

VLT Overview

Charles C. Baker
VLT Director

VLT Program Advisory Committee Meeting

University of California, San Diego
2-3 March 2004



VLT Program Advisory Committee Members

<u>PAC Member</u>	<u>Service Completed at End of Year</u>
J. Freidberg, Chair	2005
R. Hawryluk, Acting Chair	2004
D. Batchelor	2004
J. Dahlburg	2004
B. Hooper	2004
T. Jarboe	2004
A. Kellman	2005
J. Kwan	2004
P. Peterson	2005
K. Schoenberg	2005
J. Sethian	2004

Recommendations from VLT PAC September 2003 Report

- “...the VLT continue to operate under its present structure” and “...the VLT be focused on the U.S. base technology program.”
→ That is the intent of DOE and the VLT.
- “...improvements should be made...in the interactions between VLT and ICC communities.”
→ No further action on this topic.
- “VLT should not be responsible for coordinating activities of the ITER/FIRE project.”
→ That is the intent. DOE is selecting a host laboratory for an ITER Project Office.
- “Until an ITER/FIRE Director is appointed, the related R&D should be carried by the VLT.”
→ That is being done.
- “...the VLT start to develop a strategic plan setting out the long-term needs of the base technology program.”
→ For the next several months, this will be done through technology participations in the FESAC priorities panel work.

VLT PAC Charge

- **Please provide feedback to Baker and Sauthoff on program and budget information on VLT and ITER project topics to be presented at the DOE OFES Budget Planning Meeting.**
- **Key considerations include clarity of information, relationship between VLT and ITER technology activities, and proposed priorities.**
- **Immediate feedback at the debriefing will be much appreciated. A letter report by Monday March 8th, is requested.**

Agenda

VLT Program Advisory Committee Meeting

Tuesday, March 2

8:30am - 8:40am	DOE Comments	TBD
8:40am - 9:15am	VLT Overview	C. Baker
9:15am - 10:00am	ITER Project Overview	N. Sauthoff
10:00am - 10:15am	Break	
10:15am - 11:00am	Magnets	J. Minervini
11:00am - 11:45am	Plasma Facing Components	M. Ulrickson
11:45am - 12:15pm	Safety and Tritium	D. Petti
12:15pm - 1:00pm	Lunch	
1:00pm - 1:30pm	ECH Systems	R. Temkin
1:30pm - 2:00pm	Fueling Systems	D. Rasmussen
2:00pm - 2:30pm	Plasma Chamber Systems	M. Abdou

continued on next page

Agenda (cont'd)

VLT Program Advisory Committee Meeting

Tuesday, March 2 (cont'd)

2:30pm - 3:00pm	ICH Systems	D. Rasmussen
3:00pm - 3:15pm	Break	
3:15pm - 3:45pm	FIRE	D. Meade
3:45pm - 4:15pm	Advanced Design & Socio-Economic Studies	F. Najmabadi
4:15pm - 5:00pm	Materials	N. Ghoniem
5:00pm - 6:00pm	PAC Executive Session	
6:00pm	ADJOURN - (No Host Dinner)	

Wednesday, March 3

8:30am - 9:00am	IFE Technology	W. Meier
9:00am - 11:00am	PAC Executive Session	
11:00am - 12:00noon	PAC De-Briefing	
12:00noon	ADJOURN	

FY 2005 Fusion Energy Sciences President's Budget Request

	FY 2003 <u>Actual</u>	FY 2004 <u>Approp.</u>	FY 2005 <u>Cong.</u>
Science	136.2	143.9	144.0
Facility Operations	66.2	84.5	85.5
Technology	38.3	27.4	27.8
SBIR/STTR	<u>6.2</u>	<u>6.8</u>	<u>6.8</u>
<i>OFES Total</i>	<i>246.9</i>	<i>262.6</i>	<i>264.1</i>
DIII-D	51.9	56.0	54.0
C-Mod	19.2	22.2	21.5
NSTX	30.1	34.7	33.6
NCSX	11.7	16.7	16.7
IFE/HEDP	17.0	15.1	13.9

Summary of Fusion Energy Sciences FY 2005 Program

ITER

- o Direct Funding of \$7M: \$1M for procurement of S/C Wire; \$6M in reserve awaiting selection of organization to host U.S. Project Office and other decisions
- o \$38 M in resources from throughout the program will support preparation for U.S. tasks

Science (\$150.8 M, +\$0.1 M)

- o +\$1 M for MST
- o No \$3 million increase for SciDAC/FSP as planned
- o No increase of \$0.8 M for NCSX research in support of construction
- o All other programs funded at about FY 2004 appropriations level

Facilities Operations (\$85.5M, +\$1 M)

- o ITER direct funding +\$4 M
- o Operation of facilities reduced from FY 2004 plan of 18 weeks each to 14 weeks each (-\$3.2 M)
- o NCSX kept at FY 2004 level instead of the planned \$4.8 M increase
- o Funding for ORNL move stretched out

Enabling R&D (\$27.8M, \$+\$0.4 M)

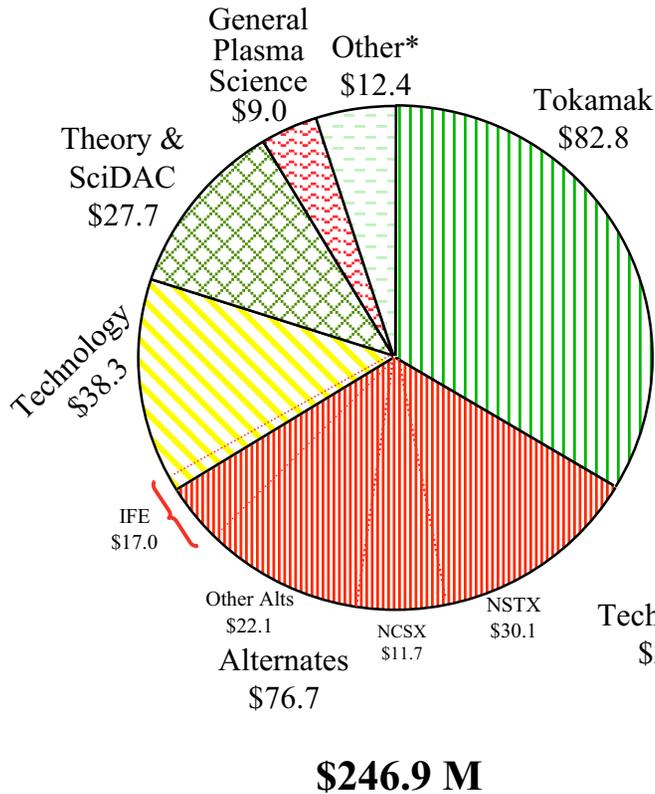
- o Fusion Technologies closed out in FY 2004, some parts moved to Plasma Technologies
- o FIRE program wrapped up with Physics Validation Review in FY 2004
- o Materials Research reduced \$0.2 M



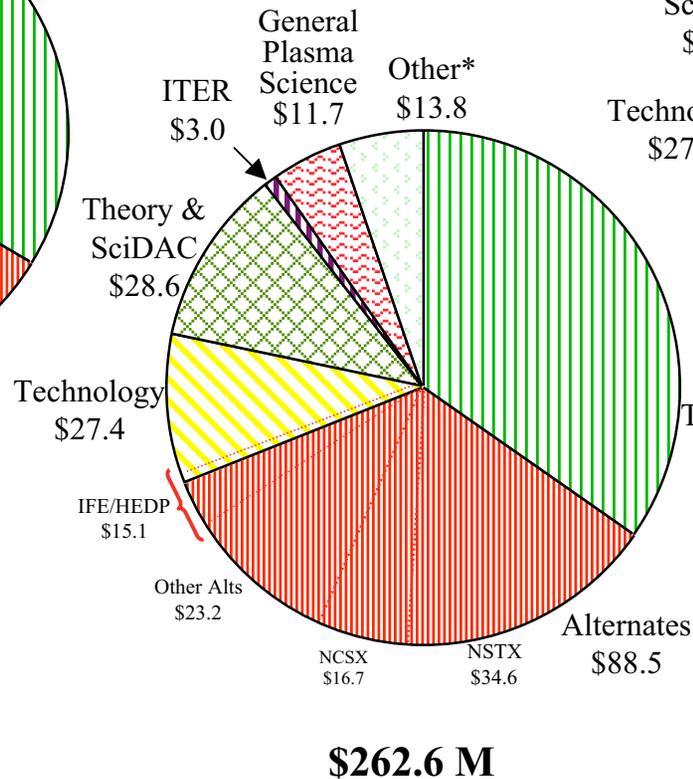
Fusion Energy Sciences Budget

(\$ in Millions)

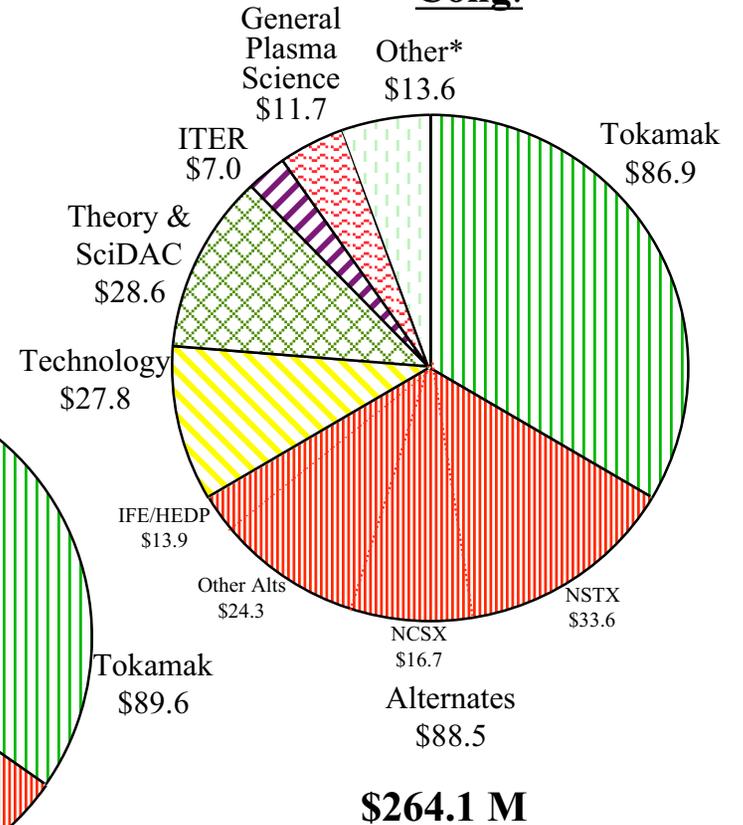
**FY 2003
Actual**



**FY 2004
Approp.**



**FY 2005
Cong.**



*SBIR/STTR
GPP/GPE
ORNL Move
Reserve
Environmental Monitoring



Fusion Program Resources in Preparation for ITER

<u>Elements</u>	<u>FY 2004 Approp.</u>	<u>FY 2005 Cong.</u>
Fusion Plasma Theory and Computation (SciDAC)	\$1,000,000	\$3,000,000
DIII-D Experimental Program	3,000,000	10,000,000
Alcator C-Mod Experimental Program	1,000,000	5,000,000
ITER Preparations	3,000,000	7,000,000
Plasma Technology	<u>0</u>	<u>13,000,000</u>
<i>Total</i>	<i>\$8,000,000</i>	<i>\$38,000,000</i>

FY05/06 Budget Considerations

- “In planning for the FY2006 ongoing base program, institutions should increase their focus on burning plasmas and identify specific tasks, such as high-priority ITPA R&D, theory, and technology R&D...”
 - This is the major factor in planning the VLT program.
Our planning assumes a positive ITER decision.
- The general approach used by Ned and Charlie regarding supporting R&D/design for ITER is to assume work to be done in national laboratories and universities, using existing people, will be funded through the base program. Industrial R&D/design will be funded by ITER project funds.
- The VLT program is thoroughly integrated into the IPPA Program Goals:
 - Lead on MFE Goal 4 (technology, materials, systems)
 - Major support on MFE Goal 3 (burning plasma)
 - Small support on MFE Goal 2 (innovative confinement concepts)
 - Activities supporting IFE Goal 2 (rep-rated systems) are to be eliminated.
- Support for the Plasma Technology area has been modestly increased, but most of the changes are due to moving elements into this area.
- The Fusion Technology area is to be eliminated in FY05.
 - Some MFE activity is retained under Plasma Chamber Systems and it is being re-directed to focus on ITER blanket test modules. The effort is severely budget limited.
 - All IFE chamber and target injection technology is to be eliminated.
- The FIRE design activity is to be concluded in FY04.

FY 05 OFES Technology Program Budgets (\$K) as of 2-02-04

B&R	Program Area	Program Elements	OFES PM	FY02	FY03	FY 04 Jan.	FY 05 CBR
AT6010301	Plasma Technologies	Plasma Facing Components	Berk	6403	6550	5954	7054
AT6010301	Plasma Technologies	Magnet Systems	Marton	2015	2103	2164	2248
AT6010301	Plasma Technologies	Plasma Chamber Systems	Berk	0	1000	0	1894
AT6010301	Plasma Technologies	ICH Systems	George	1508	1764	1334	1611
AT6010301	Plasma Technologies	Safety and Environment	Nardella	0	0	1325	1580
AT6010301	Plasma Technologies	ECH Systems	George	1094	1126	1185	1418
AT6010301	Plasma Technologies	Fueling Systems	George	891	910	930	1024
AT6010301	Plasma Technologies	Tritium Systems	Nardella	0	0	608	654
AT6010301	Plasma Technologies	Neutronics	Berk	0	0	75	197
AT6010301	Plasma Technologies	Neutral Beam Systems	George	74	64	60	60
AT6010301	Plasma Technologies	Taxes to be Extracted		0	0	0	100
	Plasma Technologies	TOTAL		11985	13517	13635	17840
AT6010401	Fusion Technologies	TSTA	Nardella	3043	2679	0	0
AT6010401	Fusion Technologies	MFE Chamber Technologies	Berk	2941	2984	1840	0
AT6010402	<i>Fusion Technologies</i>	<i>IFE Chamber Technologies</i>	<i>Nardella</i>	<i>2104</i>	<i>2262</i>	<i>1038</i>	<i>0</i>
AT6010401	Fusion Technologies	MFE Safety and Environment	Nardella	1244	1330	0	0
AT6010402	<i>Fusion Technologies</i>	<i>IFE Target Fabrication</i>	<i>Nardella</i>	<i>0</i>	<i>685</i>	<i>0</i>	<i>0</i>
AT6010401	Fusion Technologies	Tritium Research	Nardella	711	745	0	0
AT6010402	<i>Fusion Technologies</i>	<i>IFE Safety and Environment</i>	<i>Nardella</i>	<i>360</i>	<i>308</i>	<i>160</i>	<i>0</i>
AT6010401	Fusion Technologies	Remote Systems	Berk	154	110	0	0
	Fusion Technologies	TOTAL		10557	11103	3038	0
AT6010501	Advanced Design	Next Step Option-FIRE	Bolton	2157	1893	600	0
AT6010502	<i>Advanced Design</i>	<i>IFE System Studies</i>	<i>Opdenaker</i>	<i>1158</i>	<i>1002</i>	<i>0</i>	<i>0</i>
AT6010501	Advanced Design	MFE System Studies	Opdenaker	912	1068	1636	1636
AT6010501	Advanced Design	VLT Management	Marton	791	797	704	697
AT6010501	Advanced Design	Socio-economic Studies	Opdenaker	173	217	30	150
AT6010501	Advanced Design	Burning Plasma Applications	Bolton	130	179	120	98
AT6010501	Advanced Design	ITER Cost Estimating	Marton	0	733	0	0
	Advanced Design	TOTAL		5321	5889	3090	2581
AT602010	Materials Research	Materials Science	Berk	7176	7741	7636	7379
AT60	Technology	TOTAL		35039	38250	27399	27800
		TOTAL MFE		31417	33993	26201	27800
		TOTAL IFE		3622	4257	1198	0

VLT Program Element Leaders

Program Element

Magnets
PFC
Chamber
ICH
ECH
Fueling
Safety & Tritium Research
Tritium Processing
NSO/FIRE
ARIES
Socio-Economic
Materials
IFE Technology

Element Leader

J. Minervini
M. Ulrickson
M. Abdou
D. Swain
R. Temkin
S. Combs
D. Petti
S. Willms
D. Meade
F. Najmabadi
J. Schmidt
S. Zinkle
W. Meier

Presentation Format

(for each area/element presenter)

- **Area/Element Overall Mission/Scope (one slide)**
- **FY03/04 Technical Highlights/Accomplishments (two slides)**
- **Proposed FY05 Tasks of President's Budget (also called CBR \equiv Congressional Budget Request)**
 1. list specific tasks with funding and deliverables (month/date)
 2. designate those tasks directly supporting ITER but not funded by ITER Project funds
 3. identify possible tasks (with funding) for incremental funds listed **in order of priority**
- **Proposed FY06 Tasks - Three Categories**
 1. list specific tasks with funding and deliverables of the FY05 President's Budget level MINUS 10%
 2. list additional tasks with funding **in priority order** with total funding at FY05 President's Budget level
 3. list proposed additional tasks above FY05 President's Budget level **in order of priority**

For all three categories, identify those tasks directly supporting ITER, but not funded by ITER project funds.
- **List tasks in FY05 and FY06 to be done with ITER project funding, per guidance from N. Sauthoff.**
- **List key concerns/issues (one slide)**