In Favor of Supervisory Control for Cislunar CubeSats

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Despite significant advances in spacecraft autonomy in recent years, the fact remains: developing sophisticated autonomy is expensive. Cost and complexity can be reduced by allocating decision making capability to adaptable human operators or ground software rather than investing in brittle spacecraft automation. The extended two-way contacts provided by NASA's Deep Space Network (DSN) enable a supervisory control mode of operations, which allows missions to execute complex activities that are beyond the capabilities of their spacecraft's autonomy. Using supervisory control, or "joysticking", introduces risks, which will be discussed along with their mitigations. These attributes make supervisory control an appealing, but largely unexplored, mode of operations for beyond-Earth small satellite missions due to their typically constrained budget, use of DSN, and relaxed risk posture. Lessons learned from the Lunar Flashlight mission, which made extensive use of supervisory control, will be condensed to inform the development of autonomy and operational processes for future missions.