



Narrative Knowledge in Operational Art:

A Paradigm Shift for Information Technology Developers

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Prepared for

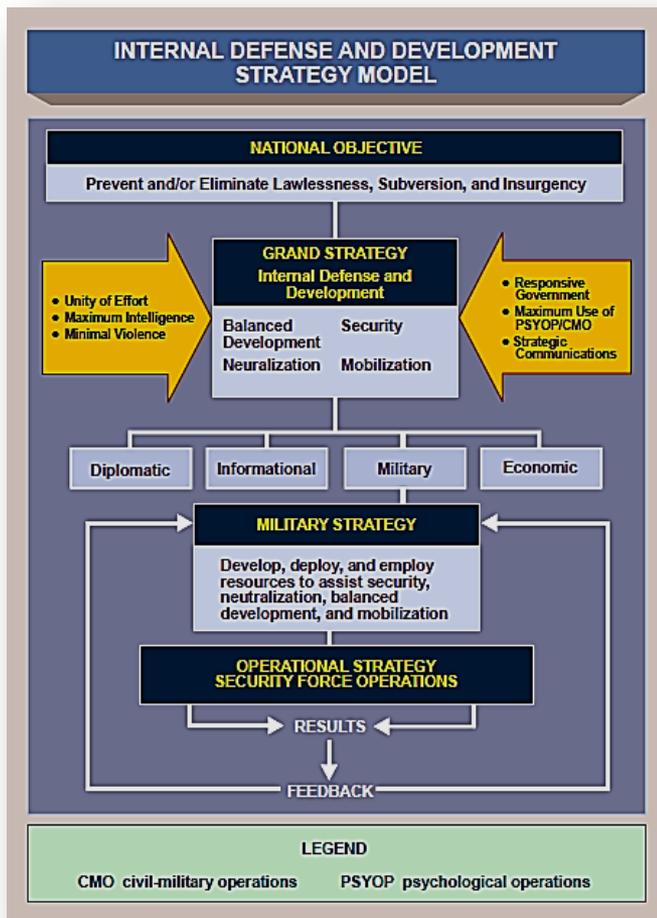
The 17th International Command and Control
Research and Technology Symposium

June 19-21, 2012

Agenda

- Importance of contextual understanding in full spectrum operations.
- Mutually supporting roles of narrative and scientific knowledge.
- A proposed application for constructing and dynamically managing operational narratives.

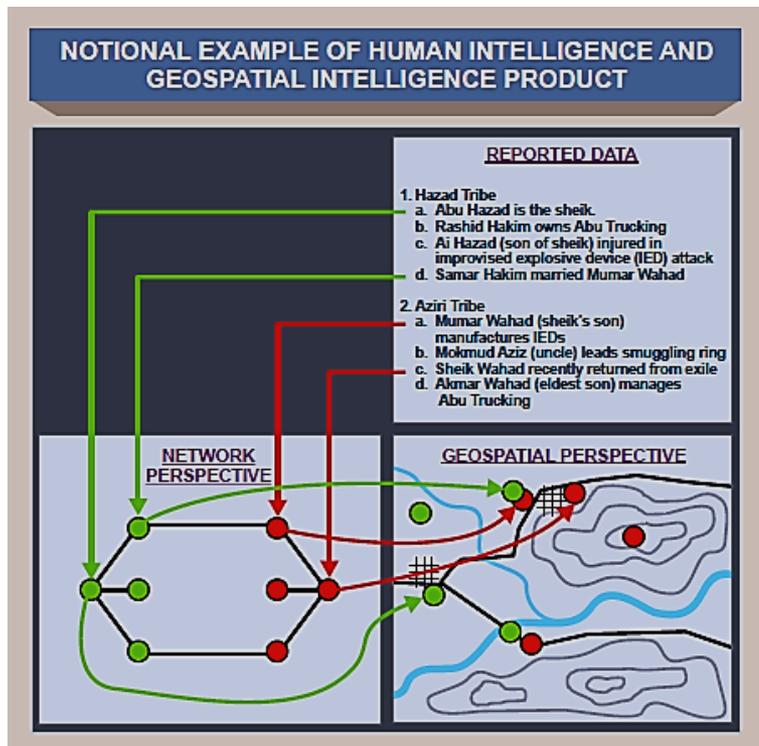
Full Spectrum Operations



- Full spectrum operations require an understanding of how diplomatic, informational, military, and economic initiatives must be **contextually balanced**.
- Success depends upon
 - Doing the right things.
 - Doing things well.
 - Avoiding unintended consequences.
- We must move to a new paradigm that
 - Places technical collection of intelligence in the context of political, social, economic, and cultural meaning.
 - Integrates intelligence analysis with operational design to produce creative solutions.

Joint Publication 3-24, *Counterinsurgency Operations*, 5 October, 2009.

Multiple Sources of Knowledge



- Contextual understanding is built through the fusion of different types of intelligence.
 - **GEOINT** provides physical location and movement information.
 - **HUMINT** provides political, social, economic, and cultural context .
 - **SIGINT, WX, etc.** augments understanding
- However, true knowledge management must place intelligence in the context of operational design.

Joint Publication 3-24, *Counterinsurgency Operations*, 5 October, 2009.

Operational Design

- Intelligence must be organized to support the development of **creative solutions**.
- Creative solutions evolve out of **local insight**.
- Local insight is captured **through interaction with affected stakeholders**.
 - Tribal / community leaders
 - Civilian populations
 - Local power brokers
 - Provincial Reconstruction Teams
- Local insight must be **systematically organized** to enable insight of emerging risks and opportunities.



Flynn, M.T. & Pottinger, M. (2010). *Fixing Intel: A Blueprint for Making Intelligence Relevant in Afghanistan*. Washington, DC: Center for a New American Security.

Kilcullen, D. & Courtney, A. (2011). Big data, small wars, local insights: Designing for development with conflict-affected communities. *What Matters*, 2 December 2011.

Different Forms of Knowledge



Logico-scientific reasoning is a rigidly logical form of knowledge:

- ✓ Objects/relationships/events are objectively definable
- ✓ Relevant systems are bounded, well-formed and exhibit repeatable behaviors
- ✓ Sensemaking is bottom-up, problem-focused process of seeking solutions
- ✓ Observed data is either fitted into existing problem frameworks or used to draw generalized inferences
- ✓ Reasoning serves to (1) identify critical performance issues and (2) predict the likelihood of future system states



**THE WORLD OF
INFORMATION
TECHNOLOGY**

Narrative reasoning is a more abductive form of knowledge:

- ✓ Objects/relationships/events are defined relative to goals, experience, and context
- ✓ Relevant systems are open, loosely-formed and exhibit emergent/novel behaviors
- ✓ Sensemaking is holistic, context-focused process of seeking situation understanding
- ✓ Observed data is interpreted by experience to build meaningful stories and understand richness and complexity of a situation
- ✓ Reasoning serves to (1) provide best explanation of observed actions/state changes and (2) develop anticipation of new opportunities and risks



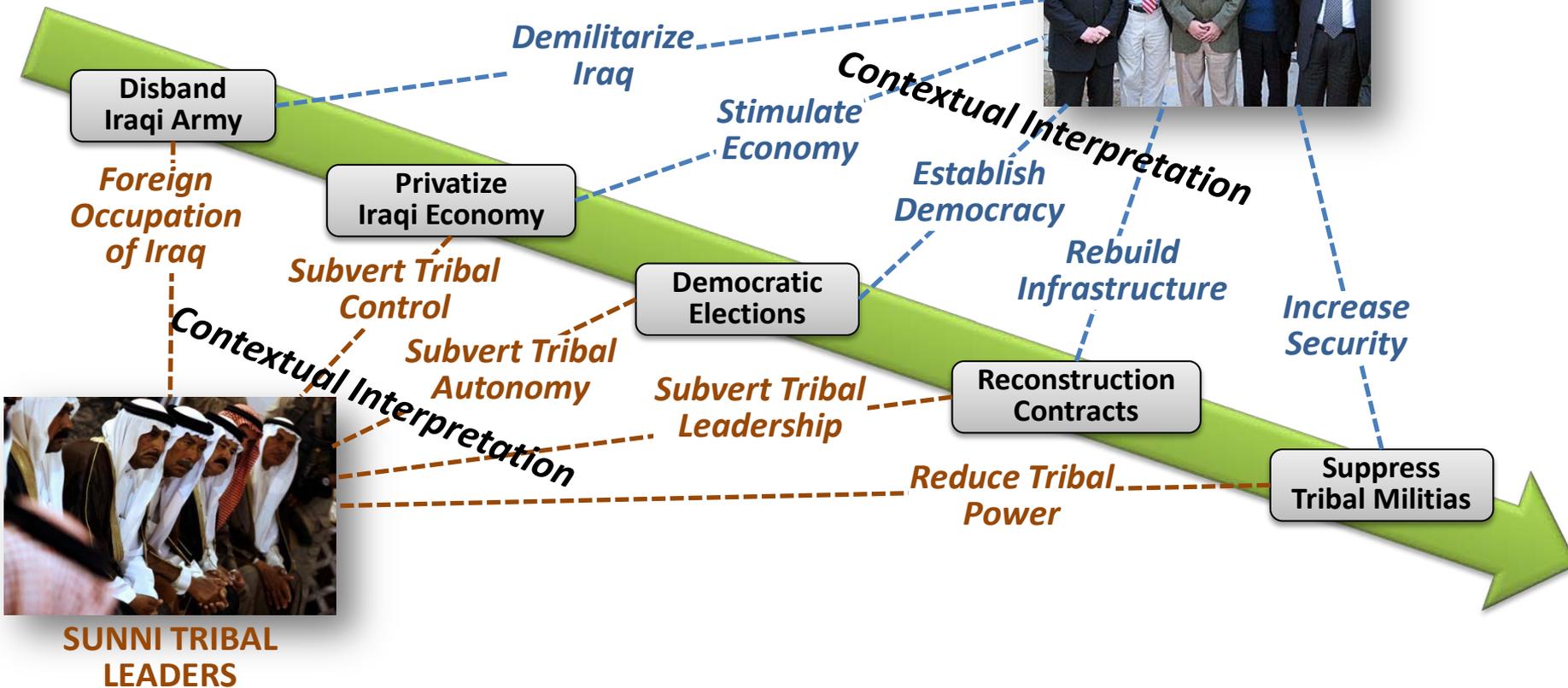
**THE WORLD OF
INTELLIGENCE &
POLICY ANALYSIS**

Narrative Reasoning Example

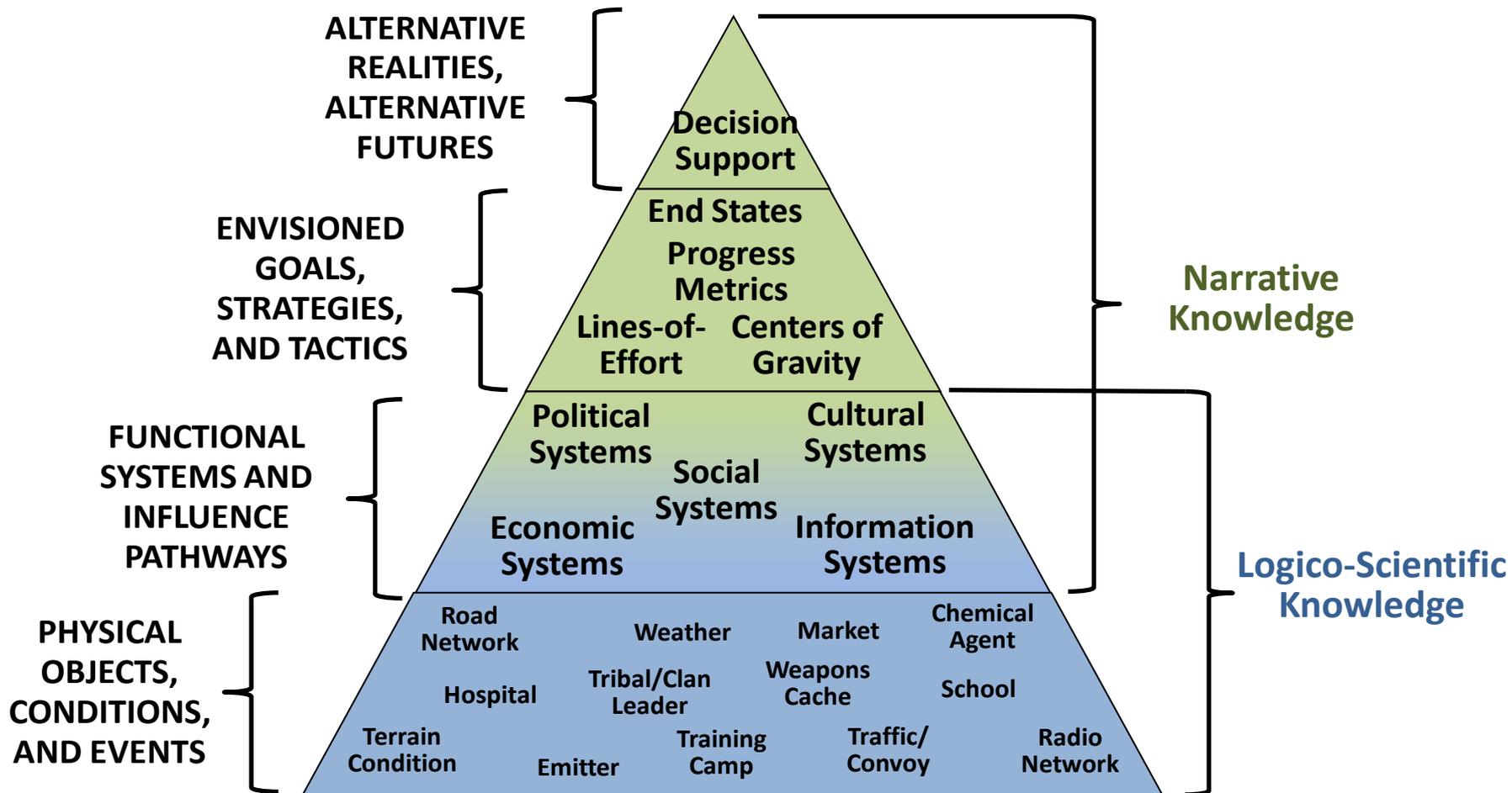


Al Anbar Province Pre-Sunni Awakening Movement

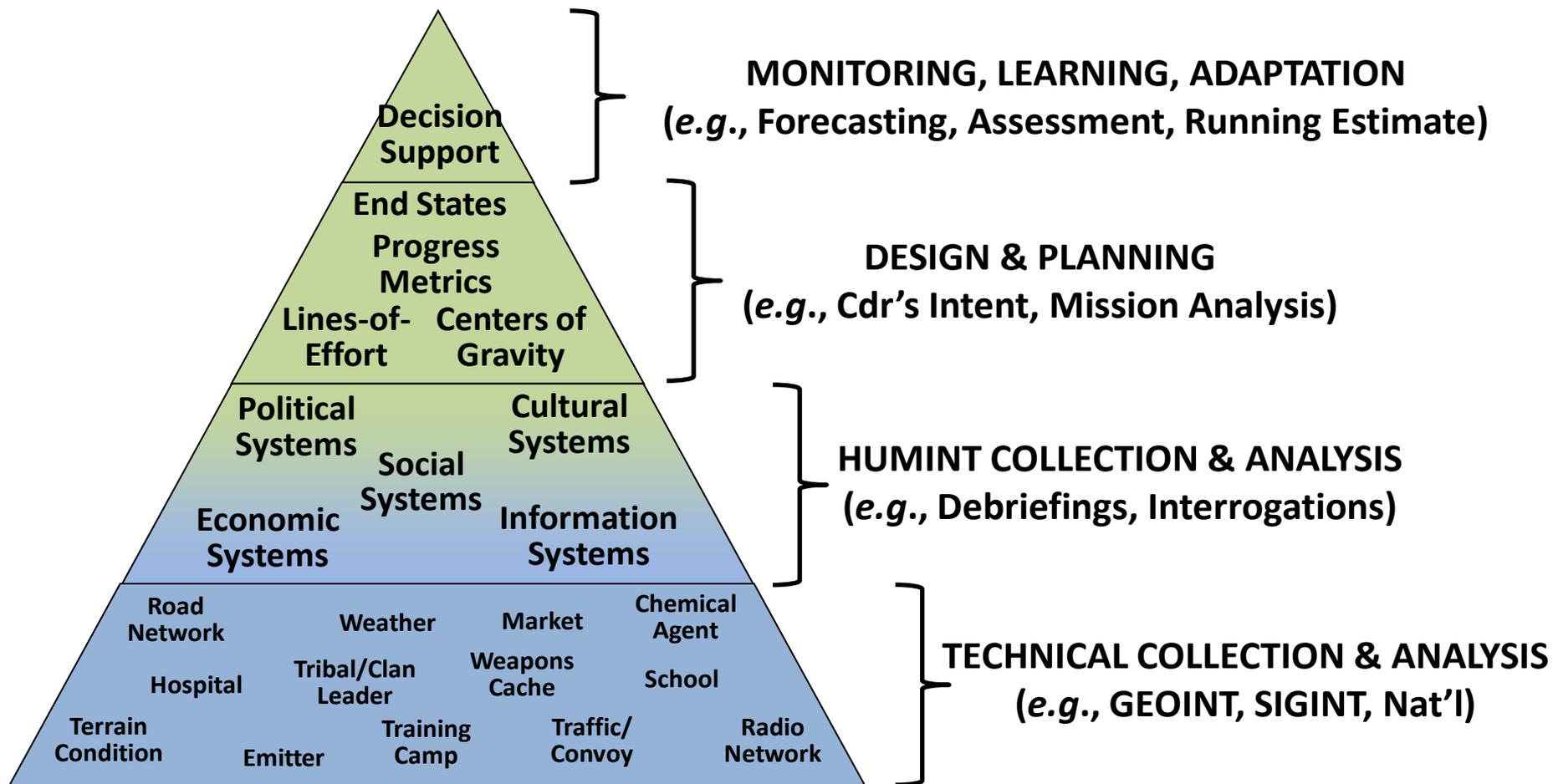
COALITION PROVISIONAL
AUTHORITY



Knowledge Pyramid Includes Both Narrative and Scientific Knowledge



Knowledge Construction

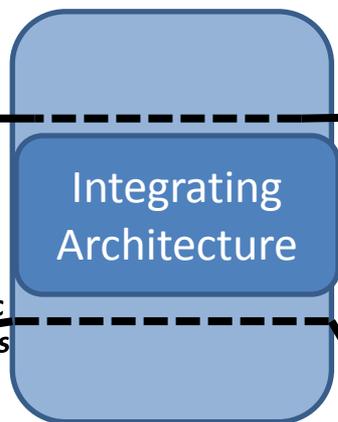
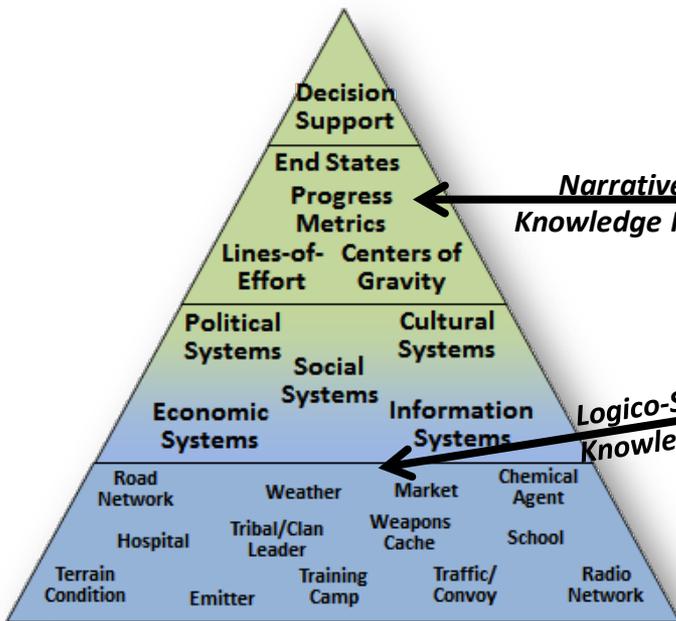


Tool Development

- Information management tools are designed to capture logico-scientific phenomena.
 - Objective reality presumed.
 - Known structures or empirical patterns.
 - Appropriate for simple and (often) complicated situations.
- Knowledge management tools must capture narrative knowledge .
 - Multiple “realities.”
 - Complex (emergent and evolving phenomena).
 - Contingent forecasts are often crucial.

Technical Approach: Understanding Multiple Realities

**NARRATIVES
AND
STORYTELLING**



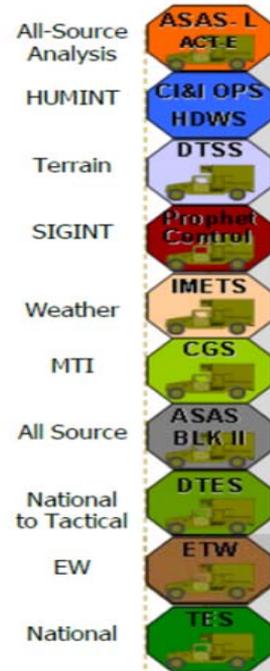
Narrative Knowledge Files

Logico-Scientific Knowledge Files

Alternative Narratives

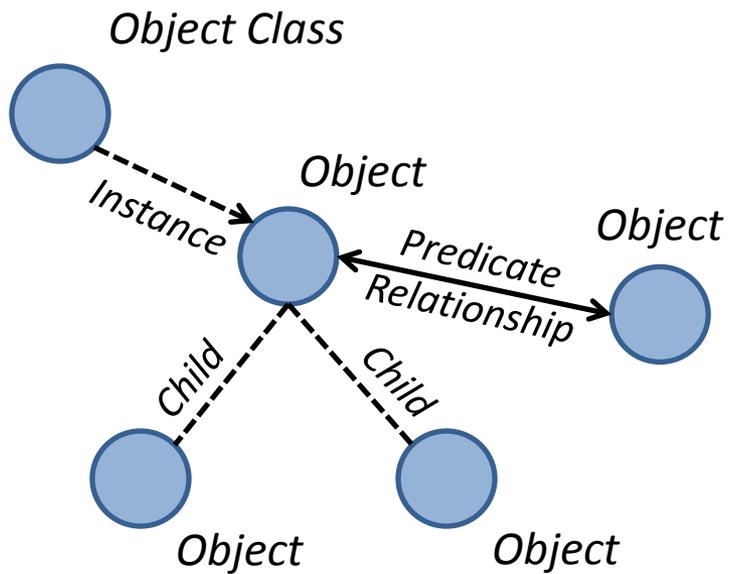
Linked

GEOINT
SIGINT
Coalition
All Source
ISR Mgmt
Weather
HUMINT
Battle Command



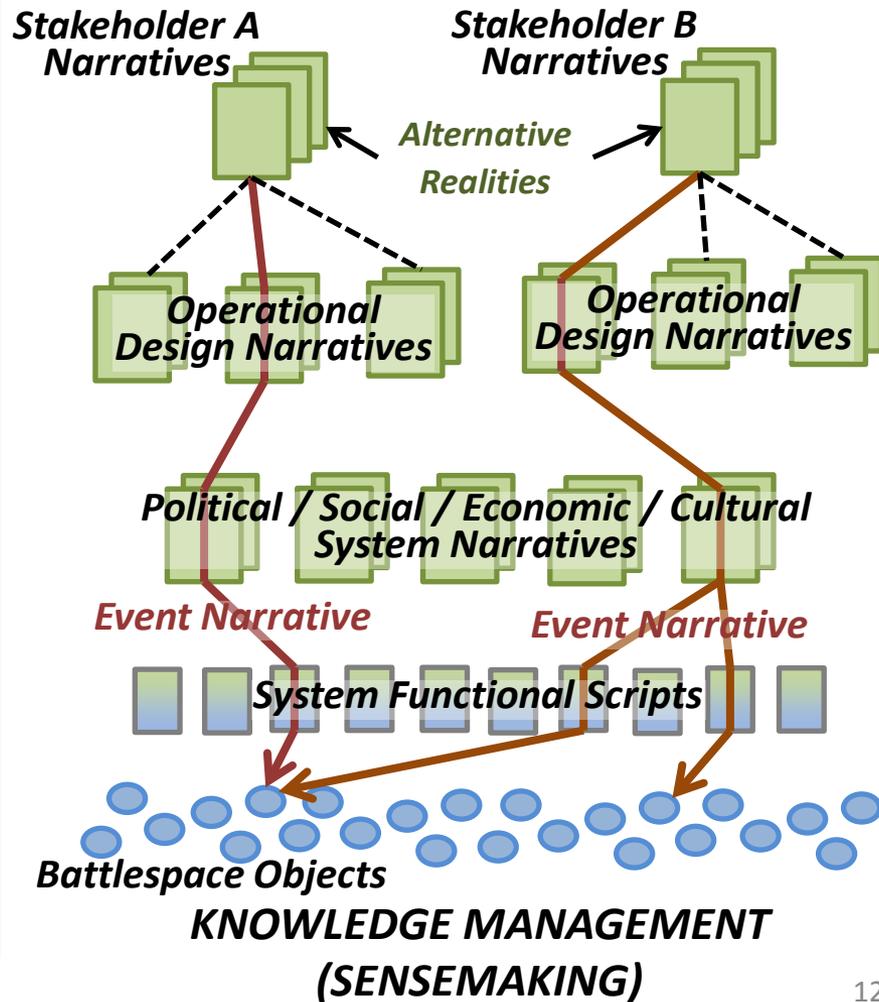
A New Reasoning Calculus

LOGICO-SCIENTIFIC



FORMAL LOGIC

NARRATIVE



Storytelling Application

OPERATIONS



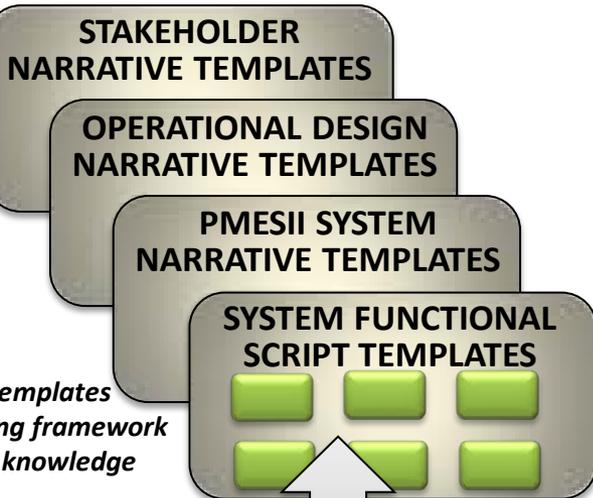
COMMAND



INTELLIGENCE



CREATIVE PROBLEM SOLVING

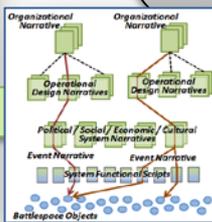
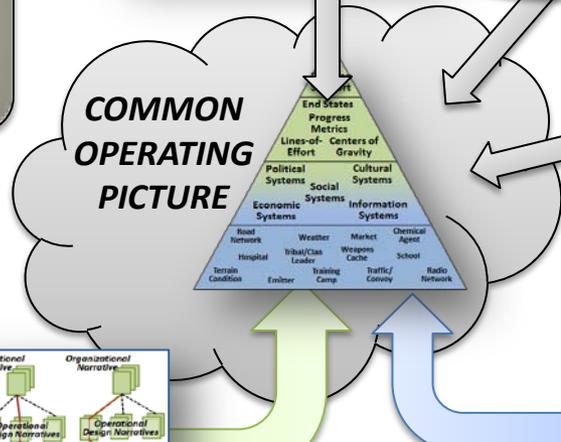


Experience-based templates provide analyst a starting framework for constructing new knowledge

OPERATIONAL STORYTELLER[©]



Analyst translates battle command and HUMINT information into operational narratives



Constructs and assesses alternative realities and alternative futures

Links narrative frameworks with technical collection

- All-Source Analysis ASAS-L ACTE
- Terrain DTSS
- SIGINT Foreign Control
- Weather IMETS
- MTI CGS
- All Source ASAS BLK II
- National to Tactical DTES
- EW ETW
- National TES

Summary

- Military units must build/maintain contextual understanding in order to create effective solutions in a complex PMESII environment.
- Current intelligence systems provide access to objective reports, but do not place them within a dynamic framework for understanding.
- Adding narrative knowledge enables examination of alternative realities and futures.
- Concept of narrative knowledge management extends across a wide range of commands, missions, and organizations.



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The author acknowledges the groundbreaking work of Dr. Dennis K. Leedom who developed many of the ideas used here.



Back-up Slides

21st Century Problems

Simple

Objective/Empirical Parameters
Well-Defined Processes
Repeatable Outcomes
Best Practice Engineering Models
Optimization / Empirical Testing

Complicated

Abstract / Inferred Parameters
Conceptualized Frameworks
Statistical / Canonical Outcomes
Multivariate Forecasting Models
Satisficing / Analogical Reasoning

Complex

Emergent Parameters of Interest
Evolving Problem Frameworks
Transient Risks / Opportunities
Probing / Sampling / Pattern Analysis
Scenario-Based Learning / Discovery

Chaotic

Key Parameters Are Unknown / Hidden
Highly Turbulent Frameworks
Unexpected Events / Conditions
Contingency Management Procedures
Focus on Regaining Stability / Insight

Joint Interagency Task Force West



MISSION

JIATF West, in cooperation with the US interagency and foreign partners, combats drug-related transnational organized crime to reduce threats in the Asia-Pacific region in order to protect national security interests and promote regional stability.

Scope of military counterdrug activities includes threats reasonably related to drug trafficking.

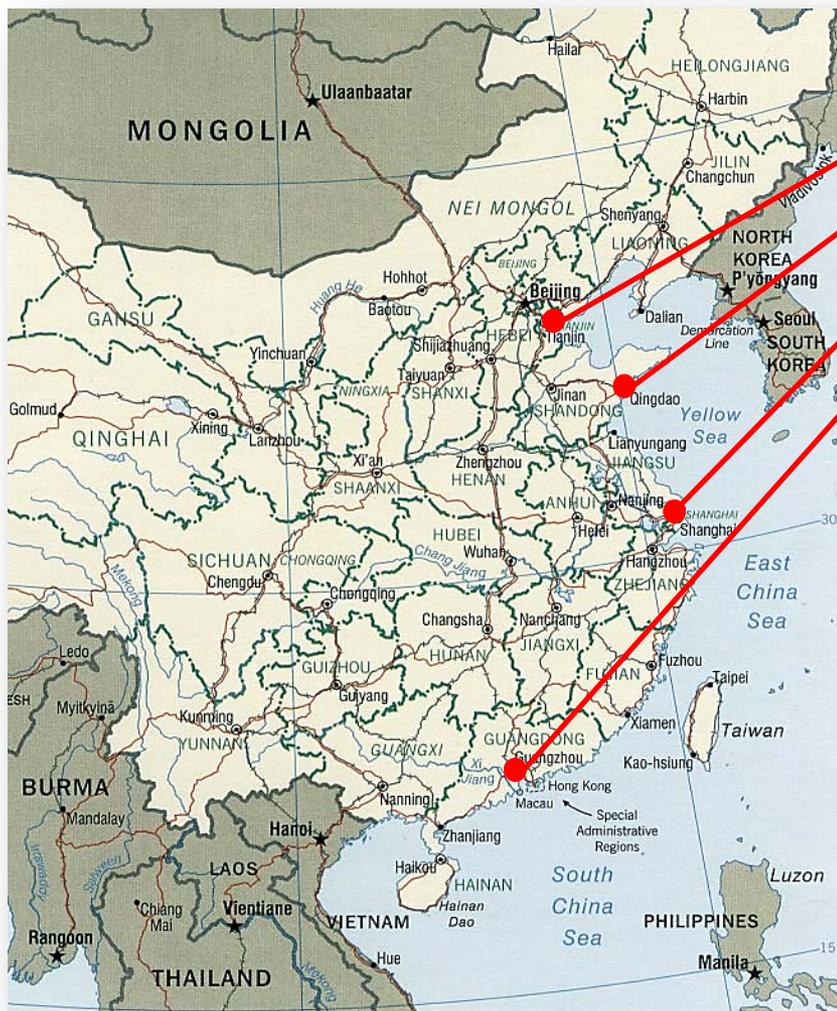
ASIA DRUG THREAT

Precursors from China and India are fueling the methamphetamine production for Asian and North American markets.

Southwest Asian heroin supplying Chinese market that exceeds diminished Southeast Asian production; this traffic is potentially supporting international terrorism.



Maritime Drug Trafficking Routes



Chinese Drug Trafficking Ports

- Tianjin
- Qingdao
- Shanghai
- Guangzhou

JIATF-W Technologies

- ✓ Drug detection sensors
- ✓ Maritime tagging, tracking, and locating
- ✓ Persistent surveillance of non-compliant vessels and small vessels

US/PACOM Narrative

- ✓ Establish persistent surveillance of major drug trafficking ports (action)
- ✓ Provides requisite intelligence for interdiction of maritime drug shipments
- ✓ Acts to reduce flow of precursor supplies and drug products within Asian region

Alternative Realities



Chinese Narrative

- ✓ Seen as incursion of claimed territorial waters
- ✓ Challenges Chinese hegemony plans throughout Pacific region west of Hawaii

North Korean Narrative

- ✓ Seen as incursion of claimed territorial waters
- ✓ Challenges international arms trading routes

Alternative Futures



Chinese Narrative

- ✓ Seen as incursion of claimed territorial waters
- ✓ Challenges Chinese hegemony plans throughout Pacific region west of Hawaii
- ✓ **Disrupts US/Chinese counterdrug cooperation (including operations against Western land routes)**
- ✓ **Triggers increased incidents in South China Sea by Chinese blue water naval forces**
- ✓ **Triggers economic retaliation against US bond/currency markets and US/Chinese trade**
- ✓ **Potentially reduces opium consumption within its own population**

North Korean Narrative

- ✓ Seen as incursion of claimed territorial waters
- ✓ Challenges international arms trading routes
- ✓ **Disrupts nuclear weapons negotiations**
- ✓ **Triggers threat of retaliation against South Korea**

Tailoring Narrative Knowledge to an Operational Environment

Narrative Knowledge <i>(Bruner)</i>	Provides basic definition of narrative knowledge, as distinct from logico-scientific knowledge
Data/Frame Theory <i>(Klein, et al)</i>	Incorporates the concept of abductively fitting data into experiential frames of reference to create meaning
Systems Thinking <i>(Forrester & Senge)</i>	Presents a holistic view of behavior that emphasizes the interaction of multiple systems and elements
Design Thinking <i>(Joint Doctrine)</i>	Integrates organizational intentionality with an understanding of the environment to construct an operational design for producing change

Bruner, J.S. (1991). The narrative construction of reality. *Critical Inquiry* 18,1, pp. 1-21.

Klein, G., Phillips, J. K., Rall, E., & Peluso, D. A. (2004). A data/frame theory of sensemaking. In R. R. Hoffman (Ed.), *Expertise out of context: Proceedings of the 6th International Conference on Naturalistic Decision Making*. Mahwah, NJ: Erlbaum.

Forrester, J.W. and Senge, P.M. (1980). Tests for building confidence in system dynamics models. *TIMS Studies in the Management Sciences* 14, pp. 209–228.

Joint Publication 5-0, *Joint Operational Planning*, 11 August 2011.

