New Administration & Technologies

Industry’s Perspective on Changes for Precision Strike

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Doug Young
Vice President, Business Development, Strike and Surveillance Division
Northrop Grumman Corporation
The future of precision strike ... 

... was found a century ago.
The Obama Administration
- Declared Defense Policy Objectives

• End War in Iraq
  – Increase commitment in Afghanistan
• Place “people first”
  – Increase size of Army / USMC
  – Take care of Service Men / Women & Families
    • Note: already occurring with the Economic Stimulus to include health care, child care services, barracks repair / construction, etc
• Restore global partnerships and build a Civilian Assistance Corps to promote stability
• Focus on adapting and building US military capabilities for current needs and missions of the future

...a more efficient and adaptive military well suited to irregular challenges that preserves nuclear deterrence and sufficient conventional warfighting capabilities
  – Administration transition team
Conflict in Early 21st Century

Hybrid Warfare - the convergence of disparate types of conflict
- Civilian-warrior - disciplined, coordinated, autonomous and determined
- Weapons - AK-47 to cruise missiles and cyber technology
- Tactics - simple to complex, coordinated with high Situational Awareness
- Environment - congested urban settings to isolated, inhabitable terrain
- Nation-states to non-state actors will embrace and exploit
Military Capabilities Needed Today

- **ISR** – to discriminate, detect and track hostile personnel, operations and capabilities
  - Imbedded in complex, congested urban terrain
  - Scattered in austere mountains to dense jungles
- **Strike** – to damage or destroy
  - With precise, low collateral damage
  - Lethal and non-lethal effects
  - Against a discrete target
  - Against a deeply buried target
  - Must be survivable and persistent

**Challenge of Precision Strike** demands extremely high fidelity information
### Layering ISR
- Maximizing Awareness of the Battlespace

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Who</th>
<th>What</th>
<th>Where</th>
<th>When</th>
<th>Why</th>
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<tbody>
<tr>
<td>SIGINT</td>
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Layering ISR assets provides precise data:
- Where (geo-location)
- When (timing)
- Accuracy (speed, signal type, characterization, picture, etc.)
Improving Persistent Awareness
- Enhancing Fidelity of Ground Surveillance

- Current E-8C provides good surveillance and tracking of ground maneuver forces

- Flown over 50,000 hours supporting operations in Iraq and Afghanistan

- Future E-8 (with MP-RTIP Actively Electronically Scanned Antenna) will dramatically improve Ground and Air Commanders’ awareness
  - Dismounted Forces
  - Cruise Missile and low flying aircraft
MP-RTIP on Joint Stars – Expanding Precise Awareness of Surface Action

Current E-8

<table>
<thead>
<tr>
<th>Operational Benefit</th>
<th>E-8 W/APY-7</th>
<th>E-8 w/MP-RTIP</th>
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<tr>
<td>Wide Area Continuous Tracking</td>
<td>Red</td>
<td>Blue</td>
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<tr>
<td>Small Area Tracking</td>
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<td>Blue</td>
</tr>
<tr>
<td>Precision Engagement of Moving Targets</td>
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<td>Green</td>
</tr>
<tr>
<td>Moving Target ID</td>
<td>Yellow</td>
<td>Green</td>
</tr>
<tr>
<td>SAR Image Resolution</td>
<td>Green</td>
<td>Blue</td>
</tr>
<tr>
<td>Concurrent SAR/GMTI</td>
<td>Red</td>
<td>Blue</td>
</tr>
</tbody>
</table>

1991 – Move and Die
Stationary and Survive
2015 – Move and Die
Stationary and Die

Improved Resolution & Track Quantities / Continuity
Expanding the ISR coverage - Global Hawk

(Cannot use EO & SAR simultaneously)
System Comparison
- GH vs U-2

**Challenge of Precision Strike demands expanded information collection**
Unmanned Combat Air System (UCAS) - Next Generation Combat System

- Carrier based stealth UAS supported by autonomous air-to-air refueling (AAR) capability
  - Return of true global strike / ISR capability to the US Navy Carrier force
- Long unrefueled range / endurance for deep persistent operations
  - ~1,700-4,000NM max unrefueled range with current engines
  - ~3,300-5,600NM max unrefueled range with advanced commercial derivative engines
- Ultra-long refueled endurance for global responsiveness, extended CV standoff with AAR
  - >100 hours, limited primarily by actuators, lube oil
  - Probe-drogue and boom-receptacle refueling
- Balanced survivability
  - Broad-band / all-aspect stealth
  - On- and off-board threat awareness
  - Dynamic mission management / auto-routing
  - LPI/LPD communications
  - Electronic and lethal countermeasures
  - Collaborative defensive operations

- Advanced, networked targeting capability
  - Automated sensor fusion
  - Automated target recognition
  - Automated precision imagery geo-registration
  - GIG connectivity for ISR data distribution / receipt
Persistent surveillance-attack system comprised of multiple distributed air vehicle nodes operating collaboratively to hold broad, deep, and heavily-defended areas at perpetual risk.
Surveillance and Attack Response
- Any Threat Environment

- **Multi-sensor ISR capability**
  - EO/IR, IRST
  - SAR, Ground / Air / Maritime MTI, ISAR
  - ESM

- **Advanced lethality**
  - Two internal weapons bays each carry up to 2,250 lbs of ordnance or advanced mission loads
  - Up to 18 250-lb GPS-guided Small Diameter Bomb, or 2 2000 lbs JDAM
  - Miniaturized precision kinetic weapons (free-fall, glide and powered) to deepen strike magazine
  - DE weapons for counter-air / missile ops
Potential N-UCAS Concepts of Employment
- Core Applications Offer True Multi-mission Capability
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“Core” Missions

- Air & Cruise Missile Defense
- Littoral Barrier Defense
- Maritime Interdiction
- Surface Attack
- ASW
- ESM/DEAD/Seaweb
- Deep/Strategic Attack
- CAS/Interdiction
- ESG ISR & Fires Support
- Expeditionary Strike Group
- Automated Aerial Refueling (AAR)
- TACAIR Strike Support
- Penetrating Surveillance, Targeting & BDA
- Boost-Phase BMD
- Deep Escort/Self Air Defense
- SOP Support
- Maneuver/IR Regular/FGF Attack

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“Core” Missions

- Deep/Strategic Attack
- CAS/Interdiction
- ESM
- EC-130/EA-18G
- C-130/Hercules
- Surface Attack
- AAR/Refueling
- Maritime Interdiction
- Expeditionary Strike Group
- Littoral Barrier Defense
- TACAIR Strike Support
- Naval Surface/Sub Fires Support
- Expeditionary Strike Group
- Automated Aerial Refueling (AAR)
- Penetrating Comms Relay
- Air & Cruise Missile Defense
- Penetrating Surveillance, Targeting & BDA
- ESG ISR & Fires Support
- “Manhunting”/Irregular Force Attack
- SOF Support
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- Boost-Phase BMD
- SEAD/DEAD
- SCAR
- “Core” Missions

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Precision Intelligence and Strike  
- Integrating Systems, 2015

**Desired Information exchange:**
- Retargeting Data
- In-flight Target Update (IFTU)
- Weapon In-flight Tracking (WIFT)
- Acknowledgement/Negative Acknowledgement
- BHI

**Scenario:**
1. Multiple Sensors execute fused track of identified target
2. C2 Node tasking pairs Shooter/Weapon to Target
3. Periodic target track updates
4. Weapon release
5. Weapon data link (WDL) gives continuous data exchange with weapon
6. Weapon acquires & guides to target; transmits BHI
The Evolution of ISR and Strike

2010

ISR
- E-3
- E-8
- RC-135
- EP-3
- RQ-4
- RQ-7
- U-2
- RC-7/12

Strike
- MQ-1A
- MQ-9
- MQ-8
- MQ-5
- F-16
- TARPS
- P-3
- F-22
- F-16
- F-15
- B-1
- A-10
- B-2
- F/A-18
- B-52
- AV-8
- AC-130

2020

ISR
- E-3
- E-8
- EP-X
- ACS
- BAMS
- RC-135
- RQ-4
- RQ-7

Strike
- MQ-1A/B
- MQ-9
- MQ-8
- MQ-1C
- P-8
- B
- N-UCAS
- NGUAS
- OA-X
- NGB
- F/A-18
- AC-130
- B-1
- B-2
- B-52

2035 Blend

ISR
- EP-X
- ACS
- RQ-X
- OA-X
- N-UCAS
- AC-X
- F-35
- P-8
- F-22

Strike
- NGB/Ph III
- B-2
- F-35
- AC-X
- N-UCAS
- OA-X
Summary

• New Administration dedicated to prevailing in current fight by adapting capabilities for this mission …
• … while preparing for future challenges by building new capabilities
• Precision Strike in current and future scenarios demands a higher fidelity of Precision Intelligence
• Near-term and developmental systems offer significant improvements of the quality and quantity of data provided …
• … and will offers weapon systems that merge collection and engagement capabilities

Industry can no longer think of Precision Strike and ISR as distinct … as the Joint Warfighter does not