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The Case for Space: Examining the Value  
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My name is Helen Greiner. I am currently the CEO of a startup company called The Droid Works. I received my Bachelors Degree in Mechanical Engineering and Masters Degree in Electrical and Computer Sciences from the Massachusetts Institute of Technology. Between 1990 to 2008, I cofounded and served as President and later Chairman of iRobot Corporation, a company that went from an apartment based startup to a publicly traded company and is a worldwide leaders in robot product sales and cutting edge robotics research. I currently serve as a trustee for MIT, the Boston Museum of Science, the National Defense Industrial Association, and the Association for Unmanned Vehicle Systems International. I also serve as the elected President of the Robotics Technology Consortium, an industrial and academic consortium of 179 companies including top tier defense contractors, top universities and non profits, and over 120 small businesses – we have members from over 2/3 of the states. In other words, I am an engineer, entrepreneur, and active in representing the robotics industry.

My own career and iRobot's history is inextricably intertwined with NASA. I was an intern at NASA's Jet Propulsion Laboratory where I worked on manipulators for satellites. This internship provided the opportunity to learn from NASA engineers and the support that I needed to pursue an advanced degree. Upon graduating, I founded iRobot in 1990 with Rod Brooks and Colin Angle, and NASA helped by purchasing robots from us – specifically an 18 degree of freedom walking robot and two portable tracked robots our very first sales. I asked a decade later why NASA bought them and the response was “we wanted to make sure that an industrial base developed in robotics”. In addition, iRobot Corporation is based on work that was funded by NASA at the Massachusetts Institute of Technology's Artificial Intelligence Lab in the 1980s – this research developed a new type of control for robots called Behavior Control. Behavior Control is modeled on insects that can easily navigate in unstructured environments – even though they lack large computation assets -- in other words, they have little bitty brains. Behavior Control mimics how insect control systems work and was implemented on insectoid robots such as Genghis and Attila. This ground breaking work was one of the threads leading to the successful Sojourner Mars exploration mission. Here on earth this NASA funded paradigm has changed the way robots are designed. This NASA research grant funded the fundamental robot intelligence paradigm that currently runs on the iRobot Roomba Vacuuming Robot. The Roomba, in case, you haven't seen them, are small completely autonomous vacuuming robots. iRobot has now sold over 3 Million Roombas , making it the best selling practical home robot in the world

Fifty percent of iRobot's business comes from military and law enforcement. In 1997, the Defense Research Projects Agency started a program to build Tactical Mobile Robot. iRobot, NASA, and others worked on this program. NASA brought their technology to bear on the iRobot PackBot System and likewise iRobot technology was spun back into NASA in, for example, the lightweight rugged wheels for

the second set of MARS rovers, Spirit and Opportunity. The PackBot Robots were the first ground robot deployed in combat in 2002 to provide initial entry into the remote caves of Afghanistan where the Taliban were hiding their weapons caches . They took the place of tying ropes around our soldiers and sending them in to face enemy combatants and booby traps. Currently PackBot's are being used to remediate Improvised Explosive Device, or roadside bombs, which are the deadliest threat to our troops in Iraq and Afghanistan. PackBots have been credited by the military with saving the lives of hundreds of soldiers and thousands of civilians. Because of this success, with team members from iRobot, DARPA, and NASA, the iRobot PackBot was inducted into the Space Technology Hall of Fame in 2006.

Because of the small investments made by NASA, the US is currently leading the world in robot products. More robots from autonomous vacuums to floor washers to warehouse robots to military robots have been designed and sold by US companies than any other country. The entrepreneurial companies, like iRobot Corporation, that make this happen are creating jobs and insuring America's leadership in the global innovation economy. NASA funding is a national competitiveness issue.

So in conclusion at just \$17.2B or just ½ of 1% of the federal budget, NASA is not just exploring the planets (including planet earth), but also supporting the next generation engineers through internships, supporting entrepreneurs through their Small Business program and other contracts, supporting cutting edge research at universities, supporting our technology industrial base, and helping develop life saving technologies. That's just ½ of 1% of the budget. NASA funding is a proven investment in US competitiveness.