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SPoRT transition of JPSS VIIRS Imagery for Night-time Applications

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The NASA/Short-term Prediction, Research, and Transition (SPoRT) Program and NOAA/Cooperative Institute for Research in the Atmosphere (CIRA) work within the NOAA/Joint Polar Satellite System (JPSS) Proving Ground to demonstrate the unique capabilities of the VIIRS instrument. Very similar to MODIS, the VIIRS instrument provides many high-resolution visible and infrared channels in a broad spectrum. In addition, VIIRS is equipped with a low-light sensor that is able to detect light emissions from the land and atmosphere as well as reflected sunlight by the lunar surface. This band is referred to as the Day-Night Band due to the sunlight being used at night to see cloud and topographic features just as one would typically see in day-time visible imagery.

NWS forecast offices that collaborate with SPoRT and CIRA have utilized MODIS imagery in operations, but have longed for more frequent passes of polar-orbiting data. The VIIRS instrument enhances SPoRT collaborations with WFOs by providing another day and night-time pass, and at times two additional passes due to its large swath width. This means that multi-spectral, RGB imagery composites are more readily available to prepare users for their use in GOES-R era and high-resolution imagery for use in high-latitudes is more frequently able to supplement standard GOES imagery within the SPoRT Hybrid GEO-LEO product. The transition of VIIRS also introduces the new Day-Night Band capability to forecast operations.

An Intensive Evaluation Period (IEP) was conducted in Summer 2013 with a group of "Front Range" NWS offices related to VIIRS night-time imagery. VIIRS single-channel imagery is able to better analyze the specific location of fire hotspots and other land features, as well as provide a more true measurement of various cloud and aerosol properties than geostationary measurements, especially at night. Viewed within the SPoRT Hybrid imagery, the VIIRS data allows forecasters to better interpret the more frequent, but coarse GOES Imagery. Night-time Microphysics and Dust RGB Imagery provides cloud analysis of cloud height, thickness, and composition in order for operational applications such as separating fog from low clouds, dust plume detection, and determining precipitating clouds in radar-void/blocked regions. The Day-Night Band has a particular benefit to seeing light from cities, fires, or other emissions as well as the reflection of moonlight off of clouds and smoke plumes, given the right lunar phase and angle. Examples from the VIIRS transition and IEP will be presented.