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October 5, 2007

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Dear Colleague:

The National Weather Association (NWA) respectfully requests your support and advocacy for the inclusion of a capable high spectral resolution atmospheric infrared Sounder on the next generation GOES-R series of spacecraft. This letter was authored and unanimously supported by a broad cross-section of remote sensing experts representing research and operational scientists and forecasters from the public, private and academic sectors.

Consistent with NWA's stature as a member-led, non-profit professional organization supporting and promoting excellence in operational meteorology and related activities, we support initiatives to modernize observing platforms and take advantage of new technologies to continue excellence in daily weather observing and forecasting for the public good.

I invite you to read the enclosed Letter of Support. We believe your advocacy will help influence decision makers on an outcome that includes a capable high spectral resolution atmospheric infrared Sounder on the next generation GOES-R spacecraft series.

I appreciate your consideration and support for this specific request.

Sincerely,

Stephen W. Harned CCM
Executive Director
National Weather Association

Enclosure

HSS Cover

National Weather Association

Letter of Support

GOES-R Series High Spectral Resolution Sounder

The National Weather Association (NWA) is a member-led, non-profit, professional organization supporting and promoting excellence in operational meteorology and related activities. Excellence in daily weather observing and forecasting for the public good can best be achieved by continual modernization of observing equipment and quickly taking advantage of new technologies. The National Oceanic and Atmospheric Administration (NOAA) is developing the next generation Geostationary Operational Environmental Satellite (GOES) with improved capabilities for imaging and sounding the atmosphere. The NWA strongly supports the need for the next series of GOES. However, due to severe budget constraints within NOAA's satellite program, it was recently decided to cancel the development of a planned Hyperspectral Environmental Suite (HES) that was expected to contribute significantly to improvements in weather forecasts. Recognizing the need for atmospheric soundings from geostationary orbit and on behalf of the NWA members from all sectors of the meteorological community, the NWA President and Council request the support of all concerned for the inclusion of a high spectral resolution atmospheric infrared sounder on the GOES-R series of spacecraft.

The NOAA's National Weather Service (NWS) has a stated need for better measurements of the vertical distribution of atmospheric temperature and moisture to improve the accuracy of weather forecasting. The current sounders on the GOES I-M series or GOES N-Q series have limited temporal, spectral, and spatial resolution and cannot provide coverage over the Continental United States while simultaneously sounding mesoscale features important for severe weather watches and warnings and short-term forecasts. An improved sounder with faster scanning, high temporal resolution, high spatial resolution, high spectral resolution, and broad areal coverage is needed to improve regional and mesoscale numerical weather prediction (NWP) models, nowcasting products, cloud heights and characterizations, and many additional environmental applications.

A high spectral resolution sounder (HSS) in geostationary orbit should be capable of providing a three-dimensional picture of atmospheric temperature and water vapor with the temporal and spatial resolution necessary for forecasting individual thunderstorm cells. In conjunction with ground-based radar, the improved satellite sounding data will provide critical information for severe weather watches and warnings, nowcasts, and short-term forecasts. A HSS would also show low-level inversions, critical for thunderstorm forecasting, and allow for the determination of surface emissivity, which is necessary for the assimilation of sounder data over land into NWP models. A HSS will allow for more accurate satellite derived upper-level winds by discriminating additional levels of motion and assigning heights more accurately. It will also provide the capability to characterize the life cycle of clouds (Li et al 2001b; Schreiner et al. 2001; Schreiner et al. 2002) and possibly identify cloud particle sizes, leading to improved NWP model performance and improved precipitation forecasts.

Decision makers are increasingly reliant on the NWS 3- to 7-day forecasts for all aspects of public health and safety, including hurricane evacuations, fuel distribution, and agriculture pricing policy. The HSS will provide significant contributions to improving the consistency and accuracy of the 1- to 7-day forecasts, extending the useful accuracy of the 8- to 10-day forecasts, and reducing the false-alarm rate in the 3- to 7-day tropical storm forecast by 30 to 40%, giving emergency managers confidence in making critical decisions with longer lead times.

The Atmospheric Infrared Sounder (AIRS) on the National Aeronautics and Space Administration's (NASA) Earth Observations System (EOS) Aqua spacecraft is an HSS in low earth orbit (LEO) that has already provided the single largest improvement in NWP performance of any new data source: equivalent to a 6-hour improvement in the 5-day forecast (Le Marshall and Jung, 2005). We can expect even more dramatic improvements with the increased temporal coverage from a HSS in geostationary orbit. As data are input to a NWP system more often, the model is more likely to retain that information and produce more accurate output from run to run (Aune et al. 2000). The current GOES sounder data have already made modest improvements to NWP output (Schmit et al. 2002; Zou et al. 2001).

Some of the potential improvements from the HSS include:

Nowcasting: Improved short-term severe weather nowcasting due to low-level layer moisture/temperature and rapid scan capability; Improved monitoring of atmospheric instability and inversions; Improved cloud and moisture products expected to influence hourly roundups and flash flood projections (Menzel et al. 1998).

Regional Models: Much greater positive impact due to increased vertical resolution, surface emissivity, cloud improvements and better definition of low-level moisture. The rapid refresh is needed for regional model initialization and more accurate predictions

Hurricane Monitoring: High vertical resolution water vapor and wind profiles are expected to improve tropical storm track and intensity forecasts. Soundings in hurricane eyes and the surrounding environment will help with hurricane monitoring.

Aviation Interests: Due to the nature of hyperspectral data, improved depiction of volcanic ash and, depending on the spectral band coverage, possibly upper-level SO₂. Improved cloud fields via an improved height determination.

Air Quality Models: Provide some tropospheric ozone and aerosol/dust loading information for air quality forecasts.

Global Models: Hourly data assimilation and increased spatial resolution will benefit greatly from hemispheric HSS radiances. Improved 1- to 7-day forecast and extended utility of 8- to 10-day forecasts.

Other: There are many other uses for sounder radiances, such as having a back-up system for some imaging functions, calculation of outgoing longwave radiation (Ba et al. 2003; Ellingson and Ba, 2003), total ozone measurements (Li et al. 2001a), estimating downburst potential (Ellrod et al. 2000) and agricultural forecasts (Diak et al. 1998).

In summary, the NWA considers the recent budget constraints leading to the cancellation of the development program for an HES on the GOES-R series of spacecraft a severe blow to future progress in environmental satellite observations and expected improvements in weather forecasts, watches, and warnings as well as air quality and climate monitoring and forecasting. The NWA urges NOAA to seek additional funding so it can reconfigure its future satellite program, thereby being able to reinstate plans for a high spectral resolution infrared sounder into the GOES-R Series.

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL ENVIRONMENTAL SATELLITE, DATA,
AND INFORMATION SERVICE

NOV 15 2007

Stephen W. Harned CCM
Executive Director
National Weather Association
228 West Millbrook Road
Raleigh, North Carolina 27609-4304

Dear Mr. Harned:

Thank you for your October 5, 2007, letter regarding the inclusion of a capable high spectral resolution atmospheric infrared sounder on the next generation Geostationary Operational Environmental Satellite (GOES-R) Series. We appreciate input from our scientific and user communities regarding this important program. Unfortunately, due to fiscal and technical constraints, the National Oceanic and Atmospheric Administration (NOAA) will not be flying an operational sounder on the GOES-R satellite series. We made the decision to remove the Hyperspectral Environmental Suite (HES) due to a combination of development challenges, a magnitude of required spacecraft accommodations, and ground product implications that presented too much risk to meet the operational requirements of the GOES-R program. We also determined that the Advanced Baseline Imager (ABI) instrument can provide derived sounding products that will meet mission continuity requirements. The ABI has many of the same spectral bands and exceeds the spatial coverage rate and spatial resolution of the current sounders.

We will continue to seek ways of flying a demonstration mission of a high spectral resolution sounder in geostationary orbit. Thank you for your interest in the GOES-R program.

Sincerely,

Mary E. Kicza
Assistant Administrator for
Satellite and Information Services





U.S. Department
of Transportation
**Federal Aviation
Administration**

Air Traffic Organization
Operations Planning Services
Aviation Weather

800 Independence Ave., SW.
Washington, DC 20591

November 15, 2007

Mr. Stephen W. Harned CCM
Executive Director, National Weather Association
228 West Millbrook Road
Raleigh, North Carolina 27609-4304

Dear Mr. Harned,

I am writing in response to your October 5 letter requesting support and advocacy for the inclusion of a capable high spectral resolution atmospheric infrared sounder (HSS) on the next generation GOES-R series of spacecraft.

The stated potential improvements from the HSS, if realized, would generally be in line with the NextGen goals for improved weather information. Specifically, increased accuracy and resolution of nowcasts and regional models are sought after during convective weather events, which are currently the primary drivers in summer delays. Improved detection and forecasting of other aviation-related weather phenomena, including volcanic ash, could also be realized by the inclusion of HSS.

While clearly a sound observational base is necessary for all weather capabilities, my office has not specifically reviewed the budget and benefits information that may have affected the National Oceanic and Atmospheric Administration's decision to eliminate HSS from the GOES-R. The FAA will continue to evaluate the weather sensing needs of the aviation community and support those that are the most significant contributors to the future of aviation.

If you or your staff should need further assistance, please contact Ms. Megan Rosia, Assistant Administrator for Government and Industry Affairs, at (202) 267-3277.

Sincerely

Victoria Cox
Vice President, Operations Planning
Air Traffic Organization