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ODDI WRTH YSGRIFENNYDD  
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GWLADOL CYMRU



WELSH OFFICE  
GWYDYR HOUSE

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FROM THE PRIVATE SECRETARY  
TO THE SECRETARY OF STATE  
FOR WALES

5 April 1988

I refer to your recent conversation with  
Mark Powell.

Please find enclosed, as promised, briefing for  
Pilkington P.E. Limited.

*Colin Bell*

C BELL

The Duty Clerk  
10 Downing Street  
LONDON  
SW1



Pilkington PE Ltd are currently engaged in trying to sell their optical sights to the Turkish Ministry of Defence (DIVA) for use on an armoured combat vehicle (ACV) for which the Turkish Government have recently invited tenders. Pilkington had hoped to sell their sights as an integral part of vehicles which were offered by GKN. However we now understand that the Turks have selected an American company (FMC) as the preferred supplier of the armoured combat vehicle. Pilkington are therefore anxious to have their sights specified by the Turks for installation in the American vehicles. We also understand that the Turkish Ministry of Defence are not adverse to specifying Pilkington sights but that no firm instruction to the American company has been issued and the Americans will not specify the British sights without such an instruction. The Germans who also bid for the vehicle will we understand be offered a compensatory engine contract in lieu of acceptance of their bid for the complete vehicle. A contract for the sights which could be worth as much as £20m to the British company might with a little prodding from HMG form all or part of a similar compensation contract for British companies. Any help which the Prime Minister could give in tipping the balance with the Turkish Ministry of Defence would be much appreciated by this important and major Welsh employer.



# PILKINGTON

◀ Electro-optical Division ▶

Pilkington PE Limited  
 Glascoed Road St Asaph Clwyd LL17 0LL U.K.  
 Telephone St Asaph (0745) 583301  
 Fax 0745 584258 Telex 61430

MD/JA/jav

5th April, 1988.

Secretary of State for Wales,  
 Welsh Office,  
 Gwydyr House,  
 Whitehall,  
 LONDON. SW1A 2ER

Dear *Secretary of State,*

THE PRIME MINISTER'S VISIT TO TURKEY

Further to our letter of 23rd March with brief concerning our bid for a major contract in Turkey, we are advised by the Turkish Company NUROL which is partnering FMC that we should brief the Prime Minister on the latest situation regarding political initiatives, and request her support to a British initiative.

We have of course kept the British Embassy closely informed in Ankara and I attach our Sales Manager's letter to the Defence Attache Brigadier Anderson, who is very keen to assist our cause.

The Turkish Government appears to have been considering placing a contract in Germany for the power plant, as a political initiative providing compensation for loss of the vehicle contract.

It has been suggested to us that since the U.K. has also lost the vehicle contract, a similar political initiative could result in award of the sighting system to the U.K. in compensation.

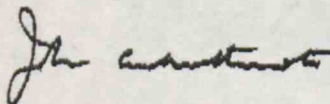
There remains the danger that without an initiative the Turkish Government will simply award the vehicle contract to F.M.C. without a stipulation that Pilkington sights are required, and if so F.M.C. will employ current suppliers for that vehicle. F.M.C. still maintain that they will react positively to Turkish Government requirements.

/...

We would therefore be most grateful if you would draw the up to date situation to the attention of the Prime Minister, and the Defence Attache in Ankara will do his utmost also to stress the importance of the contract.

With many thanks.

Yours sincerely,

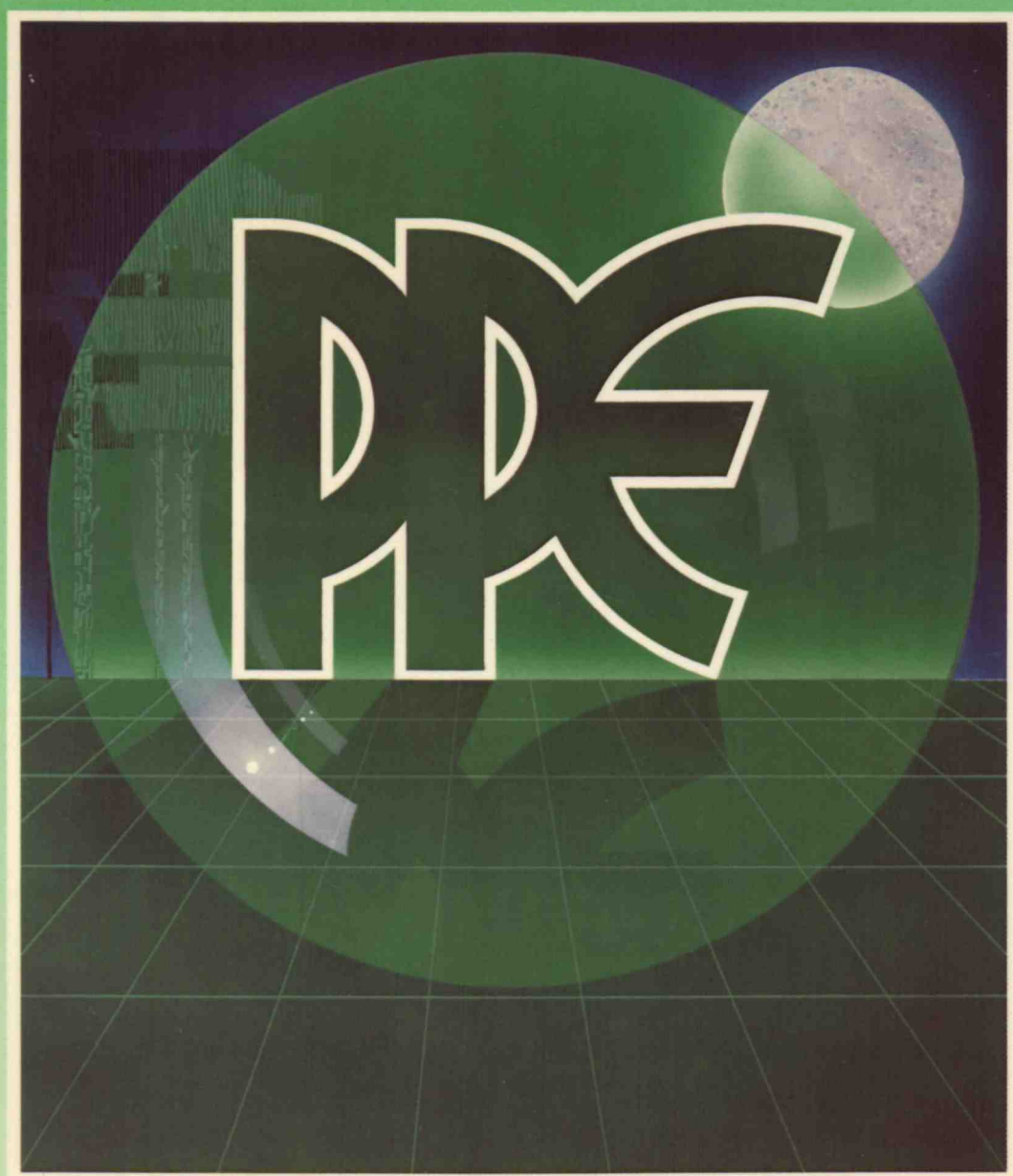


J. Arbuthnott  
Managing Director



# PILKINGTON P.E.

Passive Night Vision Devices



# PILKINGTON

From  
R. Hughes

To  
Mr. Brian Millner  
Public Affairs Adviser

Extn	3270	Subject PPE SITUATION IN TURKEY
Date	14.3.88	

c.c. Mr. J. Arbuthnott  
Mr. F. Jones  
Mr. A.J. Rees

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GKN manufacture the Warrior Armoured Fighting Vehicle (effectively a medium weight tank). This vehicle is in service with the British Army and is fitted with the PPE "Raven" combined day/night sight - two per vehicle. This sight, developed with MOD and PPE money, is now in full production at PPE. Brochures describing the sight are enclosed.

There is a very large requirement in Turkey for at least 1500 Warrior type vehicles; GKN were in competition with Krauss Maffei (Germany) and FMC (U.S.A). FMC have been selected to negotiate first - although they obviously have the best chance, GKN have not lost yet. If GKN can recover the situation, PPE stand to gain a significant order although, in conjunction with GKN, would probably have to organise a proportion of the requirement to be assembled or manufactured in Turkey.

In the event of FMC ultimately securing the Contract, however, PPE have still an opportunity to secure the sighting contract. Our sights were judged the best on the recent in-country trials and we are attempting to capitalise on this fact by negotiating directly with the Turkish Procurement Agency (DIDA) to specify our sights.

As part of its proposal phase, PPE conducted an assessment of the Turkish Electro-Optical industry with a view to identifying a potential partner to undertake local manufacture of PPE sights.

ASELSAN of Ankara were selected as the best potential partner. Their facilities and management style were the most advanced seen and judged to be the most appropriate for a technology transfer arrangement. Very fruitful discussions took place with ASELSAN which led to the signing of a memorandum of understanding whereby ASELSAN would become PPE's partner for local sight manufacture in the event that PPE's sights were chosen for the Armoured Combat Vehicle programme. This agreement would be re-activated in the event of a contract to supply Pilkington Raven sights to the American FMC Armoured Vehicle.

... / ...

Memo To : Mr. Brian Millner  
Public Affairs Adviser

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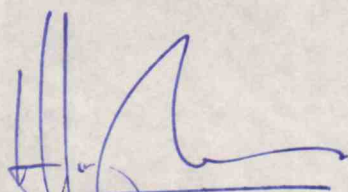
Subject : PPE Situation in Turkey

Date : 11th March 1988

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The above is a concise summary of the current situation and we are preparing a more detailed brief for Defence Export Sales Organisation (DESO).

The potential value of the contract is in excess of £110 million and would be a major coup for British Defence Exports.



**R. HUGHES**  
/RH53.sh



**PILKINGTON BROTHERS plc.,**  
St. Helens — Head Office

Pilkington Brothers PLC was founded in 1826 and is now a major public company with more than 200 subsidiary and associate companies in 29 countries. More than 40,000 Pilkington employees throughout the world are engaged in developing, producing or selling flat glass, safety glass, glass fibre, pressed glass and optical and ophthalmic glass products. Pilkington pioneered the float glass process, now licensed to 31 manufacturers and is in use in 21 countries.



**PILKINGTON BROTHERS plc.,**  
R & D Laboratories

The Research and Development activity is centered on the Laboratories at Lathom, near St. Helens. Scientists, Engineers and support staff using the most modern and sophisticated equipment provide a service for the Pilkington group at home and overseas in such major sectors as optical glass, fibre optics and glasses for the mechanical and electronic industries.



# PILKINGTON

◀ Electro-optical Systems ▶

Pilkington PE Limited,  
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(A wholly owned subsidiary of Pilkington Brothers PLC.)

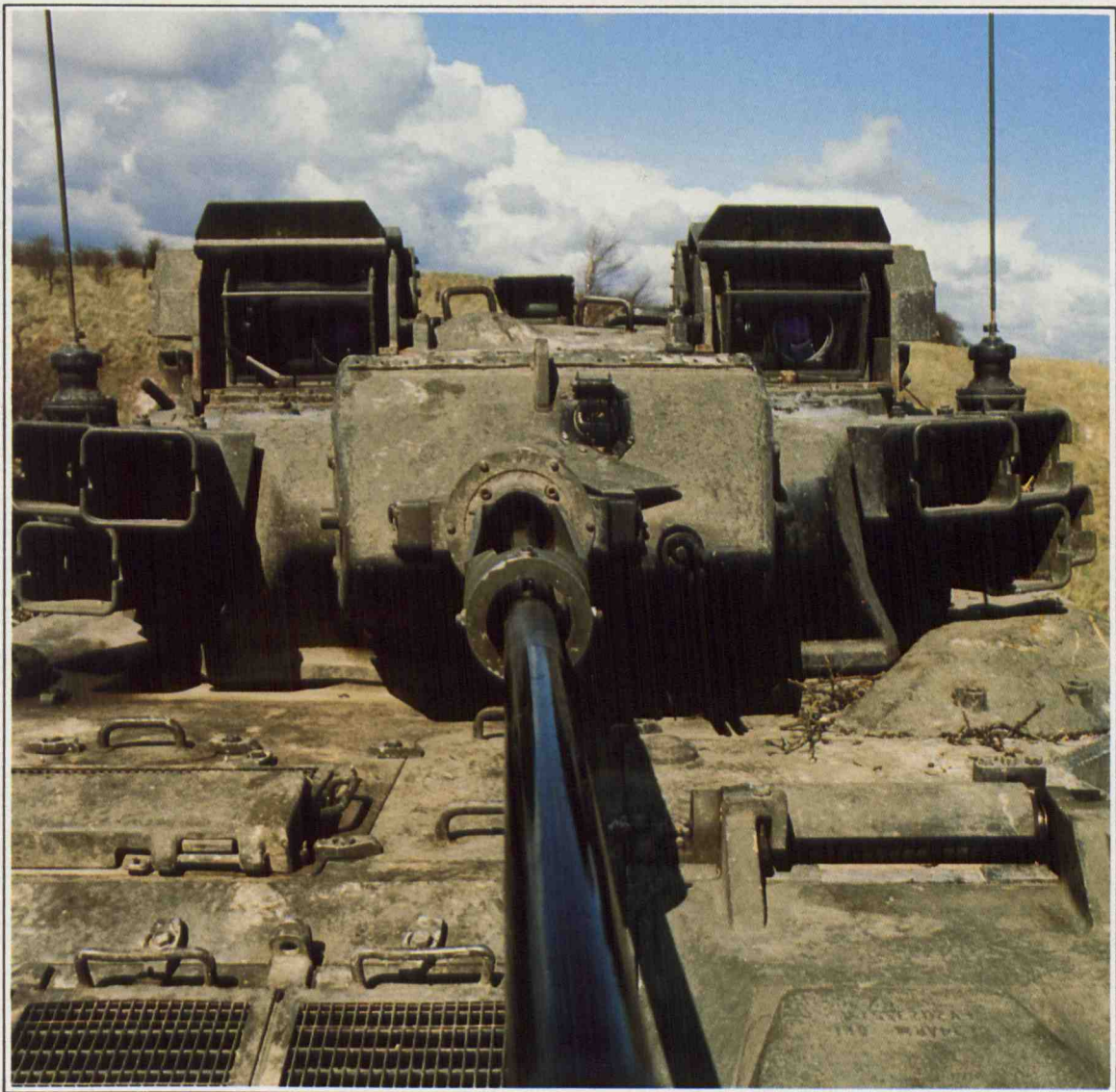
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# PILKINGTON P.E.

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## RAVEN Combined Day/Night Sight



## RAVEN

### Combined Day/Night Sight

The Raven Sighting System has been developed by Pilkington P.E. Limited to provide a comprehensive, combined day/night capability for commanders and gunners of Light Armoured Vehicles and Main Battle Tanks. Raven has been chosen for service with the British Army and features the latest state of the art in electro-optics. It affords a complete 24 hour battlefield capability for:

- Surveillance
- Target Acquisition
- Firing of main armament
- Observation of fall of shot.

Raven was originally designed to fit the British Army's WARRIOR vehicle but can be fitted to most Armoured Fighting Vehicles.



The Raven Sighting System entered production in June 1986 and has a night recognition range in excess of 1000 metres using an 18mm Generation III proximity focussed image intensifier.

#### MAJOR FEATURES

- In volume production.
- Range performance consistent with main armament.
- Day sight X1 and X8.
- Night sight X2 and X6.
- Separate graticule format for day and night.
- Rapid switch day to night.
- Safety measures built into system.
- Easy to operate.
- Built to MoD standards.
- Excellent twilight and day performance.
- Excellent night channel performance.
- Self-contained, simple installation.

## RAVEN

### Design & Installation

Raven has been designed for installation from under or above armour. A lifting frame is supplied to aid installation and removal.

Raven is designed to interface directly with the gun via a linkage on the right hand side of the sight (when looking forward).

Sight dimensions are as follows:

Width	: 295mm
Overall length	: 375mm
Front slot radius	: 148mm

The eyepieces have been designed to accommodate lateral offset arising from sight/seat centreline differences.



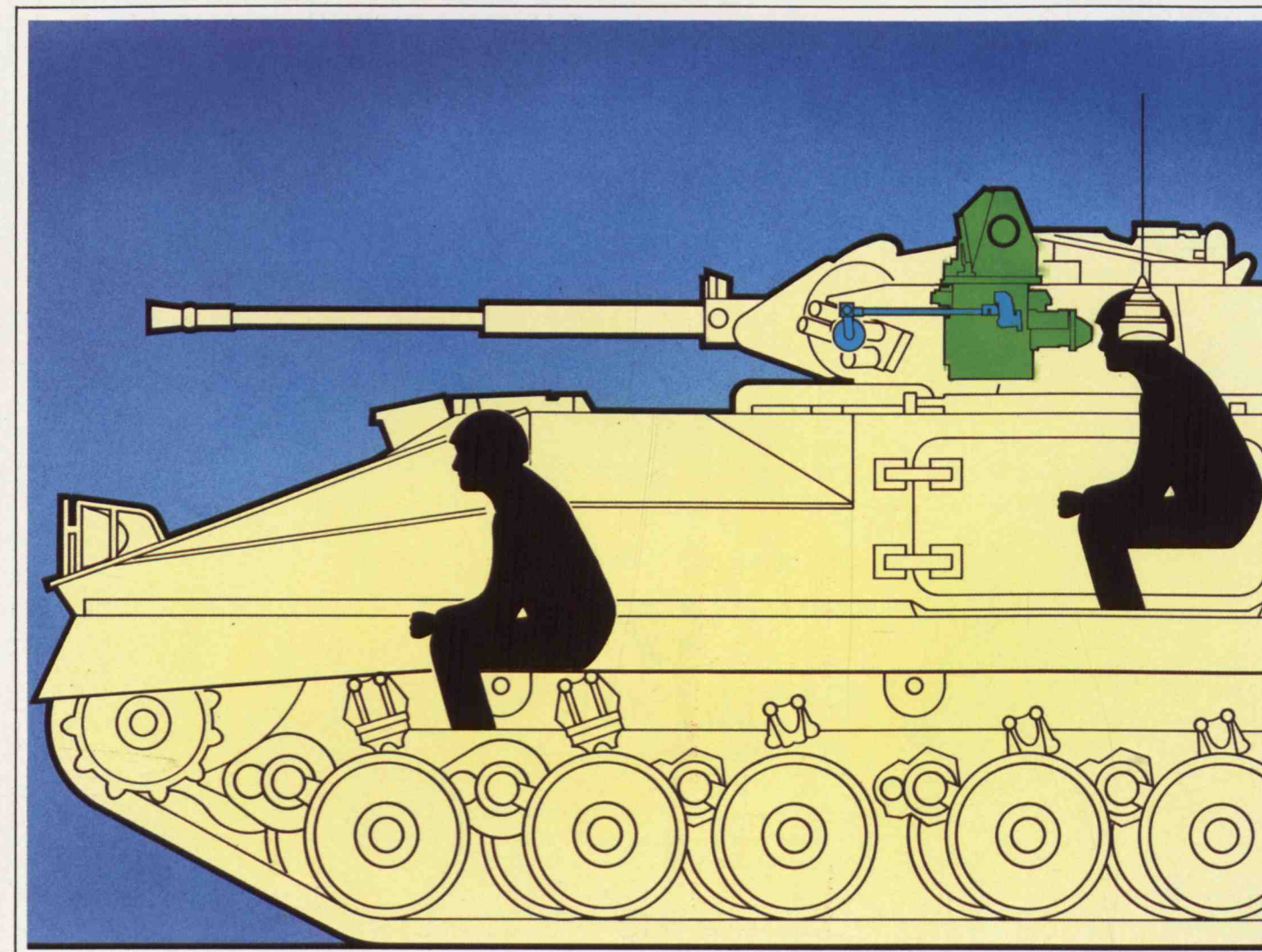
Installation is completed by placement of an armoured 'D' piece in front of the sight, positioning of the armoured cowl, and attachment of the electrical connection and ballistic link.

#### BORESIGHTING

The sight has reticle adjusters that enable the sighting system to be boresighted to the main armament. Separate adjustments are provided for boresighting the X1 and the magnified day and night channels.

#### ENVIRONMENTAL CONDITIONS

The Raven Sighting System is designed to conform to the requirements of the British Ministry of Defence Standards 07/55. The system is capable of operating in Climatic Categories A2, B2 and C1 of Defence Standard 00-1 Issue 2.



## RAVEN

### Operation & Safety

#### DETAILED DESCRIPTION

The Raven Sight is a combined day/night sighting system. It comprises three viewing channels: a fixed focus magnified day channel; a dual field of view image intensified night channel and a unity power day periscope.

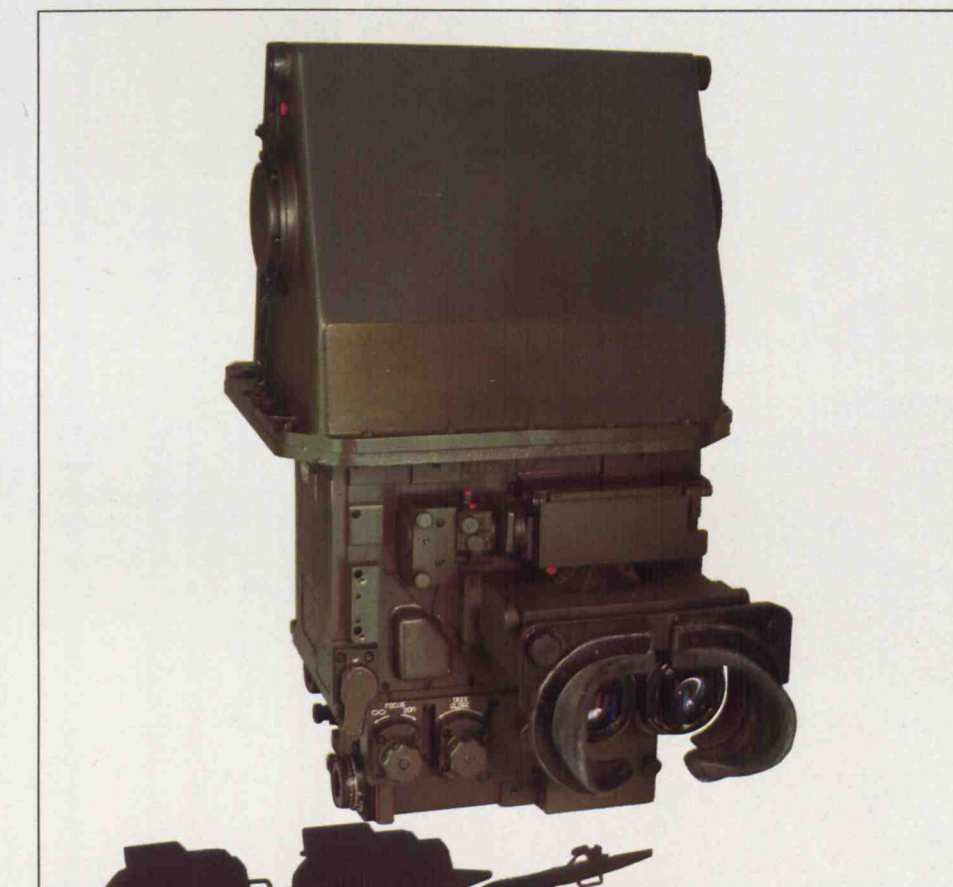
The magnified day and image intensified night channels are viewed through common eyepieces; selection of day or night surveillance being affected by a single changeover lever. A focus control and light control iris are also provided in the night channel. The unity power day periscope is viewed through a window above the eyepieces.

The three channels view the scene under surveillance via an upper mirror, the elevation and azimuth lines of sight of which are harmonised to the bore line of the main armament. The harmonisation of sight lines is achieved by a 2:1 mechanism interposed between sight and linkage to the gun, as part of the sight assembly. The pivot configuration of the upper mirror is such as to achieve a balanced system with durability to bump and shock. The sight input lever arm providing connection to the main armament via the turret link, embodies the adjustment for elevation angle

corrections with respect to the main armament. It is attached to the body of the sight and is readily removed for sight installation.

In order to provide the facility for main armament engagement the sight embodies 3 separate illuminated reticles, one in each

channel. All are separately adjustable in elevation and azimuth to achieve accurate boresighting. The method of sight reticle injection ensures that there is no possibility of light leakage during the night time operation which would affect sight security.



# RAVEN

## Maintenance & Repair

The Raven Sighting System is designed to conform to the requirements of Defence Standard 00-5 (Reliability and Maintainability of Land Service Material).

The system is compatible with British Army REME maintenance and repair techniques. Complete sets of fully proven Battalion Field and Base Test Equipment, Tools, Manuals and Spares can be supplied to support the Raven Sighting System in service.

In addition to supplying individual sets of first, second and third line REME Support Equipment, Pilkington P.E. Limited can offer a totally self-contained Mobile Field Optical Maintenance Repair Vehicle to support the complete Pilkington



Tank Sighting system (ie Raven Sighting System and the Driver's Passive Night Periscope and Tank Laser Sights).

This vehicle contains all the necessary Standard and Special-to-Type Test Equipment and Tools to maintain and repair the above referenced sights to second line (field) level. The facility conforms to the British Ministry of Defence Specification 735 and is completely



self-contained, supplying its own power requirements from a generator. Adequate bench space and a clean air booth are provided to enable the technicians to carry out maintenance and repair tasks.

The vehicle is fully air-conditioned and the facility is provided to receive NBC protection. It is designed to operate throughout the range of climatic conditions specified in Defence Standard 00-1 conditions A1 and C1.

Pilkington P.E. Limited will also set up and commission Optical Base Workshop Facilities to support their own sights and other optical equipments as required. Further details on the Optical Repair Vehicles and the other Maintenance Support facilities offered by Pilkington P.E. Limited will be supplied on request.



### PHYSICAL DATA

Height	: 560mm
Width	: 350mm
Depth	: 450mm
Weight	: 50kg

### OPTICAL DATA

LINE OF SIGHT	
Maximum elevation of line of sight	: +47°
Maximum depression of line of sight	: -12°
Accurate to within 0.3 mils over full range of elevation and depression	

### MAGNIFICATION

Day Sight	: x8
Night Sight	: x2/x6

### RESOLUTION

Day Sight	25 cycles/mil (full daylight to twilight)
Night Sight	2.7 cycles/mil (starlight)

# RAVEN

## Specifications



### ELECTRICAL DATA

Power supply 28v dc (vehicle supply)  
Power consumption 140w (max)  
Image Intensifier Tube Gen. II/III  
Eyepiece heaters switch off above 15°C.

### CLIMATIC DATA

Operating temperature range -35° to +55°C  
Storage temperature range -40°C to +70°C (without II tube)  
Environmental conditions : 07/55

### SUPPORT

Full set of Ministry approved Test Equipment, Spares and Manuals available.

### PERFORMANCE

#### RECOGNITION

Day Sight	: 3000m
Night Sight	: 1000m
for a 2.3m x 2.3m target (clear starlight conditions)	

#### DETECTION RANGE

Day Sight	: 5km
Night Sight	: 2.5km

#### FOCUS RANGE

Day Sight	: Fixed at infinity
Night Sight	: 20m to infinity
Eyepiece Focus	: -1.25 dioptries

#### EXIT PUPIL

Day Sight	: 6mm
Night Sight	: 6mm

#### EYE RELIEF

Day Sight	: 35mm
Night Sight	: 35mm



## PILKINGTON

◀ Electro-optical Systems ▶

Pilkington P.E. Limited,  
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