

37th IAA SYMPOSIUM ON SPACE POLICY, REGULATIONS AND ECONOMICS (E3)
The future of space exploration and innovation (2)

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THE ROYAL SOCIETY'S 'PERSPECTIVE ON SPACE'

Abstract

Royal Society 'Perspectives' are future-facing policy reports that focus on critical areas of emerging science and technology expected to have significant impact on humanity over the next half-century. Due for publication in late 2024, the latest edition in the series addresses space. Grounded in expert insight and building upon evolving, emerging, and expected trends, the 'Perspective on Space' investigates plausible future developments in space science and technology out to 2075, exploring their ethical and societal issues implications as well as the challenges they raise for future international space governance. The report is organised into thematic chapters, each presenting a distinct setting for future activity. The first Chapter, The Leap from Earth, discusses innovative and alternative methods of getting into space, following on from recent developments that are already drastically reducing launch costs. Continued advances could see spaceflight become as routine as commercial aviation today, opening space to a range of new actors and expanding the type and scale of activity possible. The focus of the next chapter shifts to Orbit, examining the evolution of satellite services, the intensification and diversification of activities aboard space stations, and the possibility of larger and more specialised facilities which could be assembled in orbit. The Moon and Mars, key destinations for exploration over the next decade, are the subject of the third chapter. Both present a microcosm for the future of space, showcasing the opportunities and the risks that come with humanity's continued expansion away from Earth, as well as the challenges these developments present for international governance. This includes issues around contamination, the ownership of resources and territory, and managing diverse set public and private actors with conflicting interests. The final thematic chapter looks at the future of Solar System and Deep Space exploration, with areas discussed including the search for life, solar system-wide platforms for science, and advanced propulsion systems that could enable exploration to neighbouring star systems within a human timeframe. The Perspective concludes with 'A Call to Action', directed at both national and international decisionmakers. Three overarching themes of recommendations emerge from this call: (1) the value and importance of global collaboration in constructing ambitious space infrastructure; (2) the need to integrate scientific considerations into decision-making processes on the future governance of space; and (3) the importance of early intervention to lay the right foundations for future governance issues.