

## SPACE



## Countdown begins to ESA's Vega maiden launch in late 2007

ESA (Hall 5, Space Pavilion) is gearing up for the launch of its new Vega launch vehicle after a successful first test firing of its second stage motor, the Zefiro 23, last month. The static firing was at the Italian Ministry of Defence test centre in Salto di Quirra, Sardinia and the motor delivered more than 100t of thrust (1,070kN).

Vega is ESA's newest launcher, designed to place smaller satellites of up to 2,000kg into polar and low-earth orbit. It will provide cost-effective access to space and

uses a lot of technology derived from the Ariane programme.

The launcher is designed to lift single or multiple payloads to orbits up to 1,500km in altitude. Its baseline payload capability is about 1,500kg to a circular 700km high sun-synchronous orbit, but it can also launch satellites from 300kg to more than 2t, and also piggy-back micro-satellites

The first Vega flight is currently set for the end of 2007 from Europe's Spaceport in French Guyana.

## Fifth updated GPS IIR satellite completed

Lockheed Martin has completed the fifth in a series of eight modernised Global Positioning System (GPS) IIR satellites. The spacecraft promise to provide significantly improved navigation performance for US military and civilian users worldwide.

The satellites offer improved features for GPS users, such as two new signals and enhanced encryption and anti-jamming capabilities for the military.

The team is now preparing for the second IIR-M mission, scheduled for launch on 14 September from AFS Cape Canaveral, Florida. There are currently 29 spacecraft in the GPS constellation.

# US-only build for CEV capsule says Lockheed Martin

Steve Nichols

Lockheed Martin's John Karas is optimistic that NASA will select his company's proposal for its Crew Exploration Vehicle (CEV) in late August or September.

The firm is competing against the Northrop Grumman/Boeing partnership for the multi-billion dollar contract.

The CEV capsule, similar to an old Apollo design, will transport up to six crew members to and from the International Space Station (ISS). It could also take four people to the Moon, Mars and beyond.

If Lockheed Martin's design is accepted, Karas, vice-president of space exploration, says that its construction will be a US-only affair.

"One of NASA's concerns was that any proposal must use existing US-based expertise where possible. We fully support that and our proposal maps a route by which existing personnel working on the Shuttle programme can transfer across to CEV," he says.

Lockheed Martin has already announced a partnership with Florida that, if successful, will see it locate its final assembly and testing of the CEV in the O&C facility at Kennedy Space Centre. In March, it said it would bring 1,200 jobs to the Houston, Texas, area too.

### Confident

Karas is confident that Lockheed Martin's CEV proposal will not be too heavy either. "NASA gave us a weight requirement and we are comfortably within margin. Questions over weight are always raised at this stage of any proposal," he adds.

The company was originally promoting its Shuttle-type Orbital Space Plane, but NASA changed its plans and the company had to go back to the drawing board.

Lockheed Martin remains focussed on its Space Shuttle work. Karas says he is relieved Discovery made a safe landing on Monday. "We were responsible for the modifications to the Shuttle's external fuel tank, which performed magnificently," Karas adds.



Lockheed Martin's John Karas with a CEV mock-up.

## UK minister meets Mars-bound 'Bridget'

The UK Minister for Science and Engineering Lord Sainsbury came face to face with 'Bridget' during the show's Space Day.

Bridget is the pet name for the European Mars Rover, due to be sent to the red planet in 2011 as part of the ExoMars project.

The six-wheeled testbed chassis demonstrated how the vehicle would navigate rocky Martian terrain at the show and made light work of the orange rocks carefully placed in its path.

The European-built rover will carry equipment that can look for the tell-tale signatures of life on Martian soil and rocks, such as amino acids.

The so-called Life Marker Chip (LMC), developed by Mark Sims of Leicester University, will pass samples of Martian dust through a set of tests. ExoMars will also be able to search for these chemicals underground with a 2m (6.5ft) drill.

The £410 million (\$750 million) project was approved by Europe's space ministers in December 2005.



Lord Sainsbury (third left) is introduced to 'Bridget' by Chris Draper of EADS Space. Looking on are Kaoru Mamiya of Japanese space agency JAXA and Azzedine Oussedik of Algerian space agency ASAL.

# Stereo mission promises new view of Sun

Scientists around the world are eagerly awaiting the launch next month of NASA's Stereo mission, which will provide a new perspective on the Sun.

The UK has some input to the satellite. Its Heliographic Imager was developed by a UK-led team involving the University of Birmingham and the Rutherford Appleton Laboratory, says

the British National Space Centre (Space Pavilion, Hall 5).

Stereo will work by providing two images of solar activity from satellites in different orbital positions – one ahead of Earth, the other trailing behind. The result will be just like watching a 3D movie.

Scientist Dr Alex Young says: "If you

only saw stuff with one eye, you'd lose the ability to judge perspective and depth. Basically we're looking at the sun with one eye.

"With Stereo, we're finally going to have the ability to gain this extra dimension, or this depth perception we didn't have before."

The satellites will be used to study coronal mass ejections (CMEs) – powerful eruptions that can blow up to 10 billion tonnes of the Sun's atmosphere into space. If they collide with Earth, they cause auroras, black out HF radio communications, damage communications satellites and trigger power cuts.

In 1989, the Canadian province of Québec suffered a complete blackout after plasma clouds left the Sun and hit the Earth. The massive outage lasted more than 9h.



## UK processor for Indian spacecraft

BAE Systems and Surrey Satellite Technology (SSTL) are to supply an RF system subprocessor for India's Chandrayaan-1 spacecraft. The satellite will be used to map the Moon's poles and is scheduled for launch in 2007. The OBC695B processor is derived from the unit flying on the GIOVE-A navigation satellite, which was designed and built by Guilford-based SSTL for the European Space Agency. GIOVE-A is the first in the series of European Galileo global navigation satellites.