



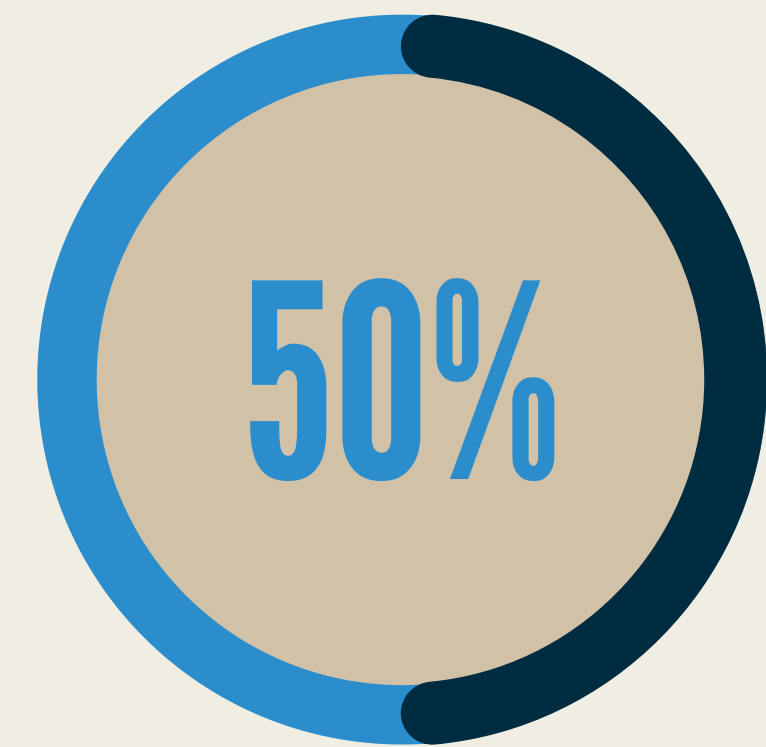
# ENHANCING PROCESSES AND SOLUTIONS FOR NOAA EARTH OBSERVATION NEEDS

## An Example of How NOAA can Improve Hurricane Forecasting through Coordinated Observing Systems Portfolio Decisions

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### BACKGROUND

#### EARTH OBSERVATIONS ARE CRITICAL TO NOAA'S MISSION



NOAA spends approximately half of its annual budget to develop, acquire, and utilize a wide variety of observing systems, which gather data from the surface of the sun to the bottom of the ocean.

#### HOW DOES TPIO SUPPORT NOAA'S PORTFOLIO OF OBSERVING SYSTEMS?

- NOAA's Technology, Planning, and Integration for Observations (TPIO) division is mandated to maintain a centralized database for all observing systems information across NOAA.
- TPIO-managed datasets document the linkages between observing infrastructure, programs, products and services. Understanding these interdependencies leads to better management decisions.
- TPIO provides analytical, technical, and decisional support to the NOAA Observing Systems Council (NOSC), NOAA's principal advisory body for observing system activities and interests.

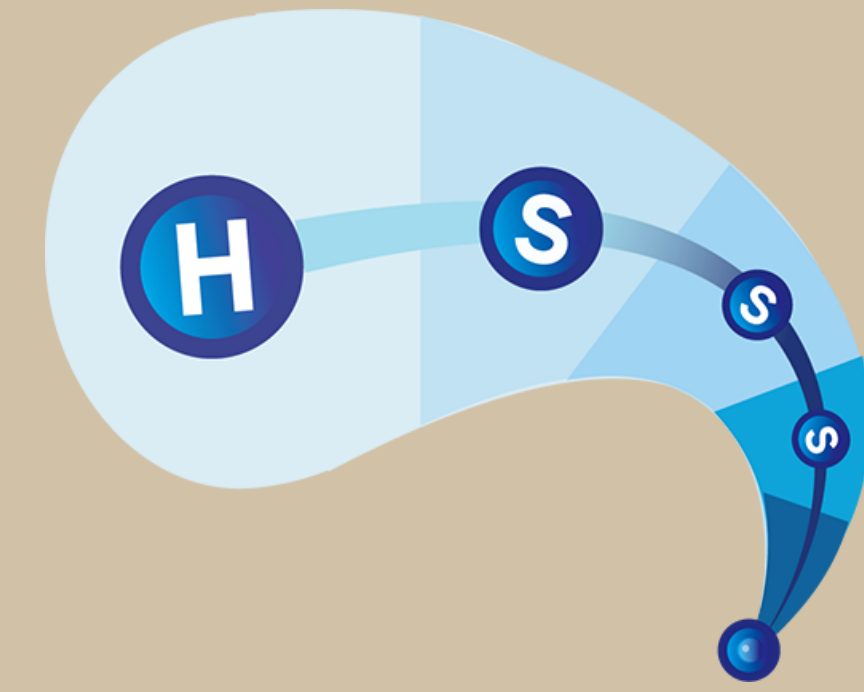


#### HOW CAN TPIO TOOLS AND DATASETS BE UTILIZED ACROSS NOAA?

- TPIO datasets can be used for a variety of purposes, including the analysis of tradeoffs and gaps between current and future observing systems, the formulation of budget scenarios, and the justification of new technologies.
- NOAA observing system portfolio managers can request analyses and information from TPIO to optimize observing capabilities, recommend the development of future observing systems, and gain a deeper understanding of how their system supports NOAA.
- Because TPIO manages the only centralized database for all observing system information, directly supports the NOSC, and has successfully engaged with various offices to conduct integrated analyses, it is the only NOAA entity with the ability to serve as a connector in this capacity.
- TPIO has already provided a variety of analyses demonstrating the value and impact of multiple observing systems across NOAA, which has resulted in successful extensions in funding.

### END-TO-END USE CASE

The following story spotlights how TPIO can advance NOAA's Earth observing capabilities by promoting increased collaboration, informed decision-making, and enhanced portfolio management. While this story presents a hypothetical 'use case', TPIO has performed all of the roles and activities depicted in this scenario.



#### WHAT IS A CRITICAL EARTH OBSERVATIONS CHALLENGE NOAA IS CURRENTLY FACING?

The Weather Improvement Act of 2013 (H.R. 2413) states that "NOAA must plan and maintain a project to improve hurricane forecasting, including the prediction of rapid intensification and track of hurricanes."

#### HOW HAS NOAA WORKED TO SOLVE THE CHALLENGE SO FAR?

NOAA's Quantitative Observing System Assessment Program (QOSAP) performed an Observing System Experiment (OSE) and an Observing System Simulation Experiment (OSSE) to assess top measurement gaps for hurricane forecasting. The results indicated that additional ocean profile temperature and salinity measurements would increase the accuracy of the operational and next generation hurricane models used by the National Hurricane Center to provide hurricane track and intensity forecasts.

Experiment results were shared with the National Centers for Environmental Prediction - Environmental Modeling Center (NCEP-EMC), which maintains NOAA's hurricane models and has the authority to add new measurements to increase their accuracy.

#### 5 WAYS TPIO CAN SERVE AS A CONNECTOR TO FURTHER ADDRESS THIS CHALLENGE

- 1 TPIO can connect with QOSAP and NCEP-EMC to ensure datasets accurately capture both NOAA's observing capabilities and needs for improved hurricane forecasting. TPIO could then analyze the updated datasets and identify the impact of new observing capabilities on the models and hurricane mission overall.
- 2 TPIO can connect with NCEP-EMC and NOAA's Office of Marine and Aviation Operations (OMAO) to identify potential Unmanned Marine Systems (UMS) capabilities that could be deployed to collect the new measurements, as required for the models. These groups could then estimate an annual cost to collect the data.
- 3 In parallel, TPIO can connect with the NOAA Chief Economist Office, which could use TPIO data and available socio-economic studies to show the societal benefit of improving hurricane forecasting and assign an overall value of improving the models for NOAA and society as a whole.
- 4 TPIO can connect with QOSAP, NCEP-EMC, OMAO, and the NOAA Chief Economist to develop a compelling budget proposal and informed decision briefing to the NOSC requesting annual funding for the deployment of current or new observing capabilities.
- 5 The NOSC can present the justification to senior NOAA leadership, who could approve the assessment and request, and direct OMAO to develop a Program Change Summary (PCS) as part of the budget planning process.

### KEY TAKEAWAYS



#### HOW CAN YOU TAKE ACTION TO HELP IMPROVE NOAA'S OBSERVING SYSTEMS PORTFOLIO?

- Review NOAA Administrative Order 212-16, "Policy on NOAA Observing Systems Portfolio Management" and contact TPIO to understand the policies, responsibilities, and requirements related to managing NOAA's observing systems portfolio.
- Engage with TPIO to ensure that observing system information is appropriately and accurately captured.
- Contact TPIO to determine how specific observing systems are linked to NOAA's mission, products and services, stakeholders, and other NOAA observing systems.
- Utilize TPIO to provide evidence for how specific NOAA observing systems sustain or advance NOAA Earth observation capabilities.
- Work with TPIO to tailor this 'use case' approach to communicate about critical system needs and provide rigor and objectivity to budget requests for NOAA leadership.

#### WHERE CAN YOU FIND OTHER RELEVANT RESOURCES AT AMS?



- Synergizing NOAA's value tree to OSE, OSSE, and FSOI Studies to Better Inform NOAA's Observing System Investment Priorities.
- Identifying the Socioeconomic Value of NOAA's Data and Services: Connecting NOAA's Value Tree Model to End Users and the Economy (Oral Presentation)
- Data-Assimilative Ocean Analyses that Accurately Represent the Initial Ocean State are Essential to Achieve Realistic HWRF Intensity Forecasts of Hurricane Michael (2018) (Oral Presentation)

#### WHO CAN YOU CONTACT FOR MORE INFORMATION AFTER AMS?



For more information about how to utilize TPIO and NOAA observing systems information, contact:  
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