

ASTUTE LAUNCH TO THE NEW IMechE SEASON

Engineering behind the new Astute class nuclear submarine explained



IMechE Event Organiser, Jim Furness (left) congratulates Tim Chittenden (centre) & James Shepherd of BAE Systems on a great presentation

The new IMechE West Cumbria season got off to a splendid start with a crisp presentation by Programme Director, Rear Admiral (Retd) Tim Chittenden, of BAE Submarine Solutions, ably assisted by graduate trainee, James Shepherd.

After summarising BAE Systems' current capabilities and the association with Barrow – having produced the first Navy submarine in 1903 and specialising in 'first-of-class' builds – Tim opened by outlining the merits of the submarine: "it's the ultimate stealth vessel – you don't know it's there, and you don't know it's not..."

With modern technology, it can now function as a strategic gatherer of information as well as a weapons platform, and the time underwater is only limited by the need for food – it can produce all it's own oxygen and water. Maybe the sanity of the submariners might also have something to do with coming up for fresh air from time-to-time...

Astute is first-of-class for a new breed of hunter-killer SSN type submarine. As a project, it is more complex than the space shuttle. It does not carry the ballistic missiles of the Trident carrying SSBN Vanguard Class, but it has a highly flexible array of torpedo tubes. Tim's visual presentation was slightly sanitised by the MoD to prevent any important specific information being given away, but the audience was re-assured to learn that Astute can dive 'deeper than 300 metres' and travel at 'more than 25 knots'. Apparently Janes Fighting Submarines is a good source for further details. Sadly for the traditionalists, there is no manual periscope for the Captain to peer through.

Astute is the first class of submarine to be designed using modern automotive type CAD techniques, and certainly the density of equipment within its limited space cries out for the sophisticated packaging and planning that can be achieved. A lot of impressive statistics were rolled out, amongst them, that the integrated, multi-channel sonar equipment package had the computing power equivalent to 200,000 laptops.

James explained some of the construction arrangements, a modular build allowing full systems testing 'off boat' before final assembly, and all equipment is mounted and shielded in such a way as to minimise emissions. 50,000 tiles cover the external surface of the vessel (the space shuttle has 27,000). The PWR2 nuclear reactor provides the heat energy that makes the steam to drive the propulsor, and all control surfaces are now individually moveable, allowing the submarine to 'hover' in a fully stationary position. Reverse osmosis units provide the fresh water from seawater, and electrolysis is used to produce oxygen for breathing air. The steel structure itself is designed to damp out any resonances that may be generated.

Assembly in the impressive Devonshire Dock Hall (DDH) has also broken new grounds for building submarines, with a number of the modules being placed in an upright position to facilitate loading and construction. Once complete, the modules are then turned round and brought together to complete the whole structure.

Astute is now in the water and is due for acceptance by the Navy in 2008. The next in line, Ambush, Artful & Audacious, are proceeding, at approximately 2 year intervals, and further possible orders are being sought.

To follow on from this excellent presentation, a visit is being arranged to view the 25,000m² Devonshire Dock Hall in Barrow on March 17th 2008 and see some of the Astute Class assembly. Unfortunately, the available places may already be oversubscribed, but anyone wishing to get their names on the reserve list should get in touch with the event organiser, Jim Furness (01900 823803). Details of this visit and all other activities can be found on the web site:

www.imechewestcumbria.org.uk