MindModeling@Home:
A Volunteer Computing Resource for Cognitive Modeling

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Performance and Learning Models (PALM) Team

6.1

(basic)

6.2

(applied)

- **Orientation and navigation in virtual environments**
- **Modeling the effects of fatigue on cognition**
- **Large scale cognitive modeling**
- **Distributed and high performance computing**
- **Natural language and synthetic teammates**
- **Performance tracking and prediction**

Dr. Jerry Ball, Dr. Scott Douglass, Mary Frieman, Dr. Kevin Gluck, Dr. Glenn Gunzelmann, Dr. Tim Halverson , Jack Harris, Dr. Tiffany Jastrzembski, Michael Krusmark, Dr. Don Lyon, Tom Mielke, Rayka Mohebbi, Rick Moore, Dr. Chris Myers, Monica Nguyen

Performance and Learning Models (PALM) Team Cont.,

Scientific Goal

Improved models of human perceptual, cognitive, and motor processes in complex, dynamic environments
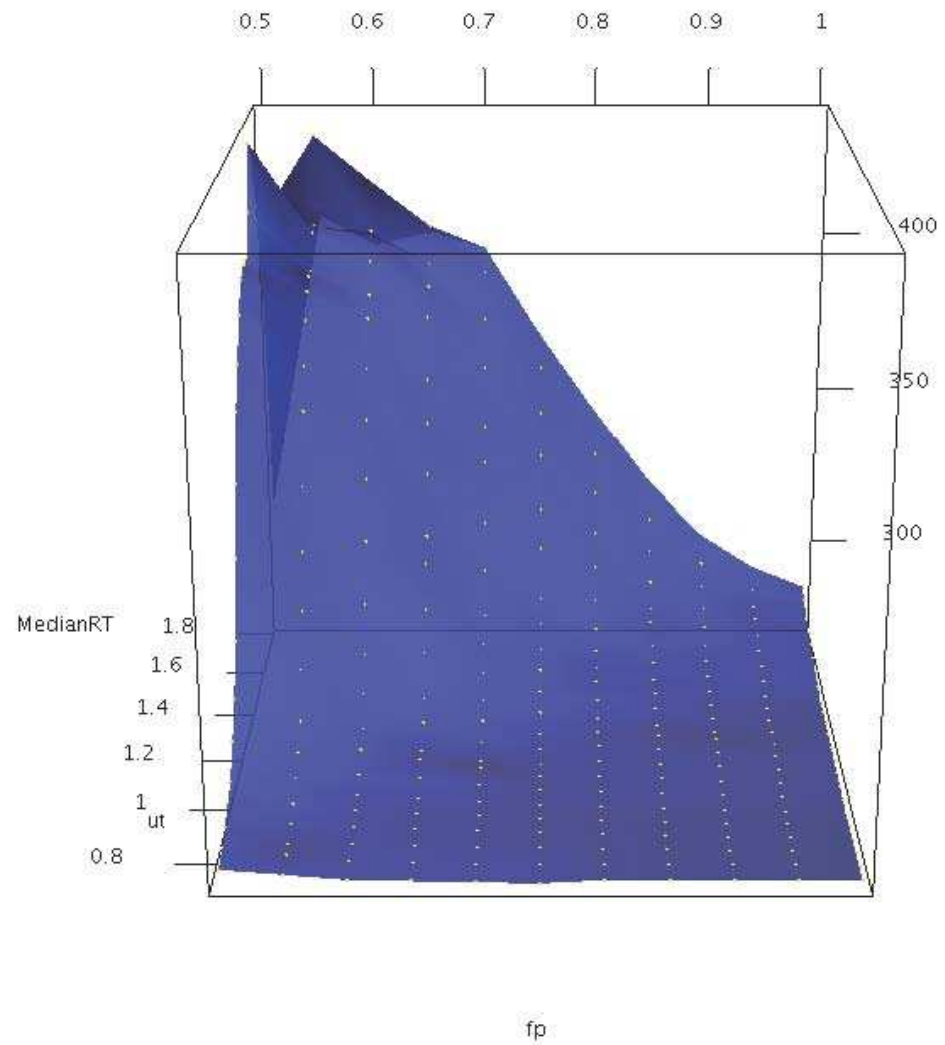
DoD Application

Computational Replicates

- Synthetic teammates
- Pedagogical agents
- Performance optimization analysis tools

Exploring the Parameter Space

# Fatigue Research Model (SASTNM_7)

	Start	End	Steps
Procedural Fatigue Parameter	0.4	1	0.1
Procedural Fatigue Decrement	0	0.04	0.01
Declarative Fatigue Parameter	0	1	0.1
Declarative Fatigue Decrement	0	0.05	0.01
Retrieval Threshold	-1	1	0.5
Utility Threshold	0.7	1.8	0.1
Initial Utility	1.5	2.5	0.1

6 * 4 * 10 * 5 * 4 * 11 * 10 = 1,524,600 Parameter Combinations

* 100 = **100,524,600 Model Runs!**

High Computational Demands

Growth in HPC Use
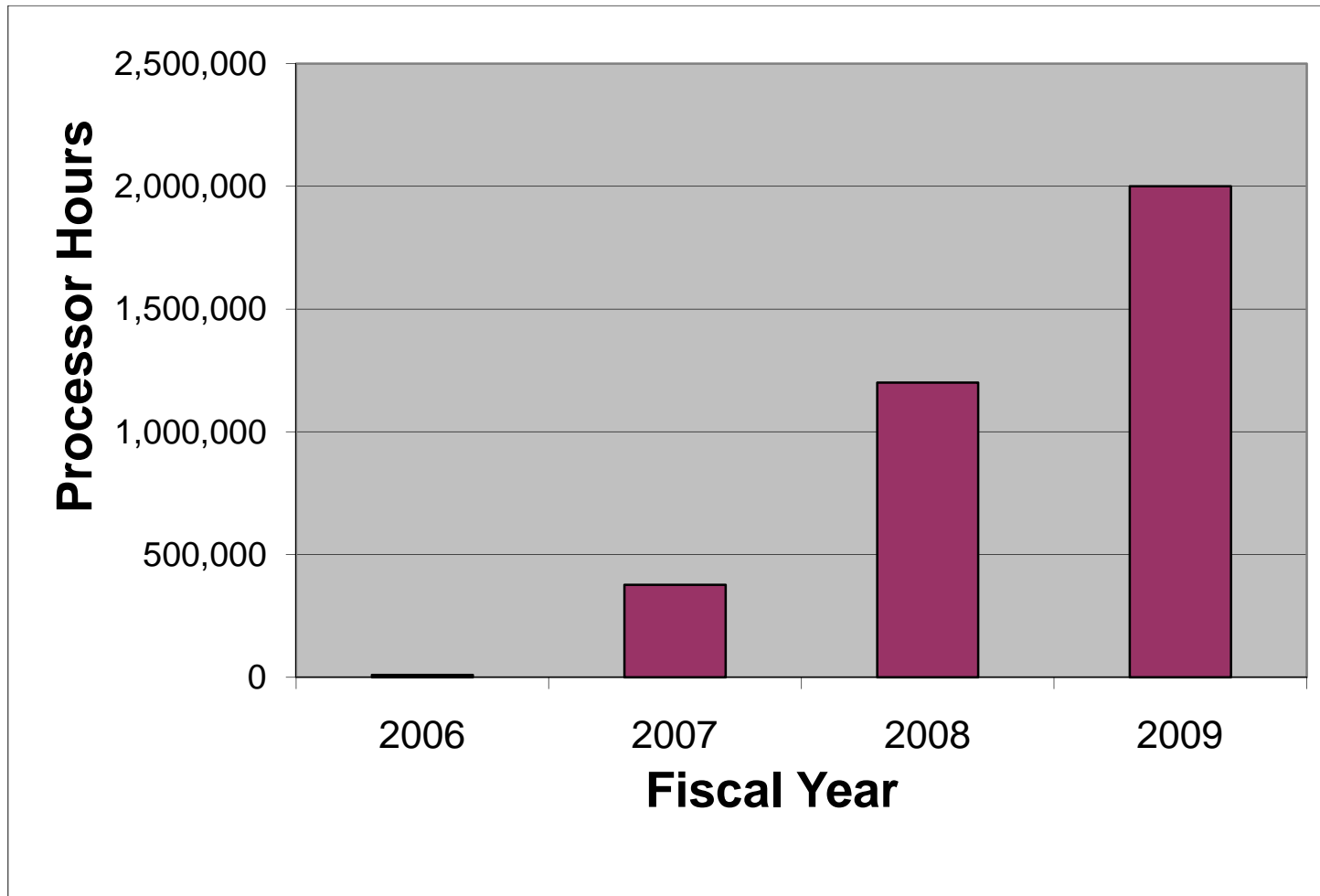
Challenges in HPC Use

- **Scheduling Tasks**
- **Time allocations**
- **Transferring completed data**
- **Limited amount of processing hours**
- **Secure access**

Volunteer Computing
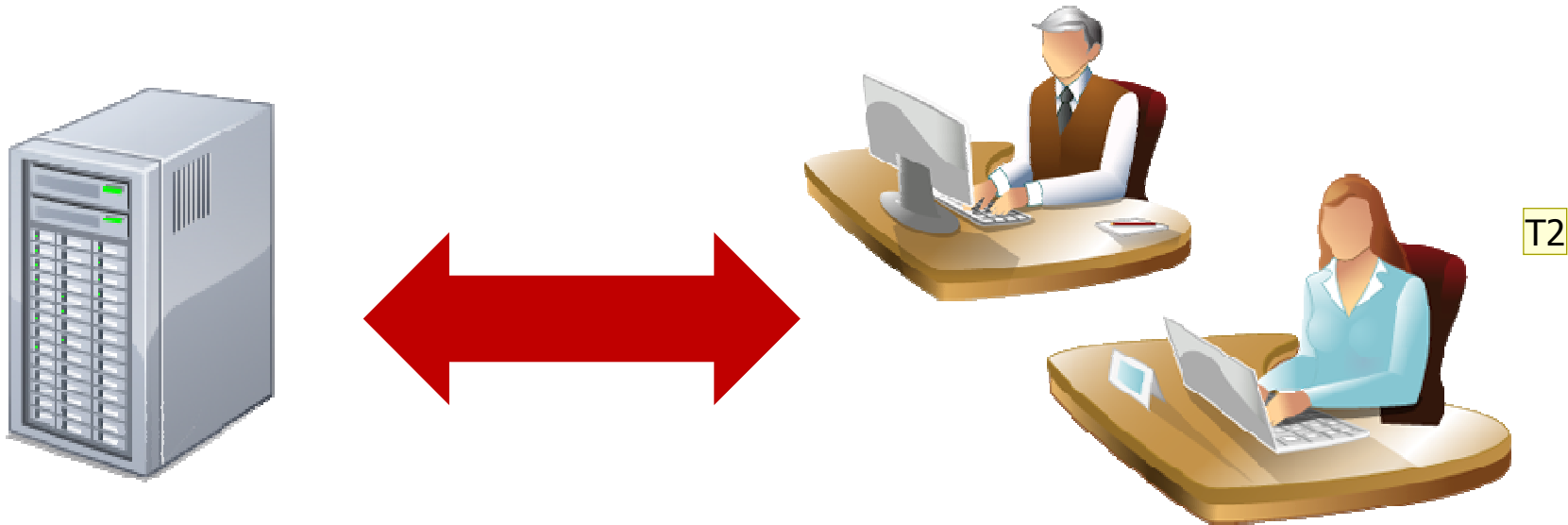
- **Berkeley Open Infrastructure for Network Computing (BOINC)**

  - **Scheduling / Work flow process management**

  - **File Distribution (Lisp VM / Model / Cognitive Architecture)**

  - **Data Management and Validation**

  - **Multi-core utilization (Client)**

T2 Distributed computing in which owners donate their computing resources (i.e. storage, processing power) to one or more projects
Tommy, 6/17/2009

SETI@HOME

Folding@home distributed computing
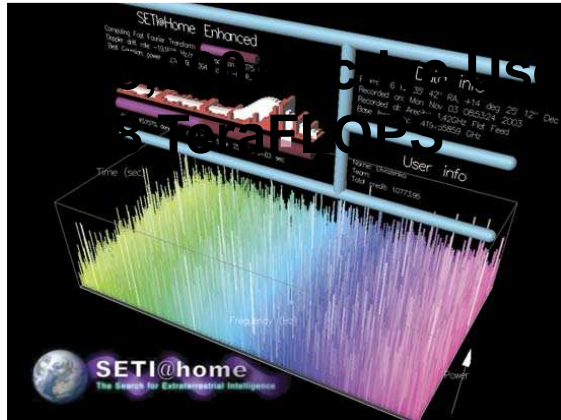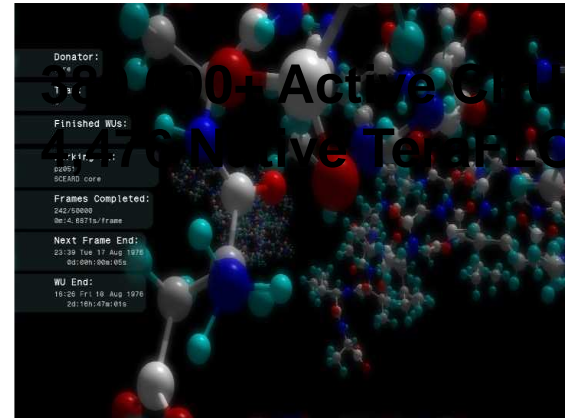
Rosetta@home
Protein Folding, Design, and Docking
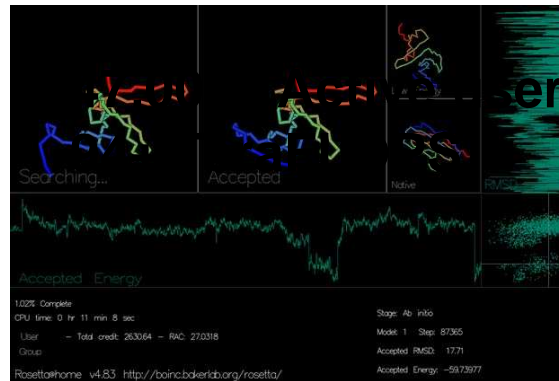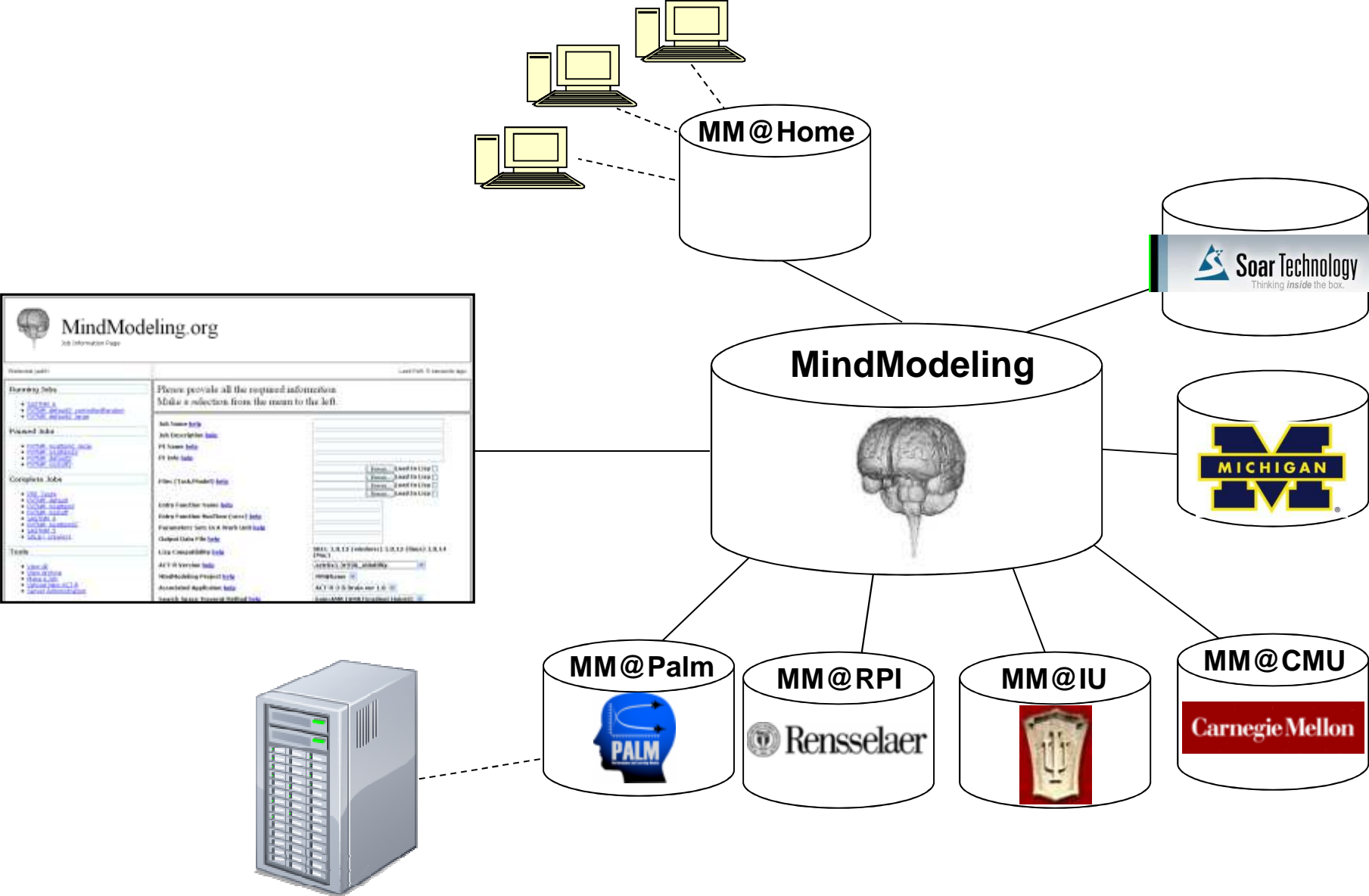
www.mindmodeling.org

MindModeling@Home

- **MindModeling@Home: Meta-Computing project spanning diverse resources to create an integrated cognitive research environment**

  - **37,000,000+ parameter combinations searched**

  - **Centralized Web Submission system for models**

  - **Support for Mac, Windows, and Linux clients**

  - **On Average, 600-800 active users**

  - **82 Countries**

PRP_Test3
(0.06 2.03 3.17 0.004)
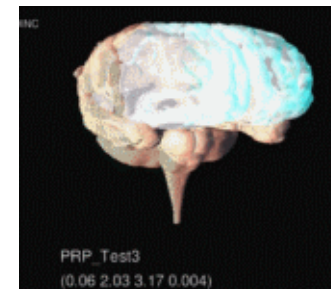
MindModeling Portal

The future of MindModeling@Home

MindModeling@Home as a Volunteer Computing Resource for Cognitive Modeling

- **Processing power comparable to HPC's**

- **Job submissions not restricted to secure access**

- **Fast turn-around time for models**

- **Capability of supporting distributed computing for a diverse range of applications**
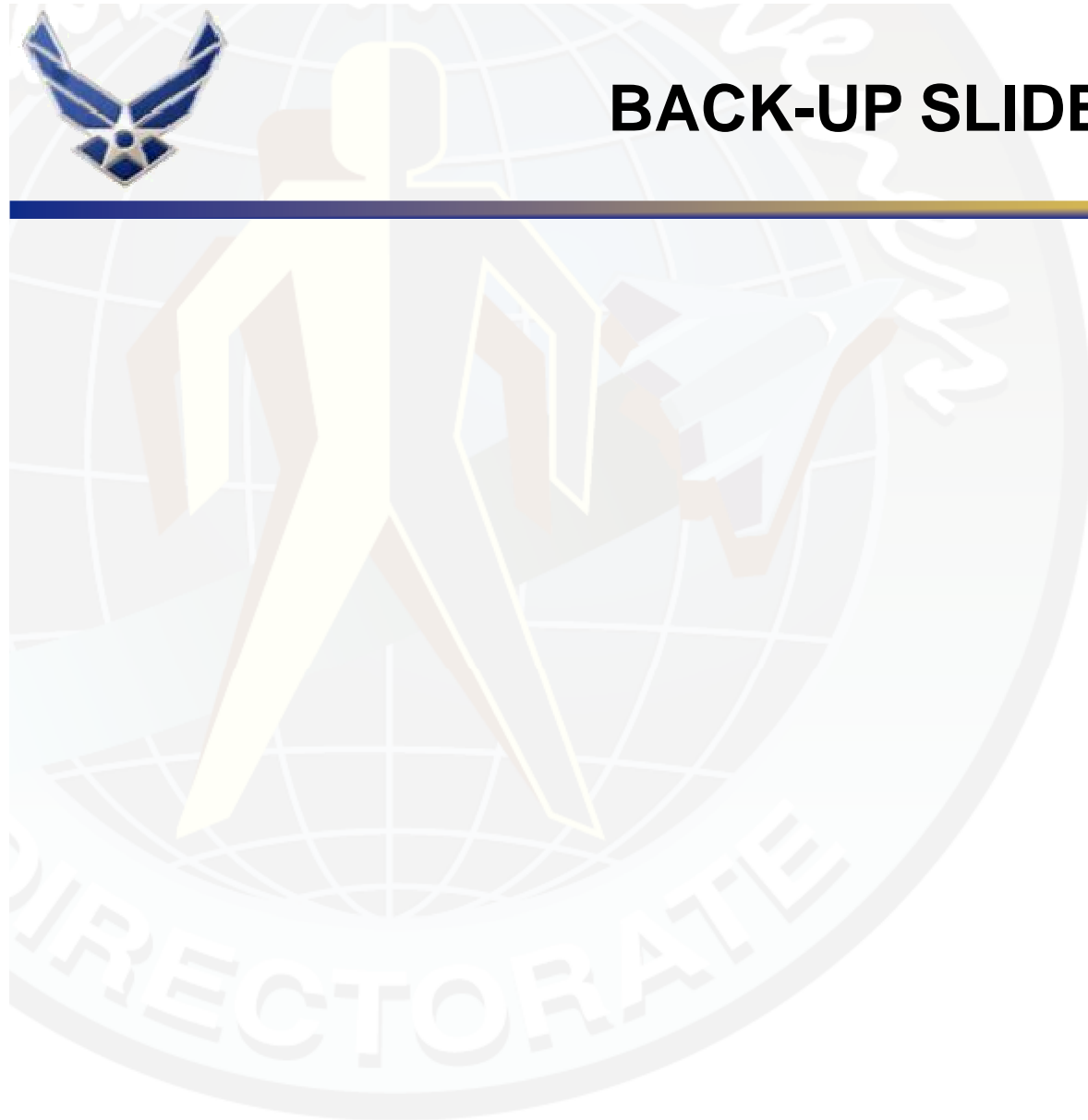
- **Web-based submission system**
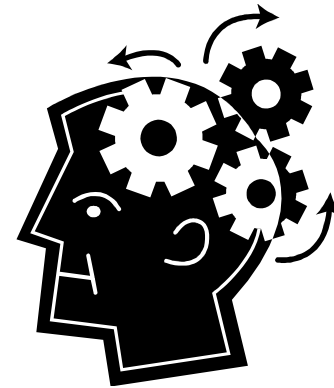
Thank you,

Any Questions?
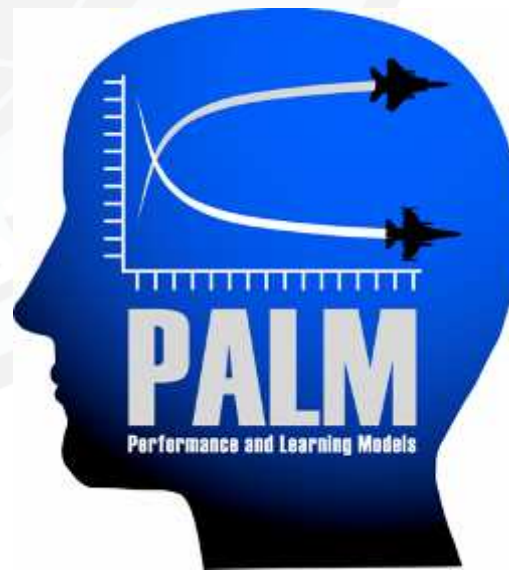
BACK-UP SLIDES

MindModeling Meta-Computing Infrastructure