The next generation operational geostationary imager

Timothy J. Schmit

NOAA/NESDIS, Office of Research and Applications, Advanced Satellite Products Team (ASPT)

To meet the growing need for improved GOES data and products, NOAA is introducing expanded geostationary imager capabilities with the Advanced Baseline Imager (ABI) on GOES-R in 2012. The ABI addresses National Weather Service concerns by increasing spatial resolution (to better depict a wider range of phenomena), by scanning faster (to improve temporal sampling and to scan additional regions) and by adding spectral bands (to enable new and improved products).

ABI will expand the current GOES Imager five spectral bands to at least twelve. Five will be similar to bands on the current GOES-8/11 Imagers. The new bands will be a visible band at 0.86 μm for the detection of aerosols and vegetation; a near-infrared band at 1.38 μm to detect very thin cirrus; a snow/cloud-discriminating band at 1.6 μm; a mid-tropospheric water vapor band at 7.0 μm; a band at 8.5 μm to detect volcanic dust and to estimate cloud phase; a band at 10.35 μm to derive low-level moisture and cloud particle size; a band at 13.3 μm band useful for determining cloud heights and amounts. There is also interest in adding bands centered at 0.47 μm, 0.555 μm, 7.4 μm and 9.6 μm. The 0.47 μm band would be used for aerosol detection and visibility estimates. The 0.555 μm would be used for daytime "green" for true color images. The 7.4 μm would measure low/mid-level flow and sulfuric acid aerosols. The 9.6 μm band would monitor total ozone on space and time scales never before possible. 2.3 and 3.7 μm bands are being discussed as candidates for determining cloud properties.

Simulated GOES Advanced Baseline Imager examples will be shown for the bands in the visible, near infrared and infrared (IR) regions. Examples of ice and water clouds, fires, and clear skies will be shown. The ABI visible/near IR bands are spectrally simulated from the NASA AVIRIS (Airborne Visible InfraRed Imaging Spectrometer). The AVIRIS is a high spectral and spatial resolution sensor with approximately 200 bands between 0.4 and 2.4 μm; these hyperspectral data are used to simulate broadband channels and to test spectral response function sensitivities. The ABI IR bands are simulated using MODIS (MODerate-resolution Imaging Spectroradiometer) data. MODIS has 17 bands between 3.7 and 14.2 μm and is currently flying on the Terra and Aqua platforms of the NASA Earth Observing System.

Timothy J. Schmit
Timothy J. Schmit works for the Advanced Satellite Products Team within the NESDIS Office of Research and Applications located in Madison, WI. Tim's experience with satellite data includes deriving VAS temperature and moisture retrievals, and gradient winds with GOES-6/7, simulating the expected signal from the GOES-I (-8) Imager and Sounder instruments, instrument calibration and inter-calibrations, deriving meteorological products from both the current sounder and imager, involvement in data

assimilation of Sounder products within numerical prediction models, and helping to prepare for the next generation geostationary imagers (Advanced Baseline Imager) and sounders (Advanced Baseline Sounder). Tim received his Bachelors (1985) and Masters (1987) degrees from the University of Wisconsin-Madison.