SPACE PHYSICS

Redesign Postpones Launch of Long-Delayed Space Station Experiment

Driven and independent, Samuel C. C. Ting has campaigned for 16 years to send a massive particle detector to the International Space Station. But just as researchers are preparing the $1.5 billion, 7.5-ton Alpha Magnetic Spectrometer (AMS) for liftoff on the last flight of NASA's space shuttle, Ting, a Nobel Prize–winning physicist at the Massachusetts Institute of Technology in Cambridge, has decided to swap out a key piece of hardware. That change will delay the launch, which was scheduled for 29 July, by months. But Ting says the change will prolong AMS's lifetime by many years, and those who know him say the move is likely not as rash as it appears.

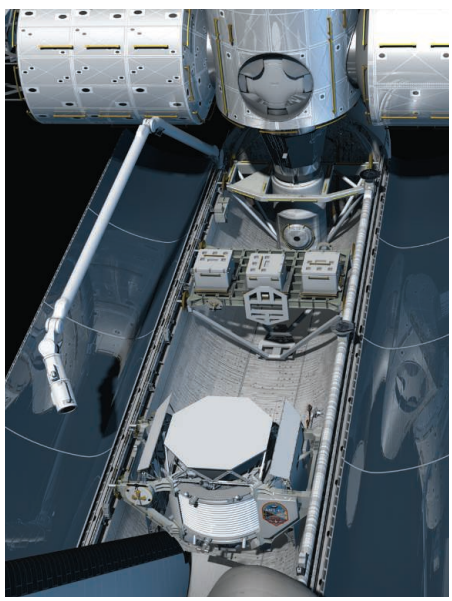
"I would never bet against Sam Ting," says Nicholas Samios, a physicist at Brookhaven National Laboratory in Upton, New York. "He's very aggressive," Samios says. But "he's a very careful guy, meticulous."

Proposed in 1994, AMS will search for antimatter lingering from the big bang, particles of dark matter, and other oddities by identifying every charged that passes through it. To distinguish electrons from positrons and iron nuclei from nickel, it measures how each particle's path bends in a magnetic field. The field was supposed to come from a 2350-kilogram superconducting coil that would generate a field about 17,000 times as strong as Earth's field. Now, Ting has decided to use a permanent magnet—akin to one on your refrigerator—that has a field one-fifth as strong and was used in a 1998 test run aboard the space shuttle. "The decision was fundamentally made by me," Ting says.

Part of the reason for the swap is because the superconducting coil generates more heat than expected. It must be chilled to nearly absolute zero with liquid helium, and the plan was to send along 2500 liters of liquid to keep AMS cold for 3 years. But recent tests at the European Space Agency's research and technology center in Noordwijk, Netherlands, suggest that AMS would boil off its helium in about 20 months, Ting says.

However, a bigger reason for the change is that revised plans for the space station give AMS a chance to run even longer than 3 years, Ting says. NASA had planned to "deorbit" the space station in 2015, but in February officials announced plans to keep it aloft until at least 2020. AMS could keep running all those extra years but only if scientists switch to the permanent magnet, which needs no coolant. Otherwise, "after 3 years we'd have a museum piece up there," Ting says.

The switch to the weaker magnet will slightly diminish AMS's ability to measure a particle's mass and to study really heavy ones. Still, "AMS is 100 times better than any other particle detector that's ever been put into space," says Jack Sandweiss, an AMS collaborator at Yale University.



Someday. NASA's space shuttle will deliver the Alpha Magnetic Spectrometer (octagonal apparatus) to the International Space Station, as in this drawing.

CREDIT: NASA

The flash retrofit will be a challenge, but Trent Martin, AMS project manager at NASA's Johnson Space Center in Houston, Texas, thinks researchers can pull it off. "I spent the last 3 weeks in Europe looking at whether this is possible, and I'm comfortable that they can make the change," he says. No new launch date has been set.

Replacing its magnet is hardly the first change of plans for AMS. NASA had scheduled a launch for 2003 but postponed it after the space shuttle Columbia disintegrated upon reentry that February. In 2005, the agency scratched AMS from its to-do list, but 3 years later Congress mandated its launch. Ting's commitment has never wavered, colleagues say. "He's a guy who pushes," Samios says. "Any other mortal would have given up." But in making a last-minute design change, Ting may be pushing his luck.

–ADRIAN CHO

ScienceInsider

From the *Science* Policy Blog

NASA Administrator Charles Bolden told a Senate spending panel that **space science** could suffer if the U.S. Congress forces NASA to stick with the Constellation program. The Administration wants to terminate that rocket effort under President Barack Obama's new space policy, which calls for a 2011 budget request that would boost NASA science to $5 billion, an 11% increase over current levels. http://bit.ly/aU9RA6

A microbiologist who once worked with **suspected anthrax mailer Bruce Ivins says** his former colleague, who killed himself in 2008, wouldn't have had enough time to make all the spores contained in the 2001 letters. But another scientist who routinely makes anthrax stocks for research has disputed the testimony of Henry "Hank" Heine before a U.S. National Academies panel. http://bit.ly/d21aF2

A new report by the Institute of Medicine on Americans' **salt intake** suggests that the government gradually restrict the level of salt in food. It's also prompted speculation that the Food and Drug Administration plans to take action. http://bit.ly/dfRM2p

The **International Barcode of Life Project** got a $35 million boost from Canadian agencies. The 26-nation effort collects specimens, sequences their DNA, and builds an informatics platform using digital bar codes to store and share information for species identification and discovery. The new funds, part available now and part spread over 5 years, bring the government's commitment to the world's largest biodiversity genomics project to $80 million and includes $2.2 million to enable researchers in five developing countries—Argentina, Costa Rica, Kenya, Peru, and South Africa—to play key roles. http://bit.ly/bTbwBT

Mexico has established the Agencia Espacial Mexicana, its first **space agency**. It won't be sending astronauts into space or even building its own rockets but instead will develop space policy and stimulate aerospace investment. http://bit.ly/duNlfW

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