



## INTERNATIONAL ASTRONAUTICAL FEDERATION

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### IAC 2013 – PLENARY 7

#### Innovation Through Human Spaceflight

Delegates attending Plenary 7 at the 64<sup>th</sup> International Astronautical Congress (IAC) in Beijing, China, today (Thursday, 26 September 2013) heard how the international human spaceflight community is developing new approaches to meet the challenges of future human space exploration through research and innovation.

John Charles Chief of the International Science Office for NASA's Human Research Programme, opening the presentations for 'The Role of International Innovations in Accelerating Future Human Space Exploration' by saying that to be involved in space business requires innovation.

"Human spaceflight is demanding, risky and expensive," he said. "It is also often counterintuitive - you have weightlessness where there is no up or down, in Earth orbit there are 16 sunrises and sunsets in a day, and you have to 'go faster' to 'go slower'.

"Because there are things that are just different living and working in space is always requires innovation."

Jean-Claude Piedboeuf, Director General of Space Exploration at Canadian Space Agency (CSA), started by expressing his Government's view that science and technology is not a means to an end on its own but a means by which sustainable development can be pursued.

"It is no longer enough for countries to support science and technology only from a national perspective - exploration is innovation and increasingly can't be done alone," he said.

Mr Piedboeuf described human spaceflight as always trying new things by its very nature and as such acts as a catalyst for a range of new technologies.

"National policies and directives should be conducive to data sharing because

innovation is not just about finding something new but is about finding something new and something useful to do with it.”

He told delegates that Earth-based solutions often did not meet the needs of space operations and finding solutions that work in space may spur out-of-the-box thinking that could go on to translate into new ways of doing things on Earth.

Jan-Dietrich Woerner, German Aerospace Centre (DLR) chairman, suggested that the most important question for scientists to ask is ‘why are we doing it?’

“This is not only for us in the space community but to convince citizens and politicians, who have to give us the money, that our proposals are worthwhile,” he explained. “For the future we should put the ‘why?’ question right at the beginning where the challenge for any project or development is connected to the motivation behind it.

“We have to change the paradigm from post-justification to a very proactive solution-first approach,” he said. “Initially we should have some goals that we expect to happen - and we can report additional results afterwards.”

Mr Woerner cited a number of examples from science and technology experiments on the International Space Station (ISS) as innovations that have subsequently been transferred to help life on Earth.

Dr Bernhard Hunfenbach, representing ESA, agreed that research on the ISS - in areas such as developing countermeasures against muscle loss in the micro gravity environment - could translate into benefits for patients on the ground with certain degenerative diseases.

He said that when looking at future exploration like sending humans to Mars it was not just about the end result but how the development could be used for many innovations along the way.

William Gerstenmaier, NASA’s Associate Administrator Human Exploration and Operations, provided a number of examples of medical advances that have been spurred by the needs of having astronauts in space but have gone on to bring real benefits to medicine on Earth.

He explained that ultra sound devices adapted for use in space were now being used back on Earth for a whole range of diagnosis that would not have previously been contemplated.

Chiaki Mukai, a former NASA astronaut who flew on two Space Shuttle missions, told delegates that innovation is not only about creating new things but also modifying or

changing existing systems or concepts.

“The driving force of space exploration has shifted from national pride to international collaboration and as a result programmes have become more beneficial to more people,” she said.

“In the coming stages of exploration we need to take a more interdisciplinary approach to ensure that robotics and humans work more closely together.”

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