Airborne Weather Radar

PILOT'S OPERATING GUIDE

A workbook and reference tool of
RTI Airborne Weather Radar Seminars

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Assumptions: Regarding the information in this Pilot's Operating Guide, continental USA operations are assumed. The suggestions may not be valid in other geographic areas. For operations outside the United States, please call RTI.

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ABOUT THIS GUIDE

This reference guide is to be used only by individuals who have attended Radar Training International's comprehensive one-day seminar on airborne weather radar. Condensing essential information covered at length in the seminar, it is divided into three general sections:

SECTION 1. Preflight: Information intended to assist pilots in getting into the proper frame of mind prior to flight activities by defining specific weather areas around the departure, destination, and alternate fields. The Objective Storm Hazards Indexing Test (p. 5) presents a series of questions and non-radar clues, setting the stage for the proper employment of airborne weather radar by assessing atmospheric potential for a convective explosion.

SECTION 2. In-Flight Operation: Concise information and key concepts in a layout convenient for reference during preflight, taxi, or in-flight operations. Do not allow use of this guide to distract from the primary duty of safely operating the aircraft.

SECTION 3. Principles For Review: An abbreviated discussion of pertinent topics that are covered in detail during the RTI seminar.

Throughout the manual, information that may have particular relevance to a specific topic or phase of flight will be highlighted with one of these three icons:

Remember

General reminders of important points covered in the seminar.

Note

Information for pilot consideration in the risk management decision process, to aid in understanding the subject or remembering steps.

Information that alerts pilots to situations or steps that, if disregarded, may result in equipment damage and/or injury or fatalities.

Section 1

PREFLIGHT

WEATHER EVALUATION (Departures, Destination, and Alternate)

- Evaluate departure, en route, arrival, and alternate Wx.
- Augment the aerodrome forecast (TAF) with other weather products.
  - The TAF is valid for a small geographic area surrounding the airfield.
- Refer to Appendix A, "Microburst Windshear Probability Guidelines" (p. 50), for terminal area operations, as appropriate.

W3 Wx-WARNING Area: 3 nm. from runway edges

Operating within high-threat environments, including the following conditions within W3, entails significant risks:

- ✓ Virga is present with other indications of a microburst.
- ✓ Any portion of an extreme cell is within W3.
- ✓ Any cell within W3 is exhibiting clues of significant attenuation.
- ✓ The effects of hazardous weather are reported, forecast, observed, or anticipated.

W20 Wx-ALERT Area: 20 nm. from runway edges

Hazardous weather within W20:

- ✓ Can produce hazardous conditions; consider modifying arrival and departure operations.
- ✓ Can have effects that extend to at least 20 nm.

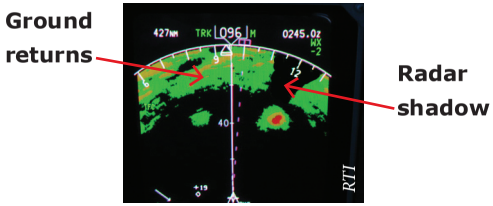
W100 Wx-AWARENESS Area: 100 nm. from ARP

Hazardous weather within W100:

- ✓ Can have a significant impact on departure and arrival operations.
- ✓ Is capable of precipitating hazardous weather anywhere within W20 or W3.

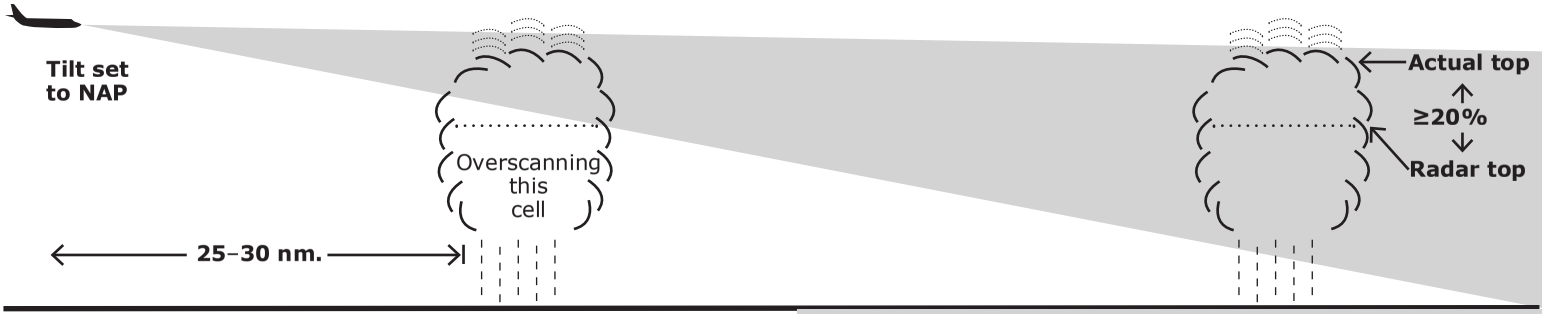
Section 2

IN-FLIGHT OPERATION



Remember

- The hazards associated with convective weather are a function of severity and proximity.
- Twenty nm. is considered the minimum safe operating distance from hazardous convective weather. Operating inside 20 nm. entails increased risk. As intensity increases, so should the minimum safe operating distance.



Remember

- Never over-fly convective weather if circumnavigation (upwind preferred) is an option.
- NAP — cruising mid-30s or higher
  - Cells displayed inside 25–30 nm. will be cleared by less than 5,000 ft., if cleared at all.
- Decisions requiring detail may be difficult beyond 50 nm. due to resolution and rate of change.

Hazards associated with convective weather may extend into the clear air above cell.

Note

Raising the tilt to minimize or eliminate ground returns increases the risk of over-scanning close-in targets.

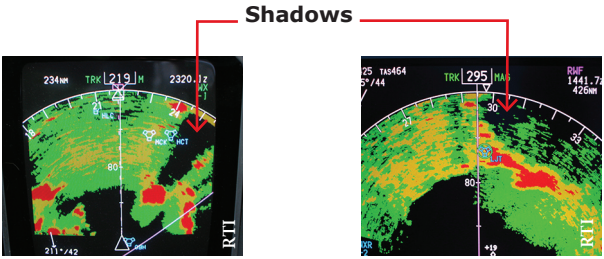
The growth rate of convective weather may exceed several thousand feet per minute.

Section 3

PRINCIPLES for REVIEW

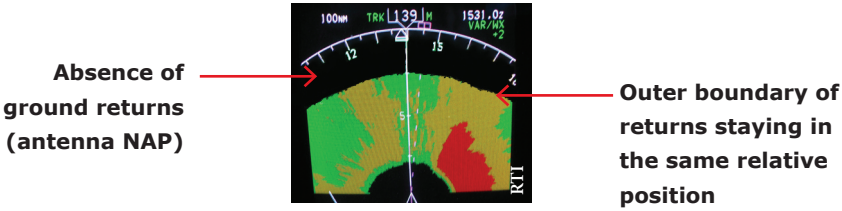
Convective Weather

- The absence of ground returns behind a cell indicates total attenuation.
  - Because radar energy is unable to make the two-way trip through the cell, its shape and gradient may be grossly misrepresented. The worst of the weather may reside (undetected) in the shadow.



Stratus Weather

- The absence of ground returns where they should otherwise be (outer portion of the display) is a strong indication of total attenuation.
  - Attenuation is confirmed if the outer edge of the returns remains at the same relative distance on the display.



Embedded Cells

- Attenuation characteristics are a combination of the convective weather and stratus weather characteristics listed previously.
  - Due to the increase in precipitation intensity, dips in the outer perimeter of the displayed precipitation may coincide with areas where embedded cells are located.
  - Areas where the intensity is less may appear as a bulge in the outer perimeter of the weather returns (i.e. the radar energy has penetrated further).