INTERNATIONAL ASTRONAUTICAL FEDERATION

NEWS ITEM 09/26/2013
IAC 2013 – HIGHLIGHT LECTURE 3

Top 10 Research Results from the International Space Station – How can we limit it to so few?

Delegates at the 64th International Astronautical Congress (IAC) in Beijing, China, were treated to an inspiring presentation today (Thursday, 26 September 2013) for the third and final Highlight Lecture of the week.

The 'Top 10 Research Results from Space Station - How can we limit it to few?' was the theme of a talk by NASA's Dr Julie Robinson, International Space Station Program Scientist at the Johnson Space Center.

Dr Robinson coordinates the International Space Station (ISS) science programme and is the author of "ISS Benefits for Humanity', published by NASA in 2012.

By way of an introduction, Dr Robinson provided an historical context to her top 10 selection by saying that the fundamental reason humans have always explored is not because we are motivated by the advancement of science;

"Early explorers travelled the world to exploit economic opportunities not to inspire their children about it," she said. "Explorers are responsible for pushing the boundaries and the scientists follow behind."

Dr Robinson described the ISS as "the most complex machine ever built by humans" and told delegates that it was easy to be "uniformed" about some of the great results coming from the Space Station.

"The Space Station is unique in that it supports almost every scientific discipline in some way," she explained.

"Ultimately it will be judged on its engineering achievements, international achievements and research achievements. We are now in the research stage and this is very important to our stakeholders - 69 countries have participated in ISS utilisation so far."

In selecting a 'top 10', Dr Robinson said she took into account a variety of criteria: Scientific journal quality, comments and reviews by other scientists, cases where novel information was presented, and benefits to human - all of which she described as important considerations in terms of research legacy.

Number 10 - Preventing loss of bone mass in space through diet and exercise; if astronauts carry out particular exercises, have the correct amount of vitamin D and calories in their diet, they return in good osteopathic health. Resistive exercise now helps with osteoporosis cases on Earth.

Number 9 - Understanding the mechanism of osteoporosis and developing new drugs to treat it. The first new drugs for treating muscle wastage are now also on the market, drawing in part from research carried out on the ISS.

Number 8 - Hyperspectral imaging for water quality in coastal bays. A 'gold standard', according to Dr Robinson, which also allows scientists to separate sediment from pollution on satellite imagery.

Number 7 - Colloid self-assembly using electron fields for nanoparticles, which is impacting manufacturing processes on Earth.

Number 6 - New process of cool flame combustion - an unexpected and novel result. In microgravity, flames burn differently forming flaming spheres that turn out to be wonderful mini-labs for combustion research. Unlike flames on Earth, which expand when they need more fuel, flame balls let the oxygen come to them.

Number 5 - Pathway for bacterial pathogens to become virulent: Bacteria can become more powerful in space, so this helps with understanding and treatments and is an example of where a biological science can make a big jump by experimenting in a different environment.

Number 4 - Educational outreach, with 43 million students and counting.

Number 3 - Dark matter: The data gathered from the Alpha Magnetic Spectrometer (AMS) is the most sophisticated detector of gamma cosmic rays that has ever been built.

Number 2 - Robotic assistance for brain surgery - the technology that went into developing neuroArm, the world's first robot capable of performing surgery inside magnetic resonance machines, was inspired by the Canadarm.

Number 1 – Dr Robinson reported that "Two years ago I wouldn't have selected this one but as the story continues to evolve I am much more optimistic again. It is a new targeted method of chemotherapy drug delivery and medical trials are now underway. It involves a single step process forming tiny liquid-filled, biodegradable micro-balloons containing various drug solutions (a process called microgravity micro-encapsulation) that can provide better drug delivery for tumours".

"The benefits I have selected serve as examples of the Space Station's potential as a ground-breaking

scientific research facility.

“The ISS advances the state of scientific knowledge of our planet, looking after our health, and providing a space platform that inspires and educates the science and technology leaders of tomorrow.

“These benefits will drive the legacy of the ISS as its research strengthens economies and enhances the quality of life here on Earth for all people.”

Contact: media@iafastro.org