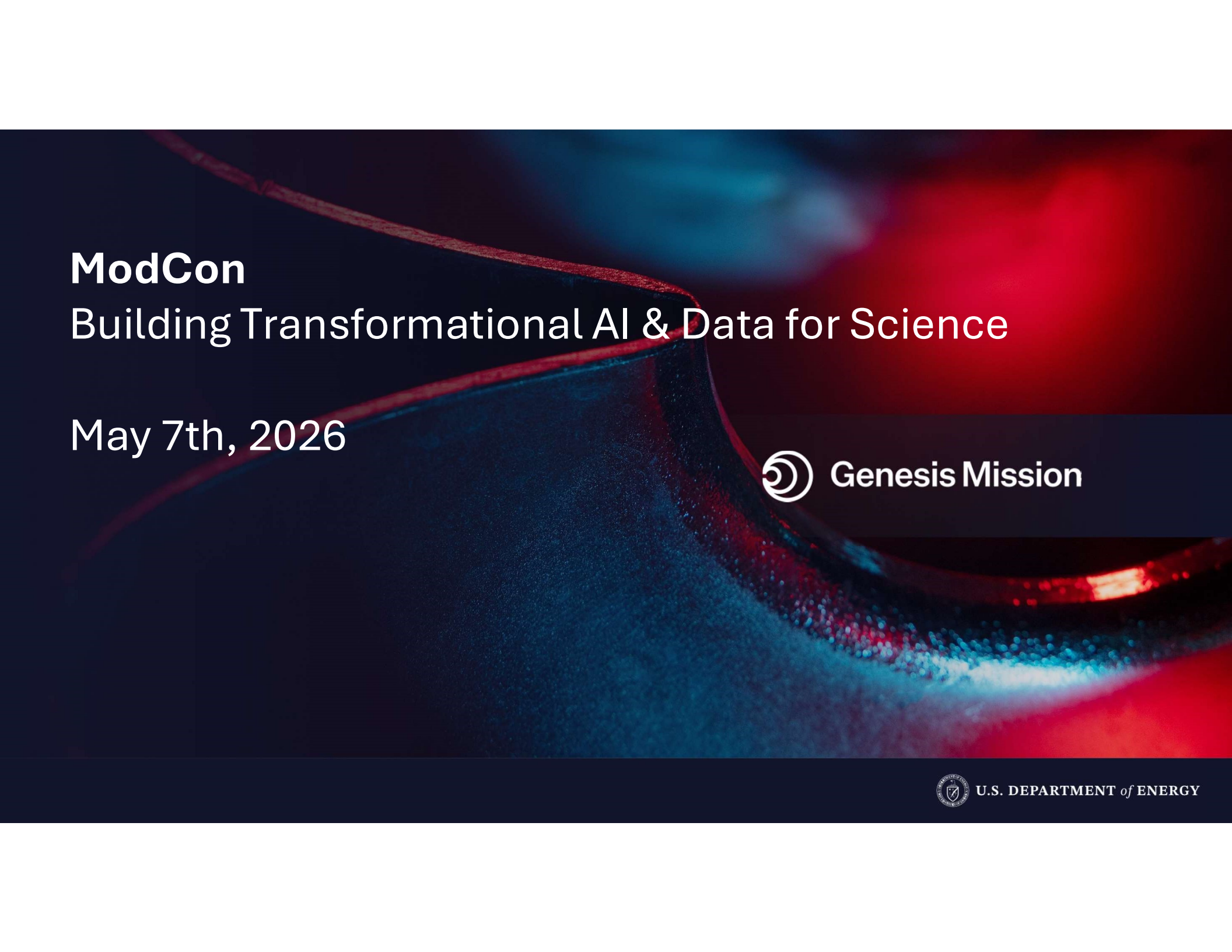




ModCon

Building Transformational AI & Data for Science

May 7th, 2026



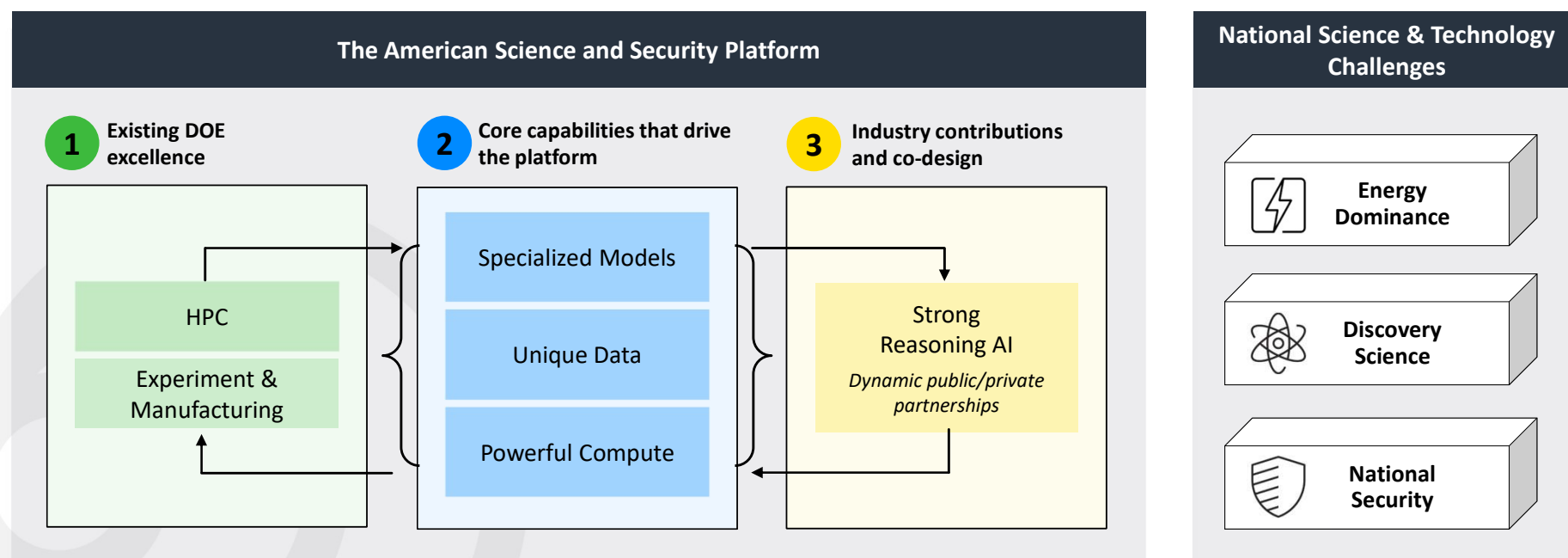
Genesis Mission



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The Genesis Mission is a DOE-led national initiative to build world-leading AI infrastructure and apply it to the nation's most pressing science and technology challenges.



The platform enables the breakthroughs. The National Challenges define what we're solving for. Combined, we aim to double the productivity and impact of American R&D within a decade.



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ModCon: delivers transformational AI and data capabilities



Mission

- AI and data research and development to accelerate technical development and scientific discovery for Genesis
- Develop and deliver cross-cutting services as an engine for transformational AI model development
- Leverage partners from industry, academia, and internationally to accelerate AI development and adoption



Four Core Teams

deliver support to Model Teams

IPPF

Partnerships and IP Management

DBS

Data Brokers & Standards

BPSW

Best Practices for Scientific Workflows

BASE

Cross-Cutting AI Capabilities



What We Deliver

AI-Ready Data Pipelines

Transform raw scientific data into training-ready datasets

Scientific Workflows

Leaderboards, workflows, and upskilling for continuous discovery

Transformational Capabilities

- Core agentic framework
- Self-improving models harness
- Multimodal reasoning frontends
- Safety, security, assurance
- Evaluation

Deployed on Genesis Mission Infrastructure
The American Science Cloud

Partners
17 DOE Labs + industry + academia

Genesis Mission Mapping
Data, models, and partnerships teams



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Governance and DOE Engagement
Lab Council, ALDs, DOE Lab Reps
Partnership Council, External | Executive Voice

MODCON OFFICE

Director
Rick Stevens, Argonne

Deputy Director
Court Corley, PNNL

Project Management
Emily Dietrich, Argonne

Model Team Coordinator
Tom Brettin, Argonne

AmSC Coordination
Neeraj Kumar, PNNL

CROSS-CUTTING CAPABILITIES

IPPF: IP & Partnership Foundation
Megan Clifford, Argonne | Daniel Ratner, JLab
Jason Hales, INL

BPSW: Best Practices for Scientific Workflows
Frank Cappello, Argonne
Rafael Ferreira Da Silva, ORNL

DBS: Data Broker Standards
Lauren Biven, JLAB | Jeren Browning, INL
Ray Grout, NLR

BASE: BASELINE AI R&D CAPABILITIES

Stefan Wild, LBNL | Nathan Hodas, PNNL

CAF: Core Agentic Framework
Ian Foster, Argonne

EVAL: Evaluation
Stefan Wild, LBNL

SAFE: AI Security & Safety
Nathan Hodas, PNNL

SIM: Self-Improving Models
Ana Gainaru, ORNL

DATA: AI-Ready Data
Shreyas Cholia, LBNL

MM: Multimodal Reasoning
Sandeep Madireddy, Argonne



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16 early seedling mission-enabling model teams shaped requirements for the Genesis Mission Platform

AIForHPC

AI-Driven Code Dev
Andrew Siegel | ANL

Microelectronics

AI Co-Design
Valerie Taylor | ANL

AI4Quantum

Quantum Algorithms
Salman Habib | ANL

COMB-FLOW

Combustion & Fluids
Sibendu Som | ANL

CM²US

Critical Minerals
Frank Alexander | ANL

Quarks to Cosmos

HEP & Cosmology
Salman Habib | ANL

AXESS

Specs-to-Silicon
Nhan Tran | FNAL

Prometheus

Nuclear Power
Peter Suyderhoud | INL

SYNAPS-I

Light Sources
Alex Hexemer | LBNL

MOAT

Accelerators
Jean-Luc Vay | LBNL

GridAI

Power Grid
Benjamin Kroposki | NREL

MAIQMag / QCAD

2D Quantum Magnets
Yongqiang Cheng | ORNL

FAMOUS

Biological Systems
Douglas Mans | PNNL

Fusion-FM

Magnetic Fusion
Shantenu Jha | PPPL

ISAAC

Scientific User Facility | Dimos Sokaras | SLAC

Alphafold for Microelectronics

Subramanian Sankaranarayanan | ANL



American Science Cloud (AmSC) – Friday 3:45PM DOE Booth

A Unified Platform for Transformational AI and Science Across DOE

- AmSC is a secure, federated, and science-optimized cloud environment
 - Not centralized servers but an environment supporting contributed tools, services, and ModCon core capabilities
- Integrates DOE's world-leading computing, experimental facilities, data resources, and HPC networks
 - A flexible structure to support integration of capabilities
- Enables AI-ready end-to-end workflows across the complex
 - Contributions from across the DOE lab complex, not predefined workflows



Data Services

FAIR, AI-ready datasets
across DOE



Model Services

State-of-the-art models for
discovery



AI Services

Extreme-scale training &
inference



Infrastructure

Secure compute, storage,
networking

Genesis Mission defines ambition and urgency.
AmSC scaffolds a shared platform to execute.

DOE Labs and Infrastructure Partners

ANL · LBNL · BNL · FNAL · INL · JLab · NETL · NLR · ORNL · PNNL · PPPL · SLAC



ModCon Core Baseline AI Research & Development **BASE**



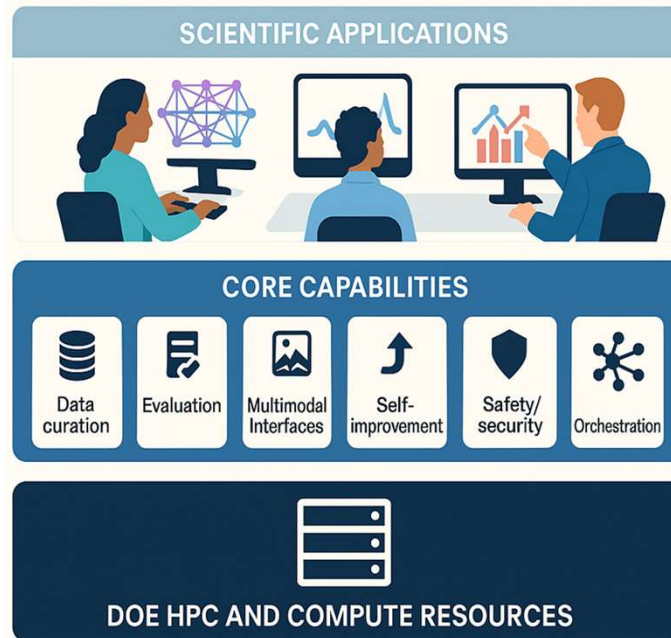
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Base R&D is delivering cross-cutting AI capabilities to the Genesis Mission

- Providing reusable methods, frameworks, and tools that underpin every Model Team
- Responsive to the requirements set by the Genesis Mission crosscuts
- Collaborating directly with Model Teams and American Science Cloud

We are also:

- Genesis Mission's crosscutting AI dev team
- Filling in what is missing from the current AI ecosystem
- Helping inspire others to use the command line

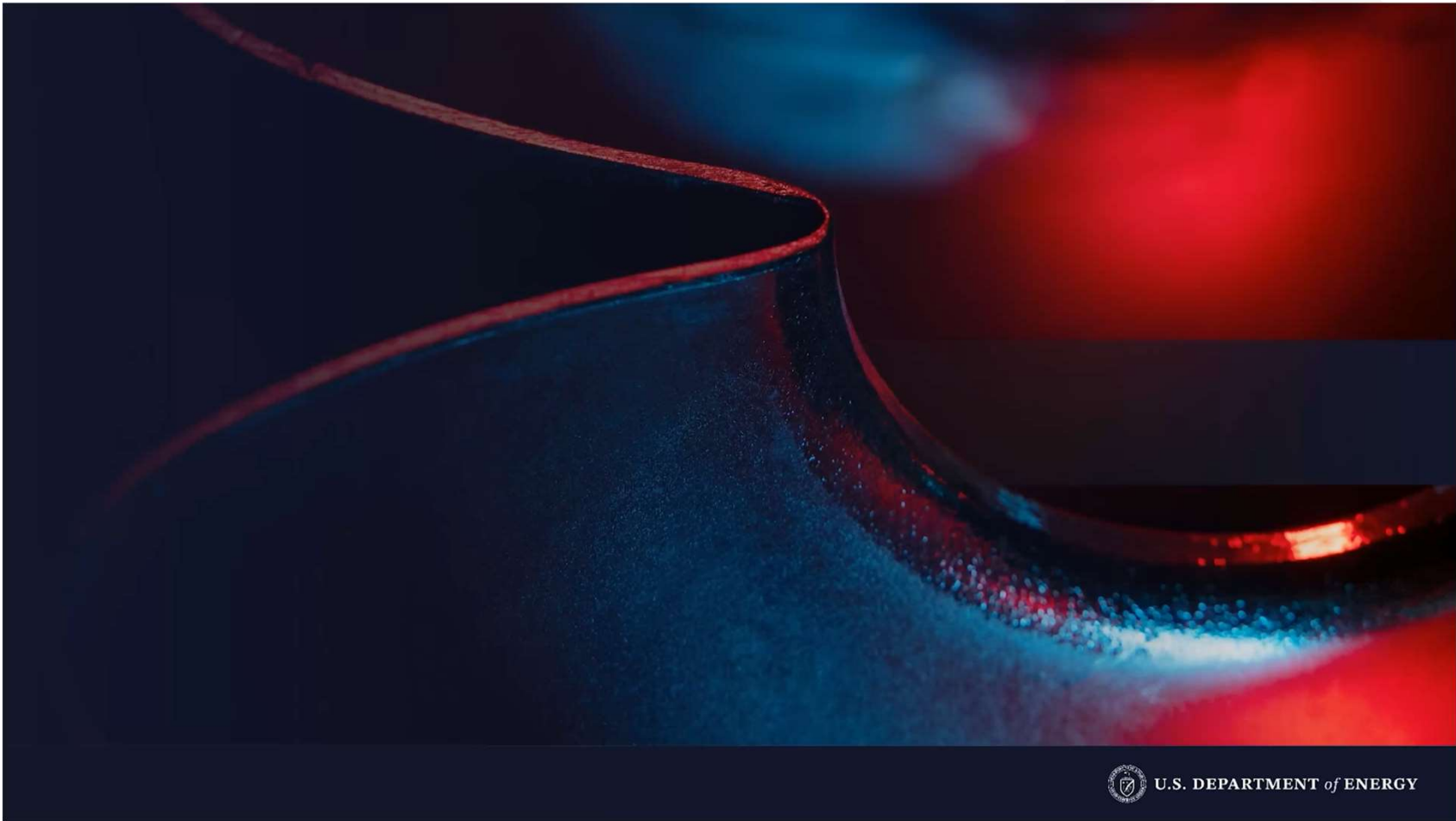


**FASTER
SCIENCE**

SAFER AI

**SCALABLE
ORCHESTRATION**

BASE Demo Video



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ModCon Core Best Practices For Scientific Workflows **BPSW**

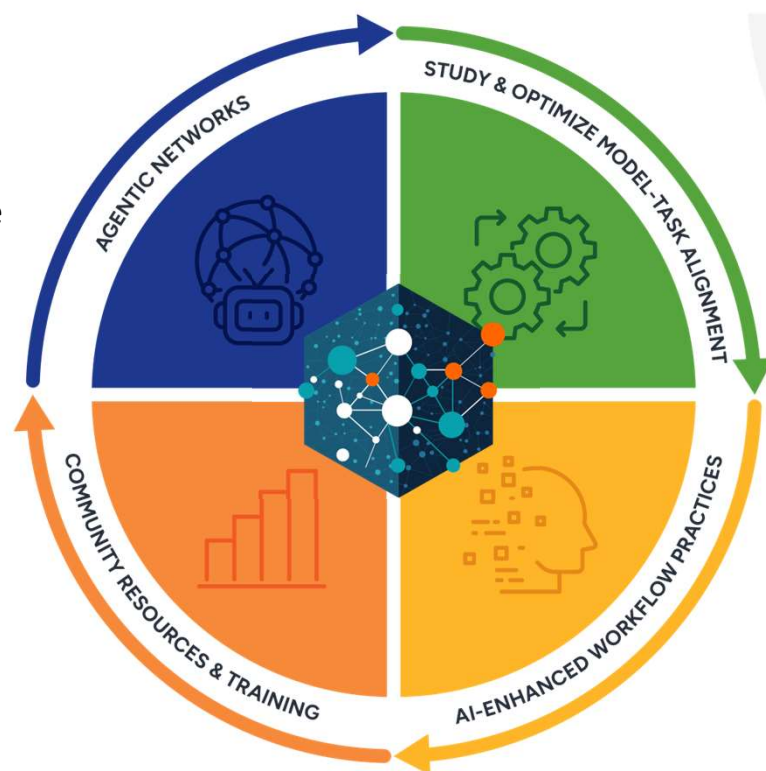


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Best Practices for Scientific Workflows: BPSW Team

Define workflow **requirements** for cross-domain agentic AI to advance discovery science,

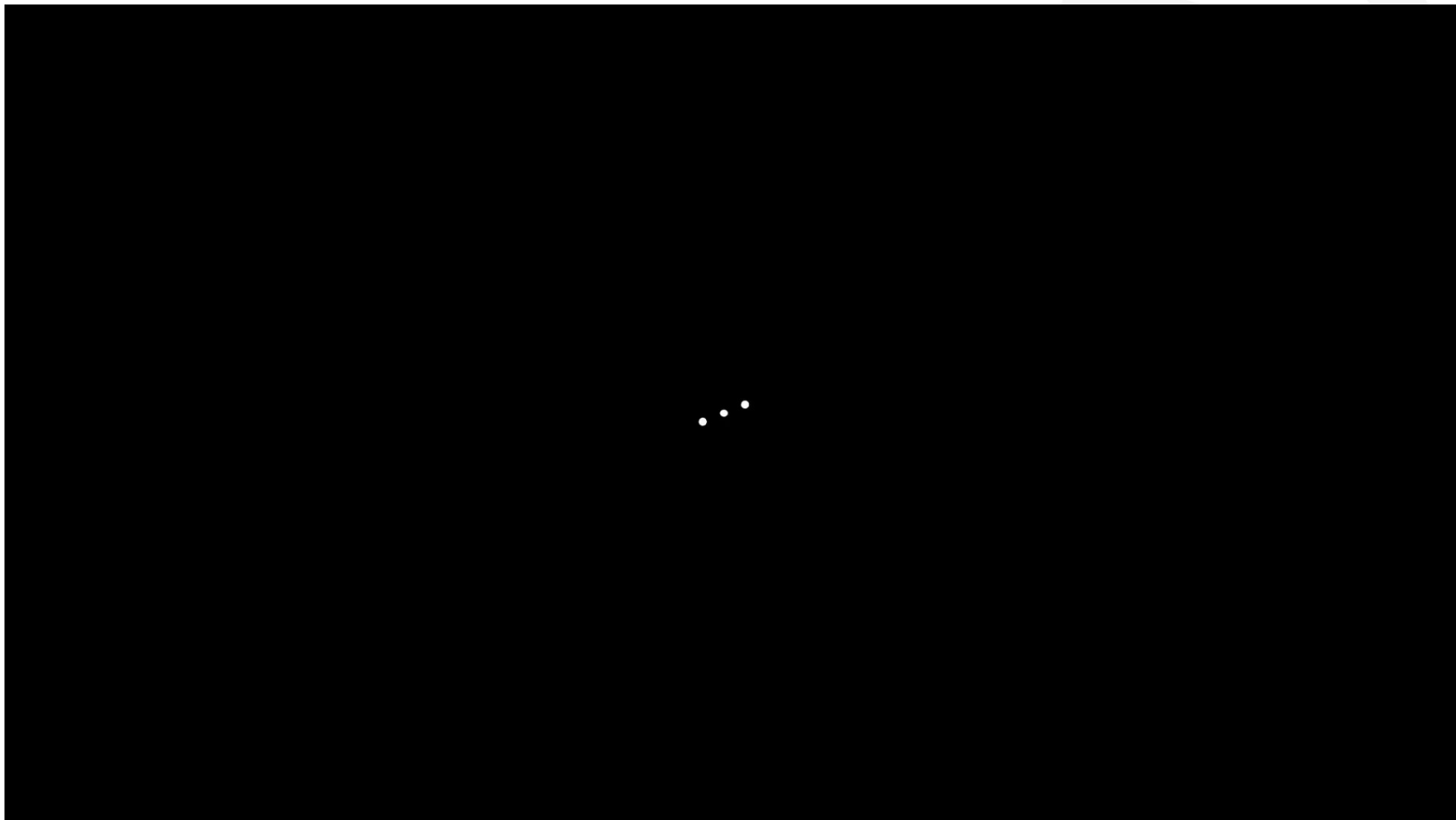
Maintain a **leaderboard** ranking AI models. A challenge repository spanning, **best-practice guides, tutorials, AI integration examples, and success stories.**



Rigorously **evaluate** then optimize how AI methods accelerate DOE science tasks and full workflows.

Publish **guidelines** and reusable **agentic workflow templates** to standardize AI adoption across DOE

 Genesis Mission **BPSW Demo Video**



ModCon Core Data Brokers and Standards **DBS**

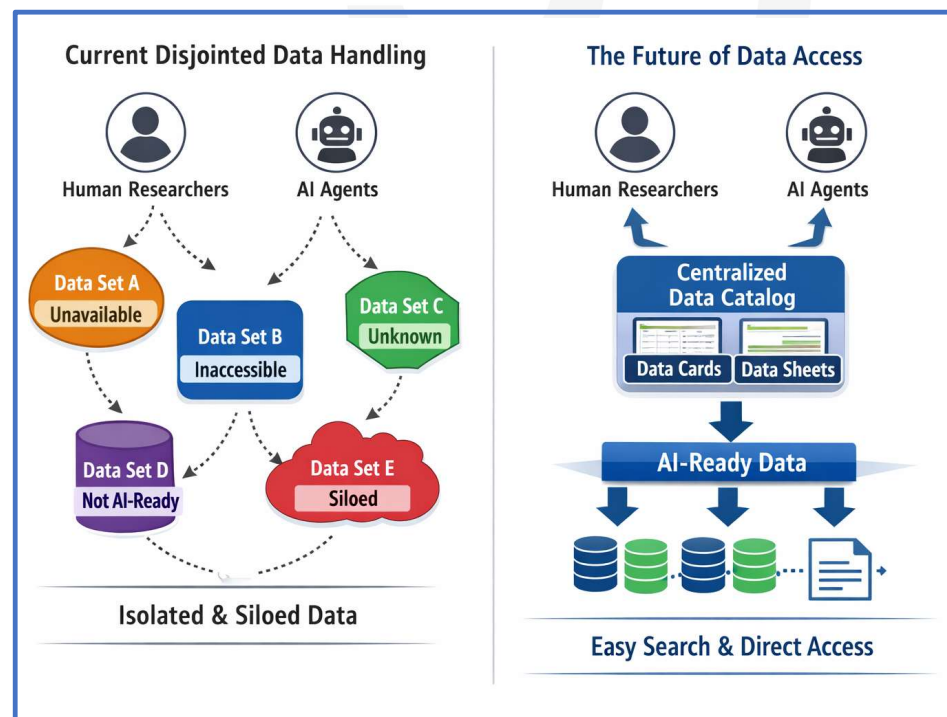


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Data Brokers and Standards enhances the productivity of science

DBS addresses current rate-limiters to scientific productivity and security by...

- improving the findability of data and related artifacts for people and agents
- developing secure, trustworthy frameworks for data sharing and publication
- automating data curation for AI-readiness.



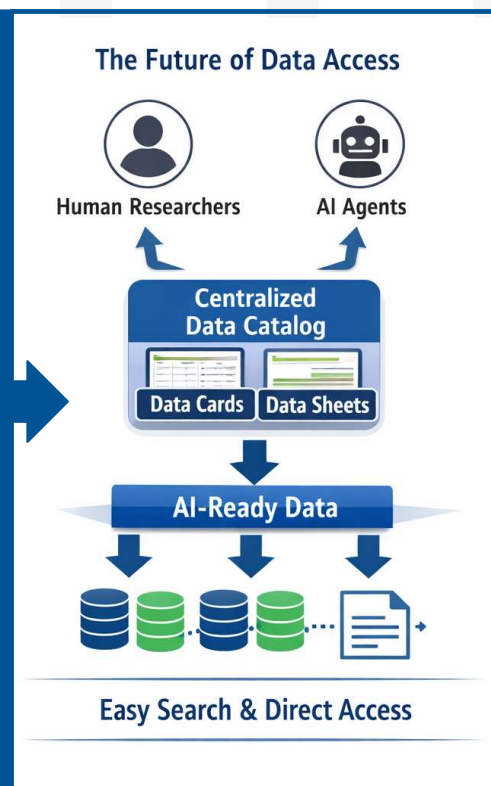
DBS is identifying, aggregating, and supporting the curation of datasets to enable autonomous discovery science for Genesis

Transforms DOE datasets into AI-ready resources by **centralizing access to metadata, datacards, and datasheets** and establishing clear standards and policies for data usage.

Bridges data generators and data users and enables:

- Novel search capabilities
- Automated access and reuse
- Integration into agentic workflows

METADATA
AGENT CARDS
MODEL CARDS
DATA CARD/README
DATASHEET



ModCon Core Intellectual Property & Partnership Formation **IPPF**



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Intellectual Property & Partnership Formation

Entry Point

Primary channel and entry point for partners and Model Teams for initial scope discussion



Intellectual Property



Streamline agreements that connect external partners with Genesis teams and ensure intellectual property and data protection

Public and Economic Benefits



Ensure the product of collaborations advances U.S. research and U.S. economic security

Partnership Management



Matchmake external partners with laboratories' resources

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