

# NASA's APPLIED METEOROLOGY UNIT

## Bridging the Gap Between Research and Operations

ENSCO's team of meteorologists develops, evaluates and transitions new technologies into operations for weather support to America's space program.

The Applied Meteorology Unit (AMU) has been staffed by ENSCO, Inc. since its inception in 1991. The AMU, jointly sponsored by NASA, the United States Air Force, and the National Weather Service, provides technology development, evaluation and transition services to improve weather support to the space shuttle, military, and commercial spaceport operations at Kennedy Space Center and Cape Canaveral Air Force Station, Fla.



The AMU is collocated with Range Weather Operations at Cape Canaveral Air Force Station, Fla., and is tasked by its customers. Tasks range from evaluating data from a weather sensor system to analysis of numerical weather prediction models.



### Bridging Research and Operations

The AMU is a bridge between the meteorological research community and operational forecasters at the 45th Weather Squadron, Spaceflight Meteorology Group, and the Melbourne, Fla., National Weather Service Office. AMU scientists work with both researchers and forecasters to evaluate new and emerging technologies in an operational setting, develop procedures for implementing new technologies, and help identify new solutions to operational forecasting problems. In addition, the AMU provides expert technical assistance to operations in real-time, as requested.

The AMU shares the results of their efforts with numerous agencies through quarterly reports and participates in ongoing technical interchanges as the need arises. Organizations involved in data and informational exchanges with the AMU include national laboratories, government agencies, universities and private companies.

**The AMU develops products that assimilate new weather technologies to increase safety, reduce costs and lessen weather impacts for space operations.**

### Products

The AMU develops products that exploit weather technology to increase safety, reduce cost and lessen weather impacts to space operations such as:

- Applications that deliver more precise forecasts of the location and timing of weather hazards
- Methods to optimize the use of sensors
- More capable local numerical weather prediction systems tailored to operational requirements
- Techniques to improve the quality, accuracy and utility of locally collected data



Geographical pattern of camera zones susceptible to cloud obscuration for the network of long-range cameras used during Shuttle launches from Kennedy Space Center. The zones are valid for high clouds with bases at 18000 ft and tops at 30000 ft. The satellite image shows high clouds in the area.

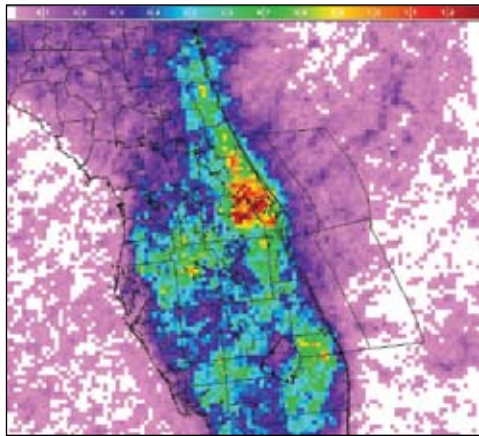
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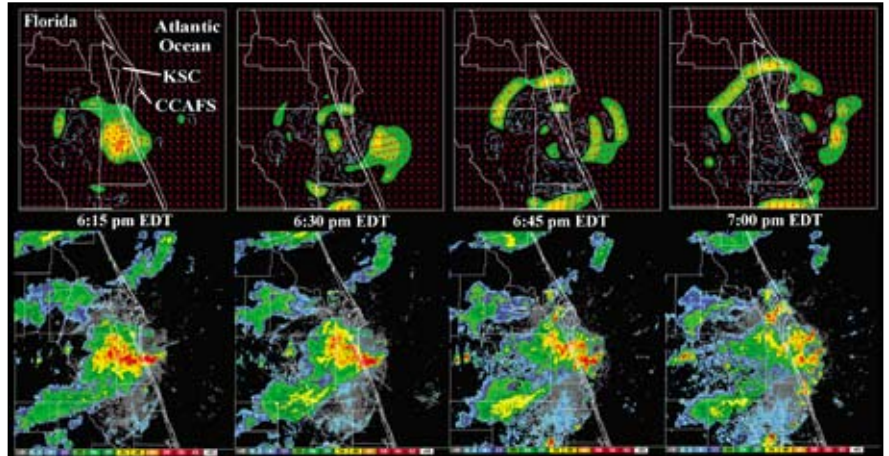
## Tools

The AMU uses several tools in the execution of tasks, including:

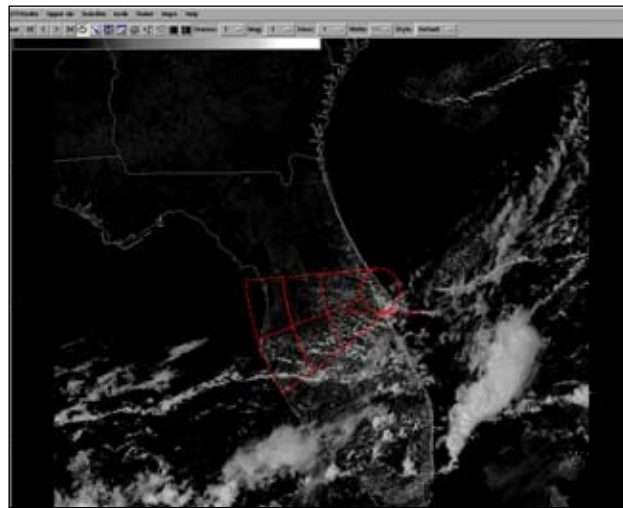
- Local and national data sets
- State-of-the-art computing hardware
- Sophisticated software packages
- Rigorous and effective analysis techniques



The AMU developed climatologies of lightning occurrence over the Florida Peninsula based on the large-scale flow and time of day. These climatologies are used by the National Weather Service office in Melbourne, FL to determine daily lightning threat.



AMU-developed system for integrating radar information and data sets to give the forecaster a conceptualization of thunderstorm activity.



The AMU-developed forecaster decision aid, used for assessing the movement of thunderstorm anvil clouds, allows for improved predictions of the threat of triggered lightning to space launch and landing vehicles

## Awards

1995	1996	1996	1999	2000	2001	2003
KSC Small Business of the Year Award to the AMU contractor, ENSCO, Inc. for the quality of its work.	NASA Space Act Award for AMU work on data reduction algorithm for Doppler radar wind profilers.	The AMU received national recognition from the Center of Excellence for Best Manufacturing Practices for its annual customer-based tasking and review processes.	Astronaut Silver Snoopy Award to AMU team member for work in developing the MIDDS Menu System.	KSC Center Director's Silver Dollar Award to two AMU Team members for support during the Airborne Field Mill Experiment.	NASA Space Act Awards for AMU research on upper air wind change characteristics and mesoscale model configuration and evaluation.	NASA Space Act Award for the configuration and implementation of a real-time high resolution weather analysis system to support Florida space operations
2004	2004	2005	2005	2005	2005	2006
NASA KSC Group Achievement Award for outstanding achievement in the preparation and implementation of Safety and Mission Success Week activities.	NASA KSC Group Achievement Award for developing an operational climatological weather data assessment tool for the 45th Space Wing - "A masterpiece of technical communication".	NASA KSC Launch Director's Award to AMU team member for the Return-to-Flight Shuttle Imaging Satellite Overlay tool.  Two NASA Space Act Awards for developing:	A contour error map algorithm to compare forecast model to observed data of sea breezes.  A quality control algorithm for the network of five 915-MHz profilers on the Eastern Range.	Three USAF 45th Space Wing Awards for:  Developing and implementing three new lightning decision aids for the Space Shuttle Return-to-Flight.	Developing a model to forecast the probability of at least three ascent imaging cameras having a view of the Shuttle unobstructed by cloud.  Weather support improvement for low temperature advisories, lightning support and Space Shuttle Return-to-Flight.	National Weather Association Larry R. Johnson Special Award for 15-year history of outstanding improvements to weather support for the space program.

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<http://science.ksc.nasa.gov/amu/>