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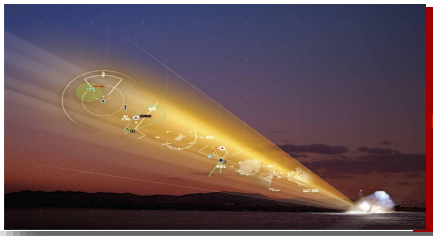
Customer Success Is Our Mission



PRECISION ENGAGEMENT

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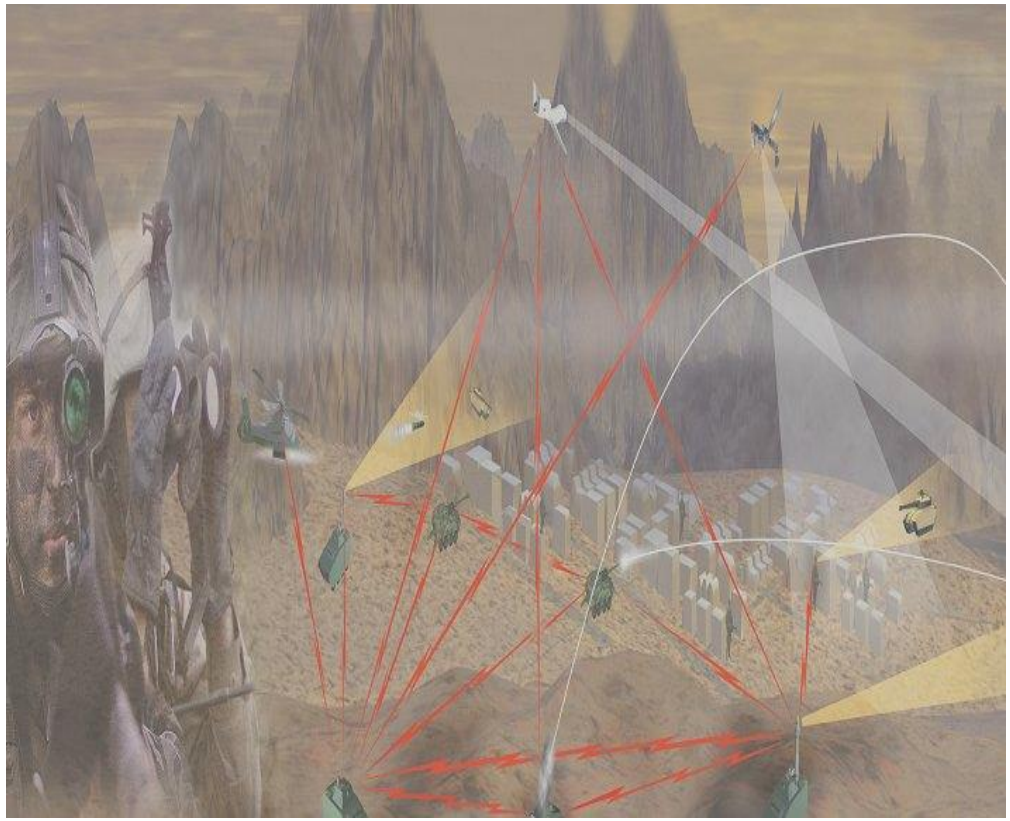
Accelerating Networked Sensors & Fires

October 19, 2005

Precision Engagement Strategic Business Area

Providing the Warfighter timely, effective and affordable Mission Solutions that span the breadth and depth of the Battlespace



John Weinzettle
Director, PE SBA
John_P_Weinzettle@Raytheon.com
520.794.4079

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A Perspective on Networked Sensors & Fires

- The U.S. Military is implementing an operational concept where early-entry & light forces rely on ***precision strike*** to augment the lethality previously associated with heavy, direct-fire weapons

- Effective Precision Strike Requires:
  - Precise Targeting Sensors
  - Precision Munitions
  - Digital C4I (includes datalinks)
  - New/revised tactics, techniques and procedures

- Must Think in System Terms

FOCUS IS AT MODULAR BRIGADE COMBAT TEAM (BCT)

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The Changing Nature of Warfare

- Battlefield being replaced by Battlespace
  - 360 degree operations
  - 3 Block War
  - Urban/Complex terrain
- Different levels of war collapsing- strategic=operational=tactical
  - Rules of Engagement (ROE)
  - Collateral Damage
- Capability becoming more important than platforms
- Joint – How We Plan & Fight
- Changing Targeting Environment
  - Fixed targets becoming more mobile; mobile targets more fleeting
  - Targets more time sensitive

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Networked Fires Process – What's being Worked

Sensor System

- Target Detection
- Location
- Reduced TLE
- Integrate sensors into network
- BDA

Network System

- Integrate communications
- Develop reliable / robust platforms
- Develop effective Battle Management System software
- Manage the Spectrum (manage / expand available bandwidth)
- Develop reliable long-range radios

Weapons System

- Develop multi-mode seekers
- Develop reliable ATA / ATR
- Improve IMU / INS / GPS systems to reduce delivery error
- Integrate platform / munitions into Network
- Develop more effective lethal mechanisms
- Improve propulsion reducing TOF

Operational / User Community

- Articulate requirements
- Develop appropriate TTP
- Staff / train Battle Command cells appropriately

FROM A SYSTEMS VIEW DO WE NEED TO OPTIMIZE ALL AREAS?

Top Challenges to Accelerating Networked Sensors & Fires

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1. **Human Intervention Points**
   - Trade off between C2 and responsive fires
   - Decision mode algorithm (TTP)
2. **Line-of-Sight Transport Capability Limitations**
   - Network transport capabilities provided by waveforms – the "tools in the toolbox"
   - Need to integrate these "tools" to form the network – one tool doesn't fit all needs
3. **Functionality and Interoperability**
   - USMTF - LINK-16 - JVMF - AFATDS - Blue Force Tracking ….
4. **Precision Engagement Limitations** – *Target Location Error (TLE)*
5. **Cold War Tactics, Techniques, Procedures (TTP)**

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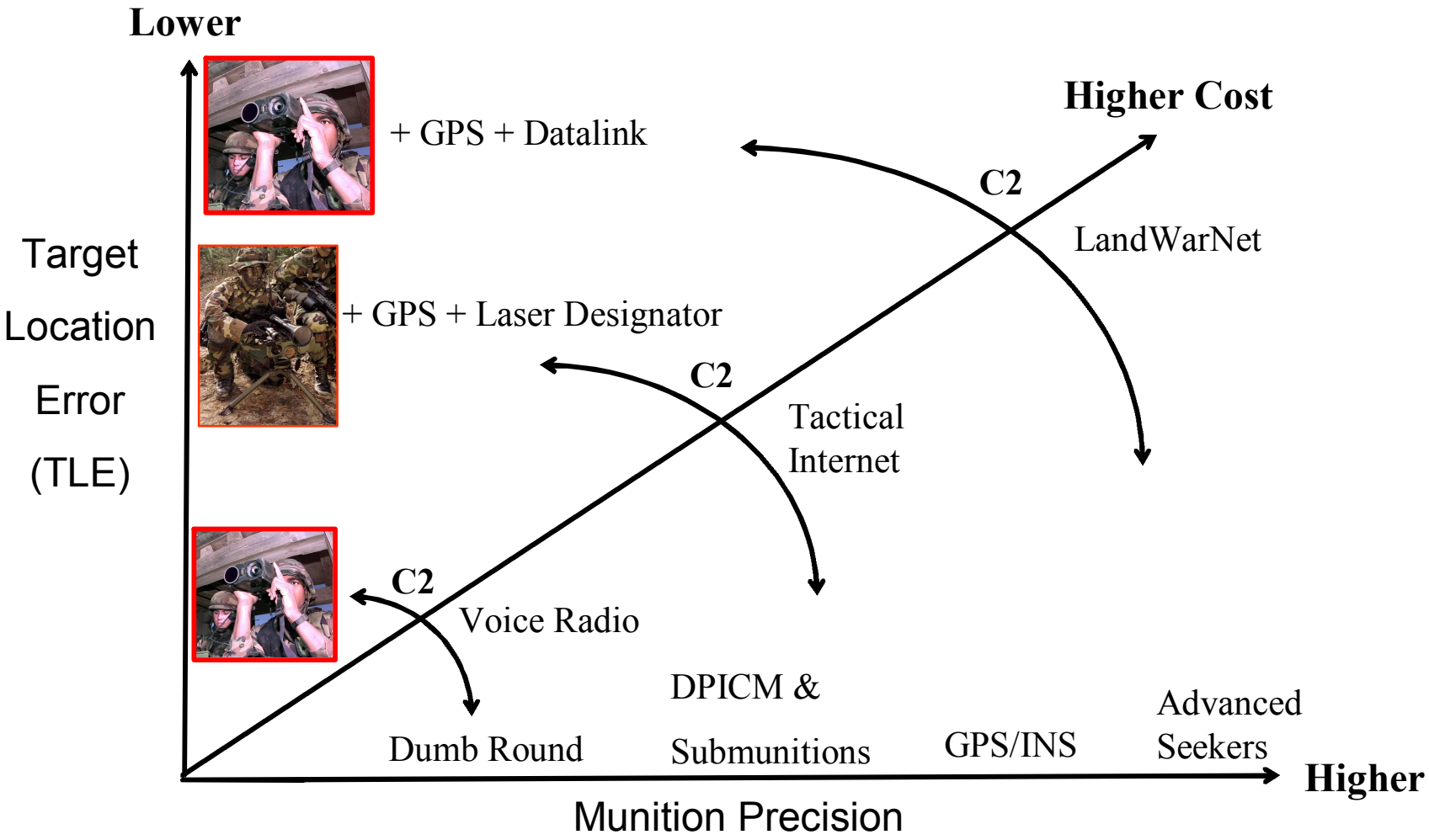
Ending the Era of Uncertainty?



IS IT AFFORDABLE?

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Affordability – What is the Right Metric?

EXAMPLE – "The Building Way"

Tank type target

	Msl	Round
TLE (m)	100	100
CEP (m)	.5	35
Rounds/hit	1	40
Cost/Round	$100K	$1K
Cost/Hit	$100K	$40K

Building Assessment: Precision $60K higher -- not affordable

EXAMPLE – A Bigger Picture

Tank type target

	Msl	Round
TLE (m)	100	100
CEP (m)	.5	35
Rounds/hit	1	40
Cost/Round	$100K	$1K
Cost/Hit	$100K	$40K
Training Rounds / Hit	0	160
Training Rds Cost **Training O&S $**	0 $	$160K $$$
Total Cost / Hit	$100K	$160K

Alternative Assessment: Precision saves $60K + $$ -- Precision affordable

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SUMMARY

- Must think in system terms to resolve fact sensors and shooters are in different stages of evolution
- Sufficient capabilities exist today to build a seamless Brigade Combat Team holistic network – “THE TOOLS ARE AVAILABLE”
- Need to relook division of labor between – sensors, weapons, the network and operational/user community
- Time to relook fires process – review from the bottom up vice the top-down