

## The SURA Coastal Ocean Observing and Prediction Program (SCOOP)

### Vision Statement

*The SURA Coastal Ocean Observing and Prediction (SCOOP) program is an initiative to create an open-access, distributed national laboratory for scientific research and coastal operations. SCOOP is designed to complement the efforts of both Ocean.US – the organization responsible for implementing the national Integrated Ocean Observing System (IOOS) – and the coastal component of NSF’s Ocean Research Interactive Observatory Networks (ORION) project. The SCOOP emphasis is on interoperability in order to create a real-time observations system for both monitoring and prediction. Through SURA Universities, SCOOP will provide the expertise and IT infrastructure to integrate observing systems that currently exist, and incorporate emerging systems. This will promote the effective and rapid fusion of observed data with numerical models, and facilitate the rapid dissemination of information to operational, scientific, and public and private users.*

### Goal

The SCOOP goal is to enable more reliable, accurate, and timely short- and long-term predictions that will guide effective coastal stewardship and planning for extreme events, facilitate safe and efficient maritime operations, and support coastal military security. The program will enable access to simultaneous measurements of winds, waves, currents, water density, nutrients, water quality, and biological indices above and below the sea surface under all conditions. Real-time collection and open dissemination of the data and numerical models will be enabled via a high-speed telecommunications backbone. When fully implemented, the coastal ocean of the U.S. will function as a tightly integrated but distributed laboratory, providing an unparalleled window to new scientific frontiers while addressing a host of immediate socio-economic issues and applications. The comprehensive system of ocean observations envisioned represents the ocean component of the Global Earth Observing System of Systems (GEOSS).

### SURA’s Role in Creating an Integrated Coastal Ocean Observing System of Systems

A coastal observing program must serve the ocean sciences community and a host of operational end users and stakeholders. In addition, it is probable that homeland security will emerge as a priority application. The effective pursuit of a functional, integrated and sustained yet distributed coastal observing program will require that the following three principles be understood and embraced.

**Principle 1.** *A national coastal observing program will necessarily consist of regional and sub-regional components.* National and international efforts are underway for creating an integrated ocean observing system that will revolutionize research, management, use, and stewardship of the oceans. The community vision is a federation of linked regional systems, with each regional system contributing data and information about its particular locality. Integrating these systems

will provide a seamless tapestry of integrated observations and local predictions of marine events.

**Principle 2.** *National, regional and sub-regional observing systems must consist of three interconnected aspects: (i) spatially distributed sensor arrays supplying real time data to regional archives; (ii) data management and dissemination hubs; and (iii) now-casting and forecasting models that are fused with assimilated observational data.*

**Principle 3.** *The creation and long-term viability of nested integrated and sustained coastal observing systems will depend on a high level of interagency coordination, the identification of a lead agency to oversee and shepherd the effort, and the forging of substantive partnerships among federal, state, and industry funding sources. These partnerships include the institutions and organizations that will be developing and contributing the technical expertise and resources to create the IOOS – such as the SURA member institutions involved in SCOOP.*

The SCOOP program will complement and support the local and sub-regional efforts through integration of work products; it will not duplicate, replace, or subsume any existing or planned initiatives. In addition the SCOOP program will facilitate the observation of large-scale coastal processes that cannot be adequately captured by localized or site-specific observatories. The scale of this region enables SCOOP to offer prototype approaches to integrate emergent regional coastal observing efforts around the U.S. coastline.

SCOOP will differ from the existing observation systems in several important respects: (1) It will provide an integrating and unifying infrastructure for the entire eastern half of the US, stretching from the Gulf of Maine to the western Gulf of Mexico; (2) It will serve an interdisciplinary and diverse scientific community as well as the routine day-to-day needs of numerous practical end users; and (3) It will serve as a prototype program in “operational coastal oceanography” by providing all three principle elements described above.

SCOOP will serve as an integrator and facilitator of simultaneous, real-time, regional measurements and model projections of winds, waves, currents, water density, nutrients, water quality, biological indices, and fish stocks under all conditions. Open access to basic observations and analyzed data and linked numerical models will be available in real time and at high speed via facilities at SCOOP partner institutions. SURA’s established expertise in network development and its developing computer/grid technologies will underpin and complement the SCOOP agenda. Improved models of physical, chemical, and biological phenomena will permit more accurate predictions of coastal hazards, threats to human health, and short- and long-term changes in coastal ecosystems. Implementation using existing and emerging IT technologies will provide for better and more reliable utilization of computational facilities within the region, as well as provide for needed “surge” computational horsepower in times of intense activity, as in severe weather and/or natural disaster situations. SCOOP will enable better coastal stewardship and planning for extreme events. It will also facilitate safe and efficient maritime operations, as well as support coastal military security and homeland defense.