Ferranti sight for Gazelle

FERRANTI's roof-mounted observation sight for British Army Air Corps (AAC) Gazelles will use direct gyro-stabilisation of the sightline mirror for simplicity and reliability. Remote stabilisation by servos would have allowed a greater magnification to be provided but at the expense of complexity. The Aircraft Equipment Department of Ferranti Instrumentation has received a multimillion-pound contract to develop its AF532 sight for AAC Gazelles, matching the range and resolution of their target-finding equipment to that of Tow-armed Lynx anti-tank helicopters.

Ferranti has been selected to develop the sight after fierce international competition. The Saab-Scania Helios servo-stabilised sight (see Flight, September 13, 1980, page 1070) proved the strongest opponent. The winning system is a derivative of the AF530, developed in the early 1970s for use with the proposed Hawskswing airborne version of the Swingfire anti-tank missile. When the weapon was cancelled in 1975, the company continued privately funded development, competing unsuccessfully for the Lynx Tow sight before winning the Gazelle contract.

The company began work on helicopter sights with the AF120, installed in AAC Scouts armed with SS.11 air-to-surface missiles. This early sight is still in service, with the Scout only now being replaced by the Tow-armed Lynx. The AF120 is fairly heavy by today's standards and much of the AF530 development concentrated on reducing size and weight by about half. While the Gazelle sight is a derivative of the AF530, Ferranti is anxious to point out that the system is not "old-fashioned" but rather the product of continuous development.

Direct stabilisation means that the sightline mirror (4 on the accompanying diagram) is positioned by the gyrors themselves rather than by separate servo motors. Inertia-induced stabilisation errors limit the mirror size, and the maximum magnification is 10X. At higher powers better stabilisation would be required, and Ferranti believes 10X to be optimum for helicopter applications. The sight is stabilised against aircraft pitch and yaw motion but not roll. The complete roof-mounted system is fitted on anti-vibration mounts.

The sight is carried above the co-pilot/observer's position on the same fairing as that developed for the Saim anti-tank-missile sight fitted to French Army Hot-armed Gazelles. The stabilised mirror is housed in a lightweight casing, complete with window and windscreen wiper, which turns with the sight head. The outside view is reflected downwards into optics produced by Avimo of Taunton, Somerset. To prevent the observer's image tilting as the sight rotates, sight-head position drives a derotation prism (9) which keeps the image erect.

The down tube, complete with eye-piece, is adjustable for length and can be rotated out of the way when not in use. Sight controls are mounted on a removable handgrip which pulls up from the instrument panel. A thumb-operated joystick provides rate control in azimuth and elevation. On 2-5X wide-angle magnification, the sight can be slewed to search for targets. A circle superimposed on the image shows the field of view available on 10X magnification. Once positioned, the sightline will remain on target regardless of aircraft pitch and yaw motion within the ±120° azimuth and ±50° elevation mechanical limits.

As the image is stabilised, the observer has no cue to sight direction so an azimuth graticule (10), positioned by the sighthead, provides direction indication. The pilot has a separate indicator allowing him to bring the aircraft nose round to the sightline if required. A light-emitting diode array annotates the observer's image with sight status, magnification and other information.

The basic Gazelle sight uses direct optics only. Provision is made for a laser designator module to be attached behind the sight as illustrated, with the beam coincident with the sight line. The AF532 also includes provision for injection of a TV image from a side-mounted cathode ray tube (CRT) module. The CRT can be used to present an infrared picture from a thermal-imaging sensor, mounted in either a modified sight head or a separate stabilised platform.

Army observation helicopters at present use stabilised binoculars which are bulky and which lack the range of the high-resolution sight now fitted to Tow-armed Lynx anti-tank helicopters. The AF532 will allow effective target detection and identification at ranges compatible with the Lynx sight and will make life much safer for the Gazelle. Laser designation, when fitted, will allow the helicopters to mark targets for laser-guided weapons such as the Copperhead artillery shell.