

**SSUSI: DMSP’s Novel Hyperspectral Imager for Space Weather Operational Support**  
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We present the capabilities of a novel hyperspectral imager now flying on the DMSP F16 and F17 satellites. The Special Sensor Ultraviolet Spectrographic Imager (SSUSI) is an optical remote sensing package that forms horizon to horizon images of the upper atmosphere that was built by The Johns Hopkins University Applied Physics Laboratory. The sensor operates in the far ultraviolet or “FUV”: a spectral range covering emissions from about 120nm or 0.12 microns to 180 nm or 0.18 microns. This spectral range is “solar blind” meaning that the Earth’s lower atmosphere and surface are black at these wavelengths. SSUSI then has an all weather, day/night capability for imaging the aurora and airglow from about 100 km to 530km. This region is particularly important operationally because it experiences orders of magnitude change in density on relatively small scales.

The poster will present a number of examples of these products and their potential impacts on the user community. In the following table, areas that SSUSI products could contribute to are indicated by *bold italics*.

<u>Space Capability Joint Effect</u>	<u>Environmental Cause</u>	<u>Environmental Effects</u>	<u>Potential National and Commerical User</u>
Comms on the Move	<b><i>Ionospheric scintillation, ionospheric refraction</i></b>	Degraded/broken comm link, anomalous radio wave propagation	Loss of command and control, lives/missions at risk
Intelligence, Surveillance and Reconnaissance	<b><i>Upper atmospheric density change, ionospheric refraction and scintillation</i></b>	Inaccurate space object identification and tracking	Space object collision (e.g. shuttle), inaccurate enemy space force position
Missile Warhead Detection/ Tracking/ Intercept	<b><i>Aurora, upper atmospheric density change, ionospheric refraction and scintillation</i></b> , clouds, atmospheric attenuation	Degraded warhead detection and tracking	Decreased probability of missile intercept, lives at risk
Precision Engagement	<b><i>Ionospheric scintillation</i></b> ,	Degraded GPS system performance	GPS guided weapons miss target, increased

	<i>ionospheric refraction</i>		collateral damage/civilian casualties, positioning errors in commercial operations.
Intelligence	<i>Aurora, upper atmospheric density change, ionospheric refraction and scintillation</i>	Decreased intelligence system performance	Inaccurate enemy position data
Spacecraft anomaly assessment	Solar/Magnetospheric particle radiation, <i>Upper atmospheric density change, ionospheric refraction and scintillation</i>	Satellite system anomalies, increased operational downtime of space system	Decreased operational space system utility (GPS, SBIRS, Space Radar (SR), etc.)
Attack Assessment	Solar/Magnetosphere particle radiation, <i>auroral, upper atmospheric and ionospheric changes</i>	Enemy and friendly weapon system performance degradation	Inability to meet attack assessment timelines, inability to distinguish hostile attack from natural effects