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Maintaining a Local Data Integration System in Support of Weather Forecast Operations

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Since 2000, both the National Weather Service in Melbourne, FL (NWS MLB) and the Spaceflight Meteorology Group (SMG) have used a local data integration system (LDIS) as part of their forecast and warning operations. Each has benefited from 3-dimensional analyses that are delivered to forecasters every 15 minutes across the peninsula of Florida. The intent is to generate products that enhance short-range weather forecasts issued in support of NWS MLB and SMG operational requirements within East Central Florida. The current LDIS uses the Advanced Regional Prediction System (ARPS) Data Analysis System (ADAS) package as its core, which integrates a wide variety of national, regional, and local observational data sets. It assimilates all available real-time data within its domain and is run at a finer spatial and temporal resolution than current national- or regional-scale analysis packages. As such, it provides local forecasters with a more comprehensive and complete understanding of evolving fine-scale weather features.

Recent efforts have been undertaken to update the LDIS through the formal tasking process of NASA's Applied Meteorology Unit. The goals include upgrading LDIS with the latest version of ADAS, incorporating new sources of observational data, and making adjustments to shell scripts written to govern the system. A series of scripts run a complete modeling system consisting of the preprocessing step, the main model integration, and the post-processing step. The preprocessing step prepares the terrain, surface characteristics data sets, and the objective analysis for model initialization. Data ingested through ADAS include (but are not limited to) Level II Weather Surveillance Radar-1988 Doppler (WSR-88D) data from six Florida radars, Geostationary Operational Environmental Satellites (GOES) visible and infrared satellite imagery, surface and upper air observations throughout Florida from NOAA's Earth System Research Laboratory/Global Systems Division/Meteorological Assimilation Data Ingest System (MADIS), as well as the Kennedy Space Center /Cape Canaveral Air Force Station wind tower network. The scripts provide NWS MLB and SMG with several options for setting a desirable runtime configuration of the LDIS to account for adjustments in grid spacing, domain location, choice of observational data sources, and selection of background model fields, among others. The utility of an improved LDIS will be demonstrated through post-analysis warm and cool season case studies that compare high-resolution model output with and without the ADAS analyses.

Operationally, these upgrades will result in more accurate depictions of the current local environment to help with short-range weather forecasting applications, while also offering an improved initialization for local versions of the Weather Research and Forecasting model.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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1. REPORT DATE (DD-MM-YYYY) 03-08-2009		2. REPORT TYPE Abstract		3. DATES COVERED (From - To) Jan 2009 - July 2009	
4. TITLE AND SUBTITLE Maintaining a Local Data Integration System in Support of Weather Forecast Operations				5a. CONTRACT NUMBER NNK06MA70C	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Leela R. Watson Peter F. Blottman David W. Sharp Brian Hoeth				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) ENSCO, Inc. 1980 N. Atlantic Ave Suite 830 Cocoa Beach, FL 32931				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) NASA John F. Kennedy Space Center Code KT-C-H Kennedy Space Center, FL 32899				10. SPONSORING/MONITOR'S ACRONYM(S)	
				11. SPONSORING/MONITORING REPORT NUMBER	
12. DISTRIBUTION/AVAILABILITY STATEMENT Unclassified, Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT This abstract describes work that will be done by the Applied Meteorology Unit (AMU) in updating the current local data integration system (LDIS) in use at both the National Weather Service (NWS) in Melbourne, FL (MLB) and the Spaceflight Meteorology Group (SMG) in Houston, TX. The goal for running LDIS is to generate products that enhance short-range weather forecasts issued in support of NWS MLB and SMG operational requirements. The current LDIS uses the Advanced Regional Prediction System (ARPS) Data Analysis System (ADAS) package as its core, which integrates a wide variety of national and local-scale observational data. It incorporates all data operationally available in east central Florida and the surrounding areas and is run at a finer spatial and temporal resolution than current national-scale operational models. This project will update the LDIS with the latest version of ADAS, incorporate new sources of observational data, and upgrade and modify early-developed shell scripts written to govern the system. These upgrades will result in more accurate depictions of the current local environment to help with short-term hazardous weather applications, will aid in initializing the NWS MLB local Weather Research and Forecasting (WRF) model, and will lead to a more robust LDIS.					
15. SUBJECT TERMS Weather Research and Forecasting (WRF) model, Local Data Integration System (LDIS), Advanced Regional Prediction System (ARPS) Data Analysis System (ADAS)					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 1	19a. NAME OF RESPONSIBLE PERSON Dr. Francis J. Merceret
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (Include area code) (321) 867-0818
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