

Interoperable Data Management and Instrument Control Experiences with the EMSO Generic Instrument Module at OBSEA

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EMSO Generic Instrument Module (EGIM) is designed to consistently and continuously acquire physical parameters of interest to a broad range of marine scientific disciplines covered by the EMSO ERIC. This research infrastructure provides accurate records of marine environmental changes coming from local nodes throughout European Seas. EGIM is able to operate on any EMSO node, mooring line, and seabed station, cabled or standalone, and surface buoy. In fact, a central function of EGIM within the EMSO infrastructure is to have a number of ocean site locations where the same set of core variables are measured homogeneously: using the same hardware, same sensor references, same qualification methods, same calibration methods, same data format and access, and same maintenance procedures.

In this paper, we present the results of the continuous shallow water tests of the EGIM, at the OBSEA site, for almost five months since its deployment and arrangement installation, followed by the acquisition of significant physical parameters in a reasonable quality range [2]. Also, we present our contribution to the implementation of the EGIM data acquisition system module focusses on the development of a generic software for sensor web enablement. Through this generic software, the EGIM data is directly inserted into a centralised SOS (Sensor Observation Service) server [3][4] and into a laboratory monitor system (Zabbix LabMonitor) for recording events and alarms. The generic software for sensor web enablement together with the SOS server is located, in the EMSO Cyberinfrastructure (CI), between the data source (EGIM) and the data management system. The generic software for sensor web enablement has two main functionalities, first to guarantee that the data is recorded properly from the EGIM hardware and second to register and insert the recorded data into a standardize OGC SOS server that works as a gateway for the EMSO data management system, as shown in Figure 1. We have identified several categories of data shared between EGIM and CI. The following define each one:

- Component descriptive data – Description of the platform/instrument configuration including instrument types, serial numbers, position of the deployment, calibration parameters.
- Command data – Commands and associated attributes such as when a command is scheduled to be executed.
- Instrument data – Data produced by the platform instruments, associated time tags, and attributes identifying the specific source instrument.
- Engineering data – Data describing the operational status of the system components.
- Metadata – Data describing the data. Metadata are data describing a resource like an instrument or an information resource.

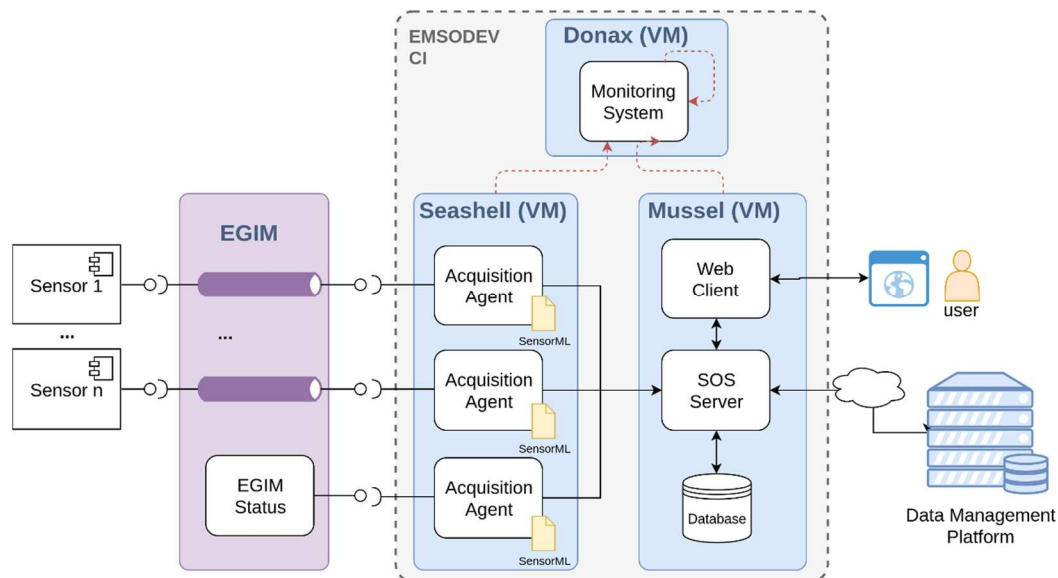


Figure 1: Overview of the EGIM Acquisition Components

To provide the description of all these categories of data we use the SensorML 2.0 standard [5]. SensorML supports the ability to describe the components and encoding of real-time data streams, and to provide a link to the data stream itself [6]. Based on the SensorML description of each EGIM component, the generic software for sensor web enablement can automatically connect to a real-time data stream, parse the data stream and generate transaction compliant with Observation & Measurement standard 2.0 which can be directly injected in the OGC SOS server. The acquisition agent (based on SWE Bridge [7]) reads and decodes this file, encoded in EXI format. With the decoded information it autoconfigures itself, opening a communication port with the EGIM-deployed instrument through an Ethernet connection, with the capability to use both TCP and UDP protocols. Then starts getting information from the instrument in push or pull mode. The data retrieved from the instrument is stored in XML files, following the insertResult format. This format is compliant with the Observation & Measurement standard 2.0 and can be directly injected in the SOS database.

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