



## **Orion:** Target diagnostic

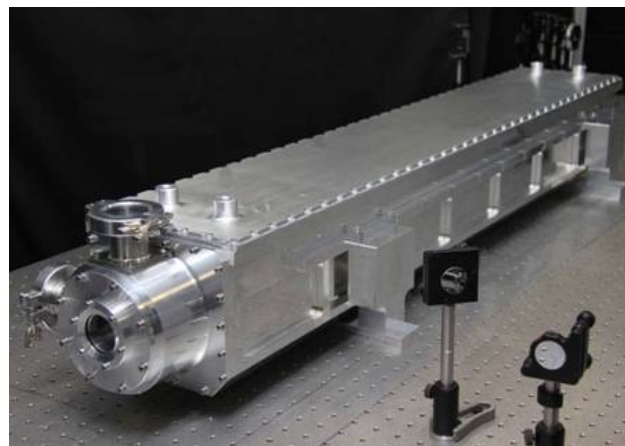
A photograph of the Orion laser facility building at AWE Aldermaston. The building is a large, modern structure with a prominent, curved, metallic facade that reflects the sky. It has a large, dark, arched entrance. The image is overlaid with a semi-transparent blue and teal gradient.

# **X-ray Streak Camera (XRSC)**

The Orion laser facility at AWE Aldermaston, one of the largest scientific capital investments in the UK, houses a large neodymium glass laser system and a target chamber in which the high energy density physics experiments are performed. This is necessary to support certification of performance and safety of the UK deterrent.

[www.awe.co.uk](http://www.awe.co.uk)

The X-ray Streak Camera (XRSC) provides a means of time-resolving the laser/plasma interactions at picosecond resolutions. There are a total of four XRSCs used with the Ten Inch Manipulator (TIM) diagnostic insertion system. Two of them are "picosecond" cameras, with 200 ps, 500 ps, 1 ns and 2 ns sweep ranges, and the other two are "nanosecond" cameras, with 5 ns, 10 ns, 25 ns and 50 ns sweep ranges. The picosecond XRSC has a resolution of <math><1\text{ ps}</math>, and the nanosecond XRSC a resolution of a few ps.



**Streak Camera Crystal Spectrometer**

### Specification

TIM based	
Power input:	24 Vdc
Communication:	Ethernet over fibre optic
Sweep ranges:	Picosecond cameras: 200 ps, 500 ps, 1 ns and 2 ns
Nanosecond cameras:	5 ns, 10 ns, 25 ns and 50 ns
Limiting temporal response:	Picosecond cameras: 1 – 4 ps
Nanosecond cameras:	8 – 100 ps
Weight:	<math><60\text{ kg}</math>

When used in real shot configuration, the XRSCs communicate via an Ethernet over fibre optic connection. Each camera has its own address on the Orion control network. The Orion control system sends the setting parameters to each camera, requests their status, and tells them to standby for the laser shot. After the shot, the control system retrieves the raw images and shot data from each camera for further analysis.