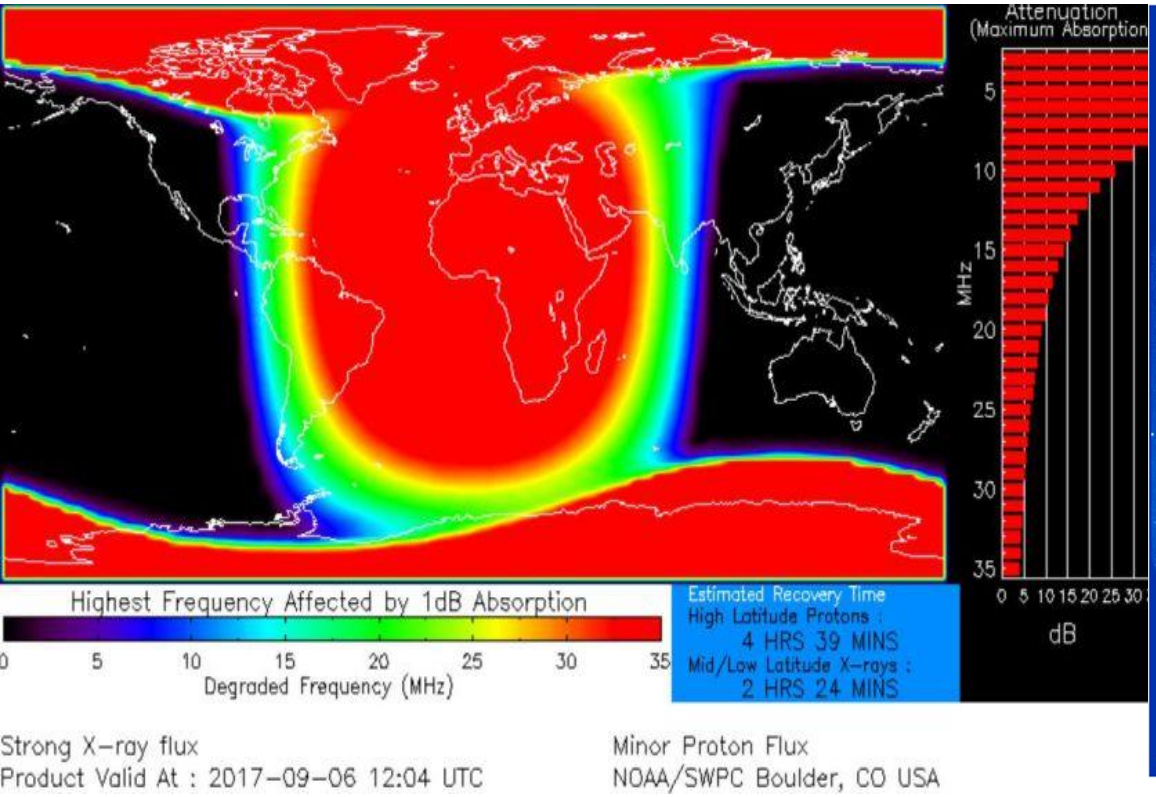
- **06 SEP: HF COMM issues were reported from SW Asia during the time of flaring**
- **05 – 08 SEP: Intermitted Polar Cap Absorption (PCA) events lasting hours affecting HF COMMS in the polar regions**

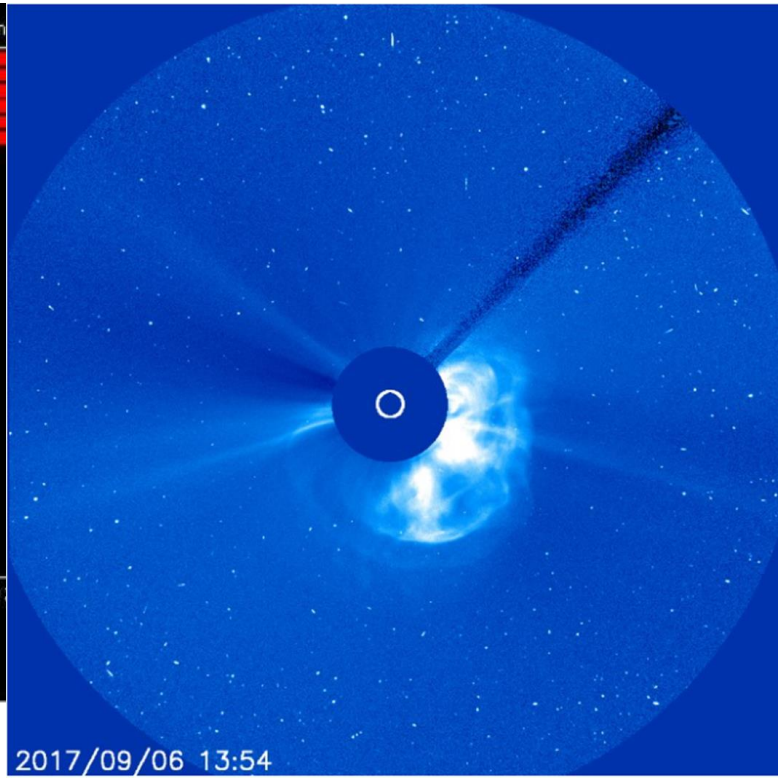




(Communication) Impacts

- 06 SEP: Radar interference issues reported with Solar Flare
- 06 SEP: Earthward Directed Coronal Mass Ejection

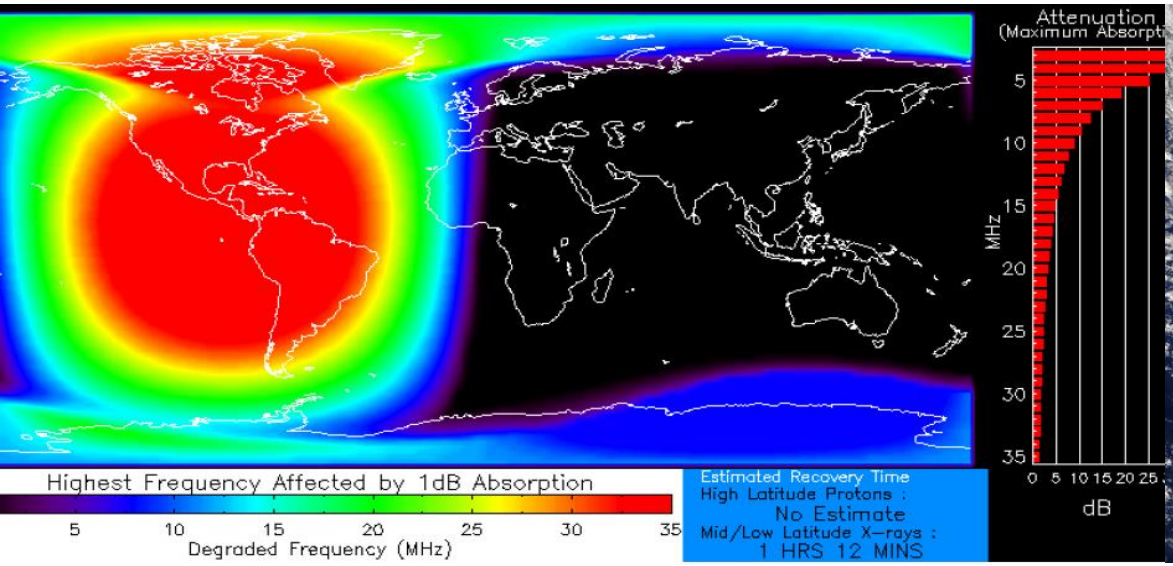


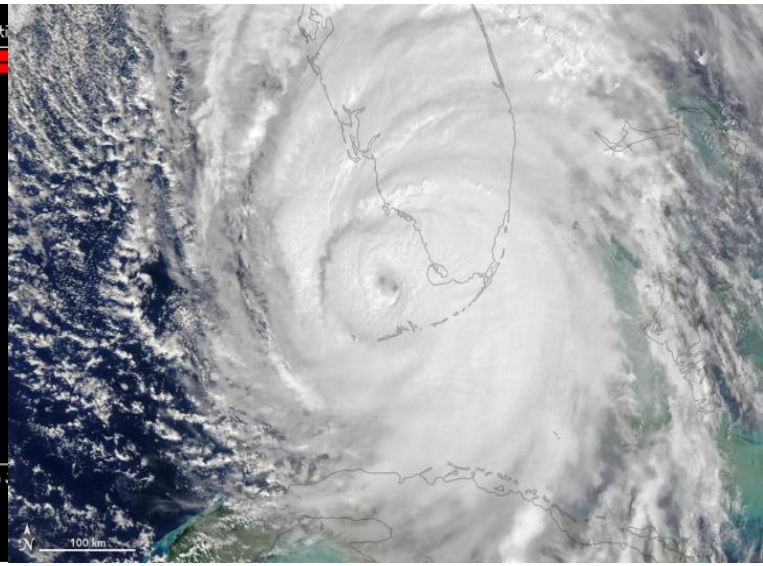


HF Fadeout due to X9.3 flare and continue radiation storm impacting polar regions.

(Communication) Impacts

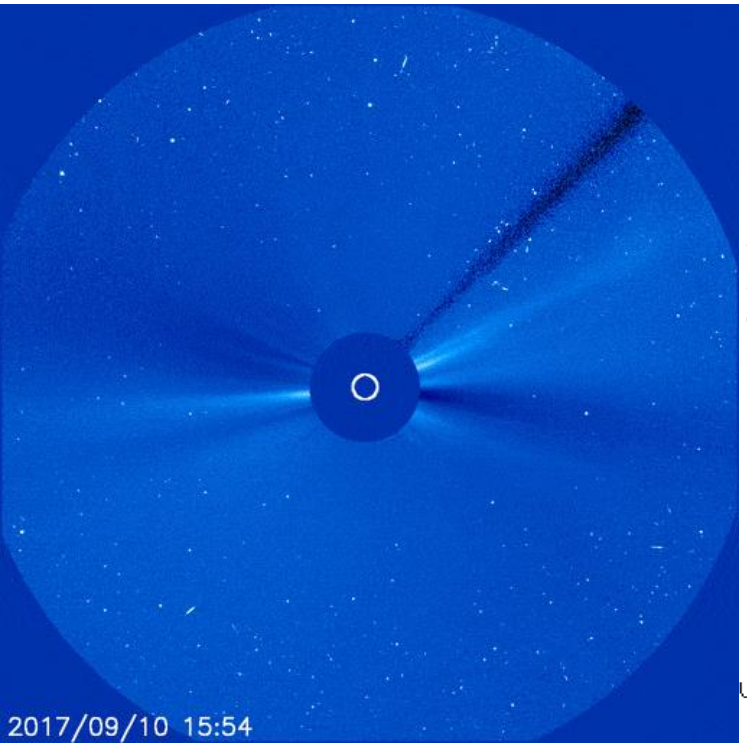
- **10 SEP: HF COMM issues were noted over areas of the Caribbean**
- **10 SEP: SATCOM issues were noted over Florida when assessing the Hurricane Irma damage**
- **11 – 14 SEP: High latitude communication issues due to protons**

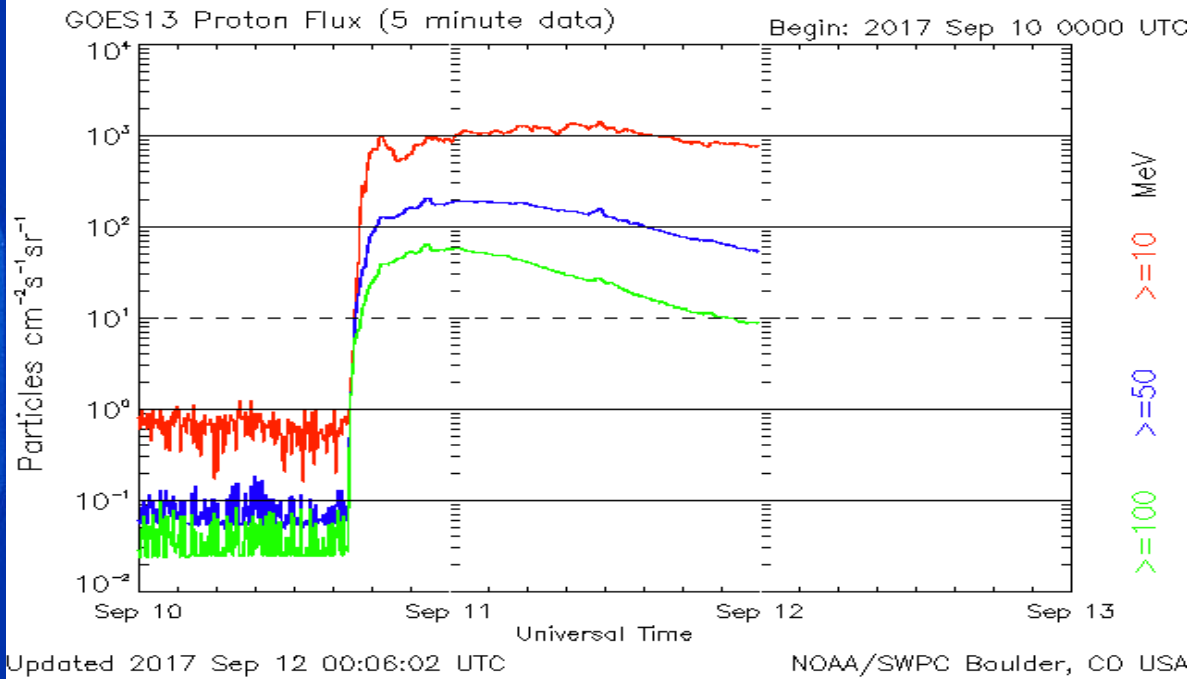




(Radiation) Impacts

- **On 10 SEP at 1845Z jet airliner routes stopped and rerouted to a more southward trek**





A rapid rise in ≥10, 50 and100 MeV protons at the time the M8.2 flare.

(Satellite) Impacts

04 - 11 SEP

- 4 NATO reported anomalies
- 1 USN reported satellite communication anomaly
- 2 HEO satellite anomalies

12 - 18 SEP

- 1 HEO anomaly
- 1 MEO (GPS) anomaly
- 4 LEO anomalies
- 3 GEO satellite anomalies

Impact Summary

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RECENT SPACE WEATHER EVENTS

VT: 10/00Z

10 Sep 17
0000Z ~ M Level X-Ray Flare Continued until 0008Z

09 Sep 17
2346Z ~ X-Ray Flare with a M1.1 Max @ 2353Z From Region 2673
2309Z ~ X-Ray Flare with a M1.0 Max @ 2311Z From Region 2673
1800Z ~ Geomagnetic Storming Ended; Max 3hr ap value of 400 @ 08/1600
1059Z ~ X-Ray Flare with a M3.8 Max @ 1104Z From Region 2673
0426Z ~ X-Ray Flare with a M1.1 Max @ 0428Z From Region 2673
0000Z ~ Geomagnetic Storming Continues; Max 3hr ap value of 400 @ 08/1600Z

08 Sep 17
2341Z ~ X-Ray Flare with a M2.0 Max @ 2341Z from Region 2673
1509Z ~ X-Ray Flare with a M3.0 Max @ 1547Z from Region 2673
1530Z ~ Polar Cap Absorption Ended
1405Z ~ Event Level Radio Burst Peak of 5000 SFU @ 1402Z on 245MHz
1317Z ~ Geomagnetic Storming Began
0745Z ~ X-Ray Flare with a M8.1 Max @ 0749Z from Region 2673
0546Z ~ Event Level Radio Burst Peak of 5900 SFU @ 0546Z on 245MHz
0346Z ~ Event Level Radio Burst Peak of 15000 SFU @ 0343Z on 245MHz
0343Z ~ X-Ray Flare with a M1.2 Max @ 0343Z from Region 2673
0223Z ~ X-Ray Flare with a M1.3 Max @ 0224Z from Region 2673
0000Z ~ Geomagnetic Storming Began; Max 3hr ap value of 236 @ 08/0200Z
0000Z ~ Polar Cap Absorption Continues
0000Z ~ Elevated Levels of High Energy Particles Continues

07 Sep 17
2255Z ~ X-Ray Flare with a M3.9 Max @ 2356Z from Region 2673
2201Z ~ Event Level Radio Burst Peak of 7900 SFU @ 2202Z on 245MHz
1436Z ~ X-Ray Flare with a X1.3 Max @ 1436Z from Region 2673
1435Z ~ Event Level Radio Burst Peak of 8200 SFU @ 1435Z on 1415MHZ
1300Z ~ Geomagnetic Storming Ended; Max 3hr ap value of 32 @ 07/1100Z
1100Z ~ Geomagnetic Storming Began
1015Z ~ X-Ray Flare with a M7.3 Max @ 1015Z from Region 2673
1014Z ~ Event Level Radio Burst Peak of 91K @ 1014Z on 245MHZ
1004Z ~ X-Ray Flare with a M1.4 Peak @ 1005Z from Region 2673
0501Z ~ X-Ray Flare with a M2.4 Max @ 0502Z from Region 2673
0000Z ~ Polar Cap Absorption Continues
0000Z ~ Elevated Levels of High Energy Particles Continues

06 Sep 17
2338Z ~ X-Ray Flare with M1.2 Max @ 2339Z from Region 2673
2110Z ~ Polar Cap Absorption Began
1737Z ~ X-Ray Flare with M1.0 Max @ 1730Z from Region 2673
1736Z ~ Polar Cap Absorption Ended
1708Z ~ Spacecraft Internal Charging Ended
1156Z ~ Radio Bursts on all frequencies max on 1415MHz with peak of 19,000 SFU at 1156Z
1156Z ~ X-Ray Flare with X9.4 Max @ 1202Z from Region 2673
0903Z ~ X-Ray Flare with X1.2 Max @ 0910Z from Region 2673
0725Z ~ Polar Cap Absorption Began
0400Z ~ Polar Cap Absorption Ended
0136Z ~ Spacecraft Internal Charging Began
0000Z ~ Polar Cap Absorption Continues
0000Z ~ Elevated Levels of High Energy Particles Continues

05 Sep 17
1845Z ~ Spacecraft Internal Charging Ended
1741Z ~ X-Ray Flare with M2.3 Max @ 1743Z from Region 2673
0639Z ~ X-Ray Flare with M3.8 Max @ 0640Z from Region 2673
0433Z ~ X-Ray Flare with M3.2 Max @ 0453Z from Region 2673
0350Z ~ X-Ray Flare with M1.0 Max @ 0351Z from Region 2673
0240Z ~ Polar Cap Absorption Began
0300Z ~ Geomagnetic Storming Ended; Max 3hr ap value of 39 at 04/23Z
0107Z ~ X-Ray Flare with M4.2 Max @ 0108Z from Region 2673
0045Z ~ Elevated Levels of High Energy Particles Began
0000Z ~ Spacecraft Internal Charging Continues
0000Z ~ Geomagnetic Storming Continues

04 Sep 17
2300Z ~ Geomagnetic Storming Began
2200Z ~ Geomagnetic Storming Ended; Max 3hr ap value of 32 at 04/21Z
2100Z ~ Geomagnetic Storming Began
2031Z ~ Solar Optical Flare of 3B
1919Z ~ X-Ray Flare with M5.7 Max @ 2033Z from Region 2673
1845Z ~ Spacecraft Internal Charging Began
1530Z ~ X-Ray Flare with M1.5 Max @ 1530Z from Region 2673
0545Z ~ X-Ray Flare with M1.2 Max @ 0549Z from Region 2673

FOR ADDITIONAL INFORMATION ON CLASSIFIED IMPACTS, PLEASE CALL DSN 272-8087 OR VISIT AFW-WEBS-(S)

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Impact Summary

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557TH WEATHER WING

Space Environment Global Situational Awareness

Valid: 12-Sep-2017 0000 Z

Observed Space Environmental EVENTS

	29	30	31	01	02	03	04	05	06	07	08	09	10	11	Today O	Today F	3-Day Forecast 13	14	15
Solar																			
Charged Particle																			
Geomagnetic																			

Quiet Active Very Active

See Discussion and Events Slide for details

Probable Space Environmental IMPACTS

	29	30	31	01	02	03	04	05	06	07	08	09	10	11	Today O	Today F	3-Day Forecast 13	14	15
HF Comm																			
Satellite Ops																			
Space Obj Track																			
High Alt Flight																			
Radar Interference																			

Favorable Marginal Unfavorable

See Discussion and Impacts Slide for details. Check regional products for specific details in your AOR.

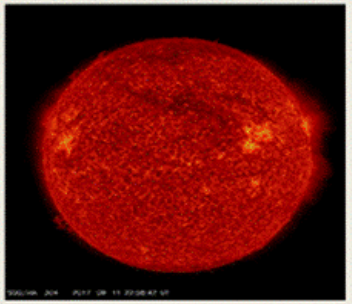
Image Updated: 11 / 2258Z

Reported Space Environmental IMPACTS

	29	30	31	01	02	03	04	05	06	07	08	09	10	11	Today O
HF Comm															
UHF SATCOM															
Satellite Ops															
Space Obj Track															
High Alt Flight															
Radar Interference															

Favorable Marginal Unfavorable No Report

See Impacts Slide for details



MIRELES / MCCULLOUGH

Valid: 12-Sep-2017 0000 Z

Prepared by 2 WS/WXZ DSN 272-8087 COMM (402) 232-8087

For more detailed and regional information go to:

https://weather.af.mil/confluence/display/AFWWEBSTBT/Space+Weather+Main+Page https://weather.af.smil.mil/confluence/display/AFWWEBSTBT/Space+Weather+Main+Page

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Questions?

"The sun never sets on the 2d Weather Squadron"