

Will humanity expand further into the cosmos?

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“ We must continue to go into space for the future of humanity. I don’t think we will survive another 1, 000 years without escaping beyond our fragile planet.” This awe-inspiring statement was made by none other than, eminent physicist, Stephen Hawking.

His opinions are shared by the scientific community at large, who passionately propagate the view that remaining on Earth is literally “ putting all eggs in a single basket” as far as long-term survival of the human race is concerned. Their argument does makes sense: By developing alternative settlement locations off Earth, humans could live on in the event of natural or man-made disasters on our own planet. Additionally, resources in space, both in materials and energy, are ginormous. Colonising the Solar-System alone will give us, by a moderate estimate, enough resources to support a billion times more than the current Earth-based population. To further develop the argument, Elon Musk’s SpaceX has just announced that it will be taking 2 people to the Moon by the end of 2018. NASA has announced it will land humans on Mars in the 2020s.

It sounds too good to be true, doesn’t it? That’s exactly where the catch is! The current cost of sending anything from the surface of the Earth into orbit is around \$3120 per pound. Let that sink in. That means a spaceship, launched with current technology, which can carry only around 100 people, will cost about \$4 trillion to launch. Mind that, this is the cost for launching alone, and of course, the price of construction will be immense too. And it won’t hurt to remember that this spaceship is just for a 100 people, which is way too less for any meaningful aim of human colonization. This cost is what the scientists who counter the vision of expansion often refer to.

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They put up a splendid argument, saying that it is better to spend such a large amount of money on solving humanity's problems on Earth, rather than building spaceships to wander into the limitless unknown. Until we reduce the launching cost dramatically, say bring it to under \$10 per pound, the overall cost of such a project will be ridiculously enormous, and will be impossible to remunerate. However, all is not as gloomy as it seems. Already private companies like SpaceX and Blue Origin - which are freed from the shackles of bureaucratic inefficiencies often faced by governmental space agencies - are testing reusable launch vehicles capable of reducing the cost of launch to just under \$500 per pound, and it will not be outlandish to assume that competition, public-private partnership, and the economies of scale will further reduce that cost to reasonable levels. However, even if we manage to reduce the cost of launching payloads dramatically, we are not out of the woods just yet. How much do we know about effects on human health, psychology, and sociology due to long-term space presence? How will we be able to maintain genetic diversity, which is essential for the survival of the human species? There are tons of such questions out there, and we don't have the answers to many of them.

But I'm sure, many of these obstacles would be easier to overcome given potential advances in Artificial Intelligence, robotics, manufacturing, and propulsion technology. The vision to expand into the cosmos will be the most daring feat humankind has ever attempted, and it would require the combined energies and efforts of scientists, politicians, and ordinary citizens alike. Personally, I believe that given mankind's drive and ambition, the

question of our expansion in space is not of if but of when. Note:- All the opinions stated in the above article are the author's own