

2009 US-KSTAR Workshop, GA, San Diego, CA, April 15-16, 2009



Preparation and Participation Plan for 2009 Operation

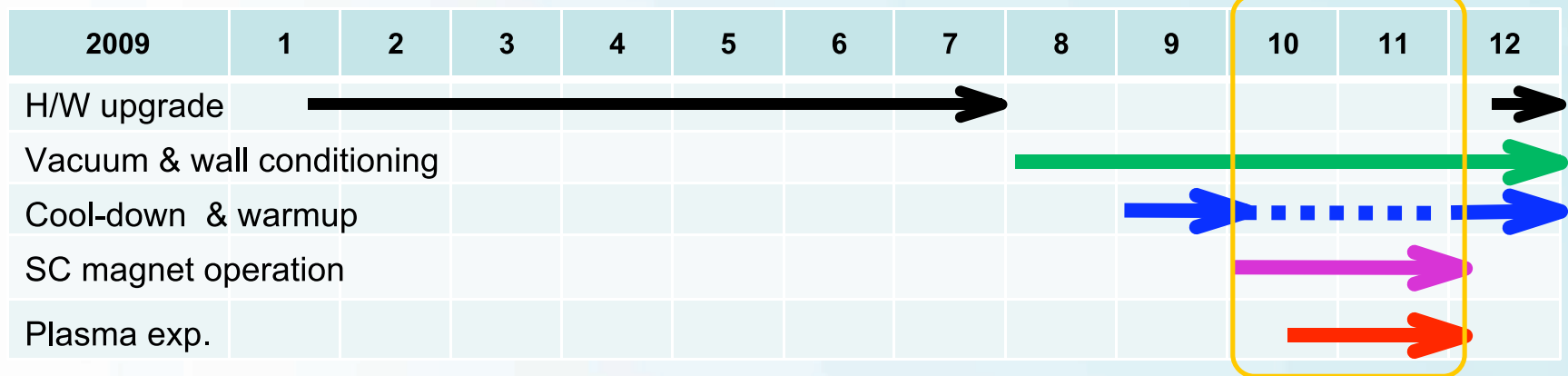
April 2009

Y. K. Oh, M.L. Walker

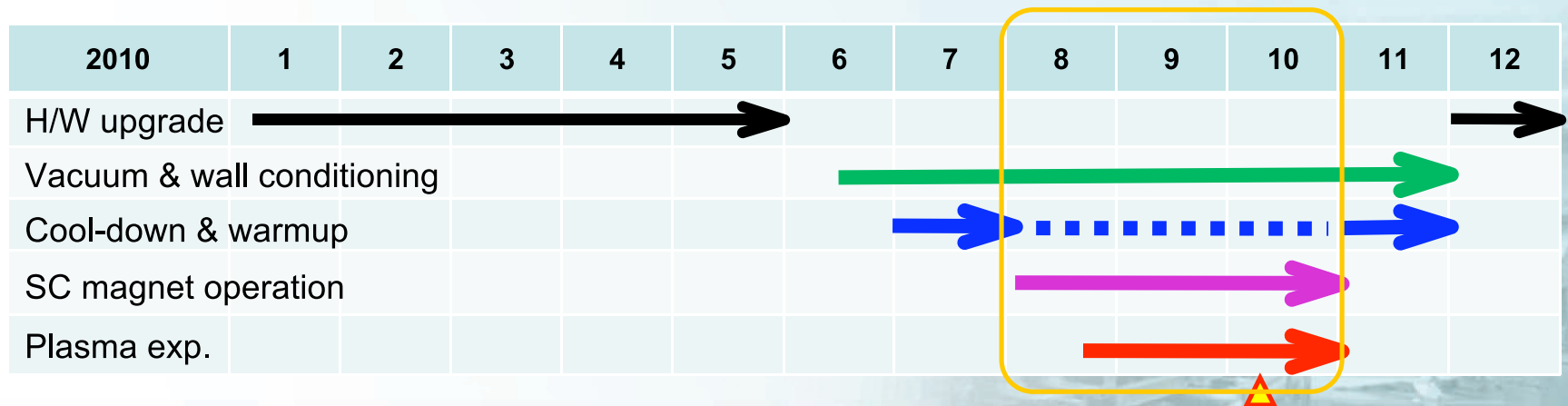


Available operation time in 2009-2010

2009 Operation



2010 Operation



System availability for 2009-2010 operation

	2008	2009	2010
SC Magnetic system			
<ul style="list-style-type: none"> • TF coils • PF coils & leads 	<ul style="list-style-type: none"> • 15 kA • 4 kA unipolar • Up/Low series 	<ul style="list-style-type: none"> • 35 kA • 4 kA bipolar • Up/Low series 	<ul style="list-style-type: none"> • 35 kA • 20 kA bipolar • Up/Low separate (4 more PF PS)
In-vessel system			
<ul style="list-style-type: none"> • In-vessel coil • PFC • Wall conditioning 	<ul style="list-style-type: none"> • Inboard limiter • Glow DC, RF DC 	<ul style="list-style-type: none"> • Inboard limiters • + boronization 	<ul style="list-style-type: none"> • Vertical control • Divertor / limiters • Passive stabilizer • + PFC baking
Heating system			
<ul style="list-style-type: none"> • ECH • ICRH • NBI • LHCD 	<ul style="list-style-type: none"> • 0.5 MW (84 GHz) • 0.03 MW (30 MHz) 	<ul style="list-style-type: none"> • 0.5 MW (84 GHz) • 0.3 MW (45 MHz) 	<ul style="list-style-type: none"> • 0.5 MW (84 GHz) • 0.5 MW (110 GHz) • 1 MW • 1 MW
Infra system			
<ul style="list-style-type: none"> • Electricity 	<ul style="list-style-type: none"> • 50 MVA (154 kV) 	<ul style="list-style-type: none"> • 50 MVA (154 kV) 	<ul style="list-style-type: none"> • 100 MVA (154 kV)



Operational parameters in 2009-2010

	2008	2009	2010
Experimental parameters			
<ul style="list-style-type: none">• Peak TF field• Operation TF field• Flux• I_p• Plasma shape• Gas	<ul style="list-style-type: none">• 1.5 T• 1.5 T• ~ 1 Wb• < 133 kA• Circular• H₂ (He for DC)	<ul style="list-style-type: none">• 3.5 T• 1.5 T, 3.0 T• ~ 2 Wb• ~ 300 kA• Circular• H₂ (He for DC), D₂	<ul style="list-style-type: none">• 3.5 T• 1.5 T, 2.0 T, 3.0 T• ~ 4 Wb• < 1 MA• Double null• H₂, D₂
Control			
<ul style="list-style-type: none">• Plasma control	<ul style="list-style-type: none">• PF blip & start up• I_p, R_p, n_e	<ul style="list-style-type: none">• PF zero-crossing• I_p, R_p, n_e	<ul style="list-style-type: none">• IVC control• I_p, R_p, Z_p, shape
Diagnostics			
<ul style="list-style-type: none">• Diagnostic systems	<ul style="list-style-type: none">• MD/ MMWI/ ECE / Hα/ filterscope/ ViS . TV	<ul style="list-style-type: none">• MD/ MMWI / ECE / Hα/ filterscope/ Vi s. TV• PD / XCS / Soft X-ray / Reflect.	<ul style="list-style-type: none">• MD / MMWI / ECE/ Hα/ filterscope/ Vi S. TV• PD / XCS / Soft X-ray / Reflect.• TS/ Hard X-ray / Fast neutral / ECEI/ I RTV



Preparation Timeline

- Control System (PCS) development is ongoing.
 - 4 cpu system with one fast (50 μ s) cpu
 - Essential algorithm upgrades only
- Get experimental proposals in soon (< May 30)
 - Feedback on the process is useful (to Dr. Woong Chae Kim)
 - Experiments selected in July
 - Detailed experimental plan for those experiments due by Oct. 1
- Training of Operators (July)
 - Training tools (simserver) needed in June
- Identify KSTAR contacts for collaborative work (systems; experiments)
 - A KSTAR physics operator will be assigned to experiment when chosen
 - They will be contact point for preparation of detailed plan
 - General contacts:
 - Physics experiments - Dr. Woong Chae Kim (woong@nfri.re.kr)
 - Commissioning experiments - Dr. H.K. Na (hkna@nfri.re.kr)



Preparation Timeline Continued

- Prepare remote access, operation, and analysis tools (by August)
 - Technology issues are being addressed
 - Is a US mirror site for KSTAR data feasible? (technology? policy?)
 - Summary of security solutions for collaborator access to US facilities needed for input to NFRI policy discussions (by May 15)
 - What requirements for tools at various US labs?
 - Is there interest in sharing access/analysis tools among labs?
- System Commissioning (October)
 - Define support that will be provided by US and on what schedule
- Device magnetic characterization experiments (October)
 - Analysis, tool development, experiment design needed long before this.
 - How is this process coordinated?
- Startup/Rampup experiments (start mid-October)
- Physics experiments (November)

How to Participate in KSTAR Operations – General

- Get list of signal names
- Get pictures of device and cross-section
- Learn how to see shot logs
- People who supported initial operation can provide advice:
 - PPPL: Dennis Mueller
 - ORNL: Don Hillis, Dick Colchin
 - GA: Walker, Hyatt, Humphreys, Eidietis, Jackson, Penaflo, Piglowski, Leuer
- Learn how to see EFIT's (or run your own)
- What are requirements for coordination with KSTAR program?
- Suggestions?

How to Participate in KSTAR Operations – Remote

- Data access needs to be defined.
- Can collaborators connect remotely via video to KSTAR control room?
- Will collaborators be allowed to run experimental session remotely?
 - If so, deputy session leader on-site will be needed.
- Will anyone be allowed to connect to PCS remotely?
- How many of these will happen this year?
- Suggestions?

How to Participate in KSTAR Operations – On-site

- Get travel tips document
- What are requirements for on-site participation?
 - Paperwork will be required some time in advance
 - NFRI is working on on-site access administration issues (< October).
- NFRI will help with booking hotel – very good rates
- How to coordinate visit with KSTAR program plan?
- How would on-site visitors participate?
 - Leading experimental session
 - Get diagnostic running
 - Both are included in experiment selection process
- How to get connected on-site?
- Suggestions?