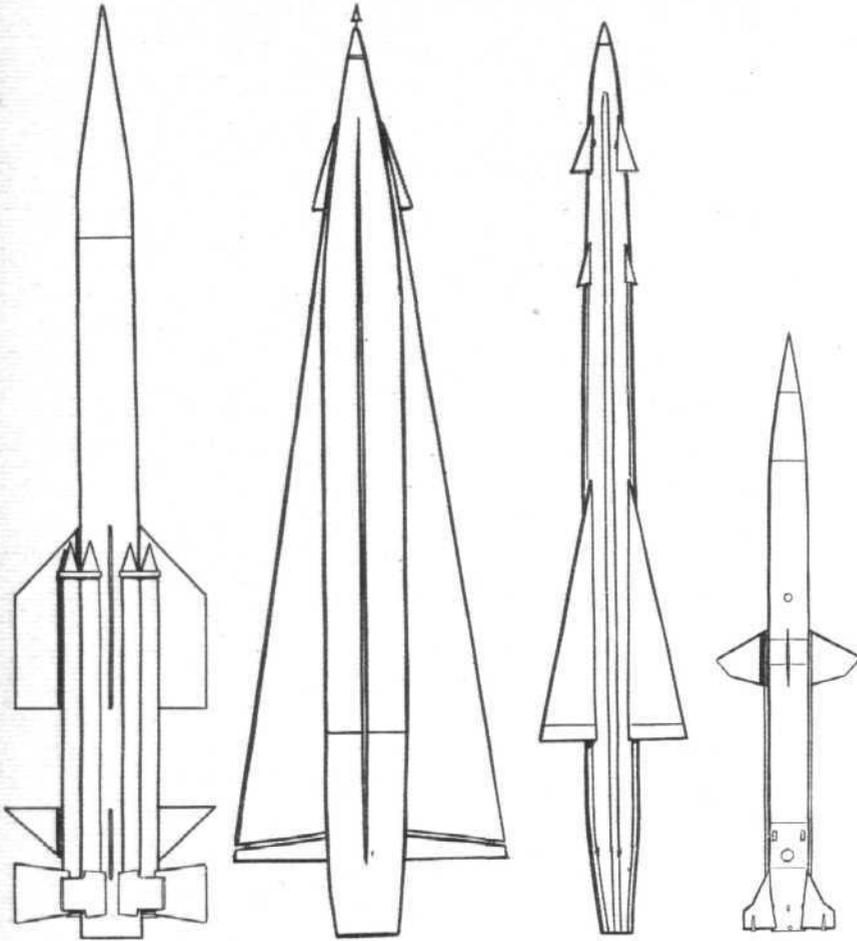
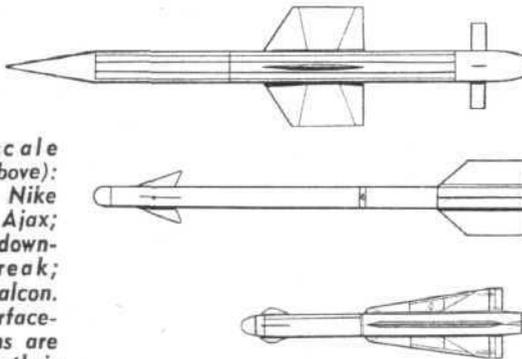


THOUGHTS ON BRITISH MISSILES . . .



Approximate scale drawings of (above): English Electric; Nike Hercules; Nike Ajax; Terrier (right, downwards); Firestreak; Sidewinder; and Falcon. The American surface-launched weapons are depicted without their tandem boost-motors, which greatly increase their length. Scale: 1in=4ft 9in.



chamber to the con-di propelling nozzle at the rear. Unlike the Fairey weapon, Firestreak employs cruciform wings and control surfaces indexed in line with each other. The wings are large and have considerably greater span than those fitted to a test vehicle which was exhibited on the D.H. Enterprise stand at the S.B.A.C. show in 1954. The latter had rectangular wings of very low aspect ratio. The production missile has trapezoidal wings, with swept-back leading edges. The section is parallel double wedge, and each wing is made as a unit which is bolted to the body along massive root attachments.

Compared with the wings, the rectangular, high-aspect-ratio control surfaces are very small. As is usual in contemporary British missiles they are situated at the rear, whereas most American air-to-air weapons employ either canard controls or moving wings. It is of interest to note that the heavy attachments of Firestreak's four wings are faired by long spines which run axially from a point well ahead of the wings to the control surfaces near the boat-shaped tail. It is fair to deduce that these spines cover push/pull rods which actuate the control surfaces by transmitting motion from a hydraulic guidance section ahead of the wings. This is a much better arrangement than having the close-tolerance jacks and valves wrapped around the fiery rocket motor. A photograph published on p. 568 of last week's issue showed a Firestreak undergoing ground testing, and it is pertinent to comment that the front ends of the four spine fairings were removed and stacked alongside.

One cannot comment on whether or not Firestreak starts its flight as a beam-rider, but it certainly employs heat-homing in its terminal phase. The American Sidewinder, also governed by infra-red emanations, has a blunt front end with an almost hemispherical nose. The de Havilland weapon has a front end of great technical interest, but nothing may be said about it at this juncture beyond the indisputable fact that it must provide some form of windows transparent to suitable wavelengths of infra-red radiation. Firestreak is quite a box of tricks, and it requires for its operation several sources of compressed air or electric power. The picture printed last week showed such services plugged in just ahead of the wings. Certain "black boxes" inside the missile have to be warmed up (or cooled down) before the weapon can be launched; a fighter armed with Firestreak would have to provide facilities for this, and other services, and the inputs would need to have special quick-release break-joints so that the weapon could leave its launcher cleanly.

It is worth commenting that the sensitive cell of any heat-homing weapon (see *Flight* for December 7 last, p. 879) responds to any source of radiation with the appropriate wavelength—for example, any body at 750 deg C (roughly the temperature of a turbojet exhaust, without reheat) produces 3-micron radiation. Theoretically, at least, Firestreak could no doubt be induced to home on to a domestic electric fire, or even a cigarette-end at close-enough range. Unless it employs some additional intelligence, it certainly could not distinguish between friend and foe.

It is probable, therefore, that the guidance system must be locked-on to its target before the missile is released. Moreover, should the weapon over-run its target, for any reason—a very unlikely eventuality—some form of self-destruction device must be triggered after a certain number of seconds' flight, to prevent the missile from locking-on to a friendly fighter some miles further on. Firestreak is something which could never be allowed to stray.

No mention has been made of any firms associated with de Havilland Propellers in the development of Firestreak, but a recent report from the Netherlands is not without interest. It states that de Havilland, Mullard, Philips (Netherlands) and the Hollandse Signaalapparatenfabriek were collaborating in the development of guided missiles; and Dr. F. E. Jones, a director of Mullard, read a paper on infra-red which we abstracted in our issue of November 23 last.

Surface-to-air. In April 1953 the then Minister of Defence announced that "after full consideration the Government has decided that the manning and operation of ground-to-air guided weapons will become the responsibility of the Royal Air Force." By inference one concluded that it would not also become the future prerogative of the Army. It was, therefore, a puzzling situation when, last week, English Electric announced that they had gained a production order for their anti-aircraft weapon while, at the same time, the Air Estimates ignored it and the Royal Air Force announced that it had bought a quite different weapon (Bloodhound, described later).

The explanation is pretty clearly that the previous carefully considered policy has been changed—as have so many of our policies in recent years—and the English Electric weapon system

English Electric's Stevenage works has this "pan-climatic" test chamber, in which parts or complete weapons can be vibrated under various conditions of temperature, pressure and humidity. The dimensions of the chamber are much greater than the firm's A.A. weapon requires, and may well fit some future ballistic missile body.

