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# AEROSPACE

A M E R I C A

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## Society and aerospace technology

On September 15, 2011, a small NASA team of two medical doctors, a psychologist, and an engineer accepted one of just nine annual Samuel J. Heyman Service to America Medals (also known as ‘Sammies’) presented nationwide. The team, comprising Michael Duncan, J.D. Polk, Al Holland, and Clint Cragg, was awarded the National Security and International Affairs Medal for its ability to bring decades of U.S. expertise in spaceflight to the problem of rescuing 33 miners trapped some 2,000 ft under the Chilean desert.

This was not the only example of the aerospace industry’s ability to assist society and project goodwill across the globe. Aerospace professionals and the technology the industry provides assisted in furnishing a ready stream of data to aid in predicting or responding to major natural disasters. These included the Japanese earthquake and tsunami, the Australian floods, and major tornado outbreaks in Alabama and Missouri.

The industry has also enabled bold new efforts such as the Internet-based Satellite Sentinel Project, which uses high-resolution satellite imagery to monitor and make public within one or two days possible human rights violation activity along the tense border between northern and southern Sudan (or, as of July, Sudan and the new nation of South Sudan). In addition, the international space station continues to operate as a national laboratory with capabilities available nowhere on Earth. Experiments and research such as the recombinant attenuated salmonella vaccine investigation, launched on STS-135, are always on the agenda.

NASA’s recently formed Office of the Chief Technologist released the annual issue of *Spinoff*, highlighting 49 benefits to society spun off from aerospace technologies generated by programs such as the ISS, telescope and deep space exploration, satellite projects, space transportation, astronaut life support, and aeronautics. These benefits range from health and medicine (stronger hip implants, cranial pressure monitoring techniques), to transportation (air traffic management, helicopter noise reduction), public safety (icing detection, parachutes for small airplanes), consumer goods (extreme temperature insulation,

plant-growth-targeted LEDs), environmental resources (real-time water quality analysis, groundwater remediation), computer technology (fluid dynamics modeling, verification tools for online shopping and banking), and industrial productivity (light-weight composite materials, deformable mirrors).

This year also brought the retirement of the space shuttle fleet and with it a decision on the final museum locations for the remaining orbiters. Discovery, the oldest and world’s most flown spacecraft, will be displayed by the Smithsonian’s National Air and Space Museum at its Udvar-Hazy Center located near the Washington Dulles International Airport. Endeavour will be given to the California Science Center in Los Angeles. Atlantis will remain in Florida at the Kennedy Space Center Visitor Complex. And Enterprise, its name a direct example of the impact that society can have on aerospace technology, will be transferred to the Intrepid Sea, Air and Space Museum in New York City. These orbiters will no doubt help inspire the next generation of engineers to push the envelope of possibilities in aeronautics and space efforts.

With the shuttle retired and no domestic capability for launching astronauts to orbit, a question many are asking is simply, ‘What’s next?’ Some may even wonder, ‘Will we leave Earth orbit in my lifetime?’ It may be a surprise to many that the latter is already taking place—albeit in simulated form. As part of an elaborate \$15-million experiment called Mars500, a diverse team with members from Russia, China, and Europe volunteered to spend 520 days isolated from the rest of the world in a 550-m<sup>3</sup> facility in Moscow on a simulated mission to Mars. With 20-min communication delays, the crew had to be completely self-reliant. This is just one example of how the aerospace industry can benefit from interactions with the sociology and psychology communities. The crew ‘returned to Earth’ on November 4. 



GOES observed an Alabama tornado outbreak storm system, on April 27, 2011. Credit: NASA.

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