PROVEN PERFORMANCE, UNPARALLELED HISTORY

The leading supplier of ice detection systems for the widest variety of aircraft

Collins Aerospace

ICE DETECTION THAT STANDS THE TEST OF TIME

Since 1965, Collins Aerospace has produced ice detection systems for use on major aircraft programs and is a recognized leading supplier of aircraft ice detection systems. We offer a complete product line to meet the ice detection needs of all types of commercial, regional, business and military aircraft, including helicopters. The Collins Aerospace vibrating probe ice detectors are the only systems certified for primary use on commercial transport airplanes by the FAA, EASA and other airworthiness authorities.

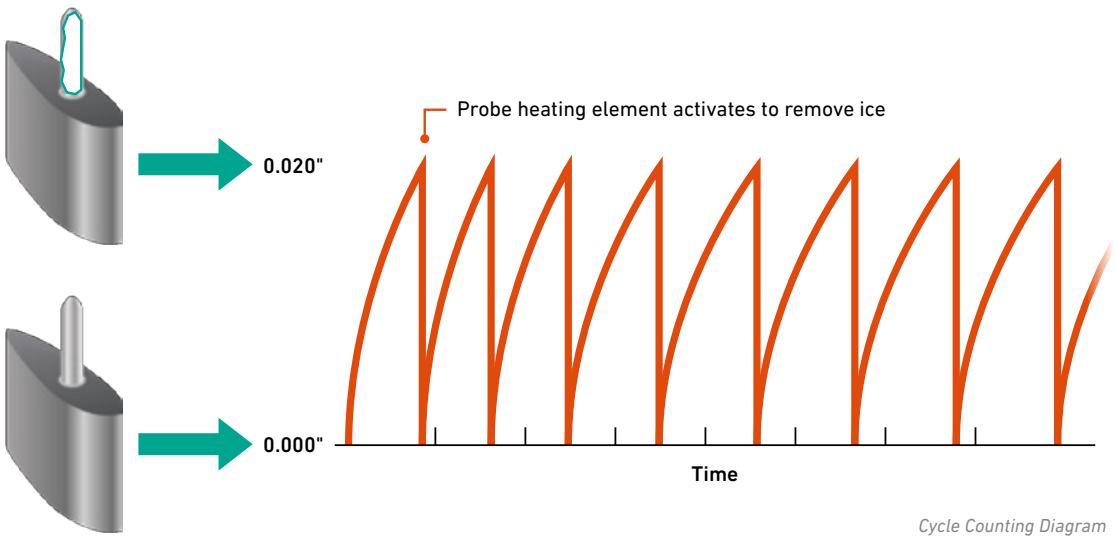
ICE DETECTION SYSTEM TECHNOLOGY

In conjunction with the FAA and aircraft manufacturers, Collins Aerospace pioneered the development of primary ice detectors. In this configuration, the ice detector—which must be extremely reliable and responsive to icing conditions throughout the entire flight envelope — is the primary source that activates ice protection systems. These ice detectors offer multiple signal (cycle counting) capability, digital electronics, extensive self-test/built-in test diagnostics, and an extremely low undetected failure rate. Our primary systems allow operators to obtain the maximum possible benefits of ice detection measurement.

MAGNETOSTRICTIVE ICE DETECTION

The first ice detection technology developed by Collins Aerospace uses the principle of magnetostriction — the ability of ferromagnetic materials to change dimensions under the influence of a fluctuating magnetic field. Our magnetostrictive sensors vibrate ultrasonically at a set resonant frequency. As ice accretes on the probe, the vibrational frequency decreases. At a specified frequency shift—which is related to the ice mass on the probe — an output signal is generated and probe heaters are energized to remove the ice. The heater is then de-energized and when the probe cools down, begins to accrete ice again.

Using the ice detector output, aircraft systems can count the number of cycles and use a correlation to the criticality of different aircraft surfaces to activate different ice protection zones at different times.



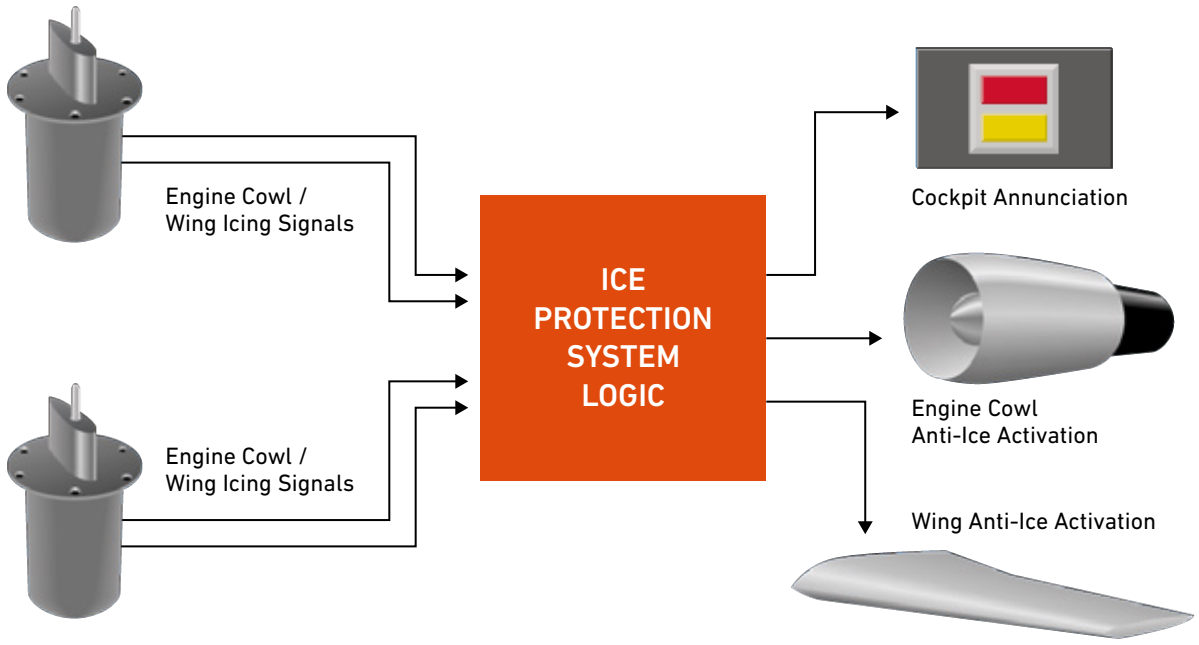
Cycle Counting Diagram

UNIQUELY DESIGNED FOR SPECIFIC APPLICATIONS

Collins Aerospace ice detection systems are customized to a specific application. Typical applications include primary automatic, primary manual and advisory systems on large transport, regional, business, military and general aviation fixed-wing aircraft or rotorcraft. The rotary wing sensing probe continually senses icing conditions, even when the aircraft is hovering.

KEY BENEFITS/FEATURES

- Increased flight safety
- Reduced crew workload
- Prolonged life of the aircraft ice protection system, reducing maintenance costs
- Significant fuel savings
- Customized to specific applications



Ice Protection System Logic Diagram

STATE-OF-THE-ART TESTING CAPABILITIES

Collins Aerospace has one of the most capable icing wind tunnels in the world. Aerodynamic and icing testing is essential to analyze the effectiveness of aircraft sensors. The advanced icing wind tunnel allows testing to meet the new, stringent icing requirements for aircraft sensors set forth by the world's aviation regulatory agencies. It offers significantly increased capabilities, such as colder temperatures and higher altitudes, and is capable of producing both solid ice particles and supercooled liquid water droplets in high concentrations. Extensive wind tunnel testing allows us to optimize the design for performance throughout the flight envelope and environmental conditions experienced in flight.

FIVE REASONS TO USE OUR ICE DETECTION SYSTEMS

1. Experience

Collins Aerospace has certified ice detectors on more aircraft than any other company. Our experience has taught us many valuable lessons that we use to improve our products.

2. Increased flight safety

Collins Aerospace ice detection systems provide a timely warning of icing conditions throughout the icing envelope, even when it is difficult for the crew to verify visible moisture (such as during night flight). Timely ice detection reduces the risk of foreign object damage to the engines from the ingestion of large ice accumulations.

3. Reduced specific fuel consumption (SFC) penalty

Operation of aircraft anti-icing/de-icing systems consumes a significant amount of energy. Primary ice detection systems activate anti-icing or de-icing systems only when they are required. Studies show that preventing unnecessary ice protection system activiation results in significant fuel savings.

4. Reduced crew workload

Ice detection systems automatically signal the cockpit when icing conditions are encountered. This system can reduce crew workload during those phases of flight when activity is highest and icing is most likely to occur—during takeoff and landing.

5. Prolonged aircraft de-icing system life

The service life of the aircraft de-icing system is extended because the system is operated only when icing conditions are present, resulting in major cost savings for the operator.

APPLICATIONS

Primary automatic

The ice detector automatically activates ice protection systems at the optimal moment. This system approach takes full advantage of the ice detector's capabilities and provides the most benefit to the operator. Flight instrumentation indications give system status and provide a manual override.

Primary manual

The flight crew activates ice protection systems based on ice detector signals.

Advisory

The crew activates ice protection systems based on the standard flight manual criteria of a total temperature reading and the sighting of moisture. The ice detector signals serve as a back-up indicator.

To learn more, go to
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