

Transcending Societal Issues for Space Exploration (12)
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ARTIFICIAL INTELLIGENCE (AI) IN SPACE: LEGAL AND SOCIETAL ASPECTS OF
AUTONOMOUS OUTER SPACE VEHICLES

Abstract

Space exploration has fostered technological innovation in a wide range of disciplines: propulsion, materials development, communications, power systems, and perhaps most crucially, increasingly sophisticated software programs that approach what some designate as “artificial intelligence” (AI). Beyond low earth orbit, spacecraft were often either beyond the reach of earthbound telecommunications stations, or the long round-trip message times required designers to embed software programs into early spacecraft computers that enabled varying degrees of limited autonomous operations. Today, Moore’s Law of declining costs and exponentially advancing computer data processing power and speed continues to confirm waves of software innovations that are fostering quantum leaps of vehicle autonomy to a degree designated as “AI.” Autonomous vehicles already operating on land, sea, and air, mirror similar transformations taking place in space. Just as earthbound AI-driven autonomous vehicles have spawned a plethora of legal and societal issues reflecting liability, ethics, and security concerns, space vehicles will also face increasing scrutiny as AI capabilities potentially loosen links to their operators and owners. This paper will review the legal and societal issues arising from increasingly autonomous spacecraft AI capabilities, especially in view of the 2019 Long Term Sustainability Guidelines and the 1967 Outer Space Treaty’s Article VI requirement for “continuing supervision by the appropriate State Party to the Treaty.”