

NASA's Flight Opportunities Program: An Evolving Design & Development Strategy for CRuSR Payloads

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The NASA Flight Opportunities Program now combines the Facilitated Access to the Space environment for Technology (FAST) and the Commercial Reusable Suborbital Research (CRuSR) efforts previously managed by the Innovative Partnership Program Office. Flight Opportunities competitively selects researchers and procures transport for their payloads on appropriate commercial vehicles. FAST sponsors parabolic aircraft flights of human-tended payloads for multiple exposures to seconds of microgravity, and CRuSR sponsors autonomous research payloads for soon-to-be available transport to near-space and exposure to minutes of microgravity and/or the upper atmosphere environment. By FY 2012, Flight Opportunities may add other platforms and test environments. One measure of program success will be the extent to which this research can infuse new technologies into NASA missions while encouraging the development of commercial space services by enlarging the research customer base.

This presentation will profile a payload development strategy to allow researchers to fly payloads quickly, frequently and safely on suborbital reusable launch vehicles (sRLVs). These emerging sRLVs can provide access to near-space at low-cost due to their reusability, the key to reaching rapid flight rates. This requires that there also be research payloads to integrate and transport that have reusable aspects to them. It is unlikely that development of unique research payloads for each flight and flight vehicle type will allow sufficiently rapid payload development to keep flight rates high and costs per flight low.

CRuSR will collaborate with researchers and other key stakeholders in this community to find innovative ways to provide rapid payload processing. One goal is to identify, implement and test various payload "reusability" concepts such as, a) standardized payload container interfaces, b) small, lightweight, adaptable, subsystems, c) simplified safety processes appropriate for short flight durations, and d) web-based tools to facilitate streamlined payload processing and community information sharing. Payload reusability can range from rapid reflights due to fast data capture after landing, to quick-change sample and subsystem replacements, to researcher teams that re-fly complete payloads that can generate new data sets based on new flight trajectories.

In the 1st quarter of FY 2011 (December 2010), Flight Opportunities released an Announcement of Opportunity for flights on both FAST and CRuSR that will initiate utilization and evaluation of innovative payload concepts by researchers and CRuSR staff. We will report on researcher-related examples from some initial demonstration flights with two CRuSR-developed payloads and some earlier orbital research, and actively solicit input from researchers and flight providers on payload reusability and related concepts.