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INFORMATION FROM THE EDITOR

On the occasion of Academician E.P. Velikhov's 70th birthday, Dr. Lev Golubchikov, former ITER Contact Person of the Russian Federation, conducted the following interview. Academician Velikhov is the President of the Kurchatov Institute in Moscow and has been Member of the ITER Council and the ITER Preparatory Committee, respectively, since the inception of the project. On behalf of the IAEA, the ITER Office Vienna extends its best wishes to Academician Velikhov.

FUSION *ITER*NATIONAL

L.G.: Evgenii Pavlovich, we have the full right to give you the name of 'founder' of both the INTOR and the ITER processes. In the beginning of May, 1978, in accordance with a decision of the Politburo of the KPSS (Communist Party of the USSR), you were charged to make, at the IAEA in Vienna, on behalf of the USSR, a proposal for the organization and development, on an international basis, of a Project for an Experimental Thermonuclear Plant. Our country was ready to construct a fusion reactor on the territory of Russia at that time. That was almost thirty years ago, but construction has not yet begun. People ask the question, "WHEN will fusion work?" To predict the future it is necessary to know at least the recent past. Could you answer several questions about the first steps and development of international cooperation in fusion?



Academician Velikhov receiving birthday congratulations from President Putin.

E.P.V.: Well, in this case is not so easy to get off lightly...

L.G.: Good. Is there a direct connection between INTOR and ITER?

E.P.V.: The joint work of many scientists and engineers from the Soviet Union, Euratom, Japan and the USA in the framework of INTOR cooperation during the years 1978–1985 allowed us to compare the results of R&D from the national projects related to a tokamak reactor, to reach agreement on the conceptual design of INTOR and to determine a list of additional R&D the results of which would influence the technical design of a reactor. But the main result of this work was the demonstration in practice of the possibility of fruitful joint work by many dozens of specialists from countries with different languages, cultures, religious customs and sociopolitical organizations. Without taking account of this experience and knowledge of the work, it would be much more difficult to organize the joint work on the ITER technical design. And besides, the five volumes published on the INTOR project are a very good reference source for engineers, researchers, scientists and students throughout the world.

L.G.: There were many stages in the INTOR project. Why did the participants not begin to work on the technical design of this reactor?

E.P.V.: The reasons were several. One of them is rather subjective, I think.

It was a period of time when a new generation of large tokamaks — TFTR in the USA, JET for Euratom (at Culham in the United Kingdom), JT-60 in Japan and T-15 in the USSR — became ready for operation. And all of them hoped to overcome the 'Lawson criterion' ($Q > 1$) a little earlier than their partners in fusion research. But to reach this goal has become possible only in the last few years.

L.G.: What prompted Chairman Gorbachev, the leader of the USSR at that time, to propose a broad international cooperation to harness thermonuclear energy?

E.P.V.: When he became the leader of the country, Gorbachev understood very well the necessity of broadening international cooperation in the modern world. Fusion research was one of the branches of science and technology where the Soviet Union could work on equal terms with any country in the world. The idea was to harness a practically inexhaustible and ecologically acceptable source of energy that would be available to all countries, not only for 'superpowers'. I had been acquainted with Gorbachev since our university years (he graduated from the law faculty, I from the physical faculty, at practically the same time) and I made use of this situation. I understood that international interest in fusion might help our national fusion programme, as head of which I was nominated just after the death of Academician Lev Andreevich Artsimovich in 1973.

In September 1985, during the meeting of Gorbachev with the French President Mitterand, the latter supported this idea, and this was written in the communiqué on the results of that meeting. Later the same year Gorbachev met with US President Reagan, and he, too, agreed to the organization of an international cooperation in fusion energy. In December 1985, after a speech by the Minister of Foreign Affairs of the USSR, A.A. Gromyko, before the United Nations General Assembly, this great idea found general understanding and we in the Soviet Union began to receive proposals from other countries willing to participate in this endeavour.

L.G.: But the agreement on the ITER technical design was signed by only four Parties, the same that participated in the INTOR activity and in the ITER Conceptual Design Activities. Why?

E.P.V.: After long and not so simple negotiations, it was decided to begin the ITER activity with specialists from only those countries that had good experience in thermonuclear research, namely the USSR (Russia), the USA, the EU and Japan. I was nominated as the Chair of the ITER Council, and Dr. M. Yoshikawa become Co-Chair. After six years of very hard work the technical design was developed. Based on the scientific data and technical possibilities existing at that time, there was a real possibility to begin the construction phase of ITER, IF...if in the USA there had not begun some political intrigue. It was forbidden to US scientists to participate in the ITER activity and the word 'ITER' became taboo in the USA. The ITER Co-Centre in San Diego was closed.

In spite of a rather hard situation after this US decision, so inexplicable from a logical point of view, the project has managed to survive and continued up to the end of 2001 working with the goal of diminishing the cost of the reactor without substantial changes to its principal parameters and of getting agreement on a site for the possible construction of ITER. Canada joined the ITER activity and in June 2001 officially proposed a site for ITER construction near Lake Ontario. It was not only a very good place for ITER. This official proposal of a site allowed the participating countries to begin official negotiations for preparation of the new Agreement on the Construction of ITER. We should be grateful to our Canadian colleagues for this bold step.

L.G.: Well, what next? Negotiations have been continuing for four years...

E.P.V.: During this period of time many events have happened. After the beginning of the negotiations on the future of ITER, the USA came back into the project. China and the Republic of Korea also became participants in the negotiations, and Canada left the negotiating table because of financial problems. The selection of a site for ITER construction is in stalemate and is delaying a successful end of the negotiations, because three Parties (Russia, China and the EU) support France, another three (Japan, the USA and the Republic of Korea) support Japan. Now France and Japan are each fighting for their ITER site — Cadarache in France and Rokkasho in Japan. They have failed to reach a consensus on the basis of mutual interests and all the rest have to wait. The problem is very serious and quite possibly the decision can only be found by the 'Big 8' by means of mutual concessions.

L.G.: When may we expect the decision on the site?

V.E.P.: I think it will happen this year. Compromises are possible. But time is flying. An energy and ecology crisis is obvious even to the person in the street. The sooner we answer the question — FUSION ENERGY: TO BE OR NOT TO BE? — the sooner we will manage not only to resolve global ecological, energy and economic problems, but also to avoid serious sociopolitical perturbation in our unstable world.

L.G.: What do you think about the possibility of other countries joining the ITER process besides the present six?

E.P.V.: It must happen, sooner or later. Fusion energy is the global future of humankind "by definition", and it will influence the fate of all countries and peoples. That is why the leaders of my country considered and continue to consider that the ITER project should be under the auspices of the IAEA and the United Nations.



Academician Velikhov in discussion with President Putin.

L.G.: In his time, Artsimovich, to the question, “When will the use of fusion energy begin?”, answered, “Only when it is necessary to humankind...and maybe a little earlier.” What do you think, has this time come?

E.P.V.: I think this time is a little late in coming.

L.G.: In one interview, to the question, “Is it possible to call ITER the main project of your life?”, you answered, “Probably, yes.” Have you changed your mind?

E.P.V.: No, my opinion is still stronger.

A NEW DOCUMENT MANAGEMENT SYSTEM FOR ITER

by H.-W. Bartels, ITER Information Technology Office Head, ITER Joint Work Site Garching

Introduction

Since October 2004, ITER has a new document management system called IDM (ITER Document Management), which supersedes the old IDoMS. The old system served ITER for over 10 years but became outdated considering the rapid improvements in software and web technologies. The new system is designed to be the basis for the upcoming construction phase of ITER. A review of a range of potential solutions, some of them commercial and some of them open source, preceded the implementation of the new system. A complete in-house development was excluded from the beginning since the risks and cost involved are too large. As a result of the review it became clear that all solutions would require significant efforts to customize them for ITER project needs. Based on this conclusion it was decided to develop a pilot version of the new system with the open source web application framework ZOPE, which is a powerful and feature-rich software to build secure and flexible web applications. The success of this pilot led to the adoption of the new system for production work by the project in October 2004.

Software used for the implementation

The implementation with ZOPE was possible with a moderate effort because this system has the following built-in features:

- security integrated from the beginning;
- an advanced and fast search engine;
- built-in Object Database which provides full support for secure transactions;
- connection to external relational databases (e.g. Oracle, MySQL) is possible;
- separation of:
 - data (binaries);
 - meta-data (date, author, etc.);
 - presentation (dynamic web pages);
 - logic (workflow, i.e. approval process);
- fully customizable (general purpose computer language Python).

The most important features of IDM are:

- use through an internet browser from any platform;
- powerful search capability;
- easy and intuitive use;
- integrated workflow with:
 - signing, review, and approval (electronic signatures);
 - ability to include and log comments;
 - control of versions;
- fine-grained security settings can control access to various parts of the system.

Basic user interface

The user interface (Figure 1) is similar to that most users know from the Windows Explorer or similar file and folder navigation tools. There are various types of folders which are differentiated by colour or name. A grey training folder is available for users to familiarize themselves with the system. All content in this folder older than 3 months will be automatically deleted. A yellow 'Users' folder provides individual folders for all IDM users which are a good starting place for storing documents in IDM. Content in the 'Users' folder and all other non-training folders will never be deleted. The blue 'Baseline' folder is a special folder which is designed to represent the current state of the ITER project. Therefore its content is dynamic and will change with time. The structure of the folders there maps the ITER work breakdown structure. Links in the baseline folder can become obsolete and are then deleted. The documents behind those links will never be deleted and can always be retrieved via the search function. All other (green) folders are of general interest to the ITER project and contain content which is expected to be stable over time. Examples are documentation about old baseline designs and documentation about meetings (minutes and presentations).

An important role in IDM is played by the Responsible Officers of each folder. A typical example would be the 'Design Integration' folder, where the head of the design integration division would be the responsible officer. The responsible officers can:

- delete links to documents in their area;
- set security permissions (read and write);
- confirm the relevance of documents in the 'Baseline' folder on request of the ITER management;
- delegate authority: define new Responsible Officers in subfolders.

In future, another feature will be implemented which will allow Responsible Officers to define new local groups at the folder level and make appropriate security settings for them. This feature will enable the creation of working groups across many fields without the need to interact with IDM administrators.

A user manual is provided both as a Word document and online. It is kept updated as new features are implemented. Users can send feature requests to the IDM administrators and a web page lists all feature requests. Another link points to the IDM development page in which a log is kept about improvements to the system.

Working with documents

The most fundamental feature of IDM is that it allows all registered users (including external collaborators) to upload documents into the system. Users can select an appropriate location in the folder structure where they have write access. In this folder they are offered a button called 'New File' which guides them through the upload process. They are able to browse the local file system to select a file for uploading and they can fill out some meta-data information like the title of the document, reviewers, approver etc. During the upload process a unique document number is generated which can be pasted within the document before the upload is complete.

Once a document is uploaded into the system, it can be routed through a standard QA workflow. The first action - review - is started once the author (plus co-authors) sign the document electronically. Reviewers can give comments to the documents and make a recommendation for approval. The author can reply to the comments. Finally a user who is in the line management of the (main) author can approve the document. Approvers can also add comments, add reviewers and delegate the approval to another person. Reviewers or approvers can lock documents. A locked document will remain in its status until the lock is removed. Approvers can also change authors - useful when new revisions of project documents are produced after the original authors have left the project.

New versions of the document can be uploaded at any time. The system takes care of the numbering of the various versions. There will be always one 'current' version, which will be the version with the highest level of approval. If several documents have the same level of approval, the newest of them will become the current version. An exception to this rule is that locked documents remain the current versions until the lock is removed. Older versions will be flagged as obsolete but kept in the database and newer versions will be

flagged as 'draft' versions. A new version must go through the same approval process as earlier versions to reach the same level of approval.

User database

Username and passwords are kept in the same repository as used for normal login into desktop computers. This is achieved by using a general standard — LDAP — for the user and group management. This way a separate user administration is avoided and the ITER users do not need to remember yet another username and password.

For external collaborators a low level of entry into IDM — read only access — is provided by a standard username and password distributed by the ITER International Team or Home Team members. External users requiring write permission can be added to the pool of IDM users once this is requested by an ITER International Team member who acts as their sponsor.

Real life experience

IDM went into production in October 2004. Since then the system has been running stably and the amount of documents is increasing steadily. Within the first 4 months about 1000 documents have been stored into the system. External collaborators from China, EU, Japan, Korea, Russia and the US have been registered as active users of the system.

Shortly after the introduction of IDM it became clear that one important use was not covered: how to upload documents to IDM which are of significant importance to the ITER project but which are authored by researchers now outside the ITER team. It seemed unrealistic to always give write access in these cases. Therefore a new upload procedure was developed quickly in which an IDM user can act as a 'signatory', i.e. they can sign a document into IDM without being the author. These documents can then even be approved inside the ITER Team to give them a formal status. This new route of uploading documents is currently used very often. This example demonstrates the flexibility which was gained by basing IDM on an open source platform. This allowed fast and flexible modification of the system to accommodate the special needs of the ITER project which would hardly be covered by any standard commercial system. Customizing commercial software systems is also possible but with large penalties in terms of cost, planning and schedule, and dependence on outside contractors and "black box" systems.

A current activity is to import the legacy documents accumulated in the old ITER document management system. This involves some effort to recognize old file formats and make them readable in the current operating systems. We expect that the bulk of this import will be finished in February 2005.

Considerable effort is also underway to quickly import recent documentation updates into the ITER system, to act as the springboard for future modifications as construction approaches.

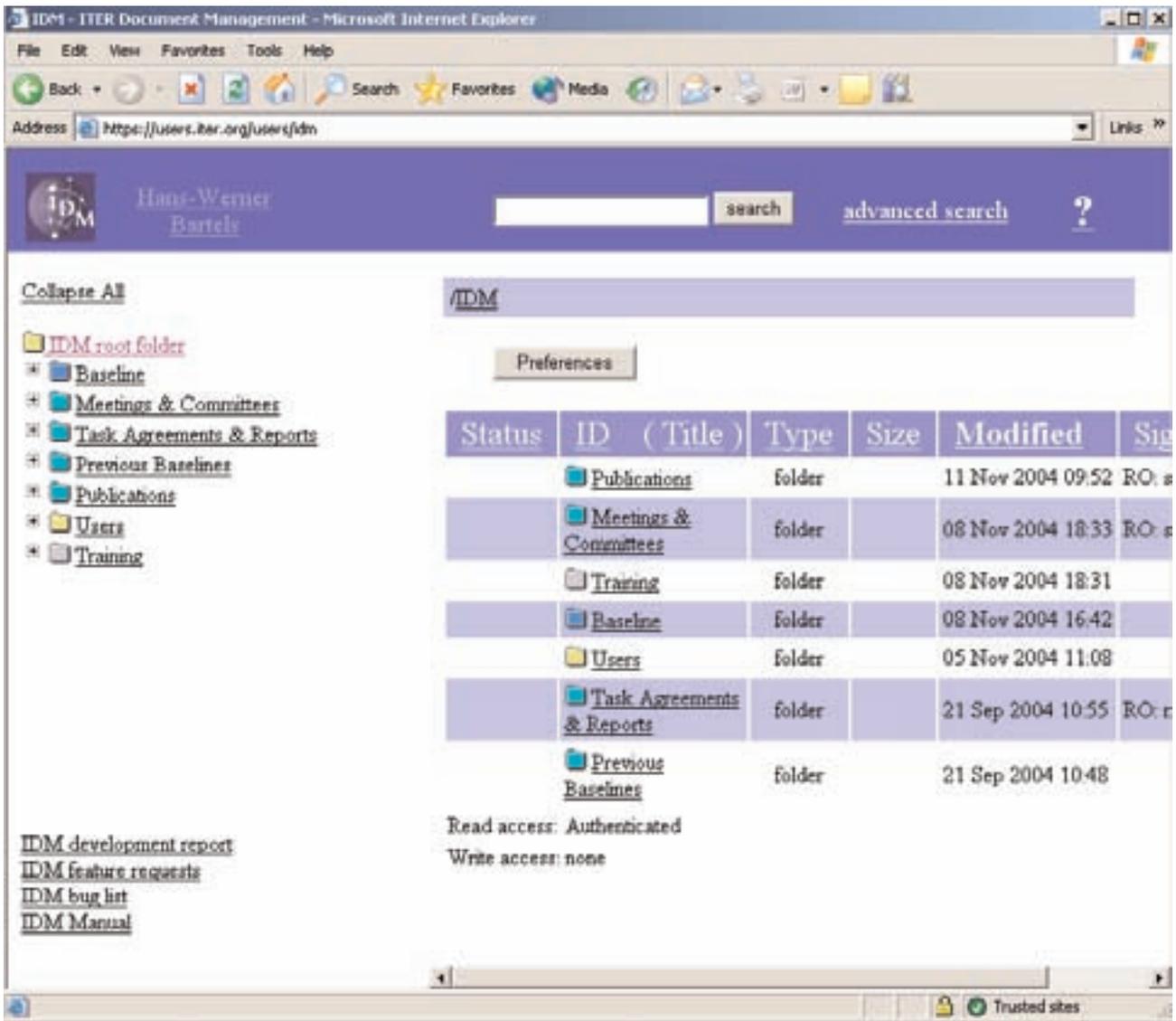


Figure 1. Basic IDM screen which appears after login into IDM. The user can navigate as on Windows Explorer by opening the folder hierarchy or clicking on folders. An alternative method to locate documents is to use a search word or phrase which will scan all meta-data and an index of the full text of Word and PDF documents.

Items to be considered for inclusion in the ITER ITA Newsletter should be submitted to C. Basaldella, ITER Office, IAEA, Wagramer Strasse 5, P.O. Box 100, A-1400 Vienna, Austria, or Facsimile: +43 1 2633832, or e-mail: c.basaldella@iaea.org (phone +43 1 260026392).

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