



# VECTOR

SECURE COMMUNICATIONS SYSTEM



VECTOR – the new “future-proof” radio system from Thales continues to address the demands of the specialist user and is founded on the company’s strong track record and market knowledge. Typical applications include special operations, VIP protection and covert surveillance for customs, drug enforcement, border operations, intelligence services and other professional surveillance applications.



*Special Forces Operations*

VECTOR (PRM5202A) is an extremely compact radio which, although specifically designed for covert applications, may be used in an overt role in conjunction with the appropriate ancillaries.

The radio is rugged and splashproof and is intended primarily for use by surveillance operators (Police, Customs and Excise, Drugs Squad, Government Agencies etc.).

The radio provides continuous operation over the 380-430MHz band and supports TETRA DMO & TMO operation. RF Power output is 1W when battery powered, and 3W when mounted in a vehicle.

End-to-end encryption is provided by a removable module. This module is protected by a comprehensive anti-tamper system, which erases stored keys and algorithms if attempts are made to extract them. Traffic keys may be filled via the infrastructure using Over-the-Air Key-Loading (OTAR) and remote control of many programmable features is possible (OTAC).

The radio may be operated in clear or Air Interface Encryption only modes to enable communications with non-secure TETRA users.

Both secure and non-secure Peripheral Equipment Interfaces (PEI) are provided for connection of external serial data devices.



*VIP Protection*

VECTOR has no external operator controls (except key zeroise). A range of ancillaries allows the radio to meet both covert and overt roles.

Discreet operation is provided by a Radio Control Unit (RCU), which is designed to fit unobtrusively in the palm of the hand and can be operated by touch alone.

For overt operation, the Control Loudspeaker Unit (CLU) provides control facilities integrated with a loudspeaker/ microphone in a convenient clip-on unit.

The mobile radio allows for discreet installations in cars and motorcycles.

The radio control software is contained in FLASH-programmable memory, which can be readily updated to utilise future TETRA system enhancements.

The main case contains the radio and cryptographic components, packaged in a compact, slim, lightweight unit which is ideal for carrying unobtrusively about the person.

Consisting of only two pcbs mounted in a simple two-part clam-shell case, access for repair is extremely easy. The casework design is light and strong, with a minimum number of fixings. The radio weighs less than 300 grams and has a volume less than 120 cm<sup>3</sup>.



*Airport Hijack Surveillance*



*Customs Surveillance Operations*

Thales, the UK's number one choice in secure communications, has introduced VECTOR, the world's smallest and lightest secure TETRA radio. VECTOR provides a complete solution for the mobile surveillance user, in addition to offering operation over fixed TETRA networks.

The radio provides both non-secure and end-to-end encrypted TETRA Direct Mode Operation (DMO) and Trunked Mode Operation (TMO) in a single covert package.

The design is based around a FLASH-loaded, general purpose programmable digital radio architecture, together with a wideband linear transceiver operating in the 380-430MHz band. This architecture will allow the radio to be tailored to meet specific customer requirements such as dual-mode operation (e.g. inter-operability modes for use with other digital standards such as APC025 or TETRAPOL), or range-enhanced DMO services.

The inclusion of an integral, but removable encryption module enables Thales to provide a wide variety of encryption solutions up to UK Enhanced Grade, including solutions tailored to meet specific national or specific agency needs.

VECTOR is set to continue Thales success in the professional surveillance market, providing users with the flexibility to select the preferred digital radio standard, safeguarded by Thales early investment in future proof surveillance radio technology.

#### **VECTOR MAIN FEATURES**

- A truly covert, secure TETRA radio
- A complete solution for Covert/Overt, Personal/Vehicle roles
- Flexible encryption solutions up to UK enhanced Grade (Voice & Data)
- Full Tx/Rx coverage over the entire 380-430MHz band
- 1W RF power output (TETRA Class 4) in Personal Role
- 3W RF power output (TETRA Class 3) in Vehicle Role
- Secure OTAR/OTAC functions (keyfill, stun, etc.)
- Integral DMO repeater functions in all roles
- FLASH programmable software for easy upgrade
- Rugged construction.



# VECTOR

## SECURE COMMUNICATIONS SYSTEM

■ Overt Surveillance ■ Covert Surveillance ■ Overt Cars & Motorcycles ■





Thales secure communications systems are in service in over 35 countries worldwide with military, police, special forces and other law enforcement agencies.

### COVERT OPERATIONS

Vector is designed for covert operations. In this role, the radio is controlled by a Radio Control Unit (RCU) based on the proven Cougar design. The RCU is small and designed to fit into the palm of the hand.

The RCU provides control of:

- Power ON/OFF
- Operating Talkgroup (channel)
- Audio Volume
- Normal voice transmission (PTT)
- Signal Tone Burst Transmission
- Clear/Secure Operating Mode

The RCU has no visual displays and is designed to be operated by touch alone. It is linked to the radio by a single cable carrying RS 232 control data and power.

The standard covert audio ancillaries are an Inductive Loop/ Microphone unit and an Inductively Coupled Earpiece.

It also features a new covert antenna designed for optimum frequency/range output.

### OVERT OPERATIONS

For overt use, the Control Loudspeaker Unit (CLU) is used to control the radio. The radio can be worn in a belt pouch with the CLU clipped to the shoulder. A short rigid antenna is used.

The CLU provides the same functionality as the RCU, but in addition provides a keyboard and display for status information and access to the full range of Trunked Mode Services.

### MOBILE OPERATIONS

The VECTOR mobile radio (VRM 5208) and CLU form the basis of a covert car or motorcycle installation.

The mobile radio is mounted in an appropriate location depending on the particular vehicle to be installed. For a car, this could typically be underneath the front passenger seat, and in a motorcycle this is generally underneath the rider's seat.

The power supply for the installation is fed to the radio direct from the vehicle's battery. The supply is filtered and conditioned before being passed to the radio.

The vehicle's external antenna is connected directly to the radio's antenna connector by a suitable length of coaxial cable.

Ancillaries are connected directly to the mobile radio. These consist of covert microphones, loudspeaker, inductive loops, push-to-talk (PTT) switches, push-to-tone switches and the CLU, which provides the same facilities as in the overt personal role.



## TECHNICAL SPECIFICATION

### GENERAL

**Frequency Range:** 380-430MHz

**RF Carrier spacing:** 25kHz, in 6.25kHz steps

**Power Output (with standard or extended life battery):** +30dBm Average (TETRA Class 4)

**Mobile Power Output:** +35dBm Average (TETRA Class 3)

**Radio Channel:** Half Duplex (audio Full Duplex to PSTN)

**Operating Modes:** TETRA TMO, TETRA DMO

**Air Interface Encryption:** TETRA Air Interface encryption using TEA 2

**End-to-end Encryption:** Internal encryption module can support a variety of encryption algorithms, including certified UK Enhanced Grade

**ETSI Specifications:** ETS 300 392-2 (V+D) and ETS 300 396-2 (DMO)

**EMC directive 89/336/EEC:** by compliance with EN 300 827 v1.1.1 (1998-03)

**RTTE Directive 1999/5/EC:** by compliance with BS EN 60950: 1992 (Electrical Safety), and ETS 300 394-1 March 1996 (Effective use of spectrum)

**Automotive Directive:** 95/54/EC

**Specific Absorption Rates:** by compliance with pre-standard ENV 50166

### Battery (Standard Life):

Rechargeable Li-ion, 7.2V nominal, >6 hours life in 1:1:18 duty cycle

### Battery (Extended Life):

Rechargeable Li-ion, 7.2V nominal, >9 hours life in 1:1:18 duty cycle

**Weight:** 300g (excluding battery)

**Dimensions:** 65 x 105 x 17mm (excluding battery)

**Temperature:** -20°C to +55°C (-30° to +70°C non-operational)

**Sealing:** IEC529 IP54

**Bump:** IEC 68-2-29 Test Eb (25g, 1000 bumps)

**Vibration:** IEC 68-2-6 Test Fc (Sinusoidal 10-55Hz, Max 2g, 90 mins at each resonance)

**Humidity:** IEC 68-2-56 Test Cb (93% RH, +40°C, 96 hours)

### EXTERNAL CONNECTIONS

**Antenna:** 50 ohm SMA coaxial socket

**Audio 1:** 7 way Fischer socket

**Audio 2:** 7 way Fischer socket

**Peripheral Equipment Interface:** 5 way Fischer socket

### CONTROLS AND INDICATORS

**Radio:** The only control on the radio is the Crypto Zeroise button

**Control Loudspeaker Unit (CLU):** LCD Dot Matrix display 47X25mm, 80X32 dots. 4 menu selection buttons, numeric keypad, speaker + button, speaker - button and Push-To-Talk

### Radio Control Unit (RCU):

10 position rotary switch: ON-OFF/Talk Group/Function Select Step Up & Down push-buttons Push-To-Talk button - initiates normal transmission of microphone signal Single tone push-button - initiates transmission of an audible signalling tone, replacing the microphone signal

### ANCILLARIES

**Antennas:** A range of Covert and Overt antennas is available, depending on operating frequency and role.

**Charger:** Battery Charger for above batteries

**Control Units:** Control Loudspeaker Unit (CLU) (Overt) incorporating microphone Radio Control Unit (RCU) (Covert)

**Earpiece:** In-ear inductively-coupled covert earpiece, Ear-hanger earpiece (connects to CLU)

**Harness and Pouches:** Shoulder Harness, Leg Pouch, Waist Pouch & Vest Harnesses

**Microphones:** Covert Microphone incorporating inductive loop

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Thales reserves the right to vary in detail from the description and specification in this publication. Publication No: 7317-2/0801/1581D.