

Target Fabrication operational statistics

C. Spindloe and M. Tolley

Central Laser Facility, STFC, Rutherford Appleton Laboratory, HSIC, Didcot, Oxfordshire, OX11 0QX, UK

Main contact email address

C.Spindloe@rl.ac.uk

RAL Experiments

A total of 12 Vulcan and 4 Astra experiments were supported by the Target Fabrication Group in the reporting period April 06-April 07. Of these experiments 10 Vulcan and 2 Astra were 'solid target' experiments constituting a total of 61 weeks experimental support for Vulcan and 9 weeks for Astra. This report will show target numbers from just the 10 supported Vulcan experiments, as one Astra laser experiment used x-ray slab targets and the other is to be completed after April 07. The report also does not include the standard amount of filter and pinhole support provided from Target Fabrication for experiments. It should also be noted from the schedule that at times during the reporting period the Target Fabrication Group was supporting 3 experiments running concurrently and additionally external contracts.

1) Target Numbers

For the reporting year the total target numbers produced are shown in figure 1. This table is broken down into separate experiments and gives data on total target numbers and also the number of high specification high aspect ratio targets that have been produced. High aspect ratio targets are defined as target that have taken a significant amount of micro-machining and micro-assembly to be produced over and above standard target manufacture. The total number of internal targets produced by the group in 2006-2007 is 1717 (not including filters and pinhole arrays). Of these 909 are high specification high aspect ratio targets.

Experiment	Targets Produced	High Specification Targets
April 2006 TAW	115	96
April 2006 TAP	148	112
May 2006 TAW	142	54
July 2006 TAW	99	48
July 2006 TAP	110	60
Sept 2006 TAE	92	62
Sept 2006 TAW	135	56
Nov 2006 TAW	197	89
Nov 2006 TAP	104	57
Jan 2007 TAE	342	152
Mar 2007 TAW	135	71
Mar 2007 TAP	98	52
TOTAL	1717	909

Figure 1. Target production summary for 2006-2007.

2) Target Types

Of the high aspect ratio targets there are a number of similar designs. Summary numbers for these targets are given below.

Target Type	Number of Type Variants
Cone Targets	6
Micro Squares (Hand cut 100 μm^2)	37
Washer Assemblies (Proton Focussing)	32
XRTS	64
Multi layer foil packages	176
X-Ray Backlighters	152

Figure 2. High Aspect Ratio Target Delivery Summary.

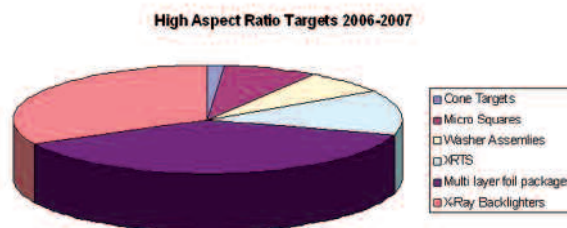


Figure 3. High Aspect Ratio Target Delivery Summary.

3) Target Design

Over the last few years there has been an ongoing increase in the number of different target designs requested for experimental campaigns. The total number of different target designs that were produced throughout the year was 294; although this figure is slightly perturbed by an experiment (in May 2006) that had a large number of design close-variants.

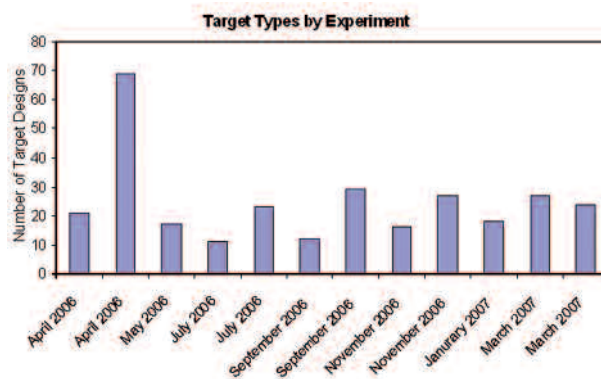


Figure 4. The number of different target designs fabricated throughout the year by each experiment.

4) Experimental Response

It is seen as a significant strength of the operational modus of CLF to be rapidly responsive to experimental results and conditions by working collaboratively with experimentalists. Pragmatically for the Target Fabrication Group this means that there are often a number of targets that have been fabricated but that are not shot by the end of experimental campaigns. Throughout the year a total of 27.5% of targets that were fabricated were returned unused to the Target Fabrication Laboratory.

The Target Fabrication Group responds to experimental changes during a run and often implements a number of modifications or redesigns to the original requests. The number of modifications and variations usually fluctuates widely across a year and is dependent on the experimental group and also on experimental conditions such as diagnostic and laser performance. On average during experiments in the reporting period 41% of the targets that were shot were modified or redesigned from the planned target specifications.

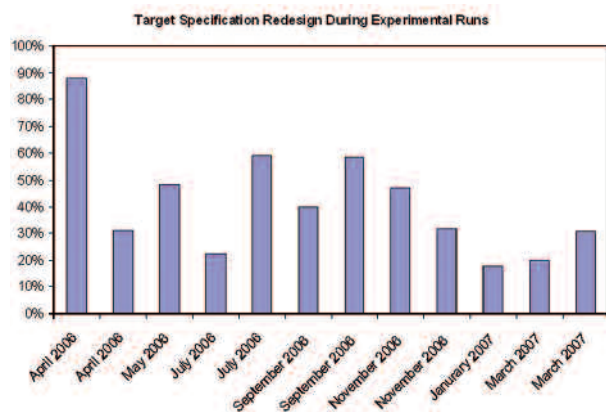


Figure 5. The number of different target re-designs fabricated throughout the year by each experiment.

External Contracts

The Target Fabrication Group also supplied microtargets, specialist coatings and expertise to external groups during the reporting period. This activity included the production of high specification backlighter assemblies as well as a number of complex thin foil coatings. Most of this work supported experiments conducted by six external groups and all of the work was carried out in addition to the experimental support for the CLF.

Summary

The Target Fabrication Group has supported 22 internal and external experimental groups in the last year as well as providing an increasing amount of characterisation services and acting as a knowledge base for target fabrication activities throughout Europe.