PANTHER EDR
VHF TACTICAL COMMUNICATIONS SYSTEM

THALES

The introduction of the new Panther EDR family of radios heralds a new era in Tactical VHF frequency hopping, encrypted radio communications. Panther EDR represents, without doubt, the most advanced system of its type available in the world today.

THE PANTHER EDR RANGE

PANTHER P
5 watt handheld & section radio

PANTHER V
5/20 watt manpack

PANTHER P
5 watt mini-manpack radio

PANTHER V
20 watt integrated vehicle radio

PANTHER V
50 watt vehicle/base station radio

PANTHER EDR

Enhanced Digital Radio
The ultimate voice and data solution

Operating in the 30 - 108MHz frequency range, Panther EDR offers unsurpassed communications performance in radios a fraction of the size and weight of the current generation of equipment.

Add to this, the multi-media capabilities and advanced user services standardised across the range of radios, Panther EDR truly represents the battlefield communication solution for the 21st Century.
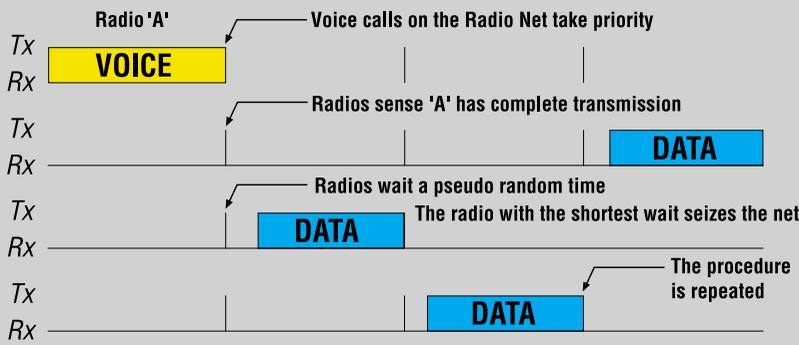

Racal was the original designer of the world's first EPM VHF tactical radio, perfecting the frequency hopping and synchronisation algorithms required to achieve protection against ECM threats (DF, Intercept and Jamming).

Panther   EDR

Carrier Sense Multiple Access

Radio 'A' → Voice calls on the Radio Net take priority

Tx / Rx — **VOICE**

Radios sense 'A' has complete transmission

Tx / Rx — **DATA**

Radios wait a pseudo random time
The radio with the shortest wait seizes the net

Tx / Rx — **DATA**

The procedure is repeated

Tx / Rx — **DATA**

Operational Applications

Panther EDR has been designed to support the operational requirements for multimedia information distribution in present and future battlefield scenarios. Racal's expertise in tactical communications has led to its involvement in the future radio developments of both the United Kingdom's BOWMAN project, and the United States DOD Force XXI program.

Voice and Data Traffic

Essential to multi-media radio networks is an on-air management system able to provide voice priority and maximum throughput of data at the same time. Panther EDR has been designed with built-in multiple radio access protocols allowing integrated voice and data throughput on a radio net.
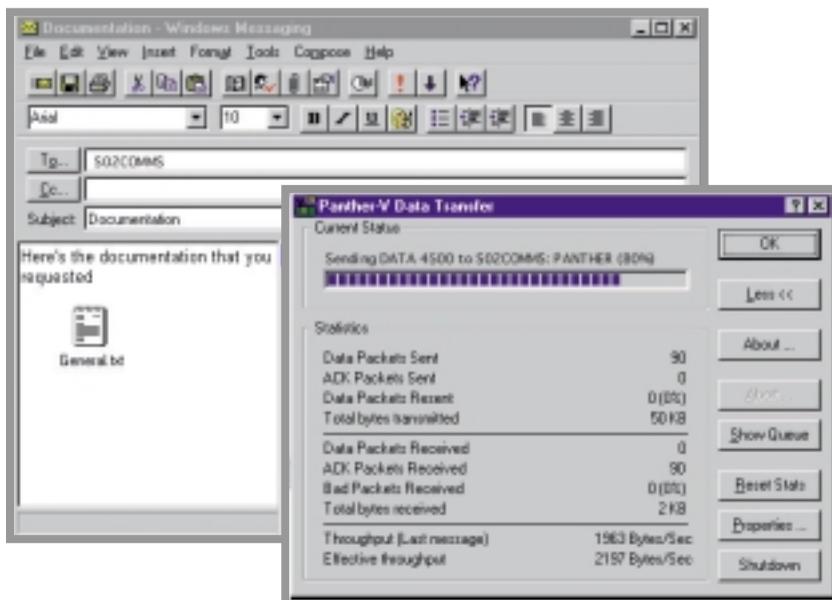
Carrier Sense Multiple Access (CSMA) automatically controls data flow across a radio network and is essential for managed mixed voice and data networks. The CSMA capability is central to providing integrated data solutions e.g. Packet data overlays.

Messaging

PantherMAIL is an optional software package that enables Email to be sent over the tactical VHF nets using standard Windows 95™ software running Microsoft Exchange, Windows Messaging, or Outlook 97. PantherMAIL supports Email with file attachments, providing a seamless Intranet solution and support for Internet messaging.

The Panther EDR digital radio system data capabilities have been optimised to support a Packet data overlay.

Panther EDR radios provide for the direct connection of PC based military or commercial data terminals, or military message terminals.
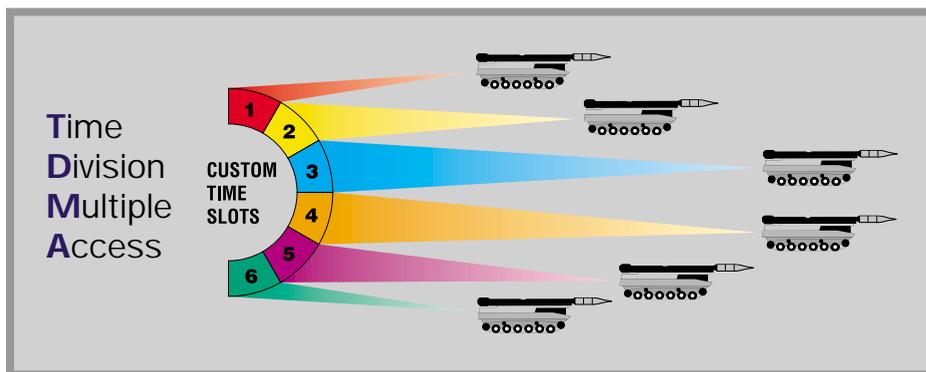
Time
**D**ivision
Multiple
Access

CUSTOM
TIME
SLOTS

Command, Control and Communications Information Systems (C³I)

The requirement for time critical data applications has, until now, only been possible through the addition of expensive external TDMA (Time Division Multiple Access) modems with comprehensive error protection capabilities. The new Panther EDR's DSP based architecture is designed for custom TDMA applications to be implemented in software and downloaded directly into the radio.

Situation Awareness (GPS)

Panther EDR provides the option for seamless transfer of GPS position information from the externally connected GPS receiver (Internal option available for Panther V) Position information is available on request (polled) or sent with each transmission.
By embedding the position co-ordinates within the encrypted on-air link protocol the information is completely protected from enemy intercept, and additionally is transparent to the radio's voice and data transmissions.
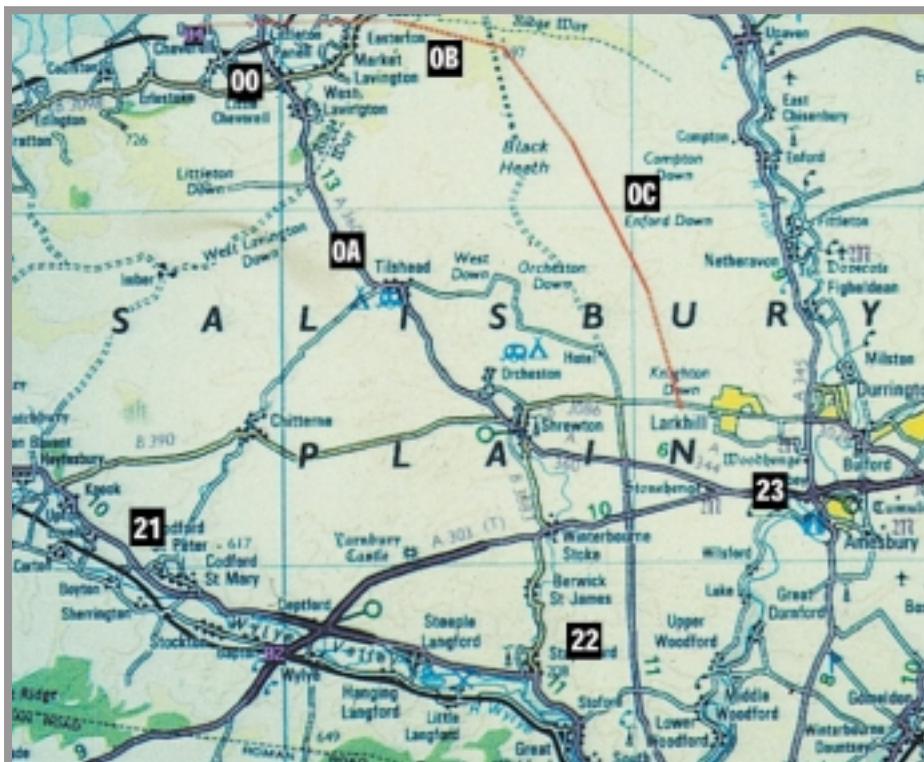
CNR Logistics Management

Panther EDR provides
- Comprehensive BIT
- Low MTTR
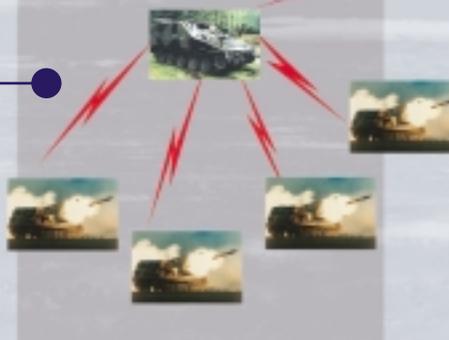- High MTBF
- Electronic Logistics Record (ELR)

Headquarters

Interoperability

High Capacity Data Networks

Panther EDR provides
- Fixed Frequency Interoperability
- Fixed Frequency Hailing
- Channel Scanning
- Two Frequency Simplex
- Combat Net Radio Interface (CNRI)
- Baseband Gateway

Logistic Management
- Logistics tracking & Management
- High availability
- Comprehensive Repair Philosophy

Weapon System Data
- Time Critical Data Transmission
- Simultaneous Data Transmission Channels

CNR EW/Weapon Systems Integration

Panther EDR provides
- Time Division Multiple Access (TDMA)
- Multiple Simultaneous data Access (MSA)

The Key To
The Digital Battlefield

Optimised Communications with
Multimedia Capabilities

Local Area System

Panther EDR provides
- Tactical Inter-net Packet Data Overlay
- Mixed Voice and Data Networks (CSMA)
- Multiple Simultaneous data Access (MSA)
- Slow Scan Video
- Position Information Transmission & Management (GPS)
- Frequency Hopping Secure Voice Communications
- Multiple Simultaneous voice Access (MSA)
- Over-The-Air Re-keying (OTAR)
- Free Channel Search (FCS)
- Integral Co-site Capability
- 2 & 3 way Re-broadcast
- Authentication & Identification
- Remote Control

Key:
Panther EDR

Operational Requirements

- Seamless Inter-net messaging

- Video & picture transmission

- Situation awareness (GPS)

- All informed Intra-net voice communications

- Point-to-point voice communications

- Communications information & key distribution

- Protection against jamming

- Inter-net re-broadcast

- Compact vehicle solutions

- Lightweight manportable solutions

- Net user integrity

- Remote control capability

Interoperability Requirements

- Interoperability with in-Service Radio Systems

- Interoperability with Government organisations

- Interface to High Capacity Data Networks (CNRI)

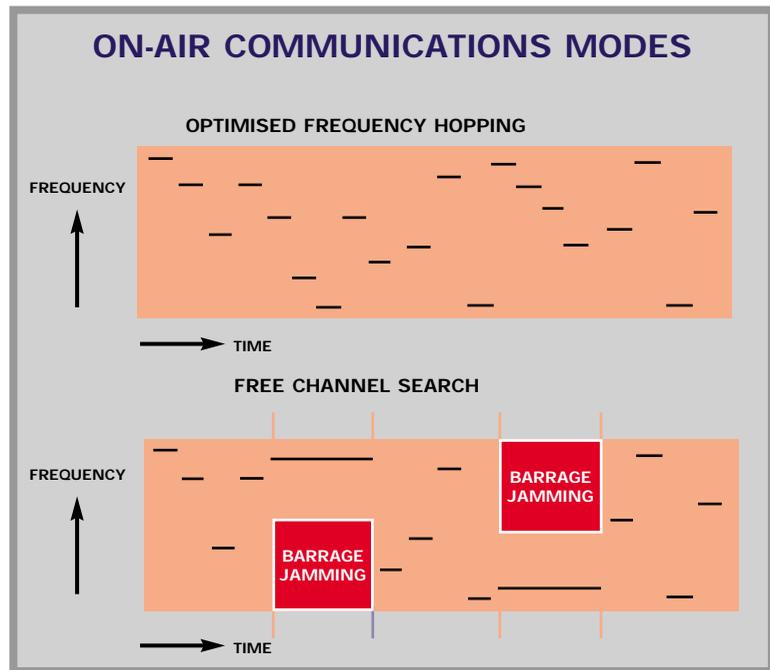- Baseband Gateways

Panther EDR

Optimised Electronic Protection Methods (EPM)

Initial and late entry synchronisation, of a Panther EDR net, is fully automatic and takes place whilst frequency hopping, with no recourse to fixed frequency. Communication is further strengthened and simplified by there being no reliance on a net Master station, and no requirement for time of day information to be entered externally by the operator, or from a GPS receiver.

A robust synchronisation system and the provision of co-site filtering built into the basic transceiver avoids the problems of multi-path propagation associated with frequency hopping systems and allows compact and cost effective low and high power vehicle stations to be configured.

Panther EDR also incorporates a comprehensive Free Channel Search capability (FCS) that selects the optimum working fixed frequency in the event of broadband jamming, and provides automated transition and inter-operation between FH, FCS and fixed frequency (FF) modes.

ON-AIR COMMUNICATIONS MODES

OPTIMISED FREQUENCY HOPPING

FREE CHANNEL SEARCH

MULTIPLE SIMULTANEOUS ACCESS OPERATIONAL NET

Broadcast Net: Red   **MSA Net 1: Blue**   **MSA Net 2: Green**

Multiple Simultaneous Access

Panther EDR has the capability of supporting simultaneous calls on 50 pairs, therefore 100 stations, within each radio net, whilst allowing the all informed net members to communicate without disruption. This unique capability is carried out whilst frequency hopping, without recourse to a fixed frequency transmission.

Video Over Radio

The Panther EDR family is capable of passing compressed video or image data over a secure EPM channel. The RAICATS technology demonstrator provides for error resilient video to be passed over a 16kbps radio link. Powerful compression and error handling capabilities negate the need for a high over-the-air data rate radio with its resulting limited range performance.

Received images can be displayed and stored using PC based applications.

Digital High Level Encryption Solutions

The Panther EDR radios incorporate a high level digital encryption device for use in all voice and data modes.
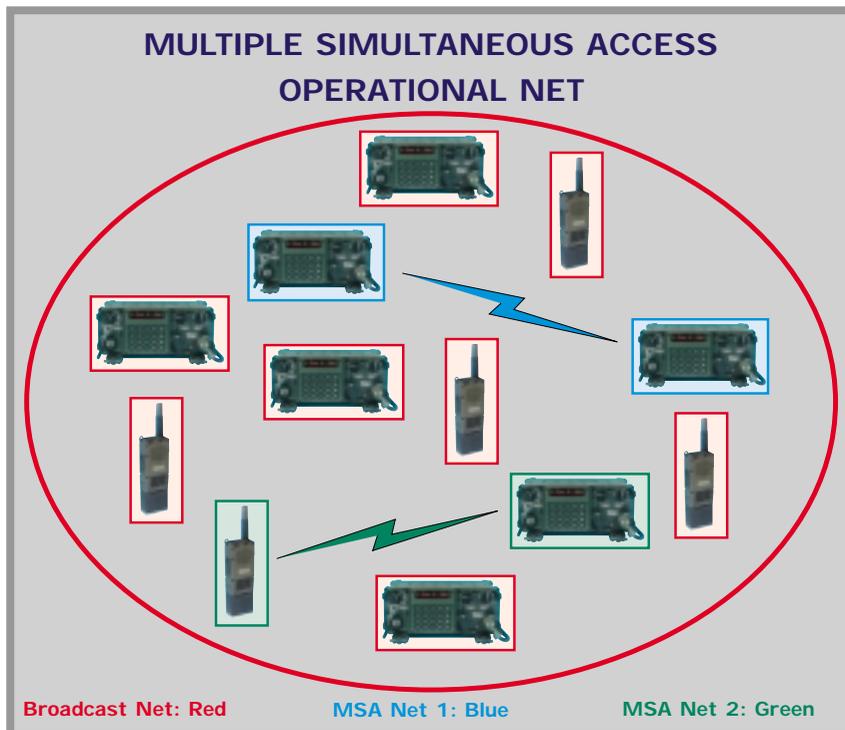
Integrated Advanced Data Modem

Panther EDR's on-air data capabilities have been significantly enhanced, providing the world's first demonstrable multi-media radio family:-

- Comprehensive 8 level Reed Solomon Forward Error Correction (FEC) with binary block coding

- FEC supported over-the-air data rates to 9.6 kbps

- Integral Carrier Sense Multiple Access (CSMA) capability to support packet data, and mixed voice/data applications

- Time Division Multiple Access (TDMA) support for time critical data applications
  - Weapon systems / EW
  - Tailor made user specific software/integration support for various weapons systems

- Simultaneous multiple net data calls

Interfaces have been added and enhanced to support the new on-air data capabilities, and custom platform requirements:-

- Dual RS232 interface - data rates to 115kbps with low control, synchronous or asynchronous operation

- Dedicated external GPS interface

- Internal GPS option for Panther V

- Patriot data mode

- M1A2 (IVIS) interface

- BCC 600 series and VIS harness interface

Advanced User Services

The Panther EDR radios provide unparalleled functionality whilst maintaining the simplicity of use renowned in our radios:-

- **Net Names:** The radios can be user configured to display a net name for each of the 8 pre-programmed channels. Alternatively the radios can be set to either display the channel number or the hailing frequency.

- **Operator Authentication:** To confirm the net's integrity, the net master or any other net member has the option to request any radio in the net for an authentication code from its operator. The 4 digit operator code is selected and set as part of the radio's programming before deployment.

- **Transmitter Identification:** Receiving radios in a net can be set to display the unique identity code of the transmitting radio.

Management Systems

- **Radio Programming:** Configuration of the Panther EDR's modes and facilities is carried out using the easy to use Windows 95™ software utility. Radios can either be filled directly from the PC or via the BCC706 Fill Gun.
The Fill Gun, designed to military specifications, can store up to 4 complete radio net configurations.

- **Over-The-Air Re-keying (OTAR)**
The built in OTAR facility provides the capability to re-programme a radio's key and frequency information over a hopping, secure radio link.

Net integrity is maintained using the Authentication facility to confirm receipt by the receiving radio, and by employing FEC on all transmitted data.

A direct radio to radio OTAR facility is provided for simple key and frequency distribution. Alternatively a PC based OTAR facility is supported by the Panther EDR radios to enable a Management Centre, in a radio network, to re-programme the radio net centrally.

- **Multi Radio Local and Remote Control Capability:** Panther EDR supports a unique multi radio control option, from a PC based Windows 95™ application. Up to 4 radios may be controlled from a directly connected PC. The application also supports the remote control of net radios over-the-air, for re-configuration of unmanned repeaters or C3I data radios.

- **Encryption Key Generation:** Thales can provide, as an option, a COMSEC/TRANSEC key generation package for use on a PC.

Electronic Log Record

The Panther EDR radios offer a unique facility which greatly assists the management and support of the equipment in the field. Each radio maintains a comprehensive log of the equipment's current status in non volatile memory including:-

• Equipment serial and type number

• Definable fields for user names

• Automatically updated record of the radio's transmit, receive and standby times for calculating field MTBFs and radio duty cycles

• Automatically updated record of the previous 50 BIT codes, with date and time stamp, for easy fault diagnosis in the workshop

The information can be simply extracted by connecting the radio to a PC running Thales' Windows based Log Reader application.

Software based radio Architecture

The use of the latest powerful DSP based technologies has enabled the Panther EDR's functionality to be the most comprehensive available, and standardised throughout the range of radios. This software based functionality further provides for additional capabilities, or customised options, to be downloaded, using a PC based Windows™ application, via the radio's external data port.

Customer tailored solutions (Options)

• Multi Language support
  The Panther EDR radios have been designed with alphanumeric displays to support customer specific language options in all display modes.
  The additional language can be loaded through the radio's external data port.

• Tailored encryption solutions.
  Thales' in-house encryption capability, developed over the last 20 years, can provide the optimum solution to meet individual customer requirements.
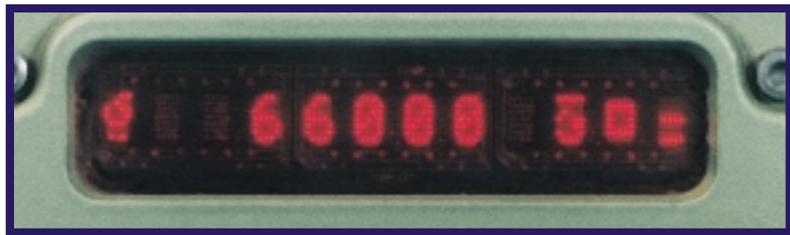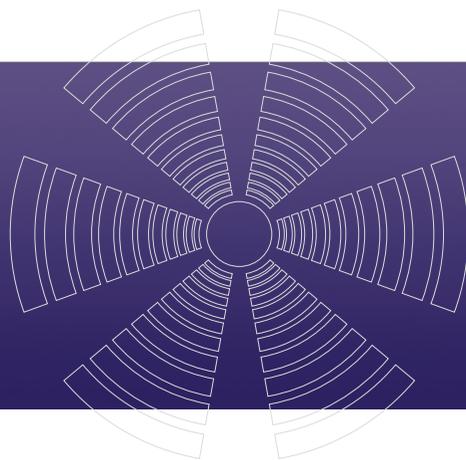
• Tailored functionality
  Additional modes or functions can be provided to meet specific requirements such as TDMA Fire Control Systems. New capabilities are downloaded in software though the data ports on the radios.

System ancillary equipments

• Antennas

• Audio

• Batteries and chargers

• Manpack frames and carrying pouches

• Remote Control Units

• Fill Gun

• Mounting hardware

THALES