

The Sylvans

Detailed summary powered by AI

1 June 2026

Motion: we should focus resources on earth, not space exploration.

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1. Analysis of the outcome

The motion was not carried, by six votes to 11 with four abstentions. It lost because the house never accepted the exchange it was being asked to authorise. The proposition built a case about need and the opposition built a case about return, but the arguments that decided the evening came from the floor, where speaker after speaker questioned whether the two halves of the motion were connected at all. By the closing speeches the proposition was defending its premise rather than its conclusion.

The proposition's case: poverty, biodiversity, climate

Sixteen floor speakers is a large number for a main debate, and it changed the shape of the evening. Neither opening speech was tested by its opposite number for two hours. Both were tested, repeatedly and from unexpected angles, by people who had not known until that night what they would be arguing about.

The opening speech was the most architecturally ambitious of the evening. Rather than argue for the earth directly, the proposer polled it: the poorest of humanity, the other species, the oceans, the climate, global medicine, each given a turn and a set of figures. The device gave a familiar case unusual reach, and it front-loaded the strongest material instead of saving it.

Its exposure was structural. Establishing that the earth's needs are enormous costs nothing, because nobody in the room disputed it. The claim that had to be carried was the second one, that space budgets are where the money should come from, and the speech spent comparatively little time there. When the floor arrived at the same gap within twenty minutes, the proposition had no reserve position prepared.

The opposition's defence: spinoffs, jobs, knowledge

The opposer answered with the by-product catalogue, which is the oldest move available on this motion and, on the night, an effective one. It converted an abstract argument about the future into a list of objects in the room: telephones, mattresses, drills, sunglasses, scanners. Several floor speakers picked the list up and extended it without being asked to, which is the clearest sign a rhetorical move has landed.

The vulnerability in it went unexploited for almost two hours. Nothing in the catalogue requires exploration as distinct from science, and much of it came from research that was pointed at other targets entirely. That objection was available from the first minute of the speech, and it did not surface until the proposition's closing.

The ebb and flow of the space exploration debate

The floor ran to sixteen speakers and did most of the evening's work. Three battlegrounds opened, and the proposition lost the first, drew the second and had the third handed to it by people who then voted the other way.

Battleground one: whose budget, measured against what

The arithmetic went to the opposition quickly and comprehensively. NASA against the Pentagon, global space spending against climate adaptation, launch costs then against launch costs now: by the halfway point the room had been shown from four directions that space is cheap. One speaker even corrected the opposer's own figure downwards, which is an unusual way to lose ground.

The most consequential intervention of the night then dismantled all of it from the proposition's side. Comparing NASA's budget to American military spending answers a question nobody had asked. The motion is about where resources should go, not about where they currently are, and the honest test is what a society would do with money it had not yet committed. That reframing rescued the proposition from a losing

exchange, and the speaker who supplied it still concluded, on their own test, that they would fund both.

Battleground two: what focus means in the space exploration debate

One word in the motion carried more weight than any figure quoted against it. A floor speaker proposed a test for it: put space exploration on an election leaflet beside the health service and housing, and ask whether you would vote for that party. On that reading the club was not debating whether to fund space, which everyone present already did, but whether to elevate it, which almost nobody would.

The reading cut in both directions and the opposition took the better half of it in reply, pointing out that if we are not currently focusing on space and are collecting the benefits anyway, the motion asks the house to change something that is working. Neither side ever agreed on what the word meant. The four abstentions are the most legible evidence of that.

Battleground three: the private sector

Roughly a third of the floor arrived with an argument neither opening speech had anticipated. Space is now substantially private, and the objections raised were about tax, subsidy, monopoly, national security and the spectacle of billionaires in orbit while public agencies are cut.

This was proposition material lying unclaimed. Every speaker who raised it was describing a resource allocation they considered indefensible, which is the motion in different words. The proposition never picked it up, and several of those speakers went on to vote against the motion or to abstain, because the case they were making was against a particular way of going to space rather than against going.

The closing arguments and what drove the result in the space exploration debate

The opposition's reply did the necessary work first, denying that the motion described a binary and arguing that the capacity to solve today's problems was built by people planning for a future they would not see. It was a defensive speech and it did not need to be anything else.

The proposition's reply contained the best argument of the evening, and it arrived roughly ninety minutes after the moment it would have been decisive. Separating the by-products of science from the by-products of exploration, and naming a military research agency rather than a space agency as the source of much of the catalogue, would have taken the opposition's foundation out at the start.

Delivered last, with no speaker able to answer it, it read as a correction rather than a case, and the house had spent two hours deciding that the motion asked it to choose between things it did not want to choose between.

What the room was never given

One thing was missing from the space exploration debate all evening, and its absence shaped the vote. Nobody put a figure on what focusing would cost. The proposition described the sums that colonisation would require and called them multiples of national output; the opposition described the sums currently spent and called them trivial. Those two accounts are not in contradiction, because they describe different activities, and neither side ever forced the other to price the same thing.

Without that number the motion could not be settled on the evidence, only on instinct. A house asked to choose between an unpriced future and an itemised present will generally take the present, and this one did. The six votes in favour came from speakers who had reached the ethical version of the argument, where the figure does not matter because the injustice is the point.

Conclusion

Six votes for the motion, 11 against, four declining. The room was persuaded that the earth's claims are urgent and that space is inexpensive, which is a coherent position and also a refusal of the question. The house did not vote for space. It voted against being made to choose.

2. Detailed transcript

The motion

The motion is: we should focus resources on earth, not space exploration.

The proposition opens the space exploration debate

Good evening, everyone. Thank you for the pleasure of your company. When I first looked at the motion I thought the logical way to present it was to define "we", then to define space exploration, then resources, then earth. As I thought about it, I decided that "we" and "earth" are actually the same thing. We tend to think of "we" as us, maybe the UK, maybe Europe, the US, the rich West. But we need to think about all of humanity. That is what "we" really is. And on planet earth it is not just humanity, it is also all the other species. What would the ocean say to this?

What would biodiversity say? It is a food chain, and we are at the top, and if you take the layers out then we also fail to survive. That is part of earth. The climate: what does that have to say?

So I decided to go out and do the research, and ask all of these stakeholders what their opinion would be, where they would stand on this motion. I thought it best to focus on earth at the beginning, because that has the most impact, rather than going through space exploration first and leaving earth until the end.

What would the rest of humanity say? Here we are really focusing on acute global poverty and economic inequality. I am not talking about the rich West, I am talking about the rest of humanity, and they would likely say that centring resources on earth addresses immediate human suffering. Millions of people today lack access to basic necessities. The World Bank tells us that roughly 700 million people live in extreme poverty, surviving on less than \$2 a day. Redirecting space budgets towards targeted basic income, sustainable agriculture and microloans on earth yields an immediate, measurable reduction in global mortality and suffering. So I think the rest of humanity, especially the non-wealthy part of humanity, would argue for focusing resources on earth.

That brings us on to the rest of sentient life on the planet. What would they say, and what would their ecosystems say? The World Wildlife Fund tells us that earth is currently undergoing its sixth mass extinction event, driven primarily by habitat destruction, pollution and over-exploitation, and that funding is desperately needed to preserve the complex ecosystems that actively support human life. The same source highlights an average 73% decline in monitored wildlife populations over the last century, and the cost of a single deep space mission could fund the permanent protection of millions of acres of critical rainforest, or of marine sanctuaries, which act as vital carbon sinks.

Without this we do not have the ecosystem, the biosphere, to absorb the carbon dioxide and produce the oxygen that contributes to our own survival. So all the other species on the planet would want to divert resources to earth, and not to space exploration.

The oceans, the climate and global medicine

Then we can ask the oceans. The oceans regulate the earth's climate and provide the primary source of protein for over 3 billion people, yet we know less about our own ocean floors than we do about the surface of Mars. Marine ecosystems are nearing breaking point. Millions of tons of plastic enter the oceans annually. Over 30% of global fish stocks are over-exploited. Allocating resources to ocean cleanup technology, to sustainable fisheries enforcement and to marine biology yields immediate ecological and economic returns for coastal nations, and the funds would be better diverted to save the ocean.

We can move on to the climate. What would the climate say? The climate crisis poses an existential threat to humanity within this century, and searching for planet B distracts from the vital, time-sensitive task of preserving planet A. The United Nations Environment Programme estimates that developing countries alone will need up to 387 billion euros annually this decade to adapt to climate change, and the global cost of transitioning entirely to renewable energy runs into trillions. That capital is being competed for by space, defence and exploration contracts.

And what would global medicine say? Investing in biomedical research, healthcare infrastructure and pandemic prevention on earth saves lives today. We need to address systemic healthcare delivery failures and the threat of emerging infectious diseases. The World Health Organization continuously reports that simple, preventable conditions, malaria, tuberculosis and lack of clean water access, claim millions of lives annually. A fraction of the global aerospace budget could completely eradicate multiple neglected tropical diseases. We could ask education, we could ask infrastructure. All of these need massive resources, and I am sure you understand that I am arguing for investment in planet earth.

The proposition on cost, collaboration and science fiction

I am now going to talk about space exploration. What does that actually mean? It could mean anything from looking through our telescopes to observe the stars, as Galileo and Newton did. We have learned things. We have advanced in physics and mathematics. We have been able to send men and women to the moon. We have GPS systems. So there have been benefits, but the proposition would argue that those benefits have been heavily weighted towards the rich nations. The global south has not benefited nearly as much. As the data has shown, 700 million of us are living under \$2 a day, and many more of us are not far off that.

So it could mean that, and there have been benefits, and they will continue. But the spirit of this motion really gets to the idea of space exploration as extracting resources from asteroids and the planets, and colonisation. That is literally still science fiction. The timeline for it runs into the centuries. These are fundamentally hostile environments, which make colonisation an illusion. The cost is many multiples of GDP, and it is actually quite impractical. We would need the nations capable of such advances, so the EU, the US, China and Russia, to collaborate. We all know the geopolitical situation at the moment, with Iran being attacked by the US, Israel being supported by others, Russia and Ukraine, and the EU against them.

The idea of collaboration is far off. It seems impractical, and it is likely that any sort of space exploration will simply lead to an expansion of an arms race into space.

So overall, when we look at the proposition, on balance the spirit of space exploration is science fiction. It is too far away to reap any benefits, and the need for the earth, the need for all of these resources to be diverted to the earth's needs, as I have laid out comprehensively, means the weight lies heavily for diverting resources away from space exploration. Thank you for your time.

The opposition opens: what we have taken from space

Good evening, everybody. Even though I was given three minutes to prepare for this, thank you to the proposer. That has been a very comprehensive, well put together and well thought through case, and I hope I can give the opposition view something that does credit to the amount of time I have put into it. I am going to reread the motion: we should focus resources on earth, not space exploration. And I am team space.

First of all, I want to define what resources are. Resources include money, time, knowledge, precious metal commodities, water and energy, and to me those are the main pillars. There are lots of other resources I am sure you can think of. Earth is quite obvious. It is the planet we live on, and I am taking it as a whole. Space exploration, to me, includes the space we know and the space we do not know, from the moon to black holes to quarks and to everything out there, and maybe even aliens.

We have heard from the proposer that we have got a lot of problems on earth, and I completely agree with that. Huge swathes of the population on earth live in poverty. They do not have electricity, they do not have water, they do not have access to healthcare, and these are all very, very important for human existence. But how are we going to fix those problems? This is where space exploration has had a direct impact on planet earth.

Did you know that your mobile phones only came about because of NASA's research for space exploration? Your cordless headphones came about because the people on the spaceship needed cordless headsets. When you go to sleep at night you may sleep on a memory foam mattress. Where did that come from? Memory foam was developed to cushion the astronauts as they come back to earth. The same with your sports shoes: the advance over the last ten years of really cushioned sports shoes uses the same foam, and that has come from space exploration. How many of you here have got a cordless vacuum cleaner? Guess where that came from.

Is it not nice not having to trip over a cord while you are vacuuming? And the power tools. Who do you think developed the cordless drill? It was Black and Decker, and that was because when the astronauts went onto the moon they could not plug into the spaceship and run an extension lead out to drill into the moon. They had to come up with a cordless drill. So all your power tools, anything cordless, has come directly from space exploration.

I do not want to go on too much and become really boring, but I find it quite interesting. Sunglasses: do we not all look lovely in this hot weather, either because it protects our eyes or because we like to pose. Sunglasses came about because of the radiation from the sun. The closer you get the brighter it gets, and you need really good protection, and scratch-proof lenses. That also came about from space exploration. Now, some of these you might think of as first world gadgets, and when people are in poverty and do not have clean water, do we really need them? You could argue against it, but they have certainly made our lives easier.

The same with laptops. One of the other benefits we have received directly from space exploration is a better understanding of the human body. CT scanners: how many people have been in a CT scanner or an MRI unit? Guess where that all came from. That came from a direct need for a better understanding of the human body, and for the conditions it was going to be in when it went up into space. So the human population, certainly in the western world where we have had the resources to implement it into our society, has directly benefited from space exploration.

The opposition on resources, jobs and knowledge

I want to go back to looking at resources, and at the people involved in space exploration. It gives jobs. You need engineers, food scientists, medical people, technology people and mathematicians, just to name a few. To look at food grown on Mars they have had to work out how to grow crops in extreme climates, under harsh conditions, where there is no water, and this has directly benefited third world countries, and now, as global warming is occurring, more western countries, because crops are able to be grown using the technology derived through space.

If we go back to looking at the resources, and now at money: how much does space exploration cost, and could it be used in a better way? We have had many examples about how we need the money for other things, but NASA's budget is only nought point five per cent of US GDP, I believe. So really, for all those benefits that we have derived from it, it is not a great cost in my view.

The knowledge we have gained that has benefited society has, to my mind, way outweighed anything that we would learn on earth. We know that when you go to war there are massive advances in science and

technology. Planes improved in the First and Second World Wars. Medical techniques did too. It is the same when you go into space: we are benefiting from things we would not come up with ourselves, that we have been forced to think about. The use of precious metals and commodities is not really that much going into a spaceship, compared with all the precious metals going into our laptops and mobile phones. And as for water and energy, it burns oxygen when the spaceship lifts off.

So I am going to recap on the motion. We should focus resources on earth and not on space exploration, and I am definitely team space. I think we need to look to the future. I think we need to advance human knowledge, and space is an area that is teaching us how our existence has come into play. We are looking at black holes, we are looking at quarks, and all those kinds of wonderful things that teach us more about our humanity. Without space exploration and the use of space, human beings would not be able to advance so much. So I am on the team for space.

The floor opens in the space exploration debate: planet independence

I have been looking at various science fiction stories that have a bearing on this problem, on this motion, and what you find is that they are all about societies that have become planet independent. Your Star Wars and your Star Trek, perhaps less so Star Trek, and the Hitchhiker's Guide to the Galaxy, are all about races of humanoids that have advanced beyond the need to have a planet. In the Hitchhiker's Guide you have got a president of the galaxy, and he visited part of London and went to a party. Normally he had two heads, but he only brought one, so he was not actually noticed.

Why have they become planet independent? The answer to that is that all planets have a finite life. If your civilisation is going to proceed beyond the life of your planet, you have got to become planet independent. We had this in my degree at university. It was billed as: how old is the age of the earth? Technically it is how old is the material of which the earth is made. You can calculate that from the various radioactive isotopes. You can work out what the state would be if they had all started at the same quantity, and the figure comes out very roughly at 4,500 million years. That may be beyond your comprehension. The age of the universe, I do not know that I believe it, but that is reckoned to be 13,000 million years.

Now, what will happen to the sun when it is running out of its fuel, which is turning hydrogen into helium? There will be an explosion, and it is thought, though how accurate this is we do not really know, that the size of the sun will expand to somewhere about the orbits of Mars or Jupiter, somewhere in that region. The earth, which is closer to the sun than Mars, will all be fried to a cinder. We cannot exist beyond the sun in its present form. We have to become planet independent. If you absorb that fact, it defeats the proposal of this motion, because the earth, in its long term, is redundant. It could be burnt up. It can no longer be a home for you. We have therefore to be doing something that will get us into space.

Princess Leia and Darth Vader belong to civilisations in a galaxy a long, long way away, and a long, long time ago. But as it stands, we are very backward. We are not part of our galaxy. We would not even recognise the president of the galaxy if he was here today. We are not sufficiently mobile. You have got to bust through the light speed. Light travels so slowly that it takes something in the region, I think, of 1,000 million years to get to the other side of our galaxy. You have not got time, you will not live that long. If you want to visit someone on the other side of the galaxy, you have got to go a bit faster than that. So we are a backward race.

And there is evidence that we are continually being visited by aliens keeping an eye on us, more intelligent species. It comes from the fact that about 20,000 Americans claim to have been abducted by aliens. They are abducted, then interrogated and then let back into the wild, as if we were animals that scientists had taken and prodded and probed and then put back into the world. I think that is evidence that we cannot ignore. So there is the position: we have to start exploring space. If we are to survive in the very long run, we need to build

the means of getting to places. NASA exists, but we do not have a NASA of our own.

We are not doing anything in that line at all. We have got quite a long time to get there, but somebody must be doing it, and I think that therefore removes the proposal's motion, because there is not a long-term future for our planet. Thank you.

Budgets compared in the space exploration debate

If I have understood the proposer's argument correctly, his core argument centred around the wastage of resources, and that is the term I want to focus on as well: wastage. He spoke about using the resources we spend on space travel to go instead towards alleviating poverty and economic inequality, developing biodiversity, reversing climate change, which he said himself would cost many trillions of dollars, investing in biomedical research, education, infrastructure and a lot of other things. There is certainly a lot of other things to spend our money on.

The problem for the proposition, in terms of what we do spend our money on, is that space exploration is actually a fairly good deal, and to prove it I will be very quick. All I need are two numbers. The first number is the annual budget of the largest space agency in the world, and that is NASA. Anyone want to guess what the annual budget is?

Twenty-five billion.

Not far off. The second figure is the annual military budget for the United States. Anyone want to guess that?

Eight hundred billion.

Very close as well. Eight hundred and fifty billion. So, 34 times the NASA budget: 850 billion US dollars to bomb the Middle East for fun. Suddenly \$25 billion seems like a much, much better deal, and in comparison it is much like loose change. So, sure, you could potentially argue that space exploration resources could be put to better use, and I will not necessarily argue against that in particular, but if we are talking about wastage, there are much, much better places to look. Thank you.

Energy, self-replicating machines and the case for waiting

Just to build on what the previous speaker was saying, I think there are some really exciting realms for this space technology to go into, technology that could be really consequential for us all. Has anyone seen the YouTube channel Kurzgesagt? It is cartoony, that is the setting, but it is an educational show, and it is really well resourced, and it talks about really cool things like the Dyson sphere, which would be where you try to capture a lot of the solar energy.

The way you do it is really cool, and would be fairly minimal if we had the right tech. What you would do is send self-replicating robots to the moon, or to some large spatial body, and they would be gathering resources, they would be mining and processing those resources, building other robots and projecting solar capture panels into space towards the sun, and then just doing that as a process that takes care of itself, which could surround the sun and generate huge amounts of energy and beam it back to us, which would have huge ramifications.

The other one is a solar engine. The previous speaker talked about calamities, and what might we need to do? Well, we might need to move our solar system to dodge crashing into another galaxy, or something like this. All longer term stuff, but who knows: better to have it and not need it than to need it and not have it. But then, looking at it again, you think, both of these things are not likely to be needed in the next twenty years or so. Should we be spending this energy now, when in twenty years a lot of experts are estimating that we might have general AI that will be able to do all this stuff? Should we, in the meantime, be spending money

on other things, as the proposer was saying? Should we be spending that money in a better way?

I looked this up, and to be fair, most of the spending is on satellites and things that I do not think we would kind of argue against. It feels fairly necessary and fairly to be expected. What seems wasteful when we look at it is things like Jeff Bezos and whoever, Branson, going up and doing it more as a jolly. I was learning a lot more about the extent of inequality now, and how these hyper wealthy people are only getting exponentially wealthier, garnering huge returns, growing their wealth at a massive rate and sucking it out from the rest of us. Is this because of not taxing them enough?

Could we be taxing them more and trying to spend that money better, to prevent all kinds of things in the short term, until we wait for AI to come and do it for us? If you think that is a strong probability, I think that is a strong case.

What we do not want to get to is a situation where we have AI, and we have this super powerful thing, but the largest countries in the world, and the wealthy countries, have all descended into the realms of reactionary right-wing politics. I have studied economics, and I am increasingly thinking that politics is downstream from economics. You have a relative low point in the American average wealth situation, and you vote in an obvious moron who just does not give a damn about the rule of law, and will do anything, or convince himself to do anything. So, is it important to spend these resources at the margin?

This is at the margin, but might that be enough to stop a decline into tyranny, and then no potential for space travel, because we have got no control over AI, or no control over anything?

A late arrival on global spending and the return from satellites

I was a little bit prepared, still writing my stuff on the bus. Anyway, I heard a couple of things, because I missed both the proposition and the opposition speeches, but I heard that the proposition was talking about wasted money on space exploration, and why do we not tackle poverty, climate change, humanitarian crises and things like that. Yes, those are important issues.

I want to go back to the previous floor contributor who talked about how much the US is spending on space exploration, and I actually have a bigger number for you guys to consider, and that is the global space exploration expenditure. I am just picking all those countries that have been the biggest spenders. For example, you have Russia, you have China, you have Japan, you have India, you have the EU, you have the UK, and then of course you have the US. All of those countries combined: guess how much money they spend. Seventy-eight billion.

And now we talk about how much money we would pump in to solve all these other problems that the proposition mentioned. I heard about trillions, just for climate change. How to mitigate it and how to avoid it: this is the figure from the Met Office, and also from many other very reliable sources, and by 2026 it is going to be over \$2 trillion. Then we talk about how much we spend on poverty. You talk about the IMF, and you talk about the World Bank, and all of those. There are many other organisations, but I just looked up the two biggest ones. You combine them together and they spend half a trillion dollars on taking care of poverty, and on helping poorer nations to develop.

So there is a lot of money, and I can guarantee you that even if you take all the \$78 billion from space exploration and put it into solving poverty, just solving one thing, there is no guarantee that you can solve that problem, because that problem is complex in nature. It has got political elements, it has got ethical elements and it has got so many other complex issues, so that adding into that is almost like an unsolvable problem. Throwing money at it will not help.

So now let us talk about the benefits. Is all that money really wasted, according to the proposition? Someone mentioned satellites. Satellites are part of the space race of two decades ago, and their by-product today is that they help us to predict weather, to avoid hurricanes and tornadoes, all these weather disasters. Satellites will give you the warning, so that is a direct result of space exploration. It took a few decades to develop, but this is a direct result.

Now, another one. Think about memory foam. It helps you to straighten your posture, and gives you a good night's sleep, which is very, very important for your health, both mental and physical. Memory foam was developed by NASA for cushioning for the astronauts, and also to soften the crash if there were a crash, and that is how memory foam came about, and now it is being used in pillows, in beds, even for your dog. It is great for our canine friends as well. One more example, and there are many, is that imaging technology comes directly from space exploration, because they needed to develop telescopes, and they needed to develop these photographic lenses, and now advanced imaging technology is helping the medical field to do retina replacement.

Now, this issue is very dear to me, because I have a family member who is going blind. His is not a retina detachment problem, it is something else, but it is from all these innovations from space exploration that we can develop secondary benefits that are so beneficial to human beings, to all of us.

In terms of this space exploration, it is largely fuelled by the public, which is fuelled by taxes. What about the argument that if we were not taxing society, it could, through private means, generate these inventions instead? Do you think that could happen?

Look at Jeff Bezos, look at Elon Musk. These are private space exploration as well. So that is not really touching on tax dollars. My point is that that amount, 78 billion for the global funding, is peanuts compared to the trillions of dollars being spent already on solving problems on earth, basically two to three trillion. So that is my point. It is beneficial. Do not stop. Let us go explore space.

Thirty years on in the space exploration debate

I think we have heard a lot of great perspectives this evening, and I would like to offer one. My perspective is that it occurred to me walking here that I debated this exact motion, word for word, thirty years ago. Now, I cannot recall exactly what I argued, and I cannot recall exactly whether the motion fell or not, but what I can tell you is that when I was walking here I thought to myself: what has changed in the last thirty years compared with when I first debated this? The first thing I thought to myself is that I am not sure whether this makes it an enduring motion, or just a lack of creativity from debating unions. Also, thirty years ago I certainly did not have ChatGPT to help me.

But what I can tell you is that, unfortunately for the proposer, the passage of time has weakened the strength of proposing the motion, and I am fully in support of our previous floor speaker. That is because three simple things have happened in the last few decades. Firstly, as our previous speaker just said, space has become privatised. When I debated this motion it was a debate of public policy. Every dollar you spent was spent by the government. That is not the case today. Space is privatised, and yes, the optics look poor, I agree with that. So do people driving Ferraris around London. But the fundamental difference that has not come through is that a large part of space has been privatised. I think that is the first change in the last three decades.

The second point is the costs. The proposer and others have framed this as a trade-off. When I debated this, when I was 12, 13, 14, it was about 100,000 US dollars to launch one kilogram to space. Today it is about one or two thousand. The trade-off has dramatically reduced. It is unfortunately not as binary as it was a number of decades ago.

The final point I want to make is that the lines have become blurred. Yes, thirty years ago we also argued that NASA created inventions for us all to use, and we continue with those arguments, but I think, as the previous floor speaker also mentioned, the lines have become blurred. It is less binary than earth versus space. A lot of earth's infrastructure is sitting in space, and we need it and use it to solve our earth problems. So the perspective I want to offer this evening is that, unfortunately for the proposer and fortunately for the opposer, the simple passage of time has, I would argue, allowed the motion to fall this evening, and I think we will see that happen tonight. Thank you.

A first night, and the earth as a dying ship

Hi everybody. It is my first night here. I hope I do not bore you. I initially thought that the opposer might need some more support, but I will do my best here to give the proposer a little bit of bolstering, and to provide an alternative lens.

There are a few points that I could touch on. One would be philosophical, and also health related, and just a little bit on definitions. We have talked a lot about the benefits of space satellites, and about how much our infrastructure is dependent on space at this point, but the motion was fairly specific about space exploration. A lot of that research has nothing to do with exploring further into space.

That leads into a notion of a philosophical idea, which I believe an earlier speaker spoke on at the beginning, which is this idea that we need to escape, and this idea that earth is a dying ship. That is a philosophical viewpoint, and if you push it onto the public more and more increasingly, how do you think that will affect your societies, your civilisation, if you believe that your society is, no matter what, doomed to failure? I think maybe there is a case for the proposition here, to put a little bit more faith into the earth, and that we could live here for thousands of more years, instead of science fiction theoretical doomsday scenarios on earth. So there is just some thinking to be done on that angle of things.

And the idea of space exploration, and being able to be planet independent, as an earlier speaker put it, comes with a lot of question marks in terms of health. There is no evidence that humans are capable of living away from the sun. We have evolved, if you will, or we are designed, to live on this planet, in this solar system, at this distance from the sun. We have already seen difficulties in people living in space. There are cases for research in that direction, and I think that is a fair point, but there is no evidence that we could be planet independent any time soon, given our current science.

I think the motion is interesting. I think there are a lot of good points in terms of wastage. We waste a lot of money on a lot of things right now, so where all of that budget would shift towards alleviating issues might be a weaker proposition, I suppose. But perhaps there is some damage done in terms of the philosophical thinking that the earth is doomed, and there may also be question marks around how much our increasing use of satellites and this infrastructure may affect life on earth. This may be contentious for some people, but there certainly could be more research done in this direction. Like our previous speaker, I studied economics and politics, but I have been reading recently more about electromagnetism and light, and how non-native magnetism can affect human health and other health on earth.

So, increasingly using more radiation around our atmosphere may have detrimental impacts on our health, and also on other animal health. Those are a few ideas, and some things to chew on, and I will cede my time. Thank you.

Images from deep space

I could talk about the kind of technological advances that space exploration brings you, and about giving very clever people an excuse to do something, and to create things, and to research, which is really important. Not to mention all the resources to be found in space, where no one lives, and there are plenty of precious

metals in the asteroids, for example. I actually returned my memory foam mattress, I did not like it at all.

But I want to talk about two of the most important images that I think I have ever seen in my life. One is called the Hubble Deep Field. That is an image from the Hubble Space Telescope, pointed at a dark patch of sky for an extended period of time, collecting enough light to come up with an image. It looks like a starry night, but each dot, and I recommend you look at it, each dot is a galaxy, not a star. It is about the size of a 5p piece if you were to look up, and in that image alone there are hundreds and hundreds of galaxies with stars. When I first saw that image, I felt something shifted in me about how I felt about myself, and who I was, and my place in the universe.

And then the other one is when you turn the camera around, and there is that famous pale blue dot that the Voyager probe took on its way to the outer solar system. It is in a sunbeam, and there is a tiny blue dot, about the size of an "o" in 12 point font on a piece of paper, and that is the entirety of human existence in a tiny little dot. Again, that shifts your perspective. There is no better way to realise how lucky we have it on earth than by going to space.

It is the most inhospitable environment for humans. I believe that if we all looked at the Hubble Deep Field, and thought about how lucky we are to have this earth, and then spun around to look and see how finite it is, we would all work towards a better world here on earth. I think space exploration is the most ideal way to do that. Not to mention it is also really cool.

We already have those photos. What more does space exploration need to do to bolster that perspective? Does everyone need to go out to space?

You know what, I actually think there is an effect on astronauts going to space. It is called the overview effect. There is something that people feel when they look at the earth, and it has been reported that they change their perspective on what is important, and how they want to live their lives. So I would say everybody going to space, having a look at your place in the universe, would be beneficial for everybody.

How would you respond to someone who may say you were fortunate enough to look at those pictures because, first, you had internet, and second, you had the means to survive to tomorrow, as against people who have neither?

Obviously I am very lucky. Images, you can proliferate them as wide as you want. I guess the question is kind of pointing at a privilege that we have, to benefit from the things that space exploration brings us. I would suppose that, to try and bring some equity and equality to the world and reduce inequalities, having those images would, I would hope, reinforce that we are all of one planet, one species, so those inequalities that exist would dissolve over time.

Do I have the right to be slightly confused? You are saying how great it is to get into space because of how great it is on earth.

I think the more we explore into space, the more we realise how much we need to protect what we currently have, not the other way around. I do not think that terraforming Mars is likely to be that fruitful. And when you go somewhere where you cannot live, you realise that you actually have a pretty good deal where you can live, and it would be good if it continued.

What focusing would mean on a ballot paper

So I am making an argument for the proposition, that we should not focus our resources on space exploration, and I think where the opposition falls down is actually on two arguments that they have made quite strongly throughout this debate. The first is pointing out how little we currently spend on space exploration. Various figures have been thrown around, but I think we would all agree that, a, it is a small

number, and b, we are currently not focusing on space exploration. Have that in your mind. The second point to make is: well, look at all the advantages we have got from our current funding that we spend on space exploration. Cordless vacuum cleaners, memory foam, perhaps GPS is a great advantage.

So the point they are making is that by currently not focusing on space exploration we have received loads of good stuff, and so the answer for the proposition should be: well, that is fine, we will continue doing all that, and then focus on something that actually does matter and does have greater things, while still having this on the back burner generating things that would also advantage us.

So then we really need to focus on what it actually means to focus on space exploration, and what that would actually look like. I would argue that a way to conceive it is that you imagine there is an election, and you get a party manifesto leaflet through your letterbox. If space exploration was on that leaflet, I would say that that is now focusing on space exploration. The question is then, would you vote for that party, given that it would focus on space exploration? The NHS, more housing, colonise Mars. I would not vote for that party. I am not saying do not fund space exploration, because that is not what the proposition's argument is.

What I am saying is that we just should not focus on it, because there are other more important things that we need to do, while also doing a bit of research here and there to ensure that the benefits keep being generated, as has been so wonderfully demonstrated.

And I think the reason that we are debating this topic today is the context of the SpaceX flotation, a \$2 trillion company, or supposedly being valued at that, which I think we all realise is the hubris of one man. The reason why we should not focus on space exploration, and why colonising Mars just sounds a bit weird, is because it is a bit weird, and we should not do that. We focus on other things, which actually matter now. Thank you.

Consumption, waste and where the money goes

So, a lot of interesting points we have all shared. On my way here I was thinking about the topic, and my position still is that I do not believe that we need to spend more resources taking them from space and spending them on earth, but I also do not think that space exploration should be our focus. However, it is inevitable, like the gentleman said. There is a privatisation of space, which I do not know to which extent it would benefit us, the regular people, in comparison with what you said. The expenditure is very small, so if that is the money and the budget that there is for it, I am not necessarily against it, but I think that we do not need more resources to be focused on it.

We can talk about poverty as a business, we can talk about illiteracy as a business, we can talk about even climate change as a business, because all of this money that we are spending in the trillions, if we are still getting GMO products getting now into the UK, and they want to bring more American products in, or to sell GMO seeds to African countries and illegalise the seeds that they have been using year after year to grow their crops, that is not missing resources, that is just a waste of those resources. We can talk about consumerism, that we consume more than we need, especially in the West. So all of this could also be shifted. I think the political mindset could shift, so we can focus on having fewer, better quality products, growing food, for example.

So all of this waste of money on products that are causing us cancer, they are causing us health problems, they are causing global warming, like the textiles that we use made of petroleum, and even now with the AI, with the consumption of water and of land. All these things, I think, are due to consumption. And like I said, I am not necessarily pro go to Mars and see what is out there, even though that is the direction that we are going, and it is just how it is, it is inevitable.

But if it has been privatised, like we said, with Jeff Bezos, and with the personal interests of, I forget his name, Elon Musk, then it is also the private interests of the extractionist and imperialist economy that we have in the West, that countries around the world still support, feeding into the divisive wars with guns and with propaganda, so they can have access to the natural resources.

As I said, poverty and illiteracy are a business. If people are dependent on the little money that they have, they do not have the strength of the forces, or the knowledge, to fight for what is rightfully theirs in their own country and develop their own country. So it is about waste, it is about mismanagement, it is about consumerism, and that is my point.

An online contribution on satellites and aid

In the mid 1960s Black and Decker did introduce the first cordless tool, but that was before they collaborated with NASA. They did do it for NASA, but it was afterwards. And what I do find interesting is that it then took forty years before cordless tools became popular, but that is because of lithium batteries and everything else. The film *Close Encounters of the Third Kind*: a lot of the younger people may not have watched this. I heard that that actually did happen, that the aliens came, but they did not think the earthlings were friendly, so they left. And another thing I have heard is that Armstrong was never given an interview in all these years about his first steps on the moon, so you know, sometimes we do need to wonder.

Anyway, if we look at the world right now, we are confronted by a sense of immediate crisis. Millions lack access to basic healthcare, clean water and reliable food, and there are even threats of war. We are told we face an unprecedented climate crisis. Faced with these massive challenges it is completely natural to ask this question: why are we spending billions of dollars looking at the stars when there is so much suffering here on earth? This debate forces us to confront a difficult balance. Is space exploration an expensive distraction from immediate crisis, or is it a tool that can help solve them today? Let us look objectively from both sides of the coin.

Let us start with the environmental crisis. Almost everything we know about global warming, rising sea levels and deforestation comes from space. Satellites work as silent environmental guardians, tracking greenhouse gases. In a world without this data, it would be like trying to do surveillance in a city without CCTV. Whilst satellites can take pictures of a dying forest, that data does not feed a hungry family or actively extinguish a fire. The core argument for focusing resources on earth is that the billions spent on orbital technology can instead be used directly on earth, funding immediate local conservation projects, and provided directly to communities suffering from environmental degradation right now.

But that is another motion to debate. It is the West who benefits from giving aid. There is more sense of urgency for sorting issues for space exploration than there is to sort health problems. By the way, has anyone watched *Billionaires Bunker*? Who are we going to actually protect on earth? As an earlier speaker says, we need to be protected. Will it be only the rich?

Proportion, and the Columbus comparison

Okay. I found myself discussing with the proposer downstairs over where this was going, and I found out that most of the notes that I had written were effectively for the opposition, contesting a lot of the arguments that he made, on two bases: mostly one on the basis of the money argument, so whether what is spent currently makes sense, and one on the basis of the utility argument, so whether spending on space exploration makes sense at all, regardless of the economic nature of things.

A lot of things that have been said make total sense. The comparison between the budget of NASA, 25 billion, versus the GDP of the United States, 30 trillion. That is 3% of the Department of Defense annual budget. That is not much. If you compare what NASA has spent in the last 25 years on space programmes,

that is 1.3 trillion. What the United States has spent on wars in the last 25 years is nine trillion, so one may argue that that has been deprioritised.

And some of the statements that were made, about using these resources to save the Amazon rainforest, did not even quite tally to me when I looked at them. The proposer argued that you could save millions of acres of Amazon rainforest, and again, if you compare the annual budget of NASA, 25 billion, then that did not quite make sense to me. It is like a million acres at \$95,000 an acre, or ten million acres at \$9,500 an acre, and on and on and on. So if you compare the 25 billion of NASA's budget versus what the USA has been spending, and we are using the USA as a proxy of the world in this, then they are not spending much on exploration.

And then the other side of the argument, the utility argument, whether it is useful at all: some of the things that were said, like extracting resources from asteroids or colonising other places, are an absolute fraction of what NASA is actually doing today to the benefit of humanity.

Reframing the question in the space exploration debate

So up to that point I was absolutely with the opposition, and then it kind of struck me, one single point. Are we really debating the right thing here? Why are we comparing in this order? I want to remind everyone of the proposition: we should focus resources on earth, not space exploration. In order to answer that question, why are we using the current budget of NASA? I do not think that is the right perspective to think about the problem, and I take from an earlier speaker some of his points before. I think the right way to look at the problem would be: if, say, humanity were given, I do not know, a hundred trillion dollars tomorrow, should they spend that on space exploration or on earth?

I think that is the question that we should ask ourselves, where we should focus our resources if the choice is A or B, because otherwise we are just arguing about nothing. Clearly 25 billion is nothing compared to what the United States, as a proxy country, makes, but that is not the point. The point is, if we had a lot of money to spend, would we rather focus this money on space exploration or on earth? That is an entirely different kind of an argument, because once you consider that argument, then things like children dying of starvation every day do make sense, and the level of poverty in the world that you see today does make sense.

Yes, space exploration is important, but it is important in the right context and in the right magnitude, as much as education is important, I would agree to that, as much as general research is important, I would agree to that. But again, should that be the focus of a major investment, should we be given the resources tomorrow, versus spending this money on earth? I think that becomes debatable. At the end of the day, if you look at a simple historical precedent, when Christopher Columbus was set to sail he had a venture which was incredibly risky, and he pitched to the Portuguese two times and he failed, and then he pitched it to the Castilians, I think more than once, and eventually he got the money to sail.

There was two million of, I researched the name, maravedis, and that corresponded pretty much to one to 2% of the GDP of Castile back in those days. So a sizeable investment for Castile, but still not like half the money they had.

What I am trying to get at with this is that space exploration is something worth pursuing, but in the right magnitude, keeping in mind the risk and reward that we should be considering. We should not put all our eggs, or the majority of our focus, into doing that, because there are priorities on earth that do deserve our attention. So let us keep our dreams alive. It is an important thing to be focusing our resources on, but let us not get overheated towards it. If I was given money tomorrow and had to choose where this money should go to, in proportion I would spend more money on earth than on space operations. I would still spend money on space operations, but in proportion I would still focus on earth. Thank you.

Three kinds of space activity, and who benefits

Thank you for the opportunity. So, what I have noticed is that most of the speeches were mainly focusing on the commercial, but I wanted to give a different lens to this debate. So to start with that, first we should know what space exploration is. At a high level there are three types. One is through rocket launch, second through uncrewed mission and third through sending humans up for their vacation or pleasure in space. In the third sector there is a major dominance by the private companies, and the general public are not really getting much out of it. And for the first and second sector there is government involvement, but again the private sector are trying to get more and more hold on that.

So from the third sector the general public are not getting really anything, and for the first and second sector we are now seeing the trend that the private sector are getting more hold, which means there is a risk of profit over welfare in the future. There is a risk of monopoly, that only the Tesla or Amazon chief executive will go and get their relatives up on the space. And the third thing is the risk of national security as well, because there is a lot of information that, with a lot of wars happening right now, could probably in the future be obtained from an invention like the satellite, which could really threaten a country's national security.

So all these factors should also be accounted for, beyond going for commercial terms. So I would request everyone, whoever is deciding to vote, please take care of all those factors beyond the commercial while voting on this topic. Thank you.

Budgets, subsidies and the private sector

Thank you. It is great to be back after a couple of months away. I want to start with some of the figures, specifically the 0.5% of GDP that is NASA's budget, which actually is not GDP, it is actually the percentage of the federal budget. So actually, in terms of GDP, it is less. It is just 0.1% of GDP. Now, even at its height, at the height of the space race in the mid to late sixties, the US never spent more than 0.8% of its GDP on space, which is a really ridiculously low figure.

So the question is, how much is enough? How much is too much? How much is too little? If we had had this conversation at the end of the Cold War, the US was still spending only 0.2% of GDP, but that is twice as much as it is now. So if we were having this conversation back then, would we have said, is that too much, is that too little? Okay, let us agree to have that number, and have the problems in the world been solved? No. If anything, they are worse. So what is the next figure? Are we going to get to 0.05% of GDP and assume that all the problems are solved, or do we need to get to zero?

So I am not really convinced that we are spending too much, or that we can allocate that money into more beneficial things to society.

But I think a lot of what has been sort of hidden in this question is the role of the private sector, which a few people including the last speaker touched upon, and I do think that this is more of a risk. SpaceX is the one that comes to mind, and the reason why we talk about space so much is not because of NASA, it is because of Elon Musk. He promised he would get people to move to Mars. What year was that? He said in ten years, and that was maybe five years ago. So I do not think we will ever get to Mars under Elon Musk.

But a lot of the problem is that these companies make a lot of money, a ridiculous amount of money, and they do not get taxed. SpaceX, fun fact, has never paid federal taxes in its twenty years of existence, or it has paid such a tiny bit that it is practically zero. So this is a company that gets a huge amount of subsidies from the federal government, and gets almost all of its business from the federal government, so it relies entirely on the state, but we are seeing institutions like NASA get defunded year after year, while all this money is propping up all these private firms that we just do not know what purpose to humanity they will serve, because they are certainly not sharing their technology the way NASA would.

All these wonderful things that we discovered with NASA's operations: I doubt that Tesla or SpaceX or Amazon or anyone else involved in these things are just going to happily give that technology to anyone else. So this is all just corporate capitalism.

But even then, even if we tax them, there is going to be more money, clearly. But even if they stop going to space, will that change anything? And I think, well, maybe in the future, once the AI bubble bursts, and we live in a world that is a wasteland of data centres, and the economy finally recovers after another five years of crisis, and we decide, well, what is the next big bubble? Maybe by then these tech companies will decide, okay, maybe now we will take it more seriously, and now we are going to invest the trillions of dollars that we have been investing in data centres into rockets and habitation on Mars and terraforming and whatever, for no purpose whatsoever other than Elon Musk and Jeff Bezos having a holiday home in the Martian desert.

And we have a situation where all this money is being misallocated, the way that it is misallocated right now for AI, because all that money is actually coming from something else that could be invested in something that could make the world better. Both the public and the private sector have a role in investing properly, investing in things that make humanity better, and they are clearly not doing it with AI, and I suspect that in the future, if there is a way for them to explore and invest in space in the way that they are doing with AI, they will do it, and they will spend equally, and we will all be worse off because of it.

Now, in terms of who do I support, it is still tricky. I will have to hear their closing arguments. I am leaning towards the opposer. But if we were having this debate ten or twenty years from now, when what I am warning about might be happening, then definitely I would be supporting the motion. Thank you.

The dark forest

Thank you. I think that broadly there were two lines of argument. One was the incidental benefits of space exploration, versus the opportunity cost of investing in space programmes, and I think both are quite irrelevant to space exploration. What is space exploration all about? We are trying to answer one of the most profound questions that humanity is trying to answer, that is, are we alone in the cosmos? Is it just us that is out there?

So let us maybe examine this question through the lens of science fiction, as an earlier speaker suggested. In Jurassic Park, we are so focused on trying to see whether we can that we are not asking whether we should. Should we really engage in space exploration? Let us imagine this. For hundreds of years we invest in space exploration, we go out, we see a bunch of stars, and then we run into an intelligent civilisation. What happens then? Now, if you go by what Project Hail Mary says, you could run into Rocky, who is all amazed about humanity. Option two is that it could just end in a funny way, like the Hitchhiker's Guide to the Galaxy: you are in the way, we are just going to demolish your home, because we would like to build a cosmic highway.

But I think the most serious exploration was done in the Three Body Problem trilogy. In it, it posits that as an intelligent civilisation, if you run into another intelligent civilisation, the safest course of action for you is to destroy that other civilisation, because you do not know the kind of technological progress that they will make, and when they make it, it is possible that their technological progress will outpace yours, and then eventually they will be in a position to destroy you. So he called it the dark forest. He said, let us not go too far out there, let us just stick to our own little patch of the universe and cultivate it. Thank you.

So, is your argument that we should not be focusing on space exploration for fear of finding someone that would destroy us, or that we should, and then deal with the consequences?

I think we should not. I think the fundamental impulse of space exploration is to push outward and outward and outward. So I think it is a good idea to restrict it.

A false dichotomy, and the ethical case for the motion

Hi folks. So many of you were thinking about space exploration on your way here. I was thinking about whether to get sushi or a meal deal. I would challenge the proposition. They present a bit of a false dichotomy, in that the assumption is that money not spent on space is spent on all these problems that exist in the world, and I agree with you, yes, we have a climate change problem, we have a global inequality problem, the corals are being bleached, there are lots of terrible things happening in the world. But just because money goes away from space does not necessarily mean it is going to be going towards these causes and solving these problems.

We have a long history of attempts being made to solve these problems, both before money was being spent on space and after we started spending money on space, but none of them were necessarily solved within that timeframe.

Secondly, on the question of equality. I think we are fairly in agreement that equality is probably quite a good thing, and we would all love to solve it. But again, it was mentioned that money going to space exploration is only benefiting the rich. Again, that is not necessarily the case. As the opposition presented earlier, some of the technological innovations have gradually flowed down into things like GPS, into smartphones, into satellites that enable rural farmers to be more efficient at farming their fields and ultimately generating money for their families. So, to conclude, while I probably do not really appreciate memory foam, and do not actually know how to use a wired, let alone a wireless, Black and Decker drill, I am with the opposition on this one.

President, what a wonderful debate. Whoever thought of the motion must be a genius in the whole history of this organisation. We have had some good ones recently, but I think, as ever, we have got into the realms of fiction, whether it is science fiction or economics. It is all a load of fiction. This debate is not about money, or about who sends people up into space. It is an ethical and moral one. What kind of world, what kind of society do we want to live in? Do we want to continue with the injustice when a third of our fellow citizens are starving? Is that the kind of society you really want to live in?

Whether we can do anything about it is not for this forum, because, as I have said on many occasions, this is a debating society. It is not a political chamber. It is not a decision-making organisation to change policy, or even a think tank. It is a debating society. We are debating ideas.

I think the motion is a very good one. I think the opponent has put on a strong debate, but if the scientific knowledge is there, as the opposer indicates, creating all these things, that knowledge is there. How we utilise it, how we politicise science, technology and engineering, how we actually meet the needs of our society today, for the many and not the few. And of course somebody raised the question of who owns space. I do not think any nation state owns space, whether it is the Chinese or anybody else, but you can quite see from a historical perspective that if we did go into the space race and start occupying and colonising these other planets, the same sort of behaviour that we had with the colonial age and the empires would happen again.

So we need to start co-operating on a worldwide basis. All these problems can be solved with intelligence and compassion on an ethical basis. I very much want you not to hesitate, and to vote for the motion tonight. Thank you very much.

Closing speech for the opposition in the space exploration debate

We have had really, really good debates for both sides of the motion, which has been very interesting to listen to, but I am just going to reread the motion, because I understand it says we should focus resources on earth, not space exploration. Some of the speakers for the motion have been arguing that resources are better

used on earth rather than put in space, and have been saying that it is a binary decision, that we either spend money on earth or on space.

But I do not think that is actually what the motion is about. The way I am reading the motion is that we would still be spending resources on earth, and it is just whether we take all the money we are spending on space exploration and put it into earth, not switching it round. So I do not actually think that is a valid argument.

Another of the points that people who have been speaking for the motion have been raising is that we should be focusing now and not on the future, that we need to be solving the issues that are on earth at the moment rather than looking at space and looking into the future. But to be able to solve problems on earth, somebody in the past must have been planning for today, for us to be able to solve those problems, because we cannot solve them today without some planning. So again, I do not think this motion is about focusing now and not on the future. I think we need to be planning for the future, so that we can solve the problems of today.

We have also heard people speaking from a humanitarian point of view, saying that if we just focus resources on earth, human beings on this planet will come up with their solutions. But all through history, in order to advance a civilisation, and if we take advancing a civilisation as being beneficial to everyone, and I am very aware that that has not happened in the past, but if we talk about advancing civilisation in history, it has always been a catalyst, something that has forced human beings to focus on the topic at hand. Unfortunately, throughout history we have had inequality, we have had poverty, we have had health issues, all that, but it has taken wars or unprecedented disasters to focus people on coming up with a solution.

If you look at COVID, how quickly we came up with the vaccines. During war times masses of development was done in medical science, in rehabilitation, in flight and things like that. Leaving it without a catalyst, we just trundle along in our own little way. Recently an Earthshot prize has been launched, and the reason it was called Earthshot was because back in the day there was a moonshot prize, and with so much focus the human population was able to deliver such progress from focusing on it. So that is why I do not think that those points that people have been speaking for the proposition hold up.

The opposition's closing: value, privatisation and perspective

I want to go back to looking at why we should oppose the motion. Someone said earth is a dying ship, and we need to plan for future generations. How are we going to improve earth? Does that mean that we need to look at moving to another planet, or, in looking at moving to another planet, are we actually learning how we can survive on our planet when it becomes hostile in terms of climate, food scarcity and things like that?

We have also heard that it is good value for money, apparently not 0.1% of GDP, but it is not just about being good value for money, because it is not about the quantum that we are spending. Again, going back to the motion, we should focus resources on earth, not on space exploration, but as we know, we are actually spending relatively little in terms of percentage, and yet we are getting huge benefits for our future. As I said in my opening speech, we are getting advances in healthcare through scanners, understanding the human body, food security, learning how to grow food in harsh climates, communication and security through satellites and comfort in terms of vacuum cleaners, laptops, GPS, scratch-proof lenses and memory foam.

We are also developing our knowledge in science, technology and healthcare, and through those advances it advances our knowledge and our understanding.

We have heard that there have been concerns about the privatisation of space, and I would like to understand, if it was all nationalised, how are we going to carve up space? Where are we going to plant those little flags? And I do not think that privatisation has brought no benefit, because, as one of the other speakers said, it is now much cheaper than in the last thirty years to send a kilogram of payload up into space, so when there is

competition and more people looking at it, it brings costs down, which benefits everybody. And also in terms of privatisation, even though it is getting government subsidies, it is not necessarily taxpayers' money, so again that falls down on the argument that money being spent in space would be available to be spent on earth.

And finally, we heard the existential view that space exploration makes us appreciate our existence more, and when you see how tiny we are on the planet alone, how tiny our planet is in our galaxy with all the other galaxies, it puts our life more into perspective. So for all those reasons I would urge you to vote against the motion, and be for team space. Thank you.

Closing speech for the proposition

Thank you, everybody. Thank you to the opposition. Thank you for your contributions. The earth listens to opposition and weeps.

I want to touch on innovation. A lot has been made of innovation, and the opposition has given the impression that literally most, if not all, innovations are the result of space exploration. That is not true. As a member of the audience defined space exploration, it is rockets, colonisation, sending humans to other planets. NASA has been mentioned as the agency. Actually DARPA is the agency that is responsible for a lot of these inventions, and that is a military agency, and its remit is to win wars. And there has been a lot of confusion as to innovations being suggested as derived from space exploration, but actually derived from science.

The opposition has just mentioned medical advances. That is not the result of space exploration, that is the result of science and medicine. The opposition has also just mentioned agriculture. Again, that is agriculture, that is not the result of innovations due to space exploration. So I think there has been a lot of overlapping, arguing that innovation is synonymous with space exploration. It is actually not. The motion states space exploration, and again, as the audience member said, rockets, colonisation, humans.

Jobs have been mentioned. Obviously all innovations create jobs, but most jobs are going to be created by investing in global infrastructure. Trillions are needed just to bring that up to scratch and to expand it out to the parts of the world where it does not exist.

Some of the numbers that have been given with regard to budget are totally, completely wrong. To actually colonise, to send rockets to collect minerals and resources from asteroids, to colonise the moon and Mars, is going to cost trillions. The UK cannot do it on its own. The numbers that have been given are in the region of 80 billion, 100 billion. We could do that. HS2 costs more than that. The actual numbers are multiples of GDP. We are talking about trillions upon trillions, and we need to do it in collaboration with the EU, the US, China and Russia to actually do this.

Let me go back to one of the reasons that NASA stopped exploring space. By the way, the driver was the military race against Russia, but one of the reasons that NASA stopped investing is because of the enormous cost. We are not actually exploring space at the moment. The numbers are massively larger than have been quoted, and so that raises a question. When you have these astronomical figures, do you invest in something that is going to yield fruit, like colonising Mars? Planetary independence has been mentioned. That is going to yield fruit in centuries. That is not going to happen any time soon.

Do you invest all of that, or do you invest in solving all of these problems on earth? The proposition thinks yes. This whole idea of planet independence, self-replicating robots, Dyson spheres, terraforming Mars: this is just literally science fiction. This is not going to happen any time soon, and by the time we do get to planet B and are able to sustain life on it, the earth will have perished, as somebody said. It is a dying planet. We have got the 700 million of us that are living on less than \$2 a day. They are weeping, they are saying no, we

need this now. The other species: the World Wildlife Fund has said there has been a 73% decline in wildlife populations.

Other species are saying we need this investment now, save us now. The biosphere, again, is at risk. We will be dead before we actually colonise Mars. The oceans support 3 billion people, and the oceans are going through this process of degradation. Climate change is existential for us this century, and that is going to have an impact before we get to Mars or colonise the moon.

All of our talent, knowledge, science, technology, engineering and maths would, on the opposition's argument, be directed towards this science fiction illusion rather than towards investing in real, imminent innovations such as medicine and agriculture that are really going to make a difference. And again, as an audience member said, try putting that on the ballot paper. Should we explore space, or should we invest in the NHS and build more houses? Space exploration is not actually going to get you elected. So when you weigh it up, yes, innovations, but they are the result of science, not space exploration. Yes, space exploration is a contributing factor, but generally it is science.

And the idea of planetary independence, and colonising other planets, or even asteroids to extract resources: again, science fiction. It is not going to yield fruit. And on balance, when we are spending these astronomical figures, multiples of GDP, the weight lies on the side of the argument of investing in earth, and in planet A, and in our species, and all the other species on the planet. Thank you.

The vote in the space exploration debate

We will now come to the vote, and we will see which way the house stands. So let me reread the motion. We should focus resources on earth, not space exploration. All those in favour, please raise your hand. And all those opposed? Any abstentions? Okay, so we have a result. By the vote of six in favour, 11 against and four abstentions, the motion has not carried.