



Sandia Aerospace SAI-340

Degraded Mode Operation
Installation Support Note (1/14/2016)

The Sandia Aerospace SAI-340 utilizes air-data to help refine the attitude solution during specific operational maneuvers. The SAI-340 is certified to support a Degraded Mode to address operation where air-data aiding has been lost. If the external air-data source becomes unavailable (plugged pitot static port, or similar fault), the unit will enter the Degraded Mode automatically.

Operation in this Degraded Mode does not imply that attitude availability from the SAI-340 has been lost. During this Degraded Mode, attitude information is always available to the pilot - it is never removed or made un-available

When operating in this Degraded Mode, the SAI-340 will show a slight pitch-up during long accelerations and a slight pitch-down during long decelerations, both on the order of $\pm 3.0^\circ$. This condition will self-correct once the maneuver is completed. Roll accuracy is not affected. This behavior has been verified in both simulated and flight test conditions.

The limited performance degradation in this mode meets the applicable performance requirements of DO-334 § 2.2.4.2 (Degraded Mode Accuracy), 2.2.4.2.1 (Degraded Mode Pitch Accuracy), & 2.2.4.2.2 (Degraded Mode Roll Accuracy), for "basic attitude performance", meaning it is sufficient to maintain positive aircraft control and perform the operations.

Therefore, for backup applications where air data is also utilized in the PFD solution, should air data become un-available in a common mode failure scenario, "basic attitude performance" is maintained by the SAI-340. Based on our engineering analysis we consider this to be compliant with 14 CFR 23.1311 § (b) and applicable sections of AC 23-1311.1C.

The Degraded Mode operation is a characteristic allowed by the FAA AHRS design guidance. Degraded Mode, as defined by RTCA DO-334 § 2.2.4, is as follows:

The intended function of a degraded mode (if provided) is to provide basic attitude performance, despite one or more AHRS failures. A degraded mode is intended to allow a pilot to maintain positive aircraft control while maneuvering under IMC, including IFR en route operations, climbs, descents, holds, fly an instrument approach to minimums, and return the aircraft back to level following an upset.(...)