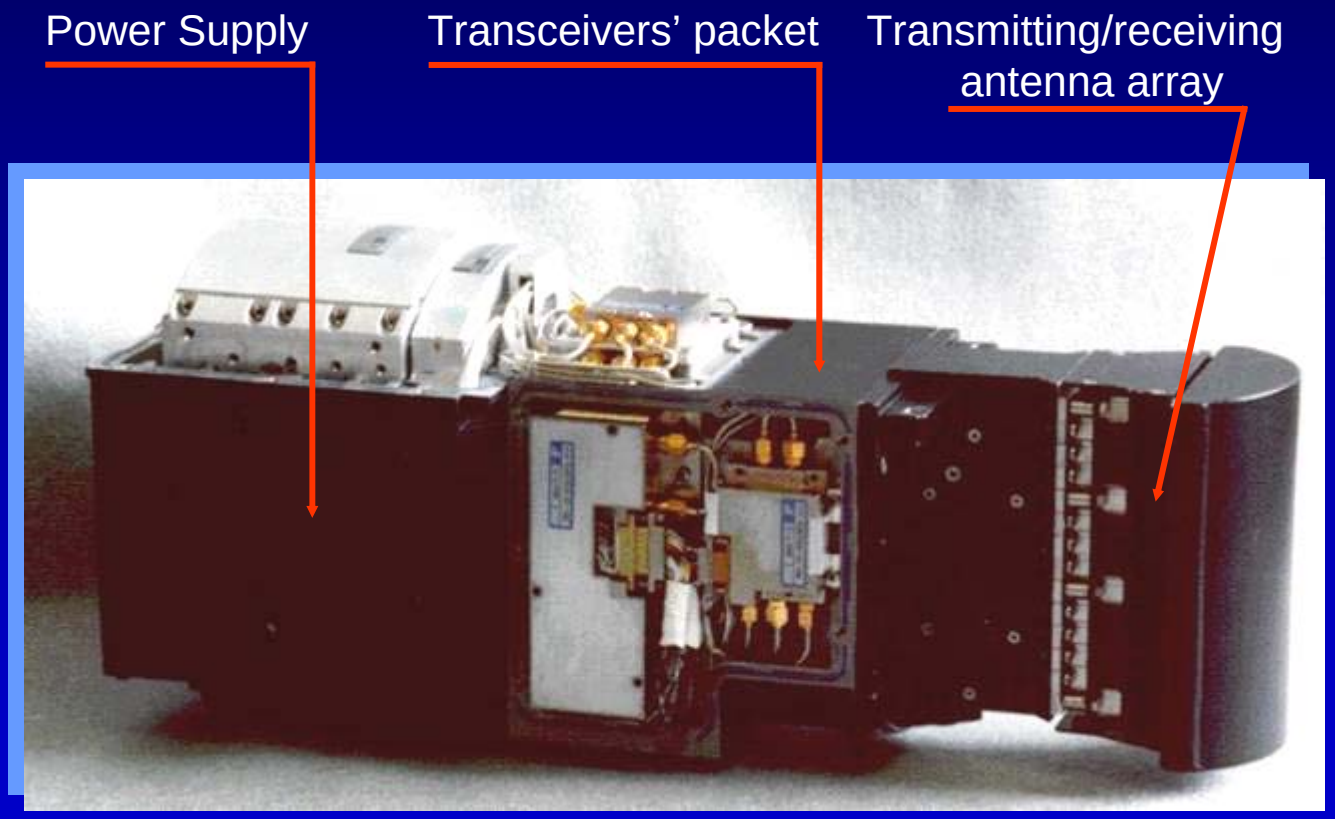
The Eurofighter EF-2000 “Typhoon”

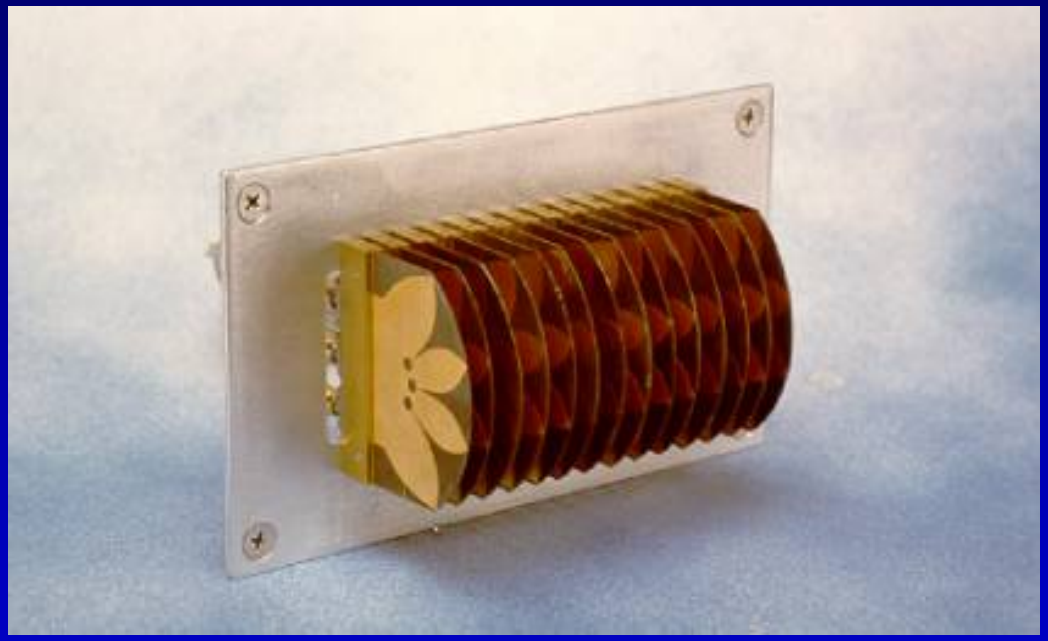
The EFA-DASS Antenna/Transceiver Unit

(main item of Elettronica's work-share)



THE ANTENNA ARRAY

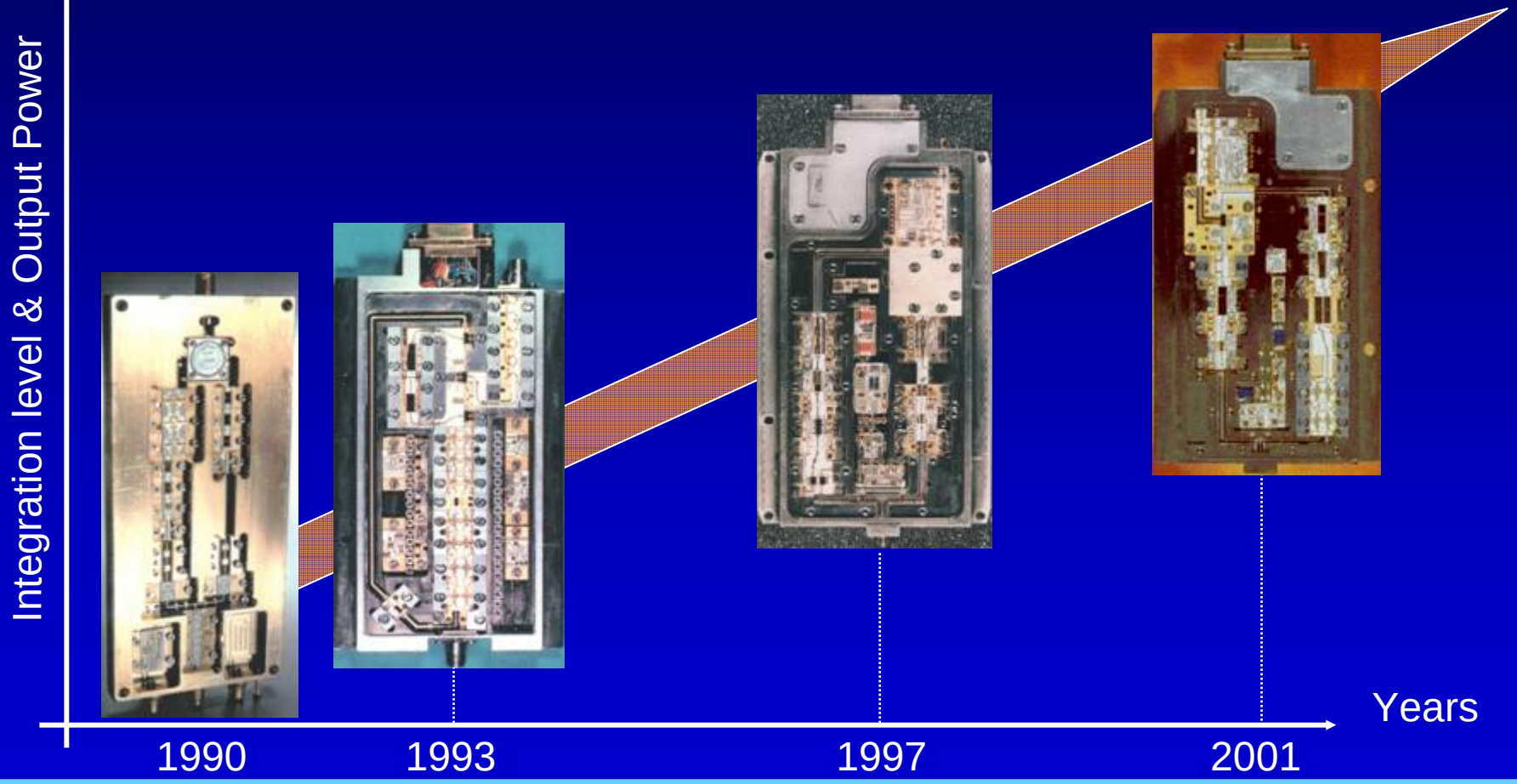
(linear array of multi-notch Vivaldi elements)



One of the various experimental antenna arrays made and extensively tested during system development

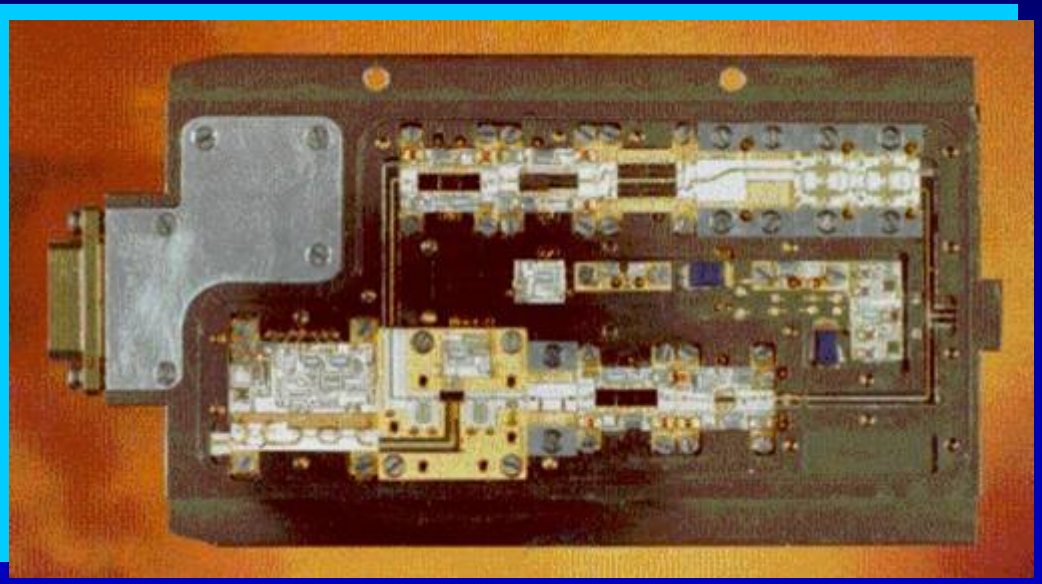
THE TRANSCEIVER MODULE

(From the feasibility demonstrator model
to the “pre-series” fully qualified units)



TRANSCEIVER MODULE

(The Pre-Production model)



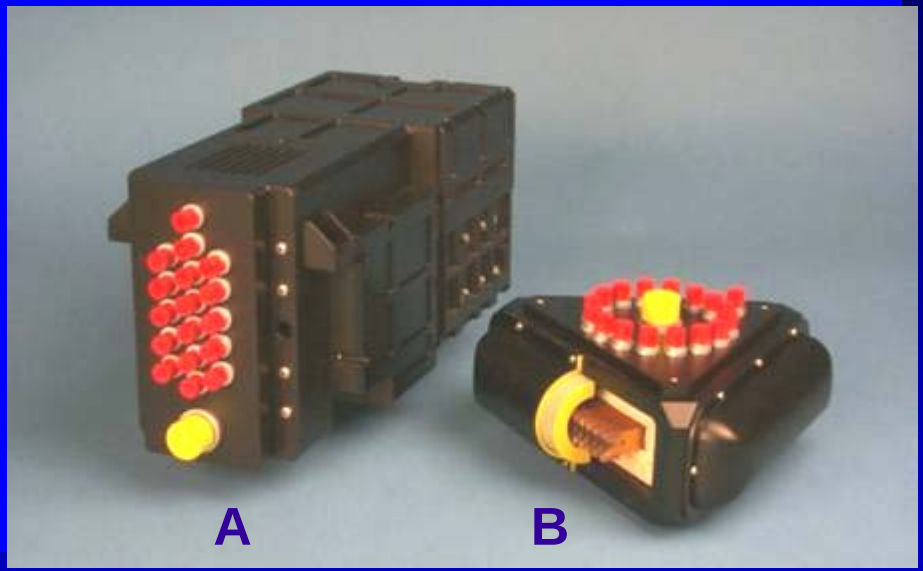
The transceiver module already produced in small series for the SS-ECM systems delivered during the pre-production phase

A new-generation airborne ECM system

- The new Elettronica Modular Airborne ECM System consists of:
  - A DRFM-based Techniques Generator, incorporating also the circuits for passive emitter tracking and the reaction-management computer
  - Active Phased-Array (APA) antennas, in number sufficient to cover all the sectors of interest, each composed of the appropriate number of elements to produce the required ERP (Effective Radiated Power)
- The Techniques Generator may optionally include the circuits required for implementation of Cross-Eye and of other ECM techniques requiring accurate amplitude, phase and polarisation control
- For each APA unit, two physical configurations are proposed:
  - the "Integral" one (as already seen for the EFA-DASS)
  - the "split" one, in which the packet of transceivers and the array of radiating elements are two separate units

An example of “split” SS-ECM structure: the HDJ-X ECM for Combat-Helicopters

- **Helo RF/SPJ needs:**
  - ***All-around protection***
  - ***Instantaneous response***
  - ***High ERP***
  - ***Lightweight & low power consumption units***
  - ***High availability (fault tolerant architecture)***

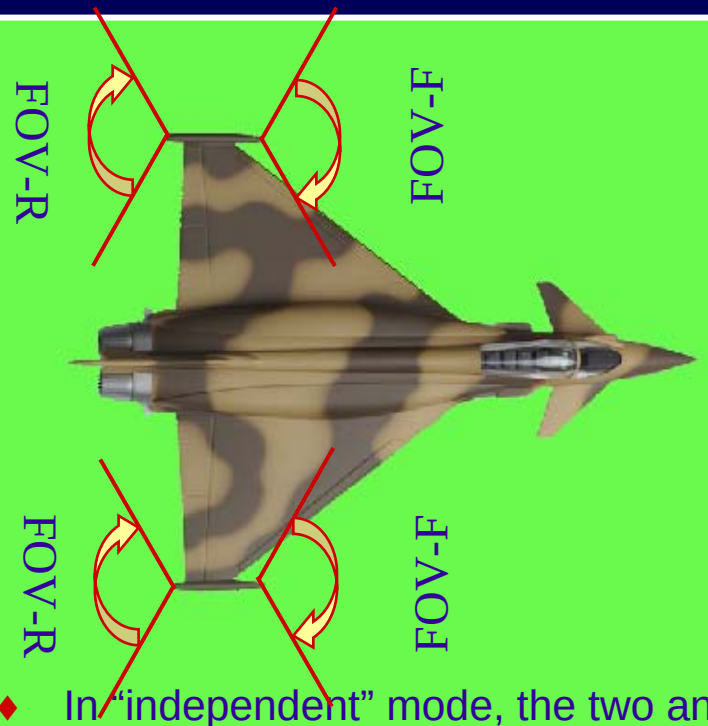


- **Solution: a Solid State ECM, composed of three “parts”:**
  - ***a compact DRFM-based Exciter (not shown),***
  - ***a single-unit transceiver assembly (A),***
  - ***a multiple-array antenna assembly (B)***

Operational Flexibility

- Implementation of Cross-Eye (X/E) requires two ECM antennas for each angular sector to be covered
- This need, which in a first instance could be seen as a negative cost-increase factor, gives the system (in addition to outstanding X/E capabilities against monopulse radars) also an excellent operational flexibility
- The two ECM antennas, in fact, may be used in various modes, either by co-operating in countering the same threats, or working independently one from the other, against different threats
- Due to system capabilities in terms of amplitude & phase control, "cooperative" modes are not limited to Cross-Eye, but include:
  - In-phase multi-threat jamming, with on-target ERP being 6 dB higher than the value provided by a single APA antenna
  - Other non-conventional ECM techniques, made possible in this system by its excellent signal control features

Operational Flexibility: an example



- In "independent" mode, the two antennas may provide fully independent reaction against different threats.
  As an example, one antenna may jam one threat with continuous noise, while the other reacts to other threats

- **In this aircraft, each pair of ECM antennas covering the same FOV (i.e. the Front or Rear sector) can be used in either independent or co-operative reaction mode, according to real-time mission needs**

- In co-operative mode, the system permits three alternative multi-threat capabilities:
  - In-phase combined-power ECM (with on-target power increase of 6 dB)
  - On-Target Phase-opposition ECM (for Cross-Eye angular deception)
  - Other "non-conventional" ECM techniques, (which however may require modified antenna elements)