A generic platform for e-Maintenance

The ambition of PROTEUS is to engineer a change in the landscape of today's maintenance support tools. The project will provide a fully integrated platform that is able to support any broad e-maintenance strategy.

Predictive maintenance in a co-operative environment

Maintenance is considered an integral part of global EAO policies (Enterprise Asset Optimisation) currently being implemented by a growing number of industrial organisations. Predictive maintenance requires the harmonious integration of:

1. Continuous remote monitoring of equipment throughout its lifetime.
2. Maintenance and Repair Operation (MRO) process management, grouping logistic actions to improve the efficiency of remote access to technical documentation and knowledge.
3. Comprehensive data presentation and synthesis involving direct delivery of operational information, including supervisory and decision level, asset management panel and maintenance contract management.

A platform for web-based e-maintenance centres

Within PROTEUS, we are developing a European generic software architecture for web-based e-maintenance centres, targeting the transportation, energy and other industries. We aim to improve efficiency by bringing expertise via Internet directly to the user site. We will promote a de-facto form of standardisation through extensive use of new data-structuring technologies (XML - Extensible Mark-up Language), application integration techniques and Internet-related technologies. This will reduce maintenance process costs (time to diagnosis and duration of intervention), and also prevent failures through early monitoring of field equipment (condition-based predictive maintenance).

Integration in a multi-user environment

Today's market for maintenance-oriented tools is split into two
autonomous sub-systems. Each area has developed its own culture, strategy, standards and products:

- **Process Control**: General-purpose DCS/SCADA systems and specialised condition monitoring add-ons to DCS (Digital Communication System) can be combined in a global maintenance management system, connectable to an integration platform via well-defined interfaces. Major players, such as Alstom, Siemens, ABB, Schneider, GE Fanuc, Yokogawa, Fisher-Rosemount, Rockwell, Foxboro and Allen Bradley provide proprietary solutions, while condition-monitoring software is a specialised field.

- **MRO/CMMS and ERP**: CMMS (Computerised Maintenance Management System) tools are key in Maintenance, Repair & Operation management. None are genuinely open, although ERP (Enterprise Resource Planning) environments such as SAP provide useful extensions.

As a considerable effort is required to make these autonomous tools communicate, there is a clear need for an integrated environment to enable newly developed and existing products to work together. Enabling technologies are needed to build a global platform for SCADA (Supervisory Control And Data Acquisition) systems, condition monitoring, CMMS, ERP and e-Procurement tools, and decision-support tools based on rules and CBR (Case-Based Reasoning).

Classical tool-integration methods based on the general-purpose technology offered by Information System tools, such as SAP/R3 and Oracle are often very expensive. There’s a major trend towards using Internet communication technology and distributed processing environments to integrate previously isolated sub-systems.

**PROTEUS** will provide experimental proof of the advantages of tool integration based on an object-oriented paradigm. The various aspects of the maintenance process will be integrated in a unique distributed multi-user environment. This generic e-Maintenance platform will provide methods and Application Programming Interfaces (APIs) for tool integration.

### Integrated maintenance applications for Europe

US companies have a substantial lead in this area e.g. with MIMOSA (Machinery Information Management Open System Alliance), a North-American initiative which is elaborating a set of standards for the design and implementation of interoperable maintenance-oriented tools. PROTEUS gives European industry a chance to profit from these emerging technologies and thus catch up.

The project outputs will offer real possibilities for developing applications within the next three years. Exploitation of PROTEUS results will allow large companies as well as SMEs to implement e-Maintenance & Logistics Centres in a variety of industrial sectors.