

The Economics of Space—A Talk by Arun R

On the evening of 28th October 2020, the Research Society MIT, in collaboration with the Astronomy Club, Manipal, presented a session on Google Meet, on Space Industry and Its Economy. The speaker, Arun R, is a senior research fellow at Bellatrix Aerospace Pvt. Ltd., Society for Innovation and Development based out of the Indian Institute of Science, Bangalore.

Bellatrix Aerospace is an Indian space company specializing in technologies relating to in-space propulsion systems and orbital launch vehicles. Their work is based on facilitating the development of key technologies in electric propulsion, new generation propellants, and launch vehicles. Arun's interest lies in studying the space industry and capturing the trends and various prospective missions of the market. In his online talk, he spoke about the economics of a space mission, various plans of space travel, and the new-age research in the industry, along with applications, both in India and the world.

Meeting details

People (53)

Chat

What are your thoughts on nokia obtaining the "rights" to establish a 4G network on the moon?

Pavan.c Roll no 22 6:48 PM
sir I want to become an astronomer many of them suggest me to da a project now so i can become familiar .is it complexy that i have to a project at this age

Mihir Myatra 6:50 PM
How can it be mined safely and efficiently?

Abhishek Avadhanam 6:51 PM
It was 4kb yeah. 4kb of ram

Advait Sankara 6:54 PM
What is your opinion on aero-spoke propulsion systems?

Mihir Myatra 6:55 PM
Fuel to carry the fuel

Aayush Krishnan 6:57 PM
Can NTR(Nuclear Thermal Rocket) Engine make a revival? They were abandoned during the space race in favour of Chemical Propulsion

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Arun Radhakrishnan is presenting

PPT for Talk - PowerPoint

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9 10 11 12 13 14 15 16

Slide 11 of 29

Notes Comments

18:58 26/10/2020

Shuba Murthy Research Soc... Arun Radhakr... Maya Menon Abhishek Am... Vibhor Gopal Hrisheekesh ... Datta sai

CUTTING EDGE ADVANCES IN SPACE TECHNOLOGY

- COIS: Commercial of the shelf components
- Modularity and interface standards
- Propulsion systems
- Rad tolerant electronics and space hardware
- Processing power on Board
- Miniaturized Arrays and Antennas
- Reusability in launch vehicles

Recent Space Advances

Arun began his session by speaking of Dr Vikram Sarabhai and the implications of India having started a space program right after Independence. It came as an unexpected boon as it paved the way for satellite television and INSAT. Today, ISRO's Mars Orbiter Mission, popularised by Bollywood in Mission Mangal, is a source of awe and inspiration, as it was carried out on a shoestring budget.

Several national space agencies around the world are government-funded. Their budgets help plan future missions. A special amount of expertise is required to run a space organisation without government support. Companies like SpaceX are currently striving to commercialise space travel as much as air travel. Project Starlink aims at launching 12,000 satellites within the next decade to establish high-speed broadband across the world. To put things in perspective, there are currently approximately 2,600 satellites in use commercially. Jeff Bezos seeks to launch 3,000 satellites to provide internet access. Naveen Jain, an entrepreneur, set his sights on extracting minerals from the Moon. An example of this is Helium-3—a bottle of this can power a reactor for

thirty years.

The screenshot shows a Google Meet interface. The main window displays a PowerPoint presentation titled 'PPT for Talk - PowerPoint' by Arun Radhakrishnan. The slide features a diagram of concentric orbits around Earth, labeled 'Commercial 1000', 'Government 600', 'Military 300', 'Civil 100', and 'Combination (commercial) 500'. The right sidebar shows 'Meeting details' with a list of participants and their questions. The bottom of the screen shows a video gallery with several participants.

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Shrey Deshmukh 7:01 PM
Why don't space agencies collaborate with each other? It would be much more efficient

Sujeet Amberkar 7:03 PM
How can space pollution be controlled? We don't want thousands of non-functioning garbage orbiting our earth.

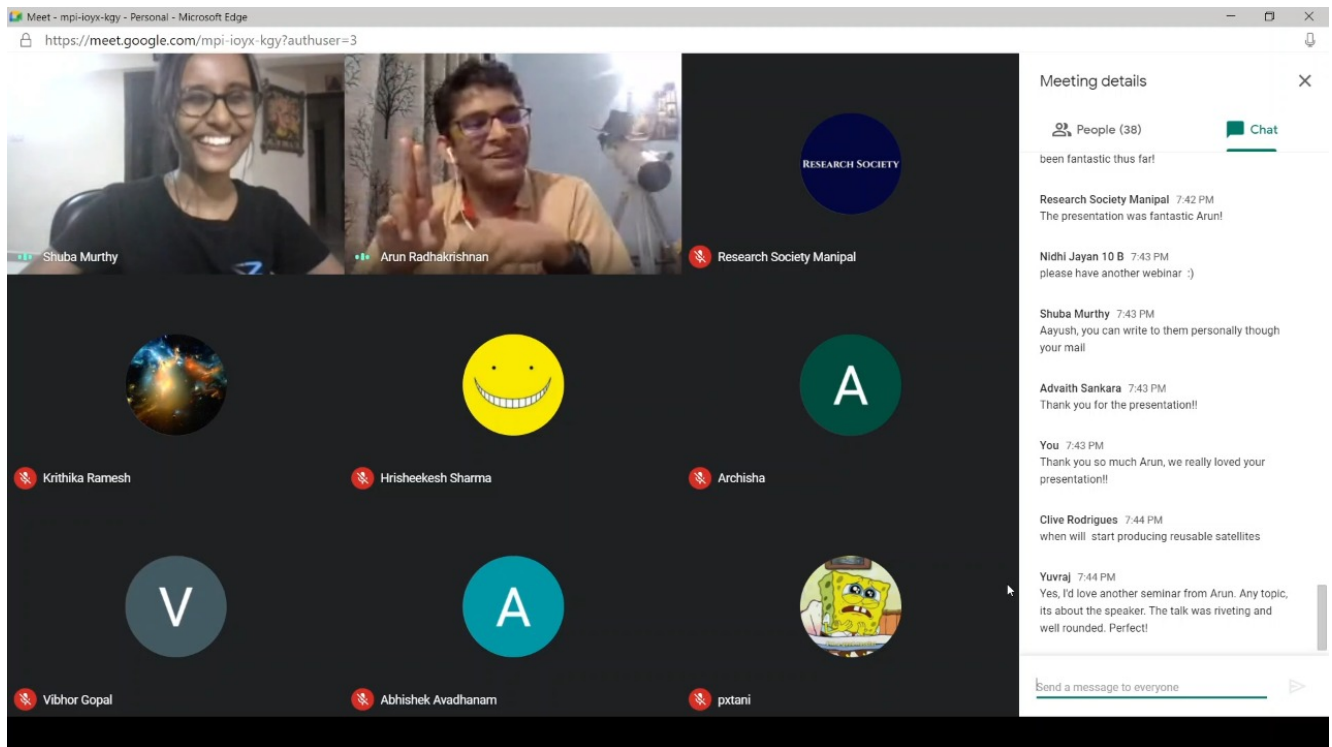
Send a message to everyone

Arun R talks about the uses of various orbits in space.

Arun explained Moore's Law and how it naturally helps reduce space occupied or increase processing power, as required. He also touched upon the propulsion systems of satellites. While chemical propulsion is the norm, it accounts for 80 per cent of the payload. However, electric propulsion systems take up only 15-18 per cent of the payload. Hence, satellites can be made more compact—a lowering of payload mass results in a lowering of cost. Another factor that could potentially reduce the cost of launch is the creation of reusable launch vehicles. However, questions about practicality arise—how would one bring back the spent parts? While in space, these contribute to space junk, a growing concern. Arun stressed on the need for strict rules and regulations to prevent the accumulation of space junk in the morbid Graveyard Orbit.

An interesting point brought up was the transparency of private organisations like SpaceX. It contributes towards an interest in space, especially among youngsters. Contrarily, ISRO's tight-lipped attitude due to national security concerns

kept many an enquiring mind away. Recently, however, the Indian government has allowed the privatisation of space. Furthermore, ISRO provides several mentorship programs to universities, allowing students to use their testing facilities to create satellites of their own.



Wrapping up a successful event

"Most of the excitement around space revolves around rocket launches, and satellite deployment, which only constitutes around 20 per cent of the space industry supply chain. We wanted someone, who had worked at the heart of the space bubble of India, to shed light on everything else that's representative of this industry," said Shuba Murthy, General Secretary of the Research Society. "Seeing an eager bunch of fellow aerospace aficionados ask questions ranging from Nokia acquiring the rights to create a 4G network on the moon to the frequent delays in the development of the SLS, helped me moderate with ease. The turnout was just over what we expected, and we were delighted with the engaging and constructive discussion that followed Arun's presentation."

With Shuba as an effective moderator, the question-answer

session was especially engaging as the eager audience put forth their queries. From the technicalities of the aerospike engine to Arun's own passion and fascination for space, the questions brought about a satisfying conclusion to the session.

Image credits: Research Society MIT