### Endurance Time Testing in Snow: Reconciliation of Indoor and Outdoor Data, 2000-02

At the request of the Transportation Development Centre of Transport Canada and the Federal Aviation Administration (FAA), APS Aviation Inc. undertook a research program to compare endurance times of de/anti-icing fluids for natural and artificial snow, and to continue to evaluate the general functionality of the artificial snowmaking system that was developed by the National Centre for Atmospheric Research under contract with the FAA. This report comprises work completed over two years from 2000-01 and 2001-02, and includes data from winter 2000-01 reported in TP 13828E.

The report encompasses four sub-projects:

1. **Intra-Laboratory Comparison of Endurance Times in Natural Snow**
   - Outdoor natural snow tests were conducted by APS and AMIL using three Type IV fluids. One hundred and seventy-seven tests were conducted using a common test procedure.

2. **Characterization of Snowfall Intensity over Test Plate**
   - This project encompassed 57 artificial snow distribution trials over 2 years using the NCAR snow machine, and 6 distribution trials under natural snow. A comparison of the snowflake size distribution of artificial and natural snow was made.

3. **Comparison of Natural and Artificial Endurance Times**
   - The objective of this project was to compare the endurance time performance of several fluids under artificial and natural snow. One project focused on a comparison of one Type IV certified fluid in which 23 artificial snow tests and 58 natural snow tests were completed. The other part of this project focused on testing Type II and IV fluids (from 2000-01 and 2001-02) under artificial snow and comparing these tests with data from natural snow testing. Over 2 years, 63 tests were performed and compared to natural snow regression data.

4. **Reconciliation Tests to Evaluate Endurance Time Differences in Natural and Artificial Snow**
   - These tests were performed to determine the variables that cause differences between endurance times under artificial snow and natural snow. Nine comparison tests were completed in 2000-01 and 6 tests in 2001-02.

An action plan for future testing should be developed in conjunction with NCAR, and any modification should be tested. Further research should be undertaken to study the characteristics of natural and artificial snow.

### Key Words
- Simulated snow, third-generation snowmaking machine, deicing, anti–icing, endurance times, holdover times, artificial snow, precipitation rate

### Distribution Statement
- Limited number of copies available from the Transportation Development Centre