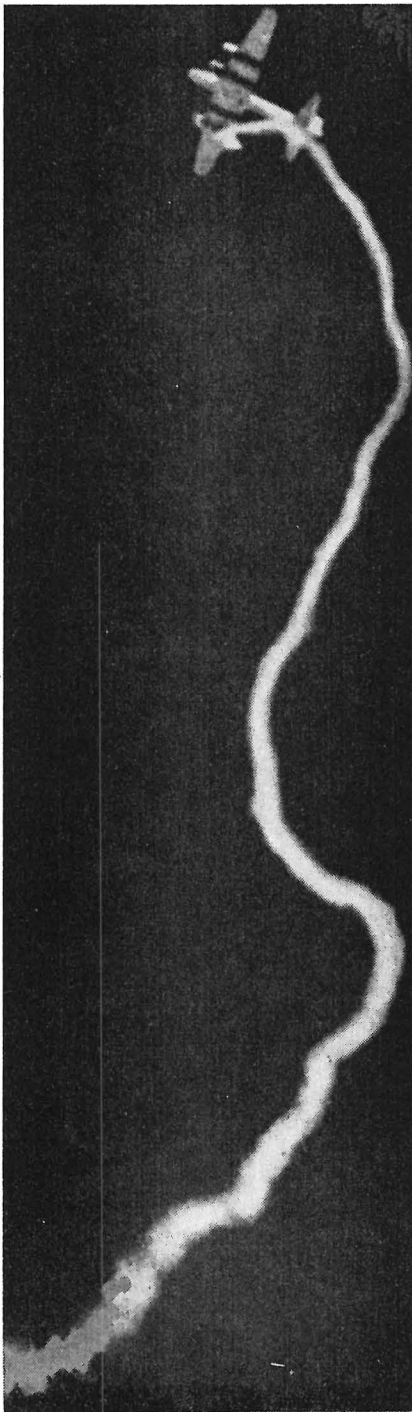


NEW GUIDED



FALCON air-to-air missile, a guided aircraft rocket developed by Hughes Aircraft for the USAF. It's ability to manoeuvre is shown at left with a direct hit on a radio controlled B-17.

... open an era

By Dick LaCoste
Washington Correspondent

In the atomic or thermonuclear war of tomorrow electronics is the key to survival. It is the brain of both the offensive and defensive weapons of tomorrow.

Because only electronics provide the answer to an effective continental defense of North America, Canada and the United States are exerting every effort to bring electronic weapons and warning systems to maturity.

► **Industry Effort** — This means almost 60% to 75% of the aircraft industry's efforts are being concentrated on the last piloted supersonic aircraft (such as the Avro Canada CF-105) and the ultimate guided missiles.

Sparked by the Defense Research

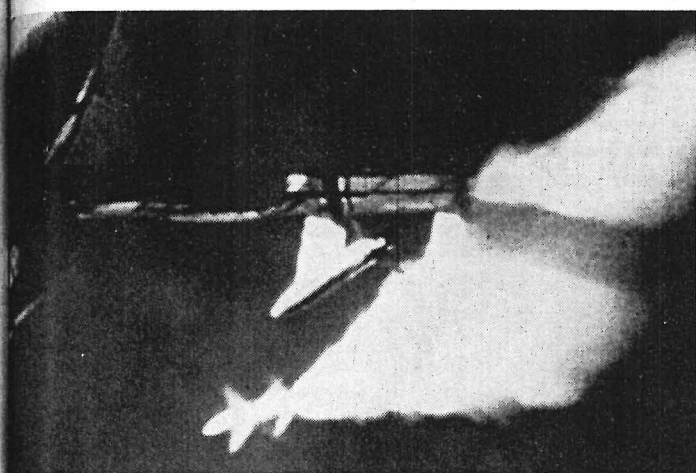
Board, Canadian industry—Avro, de Havilland, Canadair, Westinghouse and others—is racing against time to bring electronic guiding, tracking and firing system to operational efficiency.

► **Velvet Glove.** Canada's major efforts are being concentrated on air-to-air missiles to be carried aloft by the CF-100's and CF-105. A small number have been developed by Canadian Arsenals at Valcartier, Que., in co-operation with private industry. Named the Velvet Glove missiles they are undergoing tests at Cold Lake, Alberta, proving grounds.

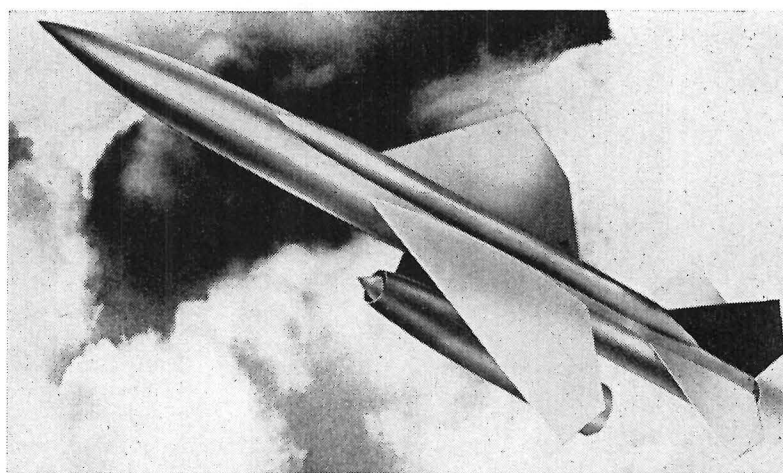
But this is only the beginning in Canada. Air-to-ground and anti-submarine missiles are also under development. Much consideration is also being given to taking on production of some of the U. S. and British missiles.



MISSILES . . .



SPARROW air-to-air missile shown being launched from a plane. It is produced for the U. S. Navy by Sperry.



BOMARC F-99 USAF pilotless interceptor being developed by Boeing marks the end of piloted interceptor fighter era. (Official USAF Photo.)

of electronics warfare

Now, the U. S. Department of Defense has three weapons that could spell the difference between defeat and victory for both Canada and the U. S. in any all-out war.

- **Atlas.** First, there's Atlas, an intercontinental missile. This super Air Force weapon is scheduled to speed to target some 5,000 miles away from a U. S. base at 10,000 miles per hour. Scientists say it will strike within a 20-mile circle of the target. Armed with an atomic or hydrogen warhead, such accuracy is sufficient for military success.

- **Nike.** Second, there's the Army's Nike, a ground-to-air missile. Right now the Nike can outmanoeuvre the fastest fighters and bombers.

- **Falcon.** This air-to-air guided missile is in quantity production for operational use by the U. S. Air

Force. It is launched from a piloted aircraft and is equipped with self homing devices to find the target itself to live up to its description of the only air-to-air missile with a "brain."

The success of this weapon has raised the possibility that it could be produced in Canada under license. It would be suited to both the CF-100 and CF-105 being developed for supersonic long-range interception.

► **System Types.** The U. S. features four basic types of missiles: surface-to-air or anti-aircraft; air-to-air or plane-launched; air-to-surface or plane bombing; and surface-to-surface or from one ground area to another.

Like any other weapon, missiles must be guided to target. The guidance system — the brains of the missiles which lead them to target

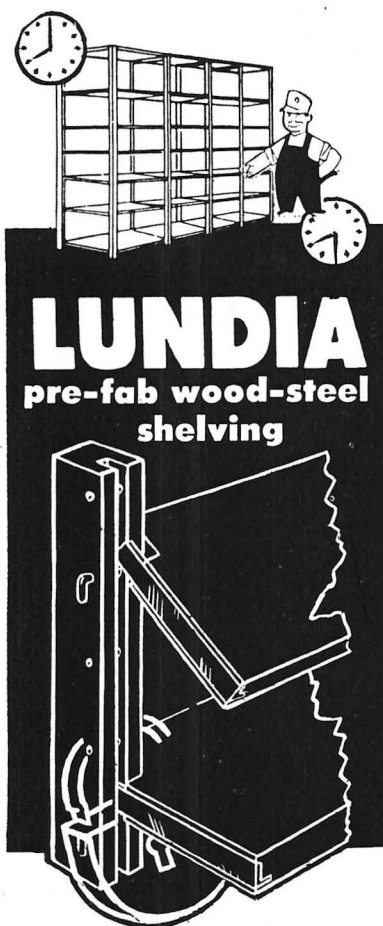
—is what makes them different from conventional weapons.

Some of these systems include the beam-riding type which follows an electronic or light beam toward a target; the homing type—self explanatory; the command guidance type which is directed from ground, ship or plane; and the automatic navigation type which can be sent to target in a dozen different ways.

An aside should be added here on preset missiles. These are not true guided missiles. Missiles of this type have their own propulsion systems. Once they are launched, their course cannot be changed.

For defense, the U. S. is banking on two missiles. The first is the miraculous Falcon. That "bird" is charged with the mission of knocking down "enemy bombers, carrying the hydrogen bomb long before they reach their targets." The Falcon is

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an air-to-air electronically-guided missile.

The second missile is the Nike, a surface-to-air missile. Affectionately known as the "homing bird," the Nike is an anti-aircraft weapon.

Third in the U. S. missile bag of armaments is the Atlas, an Intercontinental Ballistics Missile (IBM). Strictly speaking, the Atlas is not a true guided missile. It is aimed like a bullet from a gun.

The Atlas presumably would be launched from bases in this country or Canada to home in enemy territory. To this offensive phase of war would be added the punishing power of rough, tough, cigar-chewing General Curtis LeMay's Strategic Air Command.

► **Air-to-Air.** Conceived in 1947, produced and developed by the Hughes Aircraft Co., the fantastic Falcon theoretically is capable of destroying enemy aircraft carrying hydrogen bombs before they reach Canada and the U. S.

There's little doubt interceptor planes in Canada, Alaska, Greenland, Iceland, and other arctic areas soon will be equipped with the Falcon.

The Falcon can be launched from well beyond the reach of an enemy bomber's defense. It can be launched on a climbing course from an interceptor that is far below the enemy bomber, thus saving time that the interceptor would need to gain the bomber's altitude.

It has an extremely high probability of "kill," even against manoeuvring targets, especially when it is considered that a small interceptor can carry and launch a considerable number of Falcons.

Once the target has been pointed out to it the missile's electronic brain will steer it to anticipate and strike that target no matter how the bomber manoeuvres.

► **Surface-to-Air.** The liquid-fueled Army Nike is fitted with a booster rocket which gives it the initial blast-off. Approximately 20 feet long and one foot in diameter, the Nike is fitted with two sets of fins for guidance and steering.

What makes the Nike valuable is that it can operate regardless of weather conditions and visibility. Launching sites are now being installed near large industrial cities and military centers.

Inside the Nike's aerodynamic body is an explosive warhead, a rocket propulsion unit, and guidance equipment.

As the target approaches the range of the weapon, the control mechanisms, stabilization and navigational

gear are checked. At this time, certain safety mechanisms are disengaged. When the target crosses Nike's distant and invisible deadline, the missile fires.

With a roaring whoosh it strikes out to meet the enemy. Within seconds the missile has pushed past the sonic barrier. Then, while in supersonic flight, the Nike propels itself smoothly on its own rocket engine as it searches for its prey. Seconds later the Nike and the enemy meet. Both are blasted to bits.

► **Intercontinental War.** As of late March, 1955, the most fearful weapon in the U. S. arsenal was Atlas, the Intercontinental Ballistics Missile.

Two others—the Navajo and the Snark — are competitive with the Atlas. But military men call the Atlas the "true decisive weapon." They say, in effect, we shall have arrived at the age of push-button warfare when the Atlas is fully operational.

Right now the Atlas is moving out of the design range. Perhaps as many as six versions will be built. Currently envisioned, however, is a two-stage or stage-and-a-half rocket weighing 15-plus tons capable of flying 600 miles above the earth at 20 times the speed of sound.

What pleases Air Force officials about Atlas is that it's not a true guided missile. It's aimed — like a bullet. Another satisfying thought is that there is no known defense against the Atlas and similar missiles. —The fact that the Atlas has no guidance mechanism; that it cannot be sidetracked or befuddled by electronics; that it could carry a hydrogen warhead more than 5,000 miles and strike within 20 miles of target makes it a true decisive weapon. The 20-mile margin of error means little. Destruction would be complete.

The Snark, on the other hand, by no means is out of the running. Built by Northrup for the Air Force, the jet-powered pilotless plane also has intercontinental range — some 5,000 miles. Actually, the Snark has flown. But it is not in quantity production.

Measuring about 30 feet long, the Snark snakes to target at just under the speed of sound. Since its ceiling is about 50,000 feet, it could be "caught" by enemy jets. That's its shortcoming.

The third IBM with promise is North American's Navajo. A true guided missile, the Navajo is a ram jet. It is guided to target by the stars. Scheduled to fly at from 60,000 to 80,000 feet, the missile will attain speeds of slightly less than three times the speed of sound.