



March 2007

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From the Chair

Hi everyone and welcome to March's issue of NOVA. The focus this month will be to let you all know about some of our special projects that we have planned for the year. Two projects are tentatively scheduled to be flown at the 2008 X-PRIZE CUP. These are the SEDS Reusable Rocket Challenge and the SEDS Payload Challenge. Both will consist of student teams from different colleges and universities that design and build with the required specifications. Teams may also collaborate between chapters which would be a great way to meet and work with your fellow SEDS members. We are very excited for these projects and having them at the X-PRIZE Cup will give them national coverage! Another project that we are in the process of developing is the SEDS-Zero G Project. Similar to the previous year's project, students will develop an experiment to be performed in microgravity. Winners of the competition will be able to fly their experiment in a Zero-G plane and experience microgravity firsthand! The SEDS National Space Art Contest is designed to be one of our new low-budget, high-profile projects. SEDS members are asked to create art within the context of a space theme. Many different mediums can be used. It was noted at our National Conference (SpaceVision 2006) that much of the existing art having to do with space is old and outdated. SEDS wants to take a more updated perspective on space art and we encourage our members to participate. Winners of this contest will have their art publicly displayed and may even be contracted! SEDS is proud to offer a wide variety of special projects this year and most of this work can be accredited to our Director of Special Projects, Josh Nelson. Please get involved with the National Projects and do not hesitate to ask questions!

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Space News

DAMAGE FROM HAILSTORM DELAYS SHUTTLE LAUNCH

NewScientist.com news service

Kelly Young

The space shuttle Atlantis's planned March launch has been delayed to late April so technicians can repair extensive damage to foam insulation on its fuel tank caused by golf-ball-sized hail.

There are an estimated 7000 pits and divots in the foam around the top part of the tank from the hailstorm that hit the launch pad on Monday (see Hail damages space shuttle fuel tank). NASA officials expect that they will not have to repair every single mark, but the repairs will still probably number in the hundreds.

"This constitutes in our evaluation the worst damage we have ever seen from hail on external tank foam," says NASA shuttle programme manager Wayne Hale.

In addition, three ice/frost ramps on the tank were crushed by hail. These are areas of foam designed to prevent ice and frost from forming on metal brackets that hold pressurisation lines and cable trays. NASA has been working to eliminate the ramps because they have been known to shed foam during flight.

ORBITER DAMAGE

NASA covers its fuel tanks with foam both to protect the tank from aerodynamic heating during launch and to prevent hazardous ice from condensing from the atmosphere onto supercooled tank components. The liquid oxygen and liquid hydrogen inside the tank are stored at cryogenic temperatures.

Both foam and ice falling from the tank could be disastrous if they struck the orbiter in the wrong place, as evidenced by the deadly Columbia disaster in 2003.

In fact, the Atlantis orbiter itself was also damaged in the hailstorm, with NASA workers counting 26 or 27 superficial marks on the heat shield tiles on its left wing.

That area is normally protected from weather. But this time, some wind-blown hail may have snuck inside the protective gantry surrounding the orbiter and ricocheted around, says NASA launch director Mike Leinbach. "While there are a few areas, it's not that bad on the orbiter," he says.

SAND DOWN

NASA plans to haul the shuttle back into the Vehicle Assembly Building (VAB) on Sunday so technicians can get a close-up look at the external tank and make repairs, which could take several weeks.

While the shuttle is in the VAB, technicians may scan the reinforced carbon carbon panels on the leading edges of the wings to see if they sustained any damage. A large hole in one or more of these panels is what led to Columbia's breakup.

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For some shallow dings in the foam, they may be able to sand down the existing foam and blend it into the contour of the tank. Other areas may require taking out the damaged foam, pouring in new foam, and sanding it down.

"At this point, we don't see anything that looks irreparable," says external tank project manager John Chapman of the Marshall Space Flight Center in Huntsville, Alabama, US.



Image: KSC/NASA

TANK REPLACEMENT

If the tank requires even more repairs than they anticipate, they could have to replace the tank entirely with one reserved for the next shuttle mission. That tank is not expected to arrive at the Kennedy Space Center until 10 April, so it would delay Atlantis's launch to June.

Despite this setback with the first launch of 2007, NASA says it may still be able to launch the five shuttles it had planned to this year. NASA will retire the shuttle fleet in 2010.

Hail is not a new problem for the agency. In 1982, the night before shuttle Columbia's fourth flight, a hailstorm damaged the sensitive heat shield tiles on the orbiter's wings. The damaged tiles then absorbed about 540 kilograms of rain. Once in space, the orbiter faced the Sun to allow the tiles to dry out.

'NO BUDGET BREAKER'

In 1990, space shuttle Atlantis's heat shield was damaged by hail. Then the shuttle Discovery was hit by hail on the launch pad in 1999. Discovery's external tank was damaged and had to be hauled back to the Vehicle Assembly Building to fix about 460 of the 650 divots in the tank's foam insulation.

Shuttle managers say that repairing Atlantis's tank should not cost the agency a lot more money.

"This is not the kind of thing that is a budget breaker," Hale says. "We have adequate reserves to make it to the end of the year."

Space News Continued

TWO MORE INCIDENTS ADD TO GROWING SPACE DEBRIS

By COLIN CLARK

Space News Staff Writer

WASHINGTON — The Feb. 19 explosion of a Russian Breeze-M rocket stage launched a year ago created an amount of orbital debris on “the same order of magnitude” as the Jan. 11 Chinese anti-satellite (A-Sat) test, a NASA debris scientists said Feb. 23.

“This is an unprecedented set of events in terms of such large breakups in such a short time,” Mark Matney, an orbital debris scientist at NASA’s Johnson Space Flight Center, said Feb. 23.

The Proton debris is in a highly elliptical orbit with an apogee of 15,000 kilometers and a perigee of 500 kilometers. That means the Proton debris will remain in orbit for several decades because the time spent at perigee is very short, Matney said

The Breeze-M upper stage, part of a Proton rocket launched Feb. 28, 2006, by International Launch Services, was supposed to deliver the Arabsat 4A satellite into geosynchronous orbit. It failed and, for unknown reasons, the hypergolic fuel-laden rocket exploded almost a year later. Debris larger than 10 centimeters is being tracked although Matney said the official catalog of space debris had not yet been updated. The Air Force personnel responsible for tracking debris catalog “are pretty busy” building the catalog of the debris field from the Chinese FY-11 weather satellite destroyed during the anti-satellite test, the NASA scientist said.

There are also reports of another February debris event. Observers in Finland photographed the apparent explosion of an auxiliary motor on a Russian SL-12 rocket Feb. 14, according to T.S. Kelso, technical program manager at the Center for Space Standards and Innovation in Colorado Springs, Colo., a research arm of Analytical Graphics Inc. “These events are most unusual. If they are indeed both on-orbit explosions, that would make two events in less than a week. According to the NASA Orbital Debris Program Office, there were only eight events all of last year, and that was the most since 1993,” Kelso said in a Feb. 23 e-mail.

Conference Opportunities

1. 45TH AAS GODDARD MEMORIAL SYMPOSIUM

Date: March 20-21, 2007

Location: Adelphi, Maryland

(University of Maryland University College)

Website: <http://www.astronautical.org/>

For Info: 703-866-0020

2. YURI'S NIGHT WORLD SPACE PARTY

Date: April 12, 2007

Location: Your Hometown!

Register your party today!

Website: <http://www.yurisnight.net>

For info, contact Loretta Hidalgo at

loretta@yurisnight.net

Discounts: no charge for attendance

3. NSS INTERNATIONAL SPACE DEVELOPMENT CONFERENCE

Date: May 24-28, 2007

Location: Dallas, Texas

Website: <http://isdc.nss.org/2006/>

For Info: (202) 429-1600

4. SPACE FRONTIER FOUNDATION'S NEWSpace CONFERENCE

(Former *Return to the Moon Conference*)

Date: July 18-21, 2007

Location: Washington DC

Website: <http://www.space-frontier.org/>

Projects/

Moon

For Info: krukin@spacefrontierfoundation.org

5. MARS SOCIETY CONFERENCE

Date: August 30-September 2, 2007

Location: Los Angeles, CA (University of California)

Website: <http://www.marssociety.org/convention/2006/>

For Info: MarsSocInfo@aol.com

6. X-PRIZE CUP

Date: mid-October, 2007

Location: Las Cruces, New Mexico

Website: <http://www.xpcup.com/index.cfm>

For Info: (323) 957-0729

Discounts: Volunteer Opportunities Available

Volunteers get free admission

7. PRO SPACE'S MARCH STORM

Date: March 3-7, 2007

Location: Washington DC

Website: <http://www.prospace.org/>

For Info: fjohnson@arachnerd.com

8. IEEE AEROSPACE CONFERENCE

Date: March 3-10, 2007

Location: Big Sky, MT

Website: <http://www.aeroconf.org/>

For Info: david.f.woerner@jpl.nasa.gov

E-MAIL RYAN MCLINKO AT MCLINKOR@MIT.EDU IF YOU HAVE ANY QUESTIONS.

Please send comments on the newsletter to publications@seds.org.

Students For the Exploration and Development of Space

