

# **External Review of the Cooperative Institute for Climate and Satellites**

**A Presentation to the NOAA Science  
Advisory Board**

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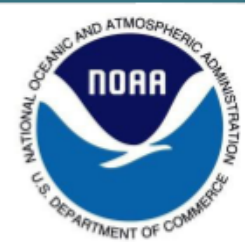
Review Panel Chair

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# Science Review Panel

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# CICS

- Established in open competition in 2009
- CICS is a consortium CI led by the University of Maryland
  - There are two principal locations, referred to as CICS-MD, located in College Park MD and managed by University of Maryland, and CICS-NC, located in Asheville NC and an Inter-Institutional Research Center of the University of North Carolina System administered by North Carolina State University.
  - The consortium also includes Princeton University, Howard University, the University of California at Irvine, Columbia University, the City University of New York, Duke University, the University of Miami, Oregon State University, Colorado State University and Remote Sensing Systems.



# CICS Research Themes

- Climate and Satellite Research and Applications
- Climate and Satellite Observations and Monitoring
- Climate Research and Modeling



# Overall Assessment

- Outstanding
  - CICS is addressing NOAA scientific and strategic needs related to climate and satellites.
    - In most cases there is a clear path from research into operations.
    - CICS-NC is remarkably well-aligned with NOAA's National Climatic Data Center.
    - CICS-MD collocation supports broad connectivity between the University of Maryland, NOAA and NASA that is particularly important to support current and emerging satellite-related research and workforce planning.



# Select Findings and Recommendations

## Science Plan and Science Management Plan



- Matching Funds: The current cost-share (matching funds) by CICS is highly beneficial to the institute's success. The consortium is meeting its commitments to support multiple CI activities. **To fully maximize activities in a renewal period, NOAA must evaluate CICS intentions and commitments for a future 5-year period.**
- CICS-NC: CICS-NC has accomplished much in the 3.5 years since inception, standing up an organization and processes, staffing from one original employee to ~35, and achieving research and R2O products. The organization is reaching a transition point in maturity. **To ensure continued, future stability and performance from CICS-NC, succession planning will be required.**
- CICS-MD: Partnerships are already forming after just a few months resulting from the new NCWCP building collocation between CICS-MD, NOAA, ESSIC and NASA personnel and more partnerships are expected.



# Select Findings and Recommendations

## Science Plan and Science Management Plan



- **Consortium size:** The CICS consortium is large in response to the NOAA FFO for CICS and the needs anticipated for a National Climate Service. Even without the National Climate Service, the CICS structure serves as an effective facilitating mechanism – the majority of consortium members are actively receiving or pursuing funds through CICS. There is no significant cost to CICS for running this large consortium and there are clearly some benefits to NOAA. In the future such a large group could potentially become unwieldy, but at this time it is not. The UMD business office is well-staffed to accommodate the current structure. The UMD management is notably flexible and supportive of CICS-like organizations (government contracting and support). CICS is well positioned to see gaps that may exist between the work being conducted by multiple NOAA offices, and thus make informed recommendations and help facilitate filling those gaps for NOAA.





# Select Findings and Recommendations

## Science Plan and Science Management Plan



- Administrative Structure: The use of a single cooperative agreement for the entire consortium, appears to be working from a scientific point of view. The relationship between the managers at CICS, CICS-MD and CICS-NC is very good and all are committed to CICS success. There are both positives and negatives to both the administration of CICS as a single cooperative agreement and two CAs (MD and NC). A single CA is attractive to NOAA with respect to administrative duties that are supported by CICS-MD. A single CA is also consistent with the preliminary NOAA SAB look at CI's, which recommends reducing the number of CI's. There is currently no issue impacting the science but it is clear there are concerns on the part of some of the CICS personnel and funders. This has been studied in more detail by the administrative reviewers. The CICS administrative review team has recommended that this issue be addressed by collecting and analyzing data on purported delays with funneling all tasking and funding through CICS-MD. The science panel supports this recommendation.



# Select Findings and Recommendations

## Science Plan and Science Management Plan



- **Metrics:** Metrics other than publications do not appear to be mature or well documented to communicate the progress of activities at CICS. **CICS should increase their use of the metrics they have identified in order to better monitor and communicate performance.**
- **ITAR:** CICS scientists are not regularly trained in ITAR (International Traffic in Arms Regulations) that control the import/export of defense related data. ITAR dictates that covered material may only be shared with US persons. Because CICS deals with both ITAR and open source material, for example, Suomi-NPP calibration/validation work in particular may involve ITAR-related information, and employs US and foreign national personnel, the opportunity might exist for inadvertent disclosure if CICS personnel are not aware of the regulations. **CICS should require an introduction to ITAR training for scientific employees. Online coursework is available from both university and industry organizations.**



# Select Findings: Science Review



- **RISA and National Climate Assessment (NCA):** Coordination work for RISA and NCA is outstanding and a major undertaking that is well-suited to CICS capabilities.
- **Global Surface Temperature:** Very high quality research is being conducted related to the global surface temperature databank at CICS-NC. This should provide an excellent, transparent basis for future evaluation of climate change.
- **Arctic sea-ice volume:** Important work related to change in arctic sea-ice volume is being conducted at CICS that has the potential to change the national conversation about diminishing sea ice from one associated with surface area to one associated with volume, which would be a positive development.



## Select Findings: Science Review



- **Precipitation:** Impressive work related to precipitation climatologies (combining NOAA and NASA interests) as well as techniques to obtain important information about precipitation rates by looking at lightning data. This includes the Research to Operations for the Global Historical Climatological Network V3.
- **Climate Data Records (CDRs):** There is progress in the development of CDRs including Geosynchronous Surface Albedo, the Carolinas' Test NEXRAD NMQ/Q2 High Resolution Pathfinder, the Global SST CDR and the SSM/I CDR.
- **Suomi-NPP land surface algorithms :** The NPP/VIIRS Land Product Validation Research and Algorithm Refinement at CICS provides early evaluation of the surface reflectance product from VIIRS; however, it is clear the scientists would like to move faster than NOAA and NASA structures will allow (IDPS upgrades as well as direction from sponsors).



# Select Findings and Recommendations: Science Review



- **Convection:** There is valuable work in relating lightning to storms, and convective properties observed by new microwave sensors.
- **Satellite data assimilation:** Impressive scientific work and partnerships is being undertaken in data assimilation that will benefit both UMD and NOAA. This work includes development of satellite products for use in data assimilation systems, the development of new methodologies, and the collaboration with the Center for Excellence for Data Assimilation research.
- **Partnerships:** The review panel noted particular research areas of potential collaboration between CICS-MD and CICS-NC, such as precipitation and land surface temperature and phenology. **CICS should increase interactions between CICS-NC and CICS-MD, particularly where the scientific expertise and projects are similar and appropriate.**



# Select Findings: Education and Outreach



- Early-career scientists: Both CICS-MD and CICS-NC have enthusiastic early career scientists making important contributions related to CICS science themes and outreach to the public. Examples include CycloneCenter, which allows the general public to study historical cyclone imagery from NCDC, and linkages to the Capital Weather Gang that provide outreach related to lightning research and public safety.
- City University of NY – Center of Excellence in Remote Sensing Science and Technology Center (CUNY/CREST): CUNY/CREST, a consortium member, is bringing needed diversity to CICS and the larger atmospheric and weather scientific community with its advanced degree programs that incorporate CICS research topics.
- CICS-NC: Outreach and education at CICS-NC is just getting started, but looks very promising with a focus on the private sector and complementing efforts at CUNY/CREST (above).



# Select Findings and Recommendations: Education and Outreach



- Staffing: CICS-MD does not have a person dedicated to outreach so many related activities are ad-hoc. CICS-MD would benefit from an outreach coordinator.
- Academics: CICS personnel are aligned with the UMD Atmospheric and Oceanic Sciences College (AOSC) undergraduate and professional masters programs - as members, affiliated researchers and students - which is unique and to the benefit of both. CICS-NC may benefit from undergraduate summer internships to strengthen ties with the North Carolina State University.



# Final Comments

- CICS is a valuable NOAA CI and assigned an overall rating of **Outstanding**. CICS' vision is closely aligned with NOAA's vision and goals, and the superior research, planning, management, outreach and education demonstrated during the first four years of the Institute is commended.