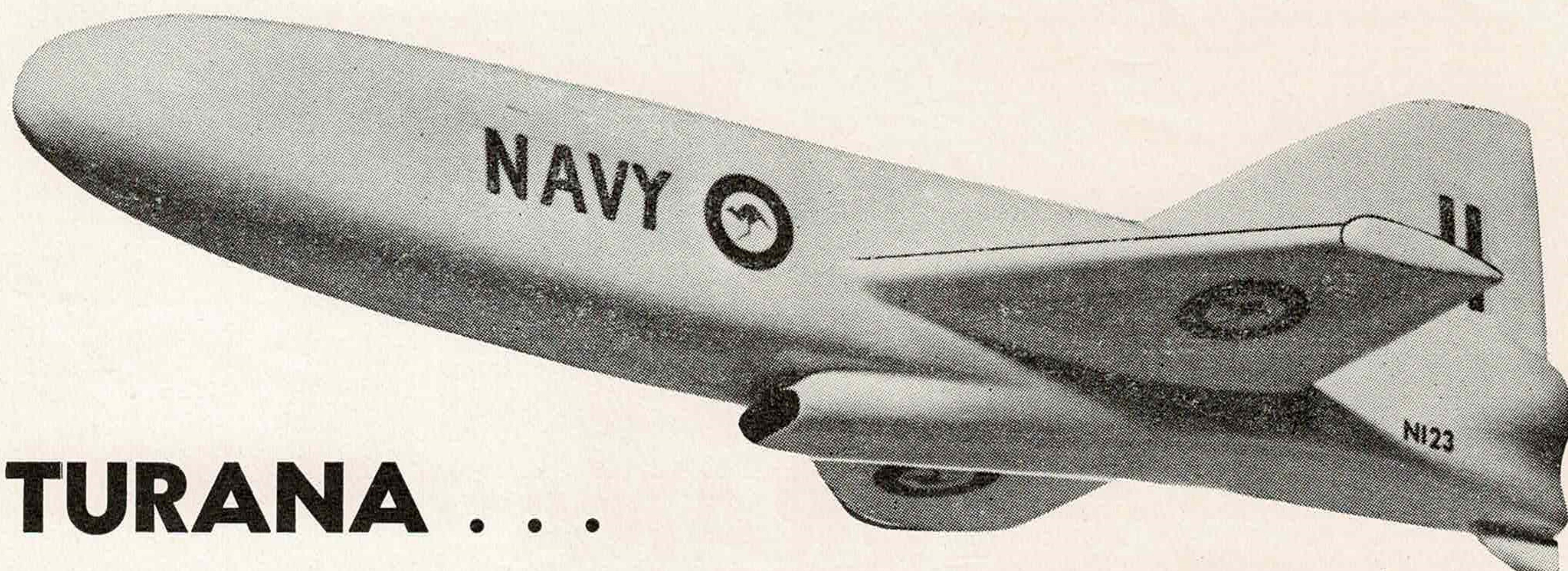




TURANA . . .

Australia's Naval Target Aircraft

The Australian Department of Supply is now engaged in the development of a versatile small turbojet-powered target aircraft based on the proven Ikara GM system and backed by long experience in manufacture of the highly-successful Jindivik target. Turana is to be used by the Royal Australian Navy and deliveries of production targets will begin mid-1971.

DEVELOPMENT of the Turana turbojet-powered target aircraft, on the basis of the already proven Ikara anti-submarine guided missile system, was an entirely logical progressive step by the Government Aircraft Factories along a path of specialised design expertise in which it already has a well-established reputation not only for technical success but for export market sales penetration where the industry of a small country rarely establishes a foothold. There was a basic local need — possibly not an immediately promising one in terms of quantity production — for a sophisticated target aircraft suitable to needs of the Royal Australian Navy, and there was the opportunity to develop it comparatively cheaply.

Much of the basic R&D cost, jigging, tooling, and component development had already been covered in the Ikara and Jindivik projects, and GAF had, too, a well established and co-ordinated back-up team of sub-contractual suppliers eager for this type of technique-enhancing work. The Turana project, indeed, in its follow-on sequence to the Jindivik, Malkara and Ikara, is a classic example of how the Australian industry — planned with foresight and effectively sponsored — might well have by now established itself internationally in other specialised fields.

This particular field, in fact, owes its cultivation primarily to a seed of research incentive planted by the first meeting of the British Commonwealth Advisory Aeronautical Research Council (CAARC) following its formation. That meeting, in April, 1948, was held in Australia, partly in recognition of the substantial research facilities here (and the wartime design and production record of our industry), and partly because of the post-war focus of British interest in the then planned Long Range Weapons Establishment to be established at Salisbury and Woomera. Those factors were also the basic reasons why that first CAARC meeting assigned to Australia the design project for a small pilotless target aircraft — which developed eventually as the Jindivik.

There was, at that time, high hope for co-ordinated British Commonwealth R&D leading to development also of related Commonwealth aircraft industry production programs. Apart from the target aircraft project there was, from that CAARC meeting, the disclosure that Australian research in the application of X-ray techniques to the testing of the properties of materials was "really fundamental"; that our work on fatigue problems in the life of structures (quoting Professor A. R. Collar of Birmingham University's Aeronautical Engineering department) was "ahead of that carried on anywhere in the world" with "considerable bearing on the future design of aircraft". And it was disclosed, too, for the first time, that Australia was doing advanced experimental work (in collaboration with the National Physical Laboratory, U.K.) on thick suction wings, "bearing on the production of an economic flying wing type civil transport."

The high hopes shrank, as did our industry. The R&D expertise we then had — so pointedly emphasised in im-

portance (as a leadership detail of 1948) by the present day problems of, for instance, the F-111C—was not applied, and thus progressively developed as an industrial asset, in Australian or joint Commonwealth design and production programs. But Woomera had its development period and, among its contributions to several facets of our industrial progress, Jindivik was able to be proved — and, with it, the design skills that have flowed on successively, and successfully, in Malkara, Ikara, some promising developments of that for wider military application, and the latest announced project, Turana.

Turana is described as a small, jet-powered target aircraft, based on Ikara but incorporating long-term experience with Jindivik, though particularly intended for shipboard use, it has added versatility in that it can be readily adapted to land-based operations. The kinship with Ikara is so apparent that it tends to obscure the substantial differences in design modification required by the application of the basic launching system and vehicle of the Ikara weapons system to the new target aircraft role, and the basic differences, also, between the Turana and the Jindivik.

Design Concepts

In simplest terms, Jindivik was designed from the outset for use from established trials bases. It takes off from a runway, leaving behind its trolley undercarriage when its Viper jet engine builds up to takeoff power. At the end of its flying pattern as a target or target tow, it is remotely guided to a touchdown on skids under fuselage and wingtips. Ikara, carrying a homing torpedo as its anti-submarine weapon, has a solid fuel motor which boosts it from a launcher fixed in a well on a ship and then sustains it in guided cruise flight to the point near the intended under water or surface victim. The final attack phase begins with the release of the torpedo, which is parachuted into the sea to "home" on its target. In actual operations, the airborne vehicle of the production Ikara is not recoverable, but in practice Ikaras, the airframe section is also equipped with a parachute.

Turana was designed to be fired from an Ikara launcher, and to be stored and handled similarly to Ikara to that stage. It is similar in length, identical in wings, and has (externally) the same fin. It has, thus, basically the same controlled surfaces. Because, however, the torpedo warload of the Ikara missile is eliminated, the re-designed under part of the fuselage is reduced in depth, and the vehicle becomes much lighter — less than 600 lb., inclusive of additional air data, guidance equipment and batteries — and with provision for at least 100 lb. of special trials equipment which can be varied to suit requirements. Because it is no longer needed for stability, the Ikara ventral fin is also eliminated. Instead, the boost rocket motor is mounted externally under the tail. The lesser depth of the body, and the boost motor protrusion do not offer any problems in a normal Ikara