Technology Development

Background

The principal reason the Marine Corps Warfighting Lab develops technology is to support concept-based experimentation. Technologies developed for this purpose differ fundamentally from technologies developed within any other venue within Marine Corps Science & Technology because they are not necessarily intended to transition into acquisition.

There are also three other purposes that the Lab develops technology initiatives:

(1) Technologies explored because the Lab is mandated through Congressional language and provided funding for a specific technology development purpose.
(2) Technologies developed as a direct result of experimentation either as concept demonstrators or as prototypes emerging from experimentation that have proven to be strong candidate technology insertions into programs of record.
(3) Technologies developed to meet emerging operational needs of the Operating Forces.

In addition, to developing technologies as described above, the Lab also assists ONR, MARCORSYSCOM, or the Operating Forces in assessing candidate technologies for sufficient maturity for an extended operational assessment. In this regard, the Lab may also conduct assessments as part of a limited technical experiment for the purpose of developing a concept of employment or interim tactics, techniques and procedures for using the technologies by the Operating Forces.

Prototypes and Surrogates

Concept-based experimentation typically requires technology that can represent capabilities not currently available in military equipment. In some cases, commercial off-the-shelf or government prototypes can be used in providing a capability not yet available with military equipment. For example, during *Hunter Warrior* the Lab used early prototypes of the FO/FAC system as a prototype for a target location data hand-off system. During *Urban Warrior*, the Lab used Libretto palm top computers as a prototype for future tactical hand-held computers.

However, in other cases, there is no available prototype and instead a surrogate that represents specific characteristics of a future capability can be approximated by a surrogate technology. During *Hunter Warrior* a system involving landlines and tower relays were a surrogate for a future over-the-horizon tactical communications system to support experimentation into the *Ship-to-Objective Maneuver* concept from over-the-horizon distances.

In other cases, the surrogate technology can be even more basic. During the experimentation leading up to *Urban Warrior*, the employment of a Marine with a clipboard with "yellow–stickies" carrying a controller radio simulated the battlefield "situational awareness" that could be afforded potentially to a small-unit leader by a not-yet-available

digital assistant in order to explore the information needs of tactical units in urban combat.

Typically, prototypes and surrogates have no use upon completion of experimentation. However, in some cases these systems are offered to the Operating Forces as residual capability upon completion of experimentation with the caveat that the Lab does not provide life cycle support, e.g., maintenance and spare parts.

Congressionally Mandated Initiatives

Annually, Congress mandates and resources the development of specific technologies.

When the Marine Corps requests the Congressional resources it is with the expectation that the Marine Corps will use the resources to either complete a desired development program or initiate a program that the Marine Corps intends to fund in subsequent years.

However, there are other congressional initiatives that are not requested and are not precursors to Marine Corps acquisition programs. In these cases, the Lab focuses the program on achieving a recognizable deliverable product. The expectation is that absent congressional resourcing in subsequent years, there will be no further Marine Corps funding of the initiative.

FY 04 Congressional Initiatives

- **Mobile Counter Fire System**
- **Project Albert**
- **UAV/UGV wearable computers**
- **Transportable Tactical Landing System**
- **Rapid Deployment Fortification Wall**
- **Advanced Lightweight Strike Vehicle**
- **Teleoperated Rapid Aiming Platform**

Technology Enhancement to a Program of Record

The Lab is a component of the overall Marine Corps Science and Technology (S&T) Enterprise. Although technology development in support of MARCORSYSCOM acquisition programs is the responsibility of ONR – in most cases Code 353 or Littoral Combat Future Naval Capabilities (LC FNC) – there are occasions when a Lab initiative may emerge into a technology enhancement for a program of record.

In most cases, such a technology initiative will emerge from a technology prototype or surrogate initially developed for experimentation. For example, the Tactical Handoff System (Experimental) is currently identified as a block upgrade to the Target Location Data Hand-off System as a result of a Lab-developed Advanced Close-Air Support System (ACASS) which was proven to be both more advanced and more desirable to the Operating Forces than the prototype pathway of the program of record.

A second example is the continued development of advanced payloads for the

Dragon Eye tactical UAV program – capitalizing on Lab residual expertise and existing experimentation opportunities with the Operating Forces – after *Dragon Eye* UAVs have entered production.

Technologies Developed to Meet Emerging Operating Needs of the Operating Forces

Operation Iraqi Freedom – and specifically *Operation Iraqi Freedom 2* (OIF 2) – offered the opportunity for the Lab to develop technologies tailored specifically to the needs

of the Operating Forces in combat. These technology needs are situation specific and thus not necessarily applicable to the Marine Corps as a whole.

For example, the Lab responded to the need for an appliqué armor system for support vehicles such as the HMMWV and LVTS with the identification of a variety of potential commercial products. In coordination with ONR and the Army Rapid Equipping Force, the Lab assisted in the expedited testing of various commercial products and approaches to armor systems, aiding in the definition of the protection standard and in quickly assessing the validity of various vendors protection claims.

In addition, the Lab responded to I MEF's

request for force protection sensors by providing lightweight night cameras for integration into an aerostat program. As a result, the MEF received an otherwise unavailable capability for 360-degree night surveillance around a key command element and airfield.

Following a final assessment the Lab will also deploy the Expeditionary Tactical Communications System (ETCS) that will meet I MEF's request for OTH voice and PLI data communication capabilities.