

Do We Need to Explore Space?

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Ever since humans first pondered the mysteries contained in the blackness of space, they have dreamed of space exploration. Within only a short time, mankind has finally become able to travel comfortably in earth's surrounding space. Unfortunately, as missions become more numerous and affordable, the limits of what can actually be accomplished by space exploration have become clearer. Despite these limitations, funding for exploration has risen exponentially over the past decades. Given the need to address pressing social, political and economic problems here on earth, such support should be reconsidered to evaluate exactly what is being gained and lost.

Why should the black vacuum of space be explored? Professor Charles G. Wilber of Kent State University answers, echoing Sir Edmund Hillary's famous comment about why he wanted to climb Mount Everest, "The only reason for going into space is because space is there. Man has an infinite curiosity which must be satisfied" (1). But what Wilber seems to be forgetting is that because of this curiosity, a total of twenty-seven deaths have occurred and an enormous amount of money has been consumed (2). Especially now, with President Bush's new "vision for human and robotic" space exploration, "A Renewed Spirit of Discovery," the monetary costs will exceed \$271 billion over the next thirteen

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years (3). With the U.S. population already having passed three hundred million, the average cost for each citizen approaches a thousand dollars. With the rising threats of HIV/AIDS, global warming, and cancer on the horizon, is such a level of funding justifiable? Some of those scientists involved in the activity argue that it is. Thus, for example, Thornton Page of Wesleyan University goes so far as to assert that raising American morale and prestige by space exploration is far more important than "accelerating the attempt to save cancer victims, or diverting scientists to the political-economic problem of reducing harmful automobile exhaust" (4). By analyzing the history of space exploration and by reassessing the human and economic toll it may become clearer whether such support is prudent.

"On July 20, 1969, the human race accomplished its single greatest technological achievement of all time when a human first set foot on another celestial body" (6). Venturing through space on the Apollo 11 spacecraft, Neil A. Armstrong and "Buzz" Aldrin completed a successful mission to land on one of the most captivating monuments of the night sky: the moon (6). Without a doubt, this single event inspired men and women all across the globe. Taking advantage of many previous scientific breakthroughs, it was a leap into the heavens that at long last released mankind from long bondage to our earthly habitat. It renewed faith in mankind's limitless capacity for what the eighteenth century philosophers called "indefinite perfectibility." The mission was also a triumph in America's space race with the USSR.

Although the mission was well worth the expense to most Americans, some thought it extravagant at the time. Apollo 11 cost nearly \$5 million in the sixties, which is equivalent to

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over \$2 billion today. Factoring in the cost of other moon-related missions, Marcus Lindroos of the University of Arizona estimates that the total cost of American missions to land on the moon neared \$100 billion (7). When compared to



other missions, the benefits of the Apollo 11 mission—raising American morale, inspiring new breakthroughs in science and preventing USSR dominance in the Cold War—may well have exceeded its costs. Like the Apollo 11 mission, there have been many others that have contributed to the progress of mankind by expanding man's horizons and

raising American morale, notably the embarkment of the Hubble Space Telescope on the Discovery mission STS-31.

On April 24, 1990, the spacecraft Discovery was launched to deploy the Hubble Space Telescope (HST) in a 380 statute-mile orbit (8). A milestone in the effort to gain understanding of deep space, HST has proven its value through its technologically advanced lenses and the many discoveries that it has helped to produce. This revolutionary moment in history combined advancements in engineering and astronomy to build and launch this amazing telescope. Some of the discoveries that have been made include Orion Nebula images that confirm the births of planets around newborn stars, Eagle Nebula images showing where stars are born, and 'Deep Field' images in which Hubble peered back in time more than 10 billion years (revealing at least 1,500 galaxies at various stages of development) (9). In retrospect, the value of the many advances that have been made in science through the implementation of the Hubble Space Telescope can be seen as worth the expenditures. Nevertheless, in analyzing the success of NASA's progress through time, one must not forget its failures, which have cost not only large amounts of money but also human lives.

One of the most tragic of all American missions was the Apollo-Saturn 204 mission, Apollo 1. On January 27,

The average cost for each citizen approaches a thousand dollars

1967, while performing routine tests and preparations in a command module three astronauts died due to a flash fire (5). Although it is impossible to assign a monetary value to the lives of three Americans, their deaths amount to a cost that must be weighed against the advancement



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of our knowledge of earth's surroundings. Because the Apollo mission cost \$23.190 billion and NASA's scheduling drawbacks cost an additional \$472 million, Apollo 1 struck hard and deep into the hearts and pockets of American citizens (5). In spite of the escalating human death toll due to space missions, especially those involving the space shuttle, the government continued to subsidize NASA's projects. Along with continued progress over the next few decades, the costs have mounted both in money and human lives.

The Challenger mission 51-L will always be seen as a great catastrophe and a dramatic case in point for critics of space exploration. On January 28, 1986, all seven members of the Challenger space craft were killed seventy-five

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seconds after liftoff, when an O-ring seal in part of the rocket booster failed (8). Clearly, the deaths of seven Americans are hard if not impossible to justify. But the official comment at the time helps explain why space exploration has endured for so long despite the criticisms. NASA Administrator Daniel S. Goldin took the occasion of the tragedy to reaffirm the commitment to explore space despite the human cost: "The best way to honor the memories of the crew of the Challenger, and of all the men and women who have given their lives to explore the frontiers of air and space, is to continue their bold tradition of exploration and innovation. That's what the people of NASA do every day. They push the boundaries of knowledge and human endeavor to improve and enrich life on Earth today and secure a better future for all of us tomorrow" (9).

Although this statement is inspirational to many, some may still question how exactly NASA helps "improve and enrich" mankind's life (9). Without a doubt, NASA scientists have contributed much through research in the fields of pharmacy, agriculture, medicine, and engineering. And there have been instances where the knowledge directly gained from exploring space has been used to improve human life. Nonetheless, the financial investment in exploring space could have been used more effectively if it had been devoted to research in curing human disease or stopping global warming.

Such considerations have not deterred our political

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leaders. President George W. Bush apparently feels that it is more essential to inspire the next generation of innovators and scientists than to help alleviate human suffering. In early 2004, President Bush initiated his "Renewed Spirit of Discovery" program. The fundamental goal of this platform is to advance U.S. scientific, security, and economic interests through a robust space exploration program (10). It bears repeating that the total cost of such an endeavor, a cost that President Bush feels that American taxpayers should bear, nears \$271 billion.

Despite what many would consider a fantastic sum, the American Association for the Advancement of Science (AAAS) warns that NASA, "like other agencies, is being asked to do more with less" (11). Such comments make one wonder whether this gigantic subsidy is being used haphazardly, even though President Bush has specifically earmarked the funds for missions to the moon, for completing the international space station, and for preparing human

it is dwarfed by the amount of funding given to space exploration. Similarly, government spending on researching the international killers known as Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) was merely \$2.2 billion in 2001 (13). In addition, some may argue that with so many reputable scientists becoming actively concerned about the environment, global warming demands more funding for research and preventive regulations. According to MIT Professor Richard S. Lindzen, recent estimates put the financial funding from the government to help alleviate global climate warming near \$2.2 billion (14). Despite the fact that the government does support research in almost every field imaginable, some still argue that the expenditures of the space administration far exceed the beneficial results. Those who take this position contend that, the more immediate problems of the human population should have higher priority.

The knowledge directly gained from exploring space has been used to improve human life

What is gained and lost by space missions obviously varies from one flight to the next. The Apollo 1 and Challenger missions can be viewed as tremendous losses while the Apollo 11 and Discovery missions created a new perspective of human life on earth and renewed the human mission to understand the universe. In the end, each of us must decide how to arrive at a balanced understanding of what is at stake. There is no easy answer to the question of whether space exploration is worth the cost. Nonetheless, the answer lies in what each individual American citizen sees as being prudent and essential for not only the progress of mankind, but also his own sustainability.

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missions to Mars.

The case for this expenditure is admittedly impressive. It will undoubtedly produce tremendous advances in knowledge and innovation. And yet, some will surely argue that with rising international conflicts, border security issues, human disease, and questions of global warming, such funding is misplaced. Of all the human diseases that affect

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the American population, cancer has risen to be one of the most dangerous. "Cancer is the second leading cause of death in the United States after heart disease," said HHS Secretary Tommy G. Thompson (12). And while government spending on cancer research has increased over the years,