M&S Caucus Leadership Summit

Modeling & Simulation: Key to Wise Investing Through Superior Decision-Making

John Nestler
Engineer Research & Development Center
U.S. Army Corps of Engineers

U.S. Army Corps of Engineers

Civil Works Programs
24K People - $12.3B

- Navigation
- Hydropower
- Flood Control
- Shore Protection
- Water Supply
- Regulatory
- Recreation
- Homeland Security
- Environmental
- Real Estate

HQ

9 Divisions

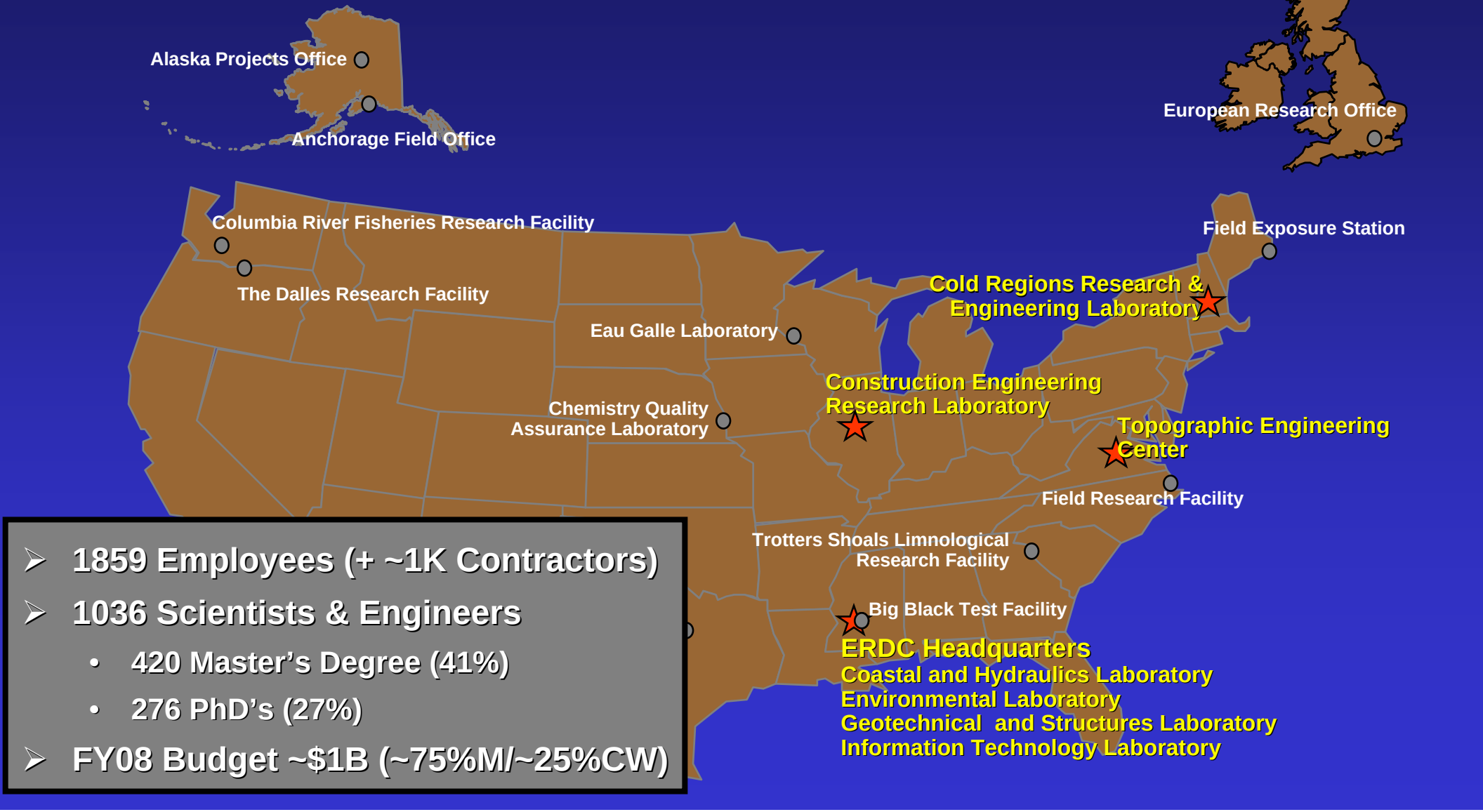
45 Districts

Industry Partners

Military Programs
10K People - $20.0B

- Military Construction
- Contingency Ops
- Installation Support
- Warfighter support
- International / Interagency Support

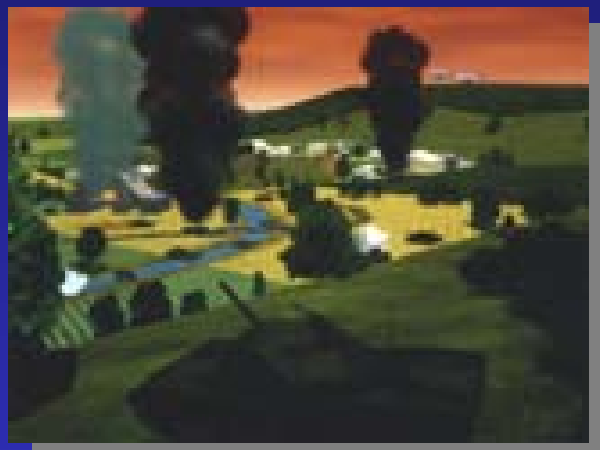
Engineer Research and Development Center



- 1859 Employees (+ ~1K Contractors)
- 1036 Scientists & Engineers
  - 420 Master's Degree (41%)
  - 276 PhD's (27%)
- FY08 Budget ~$1B (~75%M/~25%CW)

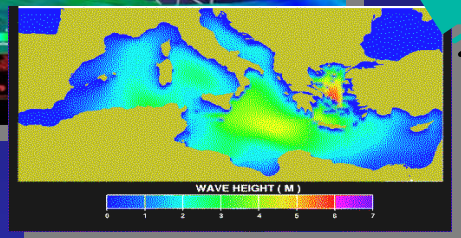
ERDC Missions In:

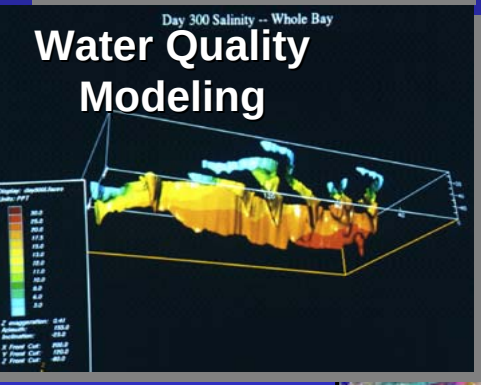
- Warfighter Support
- Installations
- Environment
- Water Resources
- Information Technology



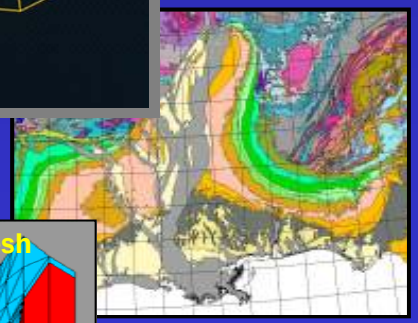
ERDC Modeling & Simulation is Important and Pervasive

CFD Modeling

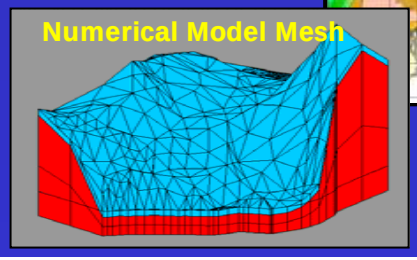


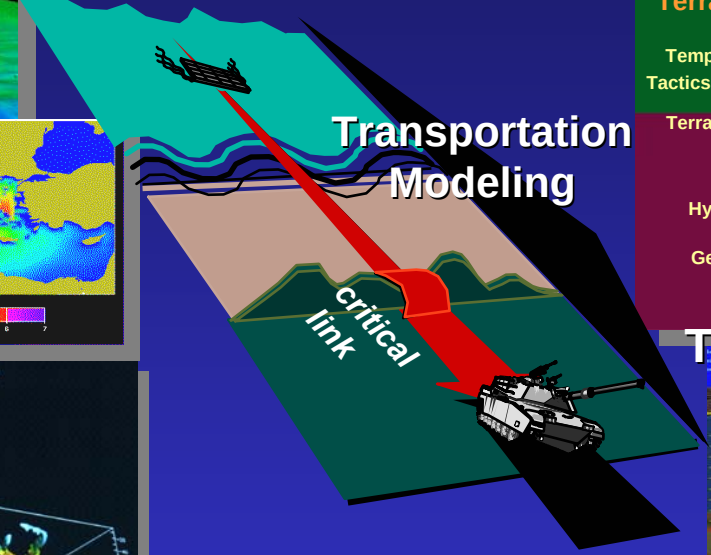


Water Quality Modeling



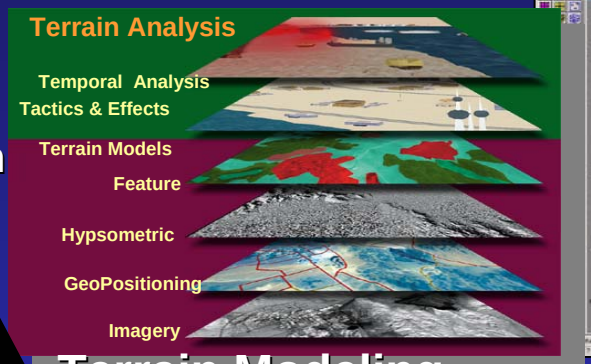
Engineering Geophysics



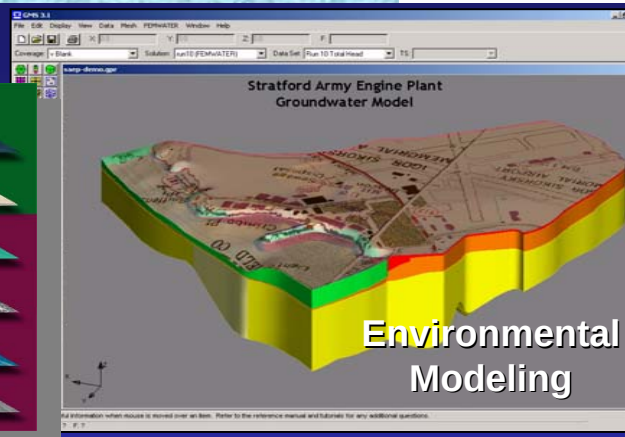


Transportation Modeling

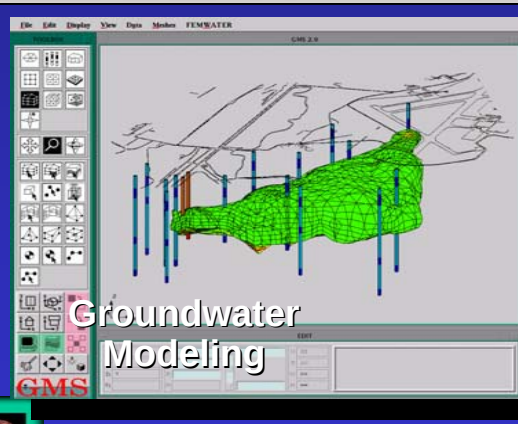
High Performance Computing Center



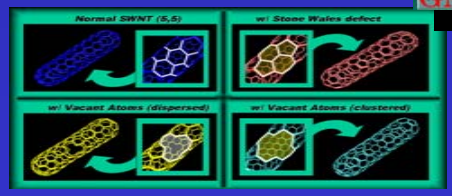
Terrain Modeling & Visualization



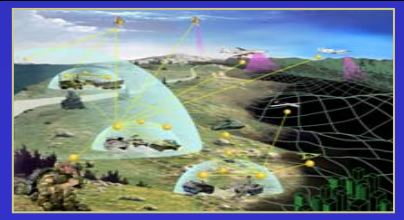
Environmental Modeling



Groundwater Modeling

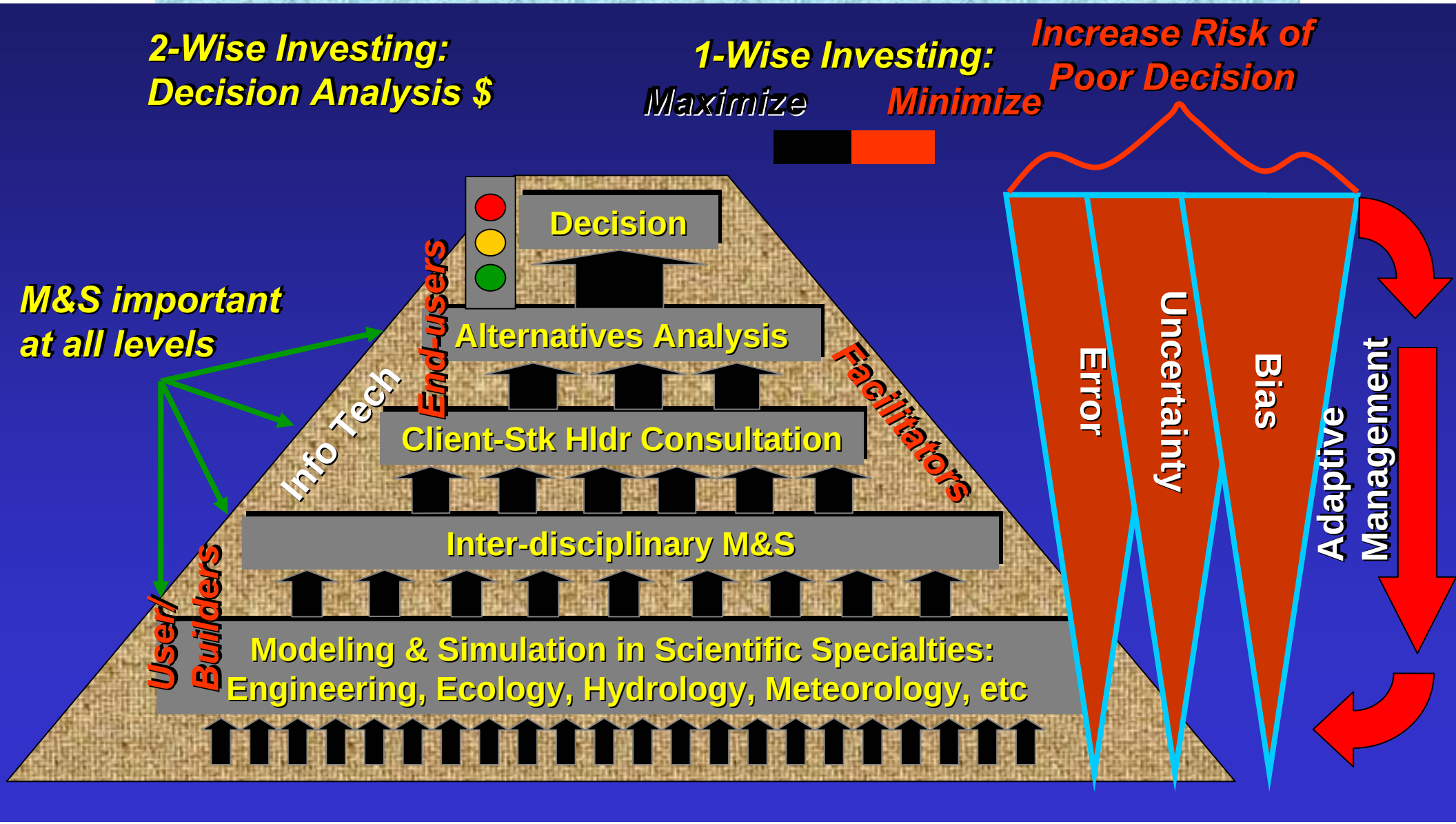


Infrastructure Materials



Theater Assessment

Enterprise Investment Decisions Reduce to "Data to Knowledge" Engine



M&S Challenge for Enterprise Investment Apps @ S&E Level

Each discipline has:

- Different “currencies” and processes of different patterns & scales.
- Different “First Principles“ using reference frameworks, concepts, & tools optimized for itself.
- Hundreds of years of convention & tradition.
- Builds tools without regard to the limits & capability of others.
- **Challenge: Fully integrate disparate disciplines without compromising the first principles of any.**

Improve M&S Technology to Enable Wise Investment by Training:

End-users

Policy- & Decision-Makers to:

- Pose answerable questions and expect uncertain results
- Understand and use decision-analysis
- Be the "architect" not the "tradesman"
- Meta-language for M&S?

Facilitators

IT Professionals to understand:

- Not all disciplines know their governing equations (approximation, correlation, vs determinism)
- Models cannot be "hooked together" without understanding underlying science
- Impressive graphics ≠ good science
- Perspective of both end-user and builder

User/ Builders

Discipline-Specific Modelers to :

- Convey information, but emphasize uncertainty
- Understand concepts underpinning models from other disciplines
- Understand that all models are related not disparate
- Understand the perspective of the end-users

Improve Enterprise-level M&S Technology to Enable Wise Investment

End-user

Policy- & Decision-Makers

- Synthesis not fragmentation

Facilitator

IT Professionals

- Facilitate don't dominate

User/ Builder

Discipline-Specific Modeling:

- Collaborate don't isolate

The Vision:

Accurate, large domain, longtime time period, multi-disciplinary, multi-media, high-res, timely enterprise M&S that enables wise investing through superior decision-making

Questions?
Comments?