

**Texas A&M Cyclotron radiation effects facility**  
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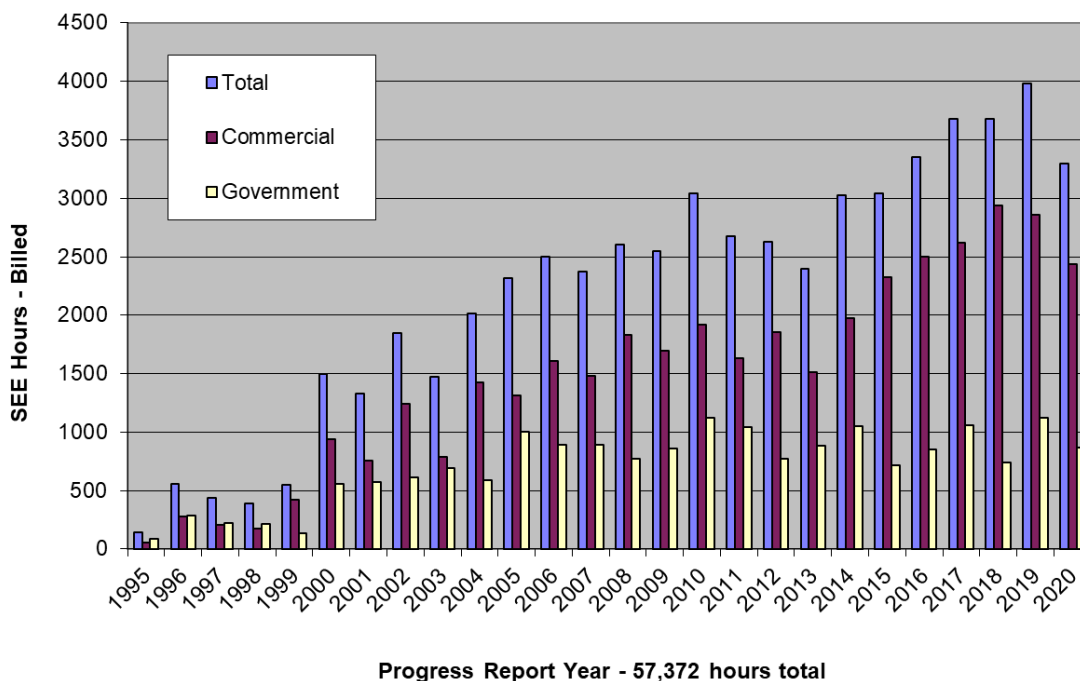
Usage of the Radiation Effects Facility (REF) decreased largely due to COVID-19 pandemic travel restrictions however it was still the 5<sup>th</sup> highest ever. In this reporting period, the facility was used for 3,300 hours, which is a 17% decrease over the record setting 3,981 hours used in the 2019-2020 reporting period. Users of the facility (and hours used) over the past year were: Northrop Grumman (402.5), Texas Instruments (353), MDA (278.5), RTS (216.5), Renesas (205), NASA JPL (161.5), Boeing Corp

**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 (%)
2020-2021	3,300	2,435 (74%)	865 (26%)
2019-2020	3,982	2,862 (72%)	1120 (28%)
2018-2019	3,678	2,939 (80%)	739 (20%)
2017-2018	3,681	2,622 (71%)	1,059 (29%)
2016-2017	3,355	2,501 (75%)	854 (25%)
2015-2016	3,042	2,326 (76%)	716 (24%)
2014-2015	3,024	1,975 (65%)	1,049 (35%)
2013-2014	2,399	1,517 (63%)	882 (37%)
2012-2013	2,626	1,856 (71%)	770 (29%)
2011-2012	2,673	1,630 (61%)	1,043 (39%)
2010-2011	3,042	1,922 (63%)	1,121 (37%)
2009-2010	2,551	1,692 (66%)	859 (34%)
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%)

(144.5), SEAKR (128), Sandia Nat Lab (125), VPT Inc (125), Honeywell (112), Intuitive Machines (111), Blue Origin (104), Raytheon (80), Fifth Gait (77), NAVSEA (72), Cobham (64), SMU (56), Troxel Engineering (55), Lockheed Martin (48), AFRL (47), Space X (35), Aria Labs (31), Innoflight (24), Johns Hopkins (24), Millennium (24), Space R2 (24), Crane AE (20), GSI Technology (20), NASA GSFC (20), BAE Systems (16), MOOG (16), Semi Zabala (16), T2 Research (16), Vorago Tech (15), mPower Tech (13), Collins Aerospace (8), Microchip (8), and TAMU Physics (4). New users included Intuitive Machines, Fifth Gait Space R2, MOOG Semi Zabala, Vorago Tech, mPower Tech and Collins Aerospace.

Table I compares the facility usage by commercial and government customers. While commercial hours still dominate, the ratio from this reporting year (74% to 26%) is similar to usage from previous reporting periods (see Fig 1). Commercial usage decreased by 15% but was the fifth highest commercial usage ever. Government usage decreased by 23% and was the tenth highest usage ever. 15 MeV/u ions were the most utilized and especially 15 MeV/u Au, until the ECR1 ion source and the K500 cyclotron RF system had failures. Then 24.8 MeV/u Xe was the highest ion in demand. No new beams were added to the K500 cyclotron SEELine users list, however 15 MeV/u V and Zr were developed for the K150 cyclotron SEELine users list. Much of the testing conducted at the facility continues to be for defense systems by both government and commercial agencies. We had no foreign users at the facility due to COVID-19 travel restrictions.



**Fig. 1.** Radiation Effects Facility usage by commercial and government customers for this and previous reporting years. While commercial hours still dominate, the ratio from this reporting year (74% to 26%) is similar compared to usage from prior reporting period. Usage hours decreased but largely due to COVID-19 pandemic travel restrictions however it was still the 5th highest ever. 57,372 hours provided since the start of the project in 1995.