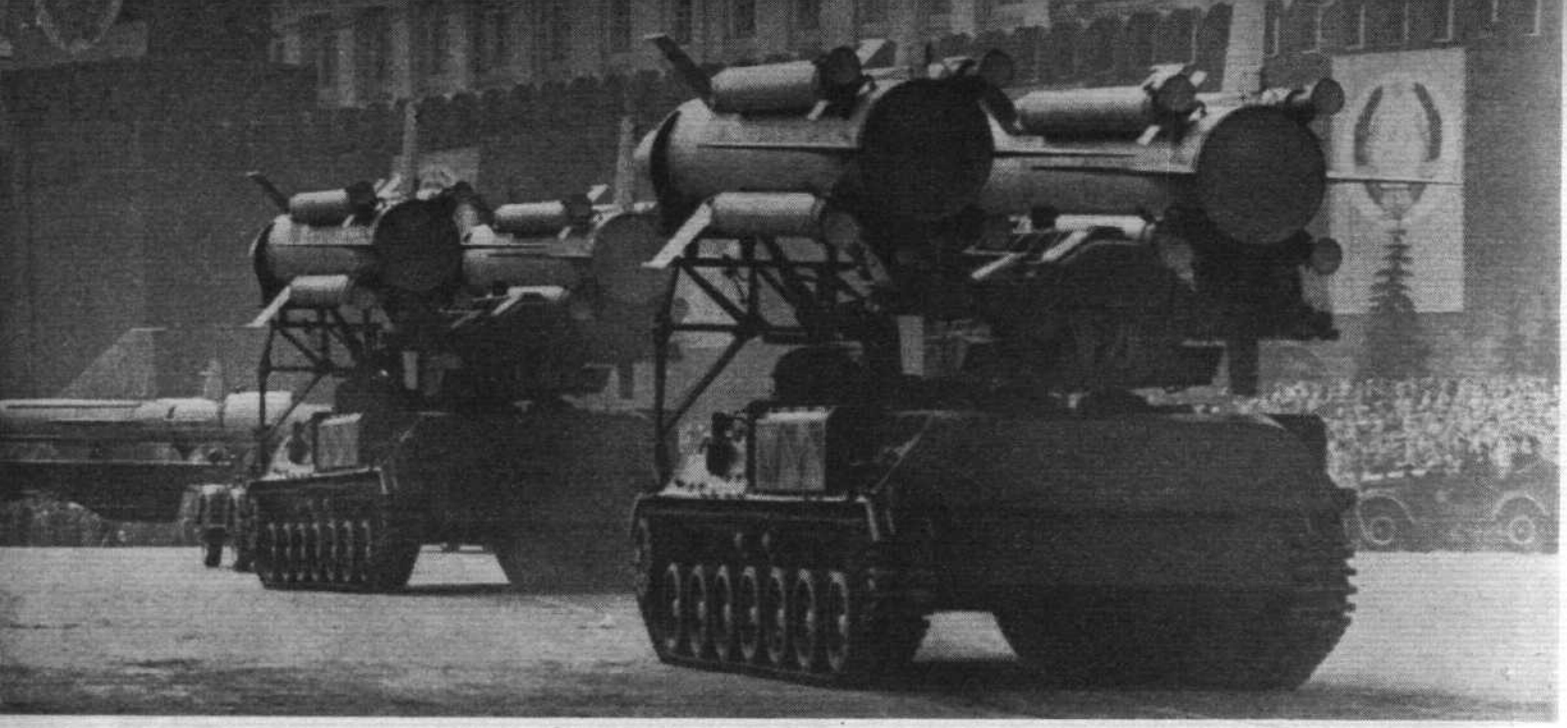

This "Tass" photograph by S. Preobrazhensky shows from a new viewpoint the Soviet missile described in last week's issue. Taken during the parade by the Moscow Garrison through Red Square on May Day, it reveals the slightly tilted mounting of the pair of weapons to allow the inward-facing tail fins to overlap. The diameters of the ramjet sustainer and the four rocket boost motors are noteworthy

Missiles and Spaceflight

TACTICAL SURFACE-TO-AIR PROBLEMS

In our April 23 issue (page 642) we discussed the problems of producing an effective and economic weapon system for defending a field army against low-flying aircraft. We did this in the context of the American Redeye infantry missile, which was ordered into production for the US Army and Marine Corps on April 10. It is appropriate briefly to review what is publicly known of such systems currently under development in Europe.

For at least three years Short Bros & Harland have been offering a land-based version of Seacat, under the name of Tigercat. Like its shipboard counterpart, Tigercat can be developed with any of several degrees of refinement, although all systems would employ essentially the same type of missile. In the simplest arrangement the missile would be steered by direct radio command whilst being tracked optically through binoculars. A more advanced system would be to link the missile into a ground radar equipment in broadly the same manner as light anti-aircraft guns currently in use; in fact, it would be possible to use the existing gun direction systems (such as Yellow Fever and a Dutch Signaalapparaten radar), probably deploying three multiple launchers to each radar. Finally, Short & Harland have for some time been studying with Elliott Bros (London) Ltd the possibility of producing a self-contained, automated system.

Chief advantages of Tigercat would be its minimal development time and cost, and very low capital outlay. Moreover, it should promise excellent reliability, and be capable of easy assimilation into land forces with only modest training and engineering resources. But despite the wide acceptance of the ship-based Seacat, Tigercat has not succeeded in attracting firm orders. Everybody is waiting for "something better," despite the enormously greater cost and technical difficulty of more advanced systems.

Probably the most important of these improved systems is Mauler, under development by General Dynamics/Pomona for the US Army since 1959. From the outset Mauler has been envisaged as an all-can-do weapon, capable of intercepting aircraft flying at high supersonic speeds at minimum altitudes, even at night or in bad weather. The entire weapon system is carried in an M-113 amphibious tracked vehicle, and is designed to maintain a high rate of fire even while on the move or in a nuclear environment.

Each Mauler missile will weigh about 120lb, and be delivered in a case which also serves as the launch tube. Originally it was expected that each Mauler vehicle would carry 12 rounds (at first two rows of six, and later three rows of four), but the number has now been reduced to nine (three rows of three). Each round is guided by an advanced CW radar, by Hughes Aircraft, and de Havilland Aircraft of Canada have been made responsible for the infra-red homing head which takes over in the terminal phase of the interception. Extensive trials have been held at White Sands missile range, and in the course of these several development difficulties have been encountered. It is difficult to know to what extent the gravity of these difficulties has been exaggerated by Mauler's many rivals, but there is no doubt that the programme has slipped considerably, and is also proving more expensive than the original estimates.

Several times during the past 12 months unofficial reports have claimed that the British Army had decided to purchase the Mauler weapon system for evaluation. Certainly the former War Office made no secret of its preference for the US Army weapon, but there has never been any assurance that the right kind of money would be forthcoming for purchasing Mauler in quantity.

Until February 1962 there was at least a project study—known as PT.428—for a British weapon in this category. This project has since been superseded by later techniques, and in British Aircraft Corporation (Guided Weapons) at Stevenage new work is going ahead, much of it in partnership with Nord-Aviation of France with whom a technical collaboration agreement has been in operation since 1962. This agreement is probably chiefly concerned with the anti-tank field, but Nord extensively investigated anti-aircraft problems with the ACAM (Nord 5301), which was terminated when the NATO nations adopted the American Hawk.

A recent issue of the London *Daily Telegraph* states that BAC are expecting a British Government contract for an anti-aircraft missile system known as Sight Line. The report states that this would be a relatively cheap and simple weapon, without night or all-weather capability, but having exceptional mobility in units weighing only a few hundred pounds. The report adds that Sight Line could enter service in 1968.