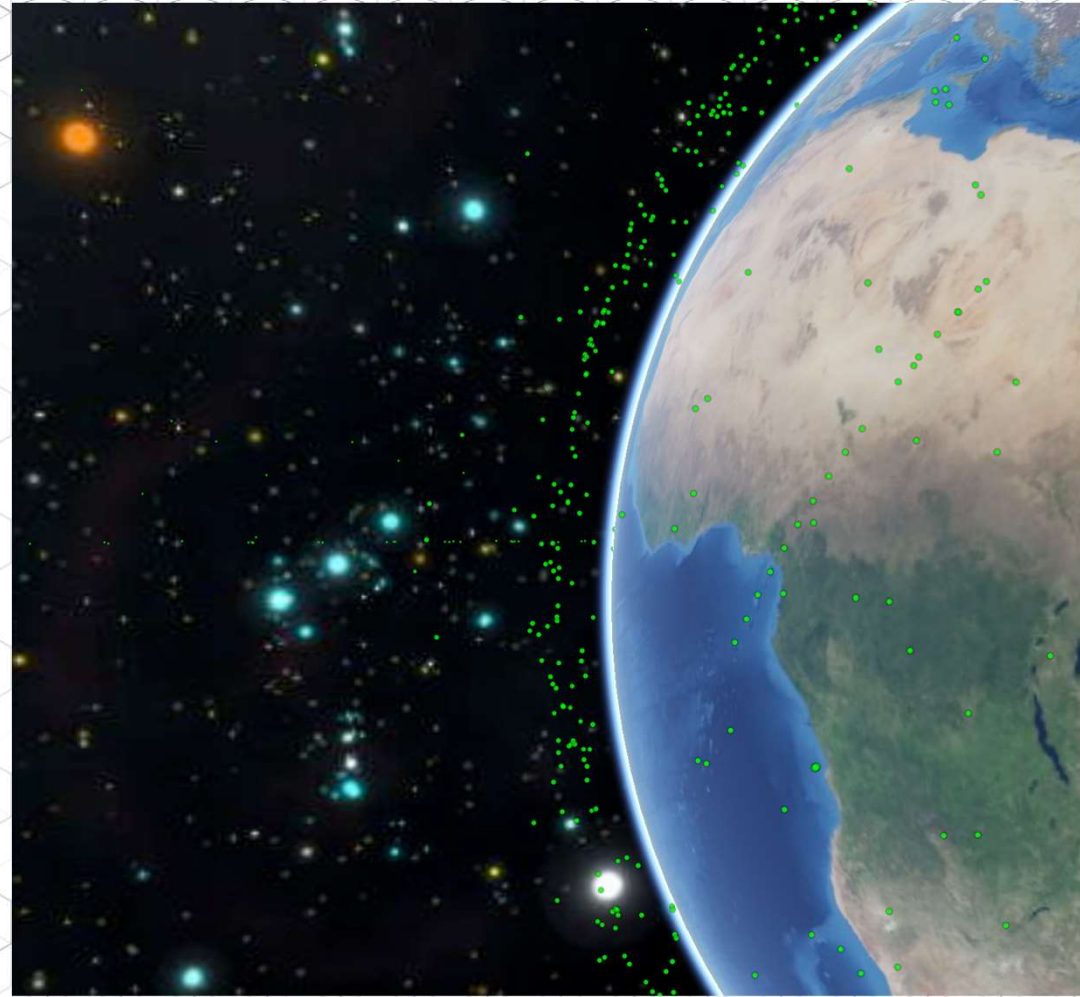


# SDC Data Sharing

Robert Hall

SDC Operations Manager



# Agenda

- SDC Recent Stats
- SDC On-boarding
- Best Practices
- GEO Pilot Summary
- SDC Improvements (SDC Powered by COMSPOC)

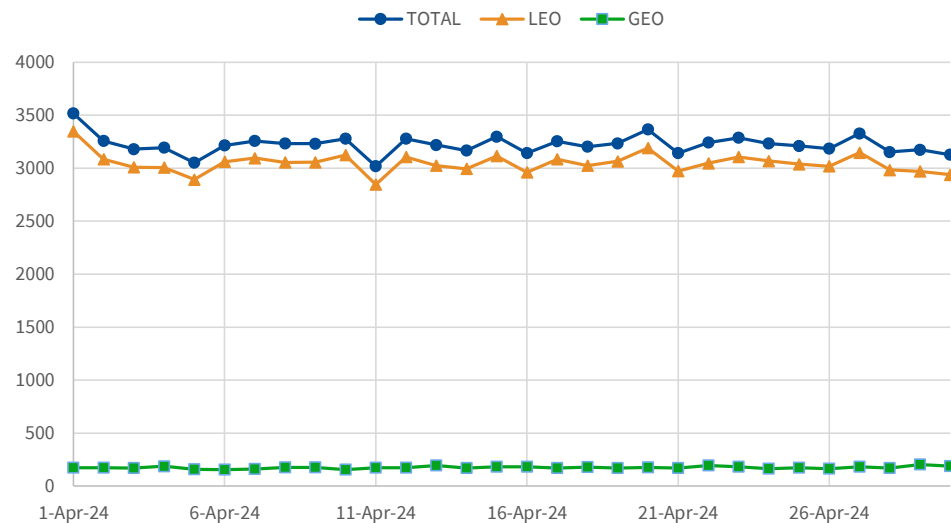
# SDC Recent Stats

## Member Totals (June 2024)

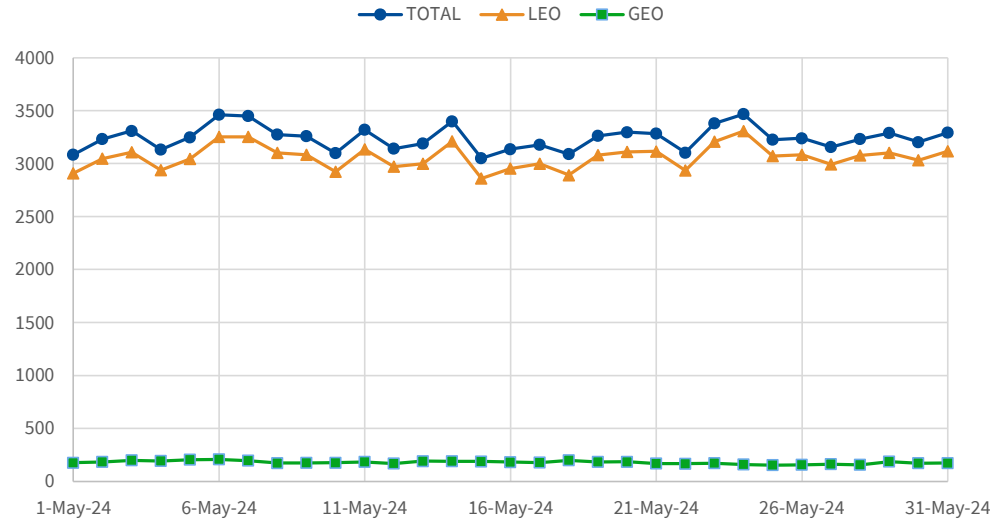
- SDC performs flight safety screening (CA) for 693 spacecraft: 283 GEO, 410 LEO/MEO
- 32 different operators provide data for their spacecraft

# Conjunction Totals

SDC Member Conjunctions Computed - April 2024

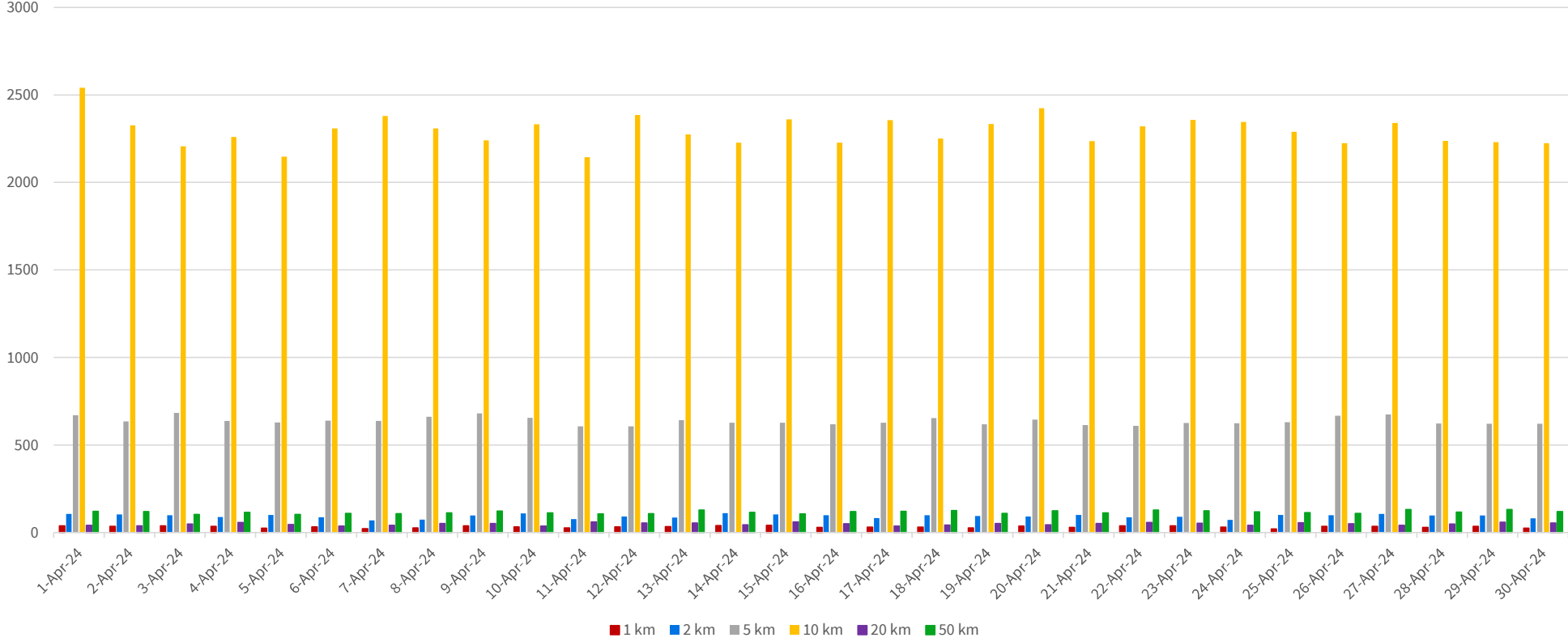


SDC Member Conjunctions Computed - May 2024



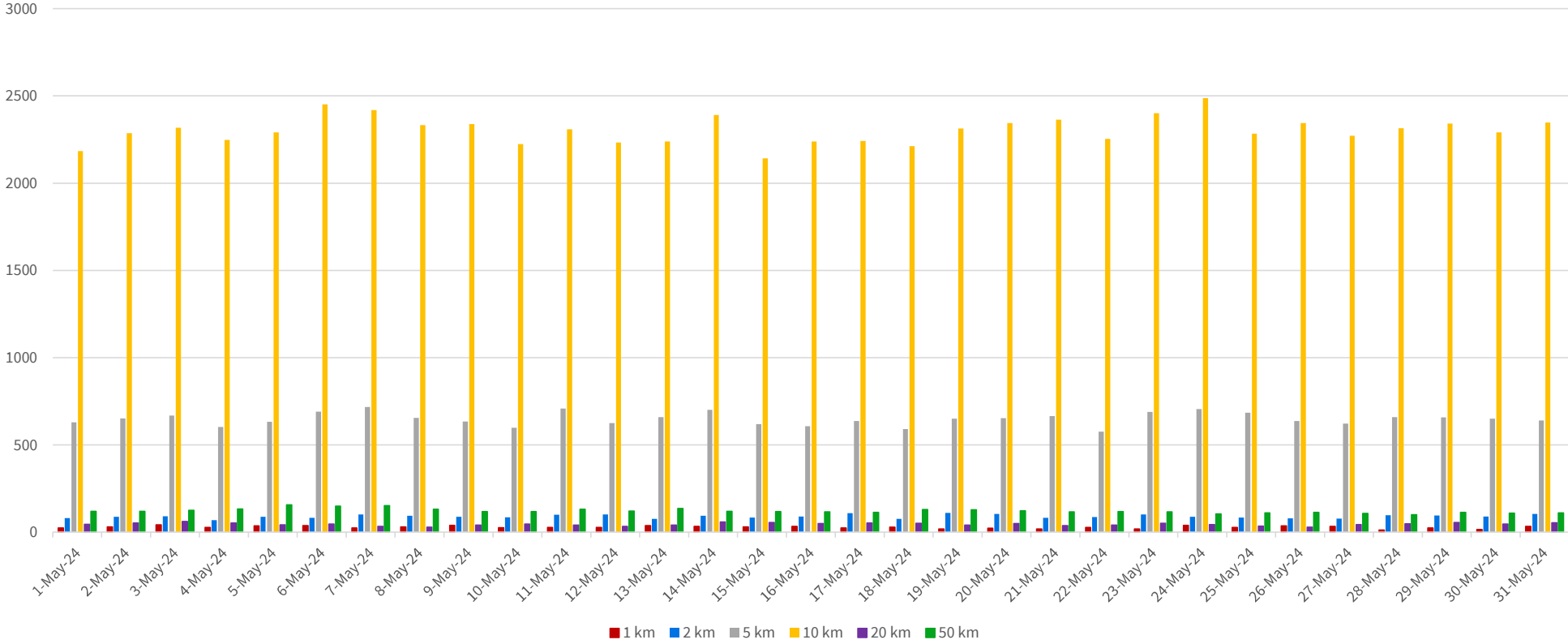
# April 2024 Conjunctions by Distance

SDC Member Conjunctions Computed by Miss Distance - April 2024



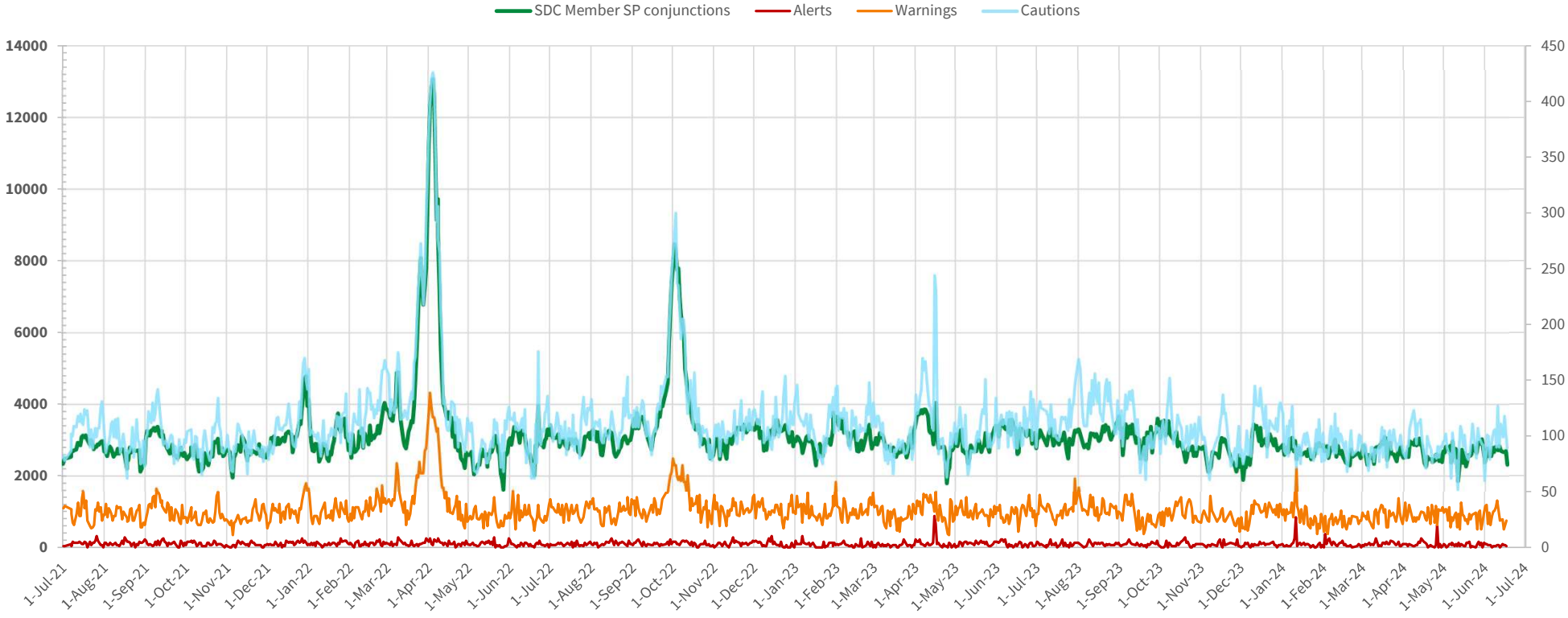
# May 2024 Conjunctions by Distance

SDC Member Conjunctions Computed by Miss Distance - May 2024



# SP Conjunctions – July '21-Jun '24

SDC SP-based Conjunctions Reported  
Alert/Warnings/Cautions using right-hand axis





# SDC On-boarding

## Adding a new satellite

- Members are able to add a new satellite to their fleet in the SDC
- However, for every satellite we need to configure ephemeris ingestion/conversion
- Given SDC history, often we have an ephemeris converter that matches
  - SDC currently maintains 19 different ephemeris converters
- Operator cannot upload ephemeris data for new satellite until we have configured ephemeris converter
  - We send an e-mail once we have the proper converter in place/ready for upload

## Ephemeris Conversion process

- We start with an ephemeris sample from the operator
- SDC attempts to convert using ephemeris header info
  - Frame
  - Units
  - Time
- SDC compares converted ephemeris to TLEs
- SDC analyzes converted ephemeris in STK
  - Report converted ephemeris in original frame and compare to owner source ephemeris
- In case of new leap seconds, SDC assesses the acceleration of converted ephemeris
  - If there is a leap second discrepancy, we will see an acceleration spike

# Best Practices

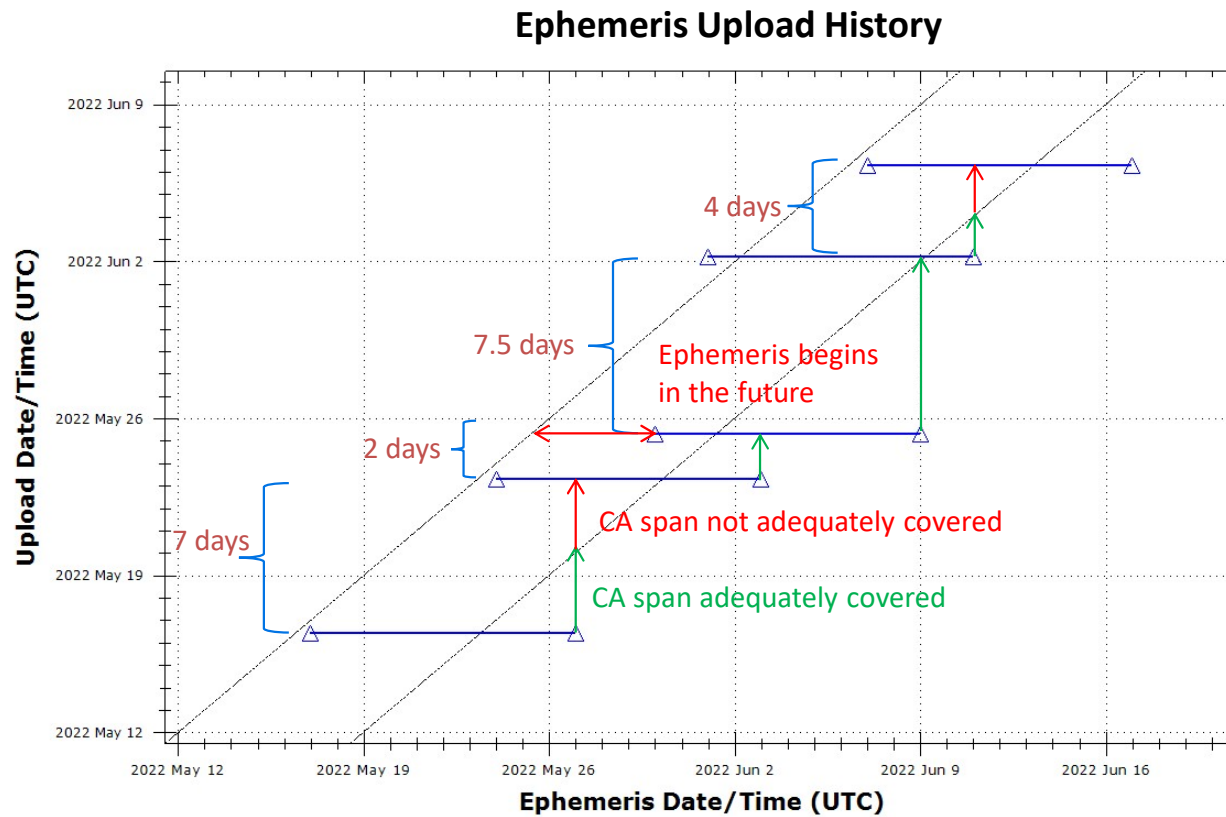
# Ephemeris Data

- CA screening is relatively easy to do
- Good data is key to effective CA operations
  - Operator ephemerides are the differentiator for SDC
    - 90 points per orbit: GEO 15 min, LEO 1 min
  - Comparative analyses can detect 'glitches' and improve overall SSA
- Operator ephemerides include effects of any planned maneuvers
  - Accounting for operational plans is critical
    - SP/TLE data cover results of canceled maneuvers

# Ephemeris Data - Recommendations

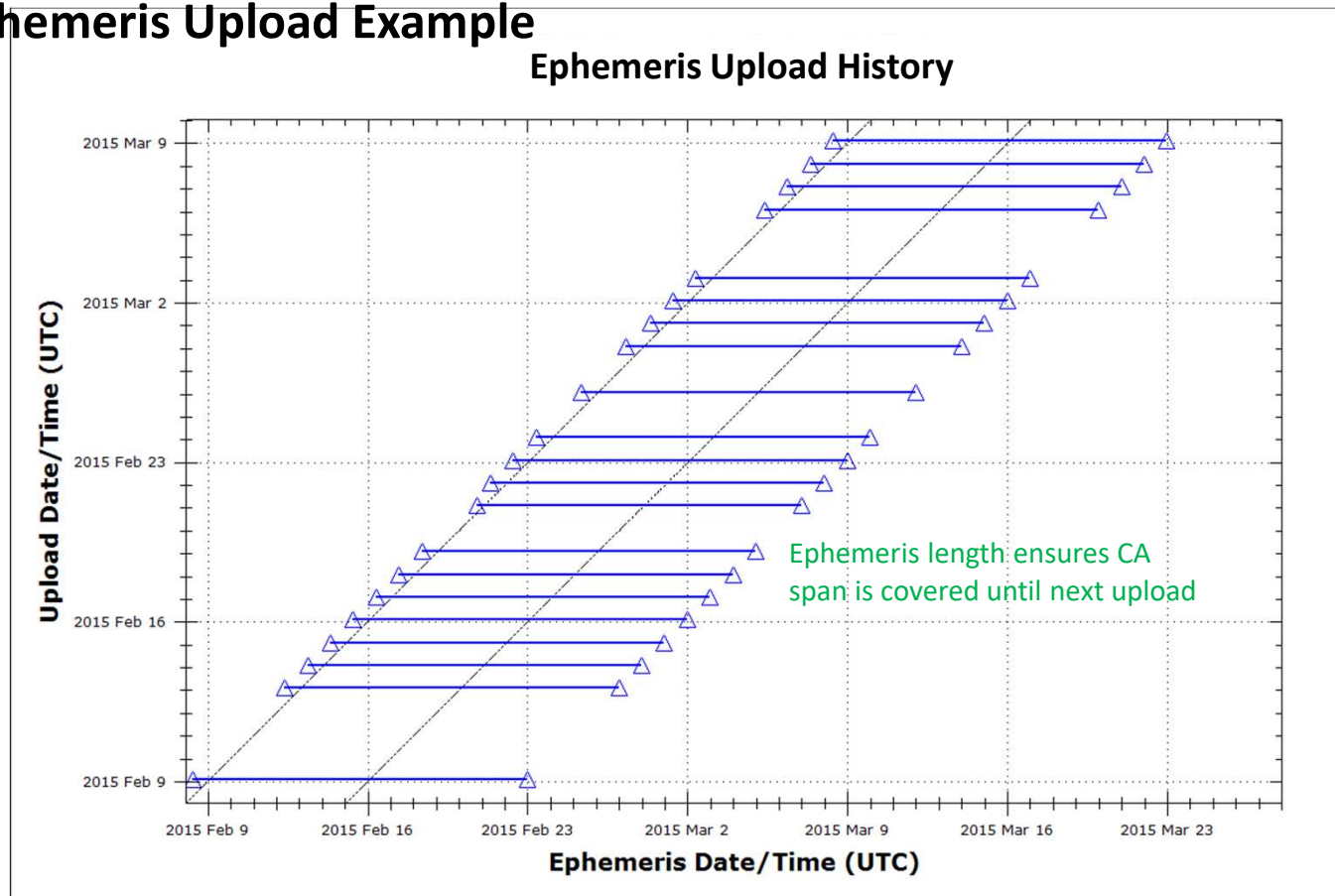
- Upload any time a new OD is performed or ephemeris is generated
  - Updated OD based on new observations
  - Updated ephemeris due to maneuver
- Upload should be done on a regular cadence
  - Automated process is ideal – remove potential for operator-related issues
  - Do not rely on manual (e.g. “sneaker-net”) process
- Uploaded ephemeris should cover entire 7-day analysis window
  - Ephemeris span should be: (upload interval) + 7 days
  - Ephemeris start should not be in the future
- Recommend 14 day span uploaded daily
  - Subject to supported by flight dynamics sw abilities
- If uploaded ephemeris does not adequately cover screening window, it will not be used
  - Invalidates one of the main benefits of SDC

# Undesirable Ephemeris Upload



# Preferred Ephemeris Upload

## Ephemeris Upload Example





# Ephemeris Types

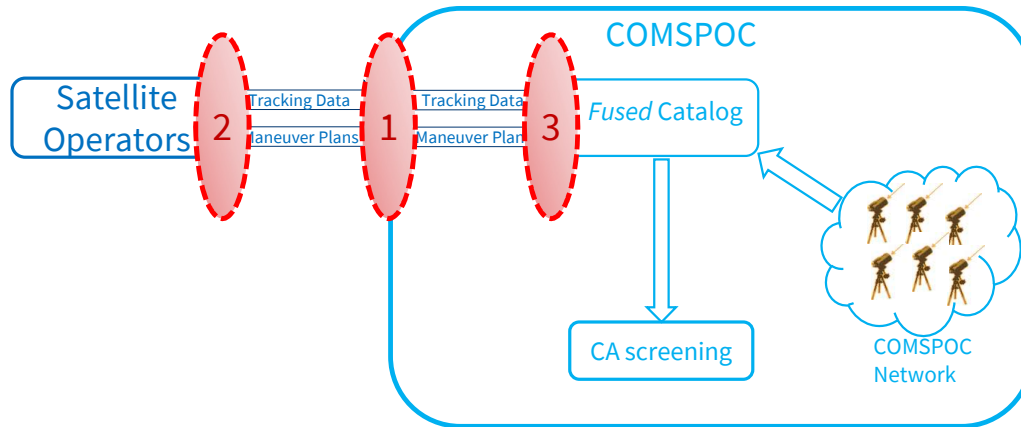
- Operational
  - Used for routine upload of operational ephemeris
  - Includes planned maneuvers for maneuvers where plans have been finalized
- Maneuver Planning
  - Tool for screening potential maneuver (s)
  - Once maneuver plan is finalized, operational ephemeris must be updated to reflect plan

# **GEO Pilot Summary**

## SDA / COMSPOC Operator Collaboration

- SDA operators & COMSPOC worked to bring the data into the system
  - Establish secure (IT) connectivity
  - Provide details of tracking stations (locations and operator calibration info)
  - Provide file format for maneuver plans
    - COMSPOC ensure available maneuver reader (build as necessary)
  - Enable routine tracking data flow
  - COMSPOC perform calibration of each individual tracking site

# Operator collaboration Focus



1. Establish Network connectivity via IT rules
2. Operator scripting to routinely push sensor data + maneuvers for selected sats – low latency req'd
3. COMSPOC configuration
  - COMSPOC configure tracking data readers based on operator format & frame
  - COMSPOC configure maneuver plans readers
  - COMSPOC calibrate every single operator sensor before allowing use

# Data sets ingested/fused – during Pilot



# Data sets still being processed – June 2024

