

Optimizing Suborbital Mission Specialist Training and Standardization

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Abstract

Commercial suborbital vehicles currently under development could soon provide researchers with opportunities to fly as payload and mission specialists. However, existing federal regulations requires crewmembers to be trained aboard commercial or private spacecraft, limiting opportunities for training. Defining the necessary skills and requirements will help to establish industry standards, which will better prepare researchers for suborbital operations.

Training

Prospective suborbital researchers must complete applicable training requirements in order to serve as crewmembers aboard commercial spacecraft. Astronautics training applicable to the suborbital flight profile includes High-G acceleration/deacceleration familiarity, flight physiology, and microgravity. These topics, as well as appropriate abort scenarios and emergency operations are mandated by U.S. Code of Federal Regulations (CFR) Title 14, part 460. A number of existing commercial providers currently offer training toward the suborbital tourism market, specifically geared toward spaceflight participants. However, these training courses can also apply to commercial payload or mission specialists. Commercial providers conduct training using such methods as hyperbaric chambers, centrifuges, and aerobatic and parabolic aircraft flight profiles. Many training providers offer courses tailored toward specific vehicles, profiles, or equipment if requested.

Industry Standardization

CFR Title 14, Part 460 defines the requirements of crewmembers operating commercial spacecraft. However, unlike civil aviator regulations, Part 460 does not indicate in detail the duration or medium such training must be administered. This allows for flexibility, but fails to address variation or validity of training regimens. In absence of further guidance, more specific standards should be adopted so as to be accepted by the existing and future suborbital operators.

Conclusions

Optimizing the training necessary for researchers to conduct suborbital flight operations should be accomplished so as to ensure industry-wide acceptance. Regulatory standards for commercial astronautics provides a foundation for training future suborbital researchers from which further standardization can be derived. Establishing collectively recognized suborbital mission specialist training standards before the advent of flight opportunities will better prepare both vehicle operators and training institutions for the dynamic certainty of contingencies in the nascent commercial spaceflight industry.

References: [1] Human Space Flight Requirements (2011) 10 CFR Part 460 [2] Seedhouse, E. (2008) *Tourists in Space, A Practical Guide*, Springer



Figure Insert: Michael Mastin training for payload specialist role with Project Polar Suborbital Science in the Upper Mesosphere (PoSSUM) at Embry Riddle Aeronautical University, Daytona Beach, FL, 2015. (Credit C. Stedman)