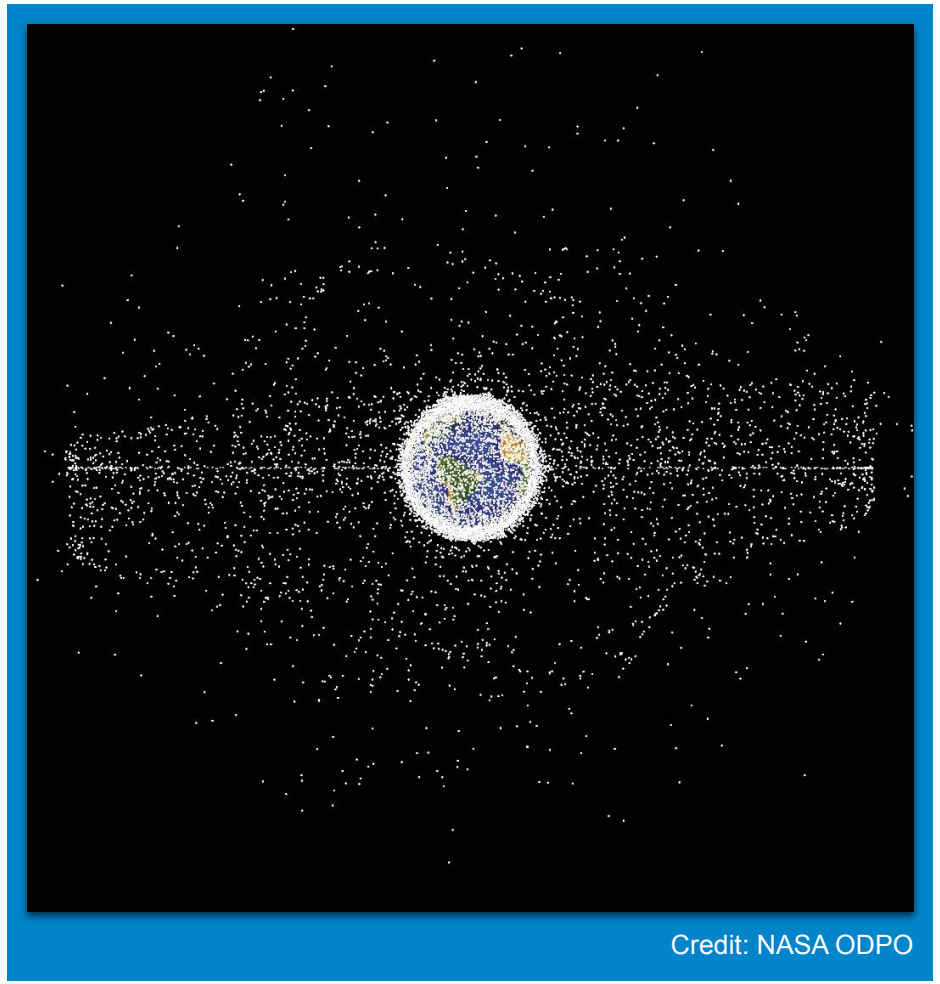
Traffic Coordination System for Space (TraCSS)

Office of Space Commerce
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
June 2024

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

Global SSA Future Vision

We envision that in the future there will be a global coordinated system of SSA providers, with a series of national or regional hubs providing SSA information and services to spacecraft operators. These centers will be supported by networks of international and commercial partnerships.

Government services will be augmented by a robust global commercial SSA sector that provides value-added services to support business intelligence and other advanced services.

To enable this vision, we are examining SSA data standards, transparency and best practices for SSA data and information sharing, and opportunities for international coordination that can best support global spaceflight safety and space sustainability.

Global SSA Vision Implementation

1) Intergovernmental Engagement

1. Build support for Global SSA Vision
2. Build connections with Global SSA Providers

2) Global User Engagement

1. Raise awareness of TraCSS
2. Build capacity to use TraCSS

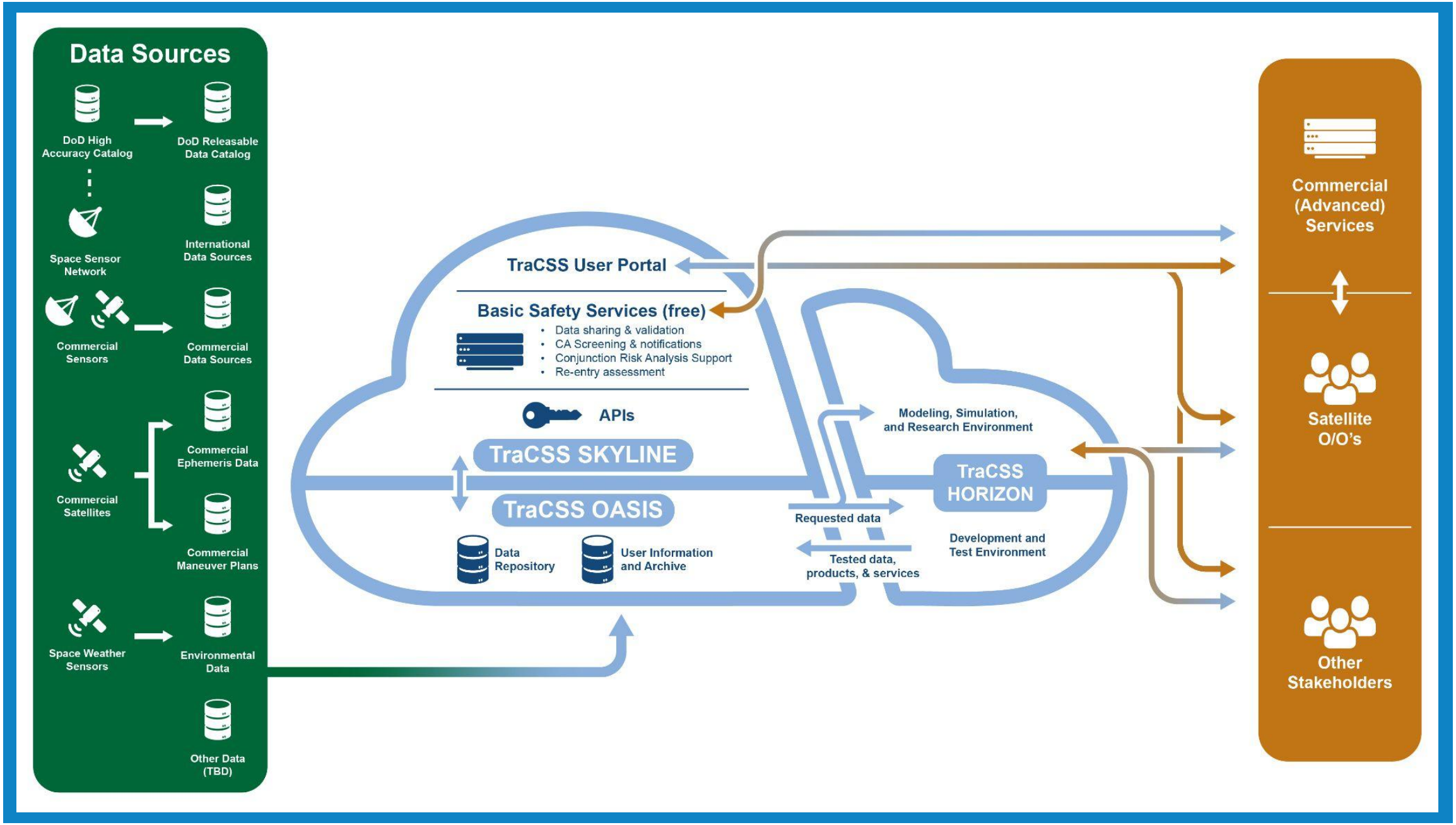
3) Standards and Best Practices

1. Advance SSA technical data standards
2. Develop/ advance norms and best practices for SSA data sharing
3. Engage in international discussions on space sustainability/ space traffic coordination
4. Build on industry best practices

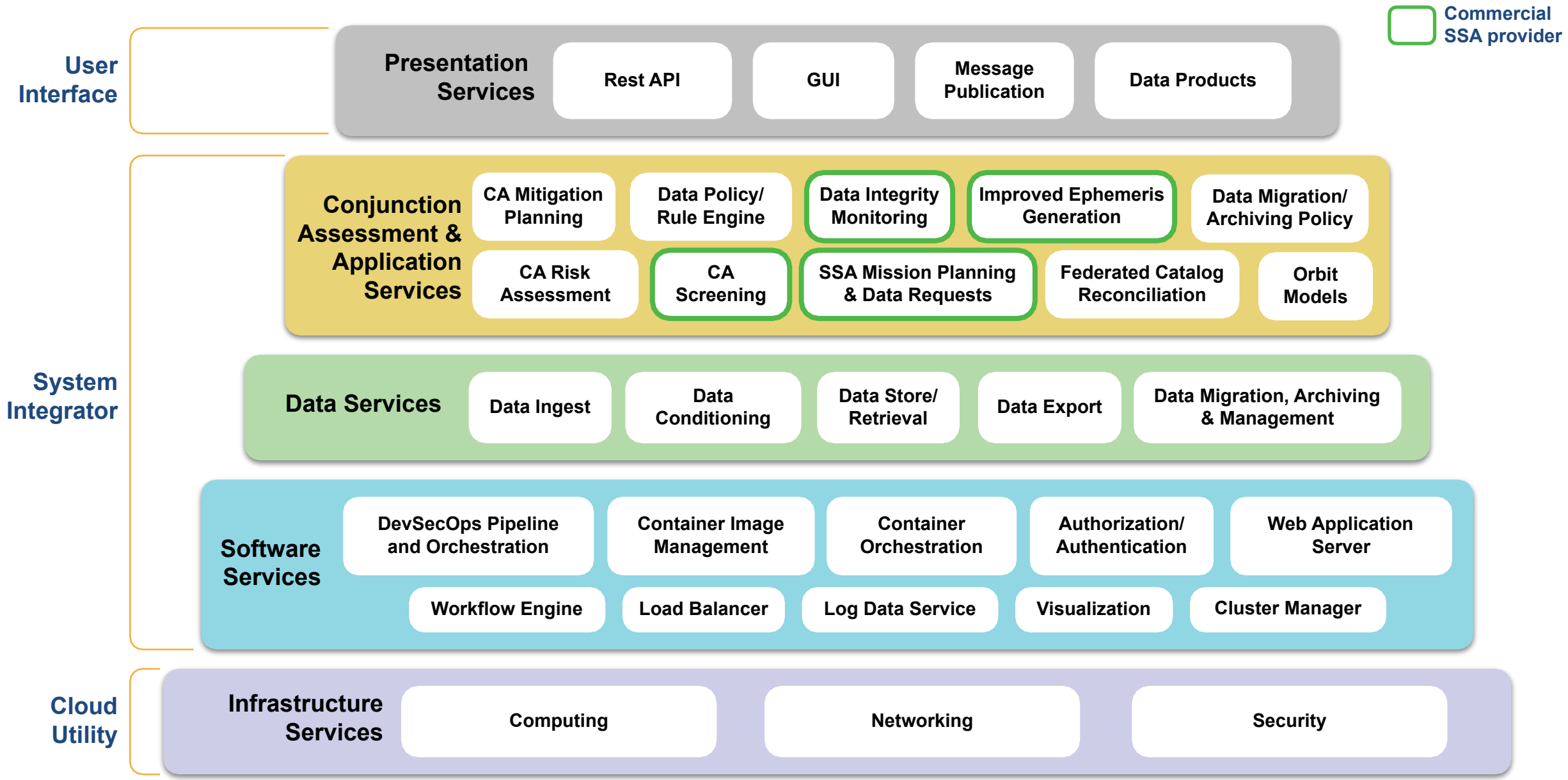
Traffic Coordination System for Space (TraCSS)

- **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

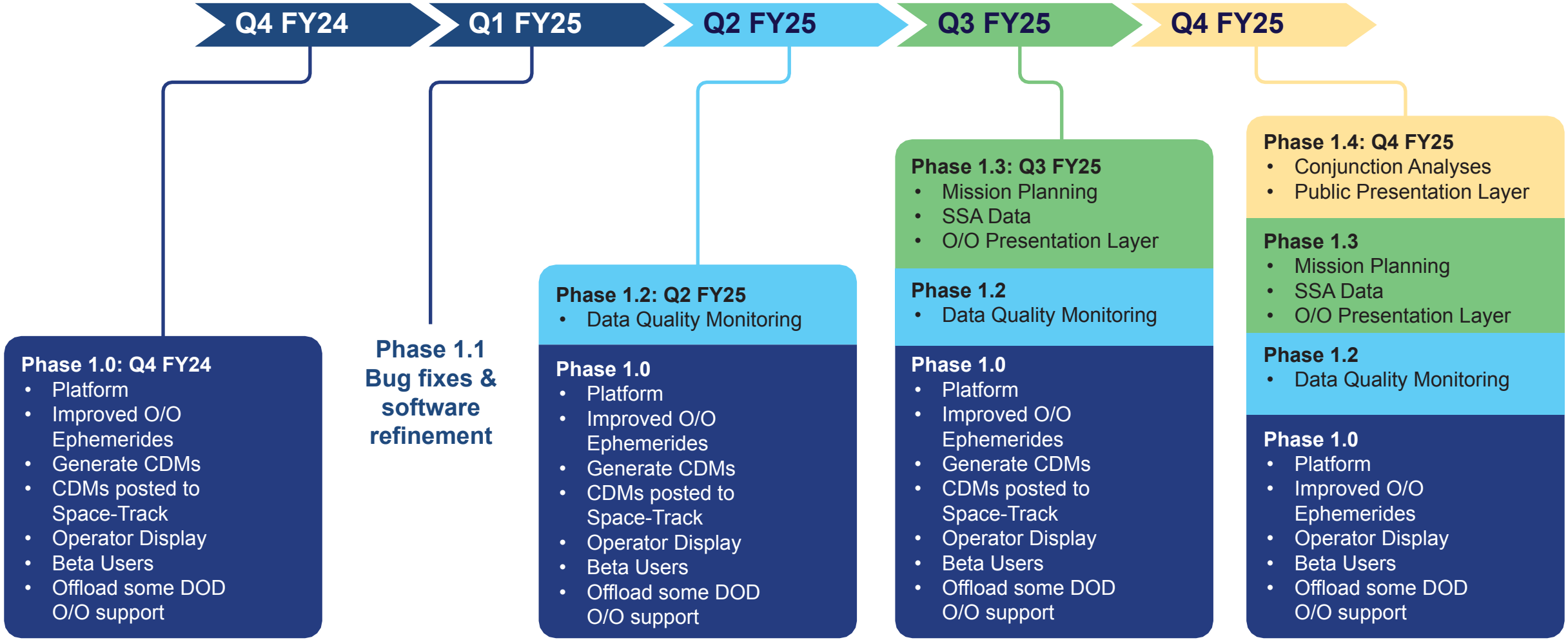

Data Sources
DoD High Accuracy Catalog
DoD Releasable Data Catalog
Space Sensor Network
International Data Sources
Commercial Sensors
Commercial Data Sources
Commercial Satellites
Commercial Ephemeris Data
Commercial Maneuver Plans
Space Weather Sensors
Environmental Data
Other Data (TBD)
TraCSS User Portal
Basic Safety Services (free)
Data sharing & validation
CA Screening & notifications
Conjunction Risk Analysis Support
Re-entry assessment
APIs
TraCSS SKYLINE
TraCSS OASIS
Data Repository
User Information and Archive
Modeling, Simulation, and Research Environment
TraCSS HORIZON
Requested data
Tested data, products, & services
Development and Test Environment
Commercial (Advanced) Services
Satellite O/O's
Other Stakeholders

Phase 1 End Configuration



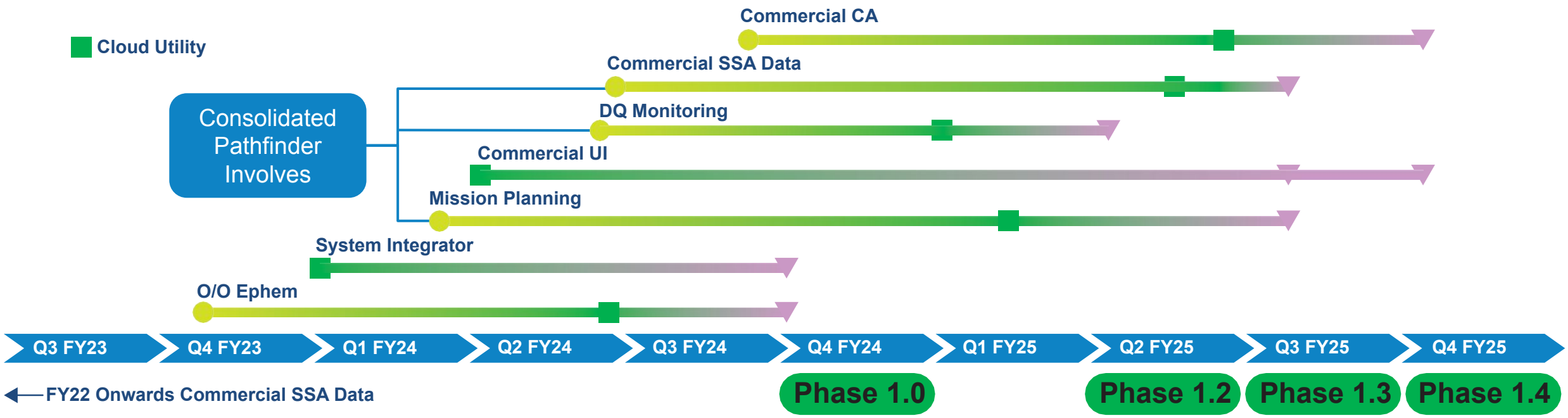
Phase 1 Capability Roll-Out Plan

Phased delivery of commercial functionality



Phase 1 Timeline

Each incremental delivery adds a block of functionality



Q2 FY23
- Verified replication of DoD CDM production

Q3 FY23
- Prototype system
- Containerized services for operational scale

Q1 FY24
- Initiate additional commercial pathfinder

Phase 1.0: Q4 FY24
- Conjunction assessment (CA) screening / CDM production
- Improved O/O ephemerides

Phase 1.2: Q2 FY25
- Data Quality Monitoring

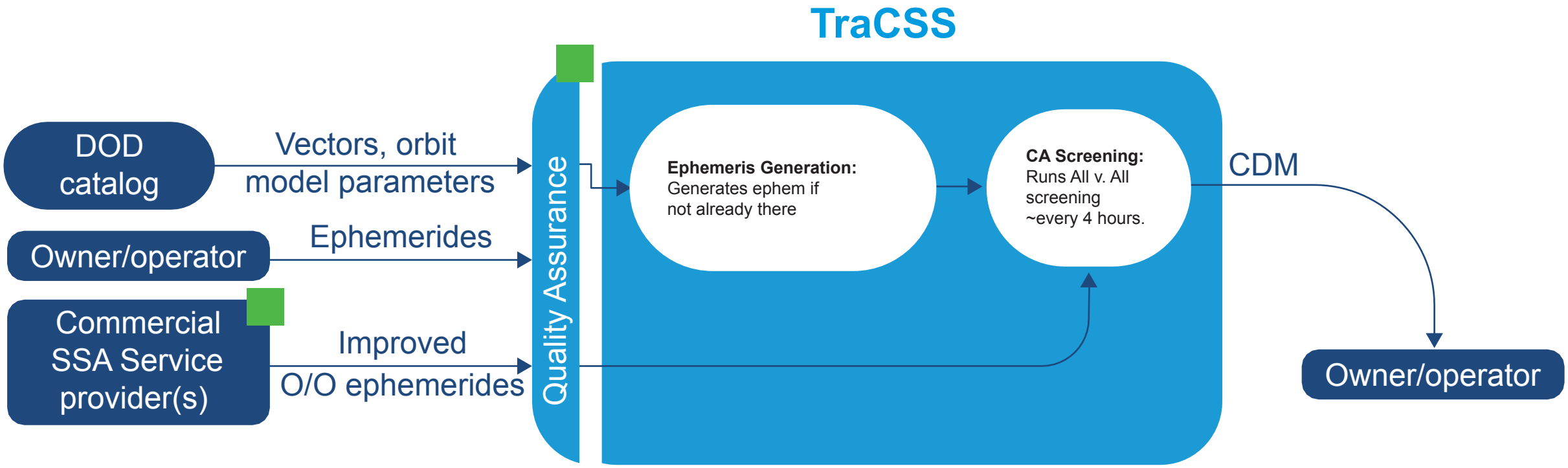
Phase 1.3: Q3 FY25
- Mission Planning
- Tasking of additional SSA Data

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



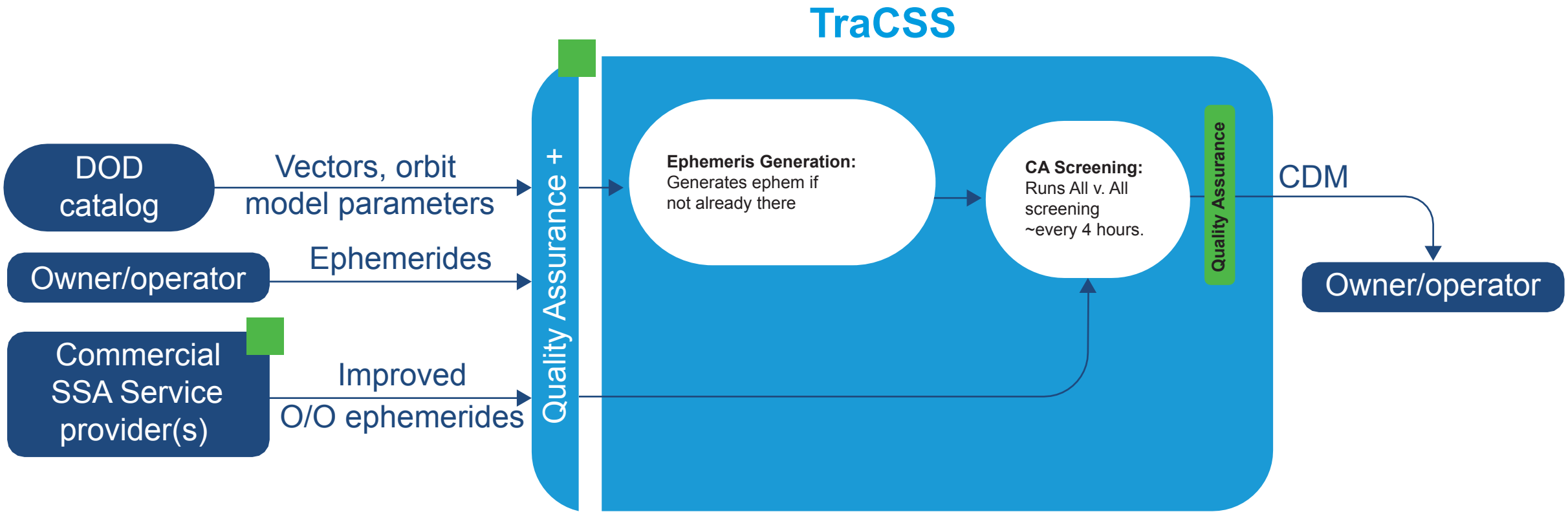
Enhanced Commercial Facing SSA/STC Features

- 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



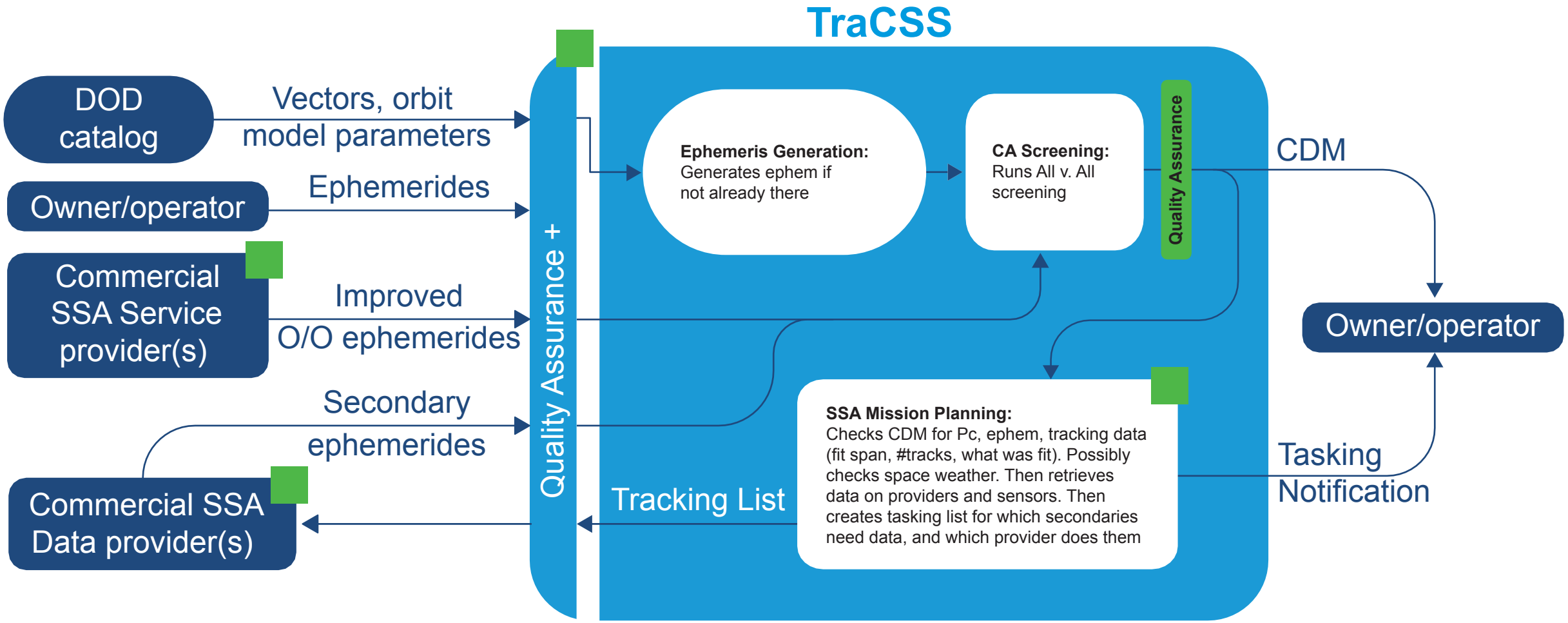
Enhanced Commercial Facing SSA/STC Features

- 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



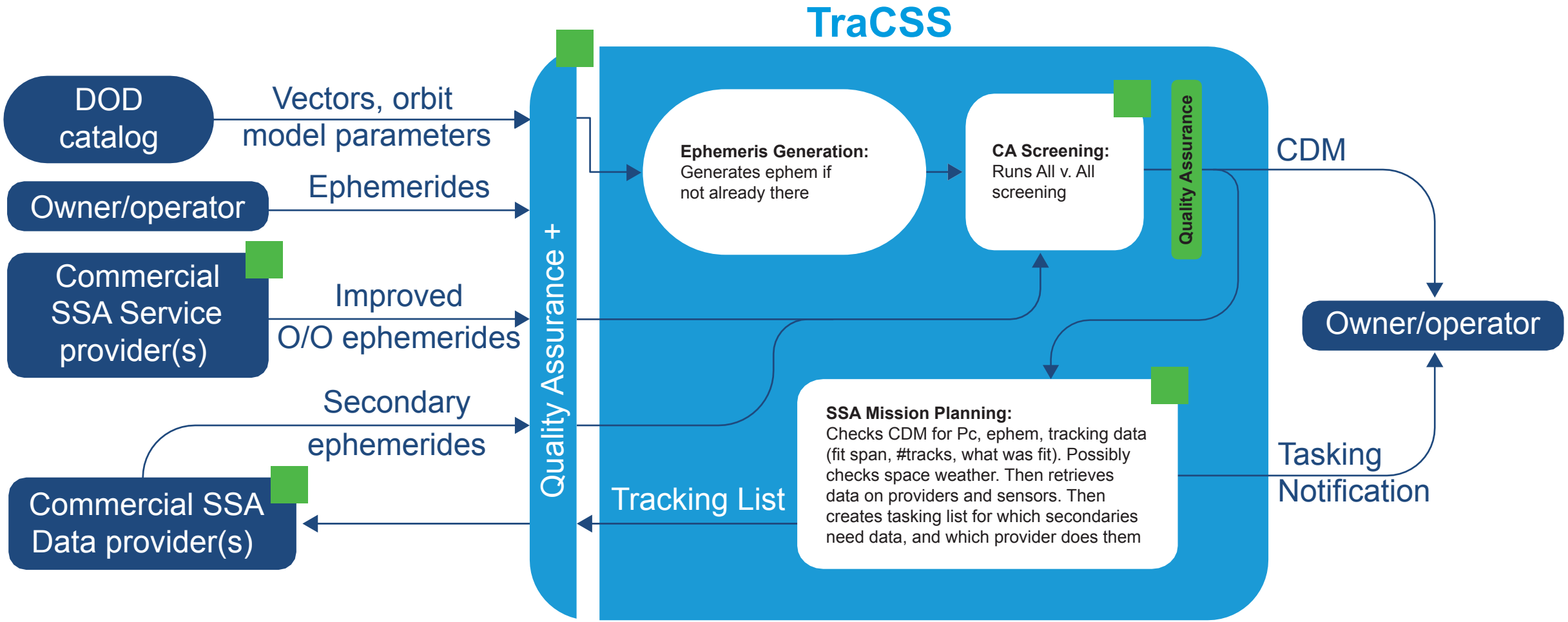
Enhanced Commercial Facing SSA/STC Features

- 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

Engage with OSC on TraCSS

TraCSS webpage

https://www.space.commerce.gov/tracss

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