

**SUPERIOR  
WEATHER  
AWARENESS  
WITH LESS  
STRESS.**

IntuVue™ RDR-7000 Weather Radar for Business Aircraft  
and Helicopters

**Honeywell**

# OVERVIEW

**Comprehensive information about weather conditions is a critical factor for efficient, reliable and safe aircraft operations. Weather-related delays, cancellations and damages are costly for aircraft operators. With the IntuVue RDR-7000, we're offering business aircraft operators the lightest weight and most technically advanced radar available.**

Weather can be difficult to predict, and pilots continually run the risk of encountering unexpected weather like hail or thunderstorms, which can impact the safety and comfort of all onboard. Since the 1950s, Honeywell has produced airborne weather radar systems that help pilots navigate and survey the aircraft environment to ensure a safe and efficient route.

Honeywell's IntuVue Weather Radar Systems can detect all weather from 0 to 60,000 feet and up to 320 nautical miles in front of an airplane. Our systems provide intuitive displays of weather and alerts throughout all phases of flight, allowing pilots to make decisions to optimize flight paths. We also increasingly build automation into our systems in order to reduce intervention required by the pilots and overall workload.

The IntuVue RDR-4000 3D Weather Radar System has been used in air transport aircraft for more than 14 years, helping airlines around the world protect their passengers and fleets from weather related hazards. We are now bringing the proven technology to business aviation, regional transport and helicopter aircraft with our newest addition, the IntuVue RDR-7000 Weather Radar System.

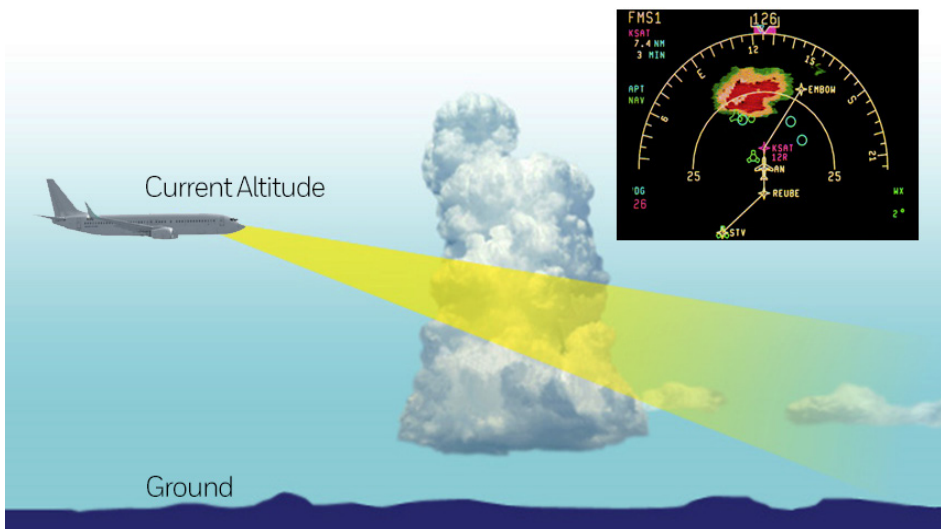
## **RDR-7000 Quick Facts**

- 3D Volumetric Scanning and Volumetric Memory Buffer
- Real-time view of weather from 0 to 60,000 FT, out to 320 NM, and in azimuth up  $\pm 60^\circ$  horizontally in front of the aircraft
- First weather radar to detect turbulence out to 60 NM
- Predicts wind shear out to 5 NM
- Detects hail and lightning conditions out to 160 NM
- Strategic Weather Detection – Automatic Mode
- Tactical Weather Analysis Mode
- Ground clutter extraction based on internal terrain database
- Certified to the new FAA enhanced turbulence Minimum Operational Performance Standard (MOPS)  
Reference FAA TSO-C63f and RTCA MOPS DO-220A

# OPERATING A WEATHER RADAR USED TO BE COMPLICATED

Older radars' Tilt Control taxes pilots

Pilots using older weather radar systems must manage both tilt and gain very effectively to detect and then analyze weather for purposes of assessing hazards to their aircraft. Taking nothing away from pilots' experience and abilities, research has shown there is wide variability in the quality and effectiveness of managing the radar and properly interpreting the information presented while performing the other duties of flying the aircraft.



Conventional Radar with Tilt Control

# THREE-DIMENSIONAL VOLUMETRIC SCANNING CHANGES EVERYTHING

The key technology incorporated is the radar's three-dimensional Volumetric Scanning capability.

The RDR-7000, with its Three-Dimensional (3D) Volumetric scanning, continuously scans the airspace from ground level up to 60,000 feet, out to 320 NM, and in azimuth up  $\pm 60^\circ$  horizontally in front of the aircraft. And with the radar's ability to store 3D data, it can provide displayed-data out to  $\pm 90^\circ$  — and even behind the aircraft (if supported by the display). Advanced pulse compression techniques previously only available in military radars now make it possible to see storms at longer ranges than ever before.

All the scanned information is stored in what we call the 3D Volumetric Memory Buffer or just the Volumetric Buffer. This buffer is continuously updated, compensates for aircraft motion, and corrects for the Earth's curvature.

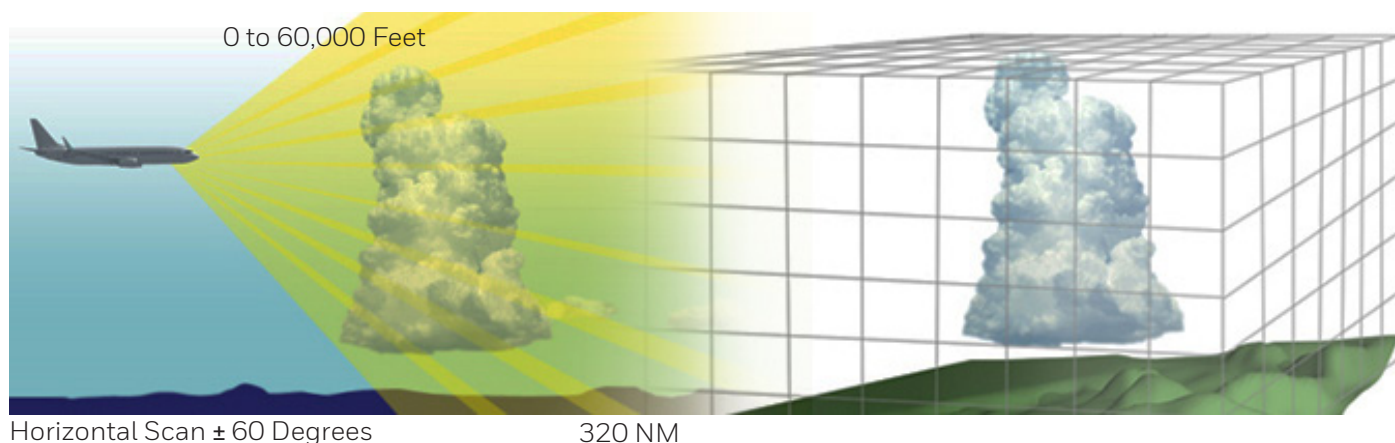
Given the lateral, vertical, and range dimensions of the volumetric buffer, accurate weather information is constantly available for display even beyond antenna scan limits, so pilots can determine the most appropriate aircraft trajectory changes such as turns and altitude changes, and to allow long range detection of weather for more strategic in-flight decision-making.

It's easy to see how this approach to gathering weather data is much better than conventional "single beam" radar. Even adding one or two more beams to a conventional radar can't match the comprehensive scanning capabilities of the RDR-7000.

## Volumetric Memory Buffer

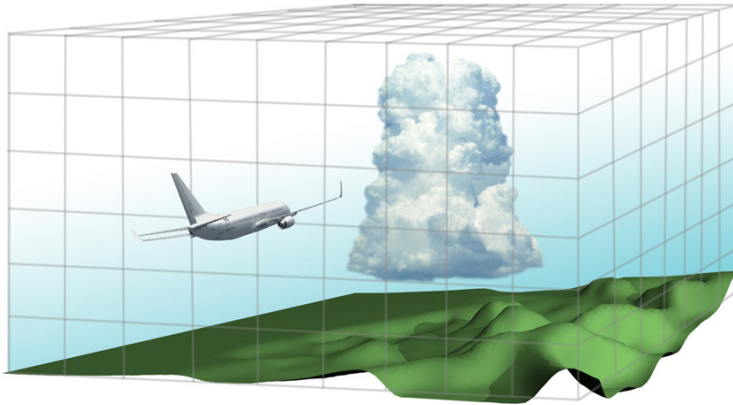
- Three-Dimensional
- Continuously updated
- Motion compensation
- Corrected for Earth's curvature

## Memory Buffer Ensures Most Reflective Part of Cell Is Always Detected and Captures All Weather within the Scanning Volume



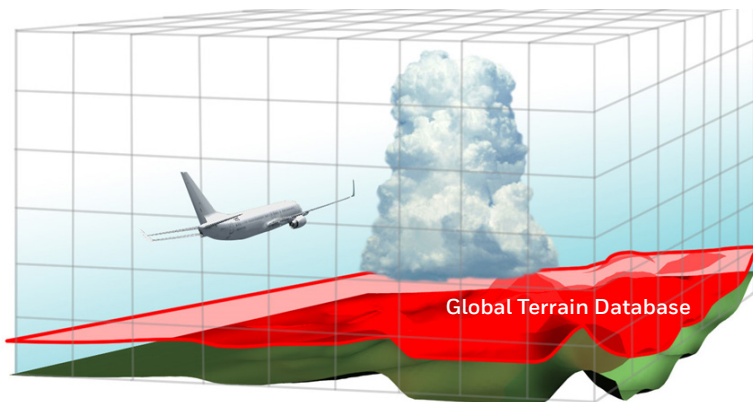
## Contains Weather and Ground Returns

One of the major issues affecting proper interpretation of radar weather information is distinguishing radar imagery generated by the terrain. Over the years, there have been many approaches to solving this problem from manual tilt management to more automatic techniques that seek to avoid pointing the radar beam at terrain or attempt to filter out terrain returns. All these approaches have short comings.

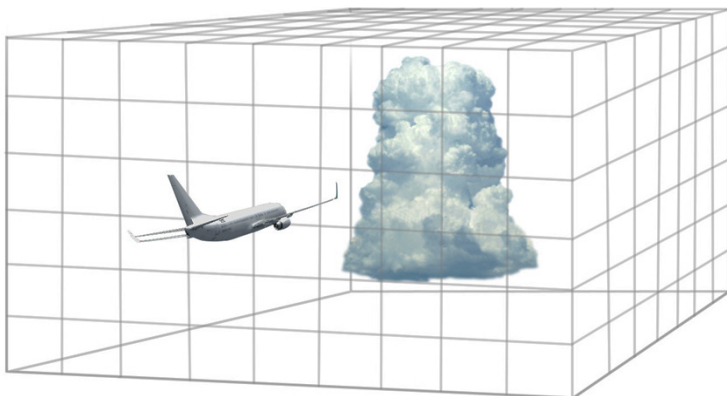


## Global Terrain Database Applied and Doppler to Ground Clutter

The RDR-7000 perfects and automates the process of eliminating ground clutter by utilizing the aircrafts internal global terrain database. As a part of the computer processing that is done on the volumetric buffer, the radar return data is compared to the terrain database and virtually all of the ground clutter is eliminated from the buffer leaving only the actual weather displayed.



## Leaving Only Weather Information



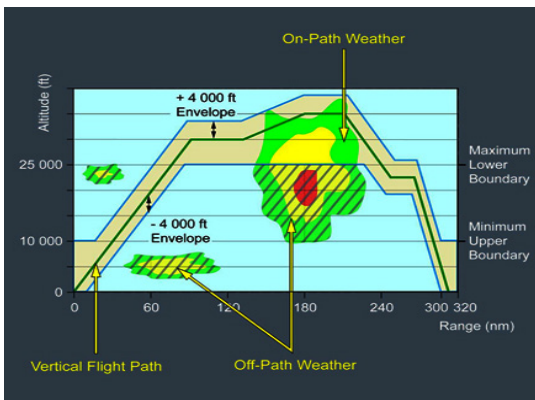
# AUTOMATIC MODE PROVIDES STRATEGIC WEATHER DETECTION

## Automatic Mode Makes Pilots' Jobs Easier and Less Stressful

By utilizing the volumetric scanning process, the RDR-7000 features fully automatic operation.

The RDR-7000 is able to *talk* to various aircraft systems such as the aircraft flight management system, air data computer, etc., and use knowledge of aircraft position, altitude, and most importantly, *intent*.

The key feature of **Automatic Mode** is the ability to depict **On-Path Weather** and **Off-Path Weather**. On-Path Weather is shown in normal, solid colors, while Off-Path Weather is cross hatched as shown in the graphic.

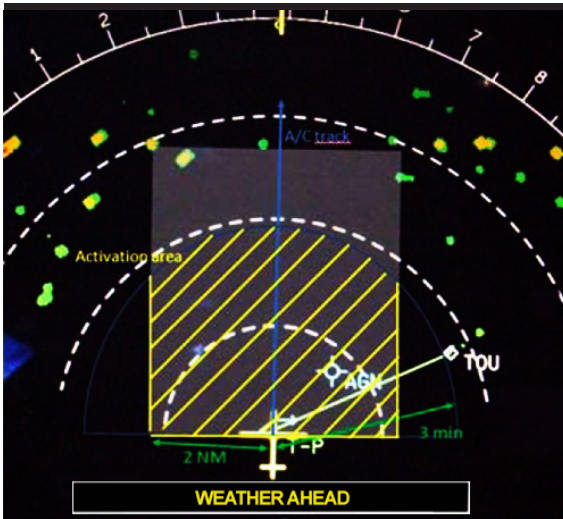


Off-Path Weather is generally defined as weather that is less relevant to the in-flight decision making process. Nominally this is weather that is more than 4,000 feet above or below the aircraft's planned flight path. However above flight level 250, that 4,000-foot floor is fixed at 25,000 feet, and only if the system determines that there is a convective cell (thunderstorm) in that location.

This is due to the recognition that any convective activity above this level should be considered as a part of the weather-related decision making process.

## Weather Alerting

Weather Alerting provides tactical notification to the pilots of significant On-Path weather and turbulence within a corridor along aircraft track, out to three minutes ahead at current aircraft speed.



### Annunciations:

Text Annunciation

**WEATHER AHEAD** in yellow text is activated on Nav display as soon as weather alert condition is detected

Audio Annunciation

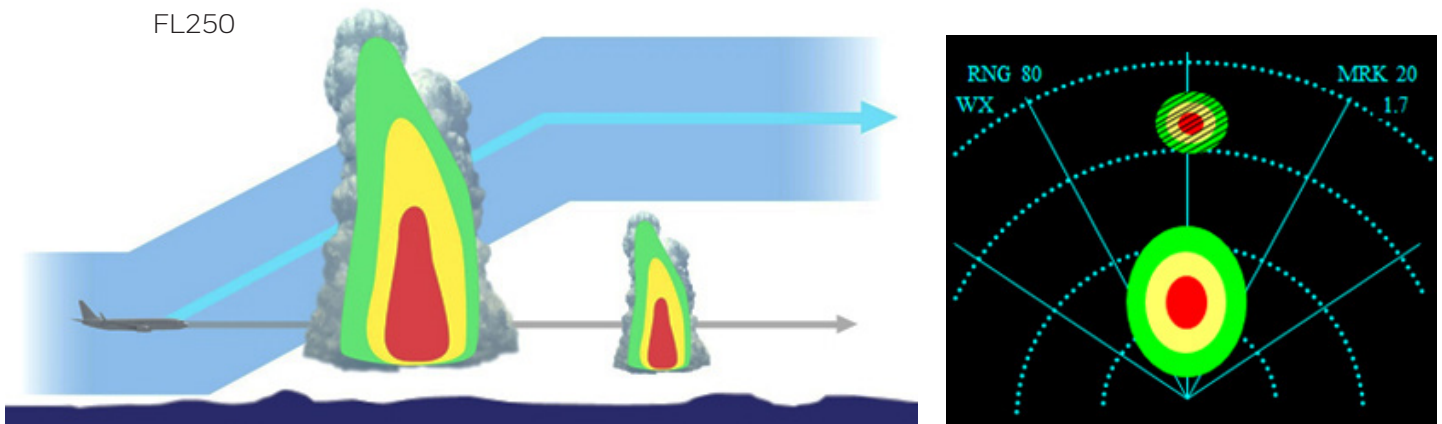
**WEATHER AHEAD**  
**WEATHER AHEAD**

only if weather remains not selected by the pilots for specified time after weather alert condition is detected

Let's examine an example of how this works.

This scenario reflects an aircraft that is climbing out on departure with two thunderstorm cells in front of its flight path. Ordinary radar would show both cells in front of the aircraft as noted by the dashed line in the illustration. The RDR-7000 however, because of its knowledge of the aircraft's climb and flight plan intent determines that the second cell should be shown as secondary weather since the aircraft's planned altitude takes it safely over the top of the second cell.

Indeed, Volumetric Scan and Auto Mode now make the job of finding relevant weather relatively simple.

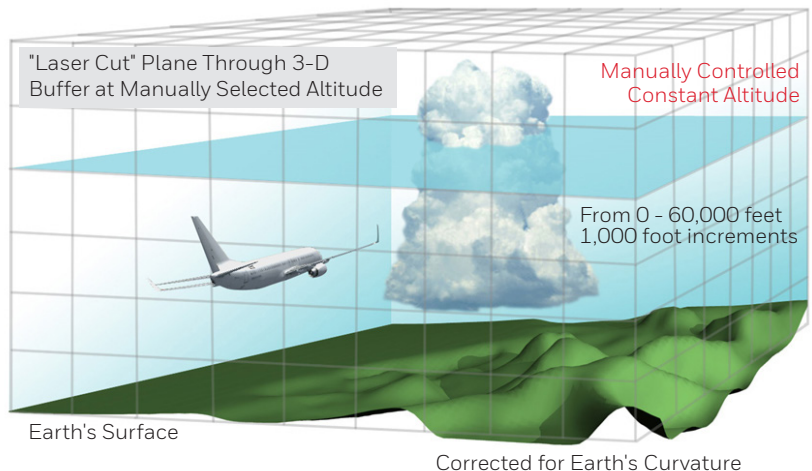


**Automatic Mode – Aircraft below FL250, climbing**

- Displays maximum weather along flight path Max/- 4000 feet
- Displays secondary weather in dashes pattern

# WEATHER ANALYSIS

## Weather Analysis – The Constant Altitude Slice



In **Manual Mode**, the RDR-7000 provides pilots with two modes that simplify the task of analyzing the extent and intensity of storm cells.

Let's look first at the **Constant Altitude Mode**. As the graphic shows, this mode allows us to view a horizontal laser cut through the Volumetric Buffer that has been corrected for the earth's curvature. This horizontal, constant altitude slice may be varied vertically from 0 to 60,000 feet in 1,000 foot increments to aid in the analysis of the horizontal and vertical extent of weather cells.

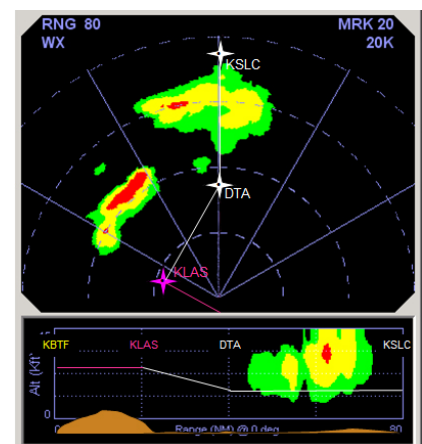
This intuitive approach to weather analysis is far easier to accomplish than the traditional tilt and gain manipulation and allows pilots to focus on interpreting the weather and hazards it may present to their flight.

## Weather Analysis – Vertical Profile Mode

The **Vertical Profile Mode** is the second tool offered by the RDR-7000 for the analysis of weather. As the name implies, this mode allows pilots to examine weather along the vertical axis.

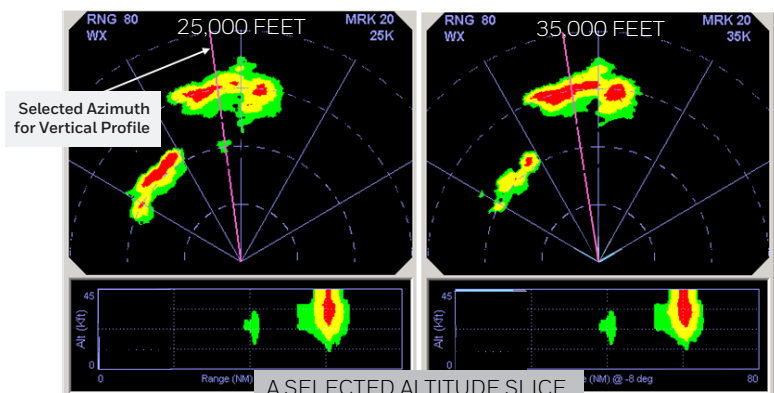
There are three types of Vertical Profiles: 1) Vertical weather data can be displayed along the aircraft's track; 2) along a track that the pilots select or; 3) along the track defined by the flight plan (as this graphic shows). The vertical display also allows for the presentation of both terrain and weather.

These Vertical Profile modes provide a valuable set of tools to get a very comprehensive picture of the vertical extent and intensity of weather cells. Additionally, pilots can also combine both Constant Altitude Mode and Vertical Profile Mode to fully isolate specific cells.



## Constant Altitude & Vertical Profile Modes

As these graphics illustrate, combining the horizontal and vertical analysis tools, provide a very intuitive and effective capability to isolate and analyze specific storm cells of interest. It's easy to see how the RDR-7000 significantly improves the pilots' ability to locate and analyze weather.





# 5 OPERATIONAL BENEFITS FOR PILOTS

1. With the RDR-7000's fully automatic operation, pilots' work load is reduced because manipulating tilt and gain is no longer required. And they will be confident that the radar is collecting and displaying a comprehensive picture of the weather.
2. The continuous Volumetric Scanning process maintains a complete, motion-compensated, 3D picture of the weather from very close and out to 320 NM with the radar's advanced pulse compression capability. This provides a high level of confidence that all weather of interest will be visible.
3. With the near-perfect elimination of ground returns using the internal terrain database, and other Doppler techniques, the RDR-7000's powerful and intuitive horizontal and vertical weather analysis tools significantly improve the quality of weather-related in-flight decisions.
4. Overall, pilots will enjoy improved weather situational awareness with less training than conventional radar, resulting in improved in-flight decision-making. This improved awareness can lead to fewer unnecessary weather deviations, or deviations of smaller magnitude. Perhaps more importantly, this may mean fewer incidents of passenger or crew injury.
5. Finally, flying with the only weather radar certified to the FAA's Turbulence Detection MOPS means pilots and passengers can enjoy fewer unexpected bumps and a safer, more comfortable ride.

## THE INTUVUE RDR-7000 WEATHER RADAR WILL BE AVAILABLE FOR:

### Business Aircraft

- Falcon 900
- Global 5000 or Express
- De Havilland Dash8-100
- Challenger 600/601
- Citation 750, X, 650 (including CIII/VII), 560, V, Ultra, 550 Bravo
- Learjet 40/45
- Hawker 800

### Helicopters

- Leonardo AW139
- Sikorsky S-76
- Sikorsky S-92
- Bell 429
- Bell 525
- Airbus H135/145

### Regional Air Transport Aircraft

- Embraer ERJ135/145
- Leonardo ATR 42/72

**For More Information**

<https://aerospace.honeywell.com/en/learn/products/weather-radar/rdr-7000>

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IS  
WHAT  
WE  
MAKE IT**

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