



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

April 7, 2020

Attachment 12– PSA Airlines

Captain Upgrade Weather Radar Training [Excerpts]

OPERATIONAL FACTORS

DCA20CA071

RADAR USAGE

RADAR USAGE

- The CA and FO radar displays show different sweeps of the radar
- One side can show the big picture on a large range scale and the other side can show close-in cells
- The colors indicate the intensity of the storm
- In order from lowest to highest intensity
 - Green
 - Yellow
 - Red
 - Magenta

Radar Tilt and Range

A common technique to set the tilt and range is to start with a range of 160

Then tilt the radar until some ground clutter is visible.

It is good to continue to adjust the tilt up and down to ensure that you do not miss a cell

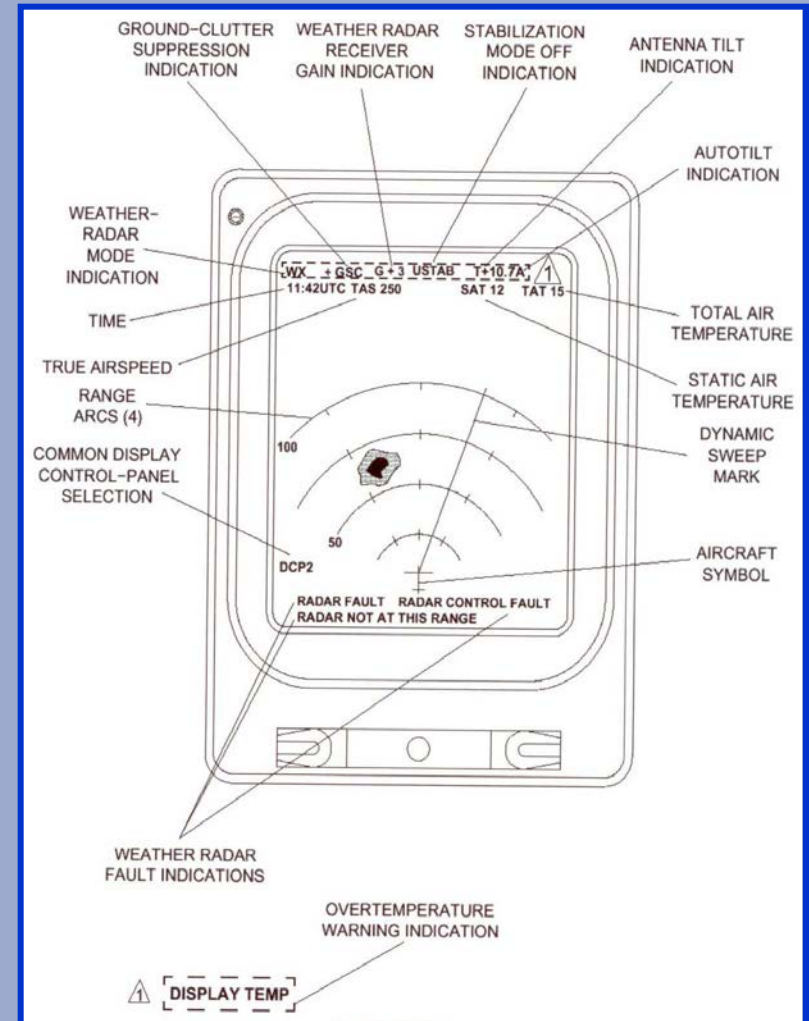
Caution – There is a 'blank' range that equals $\frac{1}{8}$ the selected range

This means if you have selected a range of 160 you will not see any radar returns within 20 nm of the aircraft

RADAR USAGE

The Sector Mode

- The sector mode (SEC) switches from a 60° scan to a 30° scan
- This will increase the number of scans per minute
- Gain control will allow you to adjust the return display level to help identify the most intense areas of the storm



RADAR USAGE

Radar Shadows

- Result when a storm reflects all of the radar energy and may mask other storms
- Shadows can be used to distinguish between storms and cities
- NEVER fly toward a radar shadow



RADAR USAGE

Overscanning



Moisture at the tops of Cumulus clouds can be frozen

RADAR USAGE

Overscanning



Remember, radar does not reflect off frozen precipitation

RADAR USAGE

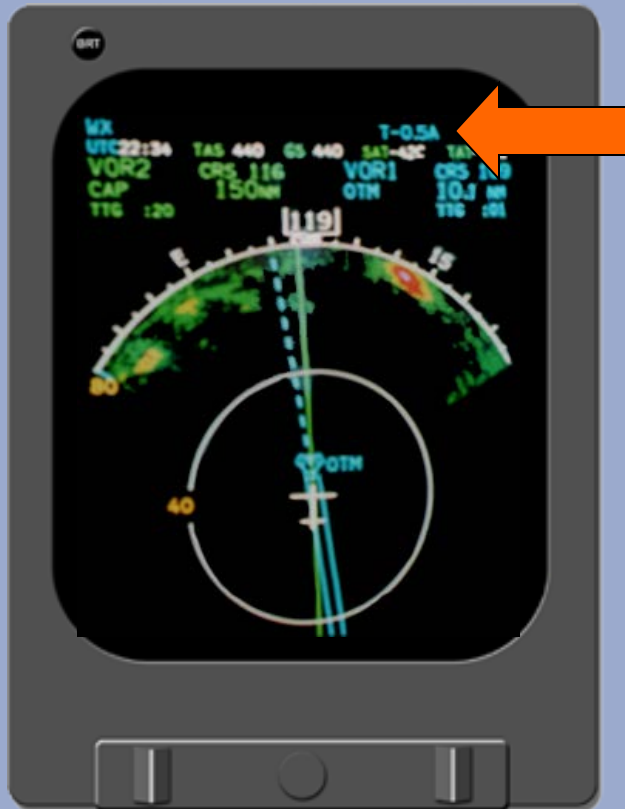
Overscanning



If tilt is not directed at the mid levels of a thunderstorm, the radar may not show any returns as we get close to the storm

RADAR USAGE

Overscanning



In this scenario, the radar beam is almost level with the airplane

RADAR USAGE

Overscanning



The display on the left shows a strong thunderstorm 80 miles away

RADAR USAGE

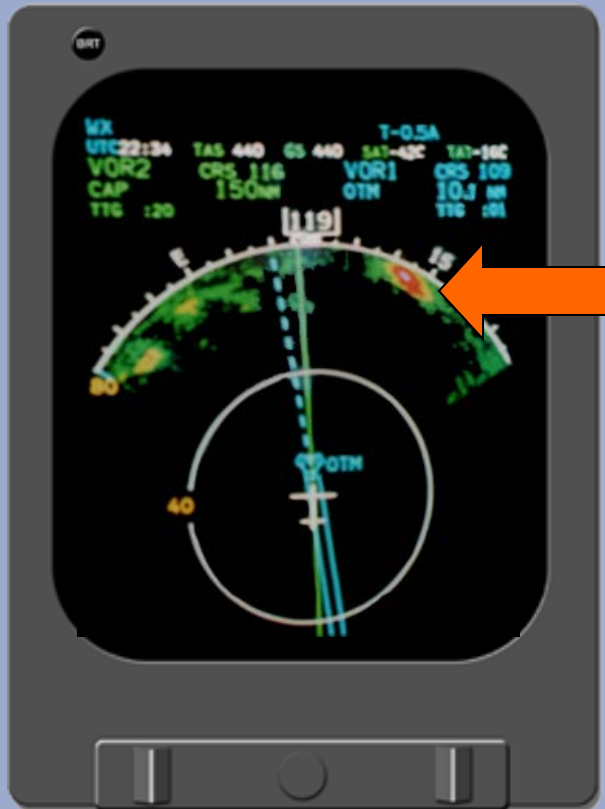
Overscanning



Since the radar beam diameter is so large at that distance it can reflect mid level moisture

RADAR USAGE

Overscanning



About 30 miles later, the radar beam diameter is smaller at the target and the same thunderstorm has significantly less reflectivity

RADAR USAGE

Overscanning



If we were to get even closer to the thunderstorm with the same radar tilt, the radar return could completely disappear

RADAR USAGE

Overscanning

At high altitudes, tilt must be adjusted down as we approach a storm to get maximum reflectivity from the thunderstorm

