

INTERDEPARTMENTAL COMMITTEE FOR METEOROLOGICAL
SERVICES AND SUPPORTING RESEARCH

Record of Actions 2006-1 Meeting
July 18, 2006

MEMBERS PRESENT

OFCM: Mr. Samuel P. Williamson, Chairman
DOC: Mr. John E. Jones, Jr., NOAA/NWS
DOD/USN: Mr. Robert Winokur for RADM Fred Byus, USN
DOD/USAF: Brig Gen Lawrence A. Stutzriem, USAF
DOE: Mr. Rickey C. Petty
DHS/FEMA: Mr. John Gambel
DHS/USCG: Dr. Jonathan Berkson (telephone)
DOI: Mr. John Vimont
DOT/FAA: Mr. James H. Williams
EPA: Dr. S. T. Rao
NASA: Dr. Tsengdar Lee for Dr. Ramesh Kakar
NSF: Dr. Jarvis Moyers
NTSB: Mr. Donald Eick

Mr. James B. Harrison, Executive Secretary
Ms. Erin McNamara, Assistant

INVITED PARTICIPANTS

DOC: Dr. James F. Kimpel, NOAA/NSSL (telephone)
Dr. Frank Marks, NOAA/AOML (telephone)
Dr. Stephen J. Lord, NOAA/NWS/NCEP (telephone)
DOD: Col Mark Weadon, USAF
Ms. Patricia A. Phoebus, NRL (telephone)
DOT/FAA: Richard Heuwinkel
NASA: Ms. Robbie Hood, MSFC (telephone)
NJIT: Dr. Louis J. Lanzerotti
NSF: Dr. Richard Behnke
USDA: Dr. Allen Riebau, FS (telephone)
OFCM: Lt Col David Andrus, USAF
Ms. Mary Cairns
Mr. Robert Dumont
Mr. Mark Welshinger
Mr. Kenneth Barnett
Dr. Paul Try, STC
Dr. Robert Katt, STC

Date of Issue: July 28, 2006

Revised (editorial corrections): August 10, 2006

1. OPENING REMARKS

The meeting was called to order by the Chairman, Mr. Samuel P. Williamson. The meeting was held in the Office of the Federal Coordinator for Meteorology (OFCM) in Silver Spring, Maryland. The Chairman welcomed the ICMSSR members and invited participants. He noted that since the last ICMSSR meeting of November 18, 2005, the following individuals have been named to represent their agencies on the Interdepartmental Committee: RADM Fred Byus, USN, Oceanographer and Navigator of the Navy; Brig Gen Lawrence A. Stutzriem, USAF, Director of Air Force Weather; Mr. William Rhodes, Science and Technology Directorate, Department of Homeland Security; Mr. Anthony Furst (Acting), Federal Highway Administration, Department of Transportation; and Mr. James H. Williams, Director, Systems Engineering Office, Operations Planning Services, Federal Aviation Administration, Department of Transportation. He also noted that for this meeting, Mr. Robert Winokur, Technical Director, Office of the Oceanographer of the Navy, will represent the Oceanographer and Navigator of the Navy. Mr. Williamson expressed appreciation to the speakers for the ICMSSR meeting. These include: Colonel Mark Weadon, USAF, Air Force Weather Deputy for Federal Programs and Cochair of the Joint Action Group for Phased Array Radar Project (JAG/PARP); Dr. Louis J. Lanzerotti, Distinguished Research Professor, Center for Solar-Terrestrial Research, New Jersey Institute of Technology, and Chair of the OFCM National Space Weather Program Assessment Committee; Mr. Mark Welshinger, OFCM Senior Staff Meteorologist and Executive Secretary of the Joint Action Group for Tropical Cyclone Research (JAG/TCR); Dr. Allen Riebau, National Program Lead for Atmospheric Science Research, USDA Forest Service, and Cochair of the Joint Action Group for National Wildland Fire Weather Needs Assessment (JAG/NWFWNA); Ms. Mary Cairns, Senior Staff Meteorologist within OFCM and Executive Secretary for JAG/NWFWNA; and Dr. Robert Katt, Consultant with Science and Technology Corporation (STC), supporting OFCM.

Mr. Williamson noted that there have been a number of significant accomplishments since the last meeting; some of these will be mentioned in today's presentations. Additional accomplishments include: conduct of the 60th *Interdepartmental Hurricane Conference (IHC)* which was held March 20-24, 2006, in Mobile, Alabama; in connection with the 28th *Annual National Hurricane Conference*, conducting a training session on "Warning Messages: Improving Response" on April 11, 2006; two Weather Information for Surface Transportation (WIST) workshops June 6-7 and June 13-14, 2006, to support continued progress and lead to a WIST research and development plan and WIST implementation plan; establishment of a National Operational Processing Centers (NOPC) Program Council within the OFCM interagency coordinating infrastructure; development of an implementing strategy/action plan to make environmental literacy a crosscutting priority within the OFCM coordinating infrastructure; support of the November 14-16, 2005, Climate Change Science Program *Climate Science in Support of Decision Making* workshop; continued collaboration with

the Committee on Environment and Natural Resources (CENR); and formation of a Joint Action Group for Extensible Markup Language and Web Services (JAG/XMLWS) to work on XML standardization issues.

Mr. Williamson informed ICMSSR that publications that have been completed since the last ICMSSR meeting include the *National Winter Storms Operations Plan* (December 2005), *National Hurricane Operations Plan* (May 2006), *Federal Research and Development Needs and Priorities for Phased Array Radar* (June 2006), *Report of the Assessment Committee for the National Space Weather Program* (June 2006), and *Federal Meteorological Handbook No. 11—Doppler Radar Meteorological Observations*, parts A, B, and D. The Chairman then noted the material provided for the meeting and reviewed the agenda. The material included: agenda for this meeting; background papers on multifunction phased array radar (MPAR), National Space Weather Program (NSWP) assessment, tropical cyclone research and development plan, national wildland fire weather needs assessment, and data assimilation survey and follow-on strategy; Record of Actions for the last ICMSSR meeting (November 18, 2005); federal meteorological coordinating infrastructure; single sheet showing current membership of the Federal and Interdepartmental Committees; a detailed ICMSSR address list; and hardcopies of briefings from today's presenters.

ACTION: The agenda was approved.

2. MULTIFUNCTION PHASED ARRAY RADAR (MPAR)

This item was led by Colonel Mark Weadon, USAF, Air Force Weather Deputy for Federal Programs and Cochair of the Joint Action Group for Phased Array Radar Project (JAG/PARP). Dr. James F. Kimpel, Director of the NOAA National Severe Storms Laboratory and Cochair of the JAG/PARP, participated by telephone. The JAG/PARP recently completed the report, *Federal Research and Development Needs and Priorities for Phased Array Radar* (June 2006). It is responsive to ICMSSR Action Item 2004-2.3 where ICMSSR supported the joint action group's "continued work to identify and document the potential needs and benefits that phased array radar and an adaptive radar sensing strategy would address, and to integrate those identified needs into a multiagency-coordinated R&D plan that would focus R&D efforts on meeting each agency's need." Col Weadon began by noting that in the MPAR national vision, the National Radar Network will be the critical observing system supporting public safety, homeland security, and the transportation sector for decades to come; there is a need to replace the aging fleet of 526 conventional mechanically scanning radars over the next 20 years with 300+ MPAR radars; MPAR can provide simultaneous air and weather surveillance from a single radar site; and with the consolidation of multiple single-mission radars into MPAR we can reduce the national radar fleet by more than 40 percent. Col Weadon noted that the scalable (modular construction) MPAR can perform weather surveillance, aircraft tracking, non-cooperative aircraft tracking, and other specialized functions. Col Weadon stated that the JAG/PARP determined that MPAR has the potential to exceed present radar capabilities and meet stated user needs; there would be a significant increase in tornado lead times; there are no serious hardware

technical challenges; and a 7- to 10-year intensive research and development effort will be required, and the estimated cost of this is \$200 million. He also noted that the lifecycle cost savings of the MPAR over the 526 conventional radars, would be \$5 billion. MPAR's potential improvements include: agile beam-forming allows multi-function applications for optimum weather, aircraft surveillance, as well as specialized functions such as tracking chemical/biological plumes, volcanic ash, birds, wildfire debris, etc.; improved coverage in the boundary layer and clutter suppression; capability to perform intensive radar interrogation ("staring") simultaneously with all-sector surveillance; rapid refresh rate—improved spatial and temporal resolution, especially of severe weather events; and graceful degradation, greater system reliability, and simplified logistics. Col Weadon then noted that the report *Federal Research and Development Needs and Priorities for Phased Array Radar* estimated needed research and development funding to be \$215 million over 9 years to meet the replacement opportunity. This would support the research needed to reduce risk, determine the capability of MPAR to meet multiple user needs concurrently, develop a full MPAR prototype, and perform a cost analysis to determine system affordability. He also noted that delays in performing the necessary MPAR research, development, and testing may mean missed opportunity to replace legacy radars. ICMSSR decided that an MPAR interagency working group should be established within the OFCM to accomplish the tasks outlined in the action below. The final published report, *Federal Research and Development Needs and Priorities for Phased Array Radar*, will be sent to ICMSSR and Federal Committee for Meteorological Services and Supporting Research (FCMSSR) members under separate correspondence.

ACTION ITEM 2006-1.1: Multifunction Phased Array Radar (MPAR). ICMSSR concurred with the establishment of an interagency working group within the OFCM infrastructure with a defined charter to develop a strategy to address the key findings and recommended next steps contained in the MPAR report, and agency comments from this ICMSSR meeting. The interagency Working Group for Multifunction Phased Array Radar (WG/MPAR) should be established not later than August 31, 2006, under the Committee for Integrated Observing Systems (CIOS). The items the working group should address include but are not limited to:

- Detailed analysis of the life expectancy of existing legacy radars (i.e., WSR-88D; TDWR; ARSR-1, 2, 3, and 4; ASR-9; ASR-11—Table 3-1 of report) and the critical programmatic replacement decision timeframes for each type of legacy radar. This analysis should be compared to the timelines of the MPAR risk-reduction R&D program schedule (Figure 6-2 and Appendix D of report), with the goal of optimizing the MPAR risk-reduction strategies with the critical programmatic replacement decision timeframes.
- Performance of a cost-benefit analysis to establish MPAR's cost effectiveness against alternative domestic radar options, considering both acquisition and total life-cycle costs.
- Continue to further define the initial operational system requirements; specifications and functional configuration; estimation of costs; and preparation of documentation to support agency programmatic and budgetary processes.

- Development of metrics to objectively assess the annual progress of the MPAR risk-reduction R&D program.
- Publication of an annual statement of next-year research priorities and objectives, and previous year accomplishments.
- Coordination of education and outreach efforts to build understanding of MPAR within the scientific community and the general public. This may include, for example, newsletters, status reports, media advisories, professional papers, workshops, and symposiums.
- Exploration of organizational infrastructures to support and manage the MPAR risk-reduction R&D program and follow-on efforts.

3. NATIONAL SPACE WEATHER PROGRAM (NSWP) ASSESSMENT

This item was led by Dr. Louis J. Lanzerotti, Distinguished Research Professor, Center for Solar-Terrestrial Research, New Jersey Institute of Technology, and Chair of the OFCM National Space Weather Program Assessment Committee. It is responsive to ICMSSR Action Item 2004-2.5. Dr. Lanzerotti identified the members of the Assessment Committee. He stated that the charge to the Assessment Committee was to review the NSWP to quantify and document the progress toward meeting the NSWP stated goals in observations, research, modeling, transition of research to operations, and education and outreach; to see if the program is still on target and moving in the direction pointed to by the Strategic Plan; to determine whether the strategic goals should be adjusted at this time based on emerging/evolving requirements; and to suggest a way ahead which will form a basis for a new strategic plan covering the next 10 years. Dr. Lanzerotti informed ICMSSR of the committee's activities in conducting the assessment, including briefings at OFCM; visits to the National Security Space Office, National Reconnaissance Office, NOAA's Space Environment Center, U.S. Geological Survey, Air Force Space Command, Air Force Weather Agency, Air Force Space Weather Operations, STRATCOM, and Air Force Research Laboratory; community and user questionnaires; and issuance of a September 2005 interim report. He noted that important reference sources were the *National Security Space Architecture 2000: Space Weather Architecture*; U.S. Department of Commerce Service Assessment, April 2004; and the National Academies report, *The Sun to the Earth—and Beyond: A Decadal Research Strategy in Solar and Space Physics*, 2002.

Dr. Lanzerotti informed ICMSSR that, in its *Report of the Assessment Committee for the National Space Weather Program* (June 2006), the Assessment Committee concluded that, since the program's inception in 1995, it has had a number of noteworthy achievements, most of which likely would not have been attained without the program's existence. The committee also found shortfalls in the program. Based on the conclusions of the committee as contained in the report, continuation of the NSWP is strongly warranted because of the enormous potential to enhance the nation's space weather mission over the next 10 years through improved operational capabilities, which capitalize on the transition of innovative research. The committee made specific recommendations to strengthen the NSWP in four key areas. The critical findings and recommendations to strengthen the NSWP are:

- (1) To centralize program management and set national funding priorities—
 - Establish a space weather expert as the permanent Executive Secretary to the Committee for Space Weather under the National Space Weather Program Council.
 - Establish a focal point for the program in the Office of Science and Technology Policy (OSTP)/Office of Management and Budget (OMB).
- (2) For continuity of data sources critical to space weather forecasts and operations—
 - Develop and execute strategy and funding for L1 sensor continuity.
 - Maintain critical ground-based assets such as USGS magnetic observatories.
- (3) To strengthen the science-to-user chain—
 - Maintain and strengthen both targeted and strategic space weather research.
 - Enhance emphasis and resources for transition of models to operational users.
 - Increase the private sector role in supplying products and services.
- (4) To emphasize public and user awareness of space weather for critical national needs—
 - Quantify the national benefits that arise from the NSWPC.
 - Enhance academic and professional education programs for new space weather professionals.

Dr. Lanzerotti then reviewed several additional findings and recommendations including strengthening and National Space Weather Program Council (NSWPC), new strategic and implementation plans, and restoring resources to the operational agencies to allow greater extramural research inputs. ICMSSR then agreed to the action item below regarding proceeding with the *Report of the Assessment Committee for the National Space Weather Program* and continuing activities.

ACTION ITEM 2006-1.2: National Space Weather Program (NSWP) Assessment. ICMSSR agreed that the *Report of the Assessment Committee for the National Space Weather Program* should proceed for consideration by the National Space Weather Program Council (NSWPC), and that the Program Council should be the executive agent for FCMSSR for continuing activities in this area.

4. TROPICAL CYCLONE RESEARCH AND DEVELOPMENT PLAN

This item was led by Mr. Mark Welshinger, Senior Staff Meteorologist within OFCM, and Executive Secretary of the Joint Action Group for Tropical Cyclone Research (JAG/TCR). JAG/TCR Cochairs, Dr. Frank Marks of the NOAA Atlantic Oceanographic and Meteorological Laboratory, and Ms. Robbie Hood of the NASA Marshall Space Flight Center, participated by telephone. Mr. Welshinger noted that this topic is supported by two previous items: ICMSSR Action Item 2004-2.6 where ICMSSR strongly supported the 58th Interdepartmental Hurricane Conference (IHC) action to develop a tropical cyclone strategic research plan; and a 59th IHC action item which was briefed to ICMSSR at the committee's November 18, 2005, meeting, to develop a

strategic plan for Improved Tropical Cyclone Reconnaissance Systems (manned, unmanned, space-based observational capabilities). Mr. Welshinger described formation and agency representation on the JAG/TCR. He also noted that numerous past efforts outlined the tropical cyclone community's priorities and strategies which were vetted through many meetings and workshops. Examples of these which detailed research challenges and priorities, operational needs, gaps, and potential solutions include the U.S. Weather Research Program (landfalling hurricanes and Joint Hurricane Testbed), OFCM-sponsored Interdepartmental Hurricane Conferences, two Hurricane Weather Research and Forecasting (HWRF) model workshops, and activities of NOAA's National Weather Service and Office of Oceanic and Atmospheric Research. Mr. Welshinger informed ICMSSR of the tropical cyclone research workshop held in March 2006 at the 60th IHC, at which ongoing efforts of three complementary hurricane research projects were reviewed. These included the NOAA Science Advisory Board (SAB) Hurricane Intensity Research Working Group (HIRWG), the National Science Foundation (NSF) National Science Board's (NSB) Task Force on Hurricane Science and Engineering (HSE), and the OFCM Joint Action Group for Tropical Cyclone Research which is preparing the document, *Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead*. The plan is approximately 75 percent complete. It notes that overarching tropical cyclone priorities that need further improvement are intensity and structure; track; other impacts (sea state, storm surge, precipitation, inland flooding); social science research and results; and intraseasonal and interannual variability. More specific examples of research priorities were identified as the role of inner core processes for intensification and weakening (e.g., eyewall replacement cycles, mixing); role of the ocean and oceanic heat content; value of high-resolution deterministic forecasts vs. ensembles; consideration of the extent to which the public understands terms such as "hurricane watch" and "hurricane warning" and whether these terms best convey these concepts; and consideration of how probabilistic forecasts can be structured to promote public understanding. Mr. Welshinger then discussed the action item from the 59th IHC to develop a *Strategic Plan for Improved Tropical Cyclone Reconnaissance Systems* and preparation at the 60th IHC (March 2006) of a list of current and promising surveillance and reconnaissance capabilities. Next steps include publishing the *Interagency Strategic Research Plan for Tropical Cyclones: The Way Ahead* in September 2006, and then focusing on development of the *Strategic Plan for Improved Tropical Cyclone Reconnaissance Systems*.

ACTION: Continue with the work and publish the results when completed.

5. NATIONAL WILDLAND FIRE WEATHER NEEDS ASSESSMENT

This item was led by Dr. Allen Riebau, National Program Lead for Atmospheric Science Research, USDA Forest Service, and Cochair of the Joint Action Group for National Wildland Fire Weather Needs Assessment (JAG/NWFWNA); and Ms. Mary Cairns, Senior Staff Meteorologist within OFCM and Executive Secretary for JAG/NWFWNA. It is responsive to ICMSSR Action Item 2005-1.1 where ICMSSR "concurred that OFCM should move forward to form a Joint Action Group (JAG) under the Committee for Environmental Services, Operations, and Research Needs (CESORN), to review the

needs and requirements for wildland fire weather information, to include identifying organizational responsibilities and addressing the following issues: data collection, fire weather research, weather forecast services, data assimilation, air quality, information dissemination, education and outreach, and user response.” Dr. Riebau offered introductory remarks by telephone; and Ms. Cairns provided the briefing prepared for ICMSSR. As background information, it was pointed out that an abundance of accumulated biomass in forests and rangelands, persistent drought conditions, and encroaching urbanization are contributing to larger, more costly wildland fires; and that to effectively manage and suppress wildland fires, fire managers need timely, accurate, and detailed fire weather and climate information. As examples, Ms. Cairns referred to the 2003 wildland fires in southern California which claimed 22 lives, destroyed 3,600 homes, burned 740,000 acres of land, and caused over \$2 billion in property damage; and the grassland fires this year in Texas which by June 1st had claimed 11 lives, destroyed 440 homes, and burned over 5 million acres. Ms. Cairns also noted the fires in southern California the week before the ICMSSR meeting, which were started by lightning, and enhanced by dry conditions (drought) and fanned by strong winds. She also noted that on June 22, 2006, California Governor Schwarzenegger signed an Executive Order to expand statewide firefighting efforts and called on Californians to take common sense fire prevention measures. Ms. Cairns also referred to the June 2005 Western Governors’ Association (WGA) meeting where they approved Policy Resolution 05-04: National Wildland Fire Weather Program. Within the policy, the WGA urged the OFCM to complete a National Needs Assessment Report of federal, state, and local fire managers’ needs for weather information in the wildfire and prescribed-fire decision-making processes. The JAG/NWFWNA was established in December 2005. Ms. Cairns then discussed the urgency for progress in this area, the interagency membership of JAG/NWFWNA, the goals of this activity, functional areas covered in the assessment, and key activities and deliverables. Ms. Cairns informed ICMSSR of preliminary findings in several areas including federal agency reactions, education and outreach, atmospheric and meteorological research concerns, user and stakeholder initial response, and social science aspects. Ms. Cairns then highlighted the next steps including the interim assessment report (early results) to be completed in the fall of 2006; an OFCM Special Session on wildland fire weather and climate use in decision making at the 3rd International Fire and Ecology Congress, November 14, 2006, in San Diego, California; and the final product available during the spring 2007 which will be used to support the 2007 WGA conference.

ACTION: Continue with the work and publish the results when completed.

6. DATA ASSIMILATION SURVEY AND FOLLOW-ON STRATEGY

This item was led by Dr. Robert Katt, consultant for Science and Technology Corporation, support contractor for OFCM. Dr. Stephen J. Lord of the NOAA/NWS National Centers for Environmental Prediction, and Ms. Patricia A. Phoebus of the Marine Meteorology Division of the Naval Research Laboratory, participated by telephone. Dr. Katt began by noting that advances in data assimilation are key to meeting virtually any forecast goal relating to model performance. It was stated in the *Strategic*

Plan for the U.S. Integrated Earth Observation System (April 2005) that “In order to take the ‘pulse of the planet,’ we must establish a valid end-to-end process that will take us from observations to user-related products. Scientific needs for this end-to-end process require that we ... assimilate the Earth observation data streams into models (eventually in real time) ...” and “Data assimilation may be the most critical path through which advances in forecasting convective precipitation will be modulated.” Dr. Katt also noted that at its November 16, 2004, meeting, ICMSSR supported action to examine gaps in data assimilation and data management capability, articulate challenges that lie ahead in meeting future requirements, and propose strategy to address gaps in capability and future challenges. And Action Item 2004-1.2 from the Federal Committee for Meteorological Services and Supporting Research (FCMSSR) December 1, 2004, meeting, recommended that: FCMSSR agencies will support R&D needs and requirements based on agency priorities and will continue to identify issues and concerns that are necessary for the development of capabilities required to realize societal benefits; federal requirements and capabilities in key areas like data assimilation need to be surveyed and further addressed; and FCMSSR agencies will support and facilitate opportunities for the transition of research into operational applications. Dr. Katt then identified the participants of the data assimilation activities, and noted that the focus on the report which is being prepared is on data assimilation for the purpose of improving forecast skill of a numerical weather prediction (NWP) model; the scope of data assimilation is restricted to incorporation of observational data as a forcing factor in cycles of forward NWP models; and broader definition of data assimilation would be addressed through inclusion of related activities such as climate reanalysis, trace constituent monitoring, and air quality. Dr. Katt identified key data assimilation issues to be:

- Data delivery and standard formatting.
- How best to evolve assimilation techniques over time to meet future application challenges.
- Early delivery of new instrument data.
- Testing and transitioning new data assimilation techniques and concepts into “hardened” data assimilation instruments for operational use.
- Impact of the national shortfall in high performance computing and support for trained personnel on meteorological data assimilation and modeling.
- Data staging and delivery required for Global Earth Observation System of Systems (GEOSS)-level infrastructure capability.
- Education and public outreach: implications for data assimilation and modeling.
- Funding issues.

Dr. Katt then informed ICMSSR that the report, *Federal Meteorological Data Assimilation Capabilities*, will be completed in the fall of 2006, and that FCMSSR will be briefed around that same time.

ACTION: Continue with the work and publish the results when completed.

7. NEXT MEETING

The Executive Secretary will schedule the next ICMSSR meeting in coordination with the ICMSSR Chairman and members.

The meeting adjourned at 11:30 a.m.