Astra operational statistics 07/08

S. Hawkes

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

Contact | steve.hawkes@stfc.ac.uk

During the reporting year April 07-April 08 a total of 8 experiments were delivered to the three Astra Target Areas. 4 experiments to Target Area 1, 3 experiments in Target Area 2 and a single experiment to the newly commissioned Gemini Target Area, TA3. In total 32 high power laser (TA2/3) experimental weeks were delivered, in addition to 3 set up weeks. In total 23 weeks were delivered to Target Area 1 with 4 set up weeks.

The overall availability to Target Area 1 was 85% rising to 132% with additional time from out of normal hours operations. Target Area 2 availability was 73% rising to 115% with additional time. For the first Gemini user experiment availability was 45% rising to 74% with additional time. Laser reliability for Target Area 1 was 90%, Target Area 2 was 82% and Gemini Target Area 3 was 58%.

2 - 8 April			
9 - 15 April		M. Zepf	I. Mercer
16 - 22 April		*Ion Acceleration*	*Electron Energy Transfer*
23 - 29 April		*and High Harmonic*	
30 April - 6 May		*Generation*	
7 - 13 May			Changeover
14 - 20 May			
21 - 27 May			
28 May - 3 June			Set-up Week
4 - 10 June			
11 - 17 June			Williams-Bryan-Newell
18 - 24 June			*Tunnel Ionisation*
25 June - 1 July			
2 - 8 July	Gemini Installation	Changeover	
9 - 15 July			
16 - 22 July		Set-up Week	
23 - 29 July			Set-up Week
30 July - 5 August		N. Woolsey	
6 - 12 August		*Astro Physics*	Springate-Tisch-Marangos
13 - 19 August		*Relevant Plasma Jets*	*Emission from Clusters*
20 - 26 August			
27 August - 2 September			
3 - 9 September			Set-up Week
10 - 16 September			
17 - 23 September			Williams-Bryan-Newell
24 - 30 September			*Tunnel Ionisation*
1 - 7 October			Gas lines
8 - 14 October			Gas lines
15 - 21 October			Gas lines
22 - 28 October	Laser Commissioning		10 Hz re-commission
29 October - 4 November			Set-up Week
5 - 11 November			
12 - 18 November	Gemini Commissioning		Marangos-Tisch-Torres
19 - 25 November			*Molecular Orbits*
26 November - 2 December	See Commissioning Schedule		
3 - 9 December	for details		
10 - 16 December			
17 - 23 December	HPL User Meeting	HPL User Meeting	
24 - 30 December	Christmas and New Year	Christmas and New Year	Christmas and New Year
31 December - 6 January			
7 - 13 January	System Maintenance/Changeover		
14 - 20 January	Set-up Week		
21 - 27 January			
28 January - 3 February	Najmudin		
4 - 10 February	*Electron Acceleration*		
11 - 17 February			
18 - 24 February		Set-up Week	
25 February - 2 March			
3 - 9 March		Gregori	
10 - 16 March		*Inner Shell Photon*	
17 - 23 March		*Ionisation*	
24 - 30 March	Quantel Servicing		
31 March 2008			

Table 1. Astra experimental schedule 2007/08.

ATA1

Investigator	Availability in normal hours	Overall availability	Reliability
Mercer	79	136	87
Williams/Bryan/Newell	88	140	92
Springate/Tisch/Marangos	87	121	90
Marangos/Tisch/Torres	86	131	91
Overall	85	132	90

ATA2

Investigator	Availability in normal hours	Overall availability	Reliability
Neely/Zeph	65	122	79
Woolsey	80	107	84
Gregori	76	132	85
Overall	73	115	82

ATA3

Investigator	Availability in normal hours	Overall availability	Reliability
Najmudin	46	74	58

Table 2. Astra statistics 2007/08.

Table 2 and Figure 1 are an experiment by experiment break down of the Astra laser performance for the reporting year. A number of these experiments experienced larger periods of downtime during the experimental campaigns.

An analysis of the contributions to this downtime was made (fig 2) in order to target areas which may be in need of investment. The single biggest cause of downtime, over 50%, was the Macholite pump laser. The Macholite provides the pump source for Astra Amp3 and is critical for the operation of TA2 and Gemini TA3. This reflects the somewhat better performance figure for Astra Target Area 1.

In order to target this large contribution to laser downtime a replacement for the macholite and a reconfiguration of third Astra amplifier is planned for the spring of 2009. Another large contribution to downtime is the cooling systems. To mitigate against this a spare chiller for the Jade was purchased and pumps in the secondary cooling circuit were replaced. During the reporting year the Astra Gemini laser systems were brought online, these are described elsewhere in this report. However, experience of bringing other large facilities online has demonstrated a dip in the performance of the existing facilities as staff and capital are directed towards the project.

Additional developments during the reporting year include the installation of a fast tip-tilt correction mirror in the third Astra amplifier in order to compensate for alignment drift. In order to maximize the contrast for the Gemini system the Carrier Envelope Phase Stabilisation was removed from the front end systems. The automated alignment system was extended to include the second Astra amplifier in order to improve system start up and reproducibility.

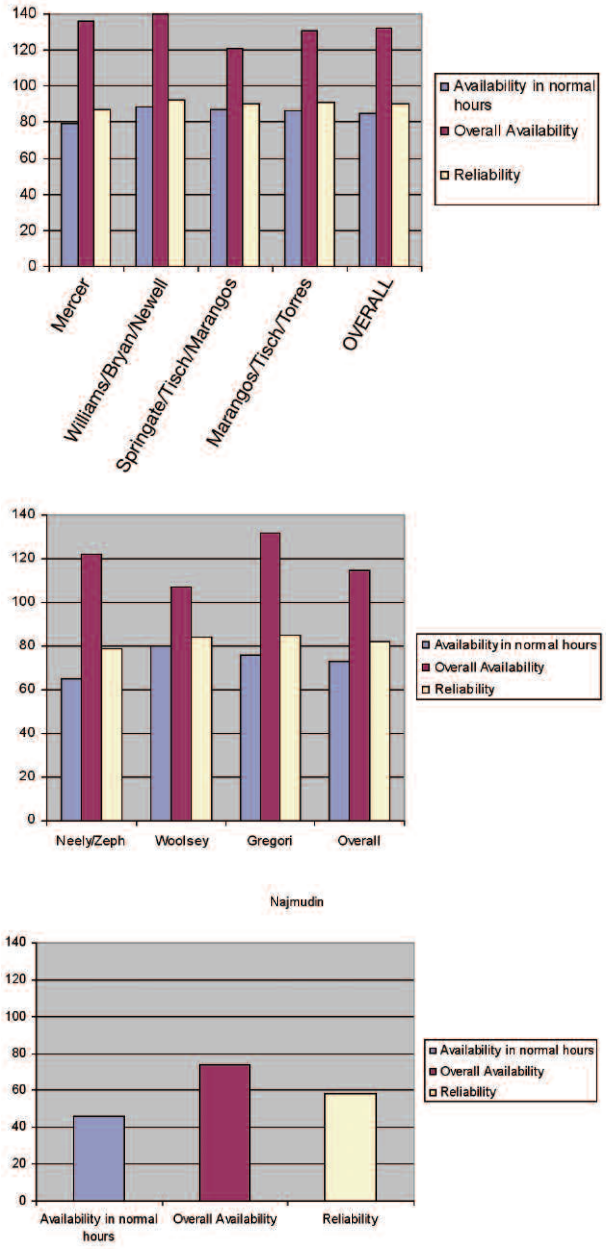

Figure 1. Astra statistics 2007/08.

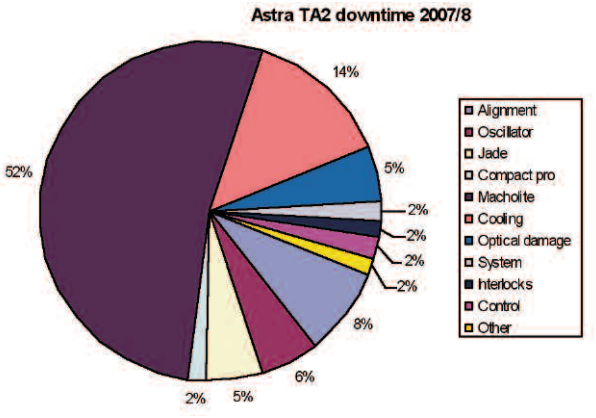

Figure 2. Astra downtime breakdown 2007/08.