

How NASA Has Lead The Pursuit of Furthering Scientific Knowledge

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The National Aeronautics and Space Administration (NASA) was founded on October 1, 1958. After falling behind the Soviet Union in the early stages of aerospace development, NASA was comprised through the National Advisory Committee for Aeronautics (NACA) and other government organizations. As defined in their own words, NASA is “responsible for unique scientific and technological achievements in human spaceflight, aeronautics, space science, and space applications that have had widespread impacts on our nation and the world” (Wilson). For the last sixty years, NASA has continued to push the boundaries of space exploration with innovative aeronautics research. Consequently, the program has drastically changed our understanding of the solar system we inhabit. Early developments in things like communication satellites, freeze-drying technology, pollution remediation, and weather satellites represent few of the many ideas that have changed daily life and created whole new industries within our economy (Wilson). Yet, with that said, success comes at a cost, and in this case, the cost is nothing but literal. It is no secret, the National Aeronautics and Space Administration spends billions of dollars every year in efforts to further space exploration and many citizens cannot fathom the nearly \$20 billion budget NASA will be taking into the year 2019. In fairness, NASA receives just 0.4% of the \$4.407 trillion FY 2019 federal budget. The Department of Defense, whose budget comprises 13 percent of the total, equals \$597 billion and surpasses NASA’s budget significantly (Amadeo). NASA is receiving an immensely significant amount of money, but it is a miniscule amount when analyzed in the “big-picture”. Furthermore, many people do not appreciate the complete impact generated by NASA. The purpose of NASA has gone beyond just fundamental space exploration: “...benefits trickle down to everyday life. Since 1976, NASA created 1,400 inventions that later became products or services. These include kidney dialysis

machines, CAT scanners and even freeze-dried food” (Amadeo). In just this passed month, NASA was working with several California organizations and ‘disaster managers’ to control and mitigate the wildfires that have broken out in multiple areas across the state. Even still, on an annual basis, NASA must present its’ proposed budget to the House of Representatives in order to get approval. Year after year, members of Congress critically analyze and question specific components of NASA’s budget; many members of Congress argue for decreased spending and limited funding: they feel the contributions from space exploration are losing value and, in turn, wasting valuable money. That said, government spending on NASA has increased annually for nearly a decade now, and in my opinion, should continue to do so. Although critics claim our tax dollars are better off elsewhere, NASA has introduced thousands of inventions and continues to work to aid the United States in a multitude of ways. Furthermore, in comparison other governmental entities, their support is limited; and henceforth, the National Aeronautics and Space Administration should continue to receive support from the United States’ government, as well as its’ citizens.

For the fiscal year of 2019, the proposed budget for the National Aeronautics and Space Administration is just shy of \$20 billion. This amount, though excessive, has not waivered much in the last five years and officials have plans to maintain a budget of under \$20 billion until the fiscal year of 2023. NASA officials have been commended for their ability to maintain a consistent, as well as, transparent budget request. Yet, for many members of Congress, they see the budget as unnecessary; some feel NASA’s direction has become misguided, and consequently, feel they should no longer be entitled to such a massive budget. Members of Congress, like Rep. Hal Rogers (R-Ky.), former chairman of the House Appropriations

Committee, is one of many skeptics: “I’m concerned about, in your budget, your cuts to the Office of Education...I can’t understand why you would want to cut that” (Foust, House). The Office of Education, which works to do things like support research infrastructure in underserved regions of the country, received \$100 million in the fiscal year 2017 would receive \$37.3 million in the 2018 appropriations bill. With this funding limited, NASA planned to eliminate three long-standing Office of Education programs that were identified by members of Congress to be “programs that so greatly benefitted the American people” (Foust, House). Members of Congress expressed their concern with these cuts as they believed they would have immediate impacts in their home states. This criticism, though fair, does nothing but stall the process of moving forward. Members of Congress are entitled to question modifications that will have direct impacts on their home state, yet to a point. Convincing members of Congress to leave the money in the hands of the experts should not be the most daunting task NASA officials face all year. Charles Bolden, NASA Chief Administrator, made the most recent meeting between the National Aeronautics and Space Administration and Congress painfully awkward as he displayed a strong sense of arrogance when addressing members of the House: “From where I sit, we’re requesting a \$19 billion budget...I leave it up to the budgeteers to determine where all the money comes from” (Foust). From NASA’s end, the process should be simple: crunch some numbers, establish a thoughtful plan, and inform the government what they need; members of Congress should not be inserting themselves into this process. Even so, criticism from members of Congress is nothing new for top NASA officials. In the year 2012, “...Senate lawmakers attacked the budget request for prioritizing the commercial crew program...[by pointing] to the fact that the 2013 budget request allocates \$326 million less to Orion and the SLS than they received in

2012. The commercial crew program, meanwhile, would get a boost of more than \$400 million over last year's funding level, to \$830 million" (Moskowitz). For NASA officials to consistently face criticism is preposterous; having to defend their ideas to those who do not have expert experience and are not well informed can be a rigorous task. NASA's missions take years to develop, and many politicians simply do not understand this aspect of NASA's research. When they do not see results in immediate succession, questions begin to rise. In my opinion, it is not the responsibility of Senators or House members to question the future of NASA's endeavours, nor is it their responsibility to question NASA's entire existence. For Administrators in NASA, the result of this annual battle does no change; the criticism is unwarranted but NASA is dedicated to never wavering their efforts to pursue space exploration to the fullest extent.

What so many people do not realize is that through sixty years of research and scientific development, NASA has been able to generate thousands of pieces of technology that have benefited society. Ranging from transportation developments to advancements made in environmental and agricultural resources, NASA has had a wide-ranging impact on our lives. Even the most mundane characteristics of our society can trace back to the origins of NASA research. For example, safety grooving, the process of cutting grooves in concrete to increase friction and prevent accidents can be attributed to NASA research. Firefighter gear is constantly improved alongside astronauts suit developments. Their lightweight breathing systems have gone on to aid military personal as well. Memory foam, something millions of people come into contact with every night, was the result of a program meant to develop a material to improve protection of passengers in case of a crash or potential fatal accident. The list is endless: from improved software technology to water purification techniques to harnessing solar energy more

efficiently, NASA is consistently working to better the lives of all United States' citizens (NASA). But is this worth a twenty billion dollar government investment each and every year? Are we getting enough out of this hefty investment? In my opinion you cannot put an exact, monetary value on the benefits of NASA. Health and medicine, computer technology, public safety, and industrial productivity are all fields that have seen significant improvements because of NASA related research and development (NASA). The overall "footprint" of The National Aeronautics and Space Administration cannot be underappreciated as it extends far beyond the realm of what we realize. A twenty billion dollar budget may seem excessive for developments in areas like public safety or water purification, yet the reality is that these developments are necessary as well as highly beneficial to our society.

To the untrained eye, \$20 billion seems like an overwhelming amount of money that will do nothing but continue to put our nation in debt. However, when you zoom out and look at the bigger picture, you would see that, NASA receives just 0.4 percent of the \$4.407 trillion FY 2019 federal budget. NASA receives less than these six departments: Health and Human Services – \$69.5 billion, Veterans Administration – \$83.1 billion, Education – \$59.9 billion, Homeland Security – \$46.0 billion, Housing and Urban Development – \$29.2 billion, and State Department – \$28.3 billion (Amadeo). Each department serves a given purpose and just like NASA, requires specific funding annually to help continue their efforts. The United States' debt has surpassed \$4 trillion: cutting \$20 billion from NASA will have little to no benefit particularly when the government is funding other organizations so heavily. Furthermore, even though space exploration is an expensive feat, it's the return that matters most. We know NASA is giving back to our society physically: with light-emitting diodes, anti-icing systems, video enhancing, etc.

Yet, NASA is doing more than just giving us physical returns: “A report by the Space Foundation estimated that activities related to space contributed \$180 billion to the economy in 2005. More than 60 percent of this came from commercial goods and services created by companies related to space technology. The space economy includes commercial space products and services. It also includes commercial infrastructure and support industries. It also counts aerospace budgets in private companies” (Balance). Nasa’s return on investment in the year 2005 was nearly tens times that of the government’s initial investment. This is a point many officials at NASA struggle to communicate: NASA does more than just send men to the moon. Since 1969, the common ception of NASA, and space exploration in general for that matter, is that we are competing with rival countries to land our astronauts first, wherever it may be. What the average citizen, myself included, does not understand is that NASA’s impact is extensive. Their research projects impact our daily lives as their work contributes to the economy unintentionally. NASA’s overall budget is miniscule in comparison to six of the most prominent government funded organizations. Their research and development not only bring us closer to understanding the universe, but improve our lives both socially and economically, meaning government investment in NASA should do nothing but increase.

To help further this point, NASA’s impact can be seen in today’s world, and as recently as the California Wildfires: “For the past two weeks NASA scientists and satellite data analysts have been working every day producing maps and damage assessments that can be used by disaster managers battling the Woolsey Fire near Los Angeles and the Campfire in Northern California” (Greicius). These wildfires forced thousands to retreat from their homes as flames blew endlessly into the night. Something people did not know is that NASA contributed greatly

to suppressing the fires in the north and south. By colluding with California officials, members of NASA were able to predict the path of the flames, and consequently predict potential danger zones for American citizens. David Green, manager of the Disaster Programs at NASA headquarters in Washington explains that, “When disaster occur, our researchers become providers and distributors of images, data, and damage assessments” (Greicius). Residents of the California community likely did not even know that NASA had a Disaster Program, nor that they were responsible for the evacuations that took place over the lengthy two week period. Initial intentions of all NASA satellites was not to predict the future of environmental disasters, yet it is one of the many “perks” NASA has giving back to our society. NASA is a universally beneficial program that, as shown here, has the potential to do more than just further research in science and technology. NASA has the ability to prevent the loss of human lives; its’ importance cannot be underappreciated. NASA employees were working as if it were any other day, and members of the affected areas ought to be eternally grateful as their lives were saved in the process.

The pure value of scientific knowledge cannot be underappreciated especially in the world we live in today. Our world is constantly evolving: changing both naturally over time, but artificially through human impacts as well. It is therefore not particularly hard to understand the value of science as scientific knowledge often contributes to what defines the very culture we have. NASA has contributed the greatest amount of scientific knowledge to our society than any other government funded organization. We may not see it easily, but in turn, society has become dependant on NASA. Critics and members of Congress feel that NASA no longer serves a purpose worth supporting: their missions are extensive and take years to develop. Yet, in my opinion, NASA’s contributions go beyond sending humans into space. Its’ impact can be

measured on a much broader scale. Their research leads to inventions, economic benefit, and offers safety measures that can be utilized on a current day basis. The overall investment from the United States government stands just below 1%, and is a minimal in comparison to other governmental entities. Therefore, the National Aeronautics and Space Administration should see an increase in spending, if anything at all. Cultures are fully defined and limited to the capabilities of their scientific knowledge and discoveries. NASA has opened our world to entirely new possibilities through extensive research and development. And yet, the question remains: to what extent are we willing to pay for this knowledge? Although the cost of furthering development in areas of science and technology has left many people to question the very importance of any scientific development, the government should continue to invest in NASA so that they can continue their pursuit of scientific knowledge, and we, as a society, can continue to benefit from it.

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