JOE Purpose

- Provides the **problem statement** for the future joint force – the “demand signals” for JCDE
- Reviews the **trends** from the present out 25 years
- Analyzes operational **contexts** that will frame the future security environment
- Anticipates **disruptions**
- Forecasts the **implications** for the joint force

“We won’t get it all right – but we can’t afford to get it all wrong”
JOE: Trends Influencing the World’s Security

Demographics – Population growth/decline, age disparities, migration, sprawling urban areas

Globalization – Rising powers, interconnections, and inequalities

Economics – Trade imbalances, rising expectations vs. failing economies

Resource Scarcity – Competition for water, energy, food

Climate Change & Natural Disasters – Sea level, storms, growing coastal populations

Cyber – Exponential growth, advantage, vulnerability

Space – More have access, defense of US space assets

Technology – Exponential growth, ubiquity, lower cost of entry – to include CBRNE technologies
...leading to Contexts of Conflict and War

- Cooperation and Competition among conventional state powers will provide a number of challenges and threats to the joint force
- Weak and failing states will require engagement and cooperation
- Large, sprawling urban areas with dynamic pressures in which the joint force must operate
- Threats from Unconventional states and non-state powers that will confront us with new and innovative ways to wage war
- Battle of Narratives will bring populations directly in touch with joint force operations and shape perceptions
- Defense of the US Homeland will require operations abroad and at home

Contexts are the confluence of two or more trends and illuminate why wars occur and how they might be waged.
Contextual S&T Implications (Near Term)

• Longer-range, more-precise weapons are more widely available and cheaper – this has anti-access implications.
• Operations into remote and under-governed spaces have unique ISR requirements and implications.
• Urban areas offer shelter from U.S. advantages in ISR and fires.
• Separating adversaries from civilian populations in urban settings will be critical, but very difficult.
• Identities forged via the internet and other communications technologies will compete for nation-state allegiance.
• Technology, WMD proliferation, and globalization will bring homeland into reach – US bases not immune.
• Protection of “homeland” will include elements of space and cyberspace.
Contextual S&T Developments (Mid-term)

• Information, bio, and nano technologies are merging:
  – Real world embedded with computational devices – including the human body itself.
  – Robotics ubiquitous and linked to the world through wireless networks.
  – Real-time, near ubiquitous multi-spectral remote sensing.
  – Real and virtual worlds more deeply linked.
  – Access to massive amounts of data + sophisticated computational tools = more powerful simulation tools widely available.
  – Fab-labs, desktop manufacturing devices, “garage” biolabs.
  – Modification of the world around us available at the smallest scales.

These capabilities will be available to all at lower costs for entry
The Nature of 21st Century Warfare

- Adversaries examine & circumvent how the U.S. wages war
- Adversaries will adapt military practice to:
  - Construct a mix of conventional, irregular warfare, and nuclear threats
  - Blur the line between political conflict and open war
  - Place U.S. forces in strategic dilemmas by developing strategies to avoid our advantages and confront us with their own asymmetries.
- Adversaries will use:
  - Globally ranging networks and open-source capabilities (internet, commercial navigation and imagery).
  - Increasing technical equality to make anti-access strategies challenging in all domains.
  - Mobility, precision fires, and information on U.S. forces while contesting our ability to respond.
- Friction is unavoidable - Surprise will still be a major factor

Must build a force that is Adaptable, Agile, and Resilient
JFCOM Near Term S&T

• Training & Education Focus/Opportunities
  – Create T&E Technology that:
    • Is User focused - easy to use
    • Is executed with Minimal downtime
    • Has Reduced reliance on contractor support
    • Is easy to recall by troops
    • Is Adaptable to differences in learners & environments
JFCOM Near Term S&T

• Training and Education Opportunities (cont )
  – Create Technology that:
    • Minimizes cognitive and data overload
    • Provides decision support at the Joint level
    • Promotes understanding of
      – different cultures,
      – histories,
      – politics,
      – personalities
    • Teaches/stresses Joint team skills
JFCOM Near Term S&T

• Modeling & Simulation Opportunities
  – Special attention to ground force simulation while maintaining emphasis on air and maritime

• Replicate:
  – High intensity, complex, stressful Joint environments
  – Urban and human terrain
  – Cultural environment in which Joint warfighters operate
  – Joint tactical and operational difficulties
  – Joint stable, relief, and engagement operations
JFCOM Near Term S&T

• Modeling & Simulation Opportunities
  – Build Systems with which JFCOM can:
    - Train
    - Experiment
    - Test & Evaluate
  - Build in multiple levels of security
  - Make systems interoperable
  - Measure performance in Joint contexts
JFCOM Near Term S&T

• Defense Economics, Acquisition, and Personnel
  – Economic warfare – Money as war
  – Office of Research and Technology Applications (ORTA)
    • JFCOM Product transition

• Science, Technology, Engineering, & Math (STEM) Education
  – Focus on the future
  – Continue to support
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