

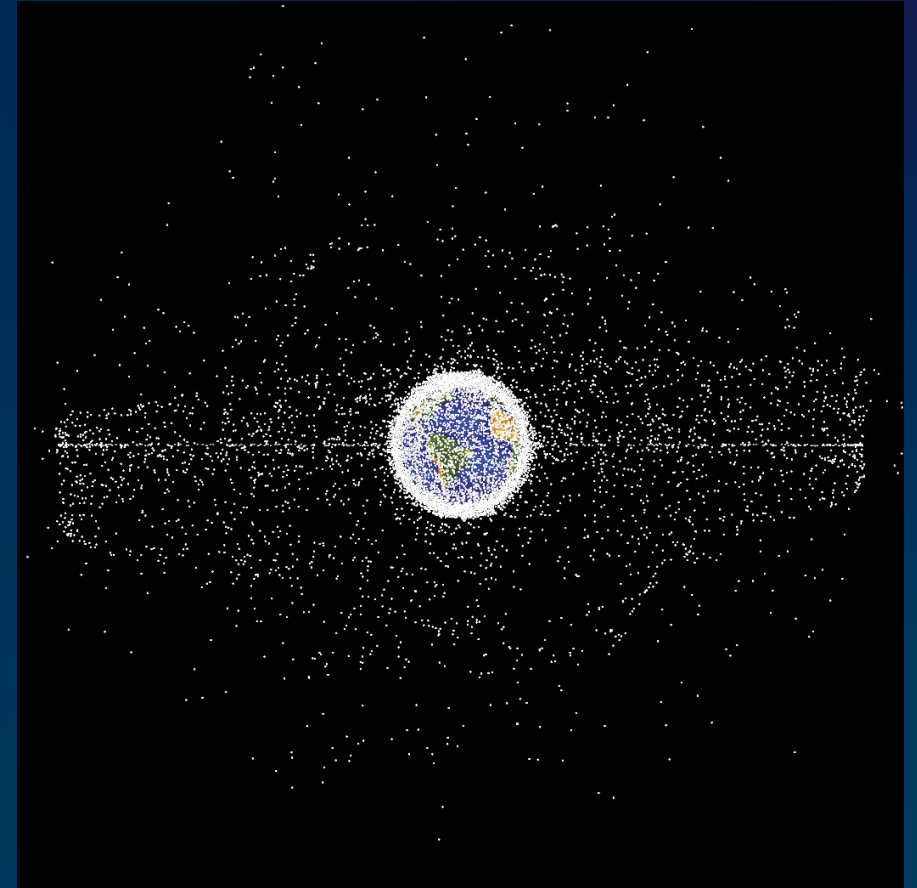
Traffic Coordination System for Space (TraCSS)

**Office of Space Commerce
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
September 2023**



Space Situational Awareness (SSA) and the Office of Space Commerce

- Commercial space companies have launched thousands of new satellites over the past few years and plan to launch tens of thousands more
- There is an urgent need for better SSA as Earth's orbits become increasingly congested, putting commercial, civil, and national security space missions at risk.
- Space Policy Directive-3 transfers responsibility from Department of Defense (DoD) to DOC for providing basic SSA services to commercial and civil operators
 - Recognizes the pressing need for more accurate and timely SSA data
 - Enables DoD to concentrate resources on national security
- NOAA recently reorganized and expanded the Office of Space Commerce (OSC) to address these challenges
- OSC is developing an SSA capability that will blend government and commercial data to provide actionable SSA for civil and commercial space operators



Credit: NASA ODPO

TraCSS Program Objectives

Relieve DoD of responsibility for SSA coordination of burgeoning global commercial space industry

Provide “Basic SSA Services” in a manner that promotes safer space operations

Encourage US Commercial SSA leadership and rely on commercial SSA providers to the greatest extent possible

Establish and maintain a resident space object data repository from which all basic services will be derived and utilized for international coordination purposes

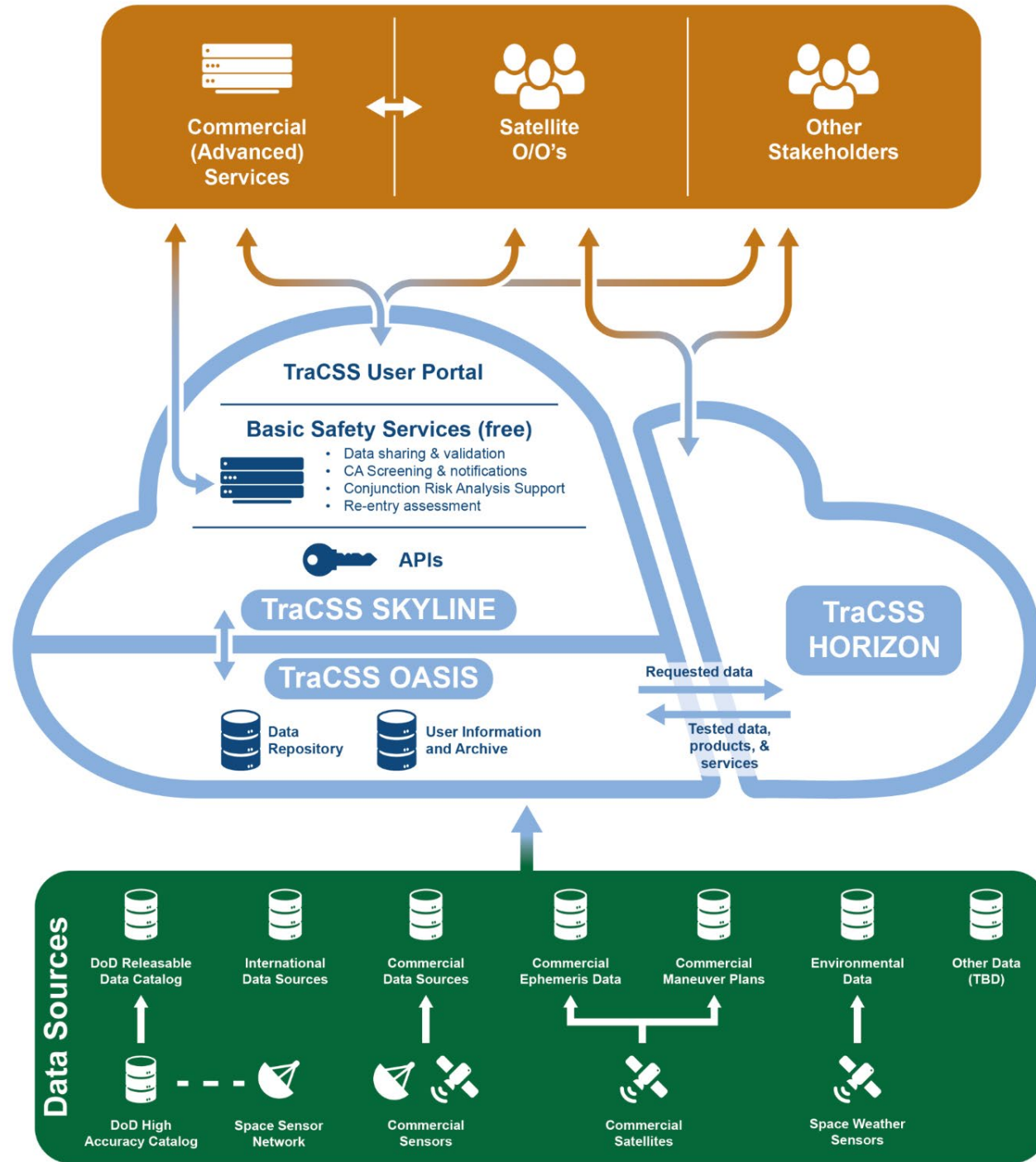
Conduct R&D activities that will advance the science and technology of SSA

Promote global SSA standards and best practices

Driven by spaceflight safety, space sustainability, and international coordination

Traffic Coordination System for Space (TraCSS)

- **Formerly known as the Open Architecture Data Repository (OADR)**
- **3 distinct components:**
 - TraCSS-OASIS: Data repository
 - TraCSS-SKYLINE: SSA application services
 - TraCSS-HORIZON: modeling, simulation, & research environment and development & test environment



Phase 1 End Configuration

 Commercial SSA provider

User Interface

Presentation Services

Rest API

GUI

Message Publication

Data Products

Conjunction Analysis & Application Services

CA Mitigation Planning

Data Policy/Rule Engine

Data Integrity Monitoring

Improved Ephemeris Generation

Data Migration/Archiving Policy

CA Risk Assessment

CA Screening

SSA Mission Planning & Data Requests

Federated Catalog Reconciliation

Orbit Models

System Integrator

Data Services

Data Ingest

Data Conditioning

Data Store/Retrieval

Data Export

Data Migration, Archiving & Management

Software Services

DevSecOps Pipeline and Orchestration

Container Image Management

Container Orchestration

Authorization/Authentication

Web Application Server

Workflow Engine

Load Balancer

Log Data Service

Visualization

Cluster Manager

Cloud Utility

Infrastructure Services

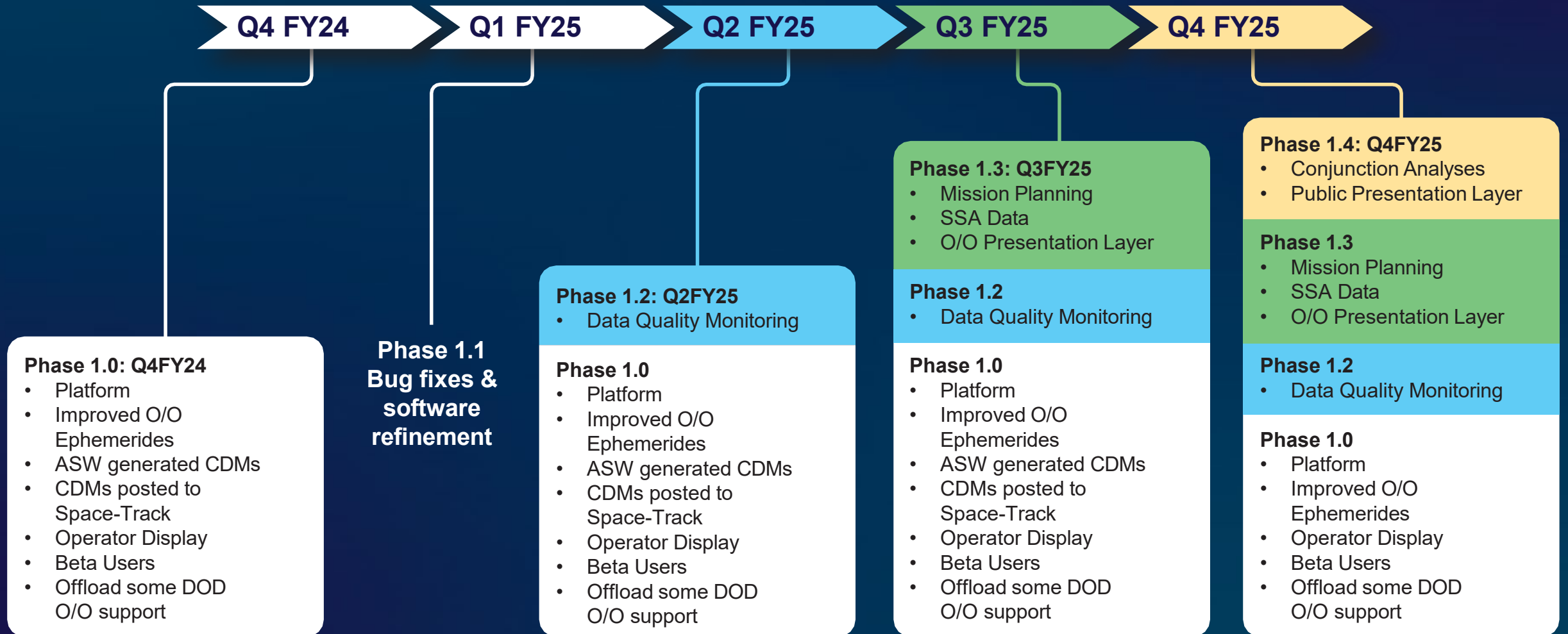
Computing

Networking

Security

Phase 1 Capability Roll-Out Plan

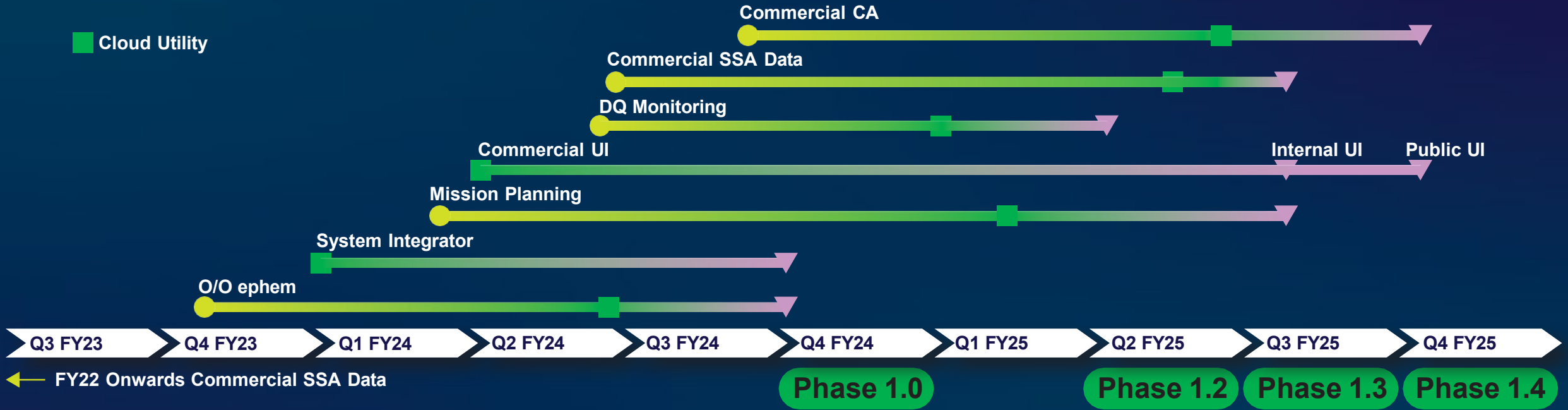
Phased delivery of commercial functionality



Phase 1 Timeline

Each incremental delivery adds a block of functionality

- Pathfinder/Study
- Contract Awards
- ▼ Delivery



Q2FY23

- Verified replication of DoD CDM production

Q3FY23

- Prototype system
- Containerized services for operational scale

Q1FY24

- Initiate additional commercial pathfinder

Phase 1.0: Q4FY24

- Conjunction assessment (CA) screening / CDM production
- Improved O/O ephemerides

Phase 1.2: Q2FY25

- Data Quality Monitoring

Phase 1.3: Q3FY25

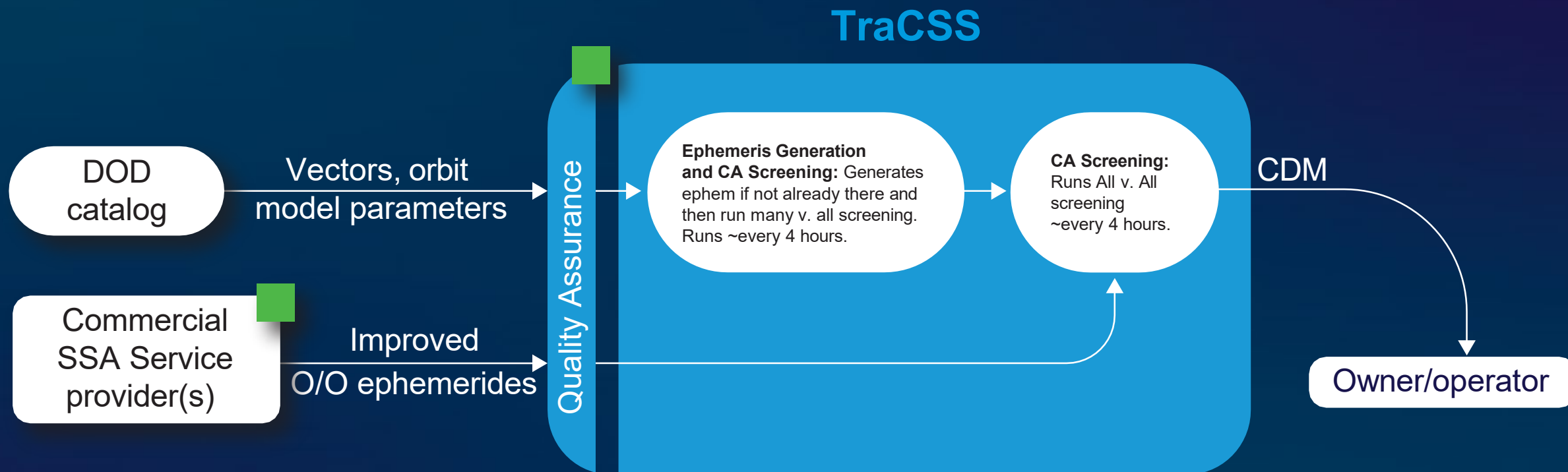
- Mission Planning
- Tasking of additional SSA Data

SYSTEM INTEGRATION PLATFORM IS THE FOUNDATION OF TraCSS

TraCSS SSA Phase 1.0 Initial Capability

A day in the life of a conjunction event

Commercial SSA provider



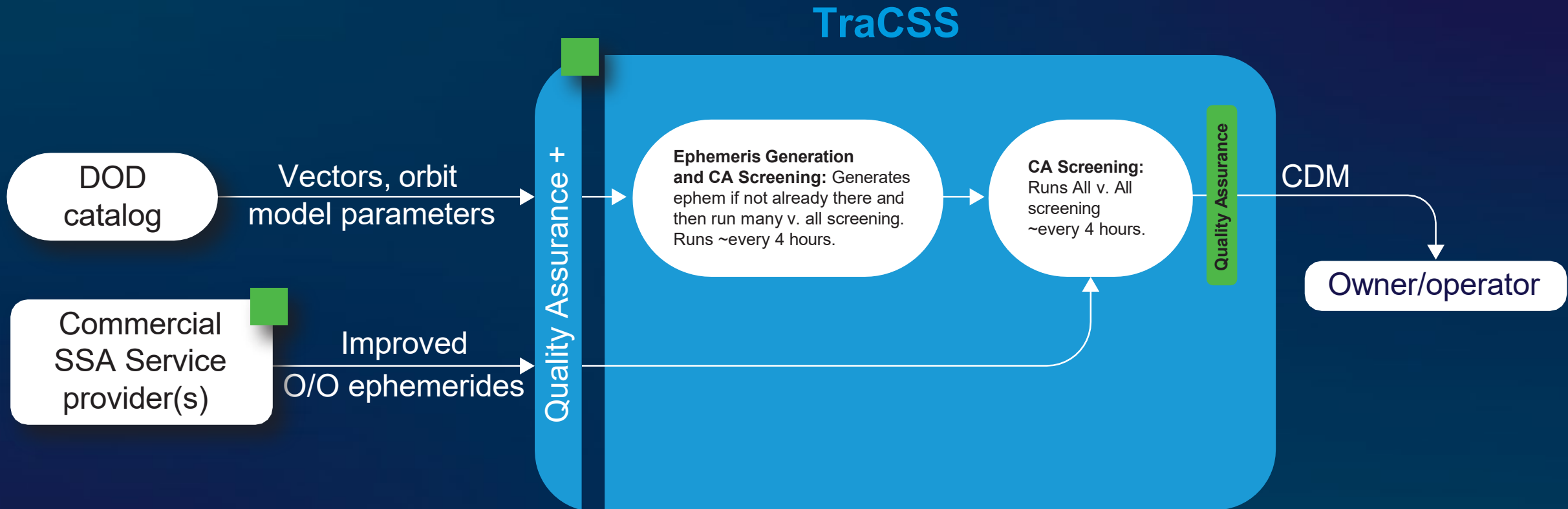
Enhanced Commercial Facing SSA/STC Features

- Increased Cadence to Conjunction Assessment (CA) Screening every 4 hours
- Investment in improved Quality Owner/Operator Ephemerides
- Maintain Space-Track.org interface to minimize disruption during start up

TraCSS SSA Phase 1.2

A day in the life of a conjunction event

Commercial SSA provider



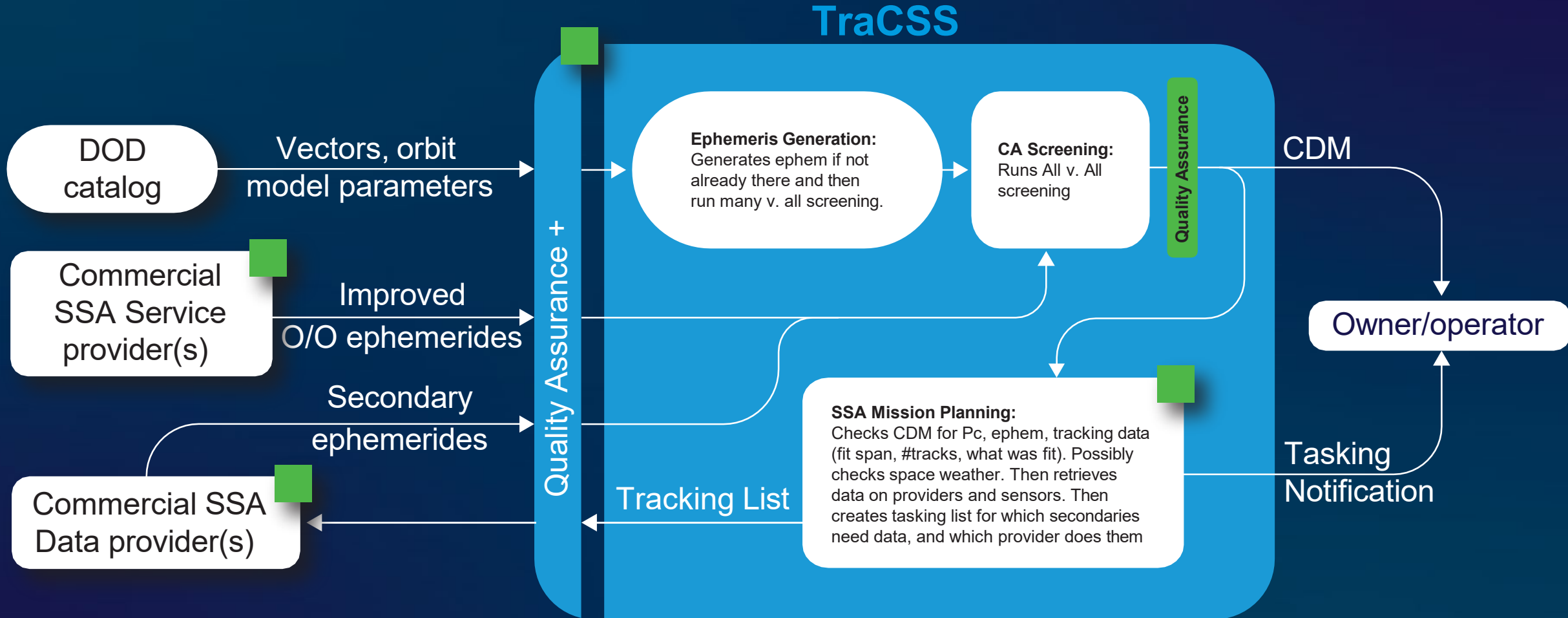
Enhanced Commercial Facing SSA/STC Features

- Addition of data quality monitoring service within QA

TraCSS SSA Phase 1.3

A day in the life of a conjunction event

Commercial SSA provider



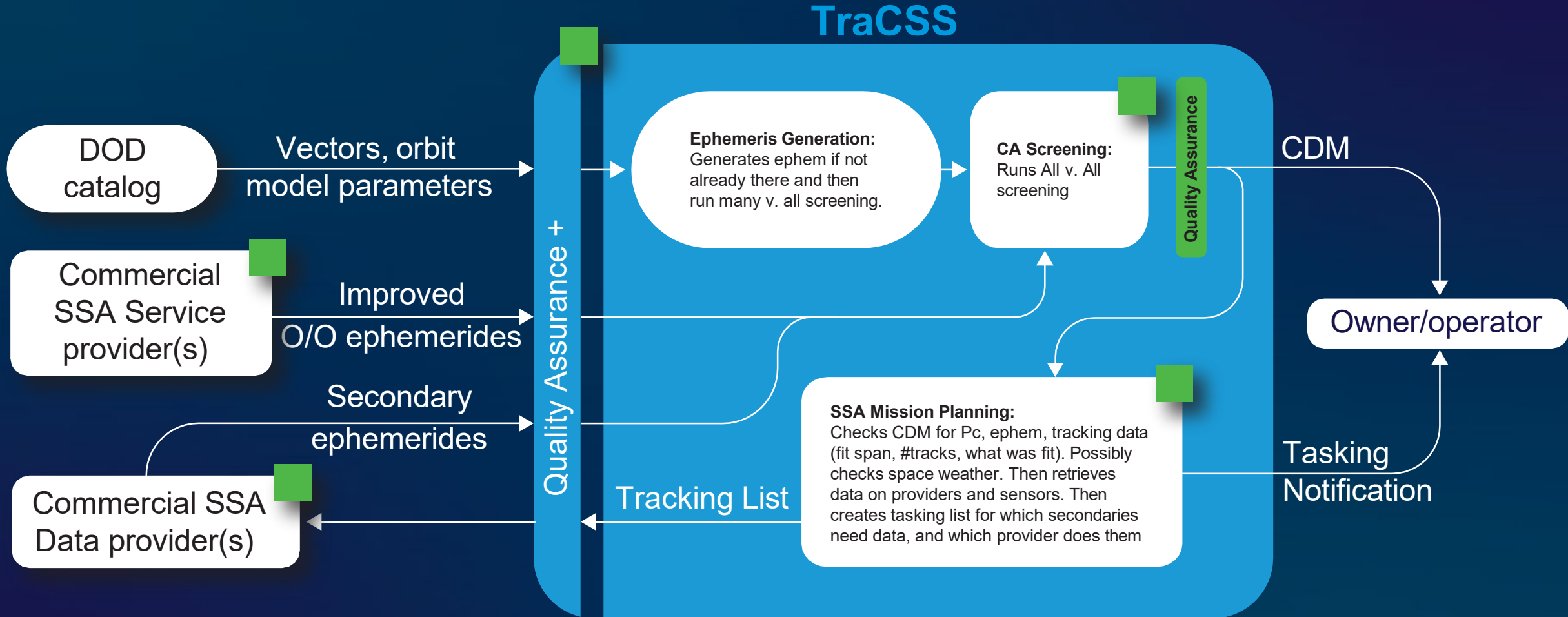
Enhanced Commercial Facing SSA/STC Features

- Mission planning service identifies additional sensor tracking needs
- Procurement of additional SSA data where needed
- Owner/Operators notified of additional sensor tasking status via TraCSS user interface

TraCSS SSA Phase 1.4

A day in the life of a conjunction event

Commercial SSA provider



Enhanced Commercial Facing SSA/STC Features

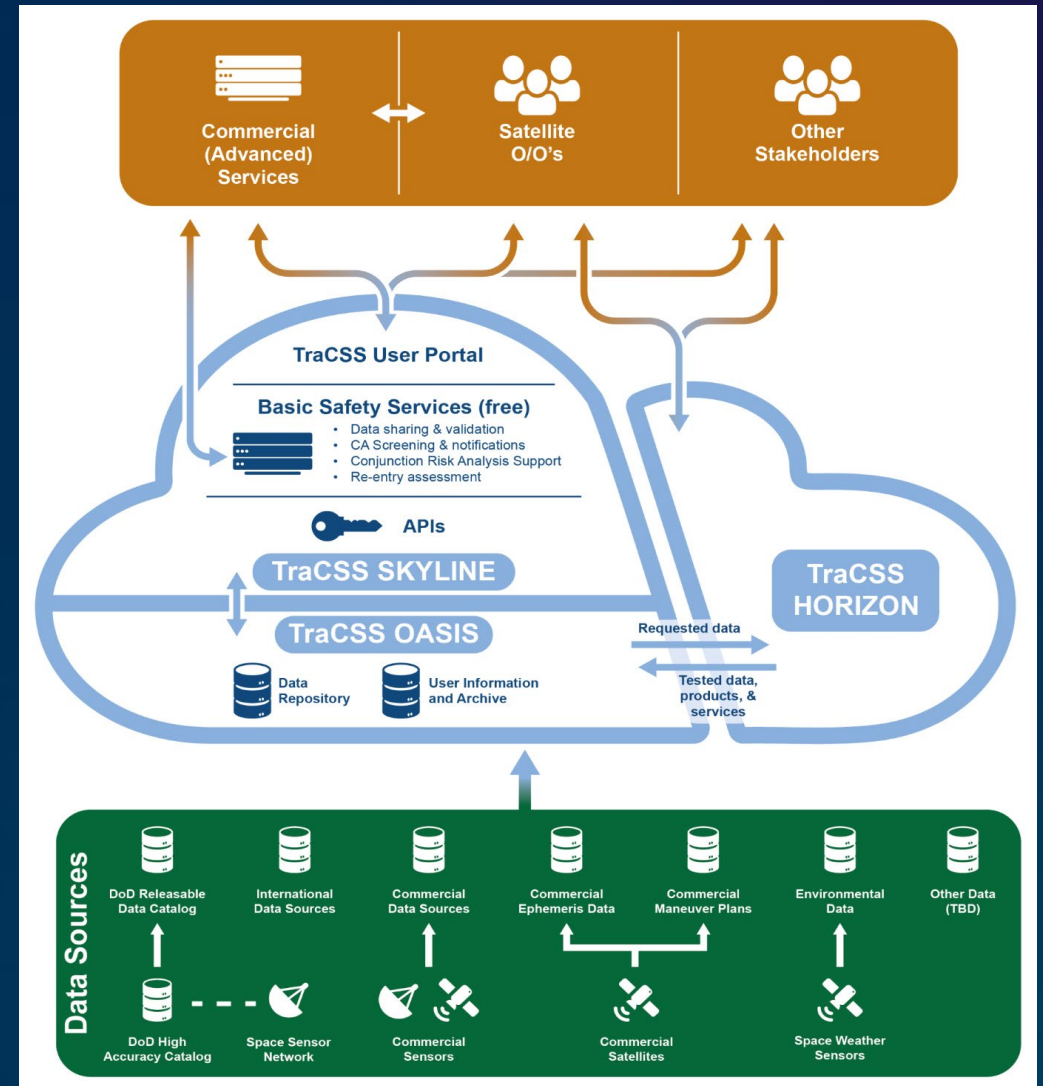
- Commercial CA screening service
- Public user interface for TraCSS

Interagency Coordination – Department of Defense

- DoD and DOC signed a Memorandum of Agreement (MOA) in September 2022, framing the departments' relationship for basic space situational awareness, space traffic management, and coordination for civil and commercial entities.
- MOA began discussions on priorities and coordination. Working groups have been established and are continuing work on defining data transfer needs and roles and responsibilities across the transition.
 - Multiple weekly virtual meetings
 - Semi-annual in-person STC Operations Coordination Workshop
- In Phase 1, TraCSS will lean more on DoD data at first. With each phase, more commercial data and commercial SSA services will be integrated over time.
 - Phased transition will help ensure there is no disruption in basic SSA safety services.
- Beyond data, coordination topics also include sharing of expertise in SSA analysis and spaceflight safety operations

Interagency Coordination – NASA

- NASA leading TraCSS-HORIZON effort
- Modeling, Simulation, and Research environment
 - Academic, R&D, and capability development
- TraCSS-HORIZON will be main interface for commercial pathfinders and studies in FY24



Recent Activities and Next Steps

- **Phase 2 Basic Service Integration**
 - Launch COLA, engaging with FAA
- **Phase 3 Basic Service Integration**
 - Re-entry Management and Assessment
- **Engaging with DoD on transition planning and priorities**
- **Progressing on major procurements (cloud utility, system integration, and user interface)**
 - Minimum infrastructure to enable phase 1 of basic services and foster commercial SSA marketplace
- **Planning studies and pathfinders with commercial industry in FY24**
- **Updating basic services definitions and refine roll-out for Phase 2 onwards**
- **International engagements and coordination**