

The Great Lakes Laboratory for Fisheries and Aquatic Sciences (GLLFAS)

GLLFAS uses the Mobile Environmental Management System (MEMS), a solution created by students of eSpatial's Academic Programme, to collect and manage critical geospatial data in a web-based system.

The Problem:

The GLLFAS's "fish species at risk" workflow, whereby scientists enter textual/pictorial information on paper field data sheets is inefficient, has potential for inaccuracies during both initial recording and subsequent data entry phases, and does not facilitate knowledge sharing between staff. Also, different types of information may be stored in different locations and valuable time can often be lost trying to correlate data in order to make decisions.

The Solution:

eSpatial's web-based and Mobile Environmental Management System (MEMS) prototype is specifically tailored to perform context-aware queries and update spatial datasets. Spatially enabled computing can provide situation aware assistance to both web-based and mobile users by presenting the right information at the right time, place and situation using context-associated knowledge. Context-associated knowledge is assembled by combining knowledge gained on information accessed in the past with the activities planned by the user, together with other situation dependencies (e.g. location) of these activities. The MEMS datasets are provided by the Canadian Department of Fisheries and Oceans (DFO) and the prototype is customised to the specific needs of the Great Lakes Laboratory for Fisheries and Aquatic Sciences (GLLFAS) Fish Habitat Section's requirements for fish species at risk assessment. Currently, researchers, habitat biologists and enforcement officers have access to the fisheries database, containing layers of biological information (e.g. spawning sites, weed beds, substrate type, etc.) solely from the office. Delivering data overlaid on base maps of the Great Lakes region to a hand held device and linking it to each task being investigated enables mobile GLLFAS biologists and enforcement officers in the field to make rapid informed decisions.



Tablet PC connecting to MEMS over Wireless Net

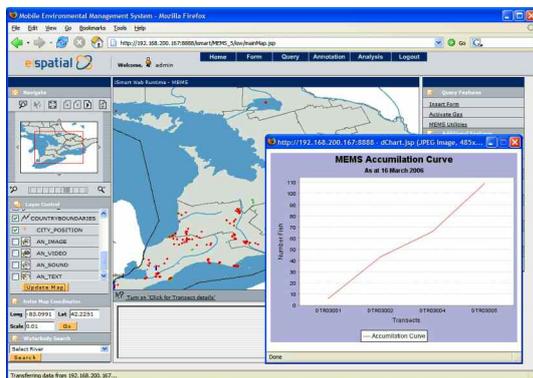
Key Benefits

- *Facilitates knowledge sharing and data analysis/synthesis.*
- *Supports effective communication between different staff at different physical locations (e.g. scientists in the lab and colleagues in the field).*
- *Allows important multimedia data and associated annotations to be combined with text-based records.*
- *Saves time and money by reducing paperwork and allows staff to input and access information anywhere at any time without having to return to dedicated access points.*
- *Reduces error by reducing latency between collection and data entry, as well as paperwork.*



The MEMS system greatly reduces the amount of effort needed to record and maintain important environmental data for the DFO thus increasing the productivity of the biologists in the field by between 20 and 50%

requirement of the three-tier architecture. This architecture allows for the development of individual components of the system separately, thus maintaining component independence. In this way, different parts of the system can be developed at different stages, some more than others, without affecting the entire system each time an update is made



Species Accumulation Curve



Multimedia Annotations

Architecture

The MEMS prototype uses a typical three-tier architecture for enterprise information systems, composed of the client layer, application server layer and the database layer. This architecture focuses on the development of services for a versatile, extendible (J2EE) application server. The communication between the client layer and the database is conducted through the application server layer. With this type of architecture, the processing load is balanced, as each tier of the system resides on a separate computer.

About eSpatial

An Oracle Certified partner based in Ireland and the USA, eSpatial provides an advanced development and deployment environment for embedded spatial applications and web services in a standard enterprise IT environment. Its iSMART® Suite allows organisations to build new applications, or extend existing ones, to include spatial functionality such as displaying a map or calculating an area or distance. eSpatial's technology is used in every area of IT including public sector, defence, telecommunications, and utility organisations.

iSMART⁵

The iSmart technology adopts the strategy of focusing the services on the application server layer of the system. This design is ideal and conforms to the

