

ITER ITA NEWSLETTER

No. 6, JULY 2003



INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, AUSTRIA

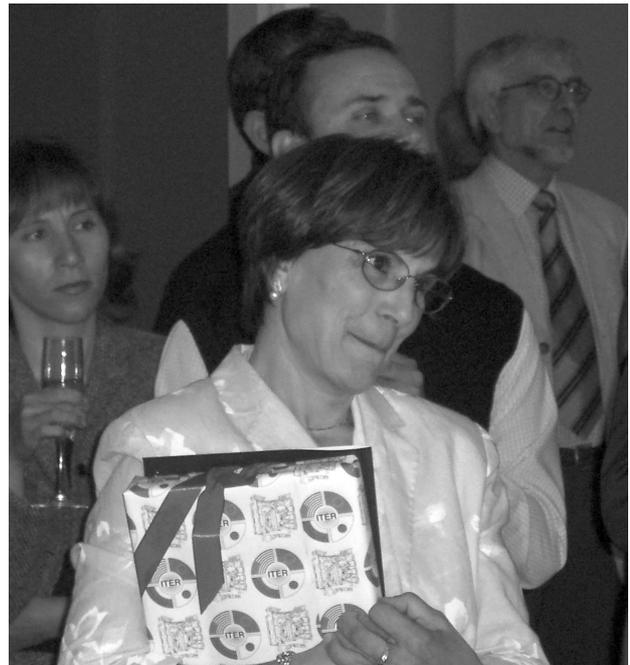
ISSN 1727-9852

FAREWELL PARTY FOR ANNICK LYRAUD AND ROBERT AYMAR

by Dr. W. Spears, ITER International Team, Garching

Although Robert Aymar will only take up his position as Director-General of CERN in January 2004, he formally gave up leadership of ITER at the end of June 2003, with the transfer of that responsibility to Yasuo Shimomura. After the summer he will devote the lion's share of his efforts to his new job. The International Team therefore held a party to say farewell to him, as well as to Annick Lyraud, who will move in September to CERN to continue to support him there.

Robert and Annick were on the receiving end of three speeches. Yasuo Shimomura paid tribute to Robert's dedication to the ITER cause from the time well before he became ITER Director, confirming that without his leadership the ITER project would not be in its present expectant state. Valeri Chuyanov drew attention to the fact that the job Robert had performed required a lot of effort, dedication, broad scientific knowledge and deep engineering intuition, but that what made him really unique was his human approach to the project. He always sought consensus, drawing good input from everyone, and allowing them subsequently to implement the ideas as their own. In the long run this was probably the only way that a project of ITER scale and complexity could be implemented. Bill Spears drew attention to Robert's ability to get things done. One only had to look at the well-established and documented ITER design, and the steps in place towards its implementation, to see that it could not have happened without him. Annick's contribution had also been vital. It would be difficult to get by as well without her liveliness and complete dedication at the core.



Robert Aymar and Annick Lyraud endure the speeches

Given the strong interest of both Robert and Annick in the project personalities past and present, a photo album was prepared for each of them containing pictures of the existing staff, mostly hard at work, as well as pictures from the earlier heady days of the EDA, and of the staff from San Diego. There were also some key pictures of the design and R&D in which they both had been so intimately and pivotally involved. From the Naka JWS there was a special group photograph, signed by all the staff there. Robert was presented with an engraved weather station to adorn his new desk, and Annick with an engraved watch. On a lighter note, Bill Spears presented Annick with a Munich pictorial umbrella, so she could finally get acquainted with the tourist sites that had been so near over the past four years. He also presented Robert with a calculator, to help him keep a tighter rein on CERN finances!

Annick gave a speech saying how much she had enjoyed working on the project and with the personalities involved, and how she would miss all of us in the future. Robert emphasized Annick's importance to the project, and admitted it was not always obvious which of them was in charge! He expressed regret that he would be leaving the project earlier than he liked, at a point when the path to construction was still not entirely smooth. When he accepted the CERN position, it had looked as though there would be sufficient time to reach a conclusion before he left, but some hurdles had proven harder to overcome than expected, and the preparations were not as advanced at this point as he would have liked, although capable of bringing success given time. Both wished the staff and the project well, and indicated they would be watching progress closely, and eagerly, over the coming months and years.

Those present – ITER staff at Garching, plus many from EFDA – drank a toast to their continued good health and success, and congratulated them on their combined 70 years of working life dedicated to the fusion cause.



And get their own back



And enjoy the gifts from their colleagues

DR. YASUO SHIMOMURA, INTERIM PROJECT LEADER **ITER Transitional Arrangements**

Dr. Yasuo Shimomura assumed the position of Interim Project Leader on 1 July 2003.

Dr. Shimomura joined the Fusion Research Programme at the Japan Atomic Energy Research Institute (JAERI) in 1971 after studying high temperature plasmas at Osaka University.

From 1973 to 1980, he led the JFT-2a/DIVA project, the first divertor tokamak in the world, and studied impurity control and plasma surface interactions. He developed a reactor-relevant divertor concept, without poloidal field coils inside the toroidal field coils, for INTOR in 1979.

From 1981 to 1991, he worked for the JT-60 Project as the Head of Experimental Planning and Analysis, later as the Head of the Large Tokamak Experimental Division. He took part in the ASDEX experiment at IPP Garching in 1982 and demonstrated the cold and dense divertor plasma. He also worked for the preparation of the ITER CDA in 1987 and was the Head of the Poloidal Field System Design Unit of the ITER CDA from April 1988 to March 1990.

From July 1992 to July 2001, Dr. Shimomura was the Deputy to the Director of the ITER EDA and co-ordinated mainly the technology R&D activities of the four Parties, the Physics Unit and Safety Division at the San Diego Joint Work Site (1992-1999) and at the Naka Joint Work Site (1999-2001). He was International Team Co-Leader from July 2001 to June 2003.



And get their own back

ITER TECHNICAL WORK DURING THE TRANSITIONAL ARRANGEMENTS

by Dr. Y. Shimomura, ITER Interim Project Leader

According to the scope defined in the Terms of Reference of the ITER Transitional Arrangements (ITA) agreed at the 5th Negotiators Meeting, the work programme for the ITA should include:

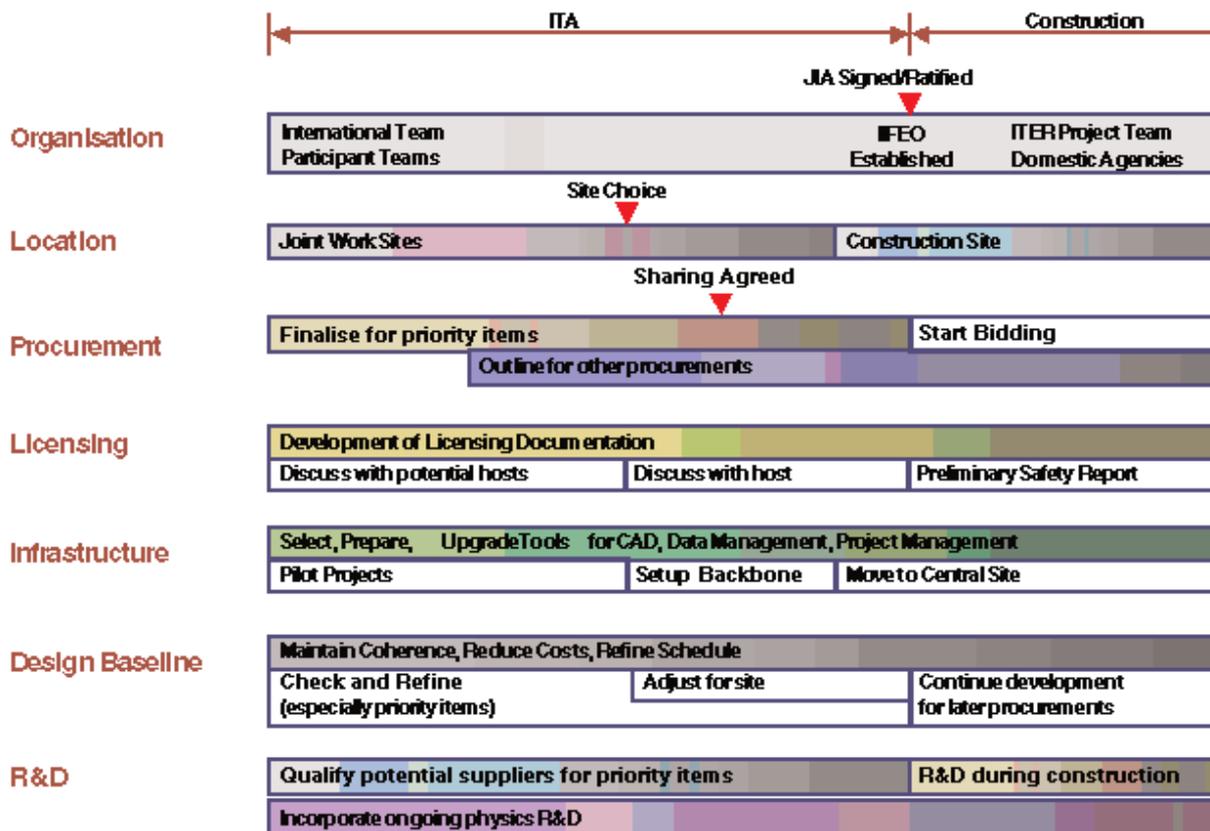
“Joint technical preparations directed at maintaining the coherence and integrity of the ITER design and at preparing for an efficient start of ITER construction, including, but not limited to:

- maintaining the documented design basis for ITER;
- site specific design adaptation for a preferred site,
- preparing for the procurement process;
- developing, and introducing on a provisional basis, ITER construction project management systems and other appropriate management tools;
- preparing licensing of ITER and undertaking necessary safety analyses.”

These technical activities all concern the preparation for an efficient start of ITER construction once the Joint Implementation Agreement (JIA) on ITER Construction, currently under negotiation, is ratified by the Parties.

The work of the ITA continues that started during the Co-ordinated Technical Activities (CTA) up to the end of 2002, with very similar objectives and priorities. The CTA had the objective to complete much of this work, but shortage of resources in both the International Team (IT) and the Participant Teams (PTs) and the lack of a consensus on a preferred site limited progress towards these goals. To improve this situation, task agreements to define the scope of work, similar to those established during the Engineering Design Activities (EDA), have been set up between the IT and the PTs. Since the end of the CTA, the project has been augmented by the return of the United States of America and the addition of the People’s Republic of China and the Republic of Korea as ITER Parties all of whom have also confirmed their intentions to participate in the ITA.

Main Technical Aspects of ITER Transitional Arrangements



At the start of the construction phase, the following will immediately be required:

- a substantial team on-site, with most of the responsible staff members already having some training in working collectively and with appropriate management tools and procedures;
- a Preliminary Safety Report, to support the request by the Director-General to the Host Country Regulatory Authority for the licence for ITER construction;
- a design completed to a level where all interfaces and the configuration are frozen;
- an agreed resource-loaded schedule for construction and an agreed procurement scheme, procedure and arrangements;
- the technical specifications for all the procurement contracts to be established during the first two-three years of construction.

The organization of the project personnel also has to change during the ITA towards one of an ITER Project Team, under one single line of technical responsibility to the Nominee Director-General, assisted by the Transitional Project Team, based at the construction site. The backbone infrastructure, in particular of databases and computing networks, necessary for the above arrangement to work well has to be set up and ready for expansion to full scale once the JIA is signed/ratified and the ITER International Fusion Energy Organization (IIFEO) is established. The latter is expected to take place in 2004, following a site choice in 2003.

With the above perspective, the work programme during the ITA, for the International Team, can be summarized as follows (see chart above):

- Transform the ITER design into a fully coherent reference baseline, adapted to the selected site, to be used for procurement and licensing. Construction schedule and costs to be confirmed or revised.
- Draft preliminary Safety Report and other documents for licensing.
- Prepare technical specifications for priority procurements:
 - all superconducting coil conductors,
 - toroidal field coil cases, structures and windings,
 - definition of PF coils including winding facilities,
 - vacuum vessel including supports for components mounted thereon,
 - tokamak building including technical outfitting,
 - cryogenic building (used for PF coil winding),
 - site facilities, in particular tunnels,
 - large diameter piping easier to install during erection.
- Technical definition of interfaces between all ITER systems, in particular all those of later procurements with the priority procurements (“machine assembly”, “maintenance” and “measurement/CODAC” structure need special attention).
- Definition of the skeleton of the later procurement packages, and the schedule and resources to establish them in future.
- Integration of results of the Parties’ ongoing physics R&D, and co-ordination, planning and definition of qualifying manufacturing R&D especially for priority procurements.

This work is in many respects, and increasingly, supported by the work of technical experts in the PTs, and should expand significantly once it is clear which Party will manufacture which items of hardware. This is currently being discussed as part of the ITER Negotiations, and should therefore become clearer during 2003.

The work programme for the initial part of the ITA is described in more detail in “ITER Transitional Arrangements: Preliminary Proposal for a Work Plan”, which was discussed amongst the IT and PTs at the end of 2002 and endorsed in general at the first Meeting of the ITER Preparatory Committee (February 2003). This work plan includes the return of Task Agreements, similar to those used during the Engineering Design Activities, between the IT and each PT on specific work scopes for R&D and design. This work, mainly by the PTs but managed by the IT, especially focuses on support of procurement package preparation:

- convergence to single reference conductor designs with adequate margins, incorporating the results of model coil tests;
- qualification of the different potential strand suppliers;
- completion of magnet safety and structural analyses;

- further detailing and analysis of the main vacuum vessel design;
- detailed layout and specification of services, design improvement, and analysis in the tokamak building complex;
- checking and development of the design of tokamak service systems to determine items that need to be procured and put in place early;
- verification of the design of the cryostat and thermal shield;
- continued improvements in the design of blanket and divertor, and their remote handling;
- preparation of all safety analyses identified as necessary in preliminary discussions with potential hosting Parties.

As part of this priority procurement preparation, for instance, specialized working groups involving IT and PT technical experts have been established to meet regularly to accelerate preparation of the technical specifications of the time-critical components of the magnet and vessel procurements. More than 80 tasks have been developed, mainly for design work.

In parallel to the above technology R&D and design, physics R&D is going on in the Parties. This work is aided by the International Tokamak Physics Activity (ITPA) and its Topical Groups, in which IT staff participate. Particularly interesting for ITER is the work directed at:

- further improvement of the ITER Physics Basis;
- further development of the ITER plasma scenarios;
- further studies of kinetic and magnetic control to refine ITER's needs;
- further development of disruption prediction and mitigation methods;
- development of numerical codes modelling ITER operation;
- further development of plasma diagnostics performance and design.

Currently, the above work is being either carried out or co-ordinated by an International Team of 62 professional staff at the Garching and Naka Joint Work Sites, with the co-operation of the Participant Teams. The staff are presently organized as during the CTA (see ITER CTA Newsletter of December 2001) with some changes of personnel. This structure will evolve rapidly as soon as the Nominee Director-General and Senior Staff structure of the future ITER Project Team are agreed in negotiations.

As part of their mandate, the International and Participant Teams also support the negotiations. One example of this is their involvement in understanding the technical strengths of the new ITER Participants, China and the Republic of Korea. A high-level technical team went to China in January 2003. They visited plasma physics laboratories at Hefei and Cheng-du, electromechanical and steel industries in Cheng-du, and an institute for non-ferrous metal research in Xi'an. They reported being "impressed by the dynamism and optimism shown by all the scientists met, their strong wish to see their doors opened to international co-operation and therefore to participate in ITER. Equipment and methods in use are similar to those in more developed countries. In particular, QA programmes are implemented in a manner already satisfying their European and Japanese customers."

A similar delegation visited the Republic of Korea in April 2003. The places visited were intended to illustrate the development of the manufacturing of KSTAR components, from additional heating power supplies to the vacuum vessel and superconducting magnets. The delegation observed the "strong interest at Government and industry levels to support Fusion Research in the frame of the long term development of alternative energy supplies." They also noted that "Korean Companies are efficient and strongly competitive on the worldwide market" and that "the large growth in the domestic support of Fusion Research with KSTAR is certainly attracting ambitious young scientists and engineers, a worthwhile difference from the present situation in most of the other ITER Partners, and a potential future benefit to ITER."

The new partners are expected to participate in the ITA activities soon. China has already started to send experts to work at the ITER Joint Work Sites. These new partners, as well as the USA, will contribute extra capabilities.

Although many aspects of the future detailed arrangements for ITER are the subject of ongoing negotiations, considerable technical work can be done to turn the design, described in detail by the Final Design Report documentation produced by the ITER Project in July 2001, into tight specifications that can be used to con-



Superconducting TF coil manufacturing facility at Academy of Sciences Institute of Plasma Physics, Hefei, China



Superconducting TF coil manufacturing plant at Korea Basic Science Institute, Daejeon, Republic of Korea

trol the quality of ITER hardware manufacture and assembly. Together with these technical developments of specifications, technical project management systems can be investigated and deployed to a limited extent to support the organization culture that will be needed for efficient construction following ratification of the JIA. While negotiations advance slowly to their goal at present, once they are completed there will be immense pressure to get on with the technical work. The current International Team, with the Participant Teams, are preparing as best they can, given limited resources, for that moment.

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).

Printed by the IAEA in Austria
September 2003

03-01659