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Hurricanes and Coupled  
Atmosphere4Ocean Systems

### **Panel V**

**Objective:** A community conversation on the optimal high5level construction of EPIC.

### **Questions:**

- If you were in charge, how would you partition the expected \$15M of EPIC funding between administration, permanent scientific and technical staff, sponsored R&D, HPC, and other expenditures? Why?
- How and who should run EPIC?
- What performance metrics should be used to measure the short5 and long5term success of EPIC?
- How can EPIC ensure that young investigators and a more diverse community are engaged, represented, and included?
- What best practices can be applied and invoked to ensure community collaboration rather than community competition?
- How do you envision balanced governance among the weather, water, and climate enterprise?

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## Uncoordinated Enterprise



## Enterprise towards a common goal



## Recommendations

1. Launch a National Academies' study on the Future of the U.S. Weather Enterprise
2. Develop a national unified modeling and forecasting system: a consolidated national center with participation from the entire Weather Enterprise and multiD agency support
3. Establish mechanisms for
  - sustained resources to support research, observations, computation, modeling, forecasting, and workforce
  - uncompromised accountability

**Shuyi Chen: Testimony before U.S. House Science Committee on “*The Future of Forecasting: Building a Stronger U.S. Weather Enterprise*”, 16 May 2019**  
(<https://science.house.gov/imo/media/doc/Chen%20Testimony1.pdf>)

## Uncoordinated community

Can this be “integrated” into a world leader?



## EPIC core model/forecast system

Who and what processes to decide?



## EPIC towards a common goal



New, innovative, community0based EPIC:

- What are science drivers?
- What are requirements?
- What are metrics to measure success?

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## **Science drivers** (for the core model/forecast system):

- High impact weather (e.g., hurricanes, heat waves, flooding, etc.)
- Increase forecast lead time beyond 7A10 days (focusing on source of predictability on weeksAS2S time scales: the MJO, jet streams, tropicsAhigh latitude teleconnection, etc.)
- Coastal prediction in a changing climate & rising seas (sea, land, urban, rivers and water shields, storm surge, etc.)

**It's the best way to attract young scientists and diverse community to participate!**

## **Requirements**

- Earth system (coupled atmosphereAwaveAoceanAiceAland) model
- Model physics developed and tested in the coupled system
- Both operational and research needs
- Observations for both model verification and data assimilation

### **Metrics to evaluate forecast skills:**

- For coupled Earth system modeling and forecast (local and **global energetics**, e.g., global rainfall/air-sea fluxes/water transport, etc.)
- Evolving (non-static) as models improving and societal needs change

### **Metrics to measure short and long term success:**

- Short-term: tangible/concrete steps toward building a dream system and demonstrate its new capability?
- Long-term: *“reclaiming and retaining international leadership in the area of numerical weather forecasting”* (EPIC Legislation, Public Law 115-423)

How should the EPIC organization, management, and governance be structured to support and provide leadership on a long-term vision and a systematic and transparent process to achieve the EPIC goals?