

Making the Case for Space

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It's been argued at water coolers and even in the US Congress. Everyone from children to adults, technology experts to Presidents, has an opinion. Does the United States need a space program? The premise of this article is that a vibrant American space program is good for the country and that Connecticut has the technology infrastructure and expertise to lead the way to a strong future in space exploration.

First, a definition of the term "space program." While NASA's human spaceflight and exploration are the most visible aspects of the US space program, there is significant space-related work being done for military and commercial applications as well. All of this work is supported by a combination of public and private funding. Many of these application areas have human and robotic components.

So, why continue to explore space? There are tangible and intangible reasons.

For many people it's a combination of national pride and technology dominance.

"When I worked in industry, we'd contact vendors to buy a component for the space suit," said Tom Filburn, professor of mechanical engineering at the University of Hartford and director of the NASA Connecticut Space Grant College Consortium. "We'd explain that there was not going to be a big market for the part we needed and they'd say that they didn't care. They just wanted to be able to claim that they made something for the space program. They weren't in it for the money, but it made the hair on the back of their neck stand up from the pride they felt in being involved in something so awe-inspiring."

Allen Flynt, general manager of the Space Systems group at United Technologies Aerospace Systems (UTAS), sees the tangible benefits such as technology development, but agrees that the intangible benefits such as the connection to the human spirit are equally important. "Humans have a desire to explore, compete and conquer new things," he said. "We want to do things that others can't. Great nations are often defined by their ability to explore. Financial considerations are obviously important, but if we try to make the case for space on a financial basis only, we don't stir the passion and emotion of people. I always believed that at the end of the day, there are tangible benefits that we can quantify in a financial sense, but it's much more difficult to measure the impact the space program has had and continues to have on the spirit of our country."

Former NASA Administrator Michael D. Griffin spoke of "acceptable" and "real" reasons to support the exploration of space. As acceptable reasons, Griffin listed

scientific discovery, economic benefit and national security. “These reasons have in common the fact that they can be discussed within the circles of public policy making,” Griffin said. “They can be debated on their merits, on logical principles. They can be justified.”

“Real reasons,” he said, “are intuitive and compelling to all of us, but they’re not immediately logical. They’re exactly opposite of the ‘acceptable reasons,’ which are eminently logical, but neither intuitive nor emotionally compelling. The ‘real reasons’ we do things like exploring space involve competitiveness, curiosity and monument building [or leaving something for the next generation].”

Paul Hildebrandt, a filmmaker and self-admitted space junkie, has raised more than \$100,000 in private donations to support a documentary film he’s making that explores the past achievements and future outlook for the US space program. (www.fightforspace.com) He expects to “Fight for Space” by the end of 2013. “I’ve always been intrigued by space exploration,” Hildebrandt said, noting that he was an elementary school student during the early shuttle era. “I remember in 2004, when President Bush announced the Constellation Program,” he said. “Then a couple of years later it was cancelled. That really hit me hard. I think what inspires us is when we send humans somewhere. It makes it personal.”

Hildebrandt and his crew have interviewed scientists, engineers, politicians, teachers, students, astronomers and more, among them former NASA astronaut Leroy Chiao; astrophysicist and author Neil deGrasse Tyson; science educator, mechanical engineer, comedian, writer and television host Bill Nye; and aerospace engineer and author Robert Zubrin.

In an interview with National Public Radio earlier this year, deGrasse Tyson said America’s space program is at a critical moment and it is time to invest heavily in space exploration and research. “Space exploration is a force of nature unto itself that no other force in society can rival,” he said. “Not only does that get people interested in sciences and all the related fields, [but] it transforms the culture into one that values science and technology and that’s the culture that innovates. And, in the 21st century innovations in science and technology are the foundations of tomorrow’s economy.”

Hildebrandt does not believe that efforts to engage commercial entities to facilitate space exploration will have the same impact that NASA has had. “Commercial companies are in business to make money,” he said. “They can do a good job of taking over low-earth orbit projects where we’ve done all we can do in terms of exploration. It’s cheaper to ferry supplies to the International Space Station via SpaceX’s Dragon capsule, for example; however, I still think we need NASA to undertake the extremely expensive missions like exploration of Jupiter.”

He cited technology transfer as another issue. "With NASA, technology spinoffs are shared as public property," he said. "When commercial companies are involved those technologies are owned by the company."

Mukwatsibwoha "Kwatsi" Alibaruho, director of the Enterprise Program Management Office for United Technologies Aerospace Systems, is a former NASA flight director who supported six Space Shuttle missions. "I don't think either NASA or industry does a stellar job of fostering interest in the space program," he said. "There is a lot of talent in both, but there are systemic problems. First, it is illegal for any federal agency (except the military) to engage in advertising or lobbying the public for its own good, which makes it difficult for NASA to hold onto an inspiring mission.

"Second, NASA has to apply for funding every year and the bureaucratic process makes it difficult to be nimble," he said. "To secure public funding, government agencies have to go through a lot of wickets to make sure the process is fair to all - making agencies slow and time is money. The bureaucracy has grown to a point where if you have a grand vision, it will take years to act on it. Consider that, between the end of the Apollo program in 1970 and 2012, our nation started several human space programs and executed only two - the International Space Station and the shuttle program. And, we were only a handful of votes away from not funding the International Space Station."

Noting that each new administration has a "new" plan for NASA, he said, "changing political tides put tremendous pressures on the mission and budget of NASA," he said.

Alibaruho went on to define space exploration as a "critical engine" that drives interest and education in science and engineering. "China is graduating two orders of magnitude more engineers every year than we are," he said. "That's one of the biggest implications of the lack of interest in our space program. Space is not the only driver of technology development, but we need everything we can get."

Hildebrandt agreed. "Students from other countries (like Germany, Japan and China) come to the United States to get the best possible technical education and then return to their home countries to be part of their active space programs in societies that value technical professionals."

As CNN reported earlier this year, "Two indicators are particularly worrisome, especially as this country experiences greater global competition and high unemployment. American students score 23rd in math and 31st in science when compared with 65 other top industrial countries. In math, we are beaten by countries from Lichtenstein and Slovakia to the Netherlands and Singapore. In science, we are beaten by countries from New Zealand and Estonia to Finland and Hungary."

So, if space is critical how does Connecticut capitalize on it?

“We have a strong history in this region that will help facilitate future space exploration,” said Elliot Ginsberg, president and CEO of the Connecticut Center for Advanced Technology, Inc. “We have an experienced workforce that understands what space travel requires and we have the infrastructure in place to transfer that knowledge base to the next generation so that we can build on the foundation that has been established.”

He noted the state’s reputation for producing quality space products including engines, rocketry, space suits and fuel cells. “Our state is unique in some respects because we have experience and an understanding of the nuances and restrictions of space travel,” he said. “We are the home not only of original equipment manufacturers, but also of the supply chain for those larger companies. We also, on a personal level, have the pride of knowing neighbors and other people in our communities, who have contributed to the space program. We have the capacity to make the space program real because so many of our citizens have worked on it and had a hand in its success. We have the opportunity to engage and excite people who are interested in exploring careers based on that tradition and foundation.”

State Representative Pam Sawyer (R-55), House Minority Deputy-Leader-at-Large and a member of the Connecticut General Assembly’s Higher Education and Employment Advancement Committee, who represents Andover, Bolton, Hebron and Marlborough, agrees. “Our legacy in the US Space Program ranges from large to small companies,” she said. “I visited Carlyle Johnson Machine Co. in Bolton recently. This company has on the order of 40 employees who have an average of 19 years of experience. One of the company’s products is used to help move machinery on the International Space Station. Who knew that a little company in little bitty Bolton, CT., would be involved?”

Sawyer explained that the Higher Education Committee worked with three of the state’s community colleges to develop a new high-tech manufacturing skills program. “We want to ensure that manufacturing for space and other applications isn’t a dying breed in our state and this effort is a step in the right direction. We will have the skilled workforce ready to update the technologies in space and other industries that will move us forward. Space is not going away because it is an important frontier. “

Hildebrandt agrees. “We are drawn to space because of the unknown,” Hildebrandt said. “We don’t know what’s out there and that’s exciting. Are we the only intelligent beings in the universe? Is there life under the surface of Europa? The space program is about advancing technology, but it’s also about advancing the people, advancing the culture and pushing ourselves further. We better the nation and the world through the exploration of space because it IS the final frontier and the ultimate goal in exploration because it is almost infinite and we will never explore all of it.” — ***Karen Cohen, freelance science writer and owner, The Write Stuff, LLC.***

