nature

www.nature.com/nature

Vol 445 | Issue no. 7127 | 1 February 2007

Brave blue world

Human spaceflight is no excuse for ignoring the home planet, which needs constant monitoring from space.

It is commonplace to dismiss NASA's human spaceflight efforts as a waste of money and expertise. For a country with an alarming budget deficit to devote tens of billions of dollars to a project with so little prospect of palpable returns is hard to justify. Certainly, science does not come close to offering a justification.

But arguments against this peculiarly pricey form of showing off, however strong, will not prevail in the foreseeable future. Space exploration resonates with the expectations many Americans have of their country as a home to the exceptional, a conqueror of frontiers and a leader of the world.

Furthermore, the inspiring, potentially transcendent impact of human spaceflight on the imagination should not be lightly dismissed. In the words of one uplifted pioneer: "In that instant I could feel no doubt of man's oneness with the universe... It was a feeling that transcended reason; that went to the heart of man's despair and found it groundless. The universe was a cosmos, not a chaos; man was rightfully a part of that cosmos as were the day and night."

The pioneer quoted above was not an astronaut, although he got as close to the alien isolation of space as any man could at the time. He was the US Antarctic explorer Richard Byrd. As NASA administrator Michael Griffin has argued, there are some interesting parallels to be drawn between the history of Antarctic exploration and the possible future for American spaceflight. But there are differences, too, to which NASA, the Bush administration and Congress should pay careful attention.

Griffin points out that after the South Pole was first explored, it was largely ignored for decades before an eventual return in the 1957 International Geophysical Year led to a continuous presence. Similarly, NASA's plans now call for ending the post-Apollo hiatus by setting up a permanent lunar base — probably at the south pole. But there the comparisons end. For one thing, the renewal of Antarctic exploration was empowered by new technologies, notably reliable diesel engines, capable aircraft and portable radios. But the technologies that NASA plans to implement on its return to the Moon look remarkably similar to those it used the first time (see page 474).

Another difference is that ever since humanity's return to the South Pole, Antarctic science has been central to the great project of understanding the changes that humans are inflicting on the Earth. An Antarctic component to the nascent global carbon dioxide monitoring effort was established in 1957. Since then the contributions have been legion: discovery of the Antarctic ozone hole; the extraction of greenhouse-gas records and climate data reaching back more than half-a-million years from ice cores; the study of the anomalous warming of the Antarctic peninsula; and so on.

Although lunar research may illuminate some far deeper recesses of Earth's history, the Moon is no Antarctica: the only input that lunar activity will provide for the study of Earth is the iconic and inspiring sight of a blue planet in a black sky over a grey desert.

The human exploration of new worlds may well be important, as inspiration and even, eventually, as something more. But it is not urgent in the same way as understanding and monitoring the Earth system. This is why, as the amount NASA spends on its new vision of exploration increases, it is vital that the resources needed to monitor and study Earth are brought up to the levels required, from which funding currently falls short. As a report by the National Academy of Science recently pointed out, some of this remediation needs to take place at the National Oceanic and Atmospheric Administration, where various instruments need to be placed on future weather satellites or flown on other platforms. But there are also challenges for NASA, notably in studying land-use change and global precipitation, that need to be seen as high priorities for the immediate future.

"The only input that lunar activity will provide for the study of Earth is the iconic sight of a blue planet in a black sky over a grey desert."

Mapping the march of global change and exploring possible futures have an urgency that the study of eternal verities and ancient deserts cannot match. The Moon is not going anywhere; Earth is. ■

Defence deficit

A public debate about renewing Britain's nuclear weaponry is undermined by excessive secrecy.

The RS21007 document could have featured in a John le Carré spy novel. The author of its six drily written pages discusses a plan to turn nuclear submarines into cruise-missile carriers. It is a detailed analysis, probing issues such as exactly which firing tubes would need to be modified. In Britain, it is unlikely that such matters would be discussed outside classified government meetings or clandestine get-togethers between le Carré's fictional spies.

Yet the origins of RS21007 are mundane: its authors are a group of uncontroversial public officials working at the US Congressional Research Service (CRS). The level of detail is not unusual for such a report. In the United States, RS21007 is seen as a useful contribution to the debate about the country's military capabilities. Had the document been written in Britain, it might never have seen the light of day. And that's a problem — without such documents it is impossible to properly scrutinize government proposals.

The proposal that matters right now, and which is currently being studied under conditions of information poverty (see page 464), is an important one. Britain's Trident submarines carry the country's nuclear weapons. The end of their design life is around 15 years away. What comes next? The government favours building a new fleet, at