

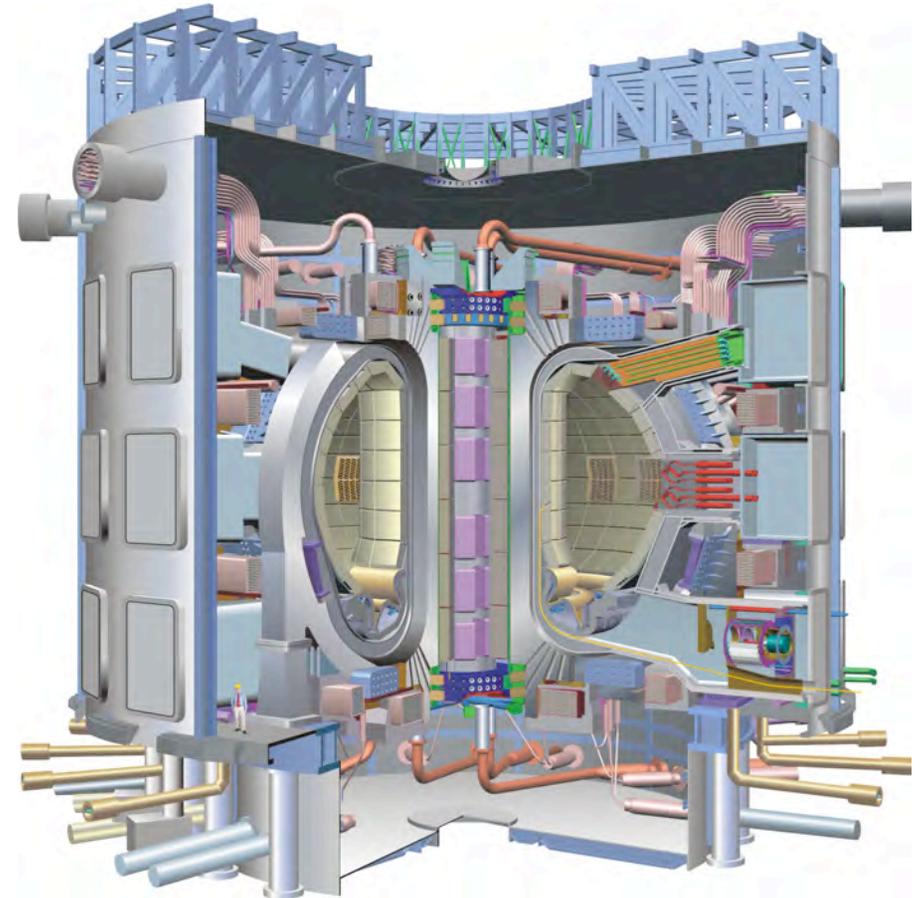
# Status of the U.S. ITER Project

**Ned Sauthoff**

**Project Manager, U.S. ITER Project Office**

**Fusion Energy Sciences Advisory Committee  
Gaithersburg, MD**

**February 28-March 1, 2006**



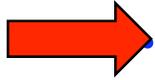
# Outline

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- **Revised US Procurement Allocations**
- **US Contributions to ITER Project**
  - Recent activities
    - USIPO Transition to ORNL
    - Lehman mini-review February 1-3, 2006
  - Near-term activities
    - Progress on R&D and design
    - Preparation for the CD-1 reviews
    - Web site
- **Staffing**
  - Deputy Directors General
  - US ITER Project Office
  - US ITER WBS managers / Team leaders

# Outline

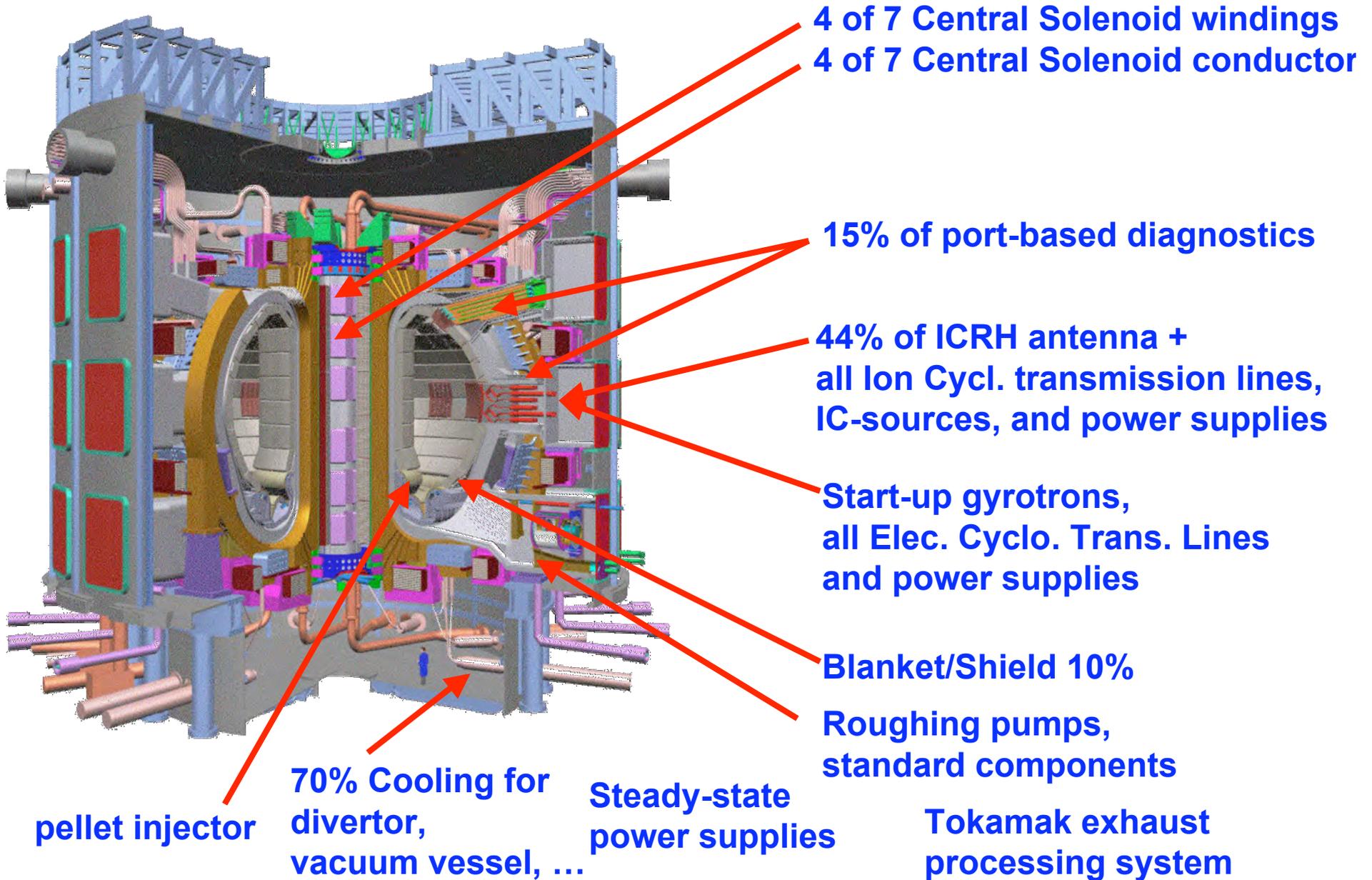
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## Revised US Procurement Allocations

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# 2003 Provisional U.S. "in-kind contribution" scopes

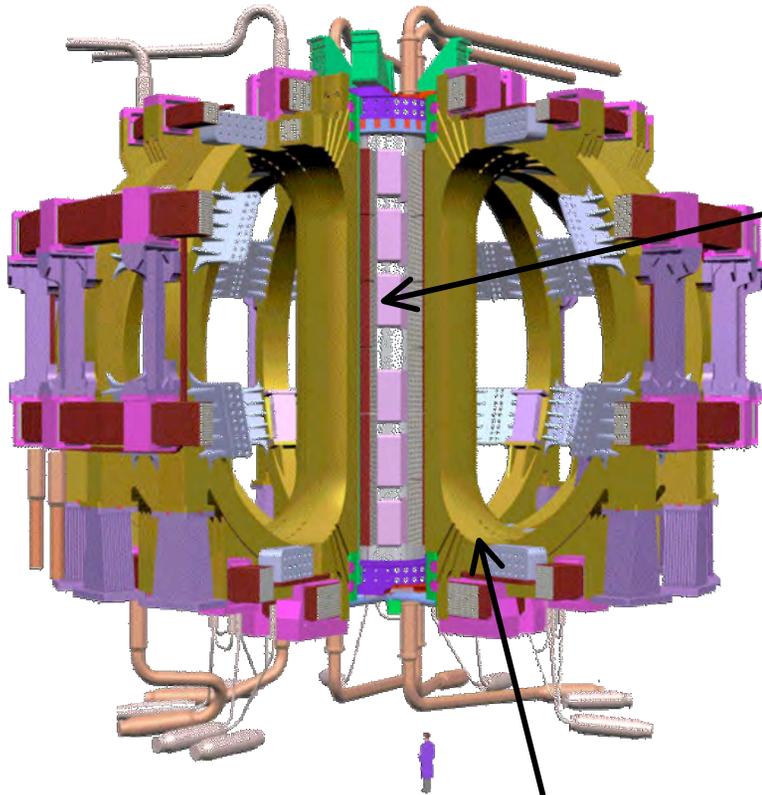


## **Process for the N-12 (2005) Revised Procurement Allocations**

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- **The N-11 (October 2005) meeting charged the International Team, working with the Participant Team Leaders, to refine the Procurement Allocations:**
  - To improve the prospects of project success
  - To identify an appropriate procurement allocation for a possible new party
- **Throughout November, IT Leader Yasuo Shimomura identified opportunities for improved allocations and worked with Participant Leaders, reaching agreement before the NSSG-13 meeting**
  - Simplify inter-party interfaces
  - Reduce undesirable multi-party duplication
  - Assign scopes to qualified parties
- **The NSSG-13 procurement allocation working group and the NSSG-13 endorsed the proposed revisions**
- **The N-12 meeting endorsed the proposed revised procurement allocations**

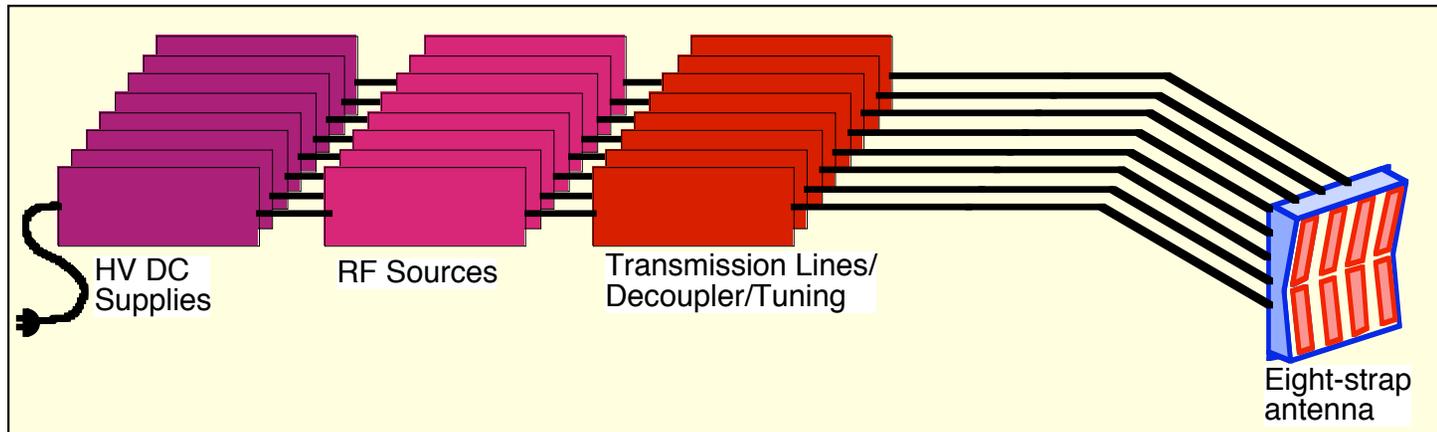
# Magnet system



- **2003: US would provide 4 of 7 Central Solenoid modules (conductor, winding, ...) while FLEX would provide the other 3 modules**
  - Issues:
    - duplication between parties
    - intricate interface
- **2005: Japan provides all CS conductor and US winds ... all 7 modules**
  - Advantages:
    - minimizes duplication
    - simplifies interface
    - shifts conductor risks

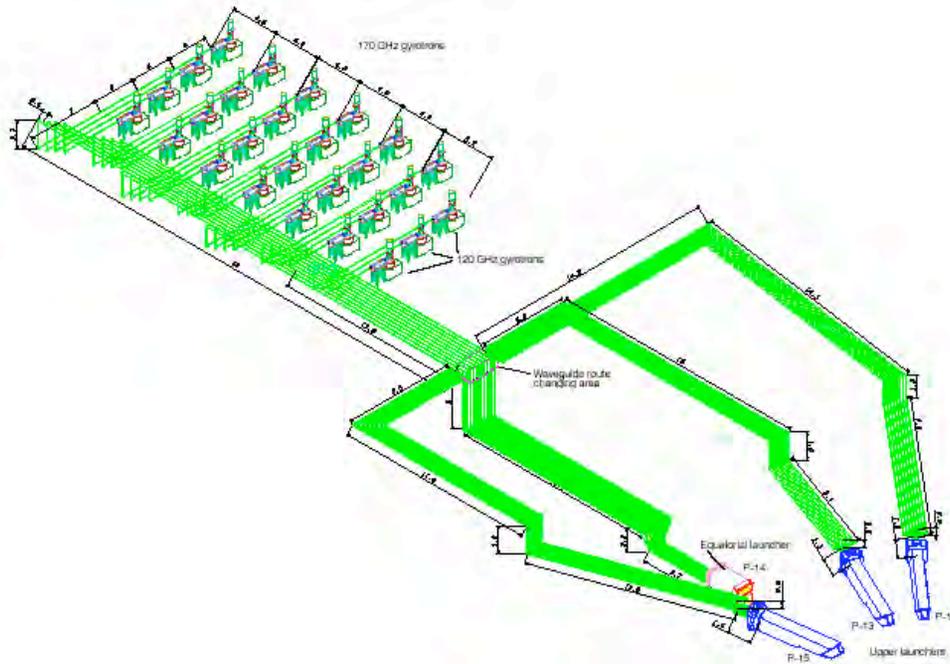
- **2005: US provides 8% of the TF conductor**
  - engages the US in superconducting materials
  - allows the US to build on multi-party developments

# Ion Cyclotron Heating and Current Drive System



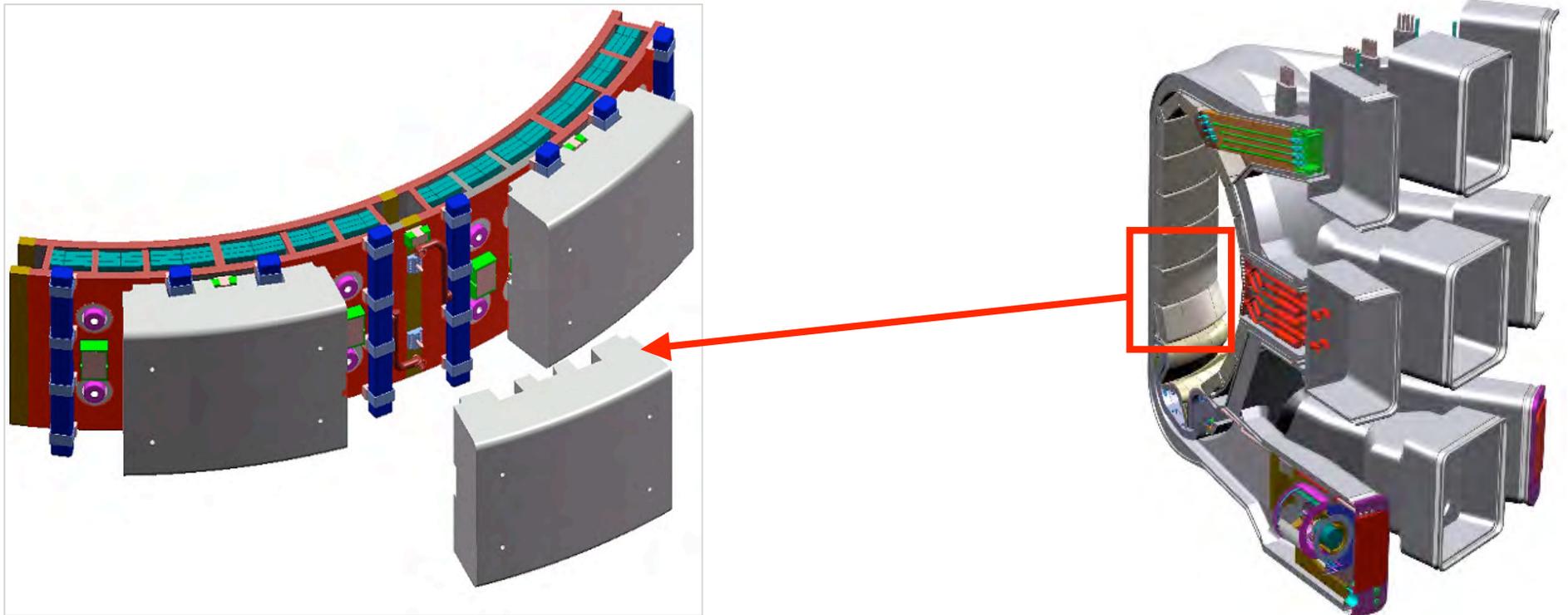
- **2003: US shares antenna with EU and provides all other components**
  - Issues:
    - interface with EU on antenna, with significant R&D
    - opportunity for scope for India
- **2005: US provides transmission lines**
  - Advantages:
    - simplifies interfaces
    - provides appropriate scope for India

# Electron Cyclotron System Configuration



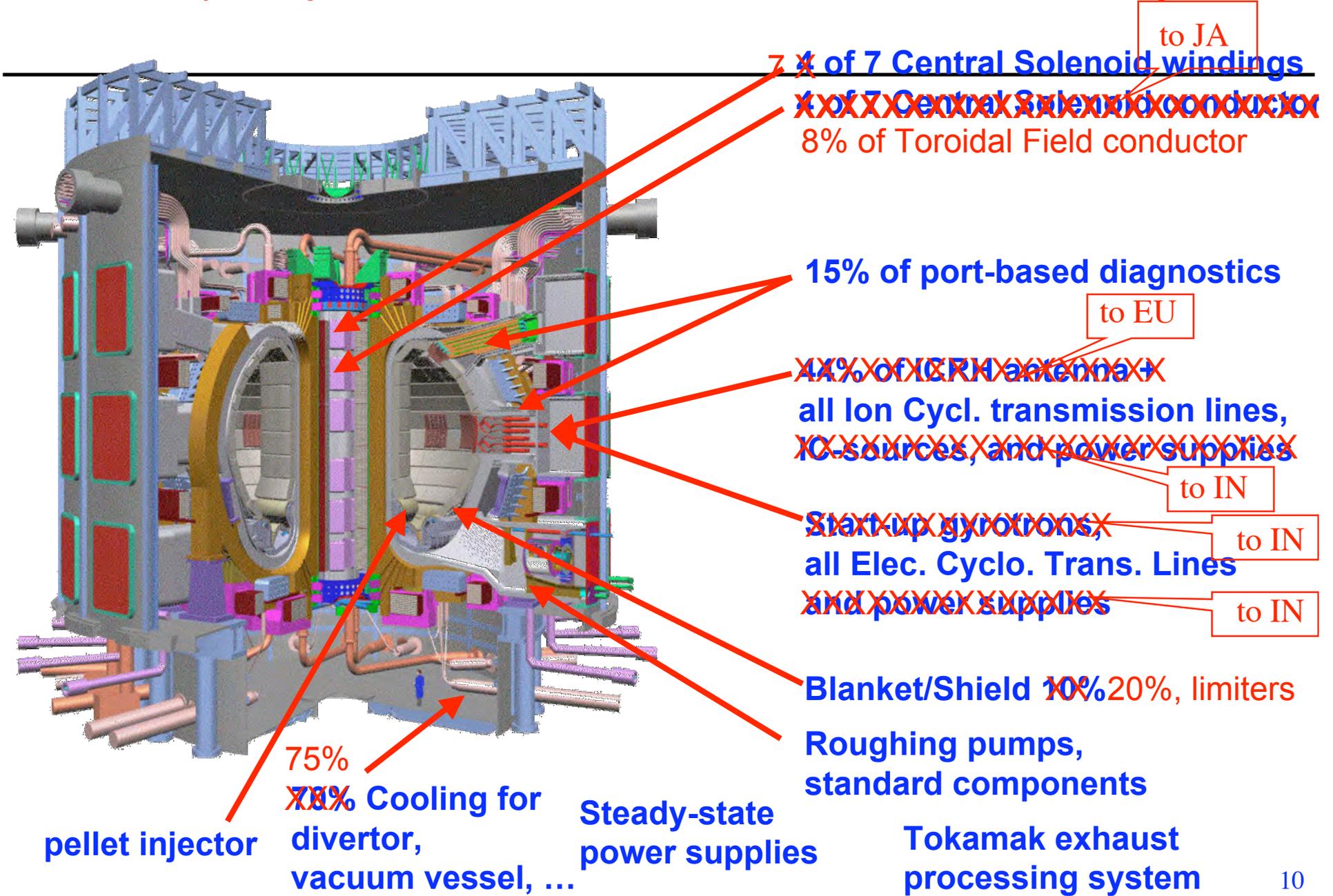
- **2003: US would provide 120GHz startup gyrotrons and all power supplies and transmission lines; others provide 170GHz gyrotrons and launchers**
  - Issues:
    - intricate interface between gyrotron providers and US power supplies
    - possible scopes for India
- **2005: US provides only transmission lines**
  - Advantages:
    - simplifies interfaces
    - provides appropriate scopes for India

## First Wall / Blanket/Shield



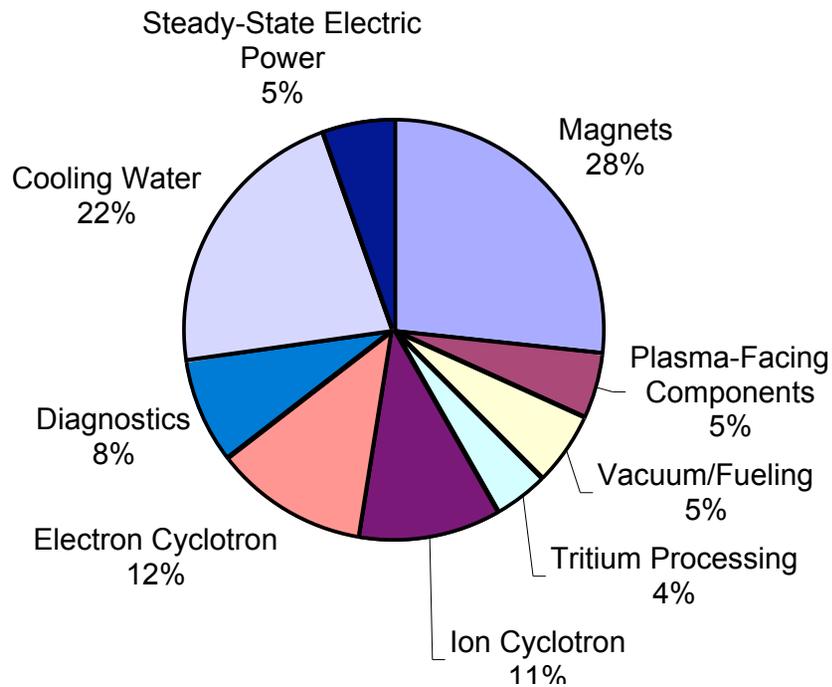
- **2003: US provides 10% of the area of First Wall / Blanket / Shield modules**
  - Issue: significant R&D spread over only small amount of fabrication
- **2005: US provides 20% of the area of First Wall / Blanket / Shield modules**
  - Advantage: Spreads R&D over larger fabrication base

# N-12 (2005) Revised U.S. "in-kind contribution" scopes



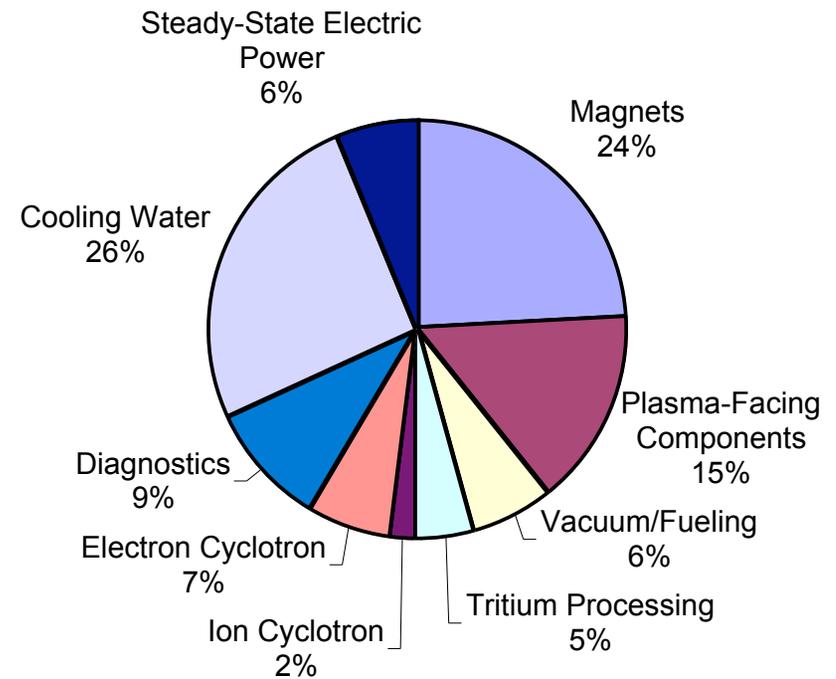
# Comparison of N-9 2003 and N-12 2005 US allocations (measured by ITER credit)

## N-9 (2003)



value ~ 270 kIUA

## N-12 (2005)



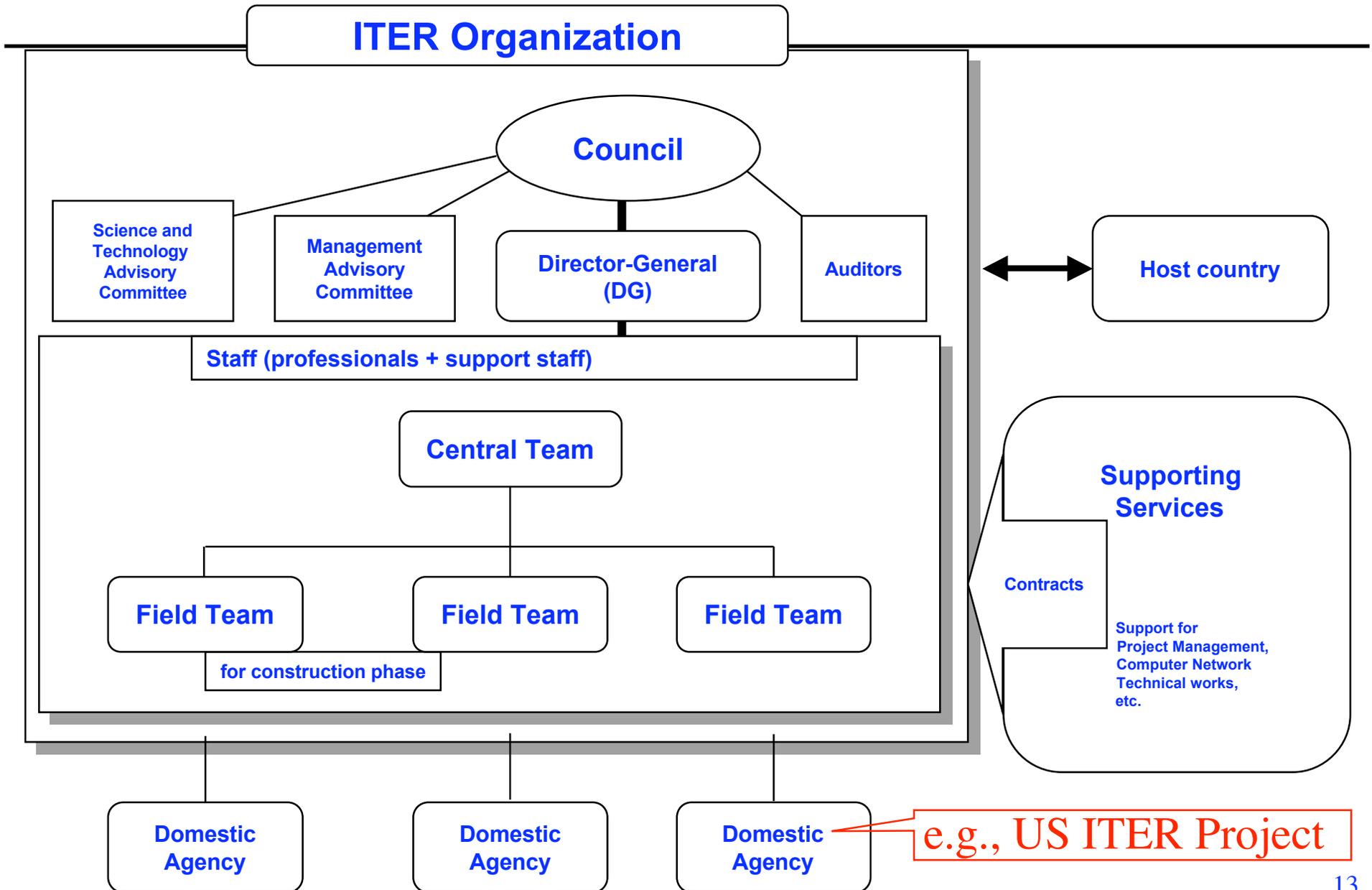
value ~ 248 kIUA

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# Highest Level Management Structure

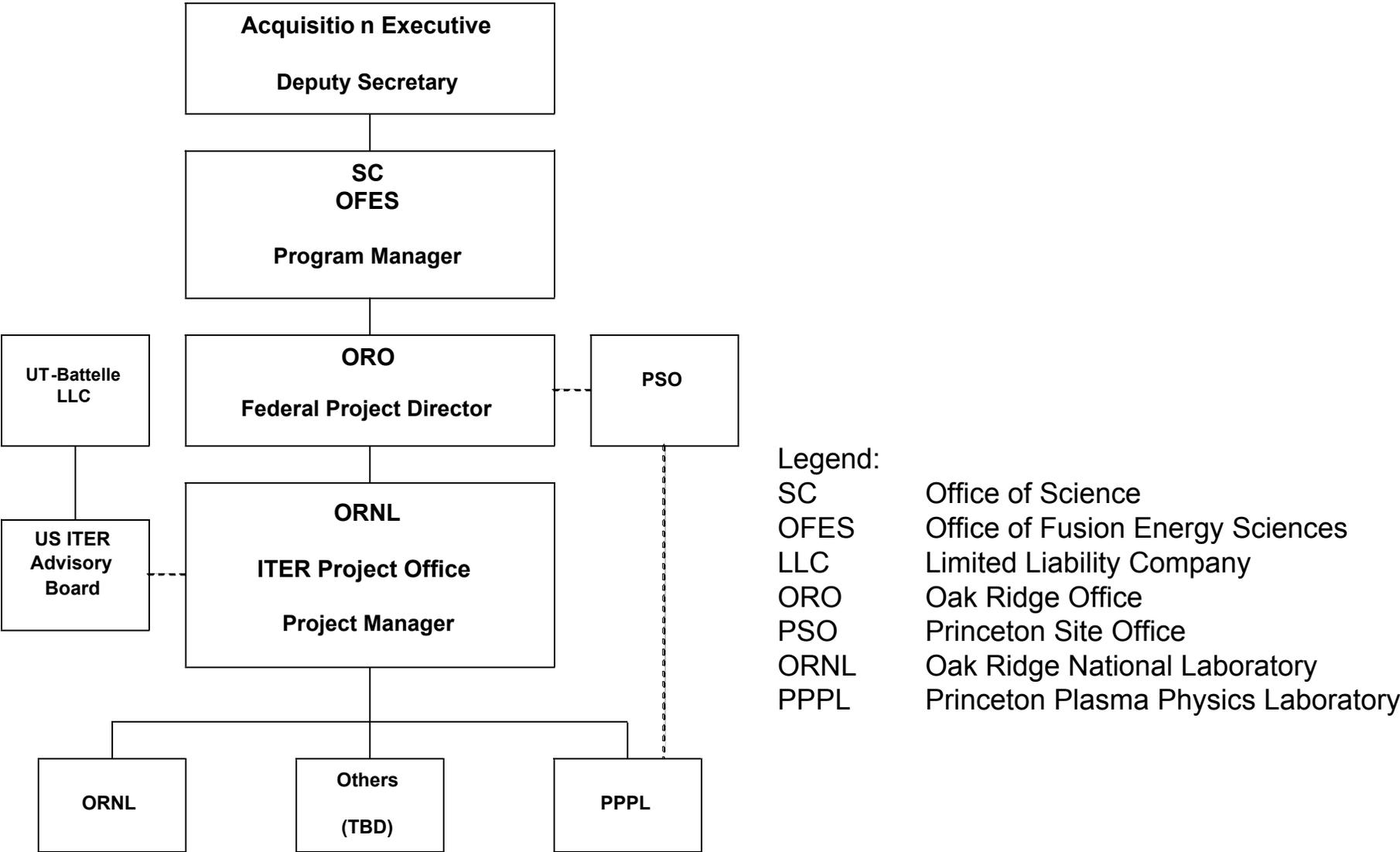


## Transition of the US ITER Project Office

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- “The centralized U.S. ITER Project Office, a partnership between PPPL and ORNL since July 2004, is moving to ORNL so that the U.S. ITER program can take better advantage of the project management experience developed by ORNL during the construction there of the Spallation Neutron Source (SNS).”
- **Emphases:**
  - Host lab (ORNL) is fully responsible for delivery of the US products
    - WBS managers are part of the Project Office team, with suitable arrangements regarding location and accountability
    - Partner institutions are delegated responsibility for specific scopes, working under an MOU
    - Major procurements go through DOE-certified procurement systems
    - Partner labs contract with subs (labs, universities and industry)

# Revised US ITER Project structure



# Outline

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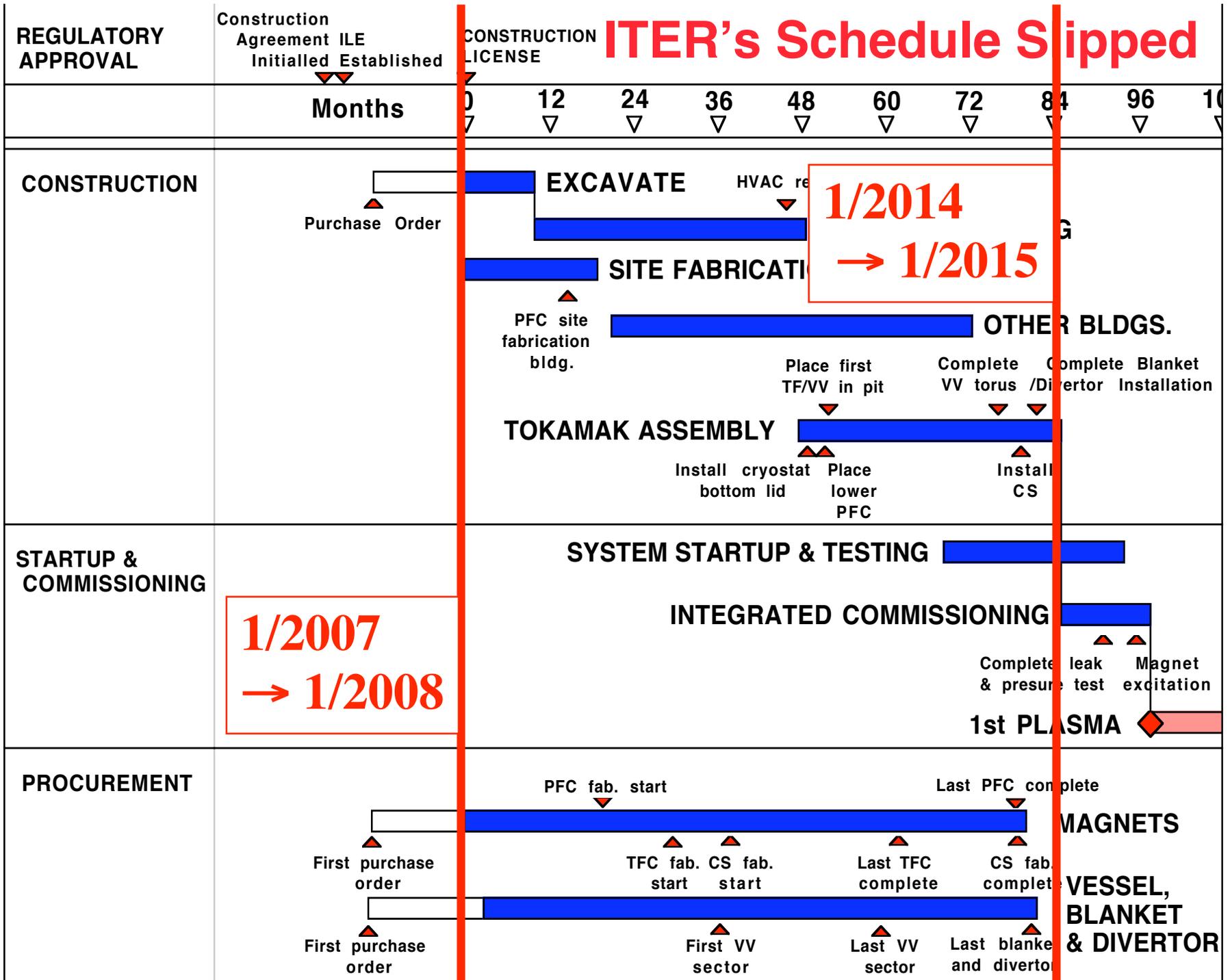
## Evolution of the US budget challenge/constraint

- In March 2005 in preparation for CD-1, consistent with DOE 413.3, we prepared a draft cost range

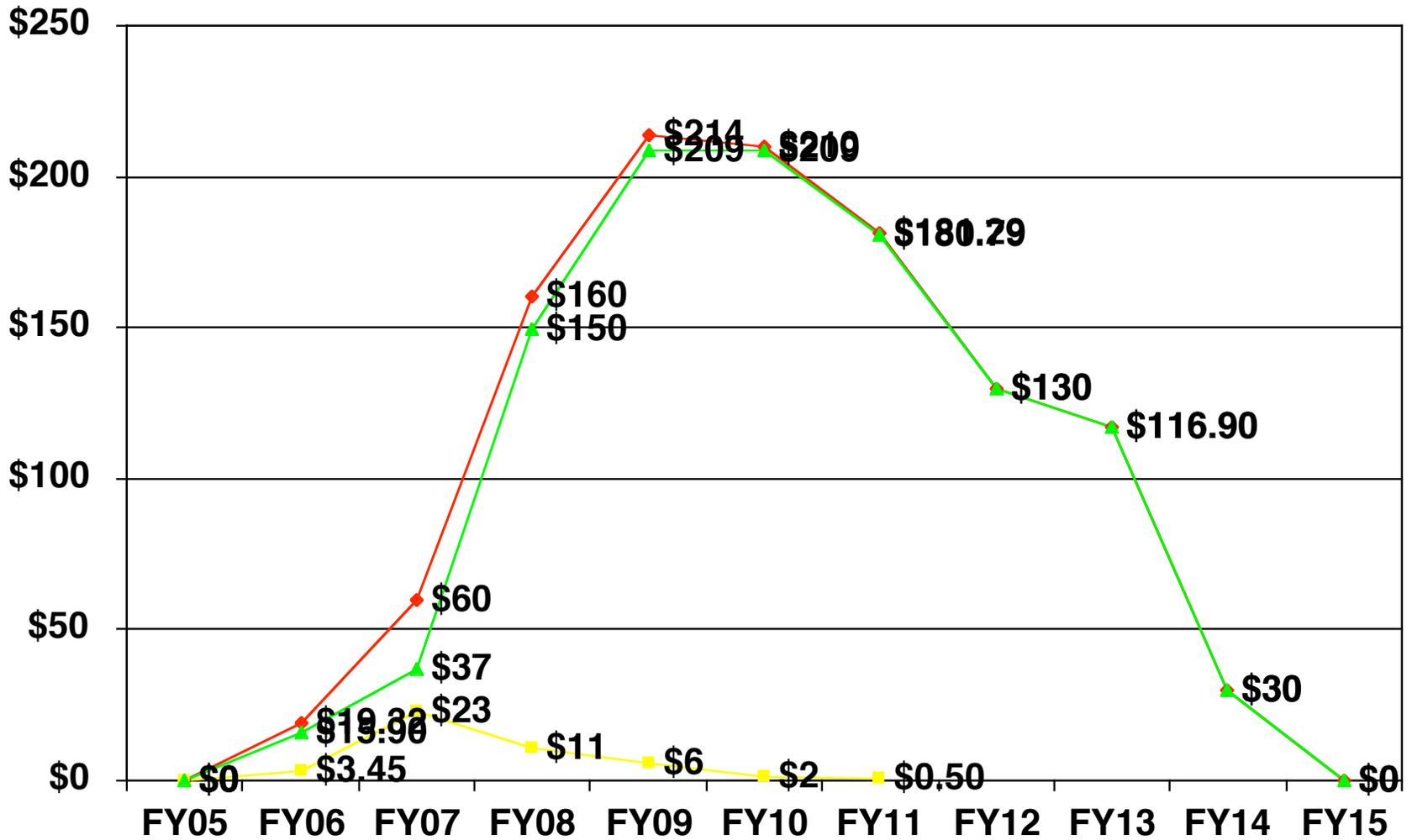
	March 2005 outcome	November 2005
In-kind hardware, ITER staff, and cash	\$1.115B - \$1.184B - \$1.4B	 < \$1.016B
Central reserve		 \$0.060B
One-year delay allowance		 \$0.046B
TOTAL	\$1.115B - \$1.4B	 \$1.122B

- In November 2005, the Director of the Office of Science gave direction on the cost of the US Contributions to ITER project
  - Fit within a budget cap of \$1.122B
  - Include \$60M for Central Reserve
  - Include allowance for 1-year delay
- Dr. Orbach requested that Dan Lehman review the cost estimates for the revised situation

# ITER's Schedule Slipped



# US ITER Budget Profile (\$M), summing to \$1.122B



# Outcomes of the Lehman mini-review focusing on cost estimate (2/1-3/2006) [1 of 3]

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## Cost estimate

- **Key project uncertainties that present cost and schedule risk include**
  - incompletely defined component and system interfaces,
  - potential new requirements or design changes by the ITER Organization,
  - commodity price fluctuations, and
  - potential delays in delivery of needed components by other ITER Parties.
- **Key Recommendations**
  - critically evaluate and reduce R&D costs where practicable and bring the R&D activities to a timely conclusion
  - identify and assess cost saving options in all areas of the project
  - ensure system estimates reflect the latest machine configuration
  - critically examine the application of overhead rates in the cost estimates

# Outcomes of the Lehman mini-review focusing on cost estimate (2/1-3/2006) [2 of 3]

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## Schedule

- **Key observations:**

- It is prudent to plan the completion of the U.S. contribution on a schedule within the control of the U.S. and as independently as possible of the overall ITER project schedule.
- If there could be any positive adjustment, it should be in the context of speeding up the design and engineering effort early in the project to assure schedule maintenance of hardware later on.

- **Key Recommendations**

- Reduce schedule risk by earlier start of U.S. design effort and early assignment of secondees for design support (while ensuring appropriate credit is received).
- When the ITER milestone schedule is developed, the U.S. team needs to re-evaluate its schedule to ensure that each U.S. deliverable has included appropriate schedule contingency

# Outcomes of the Lehman mini-review focusing on cost estimate (2/1-3/2006) [3 of 3]

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## Management

- The recent relocation of the Project Office to Oak Ridge brings ORNL infrastructure and SNS experience in project management to bear on U.S. ITER. The transition plan is in place and has been agreed to by DOE, PPPL, and ORNL....
- **Key Recommendations:**
  - Begin the transition from R&D to project execution.
  - Seek simplification of assigned scope by working with other Parties bilaterally to avoid unnecessary duplication in R&D, tooling, etc.
  - Appoint WBS managers expeditiously and create an environment to accelerate their ownership of their project scope, schedule and cost.
  - Bring U.S. issues promptly to the attention of the Council; U.S. participation in the ITER Council must be pro-active.
  - Advance the overall ITER schedule by front loading the central ITER engineering effort with U.S. personnel.
  - Seek efficiencies with the ITER Organization for design work that can be accomplished more effectively at the ITER site.
  - Using causal/beneficial analysis, examine the US ITER Project overhead rates with the goal of reducing the rates where possible.

## Some key dates for the U.S. ITER Project

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<b>Project Office Transition Plan approved</b>	<b>January, 2006</b>
<b>SC Lehman “cost only” review</b>	<b>February, 2006</b>
<b>SC Lehman Review</b>	<b>September, 2006</b>
<b>OECM Cost Review (per Dep Sec @CD0)</b>	<b>November, 2006</b>
<b>OECM endorsement</b>	<b>December, 2006</b>
<b>CD1 - Baseline Development</b>	<b>December, 2006</b>
<b>CD2 - Performance Baseline</b>	<b>December, 2007</b>

# Outline

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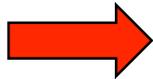
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- Near-term activities

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- Web site

- **Staffing**

- Deputy Directors General

- US ITER Project Office

- US ITER WBS managers / Team leaders

# Progress on R&D and design

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- **The Project is just this week completing its refinement of its distribution of the ~\$19M of FY06 funds (3.45M\$ of OPC and 15.87M\$)**
  - Emphasizing progress on in-kind hardware contributions through both domestic R&D and design work and through support of the International Team (US will be seeking credit in several areas)
  - Multi-party discussions will target effective arrangements for shared packages
  - Funds for infrastructure investments / test facilities are generally being held centrally, pending further discussions with ITER parties about effective joint arrangements
  - Funds for WBS-managers and close-support groups are phase-funded during the transition, pending selections of performers

# Preparation for the CD-1 reviews

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- **Per the Deputy Secretary's approval of CD-0, the CD-1 approval is contingent on a cost review by the Office of Engineering and Construction Management**
  - DOE/SC "Lehman" review: September 2006
  - OECM review: November 2006
- **The US Project will be addressing the issues of cost, schedule, and management in preparation for these reviews**
  - clarifying the roles of the ITER Organization and the Domestic Agencies
  - refining scope, with IT and ITER parties, including effective arrangements
  - acquiring appropriate documentary basis for the cost estimate
  - value engineering
  - project management plan and acquisition strategy
  - ...
- **The Project Team must be assembled and engaged throughout these activities**

# US ITER Web Site (www.usiter.org)

Address: <http://www.usiter.org/>



## U.S. Contributions to ITER

**About U.S. ITER**

- Contacts
- Jobs**
  - U.S. Positions
  - International Organization Positions
- News & Events
- Procurement
- Documentaton
- Visitor Information
- Project Info
- Email Us
- Other ITER Sites

### ITER

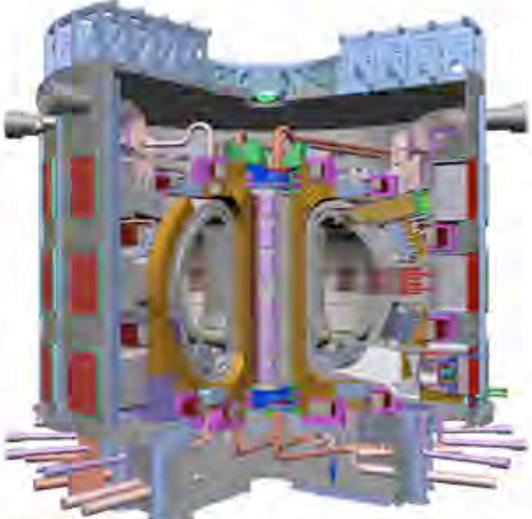
An unprecedented international collaboration of scientists and engineers has performed needed research and development and designed a burning plasma experiment called ITER. The fusion power produced by ITER will be 10 times greater than the external power delivered to heat the plasma.

The United States has joined the other ITER partners in negotiations for construction of this project, whose mission is to demonstrate the scientific and technological feasibility of fusion power. These deliberations could lead to the operation of ITER around the middle of the next decade.

ITER Partners are The People's Republic of China, the European Union (represented by Euratom), India, Japan, the Republic of Korea, the Russian Federation, and the United States of America, under the auspices of the International Atomic Energy Agency (IAEA). The device will be built at Cadarache located near Marseille in the Provence-Alpes\_Cote d'Azur region of southeastern France.

### U.S. Contributions to ITER

U.S. Contributions to ITER is a DOE Office of Science Major Item of Equipment (MIE) project consisting of procurement of hardware (including supporting R&D and design), assignment of personnel (U.S. engineers and scientists) to the ITER site in Cadarache, France, and in Field Teams in the ITER parties, and cash contributions to the ITER Organization for the U.S. share of common expenses such as personnel infrastructure, assembly and installation. All U.S. ITER project activities will be managed by the U.S. ITER Project Office The project will be accomplished through a collaboration of DOE laboratories, universities, and industry.



*ITER design*

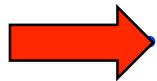
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[\[Contact Us\]](#) [\[Comments\]](#) [\[Disclaimer\]](#)

Website provided by the U. S. Department of Energy  
Oak Ridge Tennessee U.S. ITER Project Office.  
Revised: Friday, February 24, 2006 2:53 PM

# Outline

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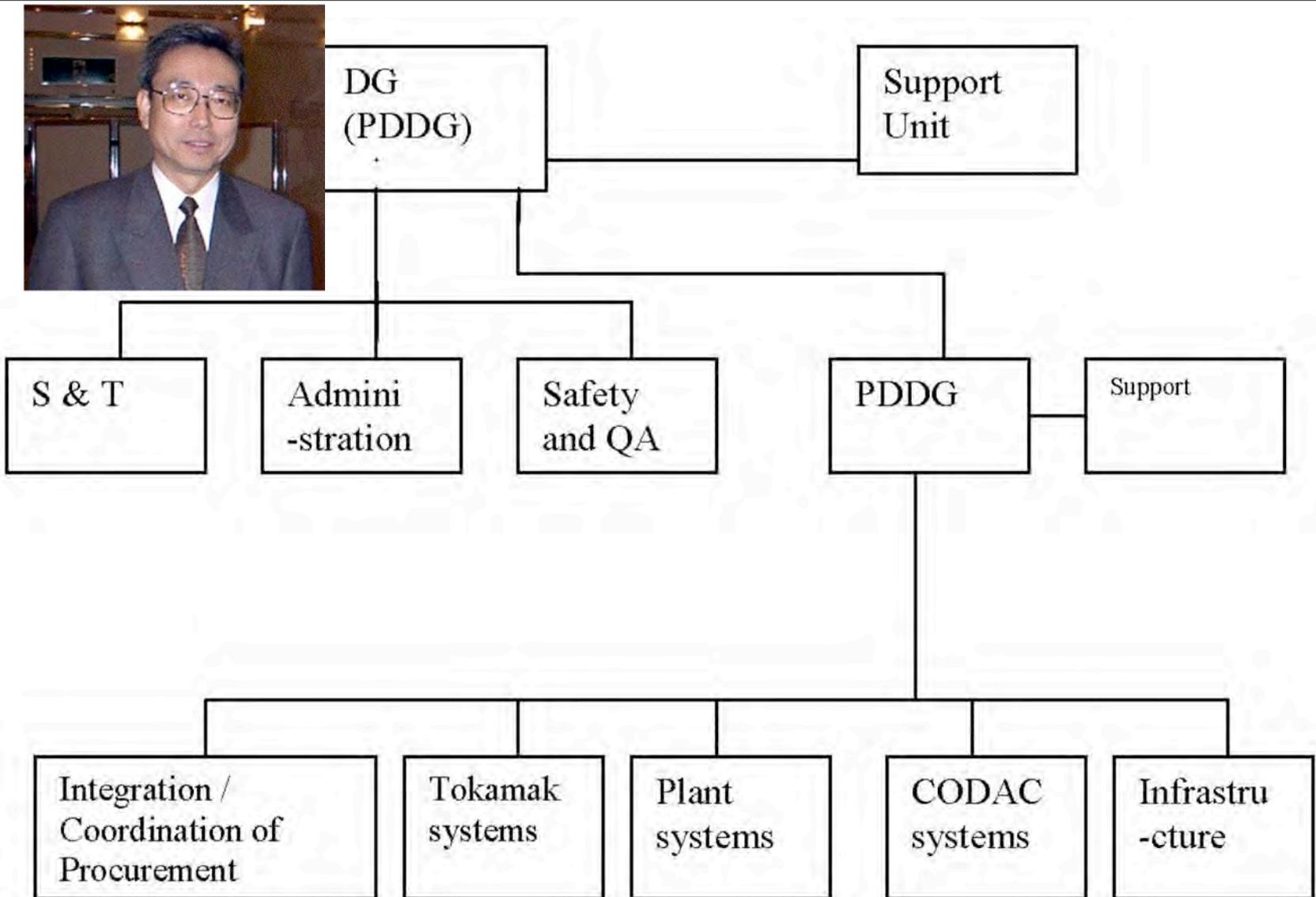
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## **Staffing**

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# Director General's ITER Organization Structure for purpose of soliciting candidates for DDG positions



## Draft ITER DDG positions (from DGN Ikeda)

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- **Integration/Coordination of Procurements:** integration of construction such as configuration control, planning, schedule control, risk management, coordination of procurements and document and drawing control
- **Science and Technology:** all S&T-related matters, ITER performance and ITER relevant R&D (except for construction of ITER) including coordination of ITER and international tokamak physics activities and test blanket development in all parties
- **CODAC Systems:** diagnostics and CODAC systems including development of information technology
- **Tokamak Systems:** development of technical specifications, procurements, installations and tests of all tokamak core systems
- **Plant Systems:** plant systems except for tokamak core, diagnostic, and CODAC systems
- **Safety and QA:** safety and quality assurance of ITER, licensing, and to provide internal audit to ITER Organization
- **Administration:** personnel, finance, accounting, contracts, media relations and to provide secretariat services to the Council
- **Infrastructure:** civil engineering work, building and site services

## **US Solicitation of US candidates for ITER DDG positions**

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- **The exact positions and their associated roles and responsibilities are not yet finalized.**
- **The US ITER Project Office invites individuals and institutions to nominate US candidates through a special web site dedicated to this solicitation, [www.usiter.org](http://www.usiter.org) and select Jobs and International Positions.**
- **The US intends to provide its list to DGN Ikeda during the second half of March. To allow for US consideration of the nominees and preparation of the US slate of US candidates, nominations will be accepted through March 17, 2006. The successful candidate would ideally report for work in the late Summer or early Fall.**
- **Share this information and encourage good candidates to express interest and to nominate candidates that we should consider.**

## **Senior Staff of the US ITER Project Office** **(ORNL lead responsibility)**

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<b>Project Manager:</b>	<b>Ned Sauthoff</b>
<b>Deputy Project Manager:</b>	<b>Carl Strawbridge</b>
<b>Project Controls:</b>	<b>Suzanne Herron</b>
<b>Project Engineering Manager:</b>	<b>Brad Nelson</b>
<b>Procurement Manager:</b>	<b>ORNL to appoint</b>
<b>Business Manager:</b>	<b>USIPO to hire</b>
<b>ES&amp;H Specialist/Manager:</b>	<b>USIPO to hire</b>
<b>QA Specialist/Manager:</b>	<b>M. Skonicki</b>
<b>Chief Scientist:</b>	<b>Director, US Burning Plasma Office (Ray Fonck)</b>
<b>Chief Technologist:</b>	<b>Director, VLT (Stan Milora)</b>

# Solicitation of candidates for WBS manager/Team Leader positions

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<b>Magnets:</b>	<b>USIPO to solicit</b>
<b>First Wall/Blanket Shield/Port Limiters</b>	<b>USIPO to solicit</b>
<b>Tritium Exhaust Plant:</b>	<b>USIPO to solicit</b>
<b>Cooling Water:</b>	<b>USIPO to solicit</b>
<b>Electrical Power:</b>	<b>USIPO to solicit</b>
<b>ICH/ECH and Vacuum/Pumping/Fueling:</b>	<b>David Rasmussen</b>
<b>Diagnostics (with extensive subcontractors):</b>	<b>David Johnson</b>

## Vendor database website

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- **To enable potential vendors to express their interests, the Project will maintain a vendor database.**
- **Potential vendors will be invited to register on the USITER.ORG website and submit information electronically**
- **Stay tuned....**

# Summary of Actions

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- **US ITER Project Office to structure the organization and to build its team**  
**to most effectively provide the US scopes**
  - N-12 revised US procurement allocations
  - Staff to the ITER Organization
  - Cash to the ITER Organization
- **Candidates and nominators are requested to use [WWW.USITER.ORG](http://WWW.USITER.ORG) to submit nominations for the following positions:**
  - ITER Deputy Directors General
  - US ITER Project Office positions
  - WBS-manager/Team-leader positions