U.S. DEPARTMENT OF ENERGY | Office of Science

NSTX-U

NSTX-U Roles and Responsibilities

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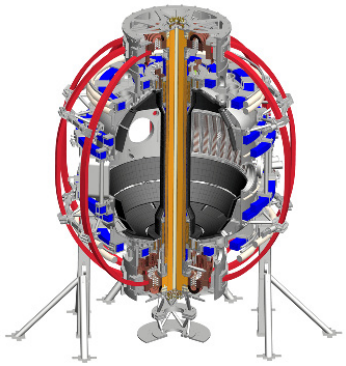
PPPL

December 4, 2015

PPPL



Roles / Responsibilities for Program Director

- Develop and implement NSTX-U scientific goals and strategy
  - Lead definition of research priorities, milestones for experimental campaigns
  - Develop 5 year plans and field work proposals submitted to DOE
  - Coordinate NSTX-U Program Advisory Committee (PAC)
  - Represent NSTX-U program at PPPL Advisory Board
- Organize scientific team: Science Groups, Working Groups, etc.
- Organize annual research forum to plan experimental campaigns
- Coordinate NSTX-U collaboration program
  - Define and document research goals and priorities for incoming collaborations
  - Work with FES to formulate collaboration solicitation and Program Letter
- Identify facility and diagnostic tools needed to achieve goals
  - Partner with NSTX-U Project Director to coordinate budget and implementation
- Work closely with FES and DOE Program Manager for NSTX-U
  - Report on NSTX-U results and highlights - quarterly and annually
  - Present research plans and goals at annual Budget Planning Meeting
  - Represent NSTX-U in Fusion Facility Coordinating Committee (FFCC)

Roles / Responsibilities for Science Groups

- Work with Program/TSGs to set run-time allocation guidance
- Coordinate research of TSGs within the SG – promote experiments / plans that achieve multiple scientific goals
  - Critical to maximizing scientific output per shot
  - "Coordinated" XPs will receive higher priority / more run time
- Inform Run Coordinator when XP is ready for final/team review
- Provide summaries and highlights of scientific progress at/for NSTX-U team meetings, FES/quarterly reviews, other venues
- Aid dissemination of results with Physics Analysis Division
  - Journal pubs, invited talks, seminars, colloquia, conferences, ITPA, BPO
- Coordinate / down-select milestone ideas from TSGs in SG
- Provide feedback / comment on annual Field Work Proposal
- Assist / report to the NSTX-U Program and Project directors

Roles / Responsibilities for Topical Science Groups

- Lead brainstorming, organization, writing of 5 year plan topics
- Determine and address highest priority scientific issues through discussion and consensus at open meetings
- Organize the NSTX-U Research Forum sessions for the TSG
- Draft scientific milestone ideas utilizing expertise of the TSG
- Propose and execute experiments to achieve milestones and address priorities
- With SG leaders, define facility and theory resources to achieve research goals
- Present TSG / SG results and plans at NSTX-U PAC meetings
- Assist / report to the NSTX-U Science Group leaders
- Note: TSG meetings should be advertised team-wide
  - Can use TSG Google Groups / e-mail lists to find best time for meetings

Roles / Responsibilities for TSG University Representatives

- Contribute to prioritization within TSGs
  - Help decide/draft milestones, XMP/XP prioritization
  - Help identify how your tools/codes/diagnostics/personnel can contribute to the group and the larger NSTX-U program
  - Advocate for university research within your TSG and for the needs of the larger NSTX-U research program
- Advocate for your TSG research *outside* of NSTX-U
  - Seek input/interest from those not funded by NSTX-U
    - Particularly from your own University and other universities
    - Includes giving seminars at other Universities / institutions describing NSTX-U and/or your research
  - Note: this kind of outreach is encouraged for all NSTX-U team-members
- Help identify best tools for remote participation, and remote experimentation

Roles / Responsibilities for Task Forces

- Address specific operational and/or scientific goal that cuts across or impacts multiple SGs / TSGs
- Goal must be very high priority within research program
- Receives dedicated run-time, and has dedicated session at Research Forum
  - Similar to a TSG, but may not necessarily have theory/modelling or university representatives – depends on duration or scope
- Organizes experimental proposals to achieve goal
- Finite duration - nominally 1-2 years, renewable if necessary
- TF leadership should nominally have a leader and a deputy, and should include at least 1 collaborator if possible
- Reports directly to Program / Project

Roles / Responsibilities for Working Groups

- Respond to specific programmatic or technical charge from NSTX-U Program or Project
- Addresses issues that cross-cut more than one SG or TSG
- Nominal lifetime = 1-2 years, can be extended/renewed
- Provides points of contact between NSTX-U and other groups as necessary (e.g. PPPL theory, FESAC, ITPA, ITER)
- Does not have dedicated NSTX-U run time, but provides recommendations on XP prioritization, other resource needs
- WG leadership should nominally have a leader and a deputy, and should include at least 1 collaborator if possible

Example task forces and working groups follow

Particle Control Task Force (PC-TF)

- Leader/Deputy: Rajesh Maingi, John Canik
- Task force goal:
  - "Develop pumping and fueling tools, operating scenarios, and control systems to achieve main-ion and impurity density control for long-pulse"
- Scope includes XPs related to:
  - Main-ion fueling optimization via PCS and/or real-time control
  - Wall coating and preparation optimization for increased particle pumping
  - Reduction / control of impurity ion source rates
  - Natural and paced ELMs for impurity and main ion flushing
  - Real-time density measurements for density feed-back control
  - Physics design and performance characterization of divertor cryo-pump (if/as resources permit implementation of cryo-pump)
- Due date: ASAP, end of FY17 run for non-cryo elements

Disruption Prediction/Avoidance/Mitigation Working Group (DPAM-WG)

- Leader/Deputy: Steve Sabbagh, Roger Raman
- Charges:
  1. How will NSTX-U interface to the upcoming FES workshops, and longer-term, address the FESAC/FES Tier 1 issue of “Transients" generally?
     a. In which disruption research areas can NSTX-U make leading contributions?
     b. What are the associated long-term resource needs from NSTX-U?
  2. What are the leading/highest priority NSTX-U contributions to JRT-16?
     a. What are the required resources during FY15-16 to support JRT-16?
  3. How can NSTX-U minimize disruptivity rates?
     a. What are leading causes of disruptions in NSTX & during initial NSTX-U ops?
     b. What prerequisites / tools are needed to prepare NSTX-U to operate a large # of sequential shot-seconds (say 1-5 shot minutes) without a disruption?
- Tasks: Organize meetings/reports to address above charges
- Due dates:
  - 1a – March/April 2015, 1b May/June 2015
  - 2a – April 2015, 3a – end of FY 2016, 3b – TBD/long-term

Non-axisymmetric Control Coil Specification Working Group (NCC-WG)

- Leader/Deputy: Jong-Kyu Park, John Canik
- Charges:
  - Specify required coil current, frequency, and location for NCC
    - Consider full set (24 coils) and partial set (12 coils)
    - Consider range of applications: NTV, EFC, RWM, RMP, ELM pacing, etc...
  - Specify required number of independent SPA channels vs. applications and requested capabilities
- Deliverables:
  - Organize summary presentation(s) on IPECOPT analysis results
  - Give presentation(s) making recommendations on NCC and SPA performance requirements, gather and incorporate team input
  - Generate written report (5-20pp Word file) documenting NCC and SPA requirements for use in developing engineering requirements document (GRD) to drive engineering design
- Due dates:
  - Initial written report April 2015 if possible (no later than May)
  - Consult with Project/engineers/designers as needed until implementation