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A Blog About Energy and the Environment



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## Lights Out for Research Satellites?

By [RACHEL NUWER](#)



NASA An artist's rendering of NASA's NPP satellite in space. Launched last October, it is the first satellite designed to collect data for both short-term weather forecasting and long-term climate monitoring.



Science

Earth-observing systems operated by the United States have entered a steep decline, imperiling the nation's monitoring of weather, natural disasters and climate change, [a report](#) from the National Research Council warned on Wednesday.

Long-running and new missions are frequently delayed, lost or cancelled because of budget cuts, launch failures, disorganization and changes in mission design and scope, the report said.

In 2007, the research council, the working arm of the National Academies, issued [a report](#) highlighting research imperatives for the next decade and beyond for NASA, the National Oceanic and Atmospheric Administration and the United States Geological Survey, including the renewal of the Earth observations program. (The report

issued on Wednesday was commissioned by NASA as a midterm assessment.)

Although NASA responded favorably to the 2007 report, the committee said, the observational program's budget has fallen short and changes in the program's scope, overseen by the Office of Management and Budget and by Congress, have impeded progress.

[Dennis Hartmann](#), a professor of atmospheric sciences at the University of Washington and the chairman of the committee that produced the new report, suggested that it could serve as a sobering reality check. "It's likely our capabilities will decline fairly precipitously at just the time they're most needed," he said. "If nothing is changed, we're predicting to be down to 25 percent of our current capabilities by 2020."

Dr. Hartmann described the factors contributing to the decline in observational capacity as a "near-perfect storm" of problems. For starters, he said, there is the ongoing federal budget crisis. Most of the equipment that the nation currently maintains in space, he adds, is aging and will inevitably fail, but no replacements are in the pipeline.

"If we want to have a continuous measurement of the Earth as a system to see if any changes are occurring, then we need to sustain these systems as our economy improves," he said.

Dr. Hartmann also cited a severe shortage of midsize launchers to place data-gathering satellites into space. Initiatives dating back to the Clinton and Bush administrations sucked up billions of dollars without producing many results, he added, referring to a proposed system that was supposed to combine the best elements of the nation's defense and civilian weather satellites but came to naught.

The question comes down to what priority should be given to observing the Earth. For both scientists and laypeople, the arguments for embracing a high level of commitment are many.

Surface winds are measured from space to predict and map hurricanes. Instruments for detecting movements in the Earth's crust help understand and track earthquakes. Sea-level fluctuations are monitored, severe weather warnings are issued and long-term weather forecasts are prepared with the help of satellites.

Weather satellites also pick up emergency beacons used by those who venture into remote areas and become stranded, leading to the rescue of nearly 300 people in 2010 alone.

Not least, space monitoring allows researchers to keep an eye on climate change and carbon dioxide in the atmosphere, helping to inform scientific understanding of the processes that drive global warming and estimate how big the changes will be.

"Almost everything you can imagine about how Earth as a system works," from natural hazards to planning involving water and air quality, "is measured or monitored from space," Dr. Hartmann said. "A lot of factors important for the commerce and quality of life are measured from space effectively and efficiently — and those will go away."

Not all was a loss, however, the report said. NASA did follow through with several of the mission launches outlined in the 2007 survey, and the agency tried to make up for budget shortfalls by aggressively pursuing international partnerships. But that may not suffice, and NASA's Earth science budget will not sustain pressing national needs, the researchers said.

Similarly, Dr. Hartmann and his colleagues found that NOAA's satellite Earth observation program and its next

generation of polar environmental satellites — integral parts of NASA’s program — are suffering from budget shortfalls and cost overruns that block progress.

The National Research Council offers two solutions for slowing or arresting a decline: refining a cost-constrained plan for NASA and NOAA mission development, and appointing a new team of experts dedicated to attaining the 10-year goals.

More money would help, of course, Dr. Hartmann said. But regardless of the amount of funds allocated by Congress, the agencies should develop an efficient, rational priority list to optimize their resources.

In its conclusion, the committee recommends “a balanced set of good Earth science missions rather than just a few missions that strive for perfection in limited disciplines.” Canceling future missions for the sake of a few high-profile launches, they write, is something the United States cannot afford to do.

“We’re pretty certain that we’re in an era when humans have as much control over change on Earth and key life-sustaining processes as nature,” Dr. Hartmann said. “We need the ability to observe Earth as a system, and we need an understanding of it.”

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