

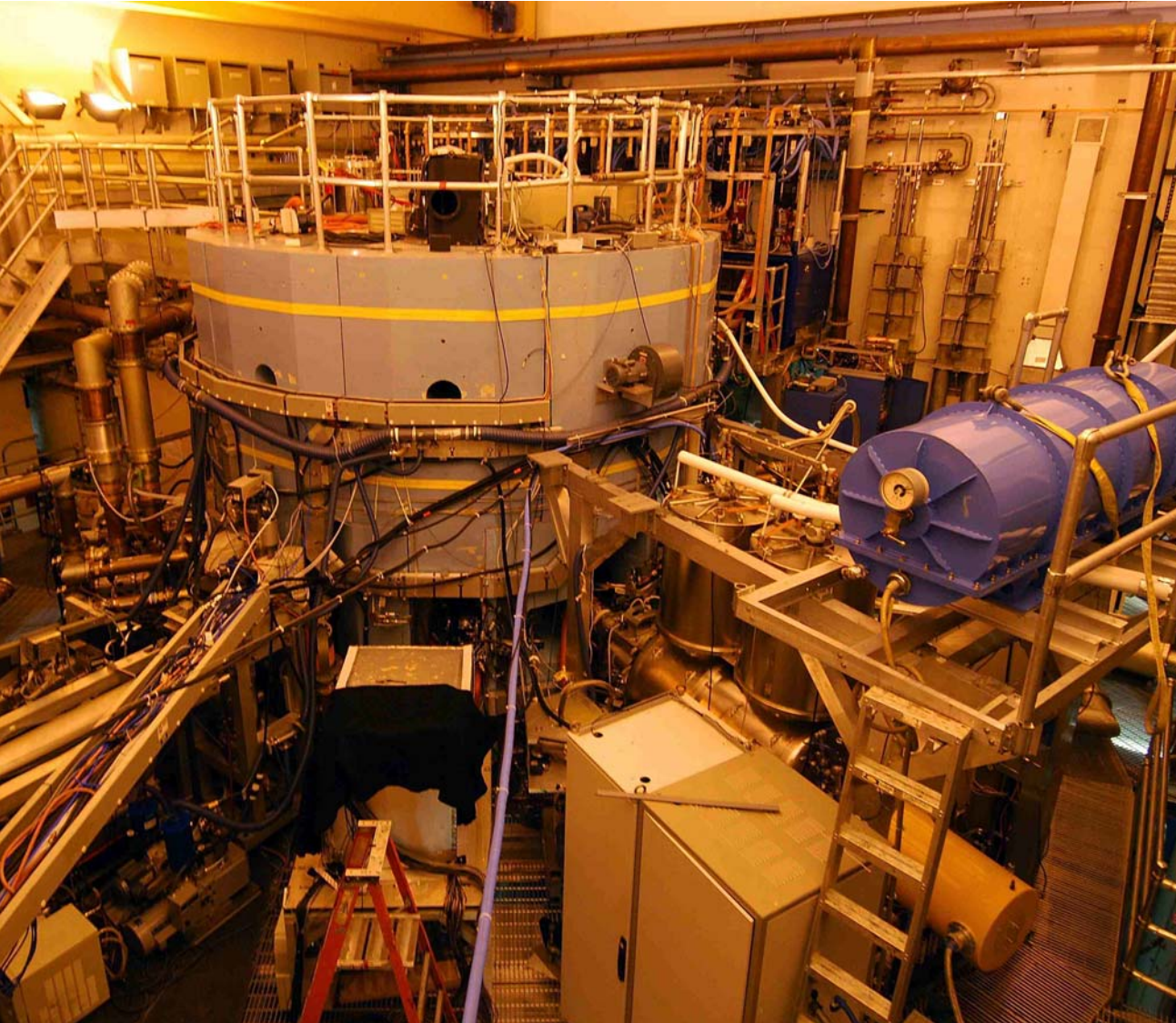
Alcator C-Mod Budgets and Schedule (2009 – 2013)



Alcator C-Mod
5-year Plan Review
May 7-8, 2008

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for the Alcator Group

*Developing the steady
state, high-Z wall,
high-field tokamak for
ITER and beyond*



Proposal for the next five years of research November 2008 – October 2013



- MIT portion of C-Mod research funded through Co-operative Agreement with DoE, OFES
 - Grant period is 5 years; current Agreement through October 31, 2008
 - Formal Proposal submitted April, 2008 is the subject of this review
- Collaborators funded separately, through grants (Universities) and Field Work Proposals (National Labs)
 - Small sub-contracts to Universities as well
- Program assumes continued participation of collaborators at similar levels
- Proposal budgets
 - Proposal is for “full utilization” of the C-Mod facility
 - about 30% increment above current guidance levels
 - Main increments go to increased research operations (ramping to 25 weeks/year), along with associated personnel increases
 - Allows faster implementation of some upgrades, plus additional upgrades (both facility and diagnostics)

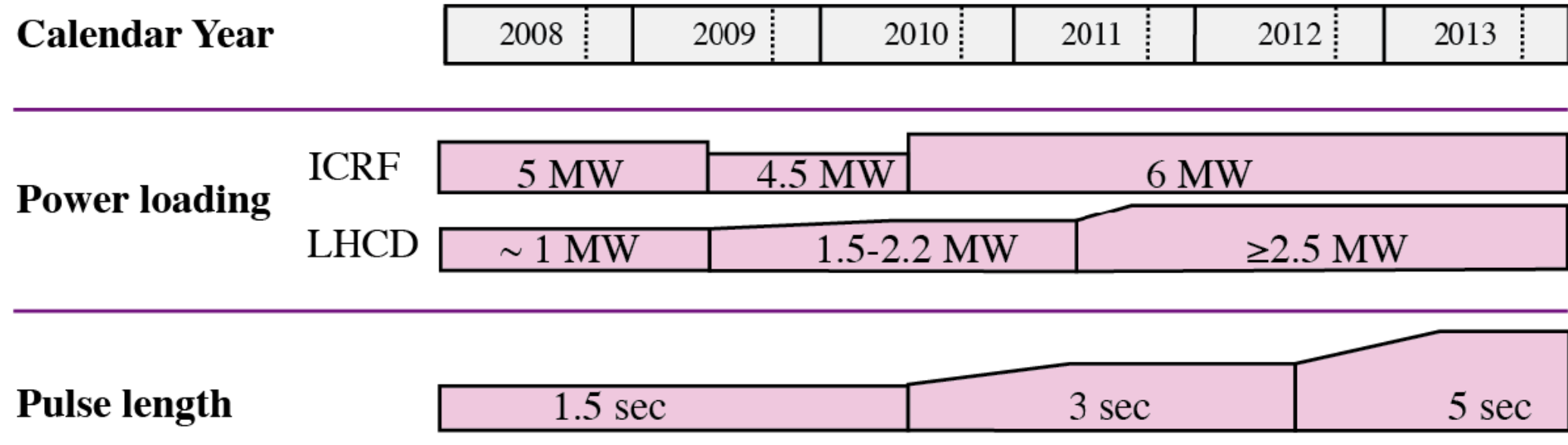
Proposal Budget Profiles (k\$)*



Institution	FY08	FY09	FY10	FY11	FY12	FY13
MIT	22,567	25,795	27,430	28,400	29,600	30,700
PPPL	2,090	2,700	3,240	3,400	3,500	3,720
U Texas	415	427	440	572	589	607
LANL	103	110	127	120	126	132
National Project Total	25,175	29,032	31,237	32,492	33,865	35,159
(research run weeks)	(15)	(13)	(24)	(25)	(25)	(25)
[guidance run weeks]	[15]	[10]	[13]	[13]	[13]	[13]

***Proposal** budgets are ~30% above FY09 guidance (plus cost of living)

Input Power and Pulse Length

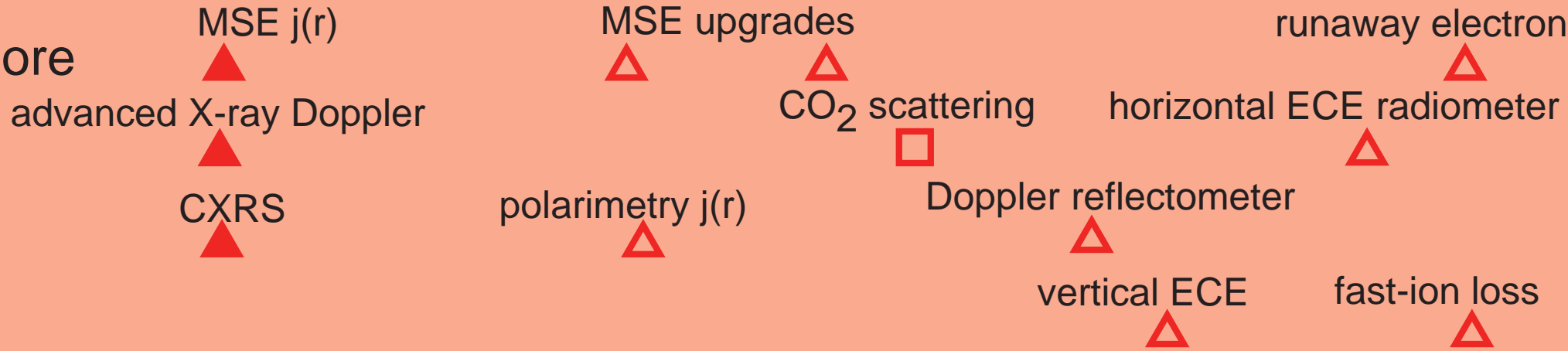


Major Diagnostic Upgrades

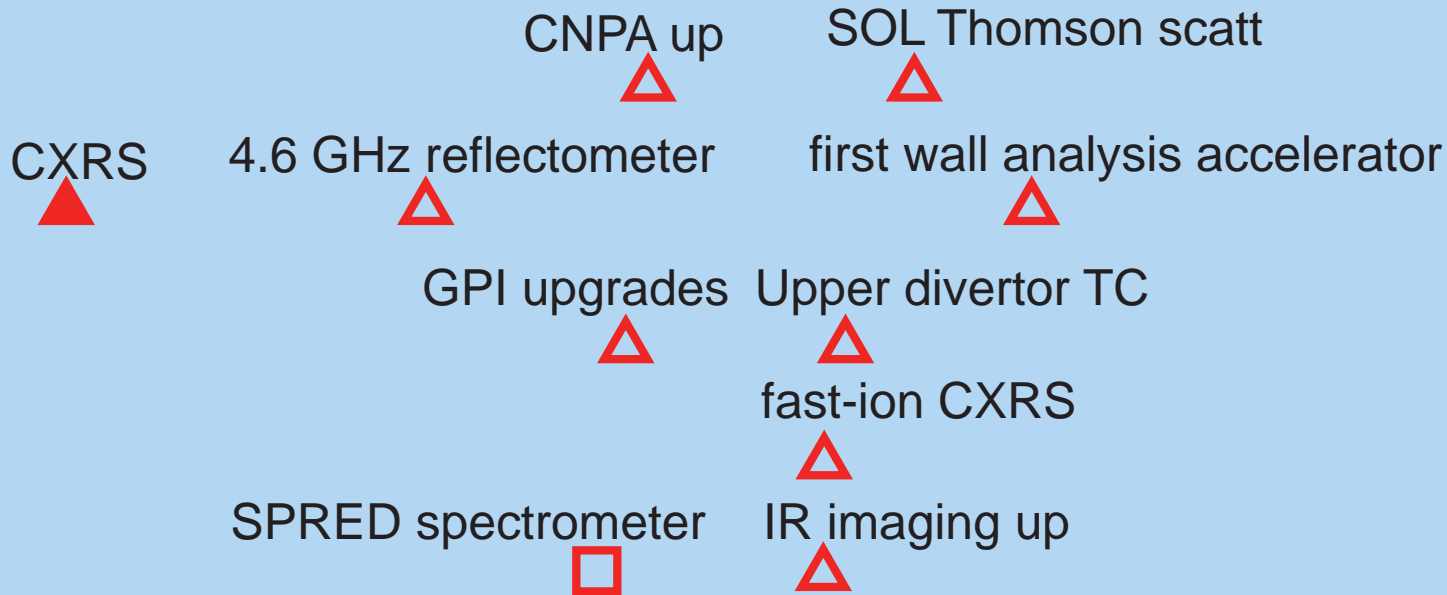
Calendar Year

2008	2009	2010	2011	2012	2013
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Core



Edge/Divertor/Plasma Facing Components



▲ Complete

△ Guidance

□ Proposed Budget

Incremental costs for 1 run week (at 14 ± 3 weeks)



Cost Category	Cost (2008 k\$)	Notes
Maintenance	124	inspections, power systems, klystrons, ICRF tubes, diagnostics, data, vacuum, instrumentation
Liquid Nitrogen	47	coil & machine cooling
Overtime	13	technicians
Electricity	11	
Liquid Helium	9	cryopump, DNB
Specialty gases	2	primarily B_2D_6
Total	206	

Budgeted Hardware Costs for Major Facility Upgrades



Item	Cost (k\$)	Implementation
DAC/Computing Infrastructure	1050	2009-2013
cryogenics upgrade	100	2009
correction coil upgrade	500	2010 (2013)
Demo-like outer divertor upgrade	1250	2011
EF2 upgrade	1500	2013
EFC upgrade	725	2011
helium recovery	100	2010

Budgeted Hardware Costs for Major RF Upgrades



Item	Cost (k\$)	Implementation
advanced LH launchers	2x800	2009, 2011
advanced 4-strap ICRF antennas	2x700	2009, 2010
LH Cart (4 th MW)	1100	2009
ICRF switchgear/crowbar upgrades	1150	2013
new LH klystrons	(4 or 6)x250	2009-2012
Fast Ferrite Tuners (ICRF)	4x250	2012
FMIT to 120 MHz	500	2013
LH transmitter protection upgrade	200	2010
FMIT #1 and #2 tunable (40-80 MHz) (PPPL)	1050	2012

Budgeted Hardware Costs for Major Diagnostic Upgrades



Item	Cost (k\$)	Implementation
Polarimeter	800	2009
In-situ first wall analysis accelerator*	50	2011
Gas Puff Imaging Upgrades	210	2009 (PPPL)
SOL Thomson scattering	150	2010
Doppler reflectometry	150	2011
CXRS Measurement of fast ions	140	2010 (U.Tx.)
MSE upgrades	125	2009, 2010 (PPPL)
IR camera upgrade	120	2010 (LANL)
DNB power & control upgrades	200	2009
SPRED spectrometer	200	2010
CO ₂ scattering	150	2010

*Interface costs only; primarily funded through OFES Diagnostic Initiative