Terminal Area Icing Weather Information for NextGen (TAIWIN)

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Introduction

• FAA released new aircraft certification icing regulations on November 4, 2014.

• Affects a portion of Part 25 aircraft, addressing Supercooled Large Drop (SLD) icing conditions
  – Changes how affected fleet operate en-route and in terminal area icing conditions

• TAIWIN addresses SLD and other icing conditions in the terminal area
Appendix O (1/2)

• Refer to:
  – Note. Appendix O was known as Appendix X when report was published.
  – Provides explanation of data and analysis used in the development of Appendix O.
Appendix O (2/2)

• SLD environments are freezing drizzle (FZDZ) or freezing rain (FZRA) environments
  – FZDZ Environments - Conditions with spectra maximum drop diameters from 100 μm to 500 μm
  – FZRA Environments - Conditions with spectra maximum drop diameters greater than 500 μm
TAIWIN Objectives

• To develop a capability that encompasses:
  – Real-time representative rate measurement of all ground-level precipitation types and accurate identification of precipitation type
  – Highly resolved, timely icing conditions aloft in the terminal area that quantify cloud properties in four-dimensions (4-D) to support aircraft trajectories
  – Highly resolved, timely diagnoses and forecasts for terminal area freezing precipitation
TAIWIN Stages

- **Stage I:** current state of observational weather information for icing conditions, both at the ground and aloft.

- **Stage II:** capable of identifying and distinguishing between Appendix C and Appendix O icing conditions.

- **Stage III:** capable of distinguishing between the icing conditions defined in Appendix C and the subsets of Appendix O (FZDZ versus FZRA aloft).

- **Stage IV:** capability at a spatial and temporal resolution that allows arrival and departure routings within the terminal area to be tailored with respect to the icing conditions.
### TAIWIN Stages

#### Terminal Area
30 nautical mile radius and 10,000 feet vertical extent

<table>
<thead>
<tr>
<th>STAGES</th>
<th>In-flight</th>
<th>Data Possibilities</th>
<th>Spacing Possibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>App C &amp; App O</td>
<td>FZDZ &amp; FZRA</td>
<td>CIP/FIP</td>
</tr>
<tr>
<td>II</td>
<td>X</td>
<td>High Res</td>
<td>HRRR/RAP, then add improved use of GOES, ASOS w/FZDZ, radar, etc.</td>
</tr>
<tr>
<td>III</td>
<td>X</td>
<td>X</td>
<td>Model/Obs improvements</td>
</tr>
<tr>
<td>IV</td>
<td>X</td>
<td>X</td>
<td>+ GOES-R, RadIA, etc. Grids match hi-res OBS</td>
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</tbody>
</table>

**Goal:** Improve Information, Resolution, and Capability Throughout Stages
10 n. mi./10,000 ft
10 n. mi./4,000 ft
5 n. mi./2,500 ft