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Title: Scorpion Small Smart Weapon

Abstract Text: Scorpion is a lightweight, compact small, smart weapon that provides the warfighter with low cost lethality against a broad target set. Scorpion is adaptable to multiple launch platforms, including manned or unmanned systems. Targets include structures, personnel, lightly armored vehicles, trucks, cars, missile launchers, and artillery or gun positions. Acting on lessons learned from fixed-wing attack, rotary-wing attack and unmanned aerial system (UAS) combat, we are taking action to meet the rapidly developing requirements of asymmetric warfare. Simply stated, Lockheed Martin Missiles and Fire Control (MFC) recognizes the need for smaller weapons and a simpler way to integrate and operate these systems on a variety of platforms. Our modular approach provides a common weapon concept across multiple platforms for maximum mission flexibility. We have committed considerable resources toward realizing these goals, and we are fully engaged with various laboratories, platform original equipment manufacturers, and suppliers to create weapons and weapon system solutions that anticipate evolving Warfighter requirements.

The internally developed Scorpion efforts began with a concept of taking an existing semi-active laser (SAL) based seeker with an existing Guidance Navigation and Control (GNC) package and control actuation system and coupling them with a lab development effort for a dual mode warhead capable of prosecuting a substantial target set. The development effort conducted trade studies in aerodynamics, power subsystem, control actuation, inertial measurement systems, safe and arm systems, and packaging. During the course of these subsystem development efforts, we realized the benefit of the modular architecture of the Scorpion platform to enable multiple seeker and warhead options. Other payloads have been considered for this vehicle ranging from kinetic effects through disruptive effects.

Below are the key elements of the Scorpion small smart weapon. • Scorpion is a small (less than 30 lb, length 21.5 inches and diameter 4.25 inches) weapon with a wing kit for range and maneuverability. Scorpion has a highly modular design which enhances its ability to generate mission-specific versions using different warheads and/or terminal seekers. The basic airframe has excellent range and maneuverability against moving targets.

- There is a semi-active laser (SAL) based seeker variant that provides a lower cost lock on before or after (LOBF/LOAL) launch alternative. Other seeker options are also available.

- Leveraging a rich history of radar based missiles; we have developed a seeker technology which will provide Scorpion with a mature, high-performance, all-weather affordable RF seeker which meets all mission objectives. To meet adverse weather requirements, we are using an internally developed seeker concept that features major innovations which enable us to provide extremely small form-factored, high-performance radars at an affordable cost.

- The modularity of Scorpion allows for various warhead configurations that are capable of destroying brick and mortar structures (penetrator), light vehicles (blast-frag) and armored vehicles (shaped charge) while moving. To control warhead effects and minimize collateral damage, we are developing a forward-fragment-firing warhead with a selectable lateral-fragment-firing casing. This concept allows the application of focused lethality on a small area in forward-

fragment mode or a broad fragment dispersion area with good fragment density when required by the target and mission. When coupled with our precise, adverse-weather capable MMW radar, the weapon will be capable of single target lethality even in a dense suburban environment but still provide multiple target lethality when desired. Other warhead variants are also being considered to provide desired lethality against a broad target set.

- Scorpion incorporates a GPS system and a weapon datalink for in flight updates of the target position. Scorpion engagement effectiveness is significantly enhanced with the weapon datalink and algorithms to seek coordinates provided by the launch platform or a tactical network. The key to providing this capability is integrated algorithm architectures, designed to manage the flow of the available sensor data, weapon maneuvering based on updates of target location changes, and terminal intercept.

Our moving target, small weapons heritage began with the Hellfire Missile and has progressed through Longbow Hellfire and now to JAGM and Small Diameter Bomb.

Scorpion can be deployed from various tube launch systems currently in use or from the M-299/M-310 launch system used to launch Hellfire missiles from helicopters and unmanned aerial systems (UAS).