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Ferranti sight
for Gazelle
FERRANTI's roof-mounted observa-tion sight for British Army Air Corps (AAC) Gazelles will use direct gyro-stabilisation of the sightline mirror for simplicity and reliability. Remote stabilisation by servoes would have allowed a greater magnification to be provided but at the expense of com-plexity. The Aircraft Equipment Department of Ferranti Instrumenta-tion has received amultimillion-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 inter-national competition. The Saab-Scania Helios servo-stabilised sight (see Flight, September 13, 1980, page 1070) proved the strongest oppo-nent. The winning system is a deri-vative of the AF530, developed in tihe early 1970s for use with the pro-posed Hawkswing airborne version of the Swingfire anti-tank missile. When the weapon was cancelled in 1975, the company continued privately funded development, competing un-successfully for the Lynx Tow sight before winning the Gazelle contract.

The company began work on heli-copter sights with the AF120, in-stalled 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 con-centrated 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 accompany-ing diagram) is positioned by the gyros themselves rather than by separate servomotors. Inertia-induced stabilisation errors limit the mirror size, and the maximum magnification
is 10 X. At higher powers better

Above left The Ferranti AF532 observation sight will be mounted on the Gazelle roof. Right Diagram of the night optics showing the laser path

KEY
1 Azimuth sensor
2 Elevation torque motor
3 Azimuth torque motor
4 Gyro-stabilised mirror
5 I0X objective lens
6 2-5 X magnification-change lenses
7 Pickoff for pilot's sight-direction indicator
8 Monocular scene
9 Derotation prism
10 Azimuth heading graticule
11 Flexible coupling between sight head and derota-
tion prism
12 Mirror
13 Path for optical laser designation
14 Azimuth servo
15 2:1 pitch drive from gyro to mirror
16 Gyro

stabilisation would be required, and Ferranti believes 10 X 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 Sffiim 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 Taun-ton, Somerset. To prevent the obser-ver'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 retractable 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 tar-gets. A circle superimposed on the image shows the field of view available on 10 X magnification. Once posi-tioned, the sighitline will remain on target regardless of aircraft pitch and yaw motion within the ±120° azimuth

and +30° elevation mechanical limits.

As the image is stabilised, the observer has no cue to sight direction so an azimuth graticule (10), posi-tioned 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, magnifica-tion and other information.

The basic Gazelle sight uses direct optics only. Provision is made for a laser designator module to be at-tached behind the sight as illustrated, with the beam coincidental 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-resoilution sight now fitted to Tow-armed Lynx anti-tank helicopters. The AF532 will allow effective target detection and identifi-cation at ranges compatible with the Lynx sight and will make life much safer for the Gazelle. Laser designa-tion, when fitted, will allow the heli-copters to mark targets for laser-guided weapons such as the Copper-head1

artillery shell.