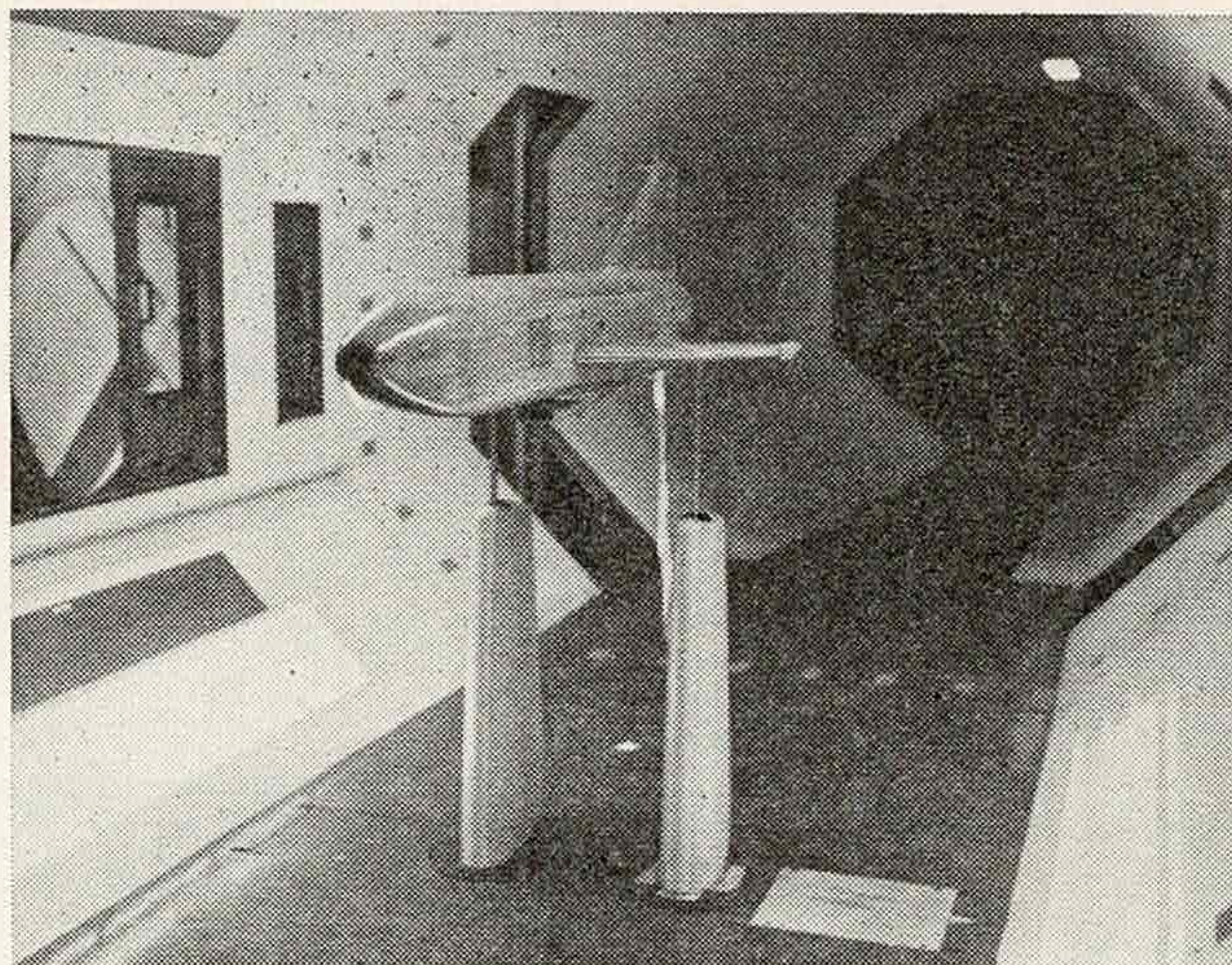




Half-scale Turana model on the mechanical force balance in the ARL 9 ft. x 7 ft. wind tunnel. Two other half-scale models cover all necessary force and pressure measurements in the incompressible speed range.

be made ready for repeated flights by the operating team without recourse to depot facilities. All that is required is a washing down of the target, and a checkout of the engine in a short run. A replacement parachute pack, and boost motor are fitted. A new boost motor will be required for each launch for it is not considered worthwhile, at present, to make the booster recoverable after jettisoning.

Though in normal naval use the Turana will use the Ikara launcher, provision has been made for the design of a lighter, portable launcher which can be used bolted down to a deck or firmly located in some other way for ground use. The adaptability of the target aircraft to ground-based uses is already recognised, but precise uses other than the basic naval one — to exercise crews in anti-aircraft gunnery, ship-to-air weapons (including missiles), etc.—are still under study.

In many items, Turana involves use of highly advanced control and other equipment. Its autopilot, for instance, is more complex than that of Ikara, and the height-lock equipment is more comprehensive and sophisticated than that of Jindivik. The Jindivik height-lock was Australian designed and developed; that for Turana is designed in Australia but employs imported barometric capsules.

Discussing its operational use, GAF states that "Turana initially adopts an optimum climbing attitude (after boost launch) and can subsequently be flown under barometric height-lock at any selected height. In non-level flight a barometric speed-lock is used to control target speed according to the controllers' requirements. Rates of climb and descent are governed by the demanded engine throttle setting. A third proportional command allows bank turn demands up to a limit of 3G. The target is

guided by the use of a suitable radar plot. All basic flight requirements are covered by the ground demand, airborne closed loop system, which eliminates the need for skilled controllers and telemetered flight information.

"Digital commands are initiated using the Target Control Unit, a self-contained piece of equipment containing all necessary control and modulation equipment, which is used in conjunction with a standard transmitter and aerial to form a complete ground control station. Flashing light visual augmentation allows for in-sight control at close ranges, using a hand-held remote control console."

In the recovery phase of the Turana operation, the drone is first directed back towards the launching base. Selection of the "recover" command then effects engine cut, a pitch-up manoeuvre and, at a safe speed, parachute deploy. Recovery is also initiated automatically in event of engine failure, electrical power failure and loss of command after a predetermined interval.

GAF point out that a wide variety of flight plans can be developed to meet the needs of most gunnery and guided missile engagements and tactical exercises. Fitted with suitable instrumentation (for which its payload capacity offers plenty of scope in volume and weight), Turana can also provide an economically effective vehicle for use as an R&D evaluation target for guided missile developmental purposes. Manoeuvring turns of up to 3G are possible and, at higher speeds, pitch manoeuvres of up to 10G may be made to provide evasion capability for short periods. A 7½ in. Luneberg lens is fitted in the nose of the target as standard equipment, providing a greatly enhanced echoing area in the forward segment. Rearward-facing passive augmentation can also be fitted, as can active beacons depending on the requirements of the potential user. Also available is a 48-channel solid state telemetry sender, tailored to occupy minimum space in the target.

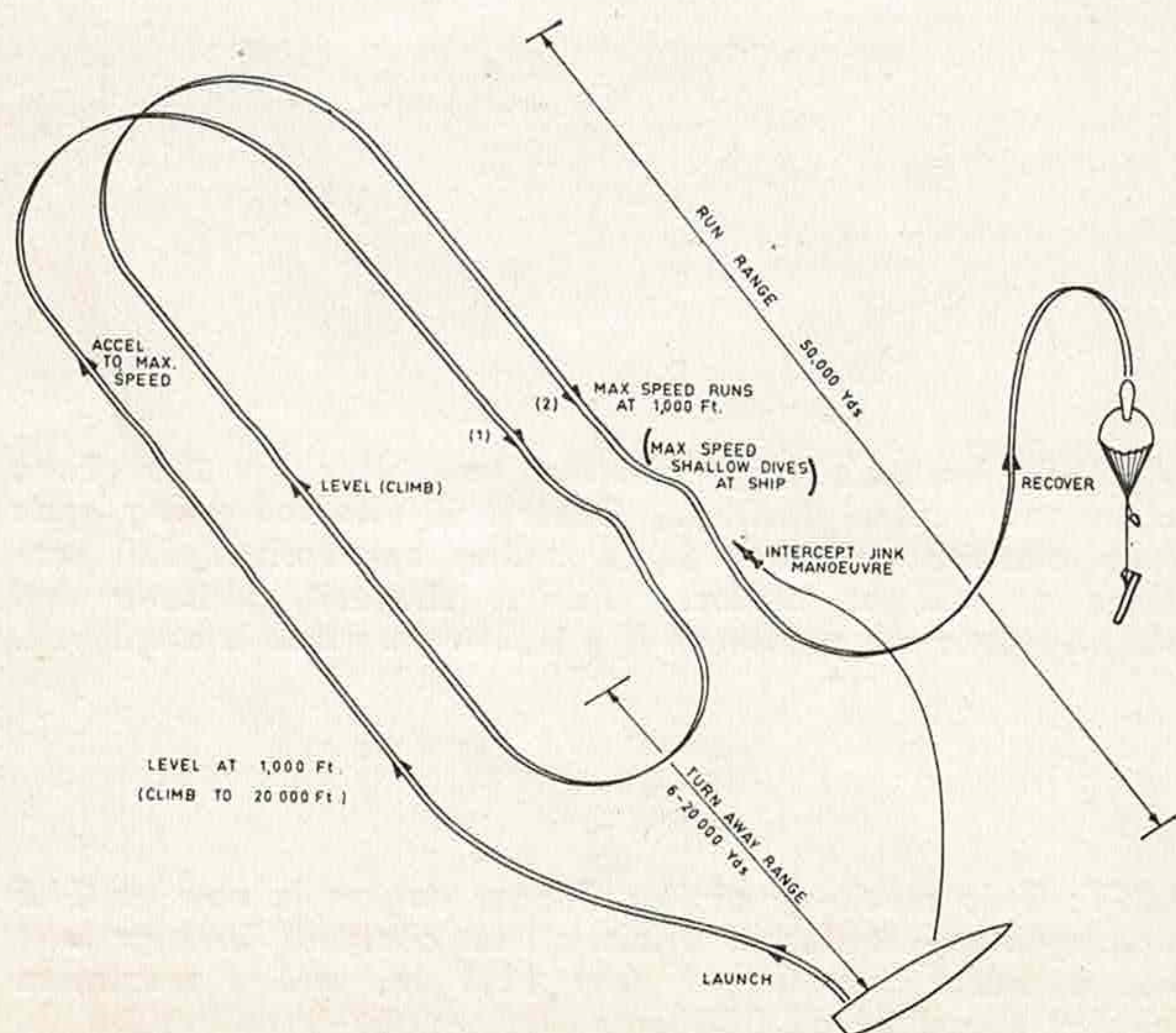
Typical flight plans drafted by the manufacturers indicate a wide versatility in use of the drone in exercise sorties for tactical gunnery, short range and medium-long range surface to air weapons. Turana performance figures are particularly impressive. The aircraft has a TAS, variable in flight from 200 kt. to more than 400 kt. with significant margin for development to higher speeds. There is also development capability in the present altitude range from 200 ft. to 30,000 ft. An altitude of 10,000 ft. can be reached in 2 min.; 20,000 ft. in 6 min. At 200 ft., endurance is 56 min. at 200 kt., and 33 min. at 350 kt. At 20,000 ft., 68 min. is available at 200 kt., and 54 min. at 350 kt.

Prototype And Production Plans

The Government has given a "go-ahead" for development and production of seven prototypes, but it is expected that successful demonstration of capability will be followed by a production order for the RAN. GAF is scheduling for delivery of production targets to begin in 1971. Though Australian naval requirements are not expected to be large, there is confidence that export orders will make Turana another export-money earner, with full recovery of R&D and production costs.

It is pointed out that the world market is a very wide one; Australia would need to capture only a small portion of it with Turana to make it a profitable venture. The Royal Navy, already a customer for the Ikara, is deeply interested, as is the UK Ministry of Technology. Principal competitor in the broader field is visualised as being the USN's Northrop Chukar (NV-105), the performance of which is roughly similar. GAF believe, however, that Turana has advantages in operation which give them a competitive edge. They cite, among these, more accurate control in the boost stage (alignment and boost thrust vector control compared with Jato bottles under the wing in the case of the Chukar) in all wind conditions; more precise control "out of sight," and the volume and weight capacity which Turana offers for special equipment payload.

END.



Typical presentation for medium or long range surface to air missiles (alternative plan shown in brackets). Launch and recover times: Level presentation 14-18 min., diving presentation 22-26 min. A target system incorporating Turana can readily be tailored to specific requirements.