

The Analysis M&S Business Plan: 2010 Update

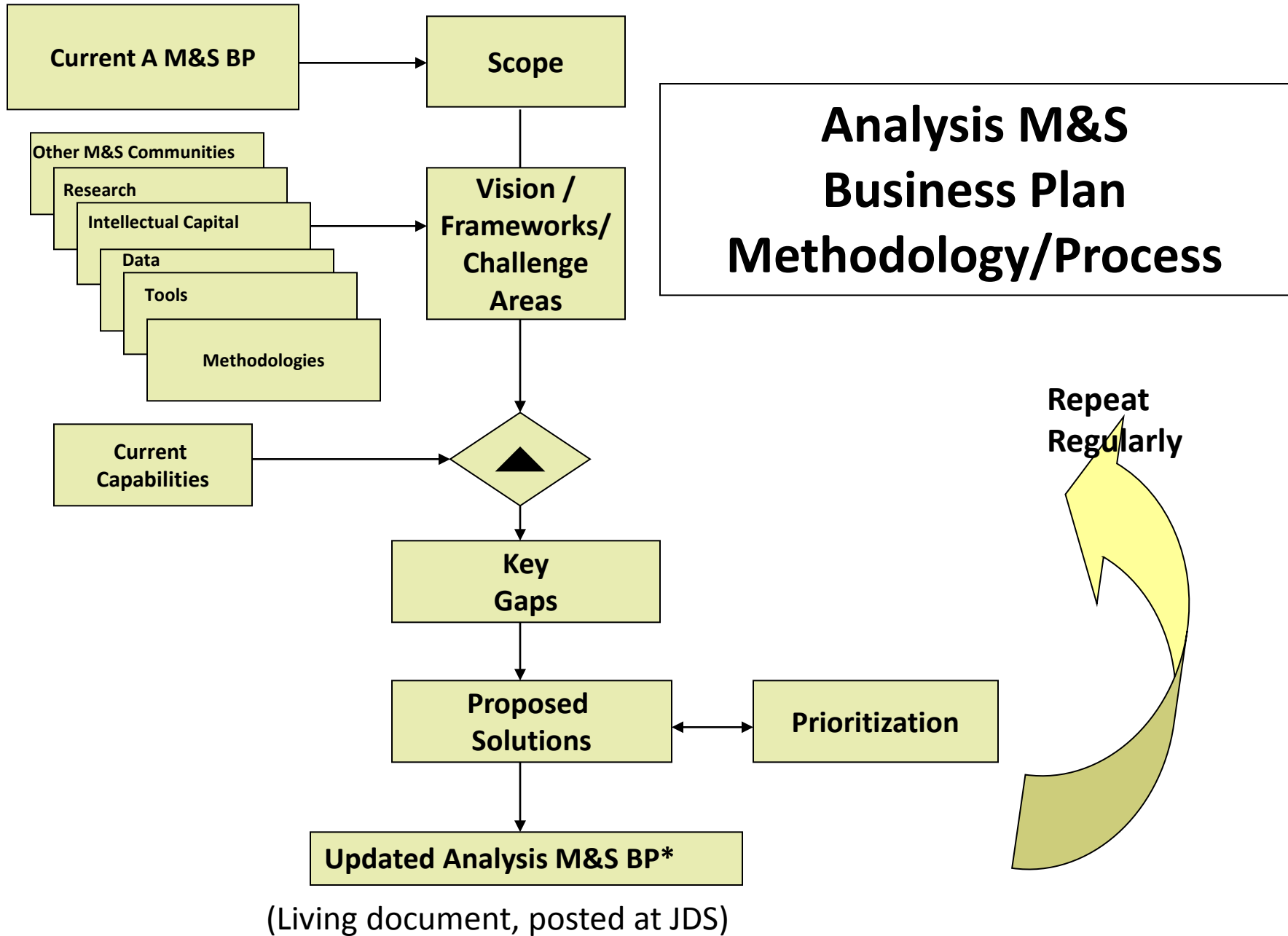
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Agenda

- Approach
- Strategy
- Analysis M&S Business Plan (2010) Exemplar:
Irregular Warfare and Related Areas
- Cross-Cutting Recommendations, Summary



Analysis Vision

A robust and inter-connected analytical community which supports the formulation, discussion, and assessment of

- National Security options
- Operational Commander actions

across DoD through the use of M&S in an environment of evolving national security issues

Major Objectives in Dec 07 Business Plan

Area	Major Objectives
Methodology	<ul style="list-style-type: none">• Develop, employ flexible, adaptable, robust methodologies focused on senior decision maker issues• Illuminate: risks, uncertainties; effects, capabilities
Tools	<ul style="list-style-type: none">• Develop, employ a core set focused on senior decision maker needs• Develop capability to create tools rapidly• Ensure tools are credible, consistent, useful
Data	<ul style="list-style-type: none">• Acquire data needed by analysts• Address all key PMESII factors• Data must be available, accessible, traceable, trusted
Intellectual Capital	<ul style="list-style-type: none">• Recruit, develop, retain multidisciplinary teams• Ensure that analysts embark on “life long learning”, employ Codes of Best Practice
Research	<ul style="list-style-type: none">• Enhance composability of M&S• Develop, employ effective, efficient VV&A processes, tools• Enhance visualization capabilities
Other M&S Communities	<ul style="list-style-type: none">• Resource efforts that support multiple M&S communities

Strategy

- Re-evaluate the twenty analysis challenge areas
- Focus on those challenge areas assessed as **RED**
- Develop recommendations to enhance those analysis challenge areas assessed as **RED**
- Develop cross-cutting recommendations to deal with highest priority needs

Challenge Area Description

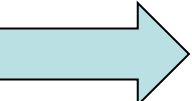
Each challenge area employs the following format:

- Definition
- Some Questions We Need to Answer
- Analysis Vision for the Area
- Existing Capabilities
- Key Gaps
- Assessment of Current Capability
 - Red /Amber/ Green (“stoplight”) Scale
- Current Activities
- Potential Future Activities

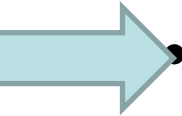
Assessment of 20 Analysis Challenge Areas

Topic	Key Elements
Operational Focus Areas	<ul style="list-style-type: none"> • Irregular Warfare (e.g., COIN, Counter-terrorism) (RED) • Stability, Security, Transition and Reconstruction (e.g., HA/DR) (RED) • Homeland Defense/Defense Support for Civil Authorities (AMBER) • Conventional Operations (e.g., Joint campaign analysis) (GREEN-AMBER)
Cross-cutting Missions / Functions	<ul style="list-style-type: none"> • Deterrence (RED) • Representation of C4ISR (AMBER) • Modeling Net-Centric Operations (AMBER) • Human, Social, Cultural Behavior (HSCB) (RED) • Information Operations (IO) including cyber warfare (RED) • CBRNE activities (AMBER) • Space operations (AMBER) • Logistics (GREEN – AMBER) • Joint, Interagency, Intergovernmental, Multinational (JIIM) operations (RED)
Management Issues	<ul style="list-style-type: none"> • Education & Training (analysts, decision makers) (AMBER) • Ensuring credibility of M&S (e.g., VV&A) (RED – AMBER) • M&S governance (AMBER) • Outreach (AMBER – GREEN) • Management of key resources (e.g., data, tools) (AMBER)
Hot Topics	<ul style="list-style-type: none"> • Representation of Complex Adaptive Systems (RED) • Portfolio management (RED)

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Key Areas Assessed in Business Plan Update

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- Irregular Warfare and Related Activities
 - Irregular Warfare (IW)
 - Stability, Security, Transition, & Reconstruction (SSTR) Operations
 - JIIM factors
 - Information Operations, including Cyberwar
 - Deterrence
 - Cultural - Social factors
 - Portfolio Management
 - Deferred: Wargaming and Complex Adaptive Systems

Vision for IW and Related Activities

- Support the formulation, discussion, and assessment of IW options across the whole-of-government in each IW area (e.g., counterinsurgency (COIN), counter-terrorism (CT))
- Provide comparable M&S support and analysis capabilities to combat operations, explicitly addressing and integrating SSTR operations across all DoD activities including DOTMLPF
- Note: DoD policy is that SSTR operations are a core US military mission that the DoD shall be prepared to conduct and support

MG Flynn's Questions for IW and Related Activities

Area	Key Questions
Social Attitudes	<ul style="list-style-type: none"> •How does the population interact as tribes? •How much of the population is affected, disaffected? •How does the population respond to strategic communication? •How is the population informed? •How do they like to be informed? •What are the preferences of people on a district level? •What efforts have historically been successful on a district level? •What kind of development do people prefer on a district level? •What part of the population is disaffected and why? What is the percentage? •How can we visualize/layer data from geography through population dynamics?
Taliban-related	<ul style="list-style-type: none"> •How does the population relate to the Taliban as an organization, not as an insurgency? (e.g., how they operate and how people are affected by them as an organization) •How do we split the population away from the Taliban, especially in Helmand /Kandahar? •What narratives do the Taliban use to get popular support? •What tactics of intimidation do they use?
Rule of law	<ul style="list-style-type: none"> •How does the population define rule of law and justice? •How can we institute a sense of rule of law? •How can the central government more effectively dole out justice to be as swift as Sharia law?
Economics	<ul style="list-style-type: none"> •What is the importance of the poppy trade to the Afghan population? •How does the government corruption impact the Afghan population and its relation to drug trade?
Governance	<ul style="list-style-type: none"> •How does the population accept and see governance? •How is the population's historical response to governance, not being governed, and warlordism?
Security	<ul style="list-style-type: none"> •How will the population respond to the new Stryker brigade that is coming in? •How does the population respond to basic force maneuvering?

Exemplar: IW and Related Activities

- **Strategic** IW and related issues
 - Addressed at NATO SAS-071, Ottobrun, March 2009
 - Working Group 6 formulated key findings, recommendations
- **Operational/Tactical** IW and related issues
 - IW Methods, modeling & Analysis Working Group (IW MmAWG) adopted a structured approach to the problem
 - Identified areas to focus on
 - “Low hanging fruit”
 - Long term investments

NATO SAS-071 WG 6: Major Findings

- **Methods** need to be addressed in prototypical efforts to understand their capabilities and limitations (e.g., theories of complexity, living systems, decision making, catastrophe)
- Steps must be taken to tailor, orchestrate, and develop selected **tools** to address specific IW issues
- Major voids in **data** exist in key areas (e.g., selection of: human, social, cultural behavior data; metadata; pedigree)
- In the area of **intellectual capital**, efforts are needed to
 - Enhance education and training of stakeholders
 - Implement reach-back capabilities
 - Address verification, validation, and accreditation (VV&A) seriously
 - Identify and evolve an IW analysis Community of Interest/Community of Practice (CoI/CoP)
- In the area of **research**, major voids exist in key social science areas that need to be addressed (e.g., treatment of “local legitimacy”; characterization of “trust”)

NATO SAS-071 WG 6: Major Recommendations

- Given the need for a “***Whole of Government***” approach to IW analysis, NATO Research & Technology Organization (RTO) should provide as much emphasis on social science research as it currently provides to operations research
- It is vital that we create and sustain ***multidisciplinary teams over an extended period of time*** to address IW and related issues
- If these ideas are to take hold, it is important that they be transitioned to the ***operational user***

Risk Results from IW MmAWG Study

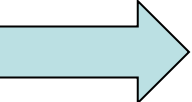
Gaps Attributed to Data & Soft Science (SS)

Severity		Probability				
		(1) Unlikely	(2) Seldom	(3) Occasional	(4) Likely	(5) Frequent
(4) Catastrophic				<u>3 Gaps</u> 3 Data 0 SS		<u>9 Gaps</u> 8 Data 8 SS
(3) Critical			<u>2 Gaps</u> 2 Data 2 SS	<u>7 Gaps</u> 7 Data 3 SS	<u>9 Gaps</u> 9 Data 6 SS	
(2) Marginal			<u>2 Gaps</u> 2 Data 1 SS	<u>2 Gaps</u> 2 Data 0 SS	<u>1 Gap</u> 1 Data 0 SS	
(1) Negligible						

Selected Recommendations for IW and Related Activities

Timeframe	Selected Recommendations
Near-Term	<ul style="list-style-type: none">• Establish, sustain Communities of Interest/Practice (COI/COP)• Establish, implement multidisciplinary analysis teams• Review, augment country data exchange agreements• Facilitate the exploitation of intellectual capital (e.g., academic)• Provide greater visibility for JDS Forum (e.g., harvest “low hanging fruit”, pursue highest risk challenges identified in IW MmAWG)
Longer-Term	<ul style="list-style-type: none">• Pursue new demand tasking for the Intelligence Community• Implement reach-back capabilities for the COCOMs• Create, sustain a SSTR Center of Excellence• Develop IW-analogue to the conventional warfare “pyramid” of M&S tools• Enhance data collected for the analysts• Enhance IW and related activity education and training for analysts, decision makers

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High Priority Recommendations

- Develop a **lexicon** to enhance multidisciplinary communication
- Evolve a **data repository** (focusing on cultural – social factors)
- Evolve a **methodology** that can be employed by analysts (e.g., wargame – M&S – wargame)
- Refine **tool** requirements (for analysis challenge areas assessed as **RED**)
- Employ an evolutionary acquisition process to develop an **operational testbed** to support the operational analyst
- Create, sustain a **Community of Interest/Community of Practice** (including the development of Whole of Government Lessons Learned)
- Create **reach-back** capabilities
- Enhance the **education and training** of all stakeholders (e.g., address social sciences, reach-back capability)
- Mandate credible **VV&A** activities

Summary

- Basic A M&S BP in place; community is developing a living document through Joint Data System (JDS) web page
- Priority issues of senior decision makers include challenges associated with:
 - IW and related activities (including SSTR operations, JIIM)
 - IO and Cyber Warfare
 - Deterrence
 - Cultural-social factors
- Next step is to coordinate draft update to the A M&S BP to refine and endorse priority actions to address these needs

Back-up Material

- Frameworks, gaps, and recommendations for
 - IW and Related Activities
 - IO and Cyber Warfare
 - Deterrence
 - HSCB

Operational/Tactical IW

“Low Hanging Fruit”

Risk	Gap	Potential Solution
Occasional / Catastrophic	Adversary force protection -- Physical (K) -- Cyber (K, D, A)	<ul style="list-style-type: none"> • Research, through intel sources, to identify adversary force protection measures (physical, cyber) • Develop a shared data base of these measures
Frequent / Marginal	Effects of non-traditional weapons (D) (e.g., IEDs)	Develop effects data (on-going JIEDDO activity)
Likely / Marginal	Different illumination levels between sensor, target (D,A)	Perform experiments, research on different illumination levels
Likely / Marginal	Different interoperability levels with coalition partners, indigenous forces (D)	<ul style="list-style-type: none"> • Identify modeling parameters, data to reflect interoperability challenges • Establish, populate an interoperability data base

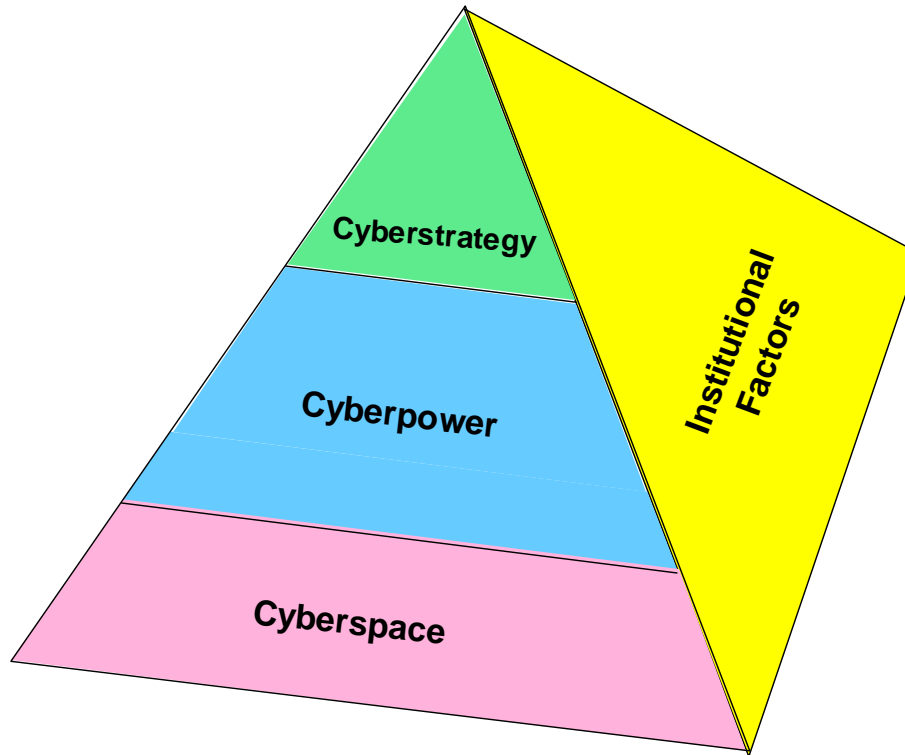
Operational/Tactical Analytic Capability Gaps: Frequent/Catastrophic

Gap	Knowledge	Data	Algorithms
Dealing with protracted operations			
Effects of influencers on attitudes/behavior of the civilian population	+	+	+
Translate civilian attitudes into levels of cooperation with friendly forces		+	+
Discriminate between civilian, adversary actors	+	+	+
How affiliations and support for other actors change based on application of influencers	+	+	+
How PSYOP change target audience attitudes		+	+
Adversary HUMINT networks	+	+	+
Adversary PSYOP techniques and effect on target audience	+	+	+
Effects of CMO on attitudes of civilian population		+	+

Operational/Tactical Analytic Capability Gaps: Frequent/Critical

Gap	Knowledge	Data	Algorithms
Munitions effects on buildings, personnel within buildings		+	+
Vehicle mobility within rubble urban areas		+	+
Effects of essential services on civilian population's attitudes/behaviors		+	
Effect of government corruption on government institutions, civilian population attitudes/behaviors	+	+	+
Attitudes/behavior of actors based on state of physical infrastructure used by actors	+	+	+
Accounting for heterogeneous groups of actors when group members have overlapping affiliations	+	+	+
Civilian support for physical, monetary resources to adversaries		+	+
Changes to adversary force structure and organization as network is degraded	+	+	
MoMs of actor organizations based on level of cooperation (e.g., USAID and HN)	+	+	+

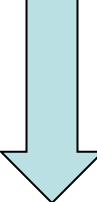

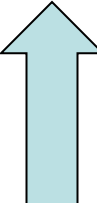
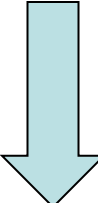
Framework for IO, Cyber Issues



High Priority Cyber Actions

Area	Key Priorities
Cyberstrategy	<ul style="list-style-type: none">• Assess impact of offensive-defensive actions on deterrence strategies• VV&A of emerging societal models• Develop tools, procedures to formulate and implement lessons learned from real world events, exercises
Institutional Factors	<ul style="list-style-type: none">• Instantiate tools to address legal issues rapidly• VV&A Critical Infrastructure Protection (CIP) tools
Cyberpower	<ul style="list-style-type: none">• Develop methods, tools to perform risk assessment (employing exploratory analyses)• Create a HSCB MTB to analyze, VV&A human responses
Cyberspace	<ul style="list-style-type: none">• Assemble, VV&A key data sources• Develop an integrated suite of tools to assess cyber security issues

Deterrence Framework

	Adversary Action that we are Deterring	Adversary Non-action (Restraint)
Benefits		
Costs		

Deterrence Recommendations

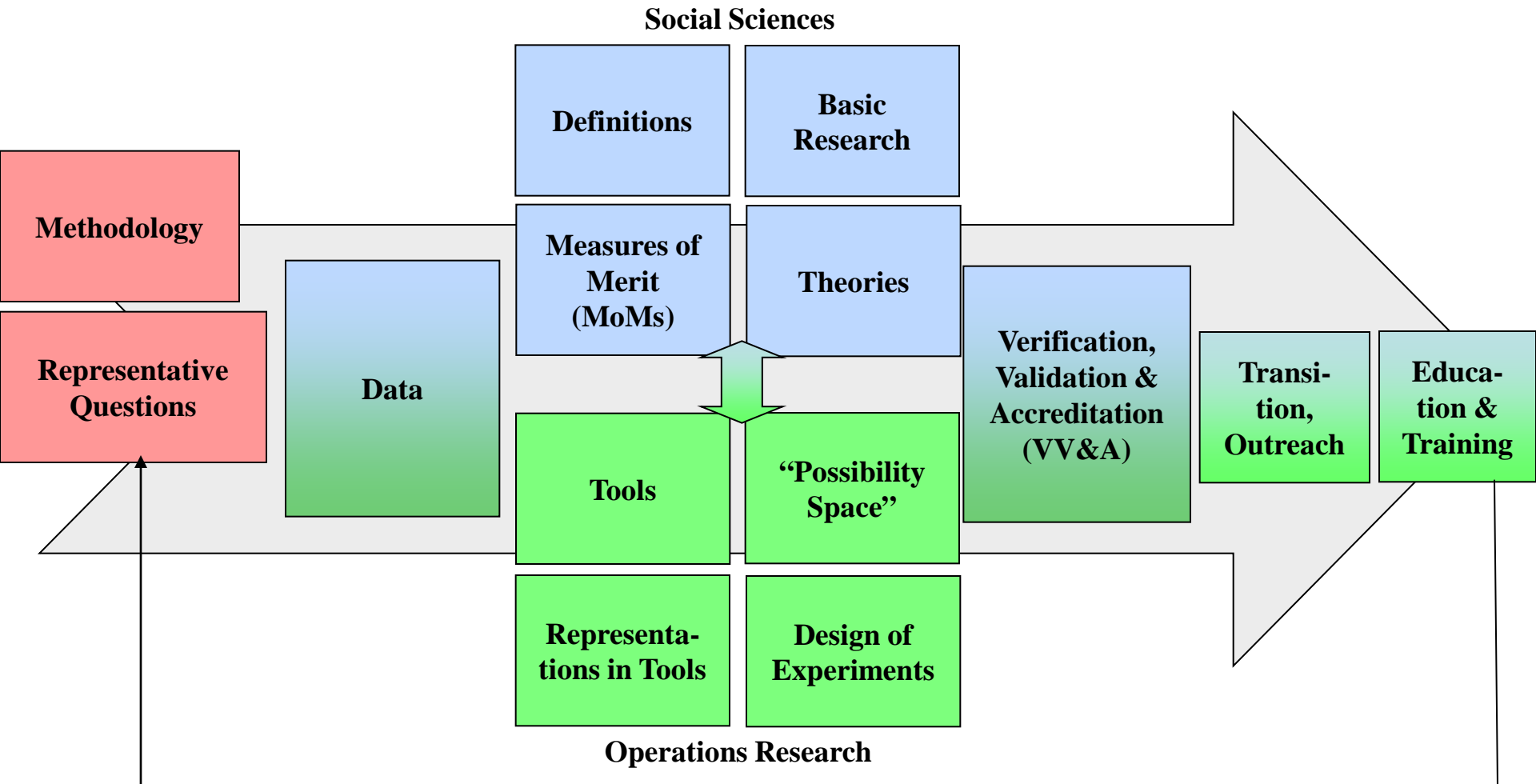
- Create a deterrence taxonomy
- Enhance community *diversity* with respect to the following
 - Create multidisciplinary teams
 - Broaden participation, methods and tools, SMEs, decision makers
- Foster a Community of Interest (COI)/ Community of Practice (COP) to address deterrence and policy analysis
- Undertake a rigorous research program including, *inter alia*,
 - Develop standards for VV&A of methods, tools, data, and SMEs
 - Enhance activities in game theory

Framework for HSCB Modeling

Drivers

Directly Implied Needs

Indirect Needs



Strawman HSCB Priorities

Risk	Key Actions	Resources
“Red”	<ul style="list-style-type: none"> • Create multidisciplinary teams • Address data shortfalls • Establish credibility (VV&A) • Enhance transition • Perform basic social science research • Enhance exploration of “possibility space” 	Medium High+ High High+ High+ Medium
“Red - Amber”	<ul style="list-style-type: none"> • Complete social science theories • Generate additional tools • Improve representation in tools • Enhance education and training 	High+ High+ High+ High
“Amber”	<ul style="list-style-type: none"> • Clarify definitions • Formulate useful MoMs • Employ effective Designs of Experiments 	Medium High Medium