60th Interdepartmental Hurricane Conference (IHC)

1. **Purpose:** The purpose of this document is to provide a summary of the 60th IHC, which was sponsored and chaired by Mr. Samuel P. Williamson, Federal Coordinator for Meteorology, from March 20-24, 2006, in Mobile, Alabama. Each year, the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) sponsors the IHC to provide a forum for the responsible Federal agencies, together with representatives of the user communities such as emergency management, to review the Nation's hurricane forecast and warning program and to make recommendations on how to improve the program. The theme of this year's conference was *Hurricane Season 2006: Building on the Historic 2005 Season*. The conference attendance was 240+; for the seventh consecutive year, attendance has exceeded 200.

2. **Media Coverage and Legislative Affairs Support.** Due to the outstanding work by Mr. Kent Laborde, NOAA Public Affairs, the 60th IHC received exceptional media coverage, including coverage from five television crews and numerous major newspapers along the Gulf Coast. NOAA Legislative Affairs, particularly Mr. Scott Carter, superbly coordinated the visit of Mr. Ryan Welch, Legislative Director, Office of U.S. Senator Richard Shelby, who read a letter from Senator Shelby during the opening session. In the letter, Senator Shelby commended the forecasts and predictions from the 2005 hurricane season, but further stated that: *As we move towards another hurricane season, we must do all we can to provide our forecasters and first responders with the tools necessary to predict events and quickly react to the damage they cause*. Mr. Welch concluded his comments by highlighting the importance of partnerships in meeting our commitments to the Nation, noting the NOAA, NASA, and NSF partnership as being particularly important in the conduct of tropical cyclone research. Following Mr. Welch's comments, retired Navy Vice Admiral (VADM) Conrad C. Lautenbacher, Jr., Undersecretary of Commerce for Oceans and Atmosphere/Administrator of the National Oceanic and Atmospheric Administration (NOAA), presented the Honorable Richard Shelby a memento for his unfailing support for the Nation's hurricane forecast and warning program. Mr. Welch graciously accepted the memento on behalf of Senator Shelby.

3. **Objectives:**

- Review the Nation's tropical cyclone forecast and warning program from end-to-end and update the *National Hurricane Operations Plan* for 2006

- Evaluate lessons learned from the 2005 hurricane season, with a focus on Hurricanes Dennis, Katrina, Rita, and Wilma

- Examine the results of the Joint Hurricane Test bed (JHT) as a model for transitioning successful research results into operations

- Review the federal priorities for tropical cyclone research and development for the next decade, to include relevant social science issues

- Examine the needs and requirements for future tropical cyclone surveillance and reconnaissance observations

- Evaluate changes in forecast and warning messages needed to improve public awareness, preparedness, and response

4. **Key Events:**

- Monday's Keynote Address by VADM Lautenbacher. VADM Lautenbacher began by acknowledging the hard work and long hours that NOAA employees and their partners put in during the 2005 hurricane season and thanked them on behalf of the Secretary of Commerce and the Nation. While NOAA's role in hurricane prediction is well known, VADM Lautenbacher noted in his address, *Power of Partnerships: Prediction and Protection*, that NOAA cannot and does not handle this responsibility alone. The only way to protect lives, property, and the economic well-being of our citizens is through partnerships. Partnerships among Federal agency representatives, local emergency managers, academia, and the private sector are key to moving our Nation's hurricane forecast and warning program forward. He also noted that the *National Hurricane Operations Plan*, a principal outcome of the IHC and the sole authoritative document for the execution of the hurricane and warning program, was used with much success during the 2005 season. He then focused on the role of partnerships leading up to, during, and following Hurricane Katrina. While the impacts were devastating, NOAA and its partners played a pivotal role in forecasting, response, and recovery during Katrina, for which VADM Lautenbacher expressed his deep thanks. VADM Lautenbacher then broke down the individual elements of the hurricane program—Earth observations, research and modeling, forecasting, preparedness, and response and recovery—and highlighted specific examples of the necessary partnerships required to get the job done. He concluded by acknowledging all of the partners in this effort and noted that our system of partnerships to turn raw observations into useful information that citizens can act on reflects our goal: *To access and provide the right information, in the right format, at the right time, to the right people to make the right decisions*.

- Panel: *Policy Partnerships in Tropical Cyclone Research and Operations*. Following the keynote address on Monday afternoon, Dr. Aaron "Bill" Williams, Director, Coastal Weather Research Center; Associate Professor of Geography; and Coordinator of Meteorology, University of South Alabama, moderated a panel of senior agency representatives, which included Dr. Jack Kaye, Director of the Research and Analysis Program within the NASA Earth-Sun System Division; Mr. Michael Buckley, Acting Deputy Director, Mitigation Division, FEMA; and Mr. Robert Winokur, Technical Director, Office of the Oceanographer and Navigator of the Navy. Dr. Margaret Leinen, Assistant Director for Geosciences, NSF, had to cancel due to an emergency. The title of her planned presentation was "NSF Hurricane Research."

  - Dr. Kaye discussed NASA's heritage of hurricane research field programs and its success with partnering with NOAA's Hurricane Research Division (HRD). He also discussed and provided examples of NASA satellite measurements that contribute to hurricane research and highlighted the NASA/NOAA/Aerosonde partnership to evaluate the use of unmanned aircraft for hurricane research. In 2006, NASA plans to partner with a European consortium and NOAA HRD to conduct the NAMMA-06

field research campaign, which will investigate African Easterly Waves as the progenitors of many late-season, strong category hurricanes that strike the U.S.

- Mr. Buckley focused on the partnerships needed to help the Gulf Coast rebuild stronger and smarter. In his conclusions, he noted that sound mitigation planning, floodplain management, and hurricane preparedness save this country an estimated $1.1 billion a year in prevented flood damages; we have a tremendous responsibility and an historic opportunity to measurably strengthen the Mississippi coast, Louisiana, and the Nation as a whole; FEMA and the National Hurricane Program – along with our Federal, State, community, and private sector partners – must make sure that Gulf Coast states and communities get the technical resources and assistance they need to start rebuilding wisely; and technical information we develop, share, and use, will continue play a critical role in Gulf Coast rebuilding efforts for years to come.

- Mr. Winokur, in discussing 2005 hurricane season impacts on the U.S. Navy and naval facilities along the Gulf Coast, noted a number of lessons learned. Namely, operational/production centers must ensure "back-up" capability and capacity, to include agency mission-unique requirements; a comprehensive personnel accountability plan is needed; and partnerships are key to meeting today's and tomorrow's requirements for tropical meteorology and specifically tropical cyclone forecasting.

o The IHC Conference Banquet: Banquet Speaker and Presentation of the Richard H. Hagemeyer Award.

- The Honorable Gregory Brent Warr, the Mayor of Gulfport, Mississippi, was an absolutely outstanding banquet speaker. Mayor Warr provided a vivid description of the challenges that he and the city of Gulfport faced following the devastating landfall of Hurricane Katrina. Mayor Warr indicated it took numerous partnerships and teamwork in their recovery efforts, pinpointing key contributions made by city employees; dedicated department directors; local banks; the contract company responsible for the massive debris cleanup; fire, police, public works and ambulance crews; electrical companies/employees; and finally, the Gulfport family. In the aftermath of Hurricane Katrina, Mayor Warr has put his strong desire to "build a better Gulfport" into action, and is convinced that, by working together with resolve, the remaining challenges posed by Hurricane Katrina will be overcome.

- For 2005, the Richard H. Hagemeyer Award, which is presented annually in honor of the longtime Director of the NWS Pacific Region and supporter of the IHC, was awarded to the renowned Dr. Joanne Simpson of NASA's Goddard Space Flight Center. With a meteorological career that spans six decades, one of her greatest achievements was the discovery of the hurricane "heat engine," the process that brings energy from the ocean surface to the clouds high above, driving the storm's power. The past winners were Prof. Russell Elsberry from the

Naval Postgraduate School, Mr. Christopher S. Velden, Assistant Scientist, Space Science and Engineering Center, University of Wisconsin, Mr. Max Mayfield, Director, NOAA's Tropical Prediction Center/National Hurricane Center, Dr. Frank D. Marks, Jr., Director of NOAA's Hurricane Research Division, the 53rd Weather Reconnaissance Squadron (special), and NOAA's Aircraft Operations Center (special).

5. **Summary of Results and Expected Outcomes:**

- The IHC has once again proved to be an extremely valuable forum to:

  - Bring the operational and research communities together to produce the best possible tropical cyclone forecast and warning program

  - Address the needs of the Federal agencies and user communities that have a stake in the Nation's tropical cyclone program

- The agenda, to include Thursday's workshops, was structured to address the conference objectives and expected outcomes. The expected outcomes were:

  - **Specific changes/updates to the 2005 *National Hurricane Operations Plan* (NHOP)**. There were 19 action items submitted to the Working Group for Hurricanes and Winter Storms Operations and Research for discussion and deliberation. Of those, nine will be closed through incorporation into the 2006 plan. Five of the items were informational in nature, one was deferred until the 2007 season, and the remaining four (plus two open actions from the 59th IHC) will be worked through follow-on action by the working group.

  - **Additional inputs into the draft OFCM-sponsored *Interagency Strategic Research Plan for Tropical Cyclones***. The workshop, *Tropical Cyclone Research: Priorities for the Next Decade*, moderated by Dr. Robert Serafin, NCAR Director Emeritus and Chair, Board on Atmospheric Sciences and Climate (BASC), obviously focused on tropical cyclone research. Dr. Michael Crosby, Executive Officer for the NSF National Science Board (NSB), provided an update on the NSF NSB's Task Force on Hurricane Science and Engineering. Gathering information through three workshops and other venues, the task force expects the final report to be published this fall. Following Dr. Crosby, Dr. John Snow, College of Geosciences, University of Oklahoma, presented an update on NOAA's Science Advisory Board Hurricane Intensity Research Working Group activities. The working group expects to have a near final report completed by mid to late summer. The last item in the research workshop was a review of the draft OFCM-sponsored *Interagency Strategic Research Plan for Tropical Cyclones*, a plan that outlines the tropical cyclone research priorities for the next decade. Dr. Frank Marks (NOAA/AOML/HRD) and Ms. Robbie Hood (NASA Marshall Space Flight Center, Global Hydrology and Climate Center), cochairs of OFCM's Joint Action Group for Tropical Cyclone Research (JAG/TCR), along with Dr. Naomi Surgi (NOAA/NWS/NCEP/EMC) led this portion of the workshop. It was very beneficial that

all three groups (NSF NSB, NOAA SAB, OFCM's JAG/TCR) were able to hear and interact concerning the complementary efforts of the three groups. Concerning the expected outcome (**additional inputs into the draft OFCM-sponsored *Interagency Strategic Research Plan for Tropical Cyclones***), the following items resulted from this workshop:

- Priorities established by the JAG/TCR were very good (intensity/structure, track, landfall impacts, socio-economic) (tactical priorities)

- An end-to-end research program needs to include seasonal forecasting; climatology/variability of tropical cyclone intensity and frequency at annual, inter-annual, and longer time scales; causes of variability; stochastic component; and climate change influences (strategic priorities)

- Plan should advocate a National emphasis on mitigation planning to include event specific actions, long-range planning, and impact simulations

    - Simulations, consisting of coupled atmosphere/ocean models, storm surge models, and GIS technologies, should help identify socio-economic impacts of the vulnerable region/area/population (e.g., schools, hospitals, nursing homes, airports, harbors, at-risk population)

- **Specific immediate actions that can be taken to bridge the gap between the hurricane forecast and warning message preparer and the message receiver to improve public awareness, preparedness, and response**. The results of the workshop, *Getting the "Right" Message to the Customer*, moderated by Dr. Betty Hearn Morrow, Consulting Sociologist, SocResearch Miami, and Mr. Bryan Norcross, Director of Meteorology, WFOR, CBS4, Miami, Florida, included some specific action items, which are detailed below. One of the outcomes of this workshop was a new proposed communications model that reflects the divergent information needs of various users. Some of the key points of the proposed communications model are:

    - Recognizes that outreach, education and relationship building is necessary in order for the model to work optimally

    - Focuses first on understanding different receiver needs (e.g., mainstream receiver, underserved populations) and response mechanisms

    - Receiver needs drive the message and specific channels of delivery (e.g., emergency management, local/state official, community-based centers of influence [COIs])

    - Community organizations are the primary channels of information for various receiver groups (e.g., YMCA, Chamber of Commerce, churches, civic organizations)

    - There are two types of messages: technical messages (e.g., watches, warnings) and actionable messages

- Channels/intermediaries send actionable messages – tailored messages that fit a specific population's needs (i.e., the specific population can personally relate to the message)

- **A list of current and promising surveillance and reconnaissance capabilities that will serve as an initial framework for the development of future tropical cyclone observational needs and requirements**. Presentations during Session 2: Observing the Tropical Cyclone and its Environment from Genesis to Post Storm: Current Capabilities to Future Requirements and the Poster Session provided valuable input into the initial framework which was summarized by Mr. Mark Welshinger, OFCM, during the conference wrap-up. Included in the summary was the potential use of unmanned aircraft systems (UASs) in tropical cyclone research, portions of which stemmed from a recent "NASA/NOAA/DOE Workshop on the Utilization of UASs for Global Climate Change and Weather Research." Ms. Sara Summers of NOAA's Earth System Research Laboratory was going to present this information during Session 2, but was unable to do so due to illness.

6. **Conference Action Items:**

- The *2006 National Hurricane Operations Plan* will be published by May 15, 2006

- The Joint Action Group for Tropical Cyclone Research (JAG/TCR) will further refine the draft strategic research plan for tropical cyclones based on the input received during the workshop. The target publication date is September 30, 2006

- Develop a Strategic Plan for Improved Tropical Cyclone Reconnaissance Systems (ITCRS) (manned, unmanned, spaced-based, etc.). Target date for an initial draft is March 31, 2007.

- By October 31, 2006, facilitate bringing together the web site owners from NOAA (e.g., HRD, NHC), Navy, etc. to improve linkages for supporting R&D (59th IHC action).

- The following recommendations were adopted for action in a comprehensive effort to improve *getting the "right" message to the customer*:

  - Results of social science research needs to be an integral part of the hurricane forecast and warning program. The tropical cyclone community needs to seek opportunities to identify social science research priorities, with the Joint Hurricane Test bed being a possible venue to attack these priorities (without compromising current projects)

  - NOAA, in conjunction with its partners, should work with diverse user groups to develop and test message format modifications

    - Test messages should build upon current formats/products/procedures and change as necessary to optimize desired outcomes

- Two types of messages should be considered: technical and actionable

- Empirical research should be encouraged and supported to develop and test modifications to current terminology used to define levels of hurricane threat (e.g., watch, warning, CAT 1-5, etc.)

- NOAA's NHC should review its timing cycle for better coordination with end-users, especially for media news cycles

- The OFCM will coordinate bringing together the appropriate federal agencies to begin the process of reviewing and improving the National hurricane warning "system"

  - Review all elements of the full end-to-end "system," incorporating concepts from the new proposed communications model that reflects the divergent information needs of various users

  - Examples of elements to consider in the end-to-end review include protocols, responsibilities, key organizations [including COIs], and communications

7. **Locations for Upcoming IHCs.** The tentatively planned location for next year's conference is Tampa, Florida, which would be cohosted by RADM Richard Behn, NOAA's Office of Marine and Aviation Operations, and Brig Gen Richard Moss, 403rd Wing Commander. The proposed location for the 2008 conference is New Orleans, Louisiana.

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