ON SYSTEMS COMPLEXITY AND EXPERIMENT VALIDITY

Erik Bjurström, PhD, Mälardalen University, Sweden
Git Roxström, PhD, Swedish Defence Research Agency (FOI)
HOW VALID ARE OUR EXPERIMENTS?

- Methodological consequences of complexity
- Are we taking unaware risks?
- Qualitative uncertainty about qualitatively new phenomena
- Cannot be met by predesigned measures
- A new meaning of validity?
- A culture of objectivity may feed overconfidence
GENERAL HIERARCHY OF SYSTEMS

- 1. Static frameworks
- 2. Dynamic systems with predetermined motions
- 3. Closed-loop control or cybernetic systems
- 4. Homeostatic systems like biological cells
- 5. The living plant
- 6. The animal
- 7. Man
- 8. Human organizations
- 9. Transcendental system
1. Organization chart
2. Flow-charts of processes
3. C2 systems
4. Simple, non-reflective, open-ended adaptation
5. Complex, non-reflective, open-ended adaptation
6. Responsiveness to physical, social needs
7. ”Theory of mind” – thinking about other’s thoughts
8. Collective, mindful and emergent adaptation
9. ... and its ontological/metaphysical aspects ...
ORGANIZATION

- Complexity reduction
- Specialization and division of labor
- Predictability of action for the sake of coordination
- Natural system turned into a rational system
ORGANIZING FOR INCREASED COMPLEXITY

- Agile C2
- Agile organizations
- Distributed
- Adaptive: re-active/pro-active
  + Sensemaking
  + Meaningful action
  + Meaningful interaction
  + Intentional action
- Interactive complexity
WHAT ABOUT VALIDITY?

- Validation and justification are social phenomena
- Statistics – probabilities
- Stochastic uncertainty vs. intentional uncertainty
- Open-ended, emergent, interactive, intentional
- Better to know we are guessing than to believe that we know?
- Are we taking unaware risks?