

in 2008 and is scheduled to open to users in 2013. The CNY180 million (roughly \$28 million) Wuhan lab at Huazhong University of Science and Technology is the first major scientific facility in China to be under the auspices of a university rather than the Chinese Academy of Sciences. A sister lab in Hefei that focuses on static magnets is comparable to centers in Tallahassee; Tsukuba, Japan; Grenoble, France; and Nijmegen, the Netherlands.

Liang Li, the director of the Wuhan lab, earlier worked in Europe and the US and designed pulsed magnets at the NHMFL. So far, 7 of 11 planned experimental stations at Wuhan are ready; they are outfitted with low-temperature cryostats, lasers, and other instruments. Li says the Chinese lab has achieved 78.8 T and plans to test its first dual-stage magnet this month. "We will get as high as we can, hopefully to 85 T."

Toni Feder

Weather data gap is forecast as satellite is delayed

A new polar-orbiting satellite is only a temporary fix for a more durable spacecraft that has been starved of funding.

As the launch of a next-generation polar-orbiting satellite is pushed back by budget cuts, the likelihood grows that the National Oceanic and Atmospheric Administration's weather forecasts will become significantly degraded in about five years. Polar orbiters supply 80% of the observational data, such as atmospheric soundings—measurements of a variety of physical characteristics such as pressure, wind speed, and water vapor content—that are entered into the numerical weather-prediction models, NOAA deputy administrator Kathryn Sullivan told the House Committee on Science, Space, and Technology during a 23 September hearing. A gap in observational data is likely beginning in 2016, she warned, when an orbiter scheduled for launch last month (after *PHYSICS TODAY* went to press) is expected to reach the end of its design life.

A permanent new polar-orbiting spacecraft, originally scheduled for launch late in 2016, would offer enhanced observational data. But the new orbiter, the Joint Polar Satellite System (JPSS), is almost certain to be delayed if Congress leaves funding for the program at its fiscal year 2011 level, as expected. Lawmakers supplied just \$382 million of the \$1 billion the Obama administration requested for the JPSS last year. The White House submitted an identical budget request for FY 2012, and Congress appears poised to continue funding at last year's level.

An experimental precursor satellite was due to be launched on 27 October. Built to try out several of the new JPSS instruments, it will also provide observational data for NOAA models. But engineers at NASA, which is managing

construction of the experimental satellite known as the National Polar-Orbiting Operational Environmental Satellite System Preparatory Project (NPP), have estimated its life at just five years. Although Sullivan acknowledged that satellites often operate well beyond their design lives, she said that a gap in observations is a "near certainty" when the NPP stops working. In that event, only a single polar orbiter operated by the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) will remain aloft. David Powner of the Government Accountability Office told the committee that even in the most optimistic scenario, the JPSS satellite won't be transmitting quality data until 2017, because necessary testing and calibration in orbit can take 6–18 months.

Pointing fingers

"To date, the federal government has spent over \$6 billion on the ... JPSS programs, and the only thing we have to show for it is a modified research satellite," said Representative Paul Broun (R-GA), chairman of the Science Committee's investigations and oversight subcommittee, at the September hearing. "The JPSS program is the ultimate example of a runaway government program that has over promised, is over budget, and has underperformed," declared Rep. Andy Harris (R-MD). But Sullivan blamed Congress for the program's woes. "NOAA and NASA have concluded that the lack of adequate funds is the major challenge to achieving JPSS mission success," she told the panel.

Right now, the US and EUMETSAT satellites are complementary. Both are

in sun-synchronous orbit; NOAA's observes conditions at 1:30 pm local time and the European spacecraft assesses morning conditions. Each orbits 14 times a day and passes over the entire surface of the globe twice. NOAA receives fresh data for its models every six hours. The afternoon measurements capture conditions in the warm and more energetic atmosphere, Sullivan said, whereas a quiescent atmosphere is seen in the morning orbit.

Although the US Department of Defense operates two other polar orbiters, they are in early morning orbits and serve very different forecasting needs, Sullivan said. "They're looking for minutes-to-hours tactical forecasting, clouds, dust—are we launching or not launching an operation now," she told the President's Council of Advisors on Science and Technology on 16 September. The US, she added, "will make every effort to take advantage of" relevant data from other nations' polar-orbiting satellites, including one Japan is expected to launch soon. The private sector has expressed no interest in supplying NOAA with the high-precision atmospheric sounding data that are "the lifeblood of weather forecasting," she noted.

To illustrate the importance of having two polar-orbiting satellites, NOAA ran its forecast models several times using archived data from only one of the satellites in the days preceding the record-setting February 2010 East Coast snowstorm. The results were compared with actual forecasts, which had accurately predicted the locations and depths of snowfall five days before the event. With input from just one orbiter, however, the models underforecasted snow depths by 10 inches, Sullivan said. The data from two satellites also have

An artist's rendering of the interim polar-orbiting weather satellite scheduled for launch late last month.



helped NOAA to improve the accuracy of hurricane track forecasts. If Hurricane Irene had occurred 10 years ago, the less-accurate predictions would have led to the evacuation of the Atlantic coast of Florida.

Married and divorced

The JPSS has a tortuous history. It began in 1994 when NOAA and DOD proposed combining their separate polar-orbiting constellations into a single next-generation set of six satellites, estimated to cost \$6.5 billion and save \$1.3 billion. By the time the Office of Science and Technology Policy had reorganized the system in 2010, the cost had soared to nearly \$15 billion for four satellites, and DOD split off to build its own constellation. Now a two-satellite program, with the second satellite to launch in 2021, the JPSS is officially estimated to cost \$12 billion through 2024. But the GAO last year warned that partly because of the loss of support for each other's missions, the JPSS and DOD satellite programs are both likely to incur further overruns and delays.

"The [JPSS] program currently finds itself in the middle of a metaphorical chicken-and-egg paradigm," a science committee report stated. "On one hand, NOAA has indicated that [it] cannot develop a credible baseline for costs and capabilities without a stable and predictable budget horizon." On the other hand, the report said, Congress is skeptical of entrusting a program that has such a dismal record with enough funding to get the job done. **David Kramer**

NSF launches family-friendly initiative

The National Science Foundation is introducing new workplace flexibility policies to make it easier for people to both pursue a research career and raise a family. "I was absolutely thrilled" to hear about the NSF Career-Life Balance Initiative, says Angela Speck, an astrophysics professor at the University of Missouri who has a spouse in academia and two children. "It sends a message that it's okay to take a break." Not only will the initiative help those who want to have or adopt children, she says, but it will also make it easier for supervisors to "find ways to make it work. It's an important move."

At a White House event marking the 26 September rollout of NSF's new initiative, First Lady Michelle Obama said,

"If we're going to out-innovate and out-educate the rest of the world, we've got to open doors for everyone. We need all hands on deck, and that means clearing hurdles for women and girls as they navigate careers in science, technology, engineering, and math [STEM]."

The 10-year plan is intended to "provide greater work-related flexibility for women and men in research careers," NSF director Subra Suresh said at a press briefing. One goal is to help raise the percentage of newly tenured science and engineering positions filled by women 10 years from now to match the percentage of doctorates granted to women today. Currently, women in STEM fields earn 41% of the PhDs but make up only 28% of the tenure-track faculty. In physics, those numbers are about 19% and 14%, respectively (see the article by James Trefil and Sarah Swartz on page 49).

Among other things, the NSF Career-Life Balance Initiative will

- ▶ Allow grant recipients to defer their awards for up to one year to care for their newborn or newly adopted children.

- ▶ Allow grant recipients to suspend their awards to take parental leave.

- ▶ Provide supplements to cover research technicians to maintain labs while principal investigators are on family leave.

- ▶ Promote family friendliness for panel reviewers by allowing them to conduct reviews remotely.

- ▶ Continue to encourage research that assesses the effectiveness of policies aimed at keeping women in the STEM pipeline.

Suresh said that the initial steps "involve taking highly successful best practices ... that have been in place only in small pockets of the National Science Foundation, and elevating them to an agency-wide activity." He added that some "seemingly simple policy steps" can be implemented "irrespective of what the budget climate is," and that they will have "a huge impact over the course of many years."

Toni Feder

Solar Decathlon has wetlands and wool but little sunshine

Nineteen participants in the fifth biennial Solar Decathlon contest in September came to Washington, DC, from as far away as China and New Zealand to showcase their designs for super-efficient homes. Academic teams assembled the fully furnished

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