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- **Sound Check:** Please verify your speaker volume is turned up and not muted
- **Questions:** The chat function is disabled, but you can submit questions through the Q&A box. We will address questions at the end during the Q&A session
- **Recording:** This webinar is being recorded. The recording and a compilation of Q&As will be made available to all attendees afterwards



Genesis Mission

AMERICAN SCIENCE CLOUD

January 20, 2026

Introduction to the American Science Cloud (AmSC): Part 2



U.S. DEPARTMENT
of ENERGY

What is the American Science Cloud (AmSC)

- AmSC is a secure, federated, and science-optimized cloud environment
 - *Not centralized servers or services but rather an environment that will support contributed tools and capabilities*
- AmSC integrates the DOE's world-leading computing and experimental facilities, data resources, and high-performance networks
 - *A flexible structure to support integration of capabilities*
- AmSC enables AI-ready end-to-end workflows
 - *Not a single set of predefined workflows but inclusive of contributions across the complex*



Genesis Mission defines ambition and urgency.
AmSC is a cornerstone building a shared platform
to execute the Genesis Mission

AmSC Concepts and Connections to ModCon and GM

- **Infrastructure Partners (IPs):** DOE labs that contribute and integrate core capabilities into AmSC
- **Model Teams (MTs):** Multi-lab teams developing domain AI models and workflows
- **Seed Projects:** Early, mission-driven use cases that pressure-test data, models, and workflows
- **Lighthouse Projects (LHPs):** High-impact scientific efforts that built on MTs/Seed projects to address Genesis Mission priorities in energy, science, and national security.
- **Lighthouse Challenges (LHCs):** Grand challenges composed of multiple coordinated LHPs

Lighthouse Challenges
Grand national challenges

Lighthouse Projects
High-impact science execution

Seed Projects
Early use cases
(pressure-test workflows)

Model Teams
Develop AI models & workflows

Infrastructure Partners
Integrate core capabilities into AmSC

Infrastructure Partners

Infrastructure Partner(s)	Lab(s)	Key Contacts (POC/PI, Leads)
OLCF	ORNL	Arjun Shankar
ALCF	ANL	Mike Papka
ESnet	LBNL	Inder Monga
NERSC	LBNL	Sudip Dosanjh
HPDF	TJNAF, LBNL	Graham Heyes
C3	PNNL	Robert Rallo
Scientific User Facilities	LBNL, ANL, TJNAF, BNL, FNAL, SLAC, ORNL	Paolo Calafiura, Nicholas Schwarz

Infrastructure Partner(s)	Lab(s)	Key Contacts (POC/PI, Leads)
DeepLynx	INL	Peter Suyderhoud
DIII-D Digital Twin	GA	Sterling Smith
EDX	NETL	Kelly Rose, Chad Rowan, Jack Searle
FemtoMind	TJNAF, FNAL	Robert Edwards
Fermi Data Platform	FNAL	James Amundson
HAIDIS	TJNAF	Ilya Baldin
SCDF	BNL	Adolfy Hoisie
S3DF	SLAC	Jay Srinivasan
Stellar-AI	PPPL	Shantenu Jha
VEE-ARIES/HERO	NLR	Kristi Potter



Multi-Lab and Public-Private Partnership

Science Council

Chair: Andreas Kronfeld (FNAL)
Kevin Yager (BNL)
Michael Beigel (BNL)
Kjersten Fagnan (LBNL)
Oliver Gutsche (FNAL)
Joel England (SLAC)
Todd Satagota (JLAB)
Jana B. Thayer (SLAC)
Neeraj Kumar (PNNL)

Industry Council

AWS
AMD
Cisco
Dell
Google
HPE
Microsoft
NVIDIA
Nokia
CORNELIS Networks

AmSC Project Leadership Office

DIRECTOR: Gina Tournassi (ORNL)
DEPUTY: Arjun Shankar (ORNL)
DEPUTY: Inder Monga (LBNL)
CTO: Sarp Oral (ORNL)
Product Manager: Deborah Bard (LBNL)
PMO: Denise Hoomes (ORNL)
CISO: Ryan Adamson (ORNL)

ModCon CoDesign Liaisons

Wahid Bhimji (LBNL)
Feiyi Wang (ORNL)
Venkat Vishwanath (ANL)

IRI Liaisons

Deborah Bard (LBNL)
Thomas Uram (ANL)

OPERATIONS

L1: Ashley Barker (ORNL)

Virtual Organization
Veronica Vergara (ORNL)
Adam Slagell (LBNL)

Intelligent Operations
Ed Balas (LBNL)
Eric Pershey (ANL)

User Engagement
Haritha Siddabathuni Som (ANL)
Chris Fuson (ORNL)

INTERFACES AND SERVICES

L1: Mike Brim (ORNL)

AmSC Interfaces
Taylor Childers (ANL)
John MacAuley (LBNL)

Infrastructure Services
Zach Mayes (ORNL) *
Shane Canon (LBNL)
P. Shyamshankar (ANL)

Data Services
Ilya Baldin (TJNAF)
Rajesh Kalyanam (ORNL)

AI SERVICES

L1: Thomas Uram (ANL)

Model Services
John Gounley (ORNL)
Huihuo Zheng (ANL)

At-Scale Services
Murali Emani (ANL)
Steven Farrell (LBNL)

Intelligent Interfaces
Wahid Bhimji (LBNL)
Shreyas Cholia (LBNL)

AmSC PARTNER INTEGRATION

L1: Chin Guok (LBNL)

IRI Integration
John MacAuley (LBNL)
Paul Rich (ANL)

CSP Integration
Roger Cass (PNNL)
Jack Deslippe (LBNL)

Industry & Gov IP Integration
David Martin (LBNL)
Rebecca Hartman-Baker (LBNL)
Ben Mintz (ORNL)

* Integration Architect



The American Science Cloud (AmSC)

A Unified Cloud Platform for Transformational AI and Science Across DOE
A cornerstone of the Genesis Mission

Mission

Deliver a seamless integration of DOE science instruments, computing, experimental, and networking capabilities, AI, data, modeling and simulation software tools in a single advanced programming interface
– the **AmSC API**

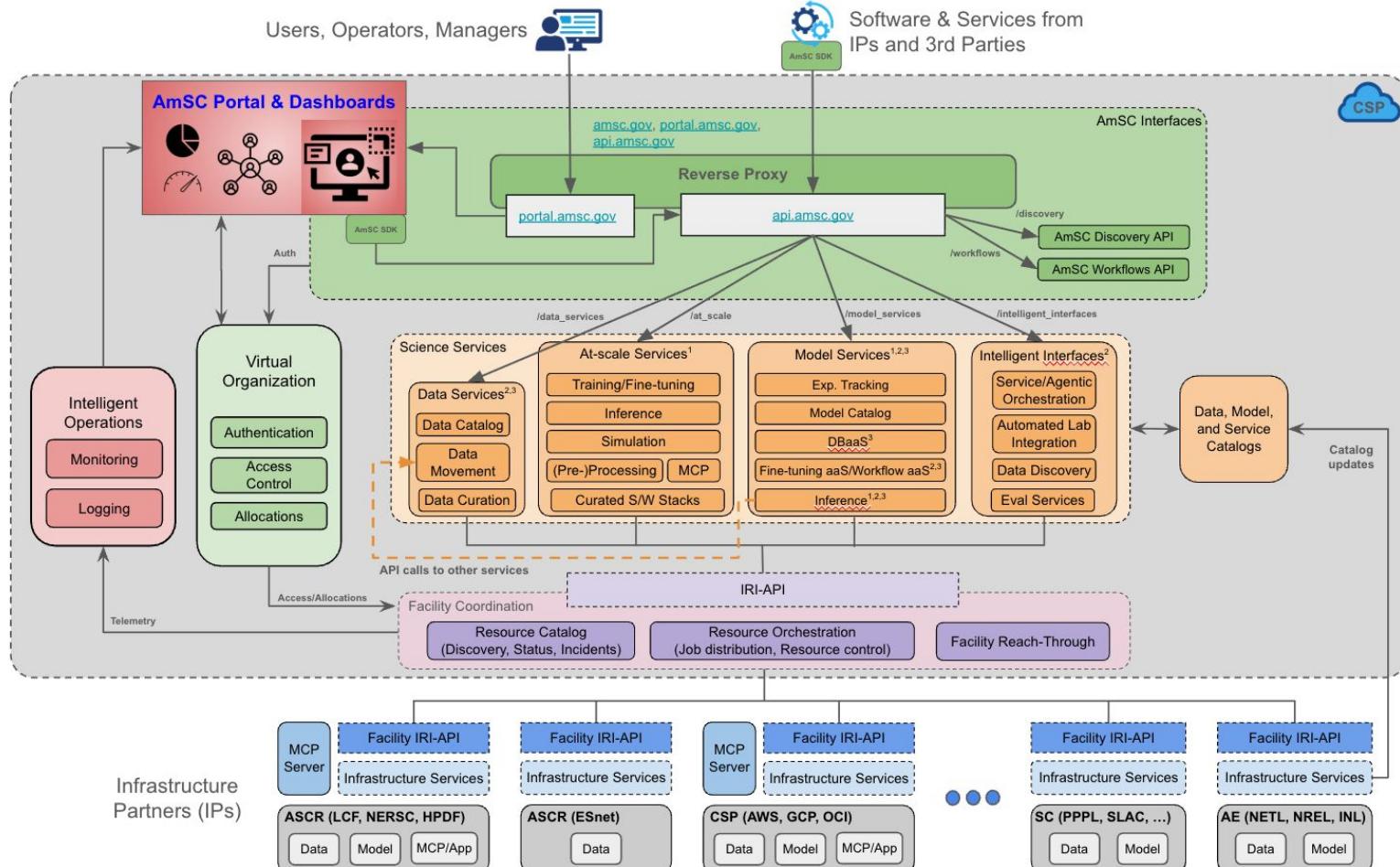
What We Deliver

- ✓ Unified APIs for data, model, and workflow access
- ✓ Secure, federated identity (Virtual Organization model)
- ✓ Seamless interoperability between DOE facilities and CSPs

Reduce “time to insight” from months to days through composable AI-driven workflows



AmSC Detailed Architecture



Our milestones will build towards our MVP

3-MONTHS FEDERATED ACCESS DEMONSTRATION

- ✓ Unified login across multiple DOE HPC sites; first operational **REST API and Python client** enabling authentication, dataset discovery, and workflow execution

6-MONTHS SCIENCE TEAM ONBOARDING

- ✓ Two to three research teams execute **end-to-end workflows** (data search → transfer → model fine-tuning) on **Frontier**, **Perlmutter**, or **Aurora** using the AmSC Data Catalog

9-MONTHS INTELLIGENT WORKFLOW MILESTONE

- ✓ First early **agentic workflow framework** autonomously discovers data, trains, fine-tunes, and performs **reasoning-based inference** across federated DOE and cloud resources

12-MONTHS MINIMUM VIABLE PRODUCT

- ✓ Link IPs and CSPs into a **unified pre-production environment** to support AI-ready data services, agentic frameworks, large-scale model training/inference and advanced simulation. Establish a **foundation for future expansion** to additional partners and services.

LONG-TERM VISION

Accelerate discovery cycles by building the world's most integrated scientific platform



In Month 3, AmSC is delivering the first capabilities to support end-to-end scientific AI workflows



Unified login across multiple DOE sites:

- The AmSC federated identity system
- The AmSC User Dashboard
- The AmSC staff hub and myAmSC user portal

First operational APIs and Services:

- AmSC Science AI Analysis Support with ChatUI
- AmSC Data Catalog and Data Movement API
- AI Software Stack, including prototype MLOps platform and Inference services
- The AmSC REST API with Python Client Module
- CSP Integration via IRI API
- Our AmSC development AWS environment

The AmSC Month 3 deliverables are the result of new efforts, underway as a direct result of the Genesis Mission.



What does the AmSC MVP look like for a simple workflow for data discovery and model training?

1. Register & Discover Data

- Register datasets in Data Catalog
- Search for similar relevant datasets

2. Find Base Model

- Search Model Catalog for appropriate model

3. Train Model

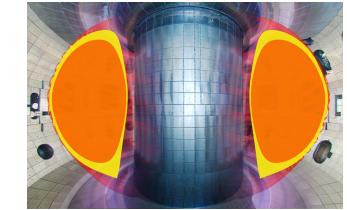
- Move data to appropriate site
- Train model with selected data
- Run on AmSC infrastructure

This set of basic AI capabilities forms part of multiple science use cases:

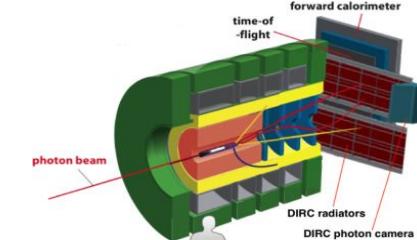
- **GridAI:** foundation model development for electrical grid planning and decision-support.



- **DIII-D:** surrogate model development for fusion reactor facility digital twin.



- **HAIDIS:** extracting physics information from GLUEX nuclear physics data.



What does the AmSC MVP look like for a simple inference workflow?

1. Data produced at experiment facility

- May be file-based or streaming

2. Data processed with AI-enhanced analysis

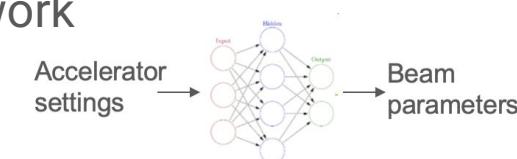
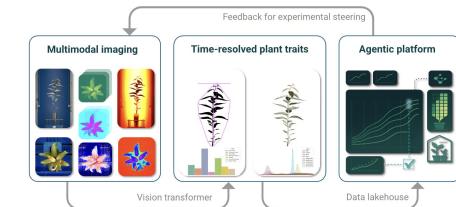
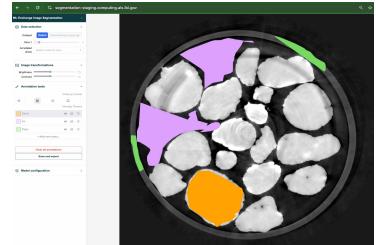
- May be time-sensitive
- May include simulations

3. Results inform next steps

- Action may be directed by user, or performed automatically as part of an agentic workflow.

This is a common workflow for facilities who will use AmSC to accelerate experimental science:

- **ALS:** Image analysis, used to give lightsource users feedback on experiment progress in real time.
- **Genomics (FAMOUS/OPAL):** agent-driven feedback for steering autonomous lab experiments.
- **SUF + MOAT:** build framework of AI-powered real-time feedback for particle accelerator operators.



AmSC Identity Management

MVP Goal: User can use a single identity to access all AmSC services and interfaces, running across multiple DOE sites and CSPs.

Month 3 Deliverable: User can login via ESnet and OLCF accounts (other identity providers in progress) and gain access to the Staff Hub and User Portal.



AmSC User Dashboard

MVP Goal: User can access all AmSC Services via a Dashboard. APIs enable service execution. User can also view and track their work executed within the AmSC ecosystem.

Month 3 Deliverable: User Dashboard design mockup with stubbed backend services.

Note: All AmSC services shown hereafter will be accessible via the Dashboard in the MVP

The dashboard features a sidebar on the left with icons for Data Catalog, Model Service, Workflows, Monitoring, and Facility Resources. A central header reads "Your AmSC Portal". Below it is a chart area with two plots: a histogram-like bar chart and a heatmap. To the right of the charts is a grid of colored squares representing different facilities: Aurora (green), Perimeter (red), ALS (blue), BNL (yellow), Frontier (orange), LBNL (green), LLNL (blue), CERN (green), PNPL (yellow), and SLAC (red). The main content area is titled "My Workflows" and contains a table with three rows:

Workflow	Current Job/step?	Status	Action
Federated Catalog Integration	Publish Access Documentation	Complete	Go to Job
Data Transfer & Cataloging	Data Transfers	Failed	Go to Job
Virtual Connection Assembly	Load Subscription	In Progress	Go to Job

At the bottom, there are three cards: "Model Catalog" (describing available models), "Data Catalog" (describing datasets from the National Lab system), and "MONITORING" (describing project metrics). Each card has a "Go →" button. On the right side, a user profile for "Joe Scientist" is shown, along with sections for "Recent /Starred" (Perlmutter, ALS, New Workflow), "Resources" (Contact List, How to Start a Workflow, File a Ticket), and "Scheduled Maintenance" (ALS closure, CHIC-STAR maintenance).

AmSC User Dashboard

MVP Goal: User can access all AmSC Services via a Dashboard. APIs enable service execution. User can also view and track their work executed within the AmSC ecosystem.

Month 3 Deliverable: User Dashboard design mockup with stubbed backend services.

Example services:

1. Graphs for quick assessment.
2. Recent work presented with current status.
3. Current Site Status
4. Data/Model Catalog

The dashboard mockup is titled "Your AmSC Portal". It features a sidebar on the left with icons for Data Catalog, Model Service, Workflows, Monitoring, and Facility Resources. A central area displays four main sections: 1) A histogram-like chart with a red circle labeled "1". 2) A table titled "My Workflows" with three rows: Federated Catalog Integration (Complete), Data Transfer & Cataloging (Failed), and Virtual Connection Assembly (In Progress). 3) A section titled "Recent /Starred" listing Perimeter, ALS, and New Workflow. 4) A section titled "Resources" with links for Contact List, How to Start a Workflow, and File a Ticket. 5) A "Scheduled Maintenance" section noting closures for ALS and CHIC-STAR. At the bottom, there are three cards: Model Catalog, Data Catalog, and MONITORING, each with a "Go →" button. A purple circle labeled "4" points to the Data Catalog card. A blue circle labeled "3" points to the Recent /Starred section. A green circle labeled "2" points to the My Workflows table. A red circle labeled "1" points to the histogram chart.

Your AmSC Portal

Recent /Starred

- Perimeter
- ALS
- New Workflow

Resources

- Contact List
- How to Start a Workflow
- File a Ticket

Scheduled Maintenance

ALS will be closed 12/24/25-1/1/26 for the holiday

CHIC-STAR will be offline briefly on 1/2/26 for maintenance

1

2

3

4

Project X

Hub

Joe Scientist
Lawrence Berkeley National Lab
Admin

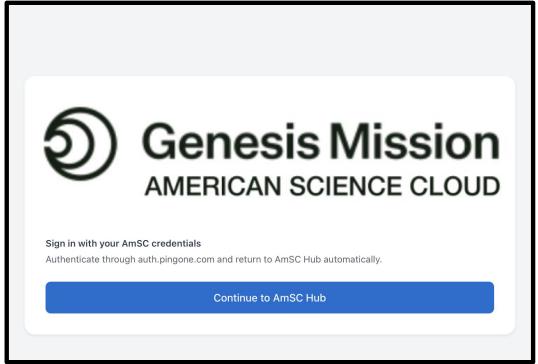
Workflow	Current Job/step?	Status	Action
Federated Catalog Integration	Publish Access Documentation	Complete	Go to Job
Data Transfer & Cataloging	Data Transfers	Failed	Go to Job
Virtual Connection Assembly	Load Subscription	In Progress	Go to Job

Model Catalog
This contains all the Models available for your use through the American Science Cloud.
Go →

Data Catalog
This contains all of the Datasets from across the National Lab system available for your use through the American Science Cloud.
Go →

MONITORING
Get a detailed look at your project's metrics.
Go →

AmSC PI Hub



MVP Goal: PIs can manage AmSC projects, resources, services and users. Hub is customizable for all infrastructure partners.

Month 3 Deliverable: Functional prototype hub with view of projects and allocations, accessible via AmSC Fed ID.

A screenshot of the AmSC PI Hub project management interface. The page has a blue header bar with the text "AmSC Hub" and navigation links for Dashboard, Facilities, Infrastructure Partners, Projects, Hpcs, Services, Users, and All. On the right side of the header, there are "Edit" and "Back to List" buttons. The main content area is titled "Project". It contains a "Project Information" section with fields for Title (Test Project), Security Level (Moderate), Status (Active), Start Date (2025-12-22), End Date (2026-12-22), and Description (This is a test project). Below this is a "Project Users" section with a table. The table has columns for USERNAME, NAME, ROLE, STATUS, SECURITY LEVEL, and ACTIONS. There are four rows, each with a blacked-out USERNAME and NAME, and the roles Member, Active, Moderate, and Edit buttons. The fifth row shows the user "Veronica Melesse Vergara" with the role Pi, Active status, and Moderate security level, also with an Edit button. Below the users is a "Project Services" section with a table. The table has columns for SERVICE, SECURITY LEVEL, STATUS, and ACTIONS. One row is shown for "Constellation" with the status Open and an Edit button. At the bottom is an "Allocations" section with a table. The table has columns for RESOURCE, UNIT TYPE, ALLOCATED, CHARGED, STATUS, and ACTIONS. One row is shown for "Frontier" with Node Hours as the unit type, Allocated value 20000.0, Charged value 0.0, Active status, and View/Edit buttons.

myAmSC User Portal



MVP Goal: Users can access the myAmSC user portal to: apply for accounts, view account and project information, and manage their projects.

Month 3 Deliverable: Functional initial portal with user profiles and account application, accessible via AmSC Fed ID.

Account Application

A screenshot of the "AmSC ACCOUNT APPLICATION" form. It includes sections for "PERSONAL INFORMATION" (Title, First Name, Middle Name, Last Name, Phone, Birth Country, ORCID, Citizenship(s)), "EMPLOYER INFORMATION" (Employer), and "AmSC INFORMATION" (AmSC Username). A "Submit" button is at the bottom right, and a "Cancel" button is in the bottom right corner of the main form area.

Project Profile

A screenshot of the "Project Profile" page for a project named "Test Project". The page is divided into sections: "GENERAL" (Project Name: Test Project, Current Status: Active, Description: This Is A Test Project, Security Level:), "ALLOCATIONS" (Allocation table showing Type: hpc_systems, Status: active, Allocation Unit Type: Node Hours, Allocated Units: 20000, Charged Units: 0), "HPC Systems:" (Frontier - Frontier Is A High-Performance Computing (HPC) Facility At Oak Ridge National Laboratory (ORNL)), and "POINTS OF CONTACT" (Principal Investigator: Veronica Melesse Vergara (vergarav@ornl.gov), Co-Principal Investigator:). The sidebar on the left shows navigation links for "Dashboard", "Profile", "Test Project" (selected), "Project Profile" (highlighted in red), and "Users".

AmSC Interfaces: Python & REST API

MVP Goal: Users, workflow engines and AmSC services can access and manage AmSC services via a fully-featured Python API client.

Month 3 Deliverable: use the AmSC Python Client API running in a Jupyter Notebook to communicate with AmSC Data services via the REST API.

This example shows listing datasets and registering a new dataset in the catalog. APIs now exist for model catalogs and workflow launching.



Dataset Catalog Demo ¶

This notebook demonstrates how to use the generated `amsc_api_autogen` client to interact with the AmSC Dataset Catalog API.

```
[ ]:  
import sys  
import os  
  
# Import Data Catalog tools from Python API  
from amsc_api_autogen import AuthenticatedClient  
from amsc_api_autogen.api.catalog import (  
    get_datasets_catalog_datasets_get,  
    create_dataset_catalog_datasets_post,  
    get_dataset_catalog_datasets_dataset_id_get  
)  
from amsc_api_autogen.models import (  
    Dataset,  
    DatasetType,  
    Location,  
    DatasetMeta  
)  
  
# Initialize the client  
# Assuming the API is running locally on port 8000  
client = AuthenticatedClient(  
    base_url="http://127.0.0.1:8000/api/current",  
    token="password123",  
    prefix="Bearer"  
)  
print(f"Client initialized")
```

AmSC Agentic Stack

MVP Goal: User can interact with all AmSC services via an agentic interface, and use agents to discover data, train/ fine-tune models, and perform reasoning-based inference across federated DOE and cloud resources.

Month 3 Deliverable: AmSC staff have prototyped and evaluated the first full AmSC agentic stack, deployed on AmSC AWS platform.

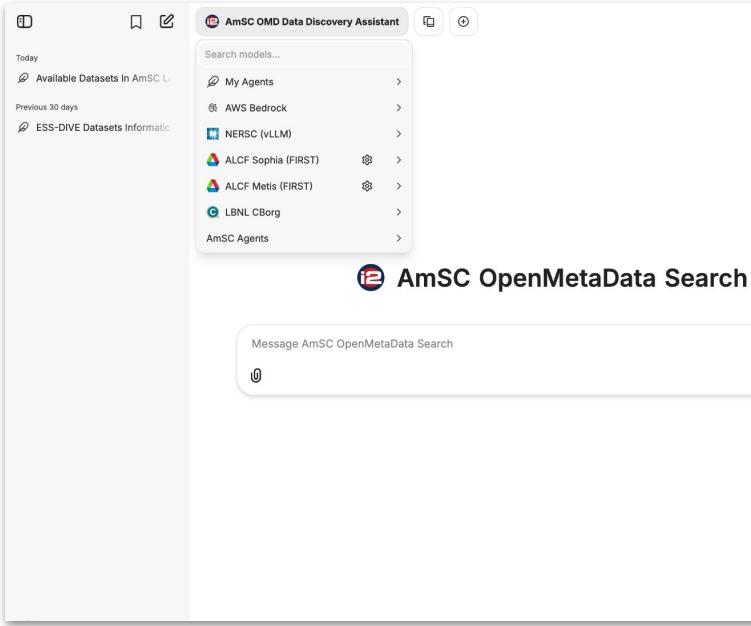
The screenshot displays the AmSC i2Chat interface, which integrates several key components:

- Agent Builder:** A sidebar on the right where users can "Create Agent". It includes fields for "Name*", "Description", "Category", "Instructions", "Model*", "MCP Servers", and "Tools + Actions".
- ChatUI:** The main area features a "Welcome back" message and two login options: "Continue with Google" and "Continue with Globus". Below this is a "Welcome to AmSC i2Chat" message and a "Message GPT" input field with a dropdown for "MCP Servers".
- Search Functionality:** A search bar at the top right allows users to "Search models..." or "Search ALCF Sophia (FIRST) models...".
- Data Catalog:** On the left, there's a sidebar titled "Previous 7 days" with links to "OpenMetadata Data Assets", "Exploring Your Data Catalog", and "Data Access and Catalog Discovery".
- Resource List:** A central panel lists various resources under categories like "My Agents", "AWS Bedrock", "NERSC (VLM)", "ALCF Sophia (FIRST)", "ALCF Metis (FIRST)", and "LBNL CBorg".

A large green arrow points from the "Welcome back" message in the ChatUI down towards the Agent Builder sidebar, indicating the flow of user interaction between the two primary interfaces.

Stack includes ChatUI, Agent Builder, MCP Server hosting, and liteLLM API

AmSC Agentic Stack: Agents for Data Discovery



This screenshot shows the results of a search for critical minerals. At the top, it says 'What datasets in the catalog are relevant to Critical Minerals?'. Below that is the 'AmSC OpenMetaData Search' interface with a 'Thoughts' dropdown set to 'Ran search_metadata'. A message states 'Excellent! I found 21 datasets relevant to Critical Minerals in the system. Here's a comprehensive summary:'. Underneath, a section titled 'Critical Minerals Datasets in AmSC' lists 'Total Found: 21 datasets'. It then details 'Dataset Categories': '1. Rare Earth Elements (REE) Data - 2 datasets' with a key dataset being 'quillinan_gto_ree_original_data_csv (EDX Catalog)' which includes analysis for La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, lithium, boron, strontium, and other metals like Cu, Ni, Zn, Pb, Co, Cr, Mo, V, U, and geothermal water chemistry data.

"What datasets in the catalog are relevant to Critical Minerals?"

User can use agents to explore the AmSC Data Catalog, integrated via an MCP service.

AmSC Data Catalog

MVP Goal: Users can register new datasets and find and/or update existing datasets, setting appropriate access controls. Datasets can be accessed by users and all AmSC services and interfaces.

Month 3 Deliverable:
Functional prototype Data Catalog based on OpenMetadata and populated with datasets from AmSC IPs.

The screenshot displays the AmSC Data Catalog interface, illustrating its search functionality and dataset details.

Search Results: A search bar at the top left shows the query "minerals". Below it, a search result card for "minerals" lists "Containers" (79) under the "Data Assets" category. A large blue button at the bottom of this card reads "Search across IP data catalogs".

Dataset Details: On the right side, a detailed view of the "gene2pfam" dataset is shown. The dataset is associated with the "amsc lakehouse" container. The dataset has 11 columns: gene_oid (string, no description), pfam (string, no description), and percent_identity (double, no description). It includes tabs for "Columns", "Activity Feeds & Tasks", "Sample Data", and "Queries".

Header: The header of the interface includes the "Genesis Mission" logo and the text "AMERICAN SCIENCE CLOUD". A prominent blue button labeled "Explore" is located on the left side of the main menu.

Left Sidebar: The sidebar contains links for "Home", "Explore", "Lineage", "Observability", "Insights", "Domains", and "Governance".

Bottom Right: A callout box on the right side of the interface is titled "Inspect and query data tables in AmSC Lakehouse".

AmSC Data Movement API

MVP Goal: User can move data between AmSC sites (DOE and CSP) via a unified service; AmSC services can transfer data to appropriate compute resources as necessary.

Month 3 Deliverable:
Globus-based data movement between NERSC and OLCF, using AmSC API-minted tokens.

The screenshot shows a POST request to `POST {{baseUrl}}/datasets/transfers/globus`. The request body is a JSON object:

```
1 {  
2   "source_url": "globus/global/cfs/cdirs/m37/  
3   "destination_url": "cad4/gpfs/wolf2/olcf/  
4   "label": "AmSC Tra  
5 }
```

The response shows a successful transfer named "AmSC Transfer" with a progress bar at 100% completion. The "Overview" tab displays task details:

Task Label	AmSC Transfer
Source	▶ NERSC DTN
Source Local User	tylern
Destination	▶ NCCS Open DTN (Globus 5)
Destination Local User	not available you do not have permission to monitor activity on this endpoint
Task ID	a9d7a912-ea79-11f0-b553-0eb0b913a0ab
Owner	▶ Nick Tyler (tylern@nersc.gov)
Condition	All
Requested	1/5/2026, 01:01 PM
Deadline	1/6/2026, 01:01 PM
Duration	1 minute 13 seconds
Transfer Settings	<ul style="list-style-type: none">transfer encryptedpreserve source file modification timestransfer new or changed files where the modification time is newer (sync)skip files on source with errorsquota errors prevent transfer retry

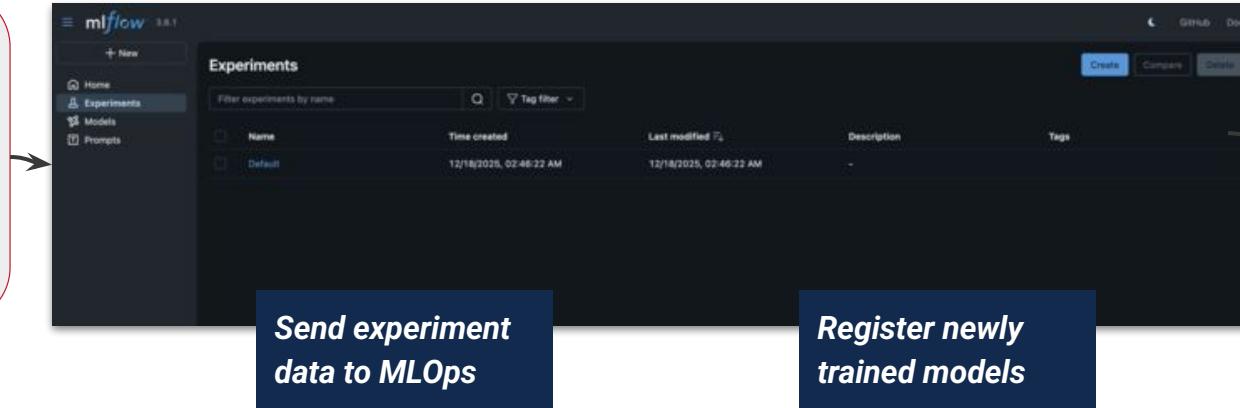


AmSC MLOps Platform: Experiment Tracking and Model Registry

MVP Goal: Users can leverage industry-standard tools to track experiments and run automated training, fine-tuning and hyperparameter optimization.

Month 3 Deliverable: Deployment of MLFlow in AWS, with connection tested from ALCF, BNL, NERSC, OLCF. Evaluating ClearML and ZenML across AmSC sites.

AmSC deploys support for model development at AmSC sites, and for cataloging and sharing AI models



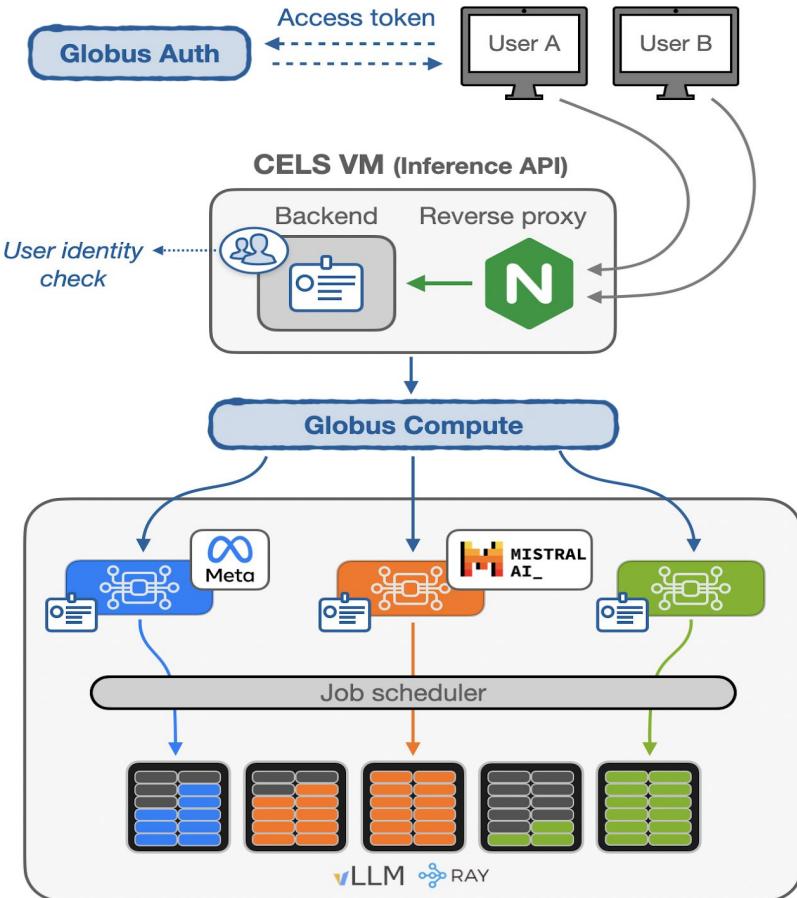
Models pulled from catalog for use at AmSC sites



AI Inference Services

MVP Goal: Users can leverage high-performance inference servers (e.g. vLLM, SGLang) hosted at AmSC sites.

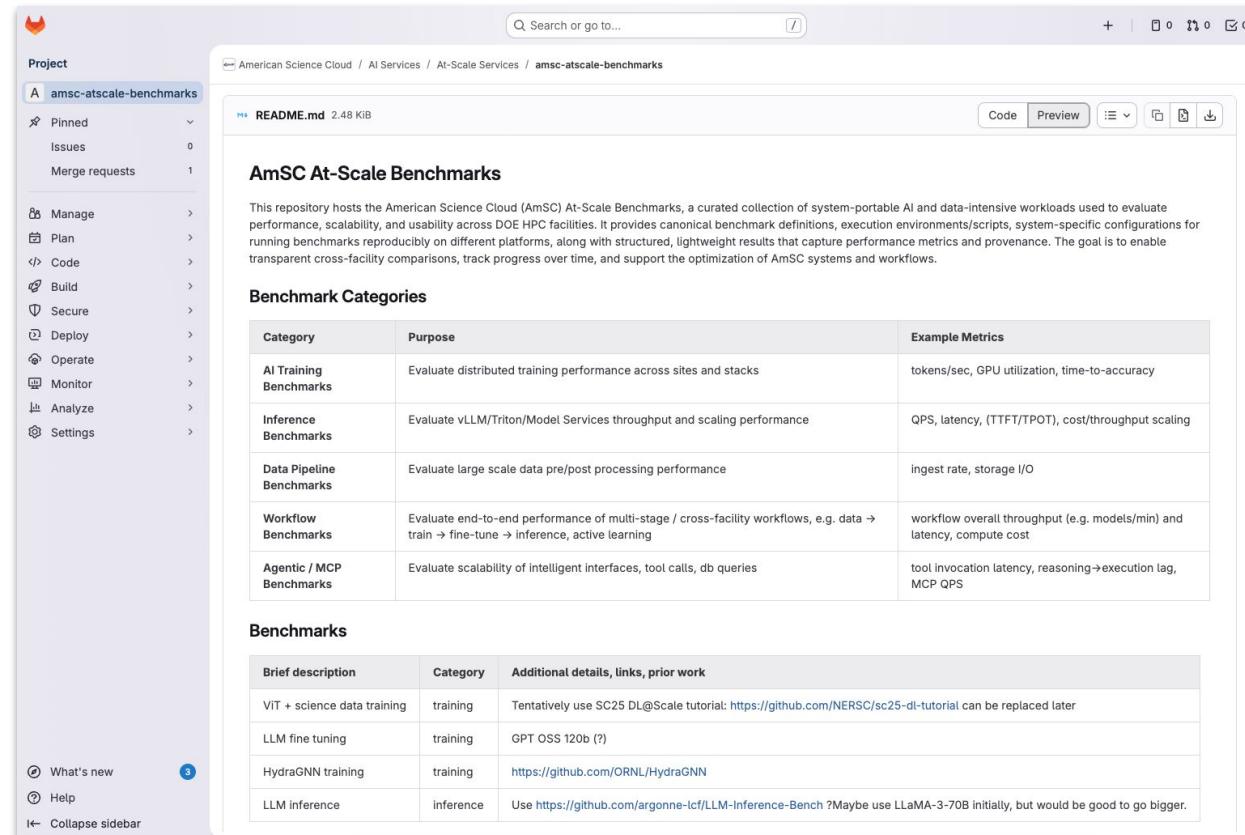
Month 3 Deliverable: Prototype deployment of inference services at ALCF, OLCF, and NERSC.



AmSC At-Scale Services: AI Software stacks and benchmarks

MVP Goal: Users can access the same software stack across all AmSC sites; software stack performs efficiently at each site.

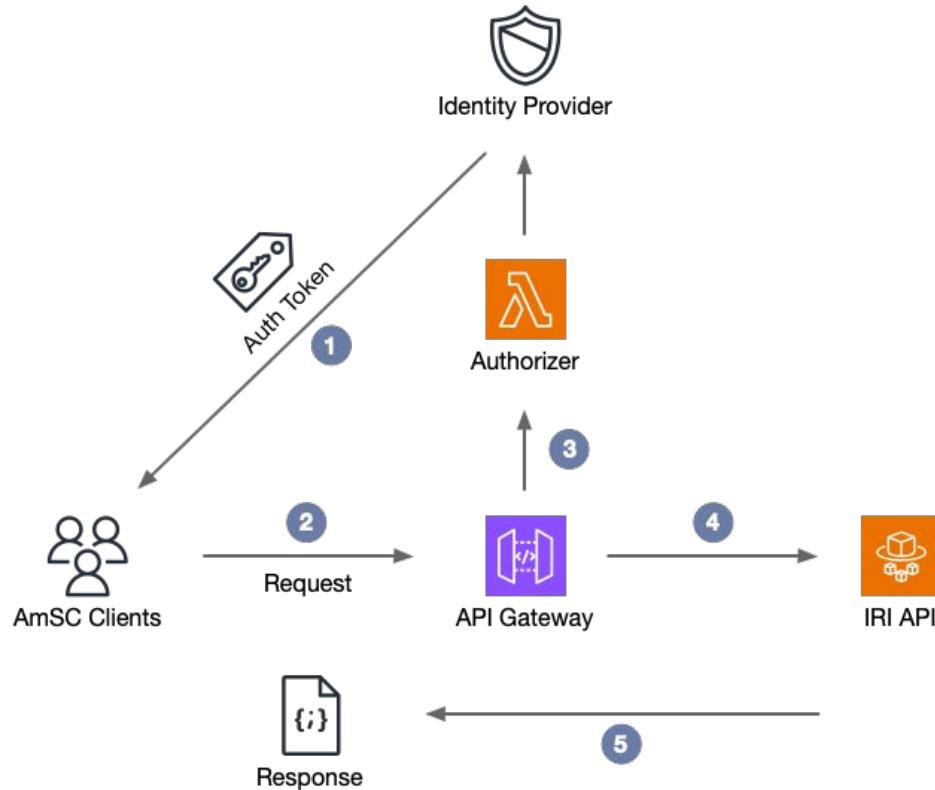
Month 3 Deliverable:
Completed survey of AI software at ASCR facilities; developed baseline benchmarks with initial performance measurements across sites.



IRI API: Integrating with AmSC sites and facilities

MVP Goal: AmSC services can use the IRI API to interact with AmSC IP sites. Endpoints include resource status, authenticated endpoints for job management, local file management, allocation information, resource orchestration and WAN management.

Month 3 Deliverable: completed API design spec and stubs for compute and filesystem control, as well as resource/site status endpoints. Connected AWS to AmSC APIs and services via an extension to the IRI API.



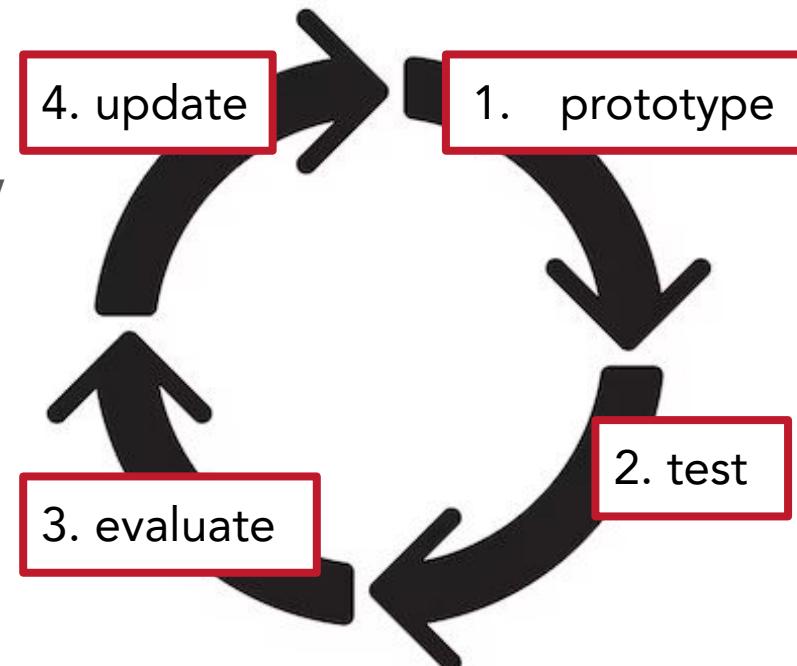
AmSC is developing capabilities via a process of iterative co-design

Next step: iterate with key AmSC users to evaluate how well capabilities meet science requirements and recommend changes to better align with science needs.

There are many AmSC stakeholders. Iteration will be managed via:

- Deeper dives into AmSC services via hackathons and workshops for current early adopters
- AmSC Liaisons to our early adopters are playing a pivotal role by giving feedback on individual use cases
- Coordinated process for scope changes

We will learn a huge amount as we work together to prepare for the Month 6 deliverables!



Infrastructure Partners (IPs) are a necessary component in the success of AmSC

IPs leverage AmSC to provide enhanced capabilities for the scientific workflows they currently support.

IPs integrate resources into the AmSC ecosystem to offer additional capabilities for all AmSC scientific workflows. Resources include physical infrastructure (e.g., compute, storage, network), services (e.g., data curation, inference), and data.



BES/HEP/NP Scientific User Facilities Infrastructure Partnership (AmSC SUF IP)

Establish AmSC as a shared platform for the research communities of multiple (accelerator-based) BES, HEP, and NP Scientific User Facilities (SUFs), along with their industry and research partners, to reduce the time to science and unlock challenging measurements and experiments

SUFs power the DOE SC mission by advancing discovery

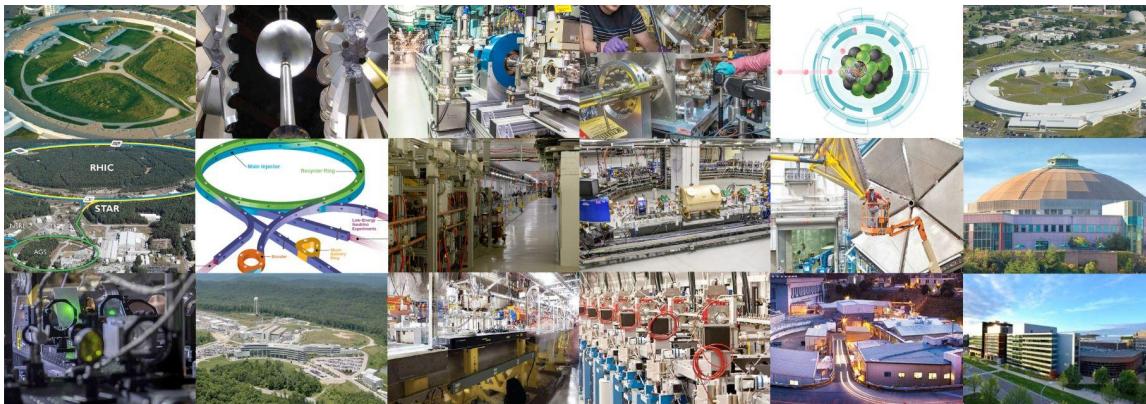
- >> 10,000 users per year, producing thousands of publication annually

Pose complex computing challenges and opportunities

- Exabytes of high-quality scientific data
 - Multiple petabytes of curated data
 - Hundreds of production workflows and AI models

AmSC Capabilities

- Federated identity and virtual organizations
 - AI services: IaaS, training, model catalogs, agentic AI
 - Robust data services
 - Operations services / IRI foundation



1. Agentic Accelerator Controls

Real-time guidance and optimization of particle accelerators
(LBNL, SLAC, ANL, BNL, ...)

2. Cross-Facility Data Ingestion and AI Workflows for NP

Automated AI pipelines
(JLAB, BNL)

3. Inference as a Service for HEP and NP Data Analysis

Distributed IaaS for data analysis
(FNAL, LBNL)

4. Light and Neutron Source AmSC Demonstrator

AI-enabled workflows across 6 facilities (ANI, BNI, LBNI, ORNL, SLAC)

5. OpenCosmo on AmSC

Seamless access to peta-scale
cosmological data
(DOE Computing Facilities)

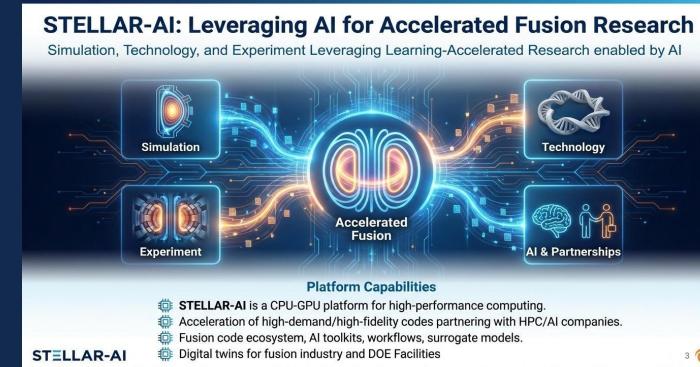
Aligned with: MOAT SYNAPS-I MAIOMag NARAD ISAAC LAMBDA

APS, ATLAS, AWA at ANL, ATF, EIC, NSLS-II, RHIC at BNL, the Accelerator Complex, FAST, IOTA at FNAL, CEBAF at JLAB, ALS, BELLA at LBNL, SNS at ORNL, FACET-II, LCLS, SSRL, NLCTA at SLAC, and FRIB at MSU

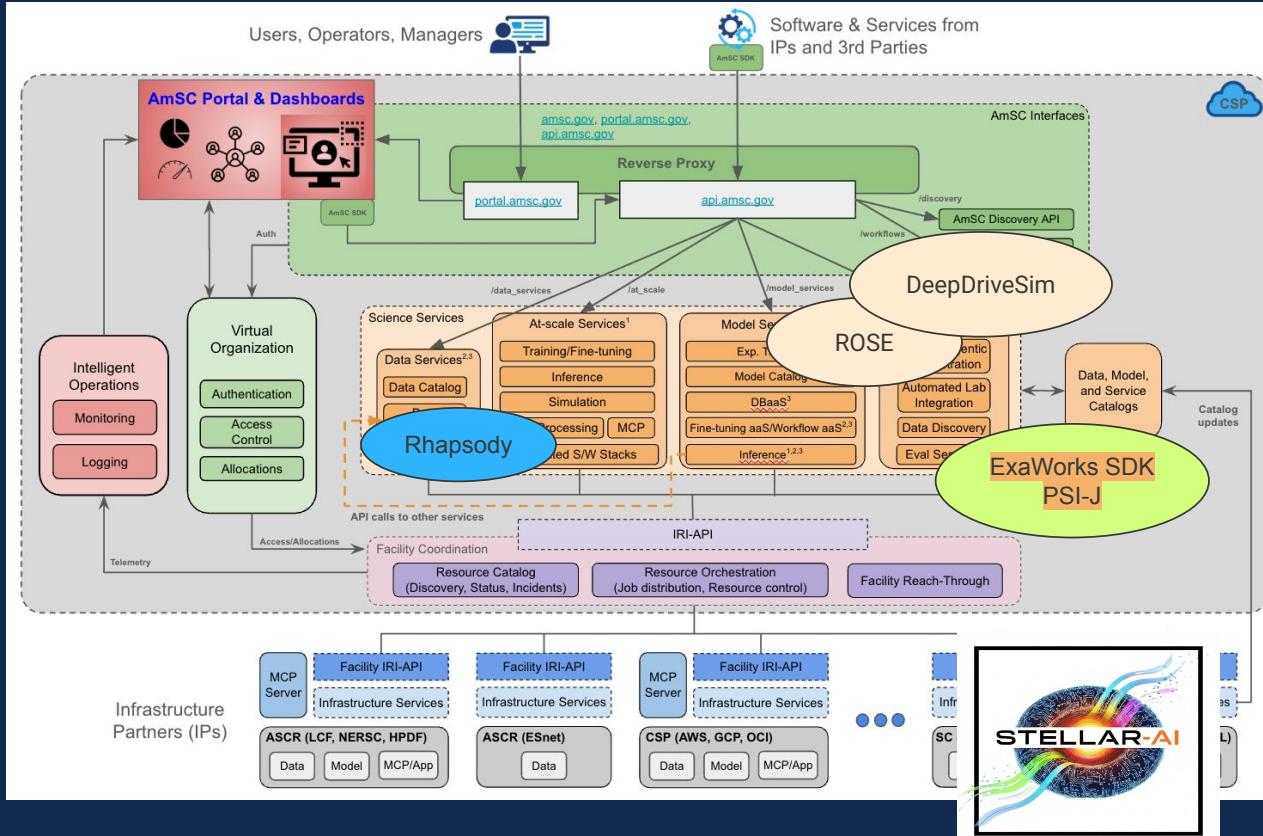
Paolo Calafiura (LBNL, PI), Nicholas Schwarz (ANL, co-PI) - POCs: Salman Habib (ANL), David Lawrence (JLAB), Meifeng Lin (BNL), Auralee Edelen (SLAC), Jonathan Taylor (ORNL), Nhan Tran (FNAL), Remi Lehe (LBNL)

STELLAR-AI: Contribution to AmSC Deployment, Development, and Integration/Usage

- **Deployment** of AmSC Software and Services
 - Accelerated Fusion requires Learning Everywhere: AI toolkits, workflows, surrogate models
- **Development** of AmSC Services
 - Consumers and producers of scalable software and services
 - Provides baseline ECP ExaWorks SDK and associated capabilities
- **Integration** into production computational campaigns
 - NSTX-U Digital Twin: A FES AmSC Project
 - Stellaris: Seed Fusion Foundation Model



STELLAR-AI: Contribution to AmSC Development



Getting Help

Questions, Problems, Requests

SEED PROJECTS

- Questions about using the AmSC environment?

Engage with your UE Liaison

AmSC INFRASTRUCTURE

- Feature Requests or requirements (routed to Prod Mgt)
- Bug reports (routed to appropriate AmSC team)
- Anything else; questions, comments, problems

help@amscproject.atlassian.net

COMMUNICATION TOOLS

- Questions about communication/collaboration tools used by AmSC teams such as Slack, Jira, Confluence, Google Cloud, GitLab?

amsc-admins@ornl.gov

<https://american-science-cloud.github.io/amsc-site/>



Genesis Mission

AMERICAN SCIENCE CLOUD

Future Events



- We will continue to have webinars for the user community as we move forward
- Deeper dives into AmSC services, updates via hackathons and workshops for current early adopters
- <https://american-science-cloud.github.io/amsc-site/events>



Q&A Session

