



AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

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May 14, 2021

Dr. Fang Liu
Secretary General
International Civil Aviation Organization (ICAO)
999 Robert-Bourassa Boulevard
Montréal, Québec H3C 5H7
Canada

Dear Secretary-General Liu:

The Air Line Pilots Association, International (ALPA), representing the safety interests of over 59,000 professional airline pilots flying for 35 airlines in the United States (U.S.) and Canada, has closely monitored the rapid increase in global space operations. Our focus on space flight operational integration has been ongoing for more than five years and our concerns are primarily focused on ensuring that no new risks to airline operations are introduced by space operations. Based on recent events, we believe that there is a lot of work that needs to be done very quickly and I ask that International Civil Aviation Organization (ICAO) take leadership on this critical safety concern.

Two recent uncontrolled and unscheduled space debris re-entry events have exposed a major risk. The events include a March 25, 2021 Space-X Falcon 9 second stage re-entry over the Northwestern United States and Southwestern Canada, and a CZ-5B-Y1 rocket on May 9, 2021, in the Indian Ocean. In the span of just 45 days, many tons of rocket components have re-entered the atmosphere as out-of-control space debris, putting many lives at risk. This includes those lives that were in-flight on airline aircraft and were likely unaware of the potential danger that they might encounter. Only after the re-entry had occurred, did the real safety threat become much more obvious.

In the case of the Space-X re-entry, we know that the second stage encountered a mechanical difficulty and was adrift, orbiting the earth for weeks before its re-entry. There was ample time to evaluate and plan for any potential risks resulting from the unplanned re-entry. Despite the second stage design to minimize debris, several components of the Falcon 9 did survive re-entry and impacted the ground.

In the days following the March 25 re-entry, several pieces of the Space-X second stage were recovered, and some of them reportedly weighed upwards of 300 pounds (136.7 kg). We are unaware of any warnings or cautions issued by Space X, or either of the Air Navigation Service

Providers (ANSPs) in the U.S. or Canada, once it was known that the re-entry would occur in continental U.S. and Canadian airspace. We are also unaware of any warnings issued by public safety agencies to generally alert the global aviation community in advance of the event.

The second re-entry event involved a CZ-5B-Y1 rocket, which was among the 10 largest pieces of human-made space debris to re-enter the earth's atmosphere. The rocket booster re-entered over the Indian Ocean approximately 50 minutes earlier than the final prediction provided by The Aerospace Corporation. If it had re-entered 15 minutes later than predicted, it would have occurred over central Florida. If re-entry had occurred 105 minutes later than predicted, it would have been over Washington, DC, and much of the continental U.S. in the moments before that.

In May 2020, a CZ-58-Y1 rocket also re-entered the atmosphere and like the Space-X Falcon 9, some of the booster components fell all the way to the ground, within the Republic of Côte d'Ivoire. Publicly available news reports indicate that another CZ-5B-Y1 booster will be used in the near future, and a re-entry event like the May 9 event will occur again. Publicly, news agencies and experts report that this rocket booster is not equipped with the capability to ensure that its re-entry can be controlled, or even accurately predicted.

The airline industry long ago realized that the "big sky theory" was not an acceptable collision risk mitigation strategy, and yet there seems to be an ongoing view that the "big sky theory" is an acceptable level of risk for space debris re-entry. The problem becomes even more apparent when looking at the forecast for future launches. Worldwide, the number of space launches increased by 54%, from 74 launches in 2010 to 114 launches in 2020¹. This trend is expected to continue through the 2020s, with The U.S. Federal Aviation Administration (FAA) Office of Commercial Space forecasting a further increase between 36% to 100% in the U.S. alone by the fiscal year 2025. Industry estimates are even higher with a fiscal 2025 growth of 177% over 2020².

Thus, the two uncontrolled re-entry events and the risk they pose to aviation are noteworthy, given the strong global safety record the global aviation industry has worked so hard to achieve. Although neither event created an aviation-related casualty, several issues have been identified by ALPA that we believe are a global threat to aviation safety and need to be addressed by ICAO.

- The need for globally accepted standards for launch planning and recovery, as well as risk mitigation, should unplanned events occur during the launch and recovery.
- The need for globally accepted standards for space debris that at a minimum, includes "design for demise" requirements, as well as vehicle design requirements to ensure that very large pieces of space debris are controllable enough to ensure that the re-entry occurs at a pre-defined location and time.
- States need to greatly increase information dissemination before and during the re-entry events, so that aviation operations have adequate advance notice, as well as ongoing

¹ <https://www.spacelaunchreport.com/logyear.html>

² https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/Commercial_Space.pdf

updates on the re-entry data as it becomes available. If necessary, actions by ANSPs should be taken so that aircraft are cleared from possible areas at risk to collisions from components that are falling through the airspace, during the re-entry.

Along with these suggestions, please accept our offer to provide the necessary personnel from ALPA to assist you in this activity. I firmly believe that ICAO is in the best position to immediately address this critical aviation safety issue. I stand firm in the belief that through collaboration and a common goal to achieve the highest possible safety levels, that the global aviation community can rise above the challenges we are currently facing, to the benefit of all humanity. I look forward to hearing from you soon.

Respectfully,

A handwritten signature in blue ink that reads "Joseph G. DePete". The signature is written in a cursive style.

Capt. Joseph G. DePete
President
Air Line Pilots Association, International

cc: Captain Jack Netskar, President of IFALPA
cc: Mr. Juan Carlos Salazar, ICAO Secretary General Effective August 1, 2021
cc: Mr. Sean E. Doocey, U.S. Representative to ICAO