



Prize Winner

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What happens to the International Space Station (ISS) after 2024?

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International Space Station (ISS) is a laboratory and an observatory constructed in space about 400km above Earth [1]. The construction of ISS was carried out by 15 countries including United States of America (USA), Russia and Japan. The ISS project began in 1998 and finished in 2011. The ISS station weighs more than 460 tonnes and is approximately the size of a football field [1]. Figure 1 shows a picture of ISS [2].



Figure 1: International Space Station [2]

The ISS has provided many benefits to science [3] during the last 20 years. Some of these include:

1. Knowledge about the effects of space environment on our human body
2. Study on micro-organisms like bacteria in space
3. Growing crystals for medicine
4. Improve our understanding of cosmic rays and dark matter
5. Combustion of fuels.



Current Thinking: The ISS was designed to operate until 2024. The participating countries have started discussing to extend the operation of ISS to another 4 years [4]. It is not clear what will happen to the ISS after 2024. There are reports that it could be deorbited, recycled for future space stations in orbit or simply left as space junk [4].

If ISS is left in space and do nothing the station will slowly start to drift and then fall on to earth. If this happens the space will get more debris and the large parts when they fall may harm humans and the environment [5].

My Proposal: I propose to use the ISS to build a laboratory on the surface of the moon. This would cost lot of money. But I think we now have the right technology to do this, for example the rocket technology developed by Elon Musk's company SpaceX.



Figure 2: SpaceX Rocket [6]

Do we really need to dispose one of the biggest achievements in the field of astronomy? It took thirteen years to build the ISS and has provided many benefits to science and humanity. Do we need to destroy it? The frequent answer to this question would be "What do we do with it". We could simply leave it out in space but as mentioned before it would pose a threat to earth if we left it as space junk. The



most rational option is to reuse it. We could easily reuse it by permitting it to be a space station on the moon. This is good as NASA is working on building a space station for the moon anyway, and it is called the Lunar Gateway [7]. The Lunar Gateway is designed to basically do what the ISS does, but on the moon it would provide a place to do experiments, make robots and of course house astronauts on the moon. The Lunar Gateway is planned to launch in 2024 which is in 3 long years. The ISS is more preferable to be a 'moon' station as it is already made and has all the functions that the Lunar Gateway has. This is a great idea if you think about it, but of course there are many challenges too.

In May this year, SpaceX has successfully launched and landed a rocketship that can be used to land astronauts on the moon and send people to Mars [8]. And in April this year the NASA selected SpaceX to land humans on the moon as part of their Artemis Program [9]. So it is very clear that SpaceX has the technology to transport a station like ISS to the moon.

To transport ISS, rockets can be installed on the ISS as shown in Figure 3.

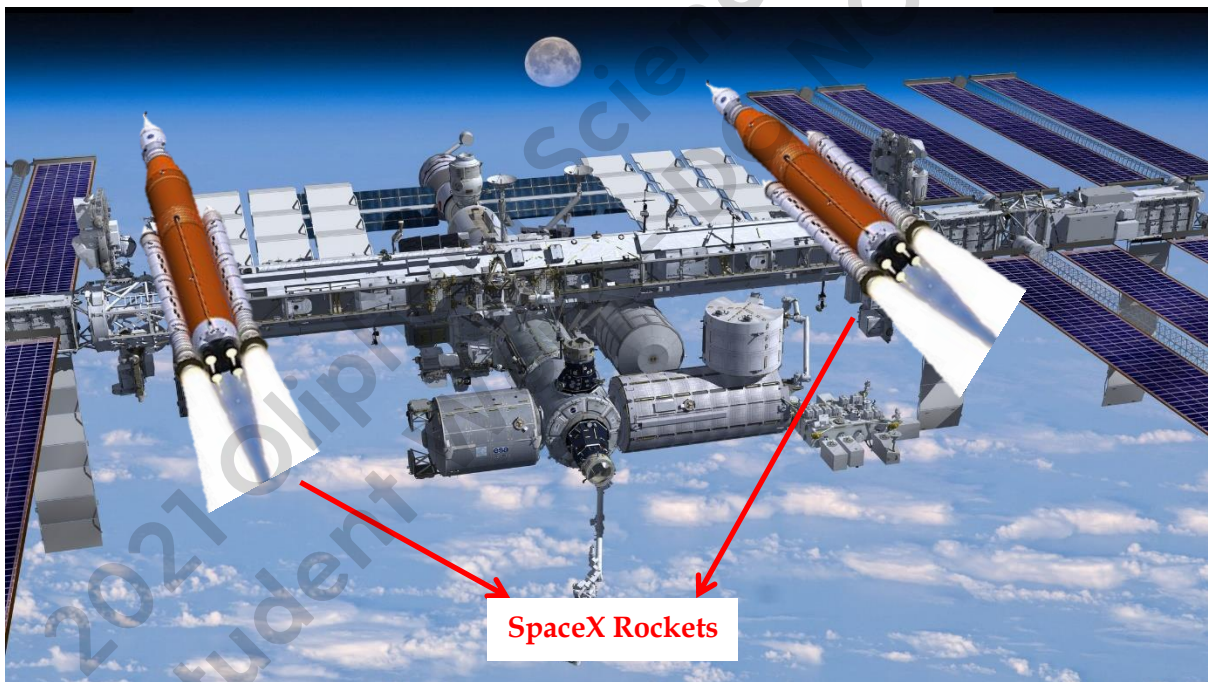


Figure 3: Installing SpaceX rockets onto ISS

Moon is the closest terrestrial body to us. A permanent settlement on the moon would benefit in many ways. The gravity on the moon will be much less than earth. Therefore it will be more energy efficient to launch space missions to other planets from the moon. Moon can also be used to make construction materials and transport it to earth; out-of-earth tourism and pest-free agriculture [10].

Let's give ISS a home on the surface of the moon!



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