# Cooperation as Key Component in Today's Advanced Military Systems

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VP, Global Marketing
January 2016
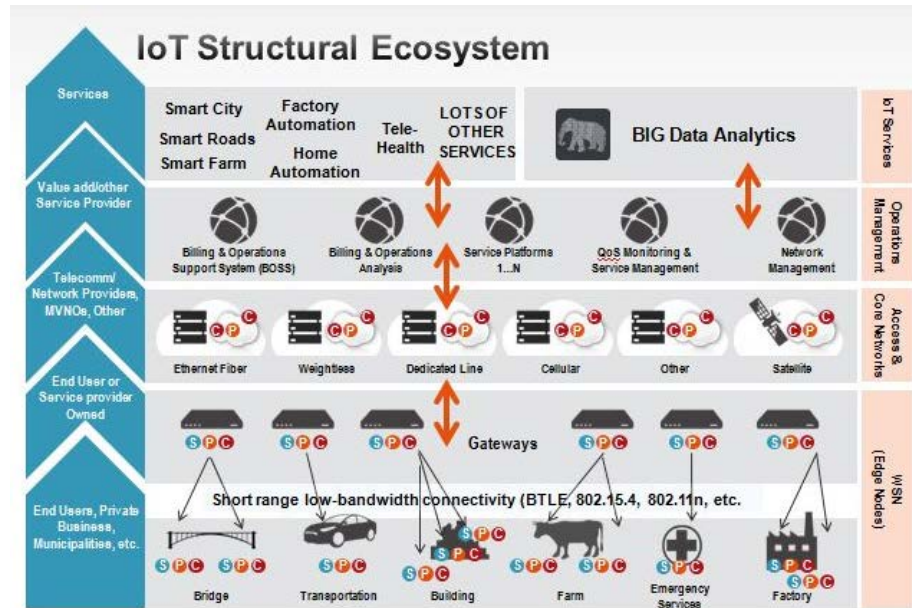
**ADLINK** TECHNOLOGY INC.

# Complexity of the Industrial IoT

Developing an industrial IoT application takes a village (of vendors).

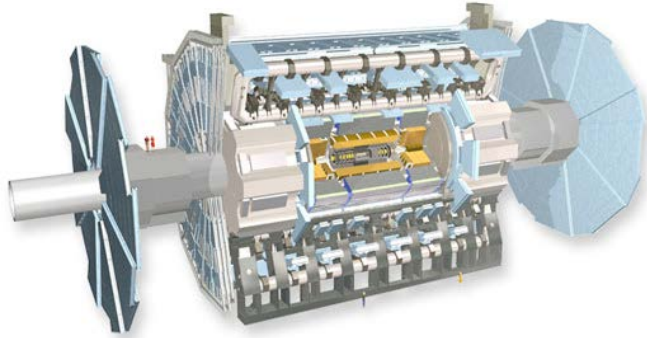# Solutions Require Collaboration

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# Case Study: ATLAS



DETECTOR



ACCELERATOR

- Particle physics experiment being performed with special detector of same name, in the Large Hadron Collider located at CERN, in Geneva

- Used to study what happens when high-energy protons collide

- Critical for confirming the existence of the Higgs boson, which accounts for the origin of mass in elementary particles

- Designed by some 4,000 physicists, engineers and computer scientists hailing from 175 universities and research centers representing 38 countries

- Technical problems that arise with accelerator are solved through direct collaboration with suppliers

- Capacity to work directly with the decision-makers at each company has streamlined problem solving
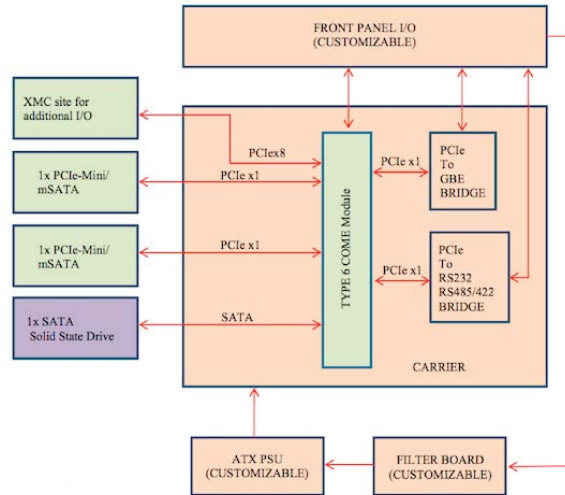
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# Case Study: Rugged Vehicular System



- PROBLEM
  - As mobile requirements and cost pressures force size reduction, the defense market is looking for a smaller, lighter, less expensive alternative to popular VME, CompactPCI & OpenVPX slot card-based systems
  - With defense budgets contracting, the market is ready for an application-ready COTS system based on a smaller standard while offering good functionality at a reasonable price

**ELMA**
Your Solution Partner

**ADLINK**

# Case Study: Rugged Vehicular System



*Elma's ComSys-5001 communications system includes Cisco's IOS software with Mobile Ready Net IP routing and an ADLINK COM Express computer-on-module.*

- SOLUTION

  - Low cost Elma system using off-the-shelf COM Express, mini-PCIe, and an expandable I/O carrier board, with box-level system meeting many MIL-SPECs and operating over -40°C to +71°C

  - Rugged ADLINK COM Express module guarantees operation at +85°C and offers space around largest, hottest components for heat spreader and thermal pads

  - Cisco's IOS software deployed by other COTS companies & large DoD primes offers proven commodity

# Case Study: Portable Man-pack Radio



- PROBLEM
    - As a consequence of recent disasters (e.g., 9/11, Hurricane Katrina), the FCC and International Telecommunication Union (ITU) mandated that first responder communication move to LTE to allow coordination among different teams of first responders at or near the scene.
    - Communications must function in challenging emergency or battlefield conditions and must be as mobile and far-reaching as possible
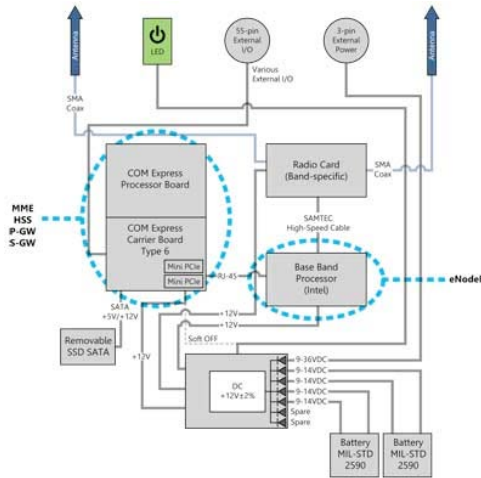
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# Case Study: Portable Man-pack Radio



*LCR's LSF-02 features the company's system design with a Connect Tech carrier card & ADLINK COM Express module*

- SOLUTION
  - Portable communications units or man-packs that can provide mobile and mission-ready tactical LTE networks that can be deployed instantly, allowing communications to resume
  - Alternative to more expensive Cell on Wheels stationary units with limited mobility that are designed to support thousands of users in centralized, controlled, and well-defined locations

# Why Collaborate with Partners?

- Using pre-certified products will reduce development time

- Selecting off-the-shelf products also accelerates design time and reduces cost of customization, while allowing desired flexibility for particular end uses and environments

- System design expertise and solid relationships bring a varied set of skills, as well as the ability to meet industry-specific requirements, together in one end product

# ADLINK: Standards Leadership & Technology Partners

- Intel® IoT Solutions Alliance Premier Member
- PICMG Executive Member
- PC/104 Embedded Consortium Affiliate Member
- SFF-SIG Voting Member
- Communications Platform Trade Assoc. Member
- SGeT Founding Member
- PXISA Sponsor Member
- AXIe Consortium Strategic Member

- Automated Imaging Association (AIA) Member
- Wind River Titanium Cloud Ecosystem Partner
- Montavista Partner
- Freescale Connect Partner
- AMD Embedded Premier Partner
- ETSI MEC Committee Member
- IBM PMQ & IBM Watson IoT Partner
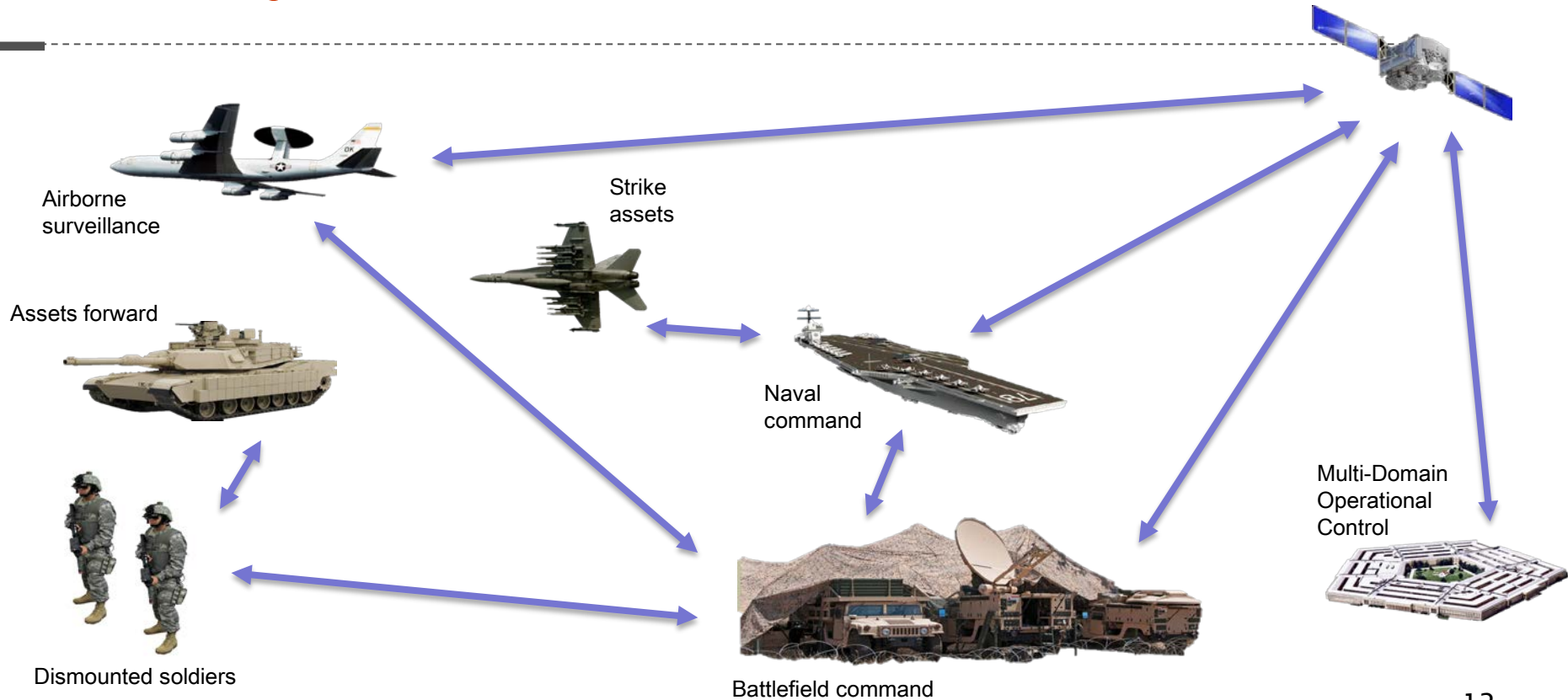- Microsoft Partner

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# Information Overload

"We're going to find ourselves in the not too distant future swimming in sensors and drowning in data"
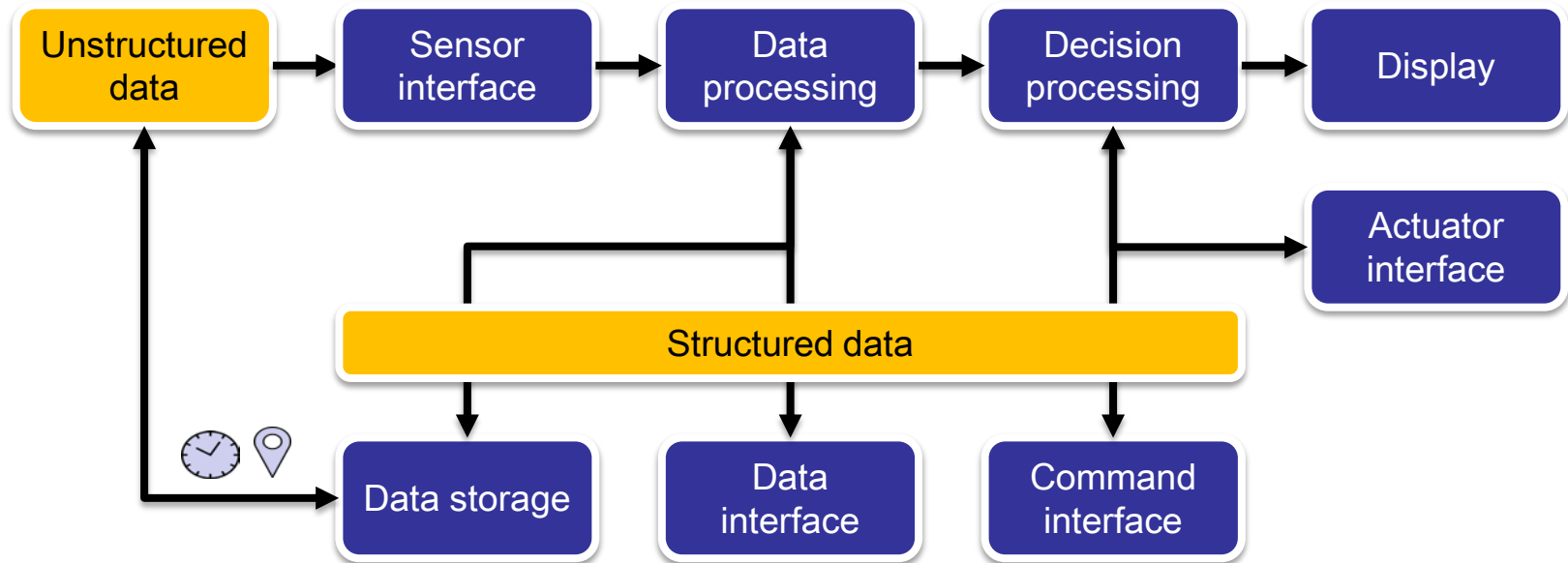
January 2010

## Lt. Gen. David A. Deptula,

Air Force deputy chief of staff for Intelligence, Surveillance and Reconnaissance

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# Military Communications



Airborne surveillance

Strike assets

Assets forward

Naval command

Dismounted soldiers

Battlefield command

Multi-Domain Operational Control

building forward together

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# Data to Decision Model

# DDS

- Publisher / Subscriber model
- Scalable, real-time, dependable, high-performance and interoperable data exchanges
- Adopted in
  - Vehicular Integration for C4ISR/EW Interoperability (VICTORY)
  - Generic Vehicle Architecture (GVA)
  - Future Airborne Capability Environment (FACE)
- 35+ Implementations by PrismTech
- ADLINK acquired PrismTech Dec 2015

building forward together

# Cloud and Fog Computing

VORTEX natively supports both Cloud and Fog computing

"IoT at the edge. By 2018, 40% of IoT-created data will be stored, processed, anlayzed, and acted upon close to the edge of the network." – *Dec 3 2014*

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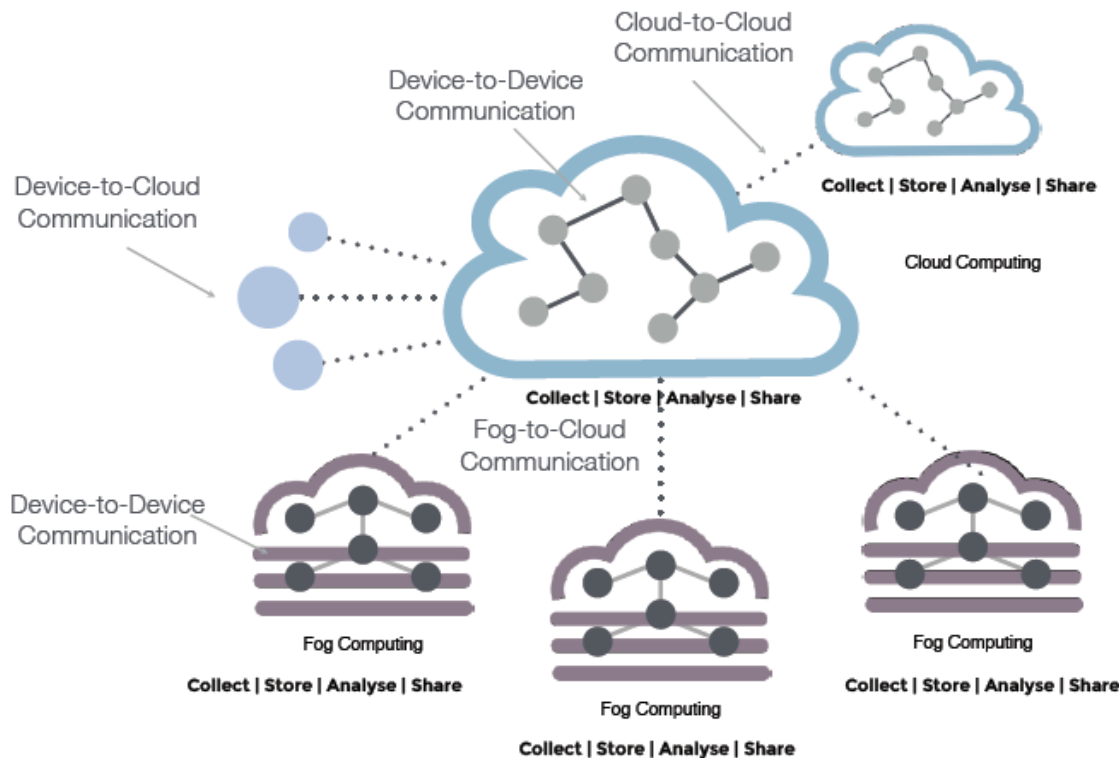
# Industry Leading Performance and Scalability

## VORTEX Device

▶ Peer-to-Peer Intra-core latency as low as 8µS

▶ Peer-to-Peer latency as low as 30 µS

▶ Point-to-Point throughput well over 2.5 M msg/sec

## VORTEX Cloud

▶ Routing latency as low as 30µS

▶ Linear scale out

▶ 44K* msgs/sec with a single router, 4x times more than the average Tweets per second in the world (~6000 tweets/sec)!

▶ *2048 bytes message payload

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