TO: **L. Dudek**
FROM: **B. Stratton**

SUBJECT: **NCSX Job 3901 Diagnostic Integration**

Date: October 8, 2008

Scope
Level of effort job for a diagnostic physicist to provide oversight of design, fabrication/procurement, installation, and commissioning of NCSX diagnostics.

Status
Ongoing

Interfaces
Not applicable

Specifications
Not applicable

Schematics and PIDs
Not applicable

Models
Not applicable

Drawings
Not applicable

Analyses
Not applicable

Testing
Not applicable

Costs
No updates

Remaining Work

This work would need to be continued if the NCSX project were resumed.

WBS 3 - Diagnostics

B. Stratton
NCSX WBS 3 Manager

Outline

- Requirements
- Interfaces
- Design, fabrication, and installation status or plans and schedule by job
- Estimates to complete
- Risks and mitigation

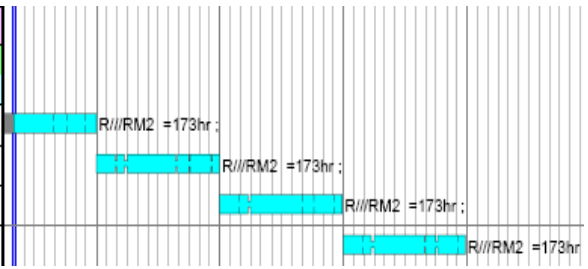
Interfaces

- Ex-vessel magnetic sensors:
  - Vacuum vessel (WBS 12)
  - Conventional coils (WBS 13)
  - Modular coils (WBS 14)
  - Cryostat (WBS 17)
  - Data acquisition (WBS 53)
  - Field period assembly (WBS 18)
- Extension and termination of thermocouple and heater tape leads:
  - Vacuum vessel (WBS 12)
- Visible TV camera system:
  - Vacuum vessel (WBS 12)
  - Data acquisition (WBS 53)
- Electron beam field line mapping system:
  - Vacuum vessel (WBS 12)
  - Data acquisition (WBS 53)
  - Cryostat (WBS 17)

Diagnostics integration status

Job: 3901 - Diagnostics sys Integration-STRATTON

390-04		LOE Support FY08	249*		01OCT07A	29SEP08	1,522	19,176.19
390-05		LOE Support FY09	247*		01OCT08*	28SEP09	1,274	29,714.48
390-06		LOE Support FY10	246*		01OCT09*	28SEP10	1,026	30,581.21
390-07		LOE Support FY11	248*		01OCT10*	28SEP11	776	32,131.29



- 10% LOE support by one physicist to manage diagnostic work in MIE project
- Sufficient based on experience so far

Estimates to complete

Job	Mech. Eng. (hrs)	Sr. Mech. Tech. (hrs)	Mech. Tech. (hrs)	Design. (hrs)	Elect. Tech. (hrs)	Elect. Eng. (hrs)	Comp. Eng. (hrs)	Res. Staff (hrs)	Travel (k$)	M&S (k$)
Ex-vessel Mag.	1023	1816	460	188	128	32	0	0	0	29.7
Visible Camera	40	0	88	80	16	0	0	0	0	3.5
E-beam Mapping	160	0	576	196	16	8	300	480	3.0	19.0
Diag. Integ.	0	0	0	0	0	0	0	778	0	0
TOTAL	**1223**	**1816**	**1124**	**464**	**160**	**40**	**300**	**1258**	**3.0**	**52.2**

- Estimates to complete based on:
  - Ex-vessel magnetics: experience to date on these tasks; vendor quotes
  - Visible TV camera: experience with similar systems on NSTX; vendor quotes
  - Electron beam field line mapping system: discussion with Auburn University personnel, in-house estimates for specific components; vendor quotes
  - Diagnostics integration: experience to date

Risks and mitigation plans

- Electron beam mapping system design not started-could be complex
  - Mitigate risk by starting design soon-summer 2008
  - This job will be transferred to ORNL in collaboration with Auburn University and University of Wisconsin
  - Plan takes advantage of extensive shared experience in field line mapping at Auburn, UW, and ORNL, who worked as a team on this task for ATF
- There is some risk of damage to VV flux loops, spacer flux loops, Rogowski coils, and heater and thermocouple leads when modular coil three-packs are placed over VVSAs and during machine assembly. Repairs could be on the critical path.