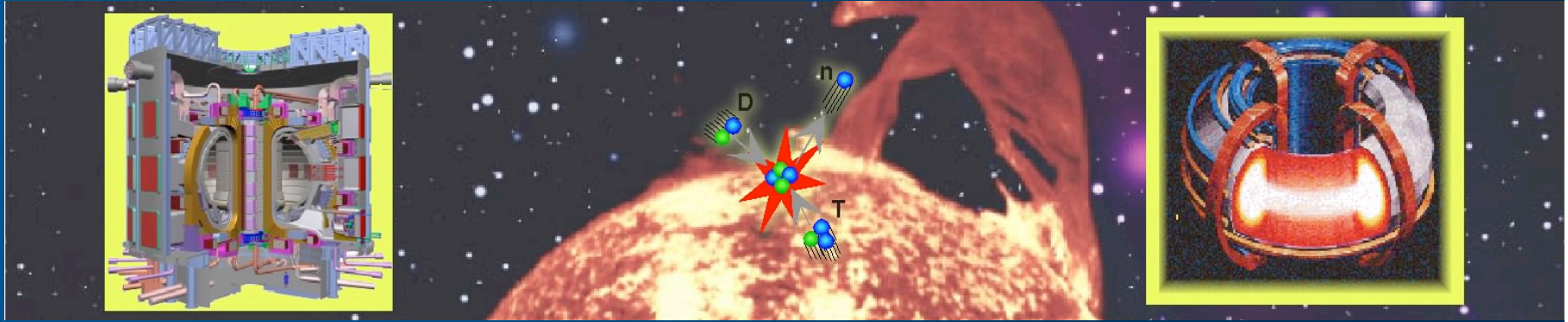


Working With ITER: Where do we go from here



Presented by
C.M. Greenfield

Deputy Director, US Burning Plasma Organization

21st US Transport Task Force Workshop
Boulder, Colorado

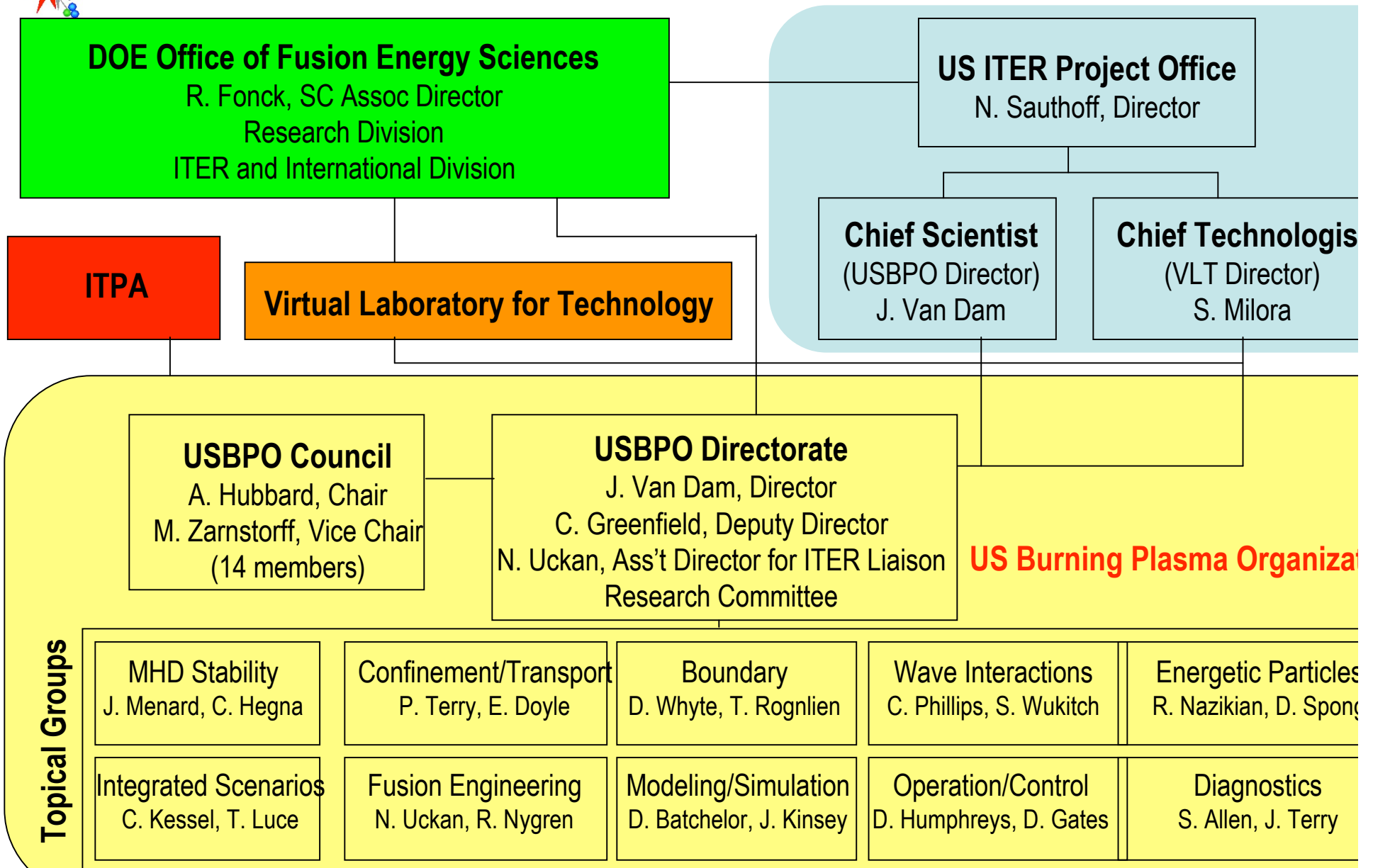
March 26, 2008



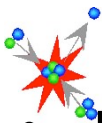
The US Fusion Energy Sciences program is organized to support Burning Plasma research



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The US FES community is actively engaged in preparations for a “burning plasma world”



- **USBPO Mission: Advance the scientific understanding of burning plasma and ensure the greatest benefit from a burning plasma experiment by coordinating relevant U.S. fusion research with broad community participation**
 - Broad participation: 289 registered members from 49 institutions represent a cross section of the community
- **Strategic planning**
 - USBPO response to Energy Policy Act of 2005
 - Follow-up (in progress) will need to take into account ITER research plan now being developed
 - Other recent planning exercises
 - Plasma 2010
 - Greenwald panel
 - ...
- **The US community has been a major participant in the ITER design review**
 - Provided 21% of the work during the review
 - A great deal of work is in progress now to address unresolved issues remaining from the review
- **Non-ITER-specific research continues to build the scientific basis needed**

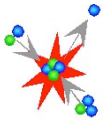
Brief history of the US Burning Plasma Organization



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- **December 2005: Burning Plasma Workshop at ORNL**
- **Early 2006: BPO organized by Ray Fonck with mission to “advance the scientific understanding of burning plasmas and ensure the greatest benefit from a burning plasma experiment by coordinating relevant U.S. fusion research with broad community participation”**
- **June 2006: Initial EPAct report completed by BPO**
- **June 2006: BPO Research Committee assembled list of 79 ITER research topics with community input**
 - **Original intention was that we would form BPO Task Groups to address some of these issues**
- **August 2006: From these 79, 14 topics were selected for submission of “issue cards” and submitted to ITER through the US ITER Project Office**
- ... **And then came the Design Review**
- **BPO also engaged in other activities... White papers on Diagnostics, V&V, FSP**

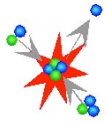
Design Review performed by eight working groups



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WG#	WG Name	Chair	IO Representative
WG 1	Design Requirements & Physics Objectives (DR&PO)	P. Thomas (US: R. Hawryluk, R. Stambaugh)	D. Campbell
WG 2	Safety & Licensing/Security	J.-P. Perves	J.-P. Girard
WG 3	Site & Buildings	C. Strawbridge	J. Sovka
WG 4	Magnets	M. Huguet	N. Mitchel
WG 5	Vacuum Vessel & Interfaces	Songtao Wu	K. Ioki
WG 6	Heating & Current Drive	J. Jacquinot	A. Tanga
WG 7	Tritium Plant	D. Murdoch	M. Glugla
WG 8	In-vessel components	I. Mazul	M. Pick/C. Lowry

- **WGs 1-8 include approximately 150 members**
- **Work packages, agreed with the Parties, added ~160 more persons**
- **Required extra PT resources of ~82.4 PPY from 7 Parties in 2007**



Additional work continues on urgent issues identified during the design review

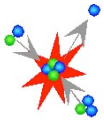
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STAC issues working groups:

1. a) **Vertical Stability**
- b) **Shape Control / Poloidal Field Coils**
- c) **Flux Swing in Ohmic Operation and CS**
4. **ELM Control**
5. **Remote Handling**
6. **Blanket Manifold Remote Handling**
7. **Divertor Armour Strategy**
8. **Capacity of 17 MA Discharge**
9. **Cold Coil Test**
10. **Vacuum Vessel / Blanket Loading Condition**
11. **Test Blanket Modules Strategy**
12. **Hot Cell Design**
13. **Heating Current Drive Strategy, Diagnostics And Research Plan**

Highlighted issues are being addressed by the US physics community

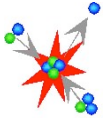
The Design Review was not a model for future cooperation on ITER



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- Need for rapid turnaround on design issues
- No clearly established channels for assignment of tasks
- Lots of confusion
- But... it worked!
 - BPO helping to organize the US community
 - Success would not have been possible without lots of enthusiasm from the community
- Lessons learned
 - Informal cooperation between interested scientists does work - this should not be discouraged
 - Clearly established channels of communication and authority are needed to address “official” ITER issues
- Design review process was a diversion from how we envisioned the BPO working

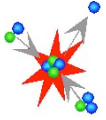
What will the BPO be in the future?



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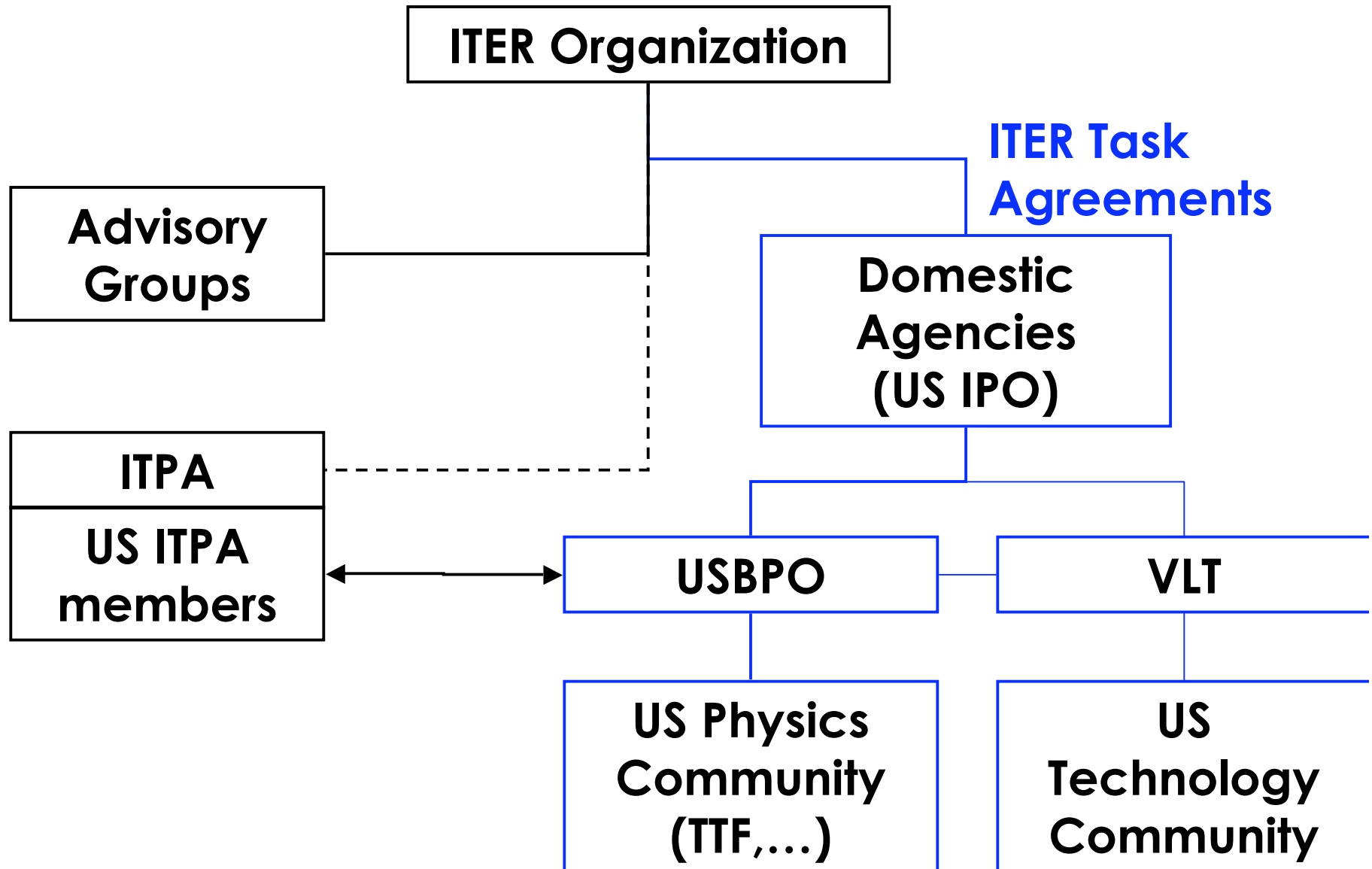
- In some sense, BPO is the “physics arm” of the US ITER Project Office
- Return to broader research scope
 - Further work on ITER issues of interest to US that arose from the Design Review
 - Re-assess other important burning plasma tasks identified prior to Design Review (Task Group model: e.g., PFCs/materials, pedestal dynamics, ...)
- Further enhance USBPO coordination with ITPA and VLT
 - Disseminate information via trip reports, meeting summaries, internet seminars, ...
- A second Burning Plasma Workshop?
 - Possible subject: development of ITER operating scenarios (Task Group)
 - Perhaps after the ITER integrated research plan is presented

ITPA developments

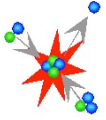


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- **Integration with USBPO**
 - ITPA (international) \iff USBPO (national)
 - **Structure**
 - 7 Topical Groups at present: Diagnostics, Pedestal/Edge, Divertor/SOL, MHD, Confinement Database & Modeling, Transport, Steady State
 - Coordinating Committee (chaired by R. Stambaugh)
 - **Activities:**
 - ITPA workshops: twice/year for each topical group
 - Published Progress in ITER Physics Basis (Nucl Fusion, June 2007)
 - Nov 2007: 6th IEA Large Tokamak Workshop on ITPA Coordinated Research Recommendations (~90 joint experiments)
 - Invited to operate under the auspices of ITER Org
 - Charter adapted (Feb 28)
 - Some changes in Topical Groups anticipated

How will the pieces fit together?



How you can get involved



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- **The USBPO represents the entire US Fusion Energy Science community**
 - You are already a member!
 - Sign up for monthly eNews and topical groups at <http://burningplasma.org>
- **Opportunities for participation**
 - BPO Task Groups will be forming
 - US ITPA participation will be coordinated by the BPO
 - Topical Group leadership drawn from the community
- **We will be trying to improve communication within the community**
 - Example: Disseminating information from ITPA meetings
 - Communications channels TBD... may try community wide video conferences