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## Space Exploration: At What Cost?

**In these uncertain times, BBC astronomer Mark Thompson shares his opinion about the funding of space exploration in light of global tragedy.**



By [Mark Thompson](#)

Sat Apr 9, 2011 12:56 AM ET

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The soon-to-retire shuttle has pushed human ingenuity to the frontiers of space science, but in light of human suffering, was it worth it? [Click to enlarge this image.](#)

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It's been a humbling few weeks for many of us. Devastating scenes in Japan [from the earthquake, tsunami and now the nuclear crisis](#) serve as a reminder how lucky many of us are.

For me, this was followed by watching Comic Relief charity event in the UK on March 18 and seeing the poverty in Uganda on the TV -- it was nothing short of shocking. In the same period, I was closely following NASA's MESSENGER space probe as it dropped into orbit around Mercury, the nearest planet to the sun.

#### [\*\*SLIDE SHOW: MESSENGER: First Photos from Mercury Orbit\*\*](#)

I found myself wondering if it's right that we are spending all this money on space exploration when people on our own planet are suffering so horribly, either at the hands of Mother Nature or poor governments.

#### **Mission to Mercury**

Mercury itself has actually had quite a lot of press of late, as the last few weeks have been a great opportunity to try and observe this tiny elusive planet. When inner planets (Mercury and Venus) orbit around the sun and reach the extremes of their orbit as viewed from Earth, they are at their easiest to spot.

For Mercury, it's been on the eastern side of the sun so is said to be at "greatest eastern elongation," a mouthful that means it's worth trying to spot it low in the western sky after sunset.

It's been great to see the nearest planet to the sun, up close, and amazing to know that we've sent a tiny space probe there to study it. But for me, even more spectacular was watching Discovery dock with the International Space Station a few weeks ago.

That question about funding still nags at me though.

#### **Big Numbers**

The MESSENGER mission cost \$280 million (which, in reality, isn't a vast amount for a space mission). The launch of a space shuttle costs \$450 million and there have been about 130 of them. It cost \$1.7 billion to build just one of the five-strong fleet.

Finally, the International Space Station has, over the years of its existence, cost an estimated \$142 billion and that's not including the plethora of smaller space missions, other space agencies and other expenses involved in space exploration.

As you can see, these are big numbers. Yet there's an urgent need for funding to save lives down here on Earth, too.

Although space exploration certainly isn't over-funded, should we keep throwing money into space exploration when there are so many examples of human suffering?

### **More Money, Less Suffering?**

A great effort this year saw the Comic Relief campaign raise £70 million (\$114 million). But this is just one example; there have been countless great fund-raising efforts internationally over the years. Public fund-raising brings in money for these great causes, yet governments give billions in foreign aid too. The UK for example, gives around \$11 billion each year in foreign aid.

So, my mind drifts back to last year's Comic Relief show when I was witnessing many of the same scenes I saw *this* year and another question pops into my mind: "why isn't any of this getting better?" It seems that money isn't the answer, or perhaps the money isn't getting spent in the right places (is the problem too big to be solved with the money being raised?). Either way, I don't think pouring more and more money into these problems will magically make them go away.

Don't get me wrong, if I thought for one second that stopping space exploration would mean these problems would be solved, then I would be one of the first calling for missions to be scrapped.

I have very special and fond memories of space exploration; watching the images come back of Halley's Comet from Giotto, seeing the surface of Titan (Saturn's moon) from the Huygens lander and incredible footage of the surface of Mars from Pathfinder.

Great memories are one thing, but many people just see space exploration as "a bit of fun" and something that's "nice to do" -- in light of recent science [budget cuts](#) and [canceled missions](#), space exploration is often one of the first government expenditures to be targeted -- but I'd argue space exploration is *critical* to our future.

### **Spinoffs**

We already see tangible benefits for developing space technology, ultimately resolving issues down here on Earth and enriching all our lives. Water purification techniques that were developed for space exploration are being used in third-world countries, ultimately preventing disease and saving lives.

There are greater yields of crops thanks to space-driven technology, not to mention advances in medicine from treatments for brain cancer to more accurate thermometers.

The environmental benefits are wide-ranging, as satellites in orbit provide valuable data about how our atmosphere is evolving. Data from studies of other planetary atmospheres in the solar system help us to understand ours.

To be honest, a huge number of space-motivated technologies – too many to list -- have changed the shape of society. Out of interest, NASA maintains [a "spinoff" online database](#) detailing how NASA's space endeavors have real-world benefits.

### Enriching Society

I'll let you draw your own conclusion on this emotive topic, but for me I shall continue to enjoy and support man's exploration of the Universe knowing that money alone can't simply get rid of world suffering.

I will sit back and enjoy the images from MESSENGER, knowing that space endeavors not only advance mankind's understanding of the Universe, but also drive the technologies that enrich our planet. I'll still donate money to help fellow man, knowing... hoping, that one day those who make the final decision on how it is spent will send it in the right direction.

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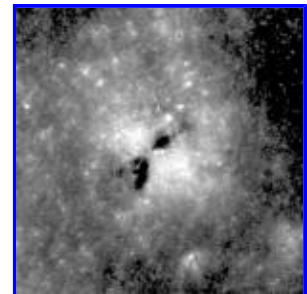
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**Otis Motis**

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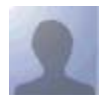
Friday, November 11, 2011, 11:39:15 PM – Flag – Reply



**Kousik S**

Man is wasting his money in space missions. It is not the correct way to explore space.

Tuesday, April 12, 2011, 7:31:58 AM – Flag – Reply



**shrikant mishra**

Yes ! NASA use gold coins to build a rocket. That way all rockets parts built over more than ten or more companies is under quality check. Not like the rockets blasted from China that falls into the nearest village , just after leaving the launch pad.

Monday, April 11, 2011, 6:19:42 AM – Flag – Reply

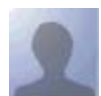


**Andrey Gorohovschi**

All civilizations become either spacefaring or extinct.

Carl Sagan

Sunday, April 10, 2011, 11:35:27 PM – Flag – Reply



**Selladore**

What are we even talking about here people?! Fund-raising? Foreign aid?! ISS cost over the years of existence according to author: 142bln. Annual US military spending: over 700bln. ANNUAL. Check out budget for 2012. From average household year's taxmoney planned: for NASA..... 33\$ For military industrial complex.... 1100. Wakey wakey...

Sunday, April 10, 2011, 8:36:55 PM – Flag – Reply



**damasterwc**

stop thinking about it in terms of money. how is paper money related to public services and benefits? you're falling into the banker's trap. there is no relation to paper money, gold coin, or electronic zeros in the banking system to clean water, police, fire departments, and the welfare system, nor is there any relation to space exploration. how does gold coin, zeros in the computer, or paper money relate to space? can we use a gold coin to launch a rocket? how about paper money? this economy post-bretton woods, post-glass-steagall is just stupid. change it now.

Sunday, April 10, 2011, 7:13:26 PM – Flag – Reply



**shrikant mishra**

It's a shame , NASA administration has not worked out a strategy , with the big commercial brains all over the world to become > 100 billion dollar company. That way NASA can also fund Republican primaries....

Saturday, April 09, 2011, 9:13:21 PM – Flag – Reply



**Adam Dillon Horne**

Nasa can send shuttles into space but can not pay its own bills? why has NASA not explored new ways of obtaining their financial obligations? open the facility up to the scientific community! If technology is just sitting there then make it available to rent for high costs. Other countries would not pay millions to use their equipment for their own scientific research? what about scientific communities and entrepreneurs? for Nasa to be so dependant on the government seems ridiculous to an extent (finances for these missions are very expensive) but for NASA to excel and continue space exploration, its resources should be devoted in finding their own financial success and sustainability.

Saturday, April 09, 2011, 2:40:31 PM – Flag – Reply



**DDOD**

Wow your kidding right? First of all the investment our government makes in NASA is invaluable to scientific research and advancement. Second if NASA just "rented out" their equipment and just let any old space explorer with some cash on hand use it it would be subject to lesser care, and there would be a likelihood of compromise of the equipment, and of course it could end up getting reverse engineered and have all the money sunk into development lost.

I just have to respond to your comment about NASA putting their resources to good use in fundraising - what do you think NASA is doing? They are lobbying to the place they can get the most money - a government entity. No private investor will put up the kind of money needed for missions, there wouldn't be enough of a return on their investment. A government however will benefit from non monetary advances in science and technology. Besides the amount of money NASA is getting from the government is negligible in comparison to most anything else, its less than 1% of the budget. Now the military, that could use some spending cutbacks, we have spent more money on Iraq and Afghanistan than we did on the stimulus and "Obamacare" combined, it would be nice if congress took a paycut too - you know to show that they "feel our pain."

Saturday, April 09, 2011, 3:32:56 PM – Flag – Reply



**Adam Dillon Horne**

you make two very good points in this topic and, maybe you did not understand the business potential NASA has in a global market for technologies that could benefit humanity on earth outside the solar system. Making NASA a brand! (in a sense). Lets start with ur first point "subject to lesser care," what if the data gathered from NASA scientists must be available to them to defend their technology? Even if re-generating placed doubt in american technology is this wrong? this could lead to other countries considering these developments where there space agency is not in a financial crippled state and develop new technologies. is this wrong or scientific progression as a whole? are Americans so scared that their technology is questionable? or not on top of the world? Your second point on the government is why i brought this subject in the first place. I understand that space explorations offer no monetary return to the government and is actually a small percentage of the budget. to direct the money away from this is disgusting, but in a time where humanity is lost in government, NASA really cant depend on government support anymore because its not relevant to current views on economy. So NASA needs to start marketing technology so they can fund themselves. Even open it up to universities to promote new technologies?

Saturday, April 09, 2011, 4:31:19 PM – Flag – Reply



**Adam Proffitt**

Considering how the government has cut the funding of NASA time after time ever since the fall of the Soviet Union your point doesn't really make sense. During the 60's NASA had almost 5 percent of the national budget. Now it has 0.75 percent the budget and they still are sending probes out to places like Saturn and Mars for scientific studies. NASA is supposed to be a publicly funded scientific and space exploration organization for the good of all Americans. Once you privatize it it becomes for the good of the wealthy. Sure, eventually the benefits trickle down to the not-wealthy, but it takes decades. When NASA actually had proper funding, they created the Saturn V rocket, which is probably the biggest technical achievement that mankind has ever created in its entire history. Seriously, go to Houston some time and visit the Space Center. Stop by the Rocket Park and prepare to have your mind blown. That thing took us to the moon, and significantly advanced other technologies which we take for granted today.

Sunday, April 10, 2011, 4:27:23 PM – Flag – Reply



**george rob**

I think Mark is right in some aspects, like large amount of money is being given to charity every year, but it is not spent where it has to be. But it can't be corrected by stopping space explorations.

Why anybody wants (especially humans) to through money wastefully? Nobody does that. Space missions r very much needed to save our future if not present. This planet is running out of LIFE supporting requirements, we must find a backup soon. Otherwise, today only some countries r suffering, but tomorrow whole humanity has to suffer.....

Saturday, April 09, 2011, 1:49:19 PM – Flag – Reply



**Marcos Toledo**

With what is happening on Earth today we better have a plan B exist strategy for getting out of here if all hell brakes loose. As for the politicians all they care about is their religio-indologic fantasies and lining the pockets of their masters and having a good time with other peoples money and the hell with the rest of us. Ending poverty and disease that what drives the economy and keeps them in power as Eric Blair writing under the name George Orwell in 1984 wrote War is Peace, Freedom is Slavery, Ignorance Strength long live big brother.

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#### PICTURES



Saturday, April 09, 2011, 1:14:54 PM – Flag – Reply



**trac1 1**

The problem is not the lack of money, but the lack of education. In the third world countries, it will be poverty until, the people will be less corrupt and more educated. The money are well invested in space exploration

Saturday, April 09, 2011, 12:28:11 PM – Flag – Reply



**Craig J. Bolton**

I guess I'm of two minds. On the one hand, if "we" seriously consider space exploration as always secondary to charity, then why not examine the budget for astronomy first? Ater all, what good is astronomy if that knowledge is never going to be put to any practical use?

OTOH, this argument that space exploration has had all of these world changing unexpected consequences in new technology sounds very like the brainless argument for certain sorts of environmentalism - that "we," right this very minute, may be causing the extinction of the one and only plant that contains the magic chemical to end cancer. Not very convincing, or, at the very best, remarkably not quantitative for someone like an astronomer who spends his life with quantification at a very complex level.

Saturday, April 09, 2011, 12:08:09 PM – Flag – Reply



**jt**

For my idiomatic example: I'm a graduate of a famous university, been laid off twice since January 2009; a week after I got my newest, highest paying job ever in late 2010 I was hit by a car and this requires at least two surgeries on my knees and a long period of disability. By the book, this is one of the worst, most unsure times of life for me and my wife. At the same time, I think I've earned the level of confidence I have in the fact that things will turn out alright, and in that spirit I finally bought my first telescope last month, which is something I've been wanting since I was a kid.

You would think that due to my circumstances I would have bought a cheap telescope, or waited until I was in a more ideal financial and physical condition. But I bought a really good one (Celestron Nexstar 6 SE), because getting something inadequate is never worth it and there is no such thing as ideal conditions.

Heck, since I bought the thing we've had nothing but cloudy skies, and I live in about the most light polluted spot outside of Times Square. So what was I thinking? I was thinking I would really like to see the Orion Nebula with my own eyes.

Saturday, April 09, 2011, 11:15:44 AM – Flag – Reply

**Adam Profitt**

Move somewhere else.

Sunday, April 10, 2011, 6:34:08 PM – Flag – Reply

**Well...Hello**

Adam - Do you really think he was attacking beloved New York? How did you miss EVERYTHING ELSE he said?

Sunday, April 10, 2011, 10:09:45 PM – Flag – Reply

**James Demello**

We should break the bank on spending for space ventures - then at least we might not be able to afford all the wars we seem to involve ourselves in. Sorry, police actions.

Perhaps we should revisit the silly space treaties that prohibit the weaponization of space. If we gave the military totally free reign in space we would probably have a fort on the moon by now with all the attendant space vehicles. Maybe if we signed international treaties that only allowed military intervention in space, we could get a bit peace on Earth.

Saturday, April 09, 2011, 9:28:31 AM – Flag – Reply

**ironwood**

Yes. I agree with Reagan's comment. It is a matter of time when a big asteroid hits earth. one which our technology cannot divert. I just hope we keep investing in space travel and if by then we have colonised the moon or mars, then at least some members of the human race will survive.

Saturday, April 09, 2011, 6:46:09 AM – Flag – Reply

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