ALLIED PILOTS ASSOCIATION

Single Pilot Part 121 Operations

Pursuit of Single Pilot Operations is a blatant attempt by the airline industry to trade away safety for lower costs. The push for single pilot operations is borne from the idea that cost savings can be achieved by removing a pilot from the cockpit. However, the research and development required to integrate a single pilot aircraft into large scale operations within saturated air traffic environments is decades away from the level of maturity required to ensure the safety of the flying public. It would require enormous amounts of public funding to ensure the integration of single pilot operations is both safe and feasible, and yet would only yield a low return on investment, realized solely by the airline industry in the form of lower costs.

Data indicates that single pilot aircraft are 30% more likely to be involved in aviation mishaps than aircraft with two or more pilots.[1] The absence of a second pilot eliminates the ability to intervene in response to physical incapacitation or in the remote chance of a willful act of negligence. An example of this is the 2015 Germanwings mishap, which was caused by "the deliberate and planned action of the co-pilot, who decided to commit suicide while alone in the cockpit."[2] Once again, on October 22, 2023, Horizon Air Flight 2059 almost became another casualty of a pilot with mental incapacitation when the jumpseater, an off-duty pilot, tried to bring the whole aircraft down by shutting down both engines. If not for the ***two other crewmembers*** in the cockpit, the flight and its passengers would have been casualties of a horrific, intentional crash. Two pilots are absolutely necessary to respond or intervene in the case of *any* pilot incapacitation (mental or physical.)

Utilizing remotely located pilots to replace the "Pilot Monitoring" on the flight deck results in insufficient information transfer, leading to slower and less effective decision loops. The use of the "Pilot Flying/Pilot Monitoring" model has been successful in almost 14 years of major mishap-free operations in the United States. This time-proven model has successfully trapped many errors and prevented mishaps. It enables extremely effective crew coordination. That effective crew coordination relies on both verbal and non-verbal cues to conduct safe and efficient flight operations. The loss of these cues would result in serious performance deficiencies during normal and abnormal air operations. Not only would we see deficiencies in the air, but we would see them on the ground during taxi operations. A single pilot cannot visually clear the space on both sides of the aircraft to mitigate taxi accidents, and the increased workload of adding virtual cues such as cameras to fill that void would greatly decrease the safety margin. This additional workload would be levied on the pilot while he or she would be checking current weather, assessing load planning closeout numbers, receiving and processing taxi instructions, and monitoring other aircraft, ground equipment, and construction equipment on the airfield.

While airborne, current flight deck procedures for critical items, such as pointing to and verbalizing altitude changes, provide a safety barrier to prevent potentially catastrophic outcomes due to pilot errors. These procedures are rooted in decades of studies on human psychological responses. The inability to quickly coordinate via nonverbal cues represents a substantial loss in crew coordination capability. Additionally, any feedback or cues from a ground-based pilot monitoring would be subject to a slight delay, due to lack of

[1] https://nbaa.org/aircraft-operations/safety/2021-2022-nbaa-top-safety-focus-areas/
[2] Causes, BEA Final Report, https://en.wikipedia.org/wiki/Germanwings_Flight_9525

human interaction and voice and data link limitations. This delay could be catastrophic, as timeliness is key to the resolution of abnormal situations.

NASA and FAA studies have shown the safety risks and challenges with single pilot operations far outweigh anticipated benefits, citing significantly increased workloads for single pilot operations when compared with two-crew operations.[3] This increased workload compounds the likelihood of significant pilot errors. High workload situations such as hazardous weather, system failures, and operations in critical phases of flight require timely support and intervention by a monitoring pilot.

Another potential issue is the unknown health effects on pilots that "confinement" to the flight deck would create…will the remotely operating Pilot Monitoring fully take over in the event the Single Pilot needs to step back to use the lavatory, leaving the flight deck completely unoccupied? Or will pilots find themselves not moving around as much, resulting in increased health concerns such as blood clots and prostrate issues?

Finally, single pilot operations present a drastic increase in exposure to large scale terrorist attacks that would result from the reliance on data link and data transfer to enable assistance in a single pilot flight deck. Any data link used would be vulnerable to cyber-attack and electronic warfare attack. This would directly impact the safety of air travel and could cause a future 9/11-type scenario on a horrific scale. A terrorist attack could be complete severance of a data link, which would very disruptive but apparent to the operator. It could also take a more subtle "ghosting" approach, in which a malicious actor could insert code to the aircraft to disrupt systems without operator knowledge. An example of this is a GPS disruption, in which an aircraft "thinks" it is somewhere that is really isn't, but with no apparent indication to the operator. Our military aircraft combat this by using special cryptographic technologies, but would that funding be available to protect data links and data transfer for thousands of commercial aircraft daily? This would be an enormous fiscal burden on the government for a relatively small return on investment.

The technology to satisfactorily replace the capabilities of a second flightdeck monitoring pilot may exist, but the ability to fully integrate that single pilot aircraft into our congested air traffic control environment is not yet feasible…it would require a huge public investment in research and development to create and integrate the network and infrastructure required to maintain the safety of the American flying public. Additionally, the threat of a full-scale terrorist attack on those networks and electronic infrastructure would need to be mitigated by providing disproportionally large taxpayer-funded security measures. In conclusion, society has observed seemingly innocuous mistakes made by machine-learning algorithms. These mistakes are far more consequential when introduced into the aviation environment, possibly leading to improper responses to system malfunctions or incorrect responses during time-critical situations.

Two **highly trained and experienced pilots are required in the flightdeck to ensure the safe operation of FAA Part 121 commercial aircraft.** ***Two*** **pilots enable the ability to conduct cross-checks, verify flight information, and provide backup for time critical decision-making to prevent aviation mishaps.**

For questions or additional information please email GAC-Chairman@alliedpilots.org

[3] https://ntrs.nasa.gov/api/citations/20170009542/downloads/20170009542.pdf