



Development of the U.S. Burning Plasma Organization

U.S. BURNING PLASMA ORGANIZATION

Fusion Power Associates Annual Meeting and Symposium
Fusion and Energy Policy
Washington, DC
Oct 11, 2005
by
Raymond Fonck, for the

US Burning Plasma Organization Steering Committee

S. Allen	R. Fonck
E. Marmor	D. Meade
S. Milora	G. Navratil
R. Nazikian	E. Oktay
S. Prager	N. Sauthoff
T. Taylor	N. Uckan
J. VanDam	



Reporting on a Work in Progress...

U.S. BURNING PLASMA ORGANIZATION

- Describes activities in forming a new community-based U.S. Burning Plasma Organization (USBPO)
- A new and evolving activity
- Need input and ideas from the U.S. fusion research community



What is the USBPO?

U.S. BURNING PLASMA ORGANIZATION

- A U.S. fusion research community-based organization with the mission:

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.



Why do We Need a USBPO?

U.S. BURNING PLASMA ORGANIZATION

- Continuing increase in Burning Plasma (BP) issues requiring programmatic activities
 - Community interaction with ITER team
 - U.S. ITER Project Office physics and technology R&D Tasks
 - ITPA priority research
 - BP-related Priorities for U.S. research activities
 - Inquiries on U.S. activities on BP Program and ITER support



Why do We Need a USBPO? (cont'd)

U.S. BURNING PLASMA ORGANIZATION

- Address need to organize and coordinate burning plasma R&D studies in the U.S. program
 - NRC BP report emphasized need to fully integrate BP research program into U.S. fusion community activities
 - UFA White Paper; Burning Plasma PAC recommendations; etc.
- Optimize our participation in BP experiments on ITER
 - Develop national task groups to address specific topics as needed
 - Start process now with domestic program activities
- Foster community ownership of BP research and ITER participation
 - Help find entry points to BP research activities for interested parties



OFES Looking to Community to Help Organize and Guide BP Program

U.S. BURNING PLASMA ORGANIZATION

- Community was effective in defining need for BP research and helping to establish US participation in ITER
 - UFA Workshops
 - Snowmass Meetings
 - FESAC and NAS reviews
- Responding to community recommendations
 - BP PAC “Guidelines for the US Burning Plasma Program”



U.S. MFE Program is Rich in Activities Related to BP and ITER

U.S. BURNING PLASMA ORGANIZATION

- Major facilities - DIII-D, C-Mod, NSTX
- ITPA activities
- Theory and Modeling
- Advanced Computing
- Diagnostics
- VLT support of ITER R&D
- TTF and basic confinement studies
- IEA international collaborations and bilateral agreements
- etc.



Expectations for USBPO: Bring a Coherence to BP Activities

U.S. BURNING PLASMA ORGANIZATION

- Enhance coordination/facilitation and guidance as needed
 - Major facility programs, international collaboration, ITPA and joint experiments
 - Theory and integrated modelling
 - VLT, TTF, SciDac, etc.
- Advocate for BP program activities
- Assist ITER Physics and technology tasks
- Plan for ITER research program
- Integrate ITER participation with the broader domestic program



Evolution of the US Burning Plasma Organization

U.S. BURNING PLASMA ORGANIZATION

- OFES engaged in discussion with ad-hoc ‘Stake Holders’ group for ~ 8 months
 - Outgrowth of BP PAC and earlier discussions
 - Individual and small group meetings: proposed mission, charter, goals, structure etc.
 - Full meeting at IAEA Villamoura in Nov 04
 - Group conference calls
 - Presentation & Discussion at 2005 Budget Planning Meeting
- May 05: OFES appoints BP Program Leader to get the process started
 - Summer-Fall 05: community discussions and organization development



Establishing a U.S. BP Organization will be an Evolutionary Community Activity

U.S. BURNING PLASMA ORGANIZATION

- USBPO will evolve as activities grow and we progress through a stream of ITER decisions in coming year
- Be flexible in adjusting to evolving program
 - Now: 'Burning Plasma' support R&D in experiments, modeling, and technology
 - Eventually: Plan for and pursue specific experiments in ITER, validate models of D-T plasma, test relevant technologies
 - USBPO will work with community and OFES to develop process/structure for this activity



Principles Guiding USBPO Development

U.S. BURNING PLASMA ORGANIZATION

- Add value to community activities; avoid new burdens
- Success of ITER; maximize benefits
- Facilitate broad community participation, ownership, engagement
- Responsive to community
- Responsibility for completing BP tasks
- Attract the best people
- Close working relationship with U.S. IPO
- Facilitate U.S. participation internationally
- Utilize existing structures and activities

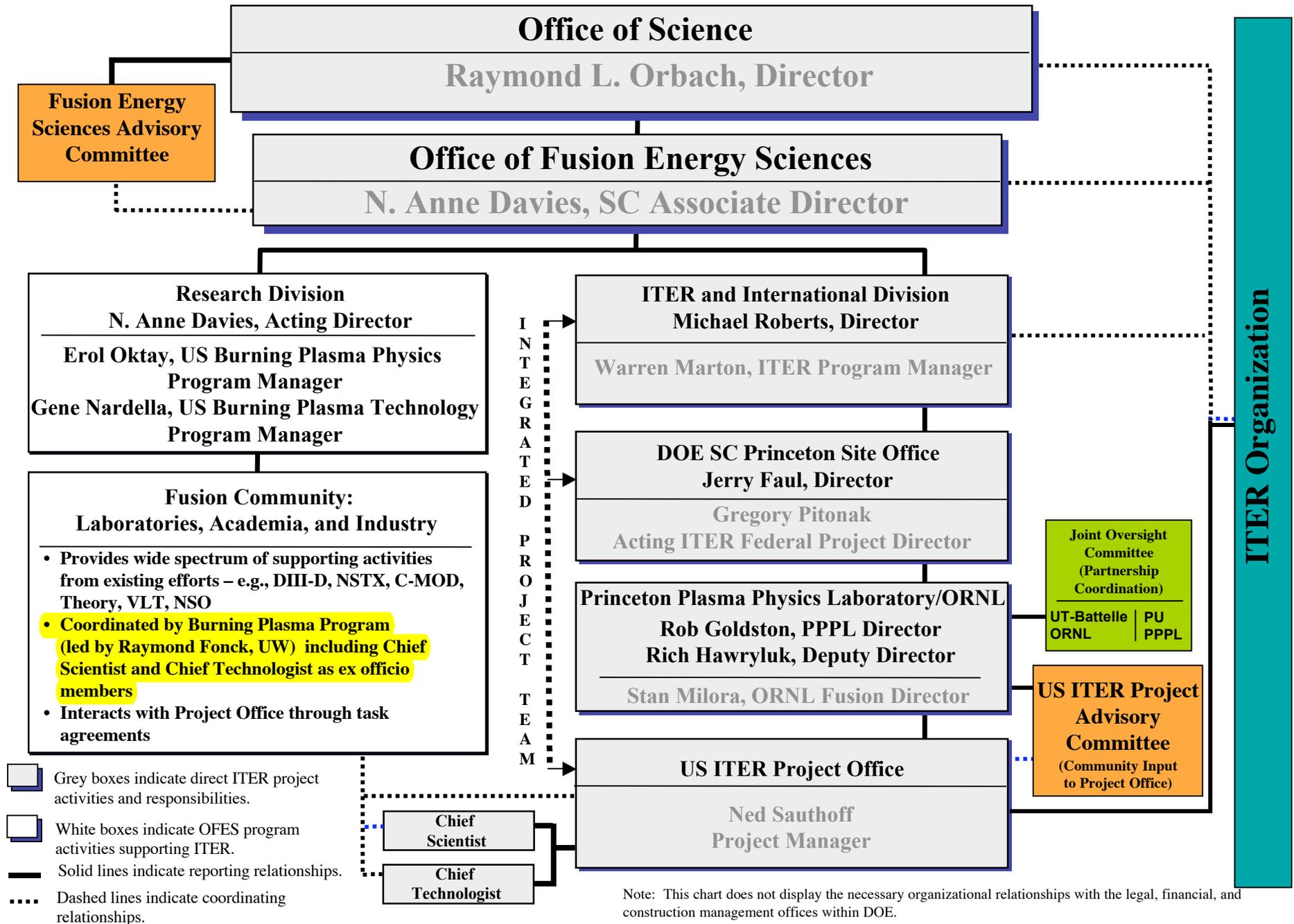


Goals of the USBPO

U.S. BURNING PLASMA ORGANIZATION

- Facilitate, coordinate and advocate U.S. Burning Plasma research
- Provide a U.S. organizational structure for participation in BP program
 - Individual investigator and larger groups
- Optimize U.S. ITER participation and address issues beyond ITER
 - Promote and coordinate activities on existing experiments, theory, simulation, diagnostics, etc.
 - Identify and develop US areas of excellence and interest in BP program
- Educate and advocate BP science to the wider scientific community
- Closely coordinate U.S. activities with US ITER Project Office
 - ITER Physics R&D
 - Maximize US exploitation of ITER
- Facilitate interactions with international partners
 - e.g., ITPA, IEA collaborations, etc.

Management Structure for the US ITER Project and Program

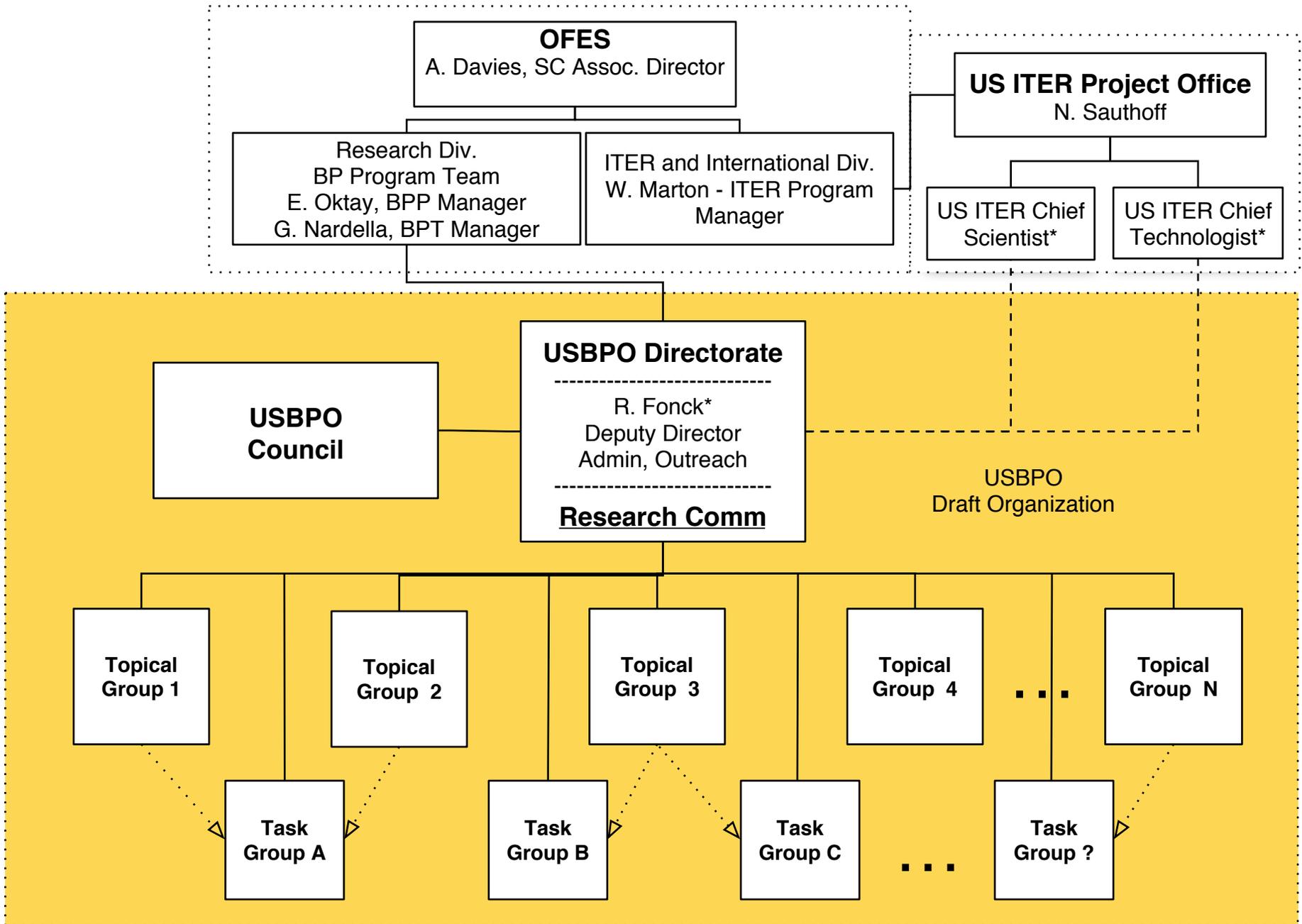




USBPO Structure Has 3 Elements

U.S. BURNING PLASMA ORGANIZATION

- Council: Community governance of activity
 - Set Policy; oversight and guidance of activities; community input
- Directorate: Implement and Manage activities
 - Facilitate discussion, participation, and execution of BP research activities
 - Report progress and advocate BP research activities
- Topical and/or Task Groups: Expert Working Groups
 - Topical Group = expertise resources; charter Task Groups
 - Task Group = answer specific charge; deliverable
 - Research Committee: Group leaders comprise Directorate managing group



— Reporting Relationship
 - - - Coordinating Relationship



U.S. BURNING PLASMA ORGANIZATION

* ex-officio Council members



USBPO Immediate Activities: Contribute while Forming Organization

U.S. BURNING PLASMA ORGANIZATION

- Heating and CD tools evaluation for ITER baseline and advanced operation scenarios
- Diagnostics evaluation for ITER control and advanced scenarios
- Aid ITER Project Office as requested
 - 2005 ITER Physics Tasks
- Community BP Workshop planning
 - Post-APS, pre-2006 ITER activities
- Organization development
 - Mission, Goals, Charter ...
 - Community outreach to solicit directions; discussion at most U.S. fusion research labs
 - Strive for initial Topical/Task Groups to be formed in Fall 05



Some Suggested First Topical Groups

U.S. BURNING PLASMA ORGANIZATION

- Standing expertise/resource groups
 - Diagnostics (ITPA, HTPD)
 - Plasma-Boundary-Wall / Edge Plasma (ITPA, DCC)
 - Energetic, Supra-thermal Particles (ITPA)
 - Confinement / Transport (ITPA, TTF)
 - MHD, Macroscopic Stability (ITPA)
 - Heating and CD
 - BP Technology (VLT)
 - Operational Scenarios and Control (ITPA)
 - Integrated Modeling and Simulation (FSP, TCC, etc.)
- Entry point for interested researchers



Some Example First Task Groups

U.S. BURNING PLASMA ORGANIZATION

- Finite-term, discrete task, defined deliverables; cross-cutting
- Workshop breakout groups: Summarize progress; ID issues; Develop plan
 - Integrated scenarios
 - Energetic Particles
 - Macroscopic Stability
 - Boundary
 - Transport & Confinement
 - Diagnostics and Control
- IPO Physics Tasks (e.g., 2005)
 - RWM Control
 - Fast particle Confinement
 - Effects of radiation transfer on divertor plasma
 - VDEs, Disruptions & their Mitigation
 - ICRF heating and current drive
- Possible long-term?
 - Pedestal
 - Integrated Scenarios

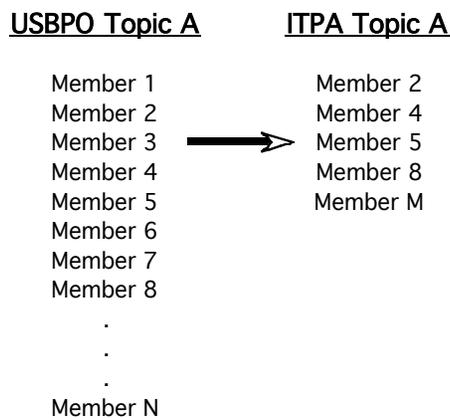


Must Interface w/Existing Activities e.g., ITPA & USBPO Interaction

U.S. BURNING PLASMA ORGANIZATION

- USBPO could act as US arm of ITPA
 - Large national membership maps to limited international participation
 - Can help transfer knowledge of international activity to larger community

Direct Topic Mapping



USBPO Topic M(B)

Member 1
Member 2
Member 3
Member 4
.
.
Member N

ITPA Topic B

Member M2
Member N4
Member N5
Member M8
Member M12

USBPO Topic N(B)

Member 1
Member 2
Member 3
Member 4
.
.
Member N



BP Workshop Planned for Dec '05

U.S. BURNING PLASMA ORGANIZATION

- Dec 7-9 at ORNL
- Driven by ITER decision and need to start contributing as negotiations move forward
- Topics:
 - Engaging the US fusion research community in development of USBPO
 - Advances in BP issues since Snowmass 2002
 - Status and plans for ITER (domestic and international)
 - Planning US Burning Plasma research activities in general, and for ITER specifically
- More info at http://www.burningplasma.org/WVS_05.html

U.S. Burning Plasma Workshop

Oak Ridge National Laboratory
Oak Ridge, Tennessee
December 7-9, 2005

Purpose of the workshop:

Begin discussions of research plans, priorities, and community coordination for burning plasma science and technology activities in the U.S.

Address specific activities for support of ITER participation during construction and eventually for the operational phase.

Topics:

- Engaging the US fusion research community in development of the U.S. Burning Plasma Organization (www.burningplasma.org)
- Burning Plasma activities since Snowmass 2002
- Status and plans for ITER (domestic and international)
- Planning U.S. Burning Plasma research activities in general, and for ITER specifically

Program Committee:

E. Marmor (MIT), Chair
M. Bell (PPPL)
R. Fonck (U. Wisconsin)
D. Meade (PPPL)
E. Oktay (USDoE)
N. Sauthoff (PPPL)
T. Taylor (General Atomics)
N. Uckan (ORNL)
M. Ulrickson (SNLA)
J. Van Dam (U. Texas)

Local Arrangements:

N. Uckan (ORNL)

Further information on the Agenda, meeting format, abstract submission, travel information, registration, and local arrangements will be posted at the Workshop web site: www.burningplasma.org/WS_05

Held under the auspices of the U.S. Burning Plasma Organization



Exploit Communications Tools to Support Broad Participation

U.S. BURNING PLASMA ORGANIZATION

- Extensively use video and tele-conferencing: existing but generalize
- Sponsor national BPS seminar (bimonthly)
- Web site; e-mail list servers - www.burningplasma.org
- e-News
- Sponsored workshops
- Research Committee
 - biweekly management meeting
 - On-site meeting 1 or 2/yr
- Council meetings
 - 1-2/yr; more at beginning...
- Other ideas?



Summary

U.S. BURNING PLASMA ORGANIZATION

- A U.S. Burning Plasma Organization is being formed
- Fusion research community-based effort to advance Burning Plasma Science and optimize benefits from participation in ITER
- Facilitate fusion community coordination of, participation in, and ownership of BP program activities
- Develop areas of focus and excellence to prepare us to participate and compete in the ITER era, and look beyond...
- Need active participation from community to succeed
- Planning a community BP Workshop in near-future



We Need Your Input and Help!

U.S. BURNING PLASMA ORGANIZATION

- How to evolve USBPO?
- What is an effective structure?
 - Management of USBPO
 - Topical Groups / Task Groups?
- How to add value to program activities, and not increase demands on programs?
 - How to interact with existing structures?
- What should scope of USBPO activities be?
- (Add your questions here ...)



USBPO Council: Community Governance of BP Program

U.S. BURNING PLASMA ORGANIZATION

- Sets Policy Direction
- Overall coordination, oversight, and guidance to USBPO activities
- Advises BPO leader (director)
- Insure fair and open process for all U.S. BP activities
- Provide fusion community input on resource needs and priorities w.r.t. BPS
- 12 members + 3 ex officio (Director, 2 IPO reps)
 - Chosen with community input



USBPO Directorate: Implement & Manage BPO Activities

U.S. BURNING PLASMA ORGANIZATION

- Use advice and guidance from Council
- Lead U.S. fusion community in discussion and execution of BP research activities
- Represent BP program in U.S. fusion community affairs
- Establish and manage structure for implementing BP research in U.S.
- Provide points of contact for information on BP research activities
- Develop communication and outreach activities to community members and outside science communities
- Report to OFES and community on progress and resources needed in BP research activities
- Develop Interface with IPO, ITPA, TTF, SciDac, etc.



Topical Groups and Task Groups: Working Research Activities

U.S. BURNING PLASMA ORGANIZATION

- **Topical Groups**
 - Standing experts groups; provides resource pool
 - Generates ideas and charters for Task Groups
 - Communication and discussion forum for relevant BP issues
 - Provides connections to existing structures (Projects, orgs, etc.)
 - Entry point for community members
- **Task Groups**
 - Temporary; execute discrete tasks
 - Integrate across Topical areas; includes expt., theory, technology, modeling
 - Produces technical report/conclusion to appropriate forum



USBPO Research Committee: Lead Tasks Execution

U.S. BURNING PLASMA ORGANIZATION

- Topical and Task areas leaders
- Working management group for BP research activities
- Identify resources needed to execute BP research tasks
- Lead task groups in executing specific BP research tasks
- Regular meetings to coordinate and monitor research activities
- Identify and recruit participants from community