JOIDES Resolution Science Operator
# Cyberinfrastructure Overview

The *JOIDES Resolution* Science Operator (JRSO) manages and operates the riserless drillship, *JOIDES Resolution*, for the International Ocean Discovery Program (IODP). The JRSO (http://iodp.tamu.edu) is based in the College of Geosciences at Texas A&M University.

The JRSO is responsible for overseeing the science operations of the riserless drilling vessel *JOIDES Resolution* (JR), archiving the scientific data, samples and logs that are collected, and disseminated via web applications and online publications. The drillship travels throughout the oceans sampling the sediments and rocks beneath the seafloor. The scientific samples and data are used to study Earth's past history, including plate tectonics, ocean currents, climate changes, evolutionary characteristics and extinctions of marine life, and mineral deposits.

The JR is an NSF large facility that serves the global geosciences community. In addition to NSF funding through a cooperative agreement, JRSO operations are partly funded by 22 IODP member nations, including Australia, Austria, Brazil, Canada, China, Denmark, Finland, France, Germany, India, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

The cyberinfrastructure team supports a split based operations construct, providing cyberinfrastructure, cybersecurity and data management services at sea on board the JR and on shore in College Station, TX. VSAT (very small aperture terminal) satellite services are used to provide connectivity services between ship and shore. Currently, this is a dedicated asynchronous wide area network circuit offering 2 Mbps down to the ship and 1 Mbps up.
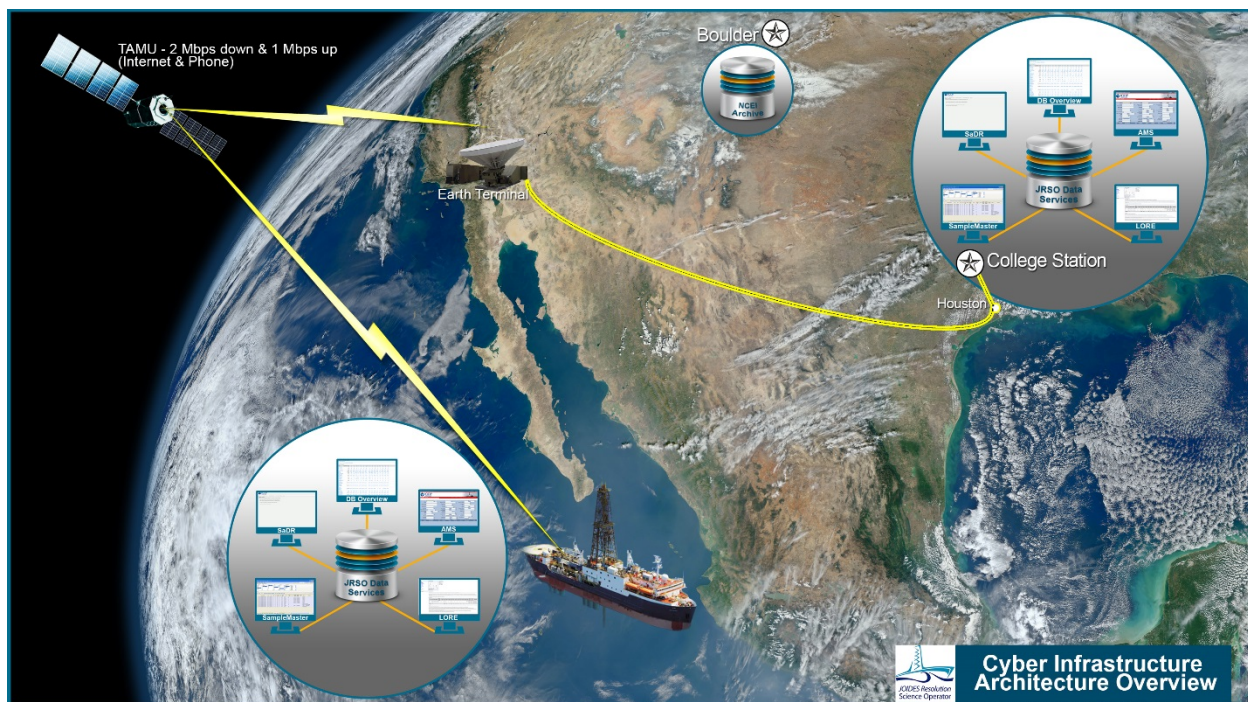
The JRSO's Laboratory Information Management System (LIMS) architecture (see picture below) is designed to capture, archive, process, manage, and disseminate data using several JRSO-developed instrument uploaders, client applications and web application tools. LIMS comprises the database that stores the data, the web services that pull and push the data, and the applications and hardware that capture and disseminate the data. One JRSO goal is to make this data, along with the data stored a legacy system (JANUS), more human and machine discoverable. JRSO is hopeful that the NSF-funded Open Core Data project will soon provide the data discovery capability it is seeking.
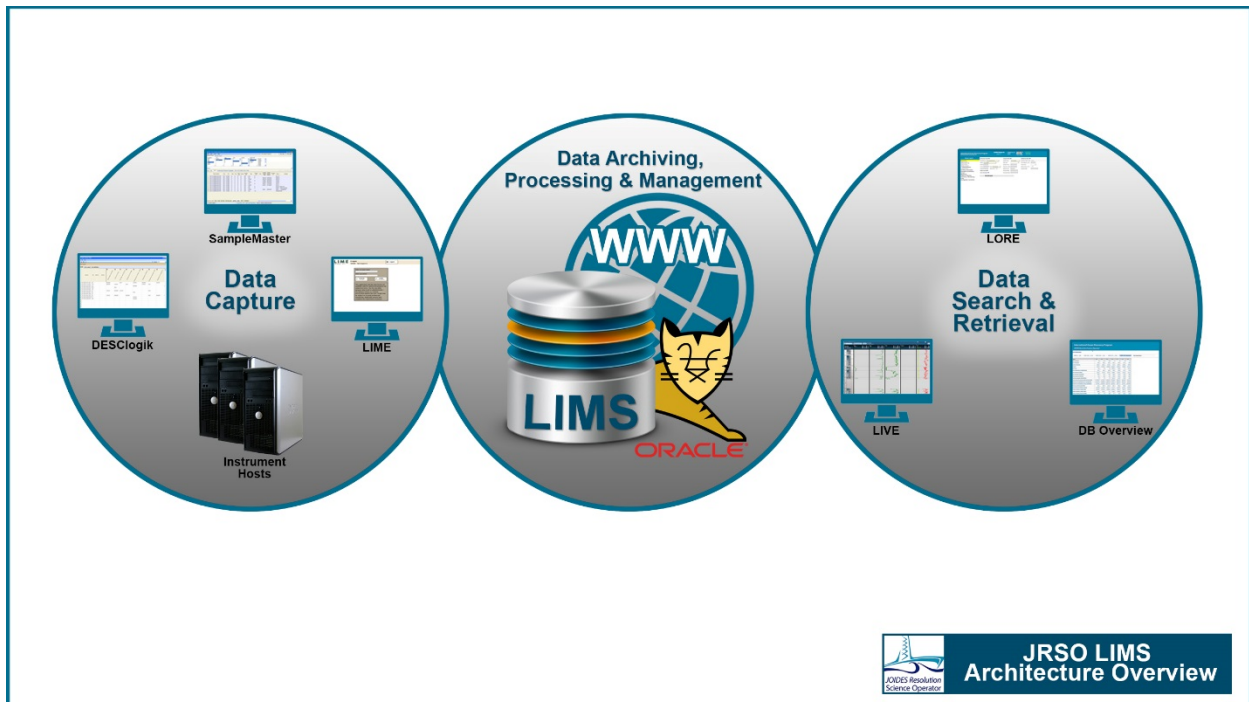
The cyberinfrastructure team serves approximately 115 internal JRSO staff, 150 international scientists who sail on the JR each year, and the broader global geosciences community.

Under its capital equipment replacement program, the JRSO routinely updates infrastructure services on ship and shore (i.e., servers, storage, backup services, battery backup, and high-speed network). The median age for JRSO infrastructure equipment is approximately six years.

JRSO leverages Texas A&M University policies and tools to maintain its cybersecurity program. JRSO conducts a security self-assessment once per year using RSA Archer GRC in order to remain in compliance with university and state regulations.

JRSO science data is permanently achieved at the NCEI facility in Boulder, CO.