

46ESS-05: Ice Detection and Protection Systems

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Aircraft engine icing is a sensitive phenomenon that occurs in a variety of atmospheric conditions and affects multiple engine components. It also poses a significant safety concern as it can trigger a loss in engine performance. Ice formation may have severe consequences for the engine operation such as airflow restriction or damage resulting from ice shedding. In the past years numerous cases of engine power loss due to icing have been reported ranging from a temporary or sustained loss of power to uncontrollability and engine shutdown. Each of these icing induced incidents may have a different origin such as sensor icing, compressor surge, combustor flame-out due to ice ingestion or engine rollback. Frequently engine icing may appear with no indications of airframe icing making it more difficult to detect. Therefore a reliable, accurate ice detection system is essential for early diagnosis. Furthermore, to prevent any engine malfunctions, an effective ice protection system must be deployed. The cooperation between these two systems can ensure a faultless engine operation in all flight conditions.