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**Strategic Options for International Participation in Space Exploration:  
Lessons from U.S.-Japan Defense Cooperation**

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**ABSTRACT**

The President's Commission on Implementation of United States Space Exploration Policy suggests that after NASA establishes the Space Exploration vision architecture, it should pursue international partnerships. Two possible approaches were suggested: multiple independently operated missions and an integrated mission with carefully selected international components. The U.S.-Japan defense sectors have learned key lessons from experience with both of these approaches.

U.S.-Japan defense cooperation has evolved over forty years from simple military assistance programs to more complex joint development efforts. With the evolution of the political-military alliance and the complexity of defense programs, these cooperative efforts have engaged increasingly industrial resources and capabilities as well as more sophisticated forms of planning, technology transfers and program management.

Some periods of this evolution have been marked by significant frictions. The U.S.-Japan FS-X program, for example, provides a poor example for management of international cooperation. In November 1988, the United States and Japan signed a Memorandum of Understanding (MOU) to co-develop an aircraft, named FS-X and later renamed F-2, as a replacement to the aging Japan support fighter F-1. The program was marked by numerous political disputes. After over a decade of joint development and testing, F-2 production deliveries finally began in 1999. The production run was curtailed due to much higher than anticipated costs and less than desired aircraft performance.

One universally agreed "lesson" from the FSX/F-2 case was that it did not represent the ideal approach to bilateral cooperation. More recent cooperative programs have involved targeted joint research and development, including component development for ballistic missile defense systems. These programs could lay the basis for more ambitious cooperative efforts.

This study examines both less-than-stellar international cooperation efforts as well as more successful initiatives to identify lessons from military programs that can help NASA encourage global investment in its Space Exploration Vision. The paper establishes a basis for examining related policy and industrial concerns such as effective utilization of dual-use technologies and trans-Pacific program management of large, complex cooperative programs.