1-1. APS-143C(V)3 OVERVIEW

The APS-143C(V)3 is an airborne pulse compression surveillance and imaging radar, which provides the airborne platform with the means to search for and detect surface targets while performing overwater surveillance. It is capable of providing true target bearing, relative target bearing and target range information relative to the position of the APS as well as target position in latitude and longitude. The Radar incorporates techniques to minimize the effects of sea clutter, and has a weather mode; which provides the capability of detecting thunderstorms and rain.

The equipment uses radar techniques for detecting radar targets. RF pulses are radiated using a directive antenna to focus the energy into a narrow beam. In the case of overwater surveillance, the beam illuminates a small patch of the ocean's surface. The return signal from this radiation is received, processed and displayed to the radar operator on a TV monitor. When a vessel is present in the illuminated patch of water, the level of the return signal is greater than that from the surrounding display that permits the operator to distinguish between a radar target and the background return, or clutter. Small target detection is enhanced by scan-to-scan integration techniques, which rely on the persistence of a target.

The radar accepts navigation data (position, heading, velocity, pitch/roll, altitude, etc.) from the airborne navigation system. The Radar detects and tracks a combination of up to 200 sea surface and airborne targets and furnishes track data on these targets. It provides the video input to the operator's display monitor, which shows relative position of targets in range and azimuth. Range is determined by measuring the time delay between pulse transmission and return signal. Azimuth is determined from the pointing direction of the antenna. A tableau to the right of the radar picture displays data and parameters pertaining to the aircraft, the radar and the designated target tracks.

The Radar aids in target classification through the use of wide band signal processing techniques such as Inverse Synthetic Aperture Radar (ISAR), Spot and Strip Map SAR and Range Profiling processing techniques. ISAR uses Doppler frequency shifts produced by target motion in sea conditions to produce an image, which displays the locations of significant scatterers on the target. Spot and Strip Map SAR use platform motion to increase the azimuth resolution of the radar. Range Profiling uses a high-resolution waveform to produce a range vs. target intensity plot, which can be used to identify significant scatterers of a target.