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SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES (D6)
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CREATING A SAFETY CULTURE IN COMMERCIAL HUMAN SPACEFLIGHT

Abstract

The establishment of a culture of safety for commercial human spaceflight requires not only regulations, but an objective administrative regime capable of identifying, prioritizing, and responding to safety concerns, even in the face of economic loss. As countries begin to create commercial human spaceflight regulatory regimes, it is vital that they look to the lessons of history to avoid stifling innovation and mitigate catastrophe.

While limited data on human spaceflight safety exists, the history of aviation regulation is much more expansive. In this paper, we perform a case study of all aviation regulatory administrations in the U.S. (the Federal Aviation Administration and its predecessors), and utilize roughly twenty measures of organizational culture as a means of correlating administrative practices (e.g., critical experience of the workforce, horizontal and vertical communication, coordination with major stakeholders, autonomy of the agency) with outcomes (e.g., safety record, licensing demand, ability to enforce regulations). Throughout the history of the FAA, the organization has been accused by the Government Accountability Office and Congress of preventing upward communication, failing to communicate laterally, setting unrealistic cost/schedule estimates, and operating as a branch of the aviation industry rather than a regulator. We examine the validity and evolution of these statements as a function of time, and causally connect the impact of elements of organizational culture and the FAA's functionality.

We compare the results of the FAA study with the extensive body of work on the Challenger and Columbia disasters and the organizational culture of NASA, to determine which aspects of a safety culture are the same/different with a separate regulatory agency and manufacturer vs. a self-policing system. While many of the criticisms of the organizational culture of the FAA and NASA are similar, economic incentives on behalf of the commercial space sector may incentivize safety to an extent that overcomes any lapses in regulation.

We use these results to inform a discussion of the structure of a new U.S. commercial human spaceflight regulatory regime, what aspects of the FAA and NASA experience should carry over to this new domain, and in what capacity businesses are capable of self-regulating as the industry grows. With a Congressional moratorium on regulation of commercial human spaceflight until 2023, it is vital for the U.S. to begin laying the groundwork for an effective regulatory agency and collaborate with industry leaders to establish the critical experience necessary for the creation/enforcement of safety regulations.