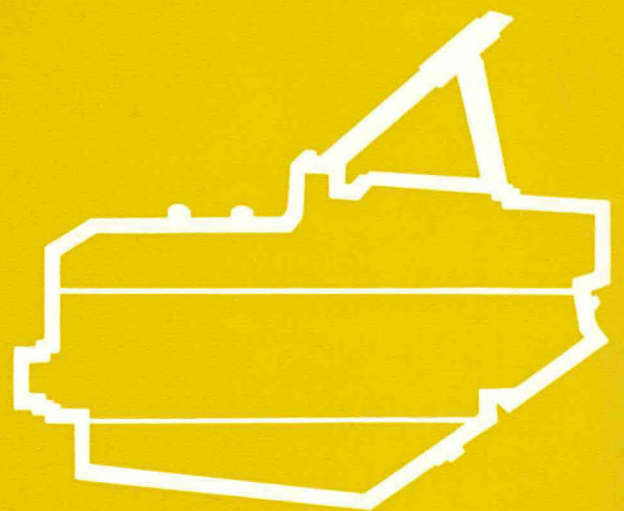
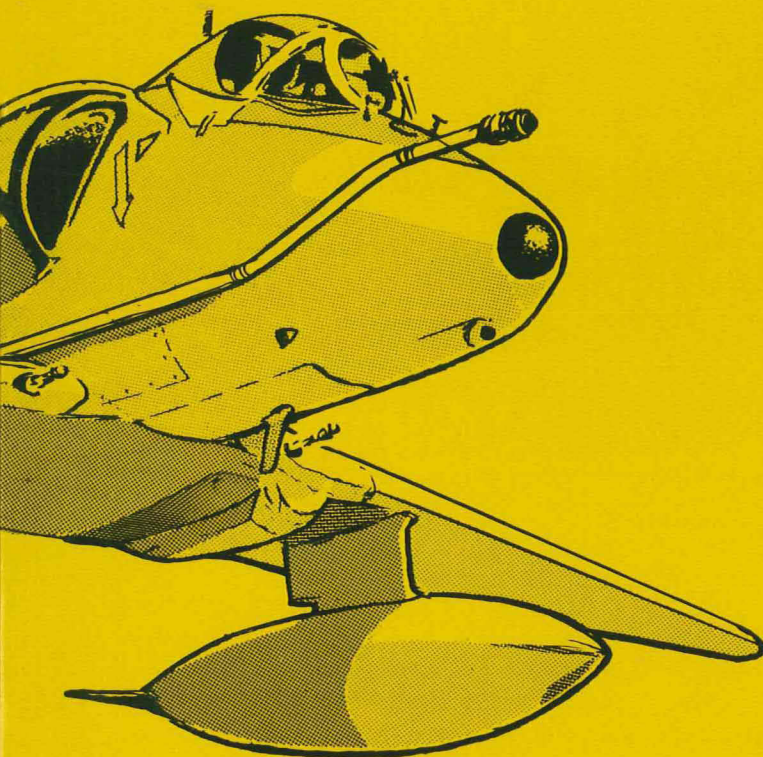


FERRANTI

ISIS D.101 SYSTEM

***Weapon Aiming for
Tactical Aircraft***



ISIS D.101 SYSTEM

Introduction

This system is a development of 30 years experience in the production of lightweight lead computing weapon aiming systems. The ISIS D.101 is a lead computing optical gyroscopic weapon aiming system configured primarily for installation in the McDonnell Douglas A4 Skyhawk. The system is designed to utilise the sensors on modern tactical aircraft such as roll, pitch, altitude, air speed, doppler ground speed and drift, and can be easily integrated with radar or laser rangefinders.

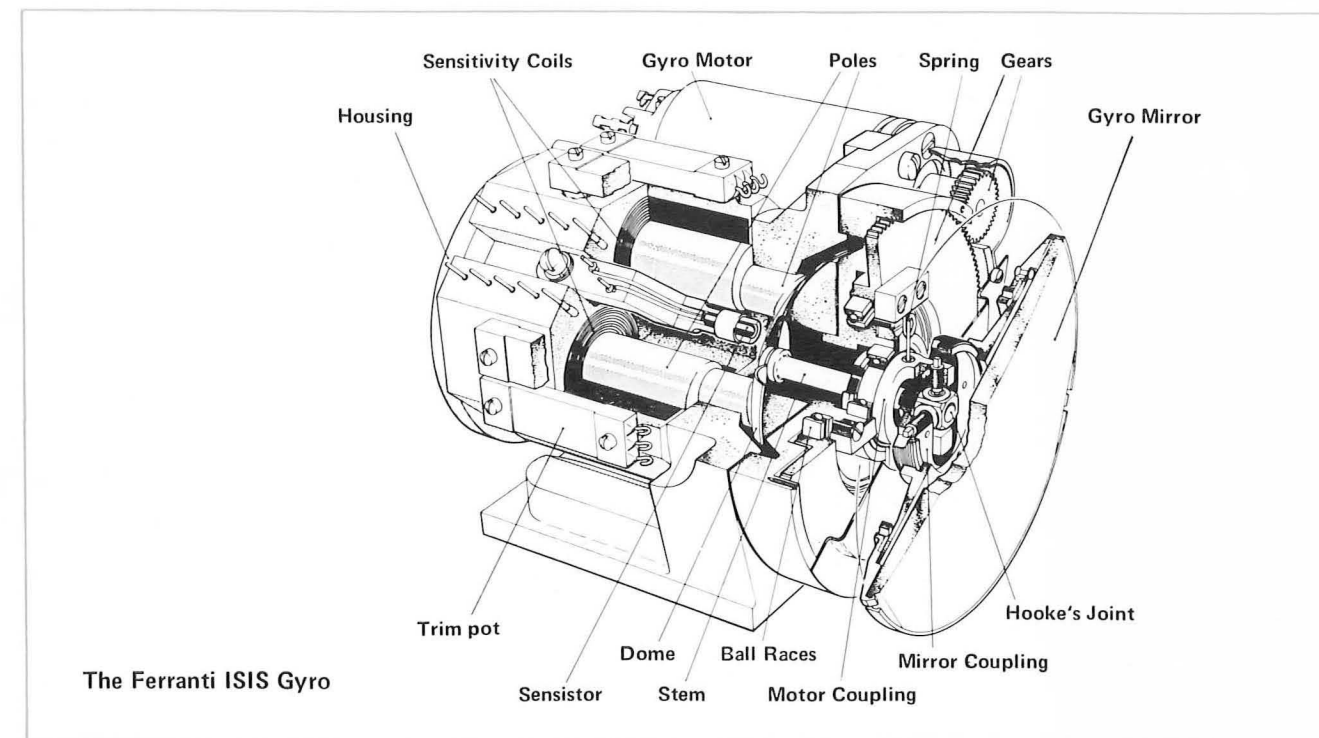
The system computes aiming-points for:

- AIR-TO-AIR
- AIR-TO-GROUND
- GUNS AND MISSILES
- GUNS, ROCKETS AND BOMBS

The system comprises a SIGHT HEAD, CONTROL UNIT, THROTTLE UNIT and REFERENCE GYRO INTERFACE UNIT.

Sight Head Type D.01

The Sight Head embodies a unique two-axis eddy current controlled rate gyro which is specifically designed for weapon aiming both in air-to-air and air-to-ground combat. The Sight Head also incorporates a manually depressible sight line display which may be used as a stand-by facility.

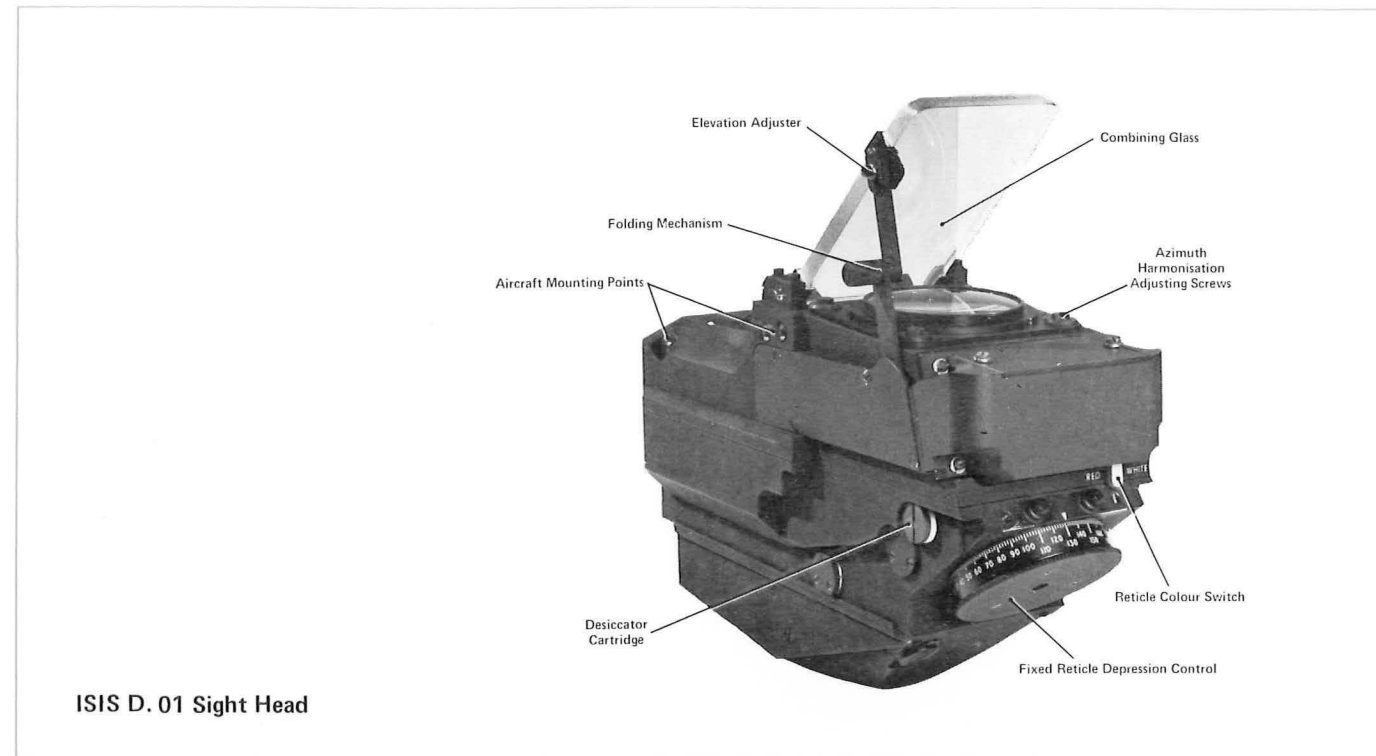


The Ferranti ISIS Gyro

The gyro performs two functions simultaneously. It measures the aircraft rate-of-turn, and also deflects the sight line in azimuth and elevation as required by the weapon mode and the attitude of the aircraft during the attack. Normally the pilot uses the gyro aiming mark to track his target. Roll stabilisation of this aiming mark in the true vertical plane eases the pilot's task in both air-to-air and air-to-ground manoeuvres.

In air-to-air combat, if the target cannot be tracked precisely with the gyro aiming mark, the standby fixed reticle (adjusted to indicate the gun line) can be used to fly the aircraft in such a manner that the target is between the fixed reticle and the gyro reticle. This technique ensures a high probability of a kill. The system is designed to cope with turns of up to 7 g without gyro topple. As it is impractical to track a target at such high "g" forces, the system can be said to be capable of use in any condition in which the pilot himself is able to carry out an attack.

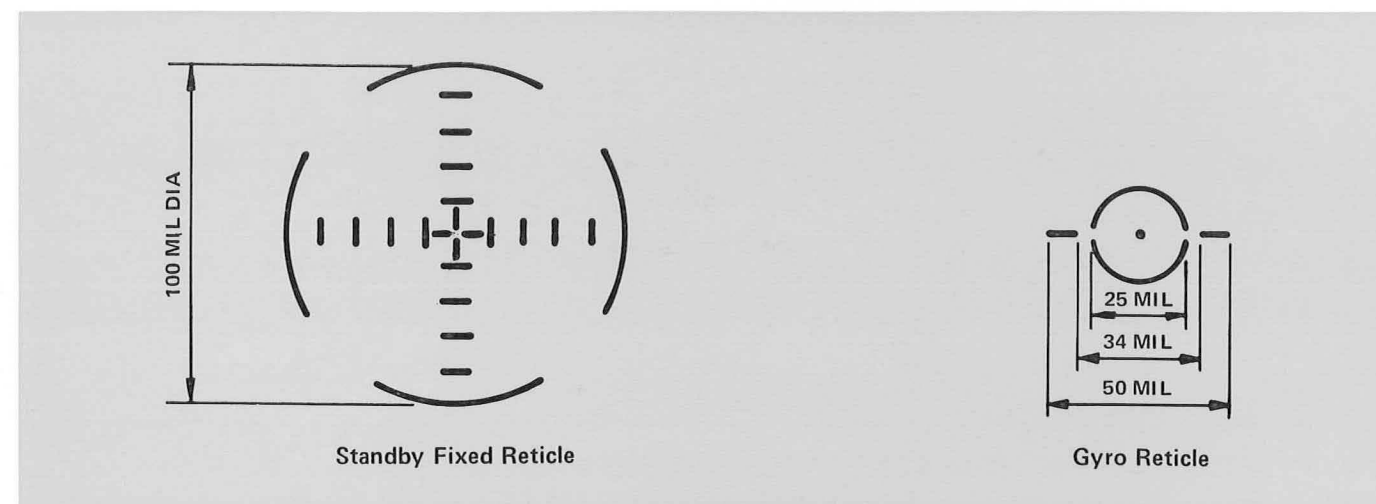
In air-to-ground strike the fixed reticle acts as a standby display which can be depressed through an angle of 380 mils in the aircraft vertical plane.



ISIS D.01 Sight Head

Reticle Patterns

The display comprises the two reticle patterns shown below but alternative configurations within a 100 mil cone of view can be fitted to suit user preferences.



- Illumination of each reticle is by a primary or a standby quartz iodine lamp, which can be adjusted in brilliance.
- A further facility is provided by colour filters which improve the display in dusk or varying lighting conditions.
- The combining glass on the sight head may be folded out of the pilot's vision.

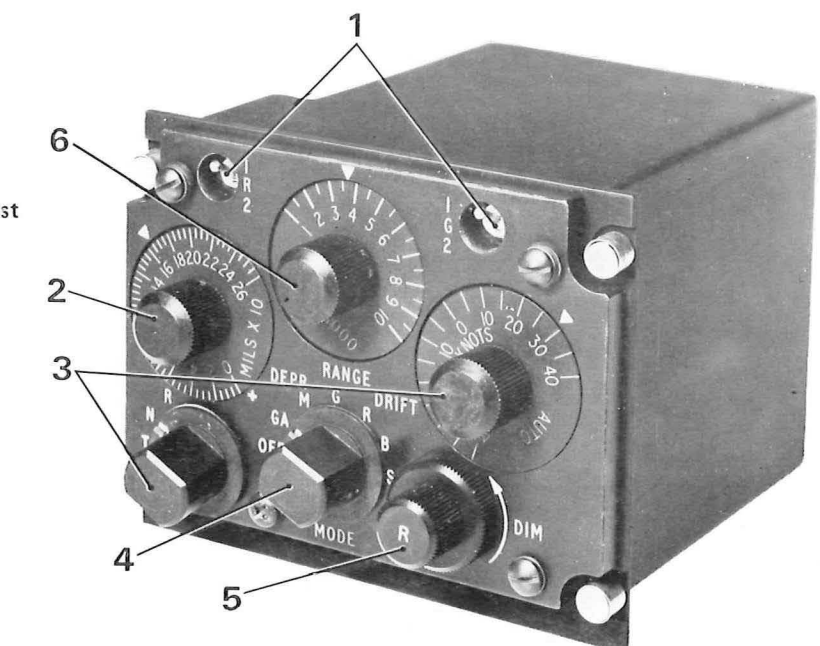
Reference Gyro Interface Unit Type D4X

This unit contains the servo mechanism which resolves roll information from the aircraft vertical gyro for correcting the aiming mark to the true vertical plane irrespective of aircraft attitude. The unit can also incorporate interface circuitry for other sensors, such as radar and laser rangefinders and if a pitch gyro input is available, it can modify the sight line depression angle with respect to dive angle.

Control Unit Type 19

The Control Unit is used to :-

- 1 Select standby lamps when primary fails
- 2 Manually depress the reticle in the 'S' mode.
- 3 Adjust crosswind in the air-to-ground mode — by pilot or automatically from doppler.
- 4 Select the Weapon Mode Computation
- 5 Illuminate the reticles (adjust the brilliance).
- 6 Pre-set air-to-ground weapon release range indicator under control of aircraft radar or laser range signal.



Control Unit Type 19

Throttle Unit Type 16

This unit is incorporated in the aircraft throttle handle and is used to select the most appropriate of three pre-set ranges for air-to-air gunnery.

Growth Potential

The ISIS D101 system may also be used with additional interface units to provide the following facilities:-

TARGET ACQUISITION : with the standby fixed reticle as an aircraft heading reference, the aiming mark may be used for steering when the ISIS gyro is fed with inputs from a doppler or inertial navigation system. When the aircraft is within visual range of the target, the pilot then switches the ISIS gyro to the weapon-aiming mode.

LASER TARGET DESIGNATION: If the aircraft incorporates a laser target designator the ISIS gyro aiming mark may be controlled by its signals. The pilot flies the aircraft to keep the standby reticle concentric with the gyro reticle until the target can be visually identified and then switches the ISIS gyro into the selected weapon-aiming mode to carry out an attack.

CAMERA RECORDER: A camera recorder to film the target and Sight Head reticle superimposition, can be fitted for use in flight debriefing.

Specification

The system is designed to meet MIL-E-5400 Environmental Conditions.

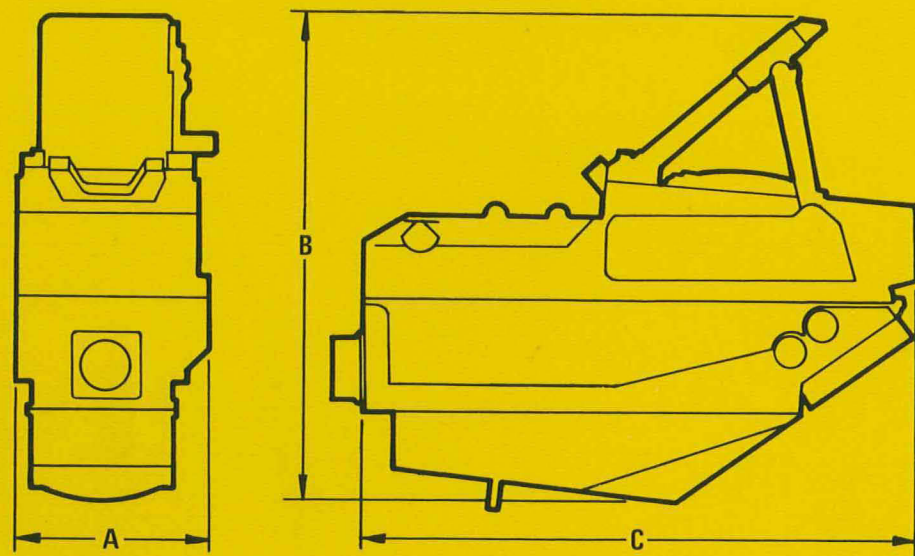
MTBF and MTBO: The system is designed to meet the Mean-Time-Between-Failure rate of 400 hours, and a Mean-Time-Between-Overhaul of at least 1000 hours.

Power Supplies & Weights

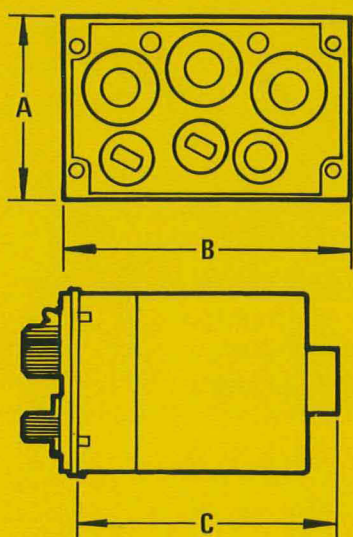
Power Supplies:
28V d.c. 3 amp
and 400 Hz 115 or 200V line to line

Weights: Sight Head: 12 lb (5.4 kg.) Control Unit: 4 lb (1.8 kg.)
Throttle Unit: 0.5 lb (.2 kg) Reference Gyro Interface Unit: 7 lb (3.17 kg.)

Sight Head Type D.01



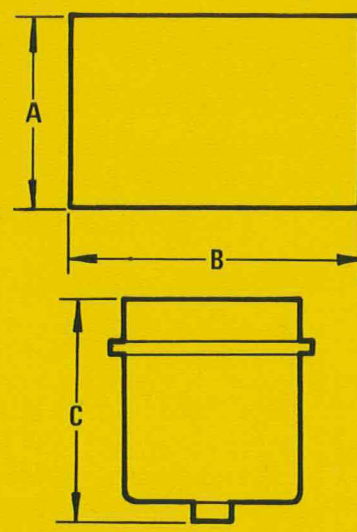
Control Unit Type 19



Throttle Unit Type 16



Reference Gyro Interface Unit D4X



| | Sight Head Type D.01 | | | Control Unit Type 19 | | | Throttle Unit Type 16 | | Interface Unit D4X | | |
|--------|----------------------|-------|-------|----------------------|------|-------|-----------------------|------|--------------------|-------|--------|
| | A | B | C | A | B | C | A | B | A | B | C |
| mm | 99.06 | 255.7 | 290.6 | 114.5 | 146 | 146.3 | 49.27 DIA | 2.54 | 126.2 | 152.4 | 136.39 |
| inches | 3.9 | 10.07 | 11.44 | 4.50 | 5.75 | 5.76 | 1.940 DIA | 1.00 | 4.97 | 6.00 | 5.37 |

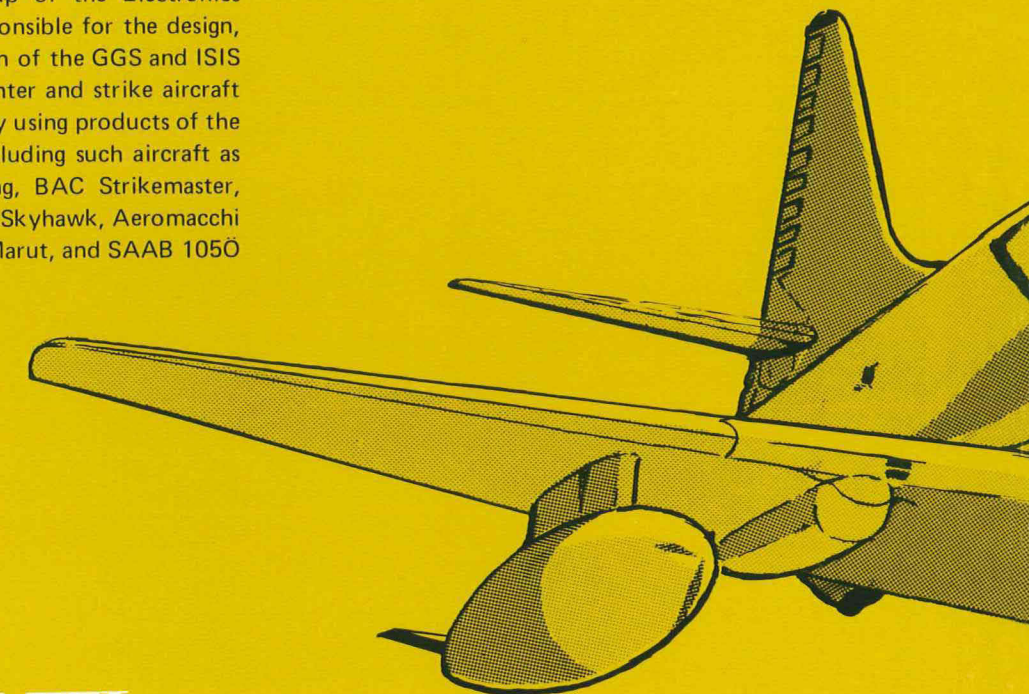
FERRANTI IN SCOTLAND

Over 5,300 of the Company's labour force are now employed by the Scottish Group of factories — forming Scotland's largest electronics complex.

The Scottish division was initially established in 1943 for the manufacture of the gyro gunsight, designed by the Royal Aircraft Establishment, Farnborough. Since that time over 50 thousand weapon aiming systems based on the GGS have been produced.

The Electronics Systems Department of the Scottish division has also developed and produced a wide range of airborne search and tracking radars. The latest addition to the weapon aiming capability of the Department is the development of a fully stabilised laser range finder. This sensor is capable of being integrated with the ISIS series of weapon aiming systems.

The Sighting System Group of the Electronics Systems Department is responsible for the design, development and production of the GGS and ISIS series. Over 25 types of fighter and strike aircraft in 30 countries are currently using products of the Sighting Systems Group including such aircraft as HSA Hunter, BAC Lighting, BAC Strikemaster, Northrop NF5A, MDC A4S Skyhawk, Aeromacchi MB 326, Hindustan HF24 Marut, and SAAB 105Ö



FERRANTI

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