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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EXPLORATION OF THE SOLAR SYSTEM: FACT AND FANCY

Abstract

The exploration of the Solar System began at the beginning of the Space Age. Looking forward, the constraints of reality must inform predictions and plans of what are likely — as compared with possible — futures. In any case, such constraints lead to four, broad requirements if we are to move forward: 1. National/international policy/science: The case to go 2. Technology: The means to go 3. Strategy: The agreement to go 4. Programmatics: The funds to go In the United States, the recently released "Vision and Voyages" planetary decadal survey articulates scientific goals and missions throughout the Solar System (1). Explicit policy documents in other countries are not so obvious, but budgets and initiatives of other spacefaring nations speak for themselves. For every space agency, the path of technology development (2) and the necessary funding (4) is highly contingent upon the details of the strategy to be pursued (3). In the United States, the programmatics of funding plays against aggressive exploration, and reaching engineering closure on technical implementation requires programmatic consensus first. While "analysis battles" continue to be waged over human spaceflight, robotic missions continue to provide significant, concrete, scientific results. "Vision and Voyages" was carefully crafted to continue such advances by providing a coordinated plan within the limited, 10-year NASA funding profile as understood in 2010. In addition to a balanced portfolio of research, technology investment, and smaller missions, it urges return of pristine rock and soil samples from Mars, as well as a search of Jupiter's moon Europa for a habitable zone. As mission difficulty, and, hence, mission costs, have escalated, national agencies have sought teaming arrangements, although technology sharing and coordination of budgets bring their own challenges. Continued technological investment is required, e.g. sine qua non are reliable isotopic power supplies, larger—and affordable—launch vehicles, and a renewed and upgraded Deep Space Network, expanded to international connections and shared facilities. Technology per se is no alternative to adequate funding for accomplishing the envisioned tasks at hand. Such exploration of the Solar System can continue—with robots always taking the first, and to some extreme environments, the only, steps, but only if the realities of physics, chemistry, associated technologies and their costs are all taken into account.