

ARCHIVED REPORT

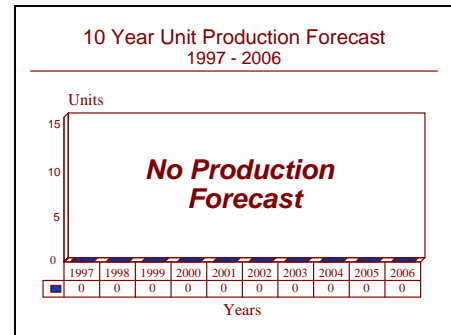
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LOCATM/XIMER - Archived 3/98

Outlook

- Study conducted by United States on ways to increase combat payloads of tactical aircraft; study contracts completed
- Results of contracts turned over to US Air Force; potential applications for this technology being examined
- No full-scale production of these systems undertaken, although certain aspects could be incorporated into future systems



Orientation

Description. Air-to-surface missile and launcher system.

Sponsor. US Air Force through the US Air Force Development Test Center, Eglin AFB, FL, USA; and Wright Laboratory's Armament Directorate, Eglin AFB, FL.

Contractors. McDonnell Douglas Corporation, St. Louis, MO; Martin Marietta, Orlando, FL; Rockwell International, Duluth, GA, USA.

Status. Study contracts completed. Results of these studies have been turned over to the US Air Force.

Total Produced. Full-scale production has not been undertaken. Originally, the potential requirement for this type of system was as high as 120,000 units, although this

dropped in early 1990 to just about 20,000, supposedly due to the changing military and economic climate. However, these were only estimated figures and not firm military requirements.

Application. An air-to-surface system intended for use on combat aircraft to provide significant increases in ordnance payload capacity.

Price Range. US Air Force estimates have placed the minimum price of this type of system, with six missiles in a single launcher, at approximately \$200,000.

Technical Data

Design Features. Specific technical data for the LOCATM/XIMER does not presently exist. Martin Marietta offered manufacturing techniques including pultrusion, injection molding, and sandwiches of braided composites (such as E-glass over foam) that are designed to minimize production costs. Both company concepts consist of six small air-to-surface missiles on an ejector rack. The McDonnell Douglas missile design has folding tail surfaces, while the Martin Marietta concept (referred to as the Advanced Attack Weapon) has folding swept-forward wings. Each missile has an imaging infrared

seeker and low-cost navigation system. The program will use low-cost composite construction, low-drag compactness, and new aft dispensing technology which allows submunitions to be dropped from the back, rather than sides of the airframe.

Propulsion. These systems use a combination of propulsion systems, one for the ejector and another for the missiles launched. The ejector could use a turbojet engine, while the submunitions or missiles are equipped with solid/liquid-fuel rocket motors. However, other sources

state that the powerplant could be an energy management system using sequential firings of either six 2.75-inch rocket motors or two three-stage pulse rocket motors. The Martin Marietta system is said to use the latter propulsion solution.

Control & Guidance. No specific guidance and control systems were mentioned. However, this system is designed to take full advantage of advanced cockpit displays and helmet-mounted sights, and to engage targets well off the aircraft's boresight. The relative bearing of the target would be loaded into the missile immediately before launch; after release, it would steer onto that bearing and acquire the target autonomously. A Global Positioning

System as well as millimeter-wave radar seekers may also be used in this weapon.

Launcher Mode. This system would be carried on wing pylons. The system would be transported directly from ammunition dumps to flight lines, and then lifted from the shipping container and attached to the aircraft. This would supposedly eliminate the time presently needed for weapons buildup and installation, allowing for more sorties and cuts in turnaround time.

Warhead. Various options are available. The system would be loaded at the factory and hermetically sealed for a 15- to 20-year shelf life.

Variants/Upgrades

No specific variants or upgrades can be presented. Possible alternative variants include different loadings and configurations for other launch platforms.

Program Review

Background. The US Air Force solicited ideas for a new weapon system designed to double the air-to-ground firepower of tactical aircraft in 1989. This program was known as LOCATM/XIMER. The individual weapons were called Low Cost Advanced Technology Missile (LOCATM), and the carrier was dubbed the Expendable Intelligent Multiple Ejector Rack (XIMER). The program is intended to identify the critical technologies for a future stand-off weapon with a range of some 40 kilometers that could offer a possible replacement for the AGM-65 Maverick by the turn of the century. The aim is at least to double the sortie effectiveness of aircraft, such as the F-16, at half the cost of current weapon systems.

The concept combined as many as six independently targeted weapons into a single streamlined and expendable package. Concept studies are being conducted by: McDonnell Douglas (formerly its Missile Systems Company), St. Louis, MO; Martin Marietta (formerly its Missile and Electronic Systems), Orlando, FL; and Rockwell International, Tactical Systems Division, Duluth, GA. The objective of these studies was to double the sortie effectiveness of current and future aircraft at one-half the cost of current weapon systems.

An LOCATM/XIMER system gathers weapons that are currently carried separately by combat aircraft. For example, two of these systems, containing 12 181.82-kilogram (400-lb) weapons, would replace the usual F-16 tactical payload of six Mk 82 227-kilogram (500-lbs) bombs or six AGM-65 Maverick missiles. The program provides a carrier (the XIMER) that produces less drag than two Mk 84 909.1-kilogram (2,000 lbs) bombs, and

thereby providing the F-16 with greater range and speed in the attack role.

The studies showed that a low-cost advanced-technology missile system could provide a significant stand-off air-to-surface capability to enhance aircraft survivability and increase sortie effectiveness. Additionally, the system's small size and weight would allow more missiles to be carried, thereby further enhancing overall capabilities. There is presently no further activity in this area, and the Joint Direct Attack Munition (JDAM) program appears to be the system chosen to satisfy the requirement.

Hughes Ring Wing. Hughes is seeking support from the US Air Force to demonstrate a deployable wing design able to extend the range of air-launched weapons. The ring-wing concept allows low-drag, low-observable internal or conformal carriage and is being studied for use on unguided bombs and missiles (such as the Hughes AGM-65 Maverick). The ring wing comprises a flexible band which is force wrapped around the weapon body and which springs outward and upwards when released, to form a parasol-type lifting surface. Wrap around control surfaces at the tail are spring deployed to stabilize and steer the weapon. Hughes has conducted wind tunnel tests of a dummy weapon with a ring wing comprising a 1 mm-thick aluminum alloy band. The wing was deployed and locked in position in 0.2 seconds. The company is now evaluating various composite materials which could be used to make the wing.

Hughes has submitted to the US Air Force a proposal for a two-year demonstration program culminating in sled tests. In these tests, the weapon would be accelerated to flight

speed and released. The tail fins would open first, stabilizing the weapon, then the wing would be deployed. The company is proposing that existing stores, such as the Mk 83 bomb, could be adapted with a sleeve version of the ring wing, which would be slid into place over the

weapon. Hughes calculates that the deployable wing could double the range of a 1,000 kg class weapon, as well as providing more than three times the terminal maneuverability. Hughes says that the concept could also be applied to air-to-air missiles.

Funding

This study effort has been completed. No additional funding is known to have been provided by the US Department of Defense.

Recent Contracts

The US Air Force Development Test Center (formerly Munitions Systems Division), Eglin AFB, FL, awarded two study contracts in August 1989. These contracts were awarded to Martin Marietta and McDonnell Douglas. Rockwell International is pursuing this concept study as a privately funded effort.

Timetable

Aug	1989	Contracts awarded to Martin Marietta and McDonnell Douglas for HAVE SLICK concept studies
	1990-91	Research completed and presented to the USAF
	1993	No additional work planned on this specific system

Worldwide Distribution

User Country(s). None.

Forecast Rationale

New airframe and carriage technology is being investigated by the United States and various other countries in the aftermath of Operation Desert Storm (1990-1991). The fighting to evict Iraq from Kuwait helped raise the profile of stand-off weapons and to boost interest in their acquisition. Allied coalition aircraft experienced considerable difficulties when engaging certain hardened, and well defended, targets that required direct, close-range approaches to deliver their ordnance. Before the war was over, calls were being sent forth by the more involved parties appealing for increases in the development of enhancement packages and all-new stand-off systems.

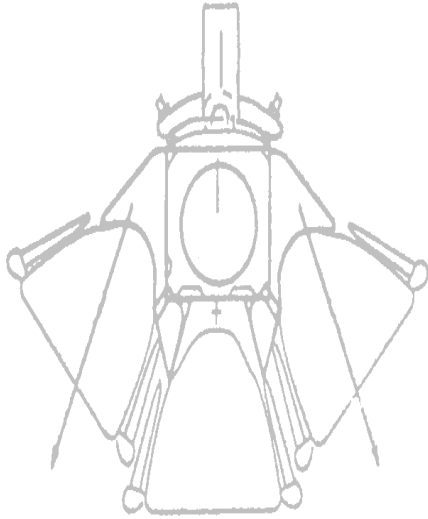
Among the qualities of interest were greater range, lower radar cross sections, better penetration power, and con-formal carriage, the latter requirement being helped along by the advent of various stealth aircraft development programs. Programs like the LOCATM/XIMER and Hughes' Ring-Wing could provide a partial, or possibly complete, solution to these needs.

In the future, certain technological aspects of these programs could be incorporated into the next generation of air-to-surface weapons. However, the exact extent of their effect will not be known for some time.

Ten-Year Outlook

No forecast has been provided.

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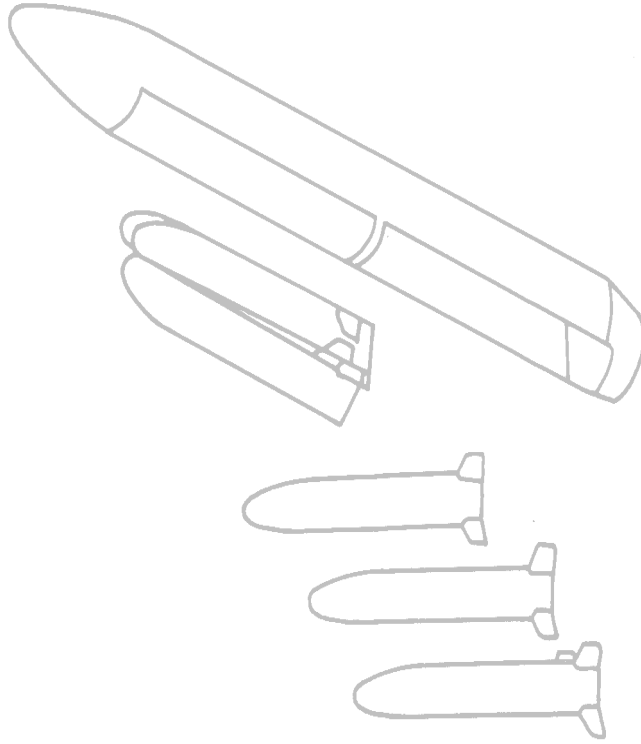
Martin Marietta Concept

Source: Forecast International



Rockwell International Concept

Source: Forecast International



McDonnell Douglas Concept

Source: Forecast International