



## M427 REVERSE MODE 5 RESPONDER

The M427 Reverse Mode 5 responder is designed to prevent air-to-ground fratricide based on Reverse Mode 5, where interrogations are directed to targets at a specified set of geographic coordinates or within some specified range of distance. Only transponders located within the area will reply.

### GENERAL DESCRIPTION

In order to use airborne transponders in this way, it is necessary to exchange the conventional interrogate and reply frequencies between them.

Thus the aircraft would interrogate the ground targets on the conventional transponder reply frequency, and the ground transponder would reply on the conventional interrogate frequency; the variant of transponder fitted to the ground platform is called Responder. Both air and ground systems use omni antenna to transmit pseudo interrogations and receive pseudo replies; no new antennas are therefore required on the aircraft.

The modified airborne transponder operates as a standard MkXIIA IFF, since the workload associated to the added M5R function is extremely low; therefore it is possible to avoid an additional box on the aircraft.

Two main modes of operation are provided:

- Don't Shoot Me (Short-ID)
- Situation Awareness (Full-ID)

### SHORT-ID

Using its IFF transponder, the aircraft broadcasts its intention (on 1090 MHz) to attack an area centered on a specific grid reference; the radius is related to the planned weapon danger zone. Friends in the impact area (equipped with Responders) answer (on 1030 MHz) with a "Don't shoot!" message, named Short-ID.

The only information associated to replies is the crypto validation and only a single reply is needed for a "Friend in Area" system declaration. A burst of interrogations will be used, to improve identification reliability.

## FULL-ID

The air-surface Situational Awareness (SA) mode operates as follows. The airborne platform sends interrogations to all the ground targets in a specified Area of Interest, using a reverse Mode 5 pseudo-interrogation (on 1090 MHz). All friendly surface targets in the selected area respond (on 1030MHz) with ID (basically Unit Reference Number, URN), position and validation using their Responder. The resulting information is used to update the local ground tactical picture held locally or distributed via Data Link to other users.

The aim of F-ID is to collect available data from all friends present in a designated area, then in this 'area of interest' the first to reply is not important, as it is in case of S-ID for attack purpose. Also in this case, to improve data availability, a burst of interrogations will be used.



## TECHNICAL SPECIFICATIONS

|                               |  |
|-------------------------------|--|
| Operating Mode                | Short-ID, Full-ID i.a.w<br>STANAG4722  |
| System Interface              | Ethernet: TCP/IP Protocol<br>Optional: RS422: Start/Stop<br>Protocol (up to 115.2Kb/s) |
| Sensitivity                   | -78dBm 1090 MHz  |
| Output Power                  | >50dBm 1030 MHz  |
| Reliability                   | 10,000 h GM 25°C   |
| Maintainability               | MTTR < 15m LRU level   |
| Testability                   | 95% fault isolation catalogue  |
| Environmental conditions      | MIL-STD-810F   |
| Operating temperature         | -40°C +71°C, -54°C after warm-up   |
| Electromagnetic compatibility | MIL-STD-461E   |
| Dimensions                    | 150(W) × 50(H) × 190(D) mm   |
| Weight                        | < 2Kg  |
| Consumption                   | < 10 W   |
| Input power                   | 28VDC i.a.w. MIL-STD-1275  |
| Cooling                       | No cooling required  |
| Mounting                      | Hard mounted   |