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ALTERNATIVE FUTURES FOR CREWED SPACE COOPERATION AFTER THE INTERNATIONAL  
SPACE STATION

**Abstract**

On December 31, 2021, NASA Administrator Bill Nelson announced the U.S Administration was committed to extending International Space Station (ISS) operations through 2030. Implementing this decision will require the United States to work with the ISS international partners in Europe (ESA, European Space Agency), Japan (JAXA, Japan Aerospace Exploration Agency), Canada (CSA, Canadian Space Agency), and Russia (State Space Corporation Roscosmos) through the rest of this decade.

The International Space Station (ISS) has been the largest and most visible international space cooperation project for decades. The program began in the 1980s during the Cold War, incorporated Russia after the end of the Cold War, and has sustained permanent human occupancy in low Earth orbit for over 20 years. Although political support among the partners appears solid, it is uncertain how many more years the Station will be able to operate technically. In addition to aging elements, there have been a series of launch failures and on-orbit accidents over the past decade that have called into question how long the station can be safely operated. The operating costs of the Station for the United States and international partners are considerable, on the order of 3 billion dollars per year just for the United States, and have been increasing as the facility ages. These costs impose a constraint on the willingness and ability of international partners to participate in new human exploration efforts, such as Artemis, the European Space Agency (ESA) Lunar Village concept, and the International Lunar Research Station (ILRS) plans of China and Russia.

Given the central importance of the ISS to international civil space cooperation today, what are the possible alternative futures for crewed space missions in a post-ISS world? States and private sector actors could work to extend the ISS, participate in the Chinese Space Station, create multiple, smaller government and private human-tended platforms, focus on human missions to the Moon and Mars, or even cease participation in human space exploration altogether. This paper examines these alternatives futures, assesses the attractiveness and practicality of the alternatives to spacefaring states, and seeks to identify the key areas of technical, economic, and policy uncertainty that will shape the post-ISS era of human space exploration.