

Rocket needs destination

NASA finally delivers its design for a huge rocket that could take humans to asteroids, Mars and a few other exotic corners of the Solar System

The Space Launch System (the name will be changed at some point, surely) will be the most powerful launcher ever built — more powerful even than the Saturn V rockets that put men on the Moon. In its full-up configuration the SLS will be some 12m taller than the moonshot rockets and have 20 percent more thrust as they clear the pad.

The SLS, depending on just how big the final vehicle becomes, could be carrying to low-Earth orbit some five-to-eight-times the payload mass of a single Ariane 5 rocket, one of the most muscular rockets in operation today. That is astonishing. But then, if you want to go to Mars, land, and get home — you will need an awful lot of equipment, and possibly even more than can be carried on one SLS.

The core and upper stages are the same width as the shuttle's iconic orange external tank — 8.4m. The shuttle orbiter's main engines will also be pressed into service anew on the bottom of the new core stage, and the solid-fuelled boosters that used to power the shuttle off the pad will now perform the same function for the SLS (although in the stretched version that was already being prepared under Constellation).

NASA calculates it will have spent about \$18bn on the project by the time the inaugural (un-



NASA Administrator Charles Bolden taking questions from the media

manned) test launch occurs in late 2017. This figure includes not just the work on the rocket, but its Orion astronaut capsule and the ground work needed at Kennedy to get the spaceport ready for a new type of launch vehicle.

It should be noted also that the 2017 maiden test flight will use a 'lite' variant, one capable

of lifting about 70 tonnes to low-Earth orbit. Further work and expenditure will be required to develop a rocket capable of lifting more than 130 tonnes — the spec demanded by Congress. So that \$18bn is actually a figure for one point along a development road. The final cost for SLS has been estimated by some to be more than

\$30bn.

NASA's budget for the next few years will be flat, at best. It is also grappling with a big cost overrun on another of its top priorities — the James Webb Space Telescope — and for which the shortfall will have to be picked up by programmes across the agency, perhaps even human spaceflight.

Dinosaur feather evolution trapped in amber

Samples of amber in western Canada containing feathers from dinosaurs and birds have yielded the most complete story of feather evolution ever seen

Eleven fragments show the progression from hair-like 'filaments' to doubly-branched feathers of modern birds. The find adds to the idea that many dinosaurs sported feathers — some brightly coloured. A study of amber found near Grassy Lake in Alberta (dated from what is known as the Late Cretaceous period) has unearthed a full range of feather structures that demonstrate the progression. "We're finding two ends of the evolutionary development that had been proposed for feathers trapped in the same amber deposit," said Ryan McKellar of the University of Alberta.

The team's find confirms that the filaments progressed to tufts of filaments from a single origin, called barbs. In later development, some of these barbs can coalesce into a central branch called a rachis. As the structure develops further, further branches of filaments form from the rachis.

Jobless claims post surprise increase

Number of Americans filing new claims for jobless benefits rose unexpectedly recently in a sign concerns about a weak economy were sapping an already beleaguered labour market

Applications for unemployment benefits have climbed to 428,000 recently from 417,000, the Labour Department said. It

was the second straight week in which claims rose. Wall Street analysts had been looking for a dip to 410,000.

Excluding one week in early August, claims have held above 400,000 since early April. A Labour Department official said there was no discernible effect from Hurricane Irene or other storms in the national reading.

Continuing claims eased to 3.726 million from 3.738 million. The number of total recipients on benefit rolls was 7.144 million.

US employment growth ground to a halt in August, with zero net job creation raising fears of a new recession and putting pressure on the Federal Reserve to ease monetary policy further at its meeting later this month.

Europe spooked by Greek debt



A woman sells fruits at Malveira farmer's market, north of Lisbon

In France, the concerns are there in black and white on the front pages of the newspapers for everyone to read

"France's banks trapped by Greek debt," said one. French banks

are profoundly exposed to Greece's debt — and there is real fear about the consequences of a possible default. Prompted by these worries, shares were sharply lower in early trading. Uncertainty is a daily re-

ality for traders. Some say Greece leaving the Euro is no longer out of the question. "The idea of letting Greece go is no longer taboo," remarked one, adding, "But no one knows how that might come about, as there is no provision in the Maastricht Treaty allowing for a country to leave the Euro."

There is also more pressure on Angela Merkel from Finland, which now warns it may opt out of Greece's second bailout deal if its demand for collateral in exchange for loans to Athens is not met. "I think all of us want to and will find a way forward that is acceptable to all partners but also answers the concerns voiced by Finland. We have experts working on it," Ms. Merkel said. The concern is that Greece will not be able to manage its debt — and the signs from Athens are not encouraging.

EU ready to announce Eurobond proposal

Most EU countries say Eurobonds are a good idea and a way of firming up the Eurozone

The European Commission is nearly ready to announce its plans for a Eurobond, backed by all EU economies, both weak and strong, that could reduce borrowing costs for stricken Greece and other shaky member states. "This is a fight for the economic and political future of Europe. This is a fight for what Europe represents in the world. This is a fight for European integration itself," said Jose Manuel Barroso, President of the European Commission.

The problem is Europe's strongest economy, Germany, is dead against the Eurobond idea, as the Economy Minister has again underlined. "Mr. Barroso does not speak for the German Government. I want to point out that we just had a verdict in the German Supreme Court which made it clear limitless German liability is not possible without the approval of the German Parliament. In my view, that eliminates Eurobonds for Germany," said Philippe Roesler.

One European Commissioner has had the wind taken out of his sails after suggesting lowering to half-mast in Brussels all the flags of EU members that are too heavily in debt. "Totally ridiculous" was one of the more polite criticisms.

Breaththrough in Belgian government talks

The man given the seemingly impossible task of trying to form a government among squabbling factions in Belgium has said there has been a breakthrough

The leader of the French-speaking socialists, Elio di Rupo, said the eight parties have succeeded in 'overcoming obstacles' that have caused difficulties. Belgium has the dubious honour of holding the world record of being the country without a government for the longest period of time. There has been a caretaker administration for 15 months since the inconclusive election in June 2010.

In general, the deadlock centres on arguments between the relatively wealthy Dutch-speaking community in the north and the poorer French-speakers in the south. According to Mr. di Rupo, differences over the BHV bi-lingual region covering Brussels and its suburbs have now been settled. Before the positive statement at the outcome it had been reported that the talks had hit a 'deep blockage' and Mr. di Rupo warned that the work to form a government is far from finished with numerous issues yet to be worked out. Over the past 460 days there has even been talk of Belgium breaking apart.

Materials prepared with aid of information agencies