

# ARCHIVED REPORT

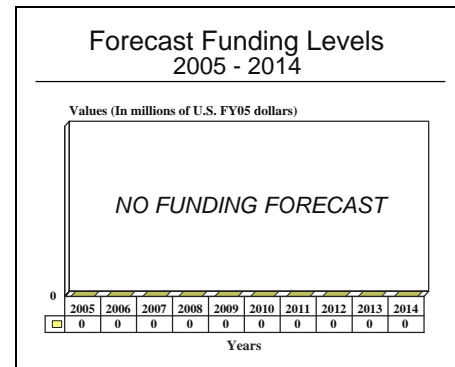
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## Ptarmigan/MRS - Archived 7/2006

### Outlook

- Only recent funding made public is for five-year support contract due to be complete in 2008
- Barring any future activity this report will be archived next year, July 2006



### Orientation

**Description.** Ptarmigan is a second-generation battle-field automated tactical communications system.

#### Sponsor

U.K. Ministry of Defence  
Royal Signals and Radar Establishment  
British Army School of Signals

**Licensee.** Licenses have been granted to Switzerland and New Zealand for the production of at least some Multi-Role System (MRS) components.

**Status.** In service, undergoing upgrade and modernization program.

**Total Produced.** An estimated total of 3,615 installations of the Ptarmigan have been sold to the British Armed Forces and various export customers.

**Application.** Ptarmigan was designed to provide operationally flexible, secure military communications over a wide geographic area by means of a mobile trunk radio network. The system replaced the British Army's Bruin system, which had been previously deployed in West Germany.

**Price Range.** A minimum configuration system based on a single node is estimated to cost \$650,000.

### Contractors

BAE Systems plc, <http://www.baesystems.com>, 6 Carlton Gardens, London, SW1Y 5AD United Kingdom, Tel: + 44 1252 373232, Fax: + 44 1252 383991, Prime

### Technical Data

**Design Features.** The system interfaces and is interoperable with strategic, tactical, NATO, and civil systems, as well as with combat net radio. Typically, 20 trunk switches form a corps deployment, while major access switches cater to concentrations of static subscribers such as corps and divisional headquarters. Each individual trunk node can contain up to 40 men and 16 military vehicles. A supergroup (comprised of three time-multiplexed 32-channel traffic groups) and a

further service group are employed to support operation between a trunk switch and each of its radio relay installations. Ptarmigan thus has duplex multichannel links at 256 kb/s, 512 kb/s, and 2,048 Mb/s, which may be transmitted by radio or cable. An HF quad cable is used to carry multichannel signals over distances of 2 kilometers at 256 and 512 kb/s transmission rates and over 1 kilometer at 2.048 Mb/s using HDB3 line encoding.

**Main Components.** The main components of the Ptarmigan system are the following:

Switch and Facilities Control Installation. The Switch and Facilities Control Installation is housed in a CB309 aluminum container mounted on a 4-ton flatbed truck. The unit is ruggedized and designed for mobile use in combat areas.

Single-Channel Radio Access (SCRA). This subsystem provides secure communications with full Ptarmigan functional capabilities to mobile and isolated subscribers. Two types of vehicular configuration are used in the implementation of the subsystem: an SCRA central configuration (which functions as a radio access point to a trunk node for a number of subscribers), and an SCRA terminal configuration.

Combat Net Radio Interface (CNRI). The CNRI is a compact self-contained unit that provides a single voice channel interface between a terminal in the trunk communication system and any one of a number of combat net radio sets.

SHF Radio Relay Equipment. The SHF radio relay equipment provides multichannel digital duplex radio and EOW transmission links in the 4.4 to 5.0 GHz band over line-of-sight paths at distances up to 30 kilometers. This system is comprised of a terminal unit, antenna feeder cable, and parabolic antennas for both short- and long-range operation.

Electronic Military Message Terminal. The CGT-1148 is a high-speed electronic hard-copy message terminal. The inherent flexibility of this unit permits the terminal to be used as a standard teleprinter with a sophisticated

solid-state compose and edit facility, or as an intelligent computer terminal.

Transmission Alarm and Control Equipment (TACE). The TACE is installed in the radio relay installation container and functions as a centralized traffic and EOW operating position when it is used in Ptarmigan trunk, access, or relay functions. TACE supplies six independent patching facilities – mixtures of UHF radio, SHF radio, and HF quad cable connections at both standard group and supergroup rates, jointly with associated EOW.

Local Distribution Access Multiplexer. The Local Distribution Access Multiplexer supplies the facilities needed to connect groups of up to 31 static digital subscriber terminals incorporating telephone, telegraph, facsimile, and data services to the Ptarmigan communications network.

Static Subset. The Static Subset provides Ptarmigan users with a microprocessor-controlled, push-button digital telephone terminal for voice communication with other fixed or mobile subscribers. When used in conjunction with a data adapter unit, the subset also supplies system access for telegraph, synchronous and asynchronous data, and facsimile traffic.

**Operational Characteristics.** The Ptarmigan system is fully digitized. Encrypted communications are provided for voice, telegraph, facsimile, and data calls. The low individual channel 16 kb/s transmission rate conserves bandwidth utilization and increases link capacity. Network redundancy and automatic alternate routing enable Ptarmigan to suffer considerable damage without loss of essential communication capabilities.

## Variants/Upgrades

GP-TAP. The General Purpose – Trunk Access Port (GP-TAP) creates a standard interface between Ptarmigan and other U.K./NATO communications. The system allows digital interoperability, as well as allowing small, remotely deployed detachments to connect directly to a main Ptarmigan network. GP-TAP was integrated into the concurrent MAPPS program in order to take advantage of cost and time savings.

MAPPS. The Mobile Access to Ptarmigan Packet Switching (MAPPS) system enhances Ptarmigan's overall operational capabilities and flexibility. MAPPS uses the Multi-Role System (MRS) technologies as its base. MAPPS also uses a combined circuit and packet switch that is fitted to the Single Channel Radio Access (SCRA) system currently installed in higher

headquarters vehicles. In 1998, MAPPS was extended to include the GP-TAP software enhancements. These reportedly improve interoperability between communications systems.

Multi-Role System. Using the experience gained during development of the Ptarmigan system, Plessey (now BAE Systems) developed a third-generation version designated the Multi-Role System (MRS). MRS is a family of digital circuit, message, and packet switches that uses a modular structure throughout. This system architecture/implementation provides a very high level of adaptability and flexibility.

## Program Review

**Background.** In August 1990, Ptarmigan upgraded software was successfully field-tested and all operational software was upgraded to the new standard. This involved the simultaneous reprogramming of the entire Ptarmigan network in conjunction with associated hardware changes. This upgraded standard was deployed to Saudi Arabia with the 7th Armored Brigade as part of Operation Granby, the British counterpart of Desert Shield. It was subsequently expanded to full division standard status when the British 1st Armored Division was formed. Subsequent combat operations in the Persian Gulf War in 1991 confirmed the success of the Ptarmigan system.

Interoperability with BATES (Battlefield Artillery Target Engagement System) was achieved in late 1992. Additional small contracts for Ptarmigan maintenance and in-service support continued to be placed throughout the 1990s. Typical of such contracts is the December 1993 award to Siemens-Plessey Electronics Systems (now BAE Systems) for modifications to the Ptarmigan system. Valued at \$33 million, the contract provided for improvements to the flexibility of the Ptarmigan system and permitted longer-range communications via satellite links.

Ptarmigan underwent a number of additional improvements in its capabilities in 1998. A new 16-group trunk switch was accepted at this time. This switch was part of a trunk switching center that provided secure voice, data node, and subscriber access to Ptarmigan.

Follow-on improvement contracts also featured added capabilities such as tripling of terminals available and enhancing interoperability with other, similar NATO systems. Ptarmigan was also equipped to interact with other British systems, including Vixen and the Air Defence Command Information Systems (ADCIS).

Two contracts were awarded to BAE Systems in June 1998 to enhance and support Ptarmigan through at least 2003. The first award, for \$29.2 million, was to provide for technical and systems support. The second award

went to enhance the operational capabilities of Ptarmigan by providing a Mobile Access to Ptarmigan Packet Switching (MAPPS).

In early 1999, the British Army awarded a contract to British Aerospace (now BAE Systems) for the development of a system designated the General Purpose – Trunk Access Port (GP-TAP). This system would provide a standard interface between Ptarmigan and other U.K./NATO communications systems. (The GP-TAP came on line in 2002.)

It was announced in October 2000 that Motorola and BAE Systems had teamed to work on the design study of the U.K. MoD's FALCON II Communications system (Ptarmigan's replacement), which was planned to provide flexible, secure wide-area communications.

In January 2002, the U.K. MoD tasked BAE Systems with the development of improved generators and air-conditioning units for the Secondary Access Node – Air Portable system, the SAN (AP) Ptarmigan variant. The effort was designed to enhance the system's power and climatic control performance. This was followed in February 2002 with the announcement that the company had been chosen by the MoD to come up with further concept studies for Project FALCON.

In May 2002, the U.K. MoD accepted the GP-TAP enhancement for incorporation into deployed Ptarmigan field units.

BAE Systems in January 2003 announced that it had completed the delivery of 30 Ptarmigan upgrades under the MAPPS program.

The MoD awarded BAE Systems another contract in July 2003 to provide technical support for Ptarmigan and the MAPPS system. The contract would cover various system support activities for the next five years. To enable the diagnosis and repair of any system problems that might arise during the rest of Ptarmigan's life-cycle, the company was also expected to establish a test and reference network.

## Funding

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Total funding of the Ptarmigan system through January 2001 is estimated to have amounted to \$3.7 billion. The program, however, has not appeared in British public source defense budget documents since that time.

## Recent Contracts

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The U.K. MoD in July 2003 awarded BAE Systems a five-year technical support contract. The amount of the contract was not provided.

## Timetable

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1985	Ptarmigan enters full-scale service
Oct	1987	Marconi awarded encryption order
Mar	1988	Plessey awarded improvement development contract
Jun	1988	System Level Modification B acceptance trials
Nov	1988	Plessey awarded Post Design services contract
Jan	1991	First combat use of Ptarmigan
Dec	1994	One-year study for digital gateway to permit systems interoperation
Mar	1996	Development of software/hardware improvements complete, program moves into testing phase
May	1997	Six-month project definition contract for GP-TAP digital interface to Ptarmigan
Mid	1997	Ptarmigan deployed by British U.N. forces in Bosnia
Dec	1997	Three-week British system trial completed; acceptance of modifications
Jan	1999	GP-TAP contract awarded to BAE Systems
Dec	2001	GP-TAP enhancement complete
Jun	2002	Operational capability enhancement with MAPPS complete
	2008	Expected end of July 2003 support contract work by BAE Systems
	2011	Planned U.K. out-of-service date

## Worldwide Distribution

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**U.K.** The Ptarmigan system is currently fielded only by the British Army.

Customers for the MRS are more numerous and include **Australia, Austria, the U.K., Greece, New Zealand, Oman, Qatar, and Switzerland.**

## Forecast Rationale

The U.K.'s Ptarmigan tactical communications continues to be replaced by the newer FALCON II system. The British Army plans on having the last of the older systems replaced by the end of 2011. Some presumably modest funding continues, however, under a recent 5-year support contract. This contract saw the U.K. and BAE Systems, Ptarmigan's prime contractor, committed to support the system and its all-important Mobile Access to Ptarmigan Packet Switching (MAPPS) system, which ensures interoperability with future U.K. communications systems.

As the clock runs out on the aging Ptarmigan, long-term funding appears to be growing scarcer. It is likely that future, relatively modest funding will be solely for support and maintenance. For this reason the ten-year funding forecast, which had previously covered a steady upgrade program, has now been removed. Barring any future activity, this report will be archived next year, July 2006.

## Ten-Year Outlook

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Major funding for RDT&E, procurement and upgrades appears to have stopped. Therefore, the ten-year funding outlook has been removed.

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