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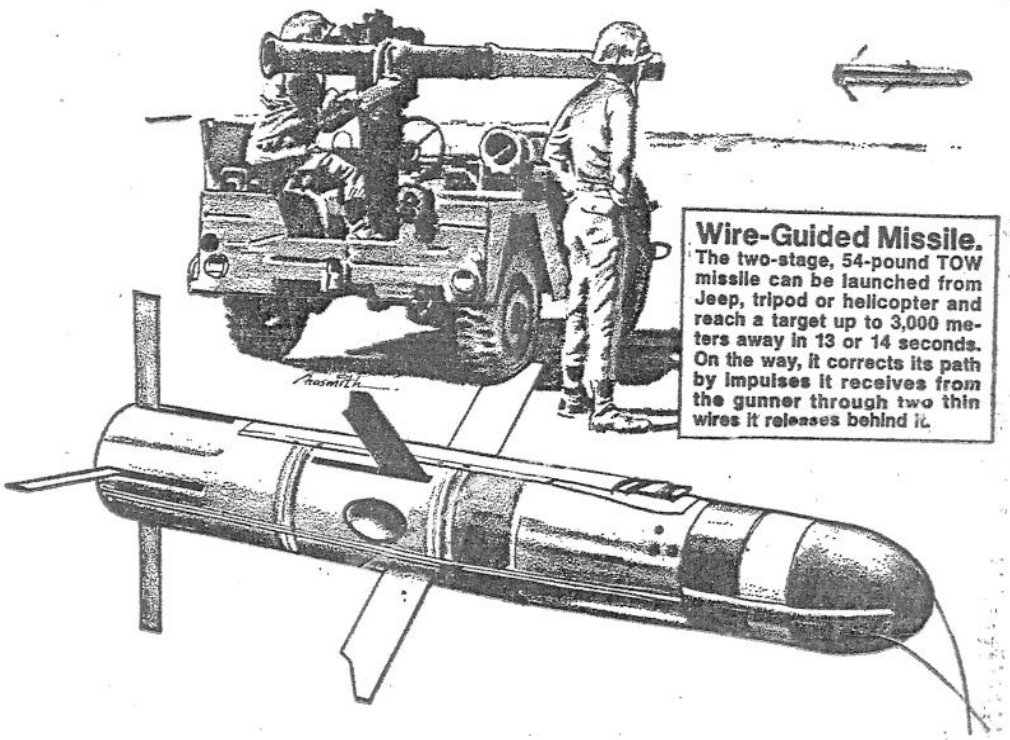

Wire-Guided Missile. The two-stage, 54-pound TOW missile can be launched from Jeep, tripod or helicopter and reach a target up to 3,000 meters away in 13 or 14 seconds. On the way, it corrects its path by impulses it receives from the gunner through two thin wires it releases behind it.

The Missile That Pulls Strings In Vietnam

By William Ellet
L.A. Times Service

MISSILE GUIDANCE CONCEPTS have changed a bit since B. F. Skinner's World War II researches into the use of a pigeon trained to make in-flight course corrections by pecking a sensor in the missile with its beak.

Lasers, television cameras and infrared sensors now are the key to sophisticated new guidance systems that are more costly than pigeons, but certainly more accurate.

Yet one of the Army's deadliest new weapons, the TOW (tube launched, optically tracked, wire-guided) missile, depends upon a relatively simple concept: the sending of course corrections to the missile over steel wires which unreel from a spindle in the launch mechanism.

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THE THREE main components of the TOW guidance system are the steel wires, optical source and sensor and a small computer.

When the missile is launched, an optical source in the missile goes into operation and is tracked by a sensor on the launcher. The operator's only job is to keep the crosshairs of his gunsight on the target.

The sensor then feeds course information into the computer, which measures the angle between the missile's direction and the operator's line-of-sight.

The displacement between the two is converted by the computer into guidance commands which are sent over the wires. This makes for a very accurate weapon; furthermore, training an operator in the use of the missile is obviously easy because the aiming procedure is so simple.

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TOW WAS originally designed as a ground-to-ground, infantry weapon to be employed against trucks, tanks and other armored vehicles. For this purpose, TOW can be mounted on a tripod, a Jeep or an armored vehicle.

However, the most dramatic combat use of TOW has been as a helicopter-mounted weapon. The only two TOW-equipped helicopters in use in Vietnam knocked out 39 armored vehicles, artillery pieces and trucks in about two months of action.

Despite TOW's successes in Vietnam, the Army has indicated that it will equip no more of the current generation of helicopters with the system.

Instead, the Army is concentrating on mating the system to the faster, more durable and more maneuverable attack helicopters, such as the Cobra and the Cheyenne, which are now being developed.

This decision in part reflects a limitation of the TOW system. Because it is a line-of-sight, wire-guided weapon, TOW must be followed all the way to the target by the operator.

If the operator happens to be sitting in a helicopter, those few seconds needed to guide the missile to its sight may make the helicopter extremely vulnerable to ground fire.

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THE NORTH VIETNAMESE have demonstrated that small arms fire, when highly concentrated, can be effective against helicopters. Also, the presence in the field of rockets such as the SS-7, a hand-launched, heat-seeking Soviet missile now thought to be in North Vietnamese hands, would make those seconds even more critical.

What military planners envision as the "ultimate" in anti-tank weapon is the "fire-and-forget" missile, a weapon that once launched will track the target independent of the launcher. Development of a weapon of this sort is currently under way.