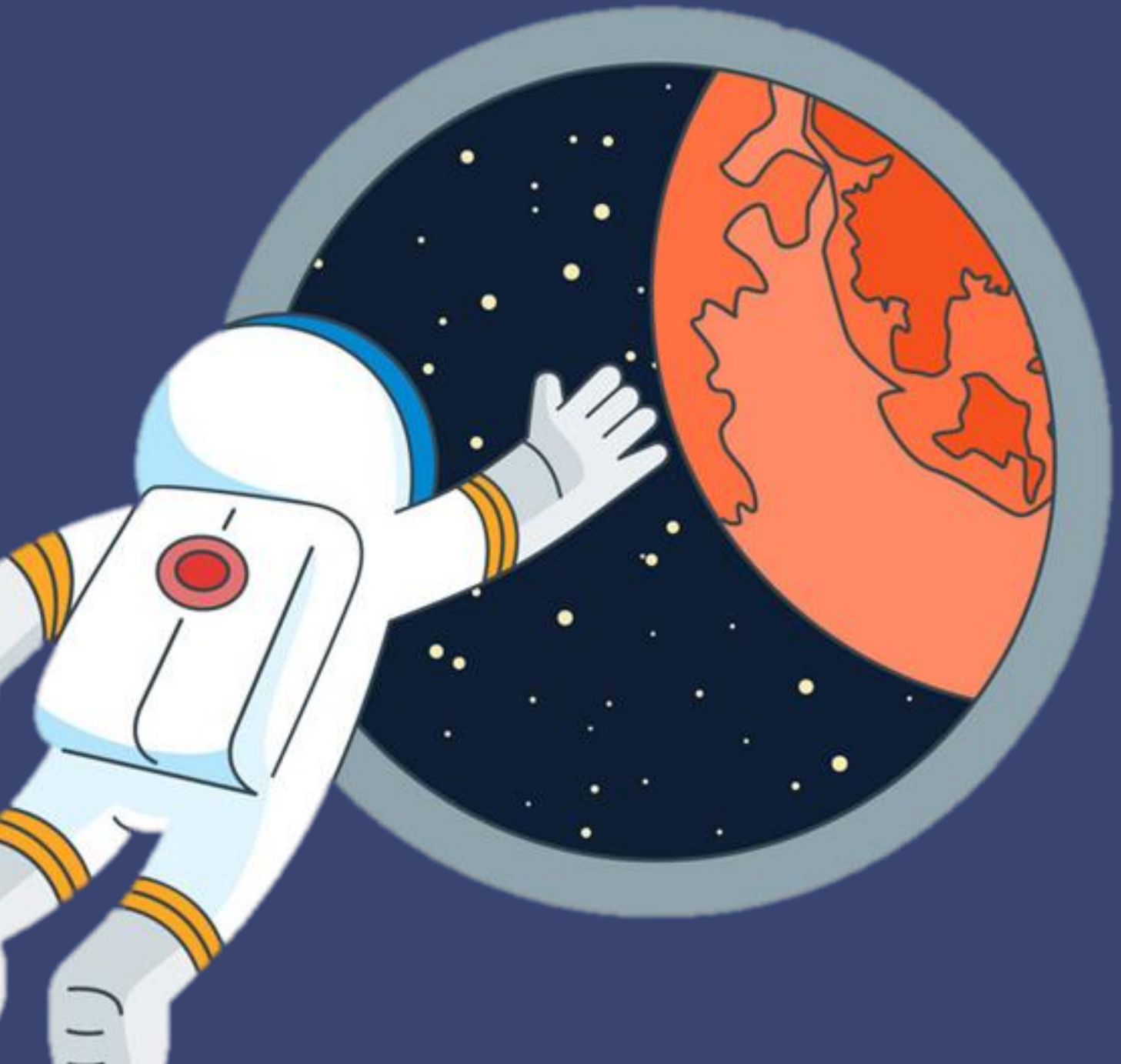
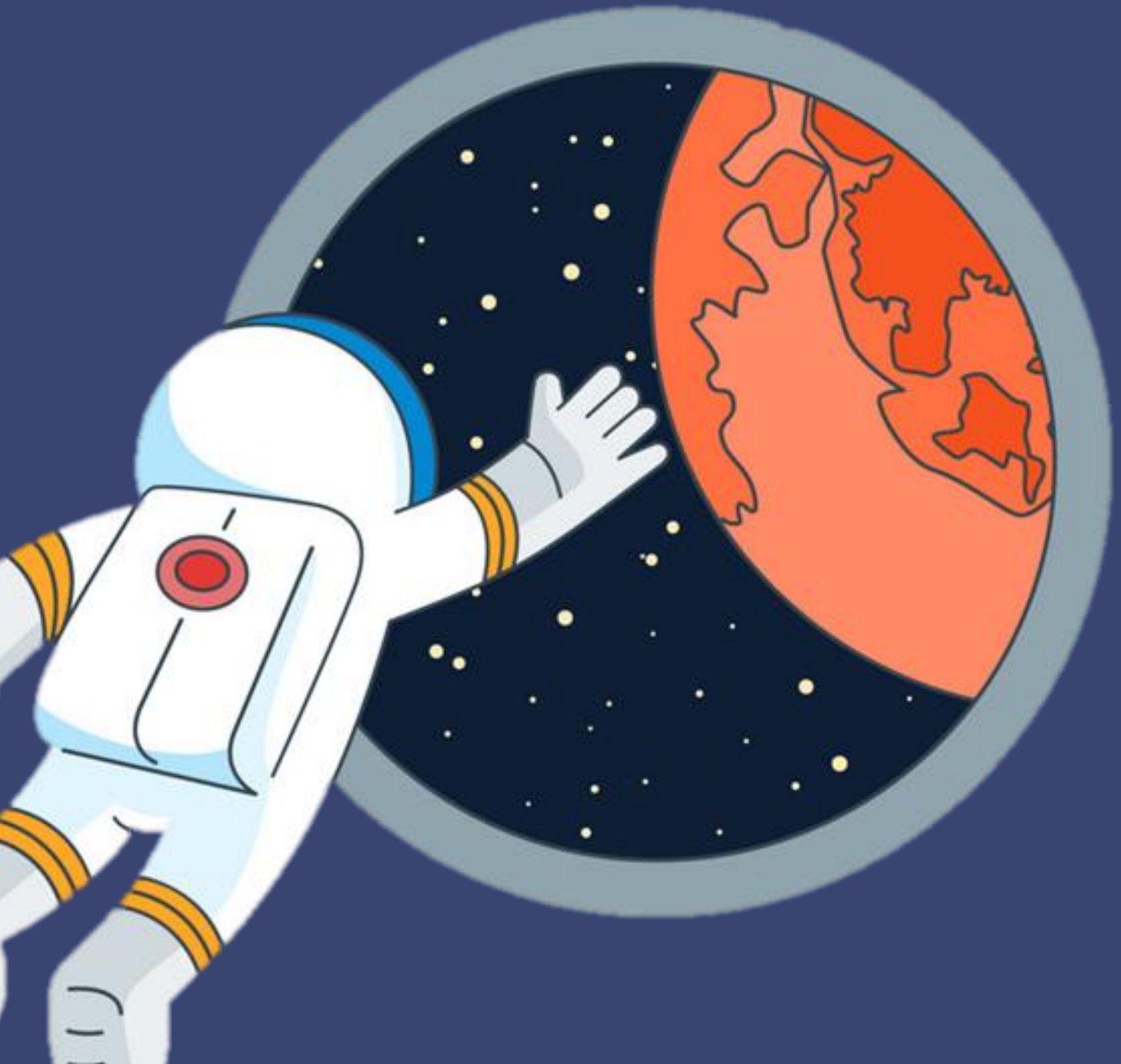


MARS 2026:

ROLE OF THE ASIA-PACIFIC IN SENDING HUMANS TO MARS AND BEYOND



MARS 2026:

ROLE OF THE ASIA-PACIFIC IN SENDING HUMANS TO MARS AND BEYOND

Results from:

Working Group 5
AP-SGOW 2021

SGAC

SPACE GENERATION ADVISORY COUNCIL

SGAC is a global **non-governmental, non-profit** organisation and network which aims to represent **university students and young space professionals** ages **18-35** to the United Nations, space agencies, industry, and academia.

Conceived at the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) in Vienna in 1999.

6 Regions, 168 Countries,
16,000+ Members

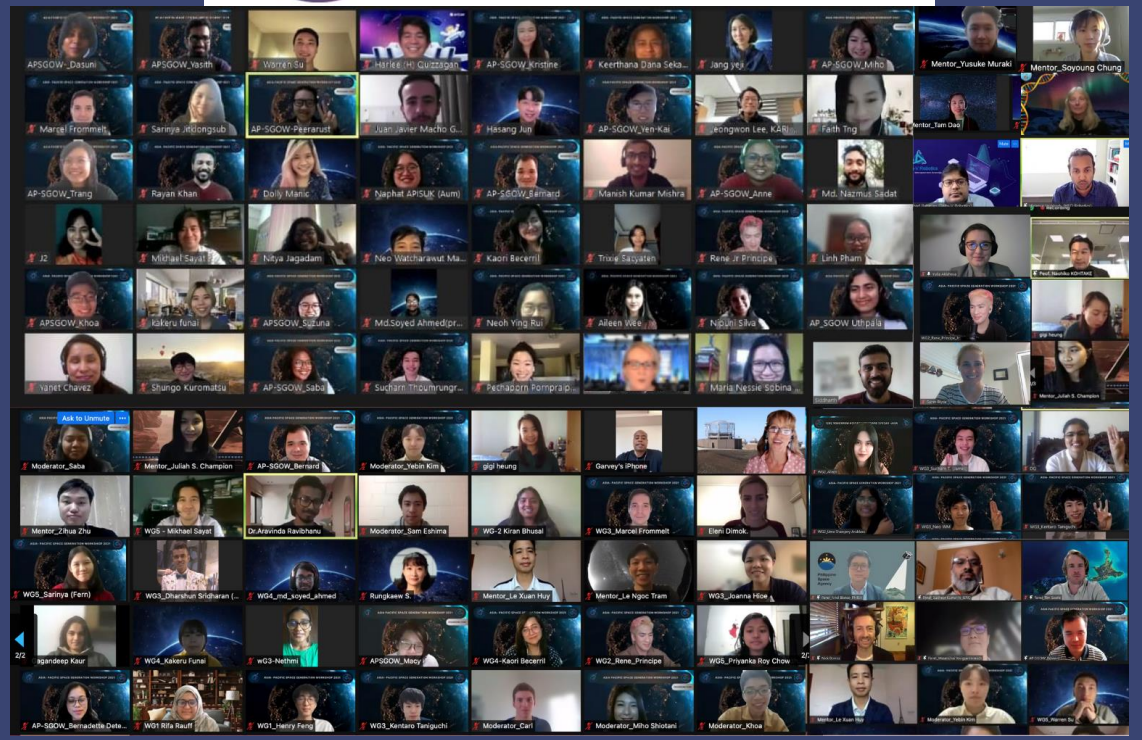
SGAC Regional and Local Events

SPACE GENERATION ADVISORY COUNCIL

Space Generation Workshops (SGWs)

- Regional multi-day workshop
- Focus in on the **regional** space issues
- Projection of regional space activities in the future
- Discussions about regional cooperation
- Working Groups

ASIA-PACIFIC SPACE GENERATION ONLINE WORKSHOP 2021



GROUP DEMOGRAPHICS

14 MEMBERS

8 COUNTRIES

HARLEE QUIZZAGAN

MIKHAEL SAYAT

RUNGKAEW SAMMAVUTHICHAI

HARINI WIJERATNE

MODERATORS:

BERNARD ISAIAH LO

SARINYA JITKLONGSUB

PRIYANKA GHATOLE

WARREN SU

PRIYANKA CHOY CHOWDHURY

NITYA JAGADAM

NATSUKI MATSUOKA

UPASANA MOHANTY

JUAN JAVIER MACHO GUERRERO

KRISTINE JANE ATIENZA

WG OVERVIEW

GOAL:

To evaluate the current state of both public and private research and development in pursuit of human interplanetary travel, focusing on the Asia-Pacific region and its potential roles.

To lay out a sustainable plan for this decade (and beyond) that integrates collaboration from both the public and private sector.

SUSTAINABLE PLAN TO MARS

MARS COLONIZATION

PHASE 1: SETTING UP SHOP

PHASE 2: BUILDING THE TECH

PHASE 3: APAC TO MARS

SUSTAINABLE PLAN TO MARS

MARS COLONIZATION

PHASE 1: SETTING UP SHOP

Economic Design

Collaborative Ecosystem

Analogue Missions

Bumping Up

Economic Design

- High focus on Human Resource Maximization
- Emphasis on benefits tied down to life on Earth => **funding/investment strategy**
- Tech innovations for daily use that goes beyond space

Setting Up Regional Collaborative Ecosystem for APAC Mars Missions

- **Test projects** are important
- Alignment of **objectives**

Analogue Missions

- **Data generation** for deep space missions and Asian physiology
- Public support purposes => **mainstreaming Mars missions**
- Psychological effects due to isolation and cultural impact on psychology

Bump up university/private research

- **Leverage existing microgravity** experiment environments
- Survival and habitat designs
  - Food technology
  - Agricultural experiments (super dwarf variety of Oryza sativa) as part of analogues
  - Disaster relief applications

SUSTAINABLE PLAN TO MARS

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SUSTAINABLE PLAN TO MARS

MARS COLONIZATION

PHASE 2: BUILDING THE TECH

Industry Mobilization

Phase 1 Analogue Missions Integration

Avenue Creation

Human Training Facilities

Biological Technologies

Mobilizing the tech industry

Integrating data from analogue missions of Phase 1 to design real Mars mission

- Scouting of landing AND settlement sites
- Leveraging the landscape (geography/connectivity) of the APAC region for test projects on satisfying technical capabilities for Mars colonization
    - Communication technology
    - Remote technology

Providing avenues for private sector and companies to develop tech and bring ideas for Mars missions

Building human training facilities

Biological Technologies

- Remote technology for medical emergencies
- Gene therapy for harmful radiation protection
- Waste management technologies leveraging indigenous APAC things

RELEVANT SPACE TECH

TECHNOLOGY NAME	CURRENT STATE	CHALLENGES
Quantum Technology	1.Communications. 2.Quantum computing. 3.Detection of physical phenomena.	1.Deteriorate easily (e.g. atmosphere). 2.Need to upskill the current population. 3.Need the right environment to operate.
Propulsion	1.Rocket propulsions, reusable rockets. 2.Normal jet/turbo engines. 3.Electric propulsion. 4.Pulsed detonation engines.	1.Power and efficiency. 2.“Green” environment friendly propellants. 3.Commercial use for more advanced propulsion systems.
Additive manufacturing	1.Metal manufacturing. 2.Manufacturing of essential medical equipment to be used in space or any other planetary body.(Mars)	1.Influence of micro-gravity. 2.Finding necessary materials.
AI & Robotics	1.Remote sensing technology. 2.Imaging analysis for geospatial applications. 3.Utilization of rovers for optimisation of desired outputs.	1.Less reliable. 2.High processing power. 3.High power consumption.
Solar power	1.Space-based solar power. 2.Used for propulsion.	1.Launching such large solar collection systems into orbit in an affordable way.

RELEVANT SPACE TECH

DOWNSTREAM APPLICATIONS

QUANTUM COMMUNICATIONS

Faster data rates and unconditional security. Revolutionise the communications industry.

PROPULSION

Cleaner emissions, efficient transportation industry, efficient generation of energy.

ARTIFICIAL INTELLIGENCE

Replace laborious, repetitive, menial jobs e.g. primary industry, manufacturing.

ADDITIVE MANUFACTURING

Efficient and sustainable creation of current technologies and structures.

SOLAR POWER

Cleaner and sustainable environment.

IMPROVEMENTS

Virtual and physical connectivity.
Efficient industries.
Healthier environment.

SUSTAINABLE PLAN TO MARS

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SUSTAINABLE PLAN TO MARS

MARS COLONIZATION

PHASE 3: APAC TO MARS

Indigeneous Deep Space Mission Capabilities

Leverage Trained Resources

Start development of indigenous deep space mission capabilities

- Launchers, space pods, space habitats, etc.

Leverage trained resources for first apac-led manned mars missions