

Information Technology Systems for Fusion Industry and ITER project

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The industrial developments in fusion industry will have to overcome numerous technical challenges and will have strong needs for modern Information Technology (IT) systems. High-quality IT systems are an essential component to assure rapid scientific and technological progress as they can substantially accelerate the learning process and shorten the time needed for a development.

Fusion is based on data-intensive scientific applications and technologies, and will benefit significantly from the use of the modern Information Technologies and Techniques such as:

- Advanced data acquisition, data and signal processing analysis;
- Grid enabled information and computing infrastructure with database and data warehouses systems for storing large amounts of data;
- Automated data management with data fusion as a component;
- Problem solving environments that support data exploration, data mining, simulation modeling, and advanced query processing;
- High speed networking;
- Visualization means to intensify visual analysis of large datasets, support operations control systems, and decision support data systems;
- Near-line archiving and others.

A fusion industry manifested itself with an unprecedented international collaboration – International Thermonuclear Experimental Reactor (ITER). Data accumulated in ITER will be the major output of the project and will create the knowledge base for a future Fusion Power Plant. A modern and effective information infrastructure will be critical to the success of the ITER project.

To accumulate and maintain the knowledge base at all stages of the project, we propose to build an integrated Information System for ITER. We refer to this system as ITER Information Plant (IIP). IIP will be used as a high-quality tool to minimize lost experimental time and accelerate the understanding, interpretation, and planning of ongoing fusion experiments. ITER IP will allow reaping maximum benefits from the scientific and technological achievements of the project as it makes the ITER results accessible to hundreds of researchers worldwide. This is expected to dramatically increase the pace of scientific and technological discovery and the rate at which practical use is made of these discoveries.

The development of ITER Information Plant will require joint expertise in fusion and information technology. We believe that it will benefit from international collaboration, as it allows bringing diverse technical expertise and creates a balanced and creative international environment.

Being a first of his kind, the ITER Information Plant could be used in the future as a prototype of the IT system for national and international fusion projects.