

UK urged to embark on human spaceflight plan

# Time for Britain to be bold again

by Clive Simpson

*Spaceflight* Editor Clive Simpson looks at some of the recommendations in a new report which concludes that the UK could hitch a ride on the International Space Station (ISS) for a relatively low cost and that this would bring many benefits to the nation. But the UK government still appears to need persuading that the idea of putting Britons in space is a sound one.

The UK should launch a modest programme to put British astronauts in space or risk missing out on significant scientific, economic and cultural benefits in the future, according to a report from an influential government advisory panel.

Although sending people into space is much more expensive than robotic missions, the panel said UK astronauts would be inspirational figures who could help to stem the decline in interest in science subjects among young people. British industry would also receive a significant boost from being involved in international space missions.

The Space Exploration Working Group (SEWG) report was commissioned by the British National Space Centre (BNSC), which coordinates UK space research. Its release on 13 September comes ahead of the government's review of space policy due out later in October.

"The concept of human exploration of space is inspiring and UK involvement could add a level of pride and encourage the young into science and engineering," said Prof Frank Close, of Oxford University and chairman of the panel. "Don't underestimate the inspiration - I know it is not very British, but perhaps we shouldn't be so British."

The report says now is a critical time for space exploration after various space agencies - including Britain, France, India, China and the US - signed up to an international space collaboration called the Global Exploration Strategy in 2006. This will pave the way for international cooperation leading to a return to the Moon.

## Prominent role

The UK government, however, has so far remained at best lukewarm when it comes to human aspects of space exploration and the report's authors said this is a mistake.

"We envisage a programme of space exploration in which this country plays a prominent role in the activities described by the Global Exploration Strategy. This will generate new scientific knowledge, increase excitement for science and technology in the young... and provide a grand challenge to invigorate the UK economy," their report said.

"Our study is recommending that the UK be actively involved in both the robotic and the human aspects of this collaborative international venture," explained Prof Close. "Basically it is time to decide - do we lead or do we just follow?"

The panel proposes an initial investment of £50 m to £75 m over five years to fund the training of a four person astronaut corps, and pay for related medical and support services. Two would take a flight to the International Space Station.

"Simultaneously we should maintain and extend the UK's significant role in planetary science and robotic exploration. The UK has



had a great tradition in exploration over the centuries but it is now time for a new vision," added Prof Close.

The SEWG was tasked in January this year to review current worldwide plans for space exploration as defined by the Global Exploration Strategy which outlines the ambitions of the world's space-faring nations.

Colin Paynter, managing director of leading UK space company Astrium, welcomed the prospect of the UK taking an active role in manned space activities.

"Space and space science inspires generation after generation to take up careers in science and engineering - and adding British astronauts to the mix should be a huge boost," he said.

"Human space exploration will be the next great adventure and with the current vibrant space industry in Britain, we are in a great position to contribute.

"Building on the UK's current expertise in unmanned space missions, we look forward to new investment in human space activities," he added.

## New opportunities

The Working Group's recommendations stress the need to be involved 'at the start' in this new challenge of space exploration



Prof Frank Close, chairman of the UK Space Exploration Working Group, with a 'British astronaut' in the London Science Museum. STFC

which it believes provides key opportunities for the UK to shape and participate fully in space science whilst building on its position as a centre of excellence for science, technology and innovation.

Engaging in both human and robotic elements together will generate valuable scientific knowledge says the report and return value to the UK through technological challenges, innovations and new commercial ventures.

The report recommends the UK should establish a detailed plan to enable a decision to be made on whether the UK becomes involved in human spaceflight in the decade beginning 2010.

Prof Close added: "For the first time in history the world's space agencies are planning to work together on the human exploration of the Moon, Mars and perhaps asteroids, with accompanying robotic missions to prepare the way. This is not science fiction – it is the real thing.

"A high-profile, UK-branded presence in human space exploration would engage British society in the full excitement of space exploration and help to inspire a new generation of scientists and engineers."

Commenting on the report's recommendations, Prof Keith Mason, chairman of UK Space Board and CEO of the Science and Technology Facilities

Council (STFC), a key partner in BNSC, said: "The working group has produced a comprehensive report and set of recommendations which will contribute and feed into the new UK Civil Space Strategy currently being developed by BNSC.

"Given the global interest in space exploration with the USA, China and India having already announced their intention to establish manned lunar bases, then this report is particularly timely. We shall give serious consideration to its recommendations."

The SEWG comprised 23 members drawn from academia, industry, education, BNSC officials and a former chief executive of PPARC (a predecessor research council to STFC).

Its remit was to review current global plans for space exploration; assess what opportunities and benefits exist for UK participation; and provide advice to BNSC and partners as to which areas the UK should focus on if it wishes to engage in space exploration.

### Website statement

A statement published on the BNSC and STFC websites on 14 September summarised the report's main conclusions but did little to engender a sense of optimism for those seeking a chink in the government's anti-human spaceflight stance of the past.

The first of its three main points said the UK's current involvement in robotic planetary science has yielded good scientific return and has helped build a capable skills and technology base in universities, national laboratories and industry.

Secondly, it stated that there is immediate scope to yield increased benefit to the UK through targeted, near term involvement in lunar exploration, emphasising UK science interests and expertise in small satellites and robotics.

The third point involving the human spaceflight issue does, however, appear to either contradict - or at best put a different slant on - the whole issue. It stated: "While a compelling rationale for the UK to immediately join the current European Space Agency (ESA) human spaceflight programme does not exist at present, there appear to be excellent scientific opportunities in the period beyond 2020 when there are plans to establish a permanent lunar base. In preparation the UK should establish a detailed plan so a decision can be made on UK involvement in human space flight in the decade beginning 2010."

The actual wording of the SEWG report clearly intimates, under recommendation six, taking "appropriate early steps to prepare for a future role in human space exploration efforts" by securing flight opportunities for British astronauts "within the next decade" to conduct science research and advance science education.

Whilst the report notes that ESA will be inviting applications to join its corps of astronauts during 2008 (and UK citizens will in principle be able to apply), it says their chances of being selected are "effectively zero" unless the UK makes a commitment to participate in the relevant programmes.

"A scenario, including a limited effort in the field of human spaceflight, would be useful in helping the UK to prepare for a more substantial and influential role in the Global Exploration Strategy and would allow the UK to access the full range of benefits associated with international space exploration programmes", concludes the report.

"This would have significant positive benefits in the fields of science, education and commerce. It would also allow the UK to assess the benefits to be gained from a more substantial involvement, while avoiding the associated costs. It would thus provide a useful exit strategy should the expected benefits fail to be realised."



*Piers Sellers, who was born and educated in the UK but had to take US citizenship to fulfil his dream of becoming an astronaut, pictured with students in London.*

## Staged approach

The report goes on to say that if the UK were to begin such a preparatory programme for human space activities now it would then be in a position to decide whether to take a full role in the wider global exploration efforts by 2015 – around which time Europe is likely to move its spending on the ISS to wider space exploration activities.

“This approach would still allow the UK to play a significant role, while allowing time to review the early benefits of such a programme before it is necessary to commit the larger funds that would be required for a GDP-level involvement,” it says.

One of the tasks of the Working Group was to assess scenarios for UK involvement in a space exploration programme and, in the report’s appendix, an outline for a potential UK human spaceflight programme (with approximate cost estimates) is given.

It says: “If the UK should choose to be an influential partner, when the human exploration of the Moon begins in 2020 and later when the first human exploratory efforts on Mars take place, preparatory human spaceflight activities will be required in the short-term.

“The purpose of these programmes would be to enable the UK to evaluate the relative costs of participation at full GDP level; to identify and define areas of scientific research related directly to human space exploration upon which the UK might focus; and to identify and define areas of science and technology related directly to human

space exploration in which the UK might develop niche leadership; and to determine more comprehensively the impact of larger scale programmes upon science education in schools and universities.

“These preparatory activities could include astronaut training opportunities, exposure to terrestrial extreme environment analogues and human spaceflight opportunities secured through bilateral arrangements. It is essential that any such programme be accompanied by a corresponding programme of science, public engagement and education.”

## Astronaut scenario

The report also outlines a scenario - “feasible logistically, economically and politically within existing frameworks” - under which British astronauts might secure flight opportunities within the next five to ten years.

It proposes the possibility of a five year programme to run between 2010 and 2015, under which two British astronauts could be flown aboard the International Space Station before 2014.

The total cost for this programme would be £50-75 million and this would allow the UK to judge the return to science, industry and to society in general (principally through education) before any commitment is made to longer-term human space exploration with international partners.

Two astronauts would carry out research in life and medical science, astrobiology, lunar geology and aerospace engineering in

partnership with UK universities.

They would be supported by two backup astronauts and the programme would include four research Chairs together with eight post-doctoral posts and 16 PhD students in order to build capacity in the research community. This would be supplemented by a team of four education specialists to provide an outreach programme to schools and the public.

Astronaut training and flight opportunities would be traded for technology and expertise while science and launch costs would be funded directly through public funds or via a public private partnership.

Selection for such a programme would be in 2010, with training in 2011 and flights in 2013 and 2014, most likely on a Russian Soyuz craft.

In response to questions as to whether there was added significance to the statement on its website, the BNSC said: “This report is a useful document in helping us assess what priority the UK should give to space exploration and how we can remain a significant space nation.

“There is no plan to produce a detailed response to the report. However, the new UK Civil Space Strategy will incorporate the government approach on future space exploration and will take the report into account.”

Britain decided against funding human spaceflight in the 1960s, a position upheld by successive governments, all seemingly determined to retain the status quo by concluding that sending people into space is too expensive.

## Britons in space

Helen Sharman is technically the only Briton to have flown in space (as part of the privately-funded Juno mission) but three others - British-born astronauts Michael Foale, Piers Sellers and Nicholas Patrick - have flown on the Space Shuttle after becoming US citizens or because they had joint UK-US nationality.

The SEWG report has been broadly welcomed by proponents of UK human spaceflight, including many members of the British Interplanetary Society (BIS).

Nick Spall, a freelance space and science writer, who has spearheaded the Society's campaign for UK astronauts, said: "I wholeheartedly welcome this report which has been completed at a crucial time. The UK has missed out on the science, technology, industrial and inspirational benefits of human spaceflight for far too long and now is the time for government action.

"I am pleased that the SEWG report agrees with the BIS campaign which has always argued that low cost access to the ISS for science and education missions is important and achievable. The BIS believes that the UK could be flying scientist-astronauts to the ISS as early as 2010 - and this could be achieved on a modest budget of only £50 million over five years.

"The current BNSC's Space Strategy review should now include the timely recommendations of the SEWG report which, together with the recent Parliamentary Select Committee's call for the government to reverse its in-principle ban on UK human spaceflight, should encourage the Space Minister, Ian Pearson, to immediately seek the small increase necessary in the UK civil space budget to implement a UK astronaut presence."

Off-the-record conversations with NASA and ESA staff confirm that the ISS access approach for the UK is feasible and only needs an appropriate BNSC/STFC grouping or committee to get things underway.

After 2010, when the US Space Shuttle retires, there will be four Russian Soyuz launches a year, with 'spare' seats available. These could be negotiated directly with the Russian space agency, Roscomos, or through ESA.

It is also understood that ESA's 2008



**Anousheh Ansari - the first woman to make a privately funded spaceflight to the International Space Station - pictured while speaking to an audience in London at the beginning of September (see p445).**

**In answer to a question on the UK's potential involvement in human space exploration, she said that she believed that without men and women going into space now we cannot gain the experience needed for humans living and working there in the future.**

**"That's why it is very important for people to go to the ISS - to study the effects of long duration flights on the human body and to learn how we can survive in a place that's not Earth. And if we don't do that it's just a very short sighted view of things," she said.**

astronaut selection programme could be broadened to more than the current European ISS-contributing nations, with the UK perhaps linking the SEWG proposal to some kind of initial astronaut training.

ESA is certainly looking to widen its ISS exploitation options and 'renting' research space on the European laboratory Columbus might be another option for the UK.

The quoted 'low-cost' start figures in the SEWG report are derived largely from BIS work and submissions prepared in 2006.

Rex Hall MBE, a space consultant and BIS council member, said: "In recent weeks the government and many senior figures have talked about role models and how important it is to look up to people.

"Science needs such figures as well - and astronauts do inspire. I have taken Russian and American astronauts to schools in this country and the interest has been fantastic. We need a British astronaut to do the same. By just committing to a flight the process of inspiration and aspiration can start," he said.

## Expanding frontiers

Jerry Stone, a freelance presenter on space exploration, said: "We should now take the opportunity to put some pressure on the BNSC and our space minister.

"The UK seems to be out of step in its thinking. Yet the situation used to be different. British explorers used to cover the world - the names of Drake, Raleigh and Cook are among those that stand out in history. Why shouldn't we once again have explorers that we can look up to, who can help expand the frontiers of our knowledge?"

Stone said that in reality money is not spent 'in space' but it is used to provide jobs here on Earth, in industry and research.

By way of a cost comparison, he cited the fact that the Millennium Dome in London had cost the country's taxpayers £789 million.

Or, in military money, the cost of one Eurofighter aircraft is roughly equivalent to the whole of the proposed initial five year human spaceflight programme for the UK.

"The UK plans to buy 232 of these aircraft at a total cost that has risen from £7 billion to £19 billion - an increase of 171 percent.

"If the government can find an additional £12 billion for a £7 billion programme, surely it can find £50 million for a science programme with so many benefits," he suggested.

Stone added: "Remember that it was apparently an advisor (presumably from the Civil Service) who counselled the then science minister (or equivalent) in the 1960s that he could see 'no commercial future for satellites', which led to the UK holding the record as the only country to have abandoned its satellite launching capability."

More recently, Britain's less-than-progressive attitude to sending people into space was summed up by the former science minister Lord Sainsbury in 2003. "There is no doubt that manned space exploration has a special excitement for people, and a particular attraction for young people," he said. "It does not, however, make a great deal of sense either commercially or in terms of doing world-class science."

In claiming there is no world-class science to be done with humans in space, he ignored the fact that almost all of the world's major economies think there is enough of a scientific return to invest heavily. The US, Europe, Russia, China, India and Japan all have bold human space programmes spanning the next few decades.

Spaceflight readers interested in the full SEWG Report can download it as an Acrobat PDF file from the BIS website - [www.bis-spaceflight.com](http://www.bis-spaceflight.com)