AAAS Board Statement on The Crisis in Earth Observation from Space

Approved by the AAAS Board of Directors 28 April 2007

The network of satellites upon which the United States and the world have relied for indispensable observations of Earth from space is in jeopardy. These observations are essential for weather forecasting, hurricane warning, management of agriculture and forestry, documenting and anticipating the impacts of global climate change, and much more.

Maintenance of an adequate constellation of Earth-observing satellites and the instruments they carry is now threatened by budget cuts and reallocations in the two federal agencies that share the primary responsibility for them, the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA). The situation is already causing harm, and it will become rapidly worse unless the Congress and the Administration take prompt action to reverse the recent trends.

A 400-page analysis of this issue was recently released by the National Research Council updating and augmenting other recent studies and commentaries.[1] The new NRC report finds that

[T]he United States' extraordinary foundation of global observations is at great risk. Between 2006 and the end of the decade, the number of operating missions will decrease dramatically and the number of operating sensors and instruments on NASA spacecraft, most of which are well past their nominal lifetimes, will decrease by some 40 percent.

It also concludes that the sensors planned for the next generation of U.S. Earth-observing satellites are "generally less capable" than their counterparts in the current, now rapidly diminishing generation. These declines will result in major gaps in the continuity and quality of the data gathered about the Earth from space.

As noted in the new NRC study and elsewhere, this trend of sharply diminished U.S. capacity in Earth observations from space has been the result not only of tightening constraints on NASA and NOAA budgets but also of an explicit redirection of NASA's priorities away from Earth observation and toward missions to the Moon and Mars. The goals in NASA's mission statement formerly began with "To understand and protect our home planet…". Those words have now been replaced with "Pioneering the future…". The aim of better exploring the moon and Mars has attractions, but we agree with the sentiment expressed by the former chairman of the House Science Committee, Representative Sherwood Boehlert (R-NY), who observed at a hearing on this topic in April 2005 that "The planet that has to matter most to us is the one we live on."

The result of the change in NASA priorities is that the funds needed to sustain critical space-based observations are now declining precipitously, even as the agency's total budget grows. The currently projected budgets show U.S. investment in these capabilities falling by 2012 to its lowest level in two decades.

Past NASA and NOAA initiatives in this domain, made possible by the sustained support of successive administrations and Congresses, positioned the United States as the world leader in the field. As of 2005, it was still the case that 60 to 70 percent of the Earth-observation data flowing from space was coming from U.S. satellites and instruments, contributing significantly to U.S. preeminence in atmospheric, oceanic, and terrestrial Earth science. Of course, partnerships and outsourcing are playing a role in this field as in many others, but partnerships and purchase of foreign data by U.S. users are themselves constrained by declining budgets and currently fall far short of U.S. needs.

The NRC study offered detailed recommendations for restoring U.S. capabilities in Earth observations from space to acceptable levels, including

- reconstituting specific key observation capabilities that have recently been deleted from scheduled NOAA satellite series;
- accelerating NASA's current launch schedule to shrink the data gaps implied by current plans; and
- committing to the 17 highest-priority new Earth-observation missions, out of more than 100 candidates evaluated for the 2010-2020 time period.

The study concluded that its recommendations could be funded until 2020 by returning the Earth-science budget at NASA to its FY 1998-2000 level and stabilizing the budget of NOAA's National Environmental Satellite Data, and Information Service at only slightly above the FY2007 level, adjusted for inflation.

This is a blueprint for a program that will bring immense returns for modest costs. The Congress and the administration ought to implement it.

[1] The latest NRC study is Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond, The National Research Council of the National Academies, National Academies Press, 2007, http://books.nap.edu/catalog/11820.html. See also, e.g., Scott Goetz, "Crisis in Earth Observation", Guest Editorial, Science, vol. 315, p 1767, 30 March 2007; Earth Science and Applications from Space: Urgent Needs and Opportunities to Serve the Nation, National Research Council, National Academies Press, 2005; Extending the Effective Lifetimes of Earth Observing Research Missions, National Research Council, The National Academies Press, 2005; Satellite Observations of the Earth's Environment: Accelerating the Transition of Research to Operations, National Research Council The National Academies Press, 2003.

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