

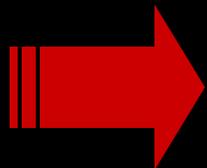


The Economics of Modeling and Simulation

Presented at the
Society of Computer Simulation (SCSC 2000)

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OUTLINE



- **Huh?**
 - “What’s it all about [Alfie]?”
- **So what?**
- **And then...?**

What's going on in Modeling and Simulation?

- **General circumstances (state)**
 - Progress: everybody's movin' on
 - Insularity: we talk ...some
 - Similarity: we're getting 'there' (some vaguely defined future state)
- **Trends (vector)**
 - Standards: becoming effective
 - Intervisibility: becoming common
 - Sharing...reuse / interoperability: becoming possible
- **Expectation / Intention**
 - Understanding M&S practice essentials
 - Convergence to 'good practice'

What's going on in the Economics of Modeling and Simulation?

- Issue -

- What do we know about the economics of M&S?
...everything and nothing!
- “There is no explicit, dependable, generally appreciated, and generally accepted corpus of knowledge or practice regarding M&S ‘as an economic enterprise’.”

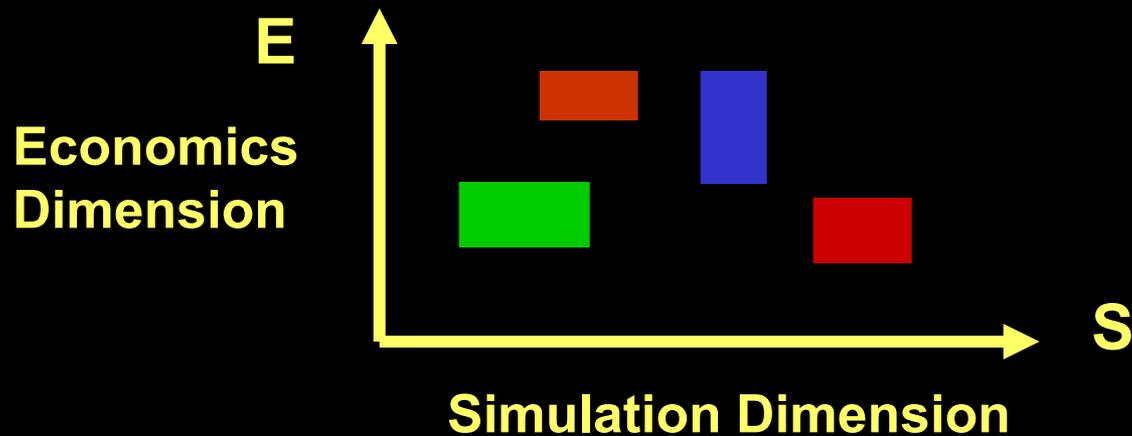
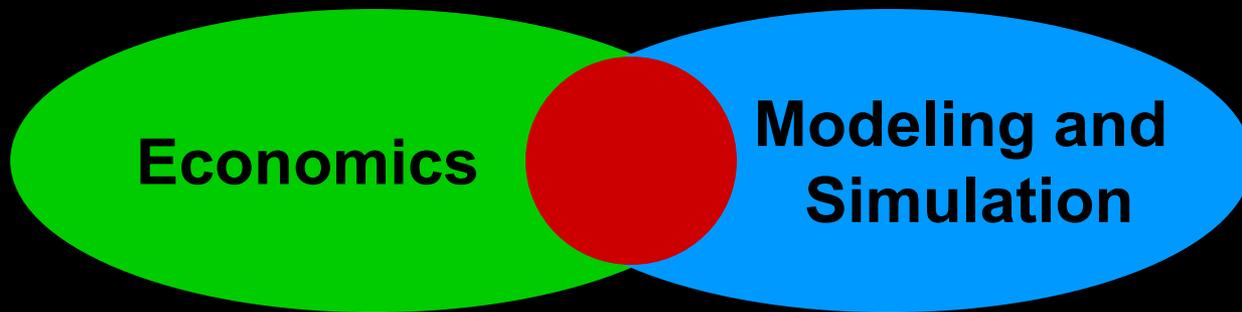
What's going on in the Economics of Modeling and Simulation?

- Opportunity -

- The significance of M&S technology, and particularly its economic implications worldwide, will continue to mount.... (*M&S is important*)
- The 'economics of M&S' is relevant to the whole M&S community.... (*Economics matters*)
- Informal, inclusive, collegial exploration can produce a body of useful findings that can be pursued more deliberately in specialized forums... (*We can figure this out*)

What are we talking about?

- Scope and Detail -



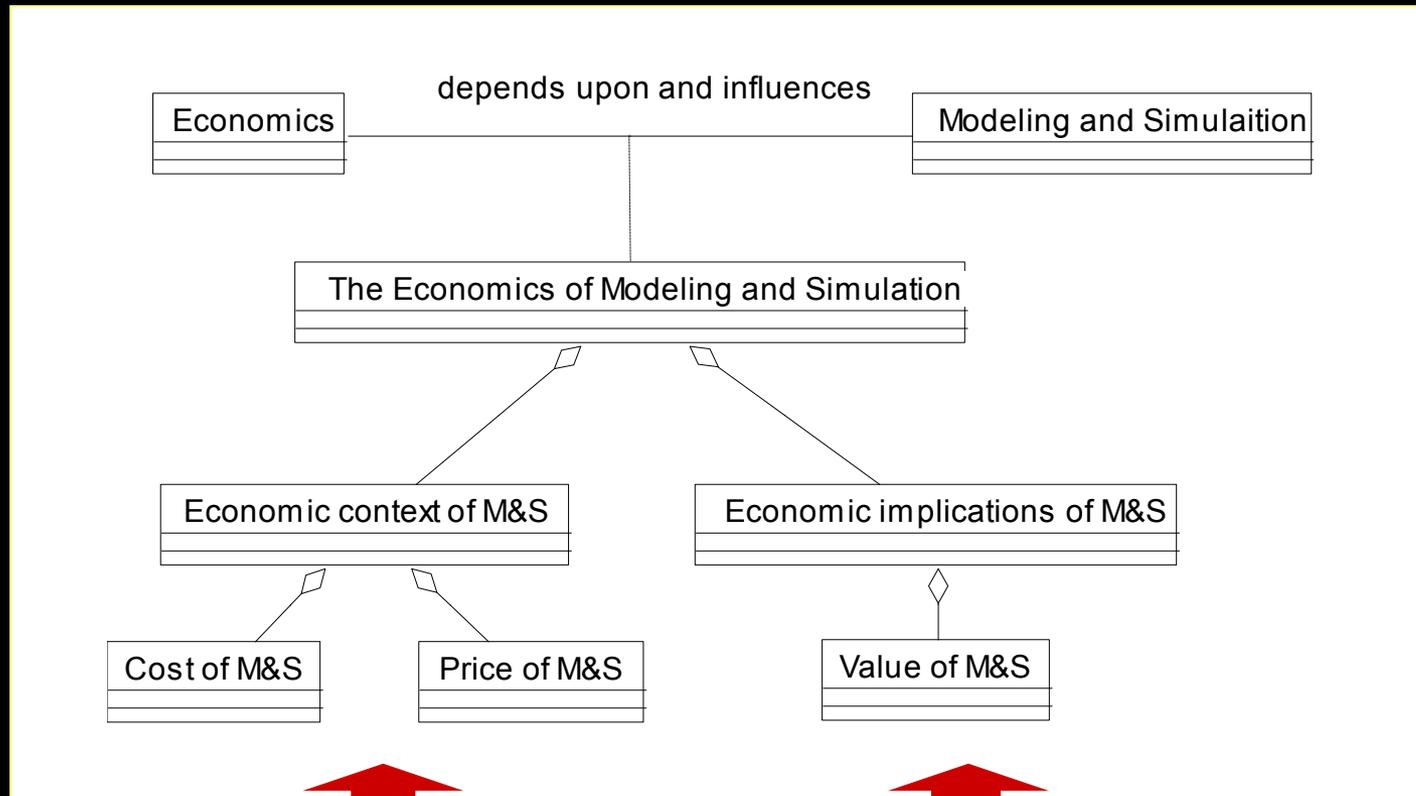
What are we talking about?

- Scope, Detail Continued -

- **To further specify scope and detail, we need to identify (generate or enumerate) the various elements of each of the two domains:**
 - e.g. for Simulation (S)
 - types of simulations
 - Parts of the simulation life-cycle (development, qualification and acceptance, use)
 - ...
 - e.g. for Economics (E)
 - Markets
 - Cost and Value factors
 - Macro dynamics
 - ...

What are we talking about?

- Relationships -



$$S = f(E)$$



$$E|_s = g(S)$$

What are we saying?...meaning?

- Definitions -

- **Familiar terms are useful**

e.g. “**simulation (n)** - A method for implementing a model over time. Also, a technique for testing, analysis, or training in which real world systems are reproduced by a model.” [DoD Directive 5000.59].

- **Unfortunately, their definitions are sometimes incomplete**

e.g. there is no definition of the verb form of simulation, and therefore no guidance as to what is in scope of the practice of simulation for economic consideration

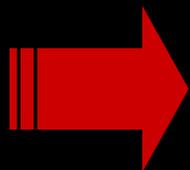
What are we saying?...meaning?

- Definitions -

- **Other terms are somewhat unfamiliar**
 - e.g. 'economics' - the study of how society manages its scarce resources
 - e.g. 'market' - a group of buyers and sellers of a particular good or service
 - e.g. 'marginal rate of substitution' - the rate at which a consumer is willing to trade one good for another
- **... but suggestive**
 - what are simulation's scarce resources?
 - what are its goods...its services?
 - who are M&S buyers?...sellers?
 - What can M&S goods be traded for?...at what rate?

OUTLINE

- Huh?
- So what?... Why care?
“...nuttin’ up my sleeve...”
[Bullwinkle]
- And then...?



What do we 'know'?

- **What we know for sure:**
 - What some of the costs and benefits of M&S are
 - What some parts of the M&S market are
- **What we don't know for sure (e.g. what is uncertain):**
 - Lots more about cost benefit, and market dynamics
- **What we know for sure we don't know:**
 - How M&S markets work in comparison to economic theory, and other comparable real (technology) markets
 - What will be the future implications of collaborative behaviors
 - What constitutes 'rational' behavior by buyers and sellers

Why do we care?

- Is there *really a problem* here? -

- **No stoppers, but difficulties**
 - We ‘do’ business one way or another, but...
 - Operation in uncertainty
 - Inability to explain to decision makers
- **‘Where there’s smoke’...**
‘there’s an opportunity’

Why do we care?

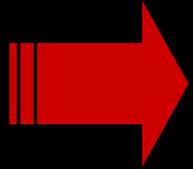
A parable -

“The Next Marginal Dollar”

...see for information the audio-visual presentation provided on the accompanying mini-CD.

OUTLINE

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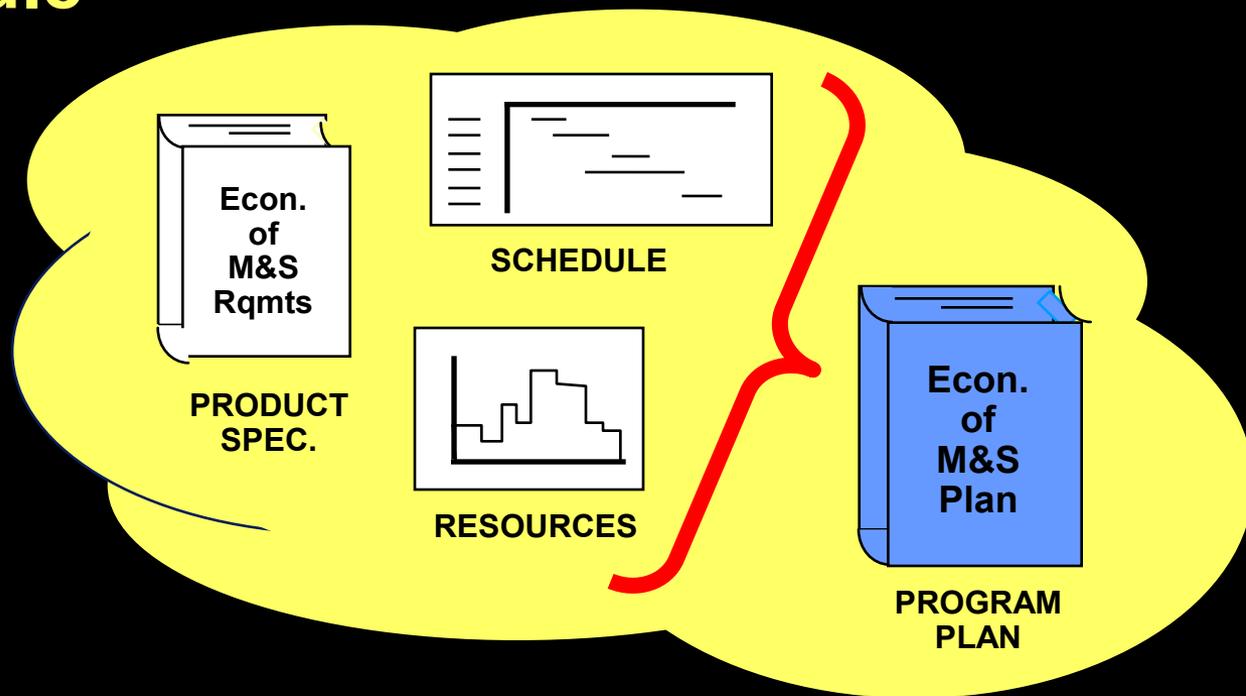


“...he jumped onto his horse and rode madly off in all directions...”

What can we do now?

- Intended **ACTION** -

- Rally-up
- Establish 'Initiative' Program Plan
- Detail Schedule
- Execute
- Integrate
 - ...sample
 - ...hold
 - ...and share



Where are we headed?

- What's going on? -

- **See Initiative NOTEBOOK**
 - Program Plan
 - Schedule
- **See Draft Proceedings of Events:**
 - SCSC '99
 - Fall 99, Spring 00 SIW
 - I/ITSEC (Orlando, Dec. '99)
 - ITEA (Las Cruces, Dec '99)
 - MORS (TBD)
 - SCSC 2000 (Vancouver July '00)
- **Next Events**
 - Fall 00 SIW

What do we want?

- Intended Outcome -

- **Exploratory Products**
 - Glossary, Annotated Bibliography
 - ‘Field Map’ of the M&S Economics domain
 - Taxonomy of M&S economics (cost, benefit, etc)
 - M&S Market Model
 - Cost Estimating Relationships (CERs)
 - Generally accepted accounting principles (GAAP)
 - Lessons-Learned Report... or ‘the book’
- **Exploratory End-State**
 - Shared understanding of market structures, mechanisms and operations
 - Improved capacity for ‘rational’ M&S market behaviors

CONCLUSION

- **This is not Campbell's Archetypal journey of the hero ...**
 - we are not Gilgamesh, Frodo Baggins, or Harry Potter
- **This is not a Mission / Missionary proselytization ...**
 - we are not Wilberforce or Albert Schweitzer or the Blues Brothers
- **In fact ...**
 - we're more like Arlo Guthrie in "Alice's Restaurant"
...so let's have us a movement