PUGNACIOUS PUP. The addition of this Martin Bullpup to a USAF Super Sabre transforms the fighter into a formidable and accurate bomber, capable of striking tactical targets from outside the range of defensive ground fire.

Missile Marriage for CF-104?

By Peter Brannan

Guided missiles will provide the key to the versatility and capability of the CF-104—the version of the Lockheed F-104 Starfighter to be built by Canadair Ltd. for the Royal Canadian Air Force. Like most modern interceptors, the 104 can be readily adapted to other roles by the addition of varied stores.

Recent announcements by Defence Minister, the Hon. George Pearkes, revealed that the Canadian 104s, billed to replace the Canadair Sabres currently in service with the 1st Air Division in Europe, will be capable of carrying nuclear armament. It is probable that this would take the form of an air-to-surface missile—and, if it does, then it could give the 104 the destructive capability of a thousand or more World War II bombers. Some tactical weapon!

In the field of air-to-surface missiles, the Hound Dog appears to be the only nuclear one currently available, and this is too big for the 104, being designed for launching from the Boeing B-52G platform.

The Martin Bullpup, which would be ideal for equipping the 104, and is in fact operational with the U. S. Navy and Air Force, is credited with having only a conventional 250 lb. warhead, but it seems feasible that the new improved version of the missile, currently being developed, will have a nuclear warhead. If so it would seem to be the logical selection for the Canadian aircraft.

The Bullpup is certainly a clean and compact weapon — and light enough that five of them are carried on the U. S. Navy's FJ4s. Some idea of its accuracy might be gained from a report in the test stage that a Navy test pilot destroyed a four-inch square target, from a range of two miles, on his first shot.

"Small War" Weapon

The Bullpup was first announced jointly by Martin and the U. S. Navy almost three years ago, at which time it was undergoing Navy evaluation. It was conceived as a weapon for the "small war" arsenal and was designed for the destruction of small tactical targets, pillboxes, tanks, truck convoys, marshalling yards and also ships, without the necessity for numerous sorties and the expenditure of large quantities of bombs or rockets.

Its four-mile range enables it to be launched from outside the effective range of high-volume enemy ground fire. The value of this was demonstrated during the Korean conflict when pilots were harassed by small arms and automatic ground fire during close air support requiring low-level flying and bombing attacks.

The 571 lb., 11 ft. long missile can be fitted to most light interceptors, transforming them into effective tactical support or light bomber aircraft. If it were married with an atomic warhead, the Bullpup would assume the devastating destructive powers of a heavy bomber, although carried by the 104 its range would be comparatively limited. For this reason obviously it remains a "small war" weapon designed for that highly controversal quantity: the limited nuclear war.

Objectives of the original design are familiar: ruggedness and reliability coupled with relatively inexpensive production. To achieve these ends, simplicity and the use of known techniques well within the state of the art were employed. The weapon system was required to be compatible with current and future light attack aircraft, and to be equally suitable for carrier and land-based operations.

Success of the design was calculated to make glide and dive-bombing a dead art, and this much seems to have been achieved.

The propulsion system for the Bullpup was developed by the Thiokol

division of Reaction Motors Inc. The latest model employs a prepackaged liquid propellant, which makes for ease of handling and is particularly useful for shipboard operations.

Republic Aviation Inc. have been in charge of guidance of the missile, and evidently have produced a most effective radio command system. The Bullpup steers towards its target by means of canard elevons, similar to those fitted to the Sidewinder. These rotate about their central axis in response to impulses from the guidance system and the missile is steadied by four tail stabilizers.

U. S. Navy units have been loud in their praise of this weapon, both from the viewpoint of reliability and ease of handling. They place the Bullpup's reliability at more than 90 percent and Navy officials have stated that no other missile has approached its record in this respect.

Now operational with both the Atlantic and Pacific fleets, the Bullpup is handled as a round of ammunition, with no test or check-out required.

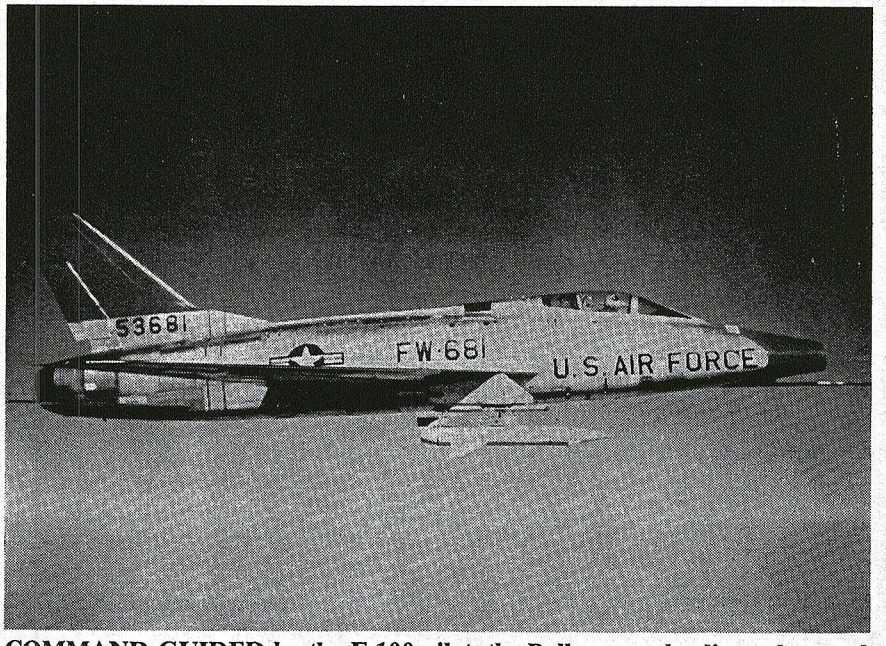
Rear Admiral Paul D. Stroop, chief of the newly formed Bureau of Weapons, commenting on this "no test" philosophy, said that to his knowledge the Bullpup was the only missile operational that did not require test equipment. In the early stages of research and development the Navy planned for a test and check-out system, but the reliability percentage during the test firings indicated that such a program would be far more costly than the loss of an occassional missile that misfired.

Admiral Stroop said this approach had resulted in considerable over-all savings, and had been endorsed by the operating experience of the U. S. Fleet. The missile had more than met all original requirements, he said, and reports from the squadrons indicated great pilot enthusiasm for it.

Further evidence of the Bullpup's acceptance is provided by the continuing contracts placed by both the U. S. Navy and the USAF for the improved version of the Bullpup. The Air Force has placed a research and development contract for a bigger version of the missile, and this is sometimes referred to as the Bulldog.

The latest Navy contract was for $22.6 million, excluding launchers, transmitters, and other components of the system. All the missiles being produced under this contract will have the pre-packaged liquid motor, new warhead, and a recently announced extended-range control system. Full performance details are classified, but the Bullpup's speed to the target is known to approach Mach 2.

FOUR INCH SQUARE target was destroyed from range of two miles by U. S. Navy test pilot Lt. L. Wayne Smith (seen with FJ4) on first try with Bullpup.



COMMAND GUIDED by the F-100 pilot, the Bullpup can be directed toward target three miles and more away. The 600-lb. missile carries a 250-lb. warhead.