

Status of the U.S. Burning Plasma Physics Program

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US Burning Plasma Organization
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Caution: This is Work in Progress!

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

What is the USBPO?

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

Advance the scientific understanding of burning plasmas and ensure the greatest benefit from burning plasma experiments by coordinating relevant U.S. fusion research with broad community participation.

Why do We Need a USBPO?

- **Increase in BP issues requiring programmatic activities**
 - Community interaction with ITER physics 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)

- Recognized need to organize and coordinate burning plasma science studies in the U.S. program
 - NRC BP report emphasized need to fully integrate BP research program into U.S. fusion community activities
 - Burning Plasma PAC recommendations
- Optimize our participation in BP experiments on ITER
 - Develop national task groups to address specific topics
 - 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

- 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”

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

- 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
- Generally analogous to VLT

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

- Major facilities - DIII-D, C-Mod, NSTX (e.g., earlier Facilities discussion)
- 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

- Enhance coordination 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

- OFES engaged in discussion with ad-hoc 'Stake Holders' group for ~ past 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
 - Allen, Fonck, Marmar, Meade, Milora, Navratil, Prager, Sauthoff, Taylor, VanDam, Willis, Oktay.
- May 05: OFES appoints BPP Leader to get the process started

Principles Guiding USBPO Development

- 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

- 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 and simulation, diagnostics, etc.
 - Identify and develop US areas of excellence and interest in BP program (including staff)
- 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 strong interactions with international partners
 - e.g., ITPA, IEA collaborations, etc.

USBPO Council: Community Governance of BP Program

- 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

- 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.

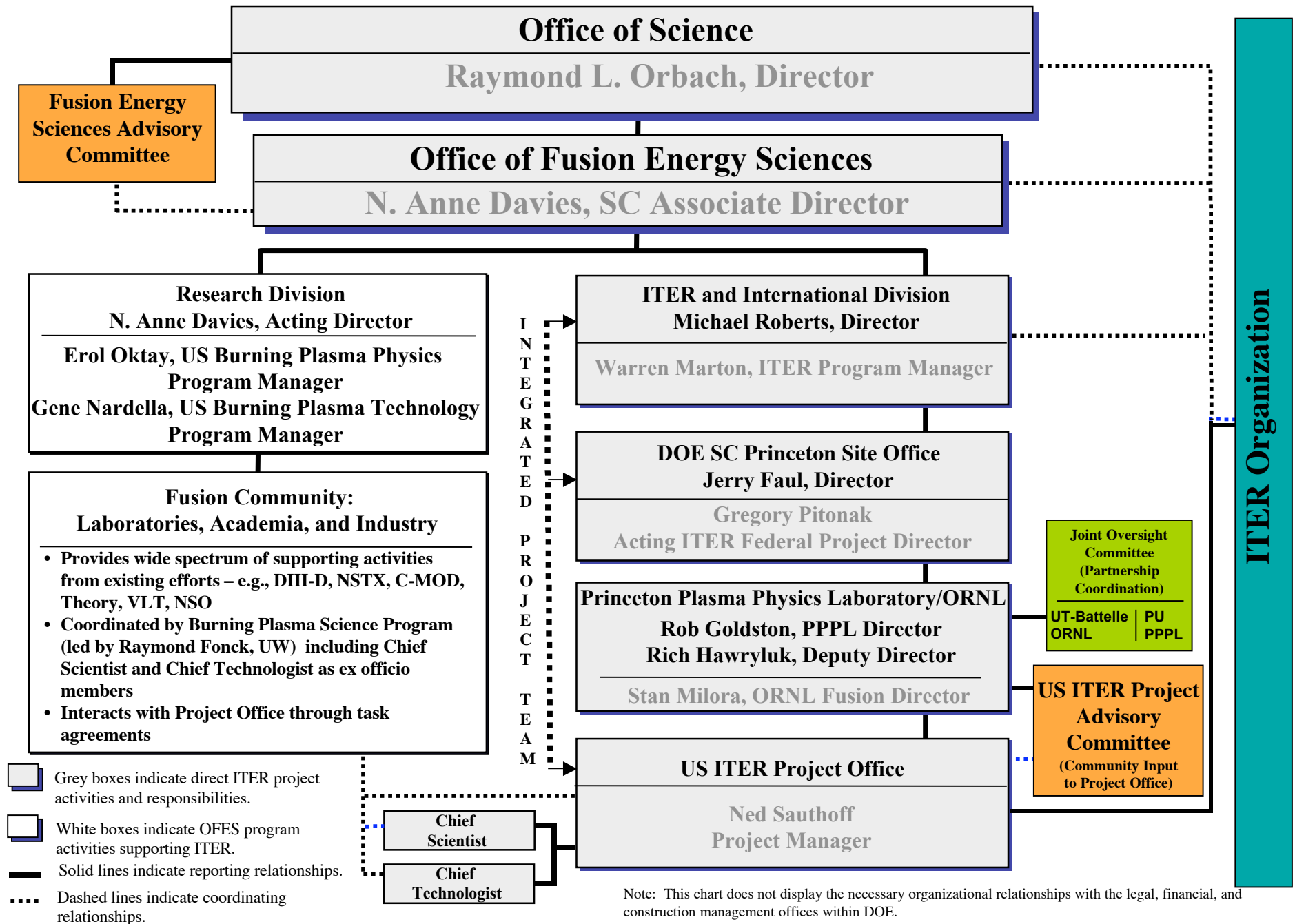
USBPO Research Committee: Lead Tasks Execution

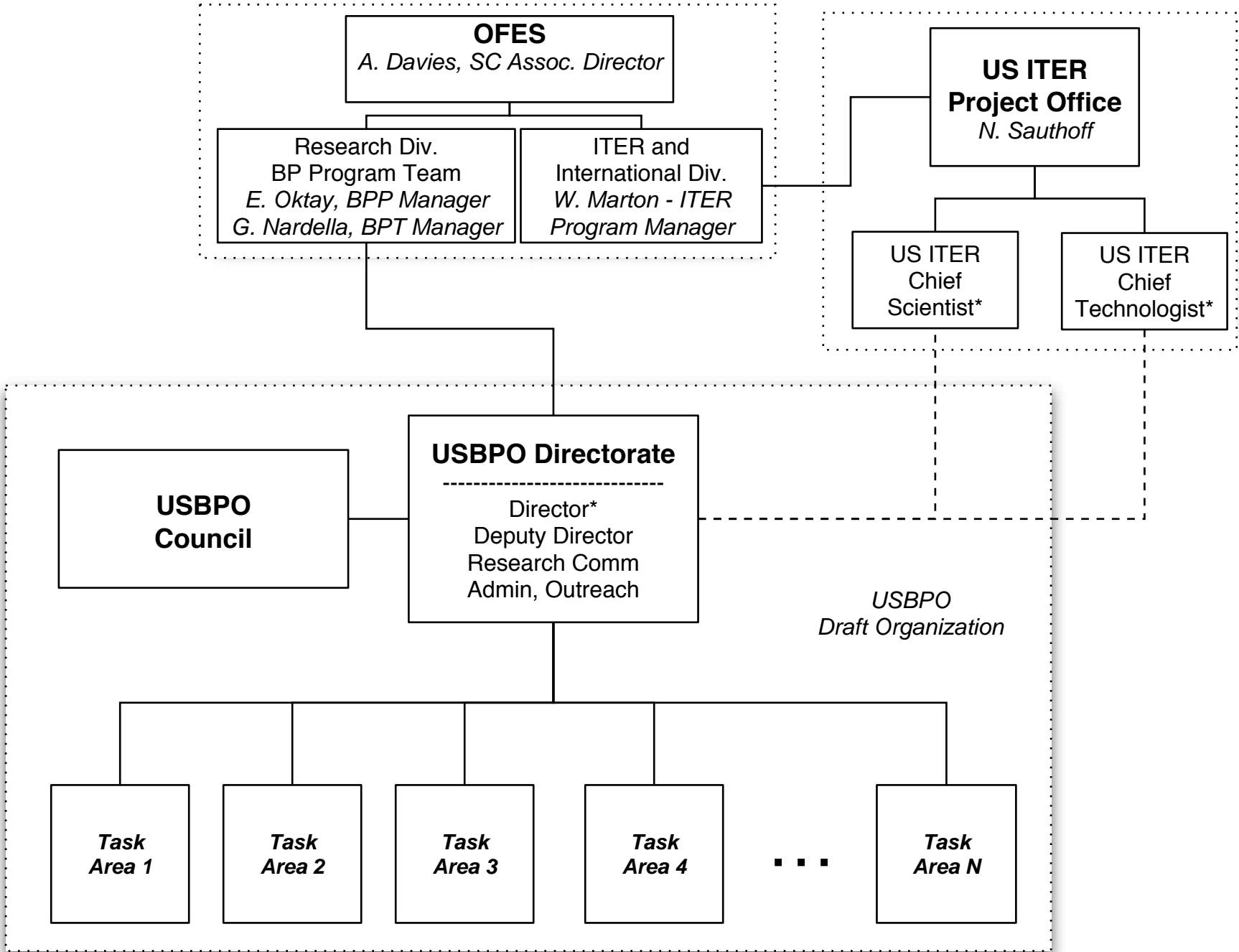
- Task areas leaders
- Working management group for BP research activities
- Identify resources needed to execute BP research tasks
- Lead task groups in executing specific BP research tasks
- Regular meetings to coordinate and monitor research activities
- Identify and recruit participants from community

Exploit Communications Tools to Support Broad Participation

- Extensively use video and tele-conferencing
- 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?

Management Structure for the US ITER Project and Program





— Reporting Relationship
 - - - Coordinating Relationship

* ex-officio Council members

Task Groups will Evolve Dynamically

- Examples of possible Task Groups
 - Boundary Physics and Surface Science (ITPA,VLT)
 - Scenarios & Steady State (ITPA)
 - Energetic Particles (ITPA)
 - Plasma Control (ITPA)
 - MHD Equilibrium and Stability (ITPA)
 - Integrated Modeling & Confine Database (ITPA)
 - Diagnostics (ITPA)
 - Transport (ITPA,TTF)
 - Pedestal (ITPA)
 - Heating & Current Drive (VLT)
 - Materials Science (VLT)
 - BP Technology (VLT)
 - BP Issues in Alternate & Future Concepts
 - Nuclear Science / Neutronics (VLT)
- Consider groups that cut across established areas

USBPO Immediate Activities: Contribute while Forming Organization

- Heating and CD tools evaluation for ITER baseline and advanced operation scenarios
 - Meade, Navratil, Murakami, Kessel, Greenfield, Hubbard, Batchelor, Bonoli, Wade, +
- Diagnostics evaluation for ITER control and advanced scenarios
 - Allen, Wade, +
- Aid ITER Project Office as requested
 - 2005 ITER Physics Tasks - Uckan, Fonck
 - Address high priority tasks such as RWM analysis (Navratil, Bialek)
- Community BPS Workshop planning
 - Marmar, VanDam, Meade
 - Post-APS, pre-ITER Design Review
- Organization development
 - Fonck, Navratil, Prager, Taylor
 - Mission, Goals, Charter ...

Summary

- 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
- Foster fusion community coordination of, participation in, and ownership of BP program activities
- Develop areas of focus and excellence to prepare us to compete in the ITER era, and look beyond...
- Need active participation from community to succeed
- Planning a community BP Workshop for near-future