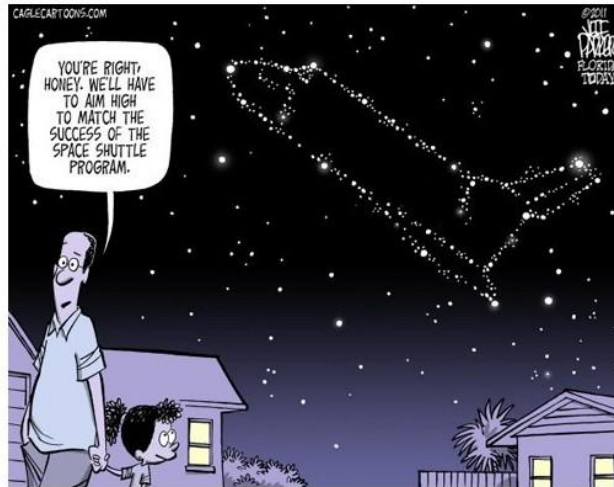


THANKS UNCLE SAM FOR THE SPACE PROGRAM AND ALL THE “SPIN OFFS”

By Nick Gier, Professor Emeritus, University of Idaho (nickgier@roadrunner.com)



Jeff Parker, *Florida Today*, July 21, 2011

The government has always stepped out and done the things that private industry wouldn't or couldn't do.

~Former Astronaut and Senator John Glenn

Once NASA blazes the trail, creates the technology and it's available for private companies to take advantage of, this is the time for the private firms to take over.

~NASA's Cargo Chief Alan Lindenmoyer

Space exploration is not a drain on the economy; it generates infinitely more wealth than it spends.

~Joan Vernikos, Former Director of NASA's Life Sciences Division

Without the skill and expertise that actual spacecraft operation provides, the USA is far too likely to be on a long downhill slide to mediocrity. America must decide if it wishes to remain a leader in space.

~Astronauts Neil Armstrong, James Lovell, and Eugene Cernan

A recent political cartoon depicted the Virgin Galactic SpaceShipTwo zooming into outer space leaving the Space Shuttle way behind. The Virgin Galactic pilot yells back: “So much for that socialist experiment!” There are of course many things wrong with this brash boast. All private spaceships are suborbital and currently are not capable of deep space travel. Former astronaut and Senator John Glenn is skeptical of those companies who claim that they will launch in 3 years. His estimate is 5-10 years.

The private craft are dwarves in comparison to the Shuttle. SpaceShipTwo is 60 feet long, 7.5 feet in diameter, and weighs 10.7 tons. The Shuttle is 184 feet long, 28.5 feet in diameter, and weighs 2,030 tons. The cartoonist gives the impression that SpaceShipTwo has broken free from earth on its own power, but he neglected draw in WhiteKnightTwo, which will launch the craft from 50,000 ft.

NASA has signed a contract with two space cargo companies to supply the International Space Station, but the price per pound is the same as it was for the Space Shuttle or the Russian Soyuz. The Russians will now charge us \$63 million to take each astronaut to the Space Station, and a Boeing spokesman admitted that they will not be able to beat that price with their own future vehicle.

Far too many people misuse the word “socialism” for any government program. If this is actually what the cartoonist means, then the American space program (returning \$8 for every \$1 spent) has been—along with the interstate highway system, public universities, and the internet—a great “socialist” achievement.

Other estimates of return on NASA investment range from \$3-\$14 for every federal dollar appropriated. An independent study done by the Midwest Research Institute concluded that the ratio was 7.5 to 1 from 1958 to 1987. Rockwell International has calculated that for every Space Shuttle employee 2.8 jobs were created in the larger economy.

Without the Stennis Space Center in Mississippi there would be, according to 2006 figures, 19,500 fewer jobs in the state, \$811.4 million less in personal income, \$324.6 million less in retail sales, and \$87.6 million less in tax revenues.

In 2008 the Marshall Space Flight Center in Huntsville returned \$1 billion to the state of Alabama and a total of \$2.6 billion to the nation’s economy. The state’s universities received \$22 million in research grants with a total \$111 million of Marshall funds going to other universities across the country. The Saturn V rocket was manufactured at this NASA center.

In 2006 the budget for the Kennedy Space Center was \$1.68 billion and the economic impact on Florida’s economy was \$3.6 billion, creating 34,000 external jobs and generating \$260 million in local, state, and federal taxes. The 13,630 Space Center employees earned on average \$72,200 per year, twice the amount of workers in surrounding Brevard County.

Texas, Louisiana, Mississippi, Alabama, and Florida would have far less robust economies without NASA. After the building of NASA’s Michoud Assembly Building, the city of New Orleans went from years of near recession to one of the fastest growing urban economies in the nation. The high-paying jobs and expanded tax base has had a huge impact on improved social services and education at all levels in these states.

I find it deliciously ironic that 24 Texas Congressmen—led by conservative Sen. John Cornyn—begged Obama for \$3 billion of the stimulus money to go to the space program. Here is an excerpt from their letter to Obama: “Since the stated purpose of the stimulus package was to

secure good jobs and stabilize our economy, there is no better investment that could be made than the addition of up to \$3 billion to NASA in FY2010.”

Private aerospace companies would not be where they are today without the federal government. They rely on NASA patents (1,000 to date) and licenses. (All NASA patent revenue returns directly to the U.S. Treasury.) When private space executives were asked what their primary inspiration was, 80 percent answered that it was the U.S. government putting men on the moon.

Thanks to the space program, we now enjoy the benefits of at least 1,650 “spin offs” from NASA research adapted by university professors and private industry. Here is a short list: communication satellites, robotic surgical arms, Teflon-coated fiberglass, liquid-cooled garments, lightweight breathing system for firefighters, Global Differential GPS, non-surgical cataract therapies, a new FDA food safety system, much improved weather forecasting from satellites and other technological innovations, new high strength aluminum alloys, memory foam, freeze dried food, light-emitting diodes, infrared ear thermometers, improved artificial limbs, aircraft de-icing systems, improved radial tires, new fire resistant materials, ballistic parachute system that has saved 200 lives during small plane malfunctions, improved water purification, heart pumps, and thousands of widely used software programs.

In 2008 *USA Today* published the “Top Scientific Breakthroughs in the Past 25 Years” and eight came directly from NASA and nine from NASA dependent industry. As former NASA administrator Michael Griffin said: “We don't just create new jobs, we create entirely new markets and possibilities for economic growth that didn't previously exist. This is the emerging space economy, an economy that is transforming our lives here on Earth in ways that are not yet fully understood or appreciated.”

President Obama has been criticized for cutting NASA's budget, but what if the Bush administration had not slashed taxes with little job creation, launched two unnecessary wars, and ignored one million cases of financial fraud? There would be room in the budget for NASA to properly support the spirit of exploration and the immense technological spin offs that have come from it.

A more accurate and inspiring political cartoon on the end of the Space Shuttle was drawn by Jeff Parker for *Florida Today*. A father and his young daughter are looking up at the night sky dominated by a Shuttle Constellation formed by 24 bright stars. He states: “You're right, honey. We'll have to aim high to match the success of the Space Shuttle Program.” China and India are also reaching for the heavens, so we'd better not fall behind in this essential area of human endeavor.

Fewer and fewer American students are majoring in science, engineering, and computer technology, and a well funded NASA could offer both inspiration and scholarship support for the next generation of astronauts and aerospace scientists.

Last month I was visiting my Indian graduate student in Houston and we visited the Johnson Space Center. The Thais have their 152-foot-long, 52-foot-high dying Buddha, but I was just as impressed with the 363-foot-long Saturn V rocket lying on its side in a huge hangar at the Johnson Space Center. I've never been so proud of my nation's achievements.

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