

AESA RADAR FOR THE RAFALE, THE OMNIROLE FIGHTER

- ▷ The AESA RBE2 combines a brand new concept with Thales' expertise from previous fighter radars. Compared to radars with conventional antennas, the RBE2 provides unprecedented levels of situational awareness, with earlier detection and tracking of multiple targets as well as the capability of using several radar modes at the same time:
 - All-aspect look-down/look-up detection and tracking of multiple air targets for close combat and long-range interception and in jammed environment in all weather,
 - Real-time generation of three-dimensional maps for terrain-following,
 - Real-time generation of high resolution ground maps for navigation and targeting,
 - Detection and tracking of multiple sea targets.
- ▷ Furthermore, the AESA RBE2 brings the Rafale a number of other key operational benefits:
 - Extended range capabilities supporting low-observable target detection and full use of new weapon systems such as the Meteor Air-to-Air missile,
 - Higher reliability for reduced maintenance and lower through-life support costs,
 - Greater waveform agility for SAR (Synthetic Aperture Radar) imaging and improved resistance to jamming.
- ▷ Dedicated to the Rafale, the RBE2 is the Europe's first-ever AESA radar delivered to Forces.

AESA RBE2

Active Electronically Scanned Array Radar





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ACTIVE ANTENNA

In a radar, an antenna is said to be "active" when it has a single subassembly for amplification of radiated power and pre-amplification of received power. This is achieved by the antenna front end, which comprises an array of several hundreds transmit/receive modules (T/R modules). By controlling each T/R module individually, the active antenna can steer the radar beam at speeds of an electronic chip. This is called "electronic scanning in space" and effectively allows the radar to overcome the mechanical constraints of steering a single antenna. It also allows the radar to track multiple targets simultaneously in all directions.

The active antenna thus replaces the conventional antenna and its mechanical steering system, along with the radar transmitter and the first stage of signal reception.

TECHNICAL FEATURES

Antenna Block

- Active electronic scanning
- Very low-side and scattered lobes in azimuth and elevation
- Very high reliability (T/R modules)

Active transmit/receiver modules and exciter/receiver

- Multipole Waveforms
- Coherent X band frequency generation
- Excellent spectral purity
- Wide bandwidth
- Full monopulse
- MMIC/GaAs technologies

Programmable signal processor and data processor

- Target detection and ECCM processing
- Fully programmable
- Anti-obsolescence solutions: open architecture – COTS components
- Tracking computation
- High-resolution map generation

CAPABILITIES

All radar functions are performed in the same flight:

Air Defence

- Very long detection and track ranges
- Fully automatic, sorting and ranking of tracked targets
- Fully target tracks independent of search volume
- Meteor compatible

Deep low-level penetration

- Automatic terrain following and avoidance

Strike mission

- En Route update of target area situation
- High resolution imagery modes (SAR) - Designations

Sea skimming attacks

- Detection and multi-tracking

Active electronic scanning makes it possible to switch radar modes quickly, thereby enabling operational functions to run simultaneously

