

20th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
DEVELOPMENT (D3)

Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and
Development (1)

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OF SUSTAINABLE PATHWAYS AND APPROACHES: A MARS COLONIZATION ROADMAP FOR
THE ASIA-PACIFIC

Abstract

Noted dreamer and multi-billionaire Elon Musk wants to establish the first human presence on Mars by 2026 and seems to be certain of accomplishing it. Despite his confidence, little detail is available for the public on how exactly he hopes to achieve this endeavour. Similar aspirations are prevalent around the world, including the Asia-Pacific (APAC) region, which is relatively underexplored in space technology research. But without having to be in contrast with the rest of the world, APAC's unique cultural and geographical characteristics warrant the region to have its own tailored Mars Colonization Roadmap. This paper elucidates the important considerations for laying down this roadmap.

It presents a three-phased roadmap — Phase 1: Setting Up Shop; Phase 2: Building the Tech; and, Phase 3: APAC to Mars. Phase 1 accounts for an economic design that highlights human resource maximization and multi-functional technology for Earth applications. These serve as the roadmap's funding and investment strategy by setting up regional collaborative ecosystems and advancing analogue missions, university research, and privatization benefits. Next, Phase 2 focuses on: (1) mobilizing the technology industry resulting from Phase 1; and, (2) providing avenues for the private sector to further augment APAC's space capabilities. The final phase fixates on the development of indigenous deep space

mission capabilities, including launchers, space pods, and space habitats, leveraging trained resources resulting from previous phases for the first APAC-led manned mission to Mars. Designing this roadmap was done through a series of Focus Group Discussions, Literature Review, and Key Informant Interviews, to comprehensively determine all important considerations for the roadmap. The region's distinctiveness was leveraged to adeptly explore approaches for a sustainable architecture. Sustainability considerations are key analysis subsequent to the region's distinctiveness. Designing the APAC roadmap therefore involved understanding its temporal viability factors, scientific and technical limitations, geopolitical and economic impact and continuity, and space exploration capability infrastructure or cycle. This suggestive roadmap paves the way for groundwork considerations and pioneering blueprints for APAC to Mars! Please note that this paper is written by a group of researchers of the Space Generation Advisory Council's (SGAC) Asia-Pacific Workshop.