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# Preliminary network design of the Ocean Observatories Initiative

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The Ocean Observatories Initiative (OOI), sponsored by the U.S. National Science Foundation, will construct an integrated network to provide the oceanographic research and education communities with continuous, interactive access to the oceans. This facility will enable the simultaneous study of multiple phenomena in the oceans over time scales from milliseconds to decades, and over spatial scales from sub-meter to global. An integrative computer architecture or cyberinfrastructure will allow researchers to communicate with and configure globally situated experiments in near-real time, forming virtual observatories by designing customized data streams readily incorporated into adaptive models. The project underwent its Preliminary Design Review for readiness in December 2007; the total anticipated capital investment, expected to begin in July 2008, is currently US$331M. The facility is organized in three scales: global, regional, and coastal. Specific assets and will include autonomous platforms sampling the full water column and air-sea interface at three high-latitude sites in the global ocean (in the Gulf of Alaska at Ocean Station Papa, in the Irminger Sea SE of Greenland, coordinated with other initiatives, and off southern Chile at 55 deg S); a submarine backbone cable of over 1200 km length spanning the seafloor of the Juan de Fuca tectonic plate that will deliver terrestrial-level power and bandwidth to regionally spaced benthic and water-column platforms; and moorings and mobile assets arrayed in control volumes of the coastal ocean in two representative locations (the continental shelf and slope in the Middle Atlantic Bight offshore Massachusetts,

and the northeast Pacific continental slope off shore Oregon). Each scale will include mobile instruments in the form of crawler and/or winched profilers, gliders, and Autonomous Underwater Vehicles that expand the footprint of the observing sites and carry a payload of different sensors. With its global dimension, multidisciplinary focus, and unifying cyberinfrastructure, the OOI is expected to catalyze new understanding of the oceans by filling in time and spatial scales that have been undersampled by ship-based measurements and experiments and satellite observations.