INTEGRATED PERSPECTIVES ON SUSTAINABLE INFRASTRUCTURES FOR CITIES AND MILITARY INSTALLATIONS

On behalf the "Integration/Infrastructure" working group

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EXPERIENCE FEEDBACK-PRACTICAL REAL CASES

	Cross -Sectors	Context	Territory
Flooding	Water Building Infrastructure	Disaster	France (V-la-R) Mississippi
Dam		Connectivity between dams	Algeria
Heat wave		Disaster	France
Climate Change		Aging and adaptation	Russia
Communication			
Infrastructure			Chechnya

- ***Systems of infrastructures:***
  - We mean by Infrastructure " systems of structures", with physical, organizational and societal inter-connections, which function in delivering services that enable cities and installations to perform their functions.
  - Without reliable, safe and resilient infrastructures to deliver shelter, food, comfort, convenience, mobility, productivity, security, and other services, no community of any size is sustainable.

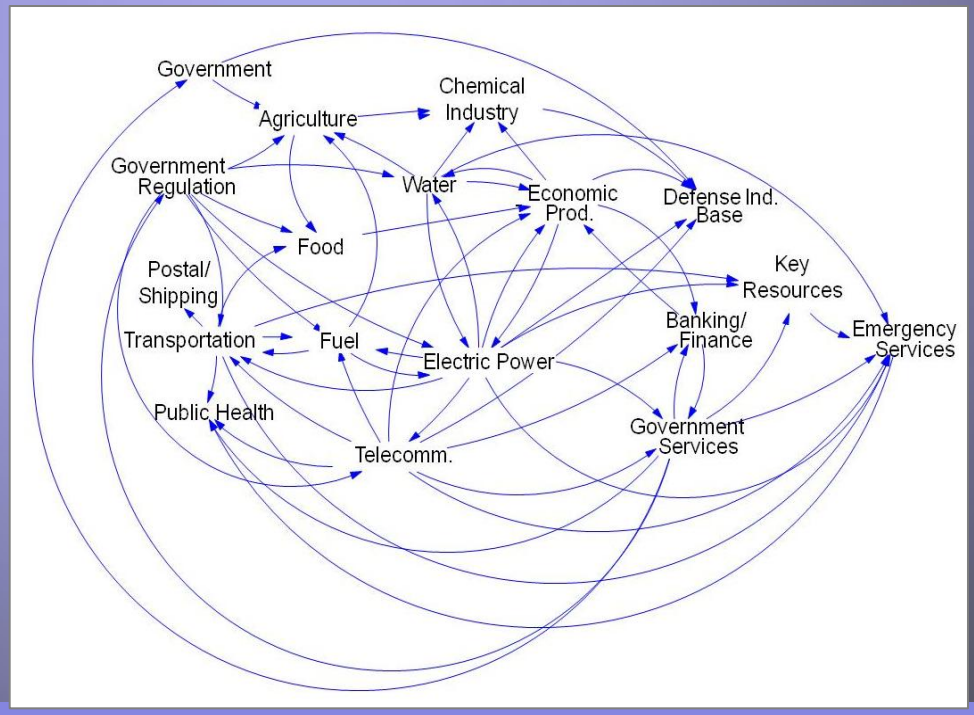


Fig. 1. Interaction between infrastructures (ORNL 2012).

Based on practical experience feed-back: Open questions

- ***A]- Framing:***
  - 1. What do “sustainability of infrastructures” and of “systems of infrastructures” mean when dealing with cities, communities, and military installations?
  - 2. How do cities, communities, and military installations depend for their sustainability on integrated complexes of interconnected and interdependent infrastructures?
  - 3. What are the greatest threats to sustainability from infrastructures that are not sufficiently resilient to potential threats?
  - 4. What does an integrated perspective contribute to identifying, reducing, and responding to these potential threats?
- ***B]- Solving:***
  - ❖What are the methods and tools that can be used?
- ***C]- Re- questioning:***
  - 5. What are the limits of an integrated approach to sustainability of infrastructures?
  - 6. What actions should be considered to improve integrated infrastructure resilience as a key component of sustainable cities, communities, and military installations?

- **1. Sustainability:**
  - Projection of historical experiences.
  - Think about how can the future be: futurology/ projection/prospection.
  - Context dependent.
  - Time dependent.
  - Depend on a social dynamic (resilience)

- 2. **Measure sustainability:**
  - Diachronicity (ex. CC, …).
  - Human and organizational aspects/technical aspects.
  - Nature of indicators:
    - The system characteristics.
    - The context characteristics.
    - Territorial characteristics: social, cultural.
  - Normal conditions and surprise (disaster conditions): resilience, risks, vulnerabilities, mitigation, adaptation.

A]- FRAMING ISSUES: STAKEHOLDERS, SHAREHOLDERS, COSTUMERS

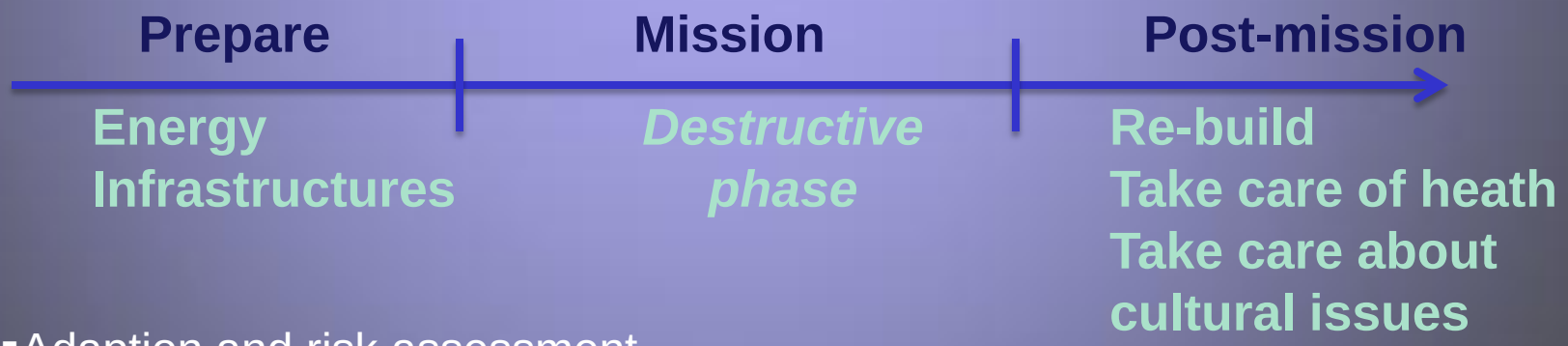
- **3. Sustainability of the infrastructures:**
  - For who? Who are the costumers?.
  - Take care of needs.
  - "I can get now satisfaction" – The Rolling Stone paradox!
  - Commons (E. Ostrom, Godard, …).
  - Variability of needs.
  - Responsibilities:
    - Who finance?
    - Who give the service?
    - Obligations/Initiatives
    - PPP
  - Who frame the system and the system of systems: *Does infrastructure follow of go forward needs?*
  - *Values/needs*

- **4. Measure sustainability:**
  - Side effects.
  - Hazards. Example CC is a slow process.

B]- SOLVING ISSUES: ANALYTICAL INSTRUMENTS TO DEAL WITH COMPLEXITY

- **1. Participative methods:**
  - State of the Art.
  - Let's talk about practical experiences: Energy, water, transportation, …
  - What is done for infrastructures.
  - Generalization vs particularization (avoid systematization).
  - How about smart systems?

- **2. Organizational issues:**
  - Connection and coordination between military and civil.
  - Thinking about missions cycle:



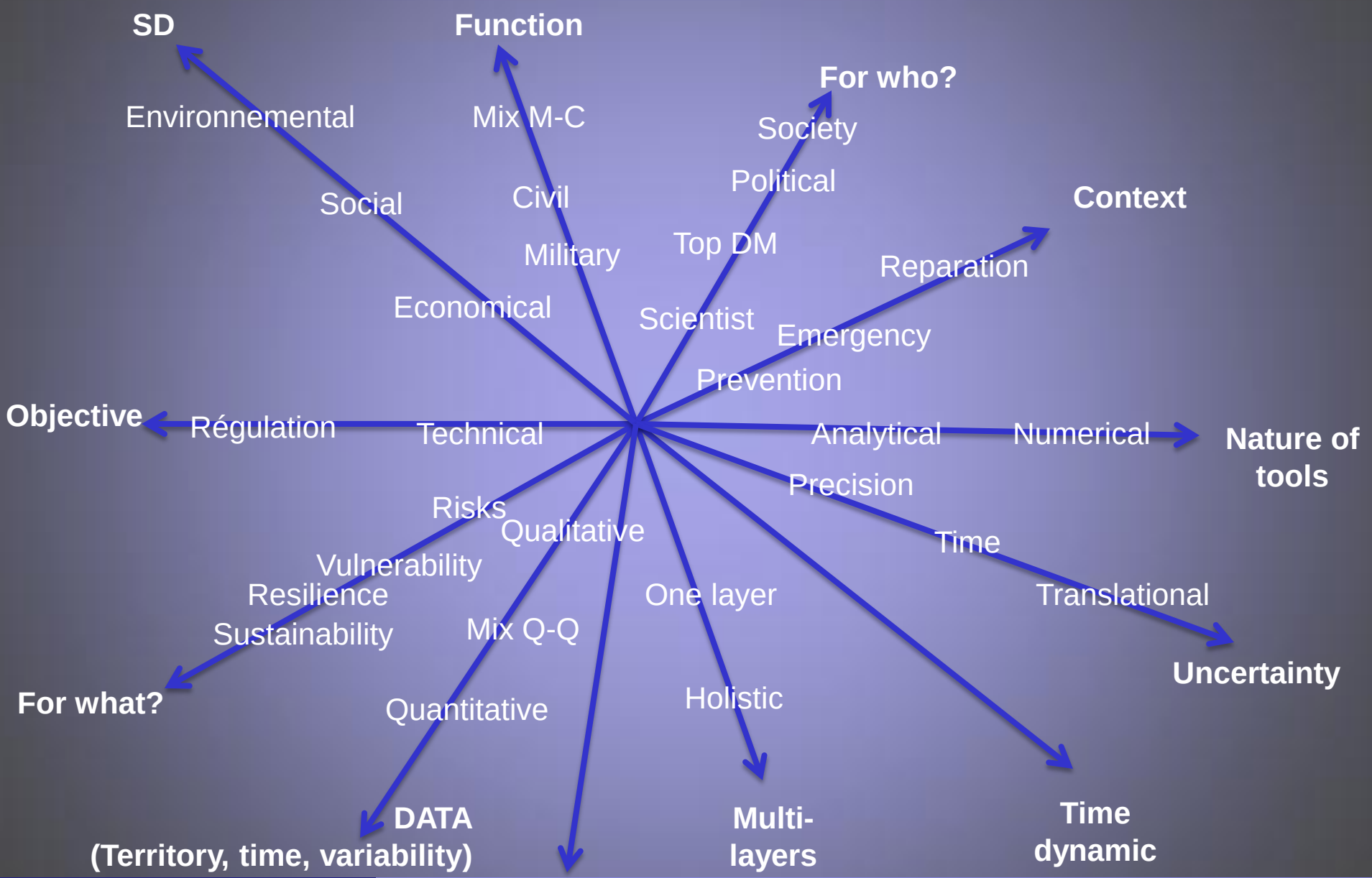
  - Adaption and risk assessment.

B]- SOLVING ISSUES: ANALYTICAL INSTRUMENTS TO DEAL WITH COMPLEXITY

- **3. Design:**
  - Infrastructure depend on “culture”, “history” and “values”.
  - Infrastructure shape societies.
  - Let’s talk about practical experiences: Energy, water, transportation, …
  - What is done for infrastructures?
  - Generalization vs particularization (avoid systematization).
  - How about smart systems?
  - Connectivity/dependence /Ability to connect/ Concentration/distribution/ border effects

- **4. Complex and hyper- complex systems:**
  - Simple but not simplistic tools.
  - Multi- disciplinary –trans- disciplinary.
  - Connect multi-layers and fractal.
  - Mult-scale.
  - Integrated tools.
  - Tools: for who? What are the DATA? What are we measuring?

B]- SOLVING ISSUES: A NEED TO MAP TOOLS AND METHODS



- **1. Robustness, efficiency and satisfactory:**
  - Go beyond the *optimization* paradigm.
  - Un- predictability of complex system.
  - Prepare – be aware.
  - Simulation and training
  - Deming wheel.

- **2. Engineering:**
  - Re- think the principle, the training and the practice.
  - Ethical perspectives: decision, design, ...
  - Co- evolution and co- adaptation.

- **3. R&D:**
  - Decision (ex. how to identify critical infrastructures, …).
  - Technology (ex. Sensors, materials, ...)

NEXT STEPS: *SERENDIPITY* (ROLE OF HAZARD) AND *AFFECTIO SOCIETATIS*

- **1. Book:**
  - What?
    - Introductive chapter: White paper+ Messages+ outlines.
    - Chapters:
      - Sustainability and integration.
      - Tools/methods to assess and to make decision.
      - Governance and participation.
      - Regulation.
      - Share your experience: water, energy, communication, ….
  - How?
    - Who lead (who frame the 1st proposal and integrate)?
    - Who want to participative?
    - Fix deadline: October 2012.

- **2. Journal:**
  - Special issue.
  - Call for papers.

- **3. SRA annual meeting (San Francisco)- December 2012.**