ULTRA

# Electro Optical Systems for Surface Space Ships

## Key features

- Surveillance
- Target tracking
- Target indication
- Asymmetric defence
- Gunfire control
- Mine avoidance
- Glide path monitoring
- Aid to navigation
- Search and rescue

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## Overview

Ultra is the UK's primary supplier of naval and maritime electro optical systems. An international market leader with over one-hundred-and-fifty systems supplied to navies, coastguards and marine police forces worldwide, including the UK Royal Navy.

These systems operate in all regions and climatic conditions, from arctic to tropical waters and are installed on all classes of vessel, from small patrol boats operating in coastal, offshore and EEZ patrol operations to major naval surface combatants, aircraft carriers and auxiliaries operating in littoral and blue water environments.

Ultra's EO system solutions cover a broad range of operational applications, from general surveillance and navigation to fire control. Systems feature high resolution video performance, automation and employ proven servo technologies from a common set of baseline COTS/MOTS modules.

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# Series 2500

## Key features

- High precision tracking and fire control for small to medium calibre guns and short range missile systems.
- Environmentally sealed interchangeable sensor suite, comprising long range, high resolution IR & TV cameras and eye-safe laser rangefinder.
- Operator defined automatic search & scan with automatic detection, queuing, acquisition and tracking of multiple targets.
- Computer controlled engagement of air, surface and shore targets with computerised gun lead-angle prediction including correction for ballistic and meteorological effects.
- High reliability with low maintenance and through-life-costs including sensor LRU servicing.

### Technical Director

| | | | |
|---|---|---|---|
| Slewing Angle: | Bearing | - | 360° continuous |
| | Elevation | - | 360° (software limited -35°/+85°) |
| Slewing Speed: | Bearing | - | >4 rad/sec |
| | Elevation | - | >3 rad/sec |
| Acceleration: | Bearing | - | >3 rad/sec/sec |
| | Elevation | - | >3 rad/sec/sec |
| Pointing Accuracy: | <70µrad | | |

### Thermal Imager

| | |
|---|---|
| Detector: | CMT 640 x 512 pixels (plus microscan option) |
| Spectral Band: | 3-5µm mid-infrared (8-12µm optional) |
| Field of View: | 1.3° x 1.8° to 17.3° x 24.0° continuous zoom |

### TV Camera

| | |
|---|---|
| Detector: | 3 x CCD 752 x 752 pixels |
| Dynamic Range: | <10lux (twilight) to >100,000 (full sunlight) |
| Field of View: | 1.3° x 1.8° to 12° x 15° continuous zoom *1 |

### Laser Rangefinder

| | |
|---|---|
| Detector: | NdYag OPO Shifted |
| Pulse Repetition: | 10Hz, 1Hz, single shot |
| Instrument Range: | >30km |

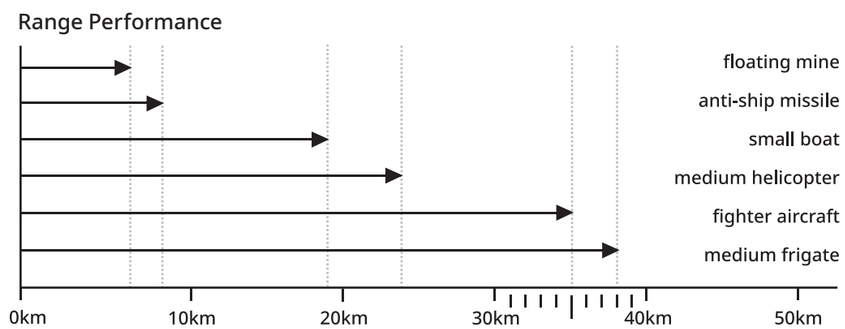
### Installation Parameters

Dimensions & Weight

| | | | |
|---|---|---|---|
| EO Director: | Swept arc | | -1,060mm Ø (in azimuth) |
| | Height | | - 915mm (above mounting) |
| | Penetration | | -360mm (below mounting) |
| | Weight | | - 165kg |
| Processing Cabinet: | Height | - | 1,160mm |
| | Width | - | 720mm |
| | Depth | - | 510mm |
| | Weight | - | 120kg |
| Power Supply: | 440V, 60Hz, 3 phase: 3.5kVA | | |
| | 115V, 60Hz, 1 phase: 0.75kVA | | |

Note: *1 FOV limits are software defined parameters that can be altered to meet customer requirement.

| SYSTEM OPERATIONAL MODES | Series 2500 | Series 1700 |
|---|---|---|
| EO SURVEILLANCE & TRACKING | | |
| Automatic Search & Scanning – Horizon, Sector, Box | ✓ | ✓ |
| Automatic Multiple Target Detection | ✓ | ✓ |
| Automatic Acquisition | ✓ | ✓ |
| Centroid Tracking | ✓ | ✓ |
| Correlation Tracking | ✓ | ✓ |
| Edge Tracking | ✓ | ✓ |
| Combined Tracking (system selected) | ✓ | ✓ |
| Multiple target tracking and queueing | ✓ | ✓ |
| GUNFIRE CONTROL | | |
| Surface Engagement – Direct Aim | ✓ | ✓ |
| Surface Engagement – Aim-Off | ✓ | ✓ |
| Surface Engagement – Spotting Correction | ✓ | ✓ |
| Air Target Engagement - Linear | ✓ | ✓ |
| Air target Engagement – Fly Through Range | ✓ | ✓ |
| Air target Engagement – True Target Motion | ✓ | ✓ |
| Naval Gunfire Support – Direct | ✓ | ✓ |
| Naval Gunfire Support – Indirect Beacon Track | ✓ | ✓ |
| Naval Gunfire Support – Indirect Dead Reckoning | ✓ | ✓ |

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# Series 1700

## Key features

- General purpose surveillance and tracking sensor with long range, high resolution IR and TV cameras and laser rangefinder providing positive identification of surface and air targets.
- Operator defined surveillance scan routines with automatic target detection and tracking.
- Primary sensor for small to medium calibre gun with computer controlled gunfire control and lead angle prediction.
- On screen splash marker for line and range spotting and electronic alignment of sensors and weapons.
- Flexible system configuration - stand-alone or fully integrated into Combat Management System.
- High reliability with low maintenance and through-life-costs including sensor LRU servicing.

### Technical Director

| | | | |
|---|---|---|---|
| Slewing Angle: | Bearing | - | 360° continuous |
| | Elevation | - | -35° to +85° |
| Slewing Speed: | Bearing | - | 1.35 rad/sec |
| | Elevation | - | 1.35 rad/sec |
| Acceleration: | Bearing | - | 1.35 rad/sec/sec |
| | Elevation | - | 1.35 rad/sec/sec |
| Pointing Accuracy: | <200µrad | | |

### Thermal Imager

| | |
|---|---|
| Detector: | CMT 640 x 512 pixels |
| Spectral Band: | 3-5µm mid-infrared |
| Field of View: | 1.4° x 1.8° to 19° x 24.0° continuous zoom*1 |

### TV Camera

| | |
|---|---|
| Detector: | 3 x CCD 752 x 575 pixels (equivalent to 884 x 575 pixels) |
| Dynamic Range: | <10lux (twilight) to 100,000 (full sunlight) |
| Field of View: | 1.3° x 1.7° to 12° x 16° continuous zoom *1 |

### Laser Rangefinder

| | |
|---|---|
| Detector: | Erbium Glass |
| Pulse Repetition: | 10Hz, 1Hz single shot |
| Instrument Range: | 20km *2 |

### Installation Parameters

Dimensions & Weight

| | | | |
|---|---|---|---|
| EO Director: | Swept arc | - | 935mm Ø (in azimuth) |
| | Height | - | 750mm (above mounting) |
| | Weight | - | <100kg |
| Processing Cabinet: | Height | - | 1,200mm |
| | Width | - | 700mm |
| | Depth | - | 600mm |
| | Weight | - | <200kg |
| Power Supply: | 115V, 60Hz, 1 phase: 1.25kVA | | |

Note: *1 FOV limits are software defined parameters that can be altered to meet customer requirement. *2 Measured with NATO target 5m x 5m with 40% reflectivity & good visibility.

# Human Machine Interface (HMI)

Ultra can supply its EO systems with an EOTS/FCS Client Application containing the system control logic.

The EOTS/FCS Client Application provides the 'HMI engine' that allows control of the system from a Multi-Function Console and visualisation of video via a User Interface (UI) graphic application that can run on any console hardware. The UI communicates with the EOTS/FCS Client via a software API. This UI is independent from the functional logic of the system, enabling it to be easily adapted specifically by the CMS supplier or other third party to provide the same look and feel for the environment in which it will run.

Alternatively, Ultra can supply an EOFCS Control Console configured for one-man operation of the EOS, FCS and gun. This console is equipped with a flat screen colour display, joystick, tracker-ball and QWERTY keyboard and hosts the EOS/FCS Client plus Ultra's own UI application. This HCI UI is a bespoke software application based extensively on that developed for the UK Royal Navy Type 45 Destroyer.


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