NDIA Frameworks Panel - MAPS
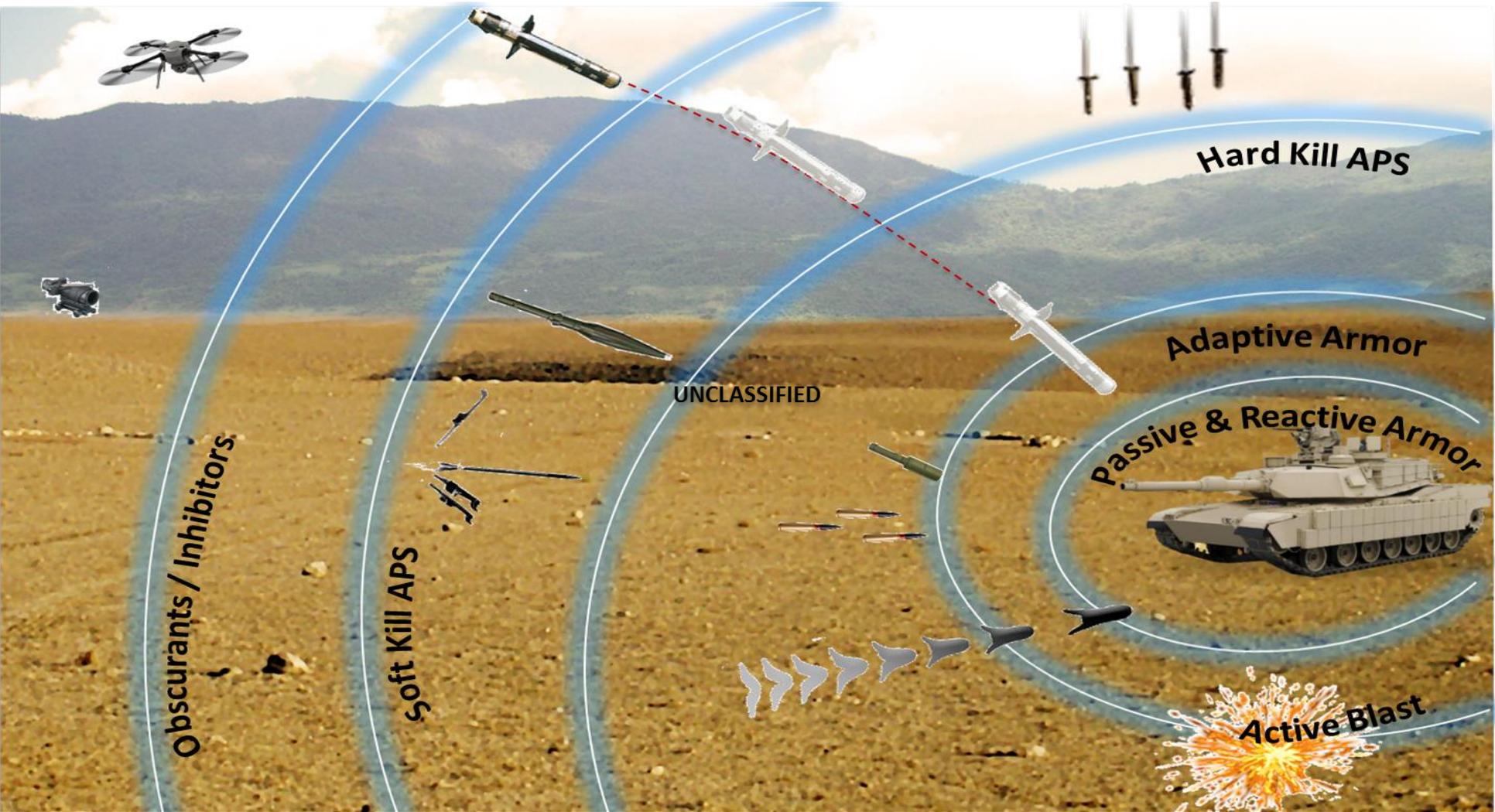
Dan Torres
Framework & Architecture Lead, MAPS
RDECOM-TARDEC

25 OCT 2018

THE NEED FOR LAYERED PROTECTION: ACTIVE PROTECTION SYSTEMS (APS) & BEYOND

TRADITIONAL SURVIVABILITY CAPABILITIES ARE DESIGNED TO DEFEAT SPECIFIC THREATS LAYERED PROTECTION PROVIDES AGILE THREAT DEFEAT RESILIENCY

ENABLING LAYERED PROTECTION

Modular Active Protection Systems (MAPS)

Government Owned Architecture & Controller

MAPS Base Kit

MAPS Framework

Registration No

MODULAR ACTIVE PROTECTION SYSTEM FRAMEWORK
REFERENCE ARCHITECTURE ICD
RELEASE VERSION: A   RELEASED: 30 JUNE 2017

TARDEC
·Technical Report·

30 June 2017

Future MAPS Framework (MAF) Compliant solutions for the rapidly changing threat

Hard Kill APS

Soft Kill APS

Revenge Kill
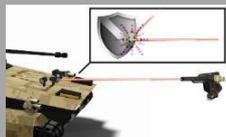
Active Blast

Top Attack

UAS QUADCOPTER

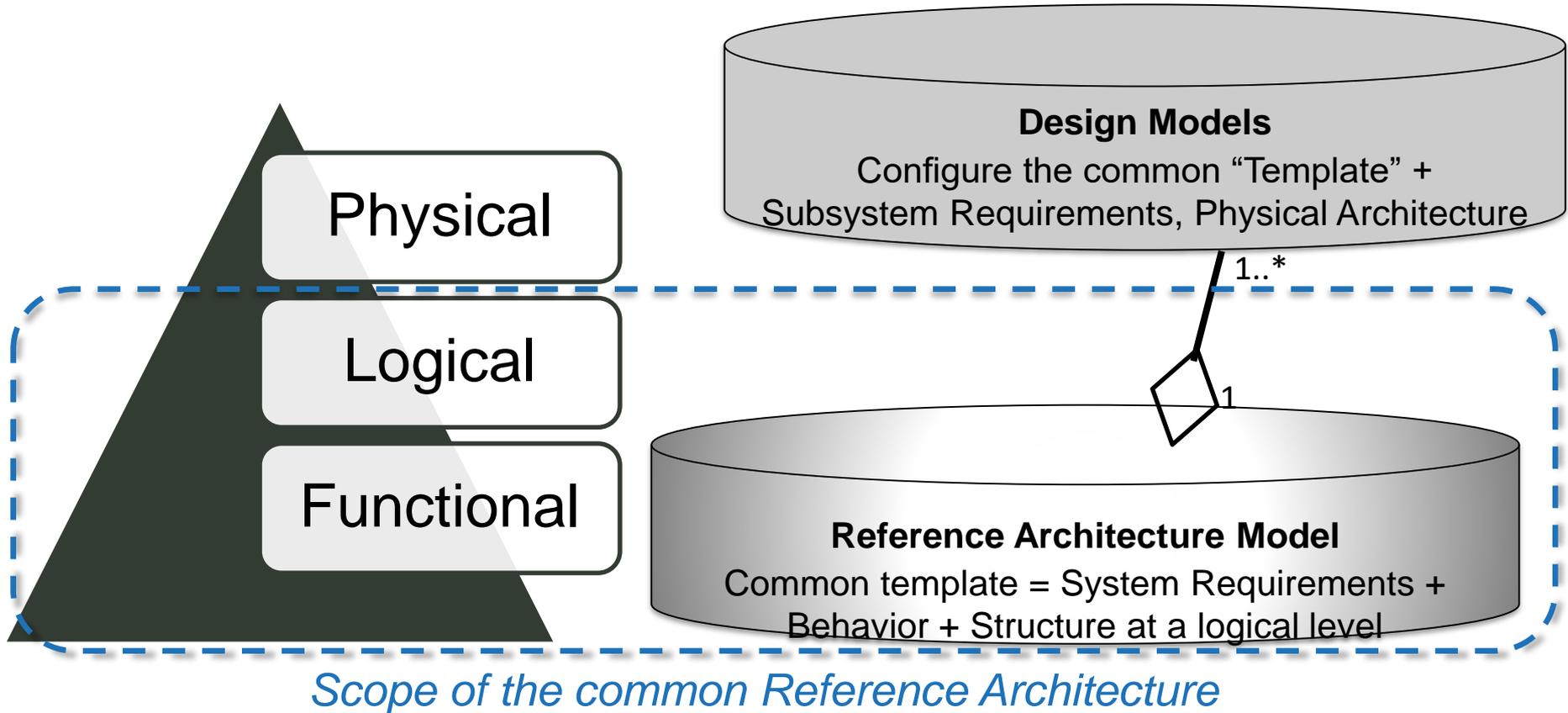**Pre-Shot Detection**

Adaptive Armor

Near

Mid

Far

- MAPS ENABLES LAYERED PROTECTION FOR EVOLVING VEHICLE PROTECTION NEEDS -

REFERENCE/DESIGN ARCHITECTURES

One Reference Architecture is the basis for many design models

Design Models
Configure the common "Template" +
Subsystem Requirements, Physical Architecture

Physical

Logical

Functional

1..*

1

Reference Architecture Model
Common template = System Requirements +
Behavior + Structure at a logical level

Scope of the common Reference Architecture

MAPS MODULARITY STRATEGY

Sensor ← → **MAPS Base Kit** — Government Owned Architecture & Controller ← → **Countermeasure**

Host Platform/ User Interface
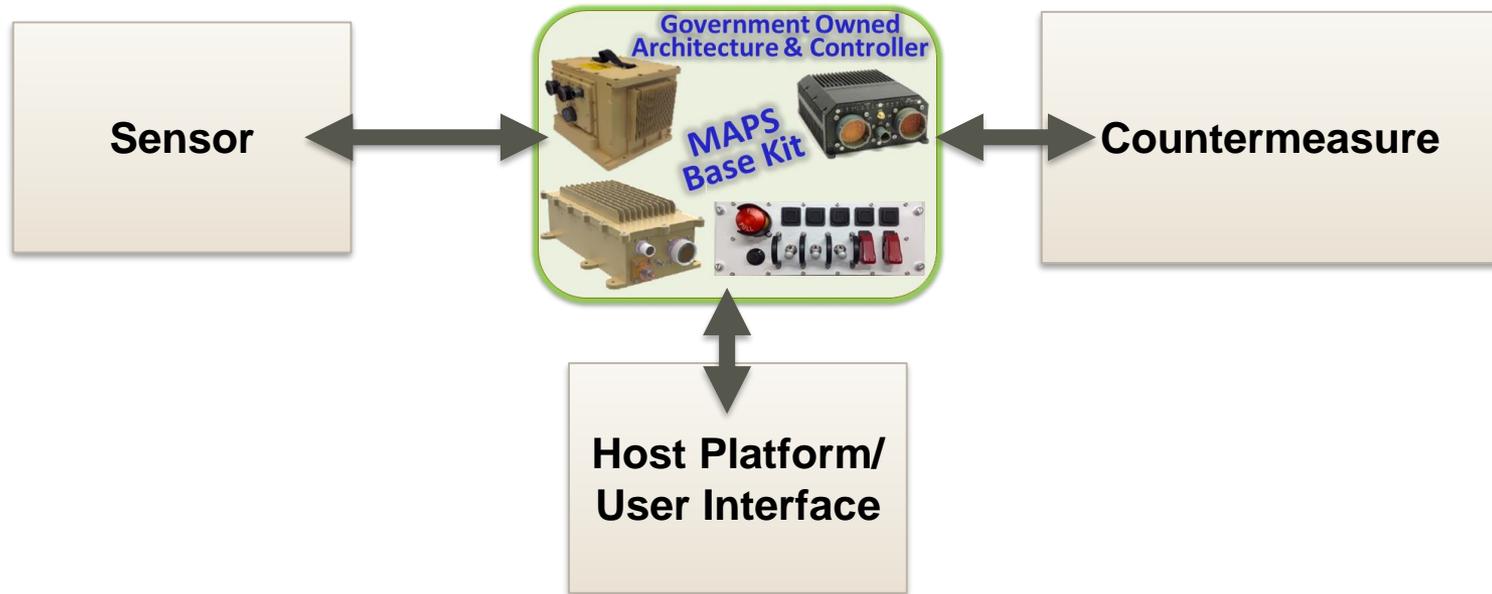
Develop a Government-Owned, Government-Controlled "Hub" (Controller),

and the design rules surrounding it

The MAF includes the guidance for every aspect of compatibility:
technical interoperability, standards, compliance, reference implementation, business, contracts, etc.

The Reference Architecture specifically addresses the design rules/technical interoperability.
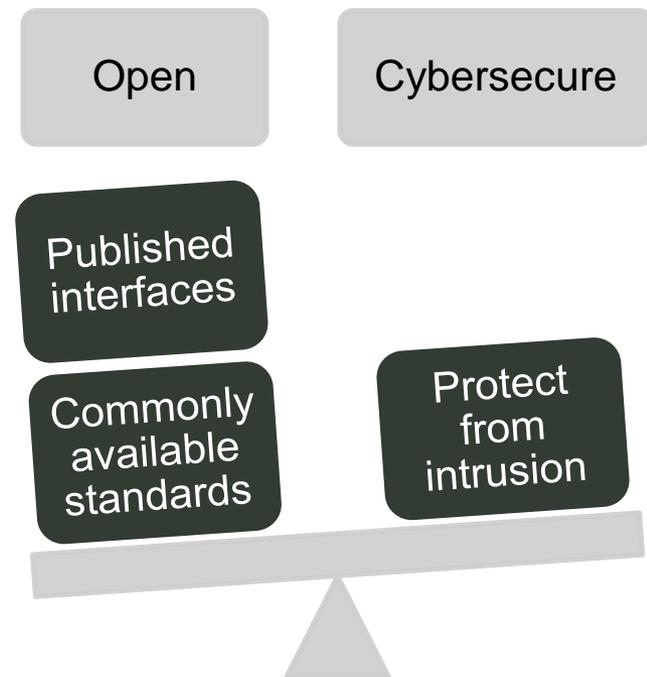
TRADE-OFFS WITH MODULARITY/OPENNESS

Trade-Offs exist when designing for modularity & openness

Challenge: Optimize design for MOSA while abiding by specific regulations and design constraints

Solution: Incorporate design constraints into the Reference Architecture, in order to bound the problem & communicate the boundary to stakeholders

Open

Cybersecure

Published interfaces

Protect from intrusion

Commonly available standards

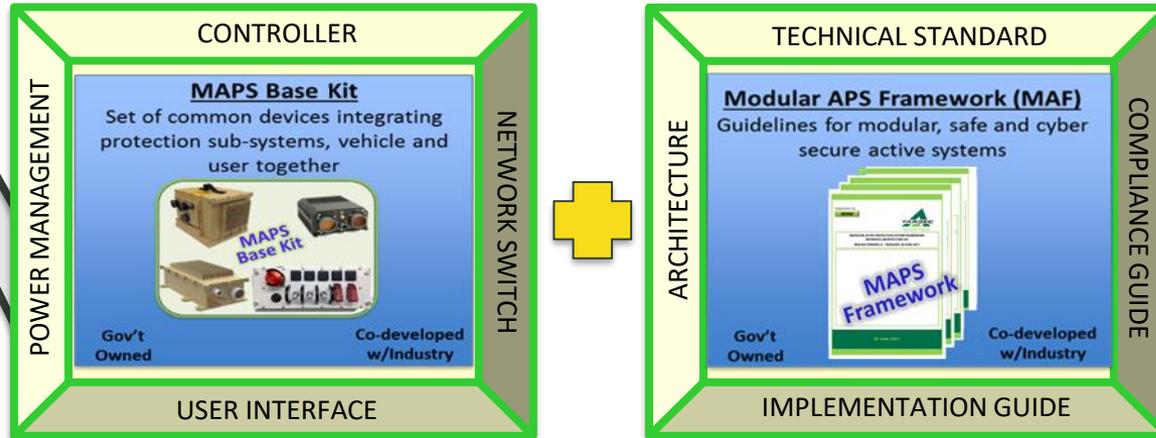October 2018

USE OF MAPS' MODULAR AND OPEN SYSTEM APPROACH

– Enables Safe and Secure integration of an autonomous weapon system with platforms

– Permits analysis of functions for safety criticality

– Facilitates ease of integration for substitution of similar capabilities by using existing design model and Interface Control Documents

- Increases ability to evaluate effects of pairing/integration of disparate subsystems

– Enables mapping of Risk Management Framework (RMF) cybersecurity controls
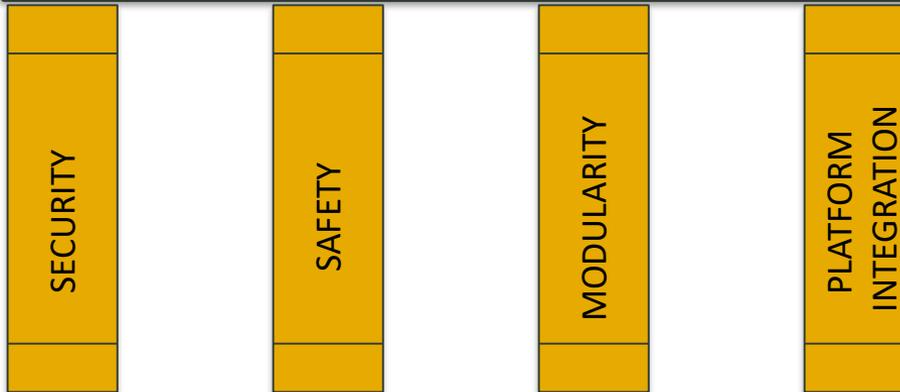
– Connection/integration/ICD to platforms is done once

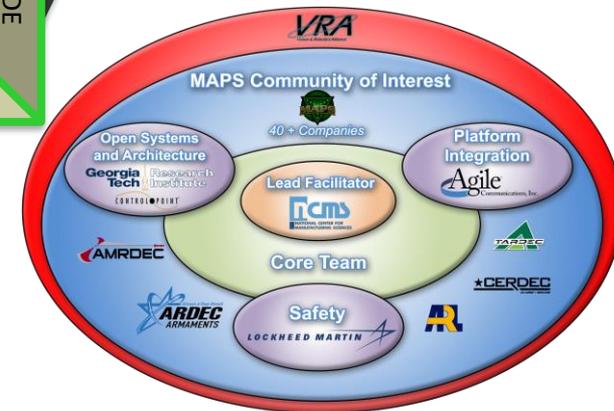# BACKUP

MAPS PRODUCTS AND PARTNERSHIPS

Army Team

CONTROLLER

MAPS Base Kit
Set of common devices integrating protection sub-systems, vehicle and user together

Gov't Owned   Co-developed w/Industry

POWER MANAGEMENT

NETWORK SWITCH

USER INTERFACE

TECHNICAL STANDARD

Modular APS Framework (MAF)
Guidelines for modular, safe and cyber secure active systems

MAPS Framework

Gov't Owned   Co-developed w/Industry

ARCHITECTURE

COMPLIANCE GUIDE

IMPLEMENTATION GUIDE

MAPS GUIDING PILLARS

- **SECURITY**
- **SAFETY**
- **MODULARITY**
- **PLATFORM INTEGRATION**

Industry Team

VRA — Voice of Robotics Advisory

MAPS Community of Interest

40 + Companies

Open Systems and Architecture — Georgia Tech Research Institute — CONTROLPOINT

Platform Integration — Agile Communications, Inc.

Lead Facilitator — NCMS National Center for Manufacturing Sciences

AMRDEC

Core Team

TARDEC

ARDEC ARMAMENTS

Safety — LOCKHEED MARTIN

ARL

CERDEC

MAPS Vendors - Sensors, Countermeasures, Controller Sub Systems

LOCKHEED MARTIN   LEONARDO DRS
   RAFAEL ADVANCED DEFENSE SYSTEMS LTD.
NORTHROP GRUMMAN
BAE SYSTEMS   artis
L3 MUSTANG TECHNOLOGY   IMI Israel Military Industries Ltd   GENERAL DYNAMICS Ordnance and Tactical Systems

**- GOVT-INDUSTRY PARTNERSHIPS FORTIFY DEVELOPMENT OF MAPS PRODUCTS -
- MAPS GUIDING PILLARS ENABLE TRANSITION TO VEHICLE PLATFORMS -**

STRATEGY FOR MODULARITY

Why is the program focused on Modularity?...

- To make complexity manageable
- To enable parallel work
- To accommodate future uncertainty
- To enable reuse and reduce cost

How do we structure the model and architecture for the realities of this context?...

- Highly Integrated
- Interoperable
- Interchangeable
- Simultaneous Development
- Upgradeable