

## Texas A&M cyclotron radiation effects facility

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The activity of the Radiation Effects Facility (REF) increased over the previous reporting year. In this reporting period, the facility was used for *a record* 2,600 hours, which is a ~10% increase over the 2,373 hours used in the 2007-2008 reporting period. Users of the facility (and hours used) over the past year were: NASA GSFC (308.5), Xilinx Corp. (274), NASA JPL (200.5), Boeing Seattle (163.25), SEAKR Engineering (143), Ball Aerospace (142.25), Aeroflex Corp. (135.25), International Rectifier (129.5), BAE Systems (120.75), Cisco Corp. (106), Intersil (88), General Dynamics (77.5), Honeywell (64), Northrop Grumman (61), European Space Agency (48), NAVSEA (48), VPT Inc (46.5), Sandia National Laboratory (40), University of Idaho (39.5), Intel Corp. (38), Lockheed Martin (31.75), Air Force (24), AMTEC Corp. (24), Georgia Tech University (24), Harris Corp. (24), Shoga(independent) (24), Vanderbilt University (23.75), Silicon Turnkey Solutions (23.5), Maxwell Corp. (22), L3 Communications (16), NASA JSC (16), National Semiconductor (16), Vitesse Semiconductor (16), Raytheon Corp (13.5), Silicon Space Technologies (11.75), Space Micro Inc (8) and Sun Tronics (8). New users included European Space Agency, L3 Communications, National Semiconductor, Shoga, Silicon Space Technologies, Silicon Turnkey Solutions, Space Micro Inc, Sun Tronics, University of Idaho, Vanderbilt University and Vitesse Semiconductor.

TABLE I. Radiation Effects Facility usage by commercial and government customers for this and previous reporting years.

Reporting Year	Total Hours	Commercial Hours (%)	Government Hours (%)
2008-2009	2,600	1,828 (70%)	772 (30%)
2007-2008	2,373	1,482 (62%)	891 (38%)
2006-2007	2,498	1,608 (64%)	890 (36%)
2005-2006	2,314	1,314 (57%)	1,000 (43%)
2004-2005	2,012	1,421 (71%)	591 (29%)
2003-2004	1,474	785 (53%)	689 (47%)
2002-2003	1,851	1,242 (67%)	609 (33%)
2001-2002	1,327	757 (57%)	570 (43%)
2000-2001	1,500	941 (63%)	559 (37%)
1999-2000	548	418 (76%)	131 (24%)
1998-1999	389	171 (44%)	218 (56%)
1997-1998	434	210 (48%)	224 (52%)
1996-1997	560	276 (49%)	284 (51%)
1995-1996	141	58 (41%)	83 (59%)

Table I compares the facility usage by commercial and government customers. The ratio from this reporting year (70% to 30%) is similar to the trend seen in previous reporting periods and commercial hours still dominate. Commercial hours increased by 23% and government hours increased by 13% over hours from 2007-2008. Much of the testing conducted at the facility continues to be for defense systems by both government and commercial agencies. It is expected that the high usage of facility will continue

Table II lists the beams used this year and the number of times each was requested. In total, 485 beams were run this year which is identical to the previous year. 15 and 25 MeV/u Kr and Xe were most utilized as well as 15 MeV/u Au. New beams of 15A MeV  $^4\text{He}$ ,  $^{14}\text{N}$ , 25A MeV  $^4\text{He}$ ,  $^{14}\text{N}$  and 40A MeV  $^3\text{He}$  were added to SEELine users list.

TABLE II. Beams used and the number of times requested for this reporting year and previous years. 485 beams were run this year.

Particle Type	A MeV	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
$^4\text{He}$	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
$^{14}\text{N}$	“	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
$^{20}\text{Ne}$	“	1	13	19	15	23	36	39	37	41
$^{40}\text{Ar}$	“	4	24	43	46	51	56	60	57	63
$^{63}\text{Cu}$	“	N/A	N/A	5	14	22	23	25	24	19
$^{84}\text{Kr}$	“	6	26	55	47	49	75	81	77	63
$^{109}\text{Ag}$	“	N/A	N/A	6	18	15	26	28	28	34
$^{129}\text{Xe}$	“	5	18	43	51	50	78	84	84	48
$^{141}\text{Pr}$	“	N/A	N/A	2	2	1	4	4	4	4
$^{165}\text{Ho}$	“	3	11	17	7	8	22	24	24	13
$^{181}\text{Ta}$	“	4	5	4	3	5	3	3	3	3
$^{197}\text{Au}$	“	12	9	23	34	34	46	50	49	44
$^4\text{He}$	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2
$^{14}\text{N}$	“	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1
$^{22}\text{Ne}$	“	27	13	19	6	15	21	23	20	21
$^{40}\text{Ar}$	“	31	20	32	16	25	31	33	35	28
$^{84}\text{Kr}$	“	32	20	35	26	33	40	43	45	47
$^{129}\text{Xe}$	“	25	18	24	15	25	34	37	40	37
H-D	40	1	8	10	4	7	4	4	5	2
$^3\text{He}$	“	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
$^{14}\text{N}$	“	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	2
$^{20}\text{Ne}$	“	5	3	5	6	11	2	2	3	4
$^{40}\text{Ar}$	“	12	8	10	7	13	7	8	9	6
$^{78}\text{Kr}$	“	13	9	6	5	10	3	3	3	2
Total		192	207	360	324	399	511	552	550	485