

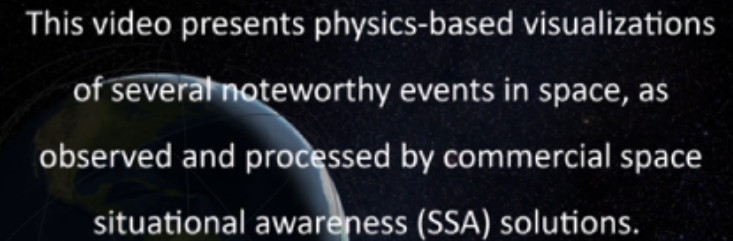
# **Spectrum of Space Threats and Awareness**

## **The Disparity Is Growing Alarmingly Fast**

Paul Graziani, CEO, COMSPOC Corporation

# This Presentation

- Space is rapidly becoming more congested
- Space as the first warfighting domain is real
- The nature of threats to space assets is evolving
- There is a startling new reality of space-based threats
- Space domain awareness is lagging
  - Pace of innovation is not matched by pace of adoption
- Conclusion



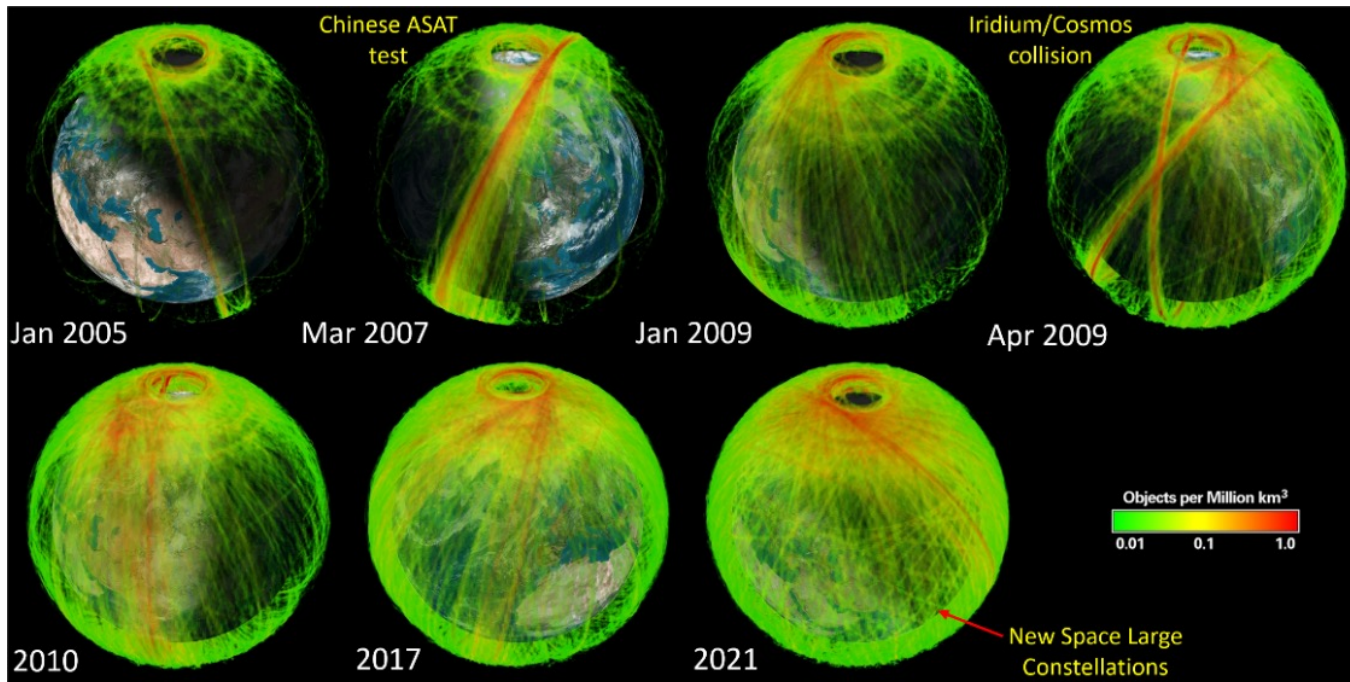
This video presents physics-based visualizations of several noteworthy events in space, as observed and processed by commercial space situational awareness (SSA) solutions.

# Counterspace Reports

- U.S. Defense Intelligence Agency
  - [2019 Challenges to Security in Space](#)
  - [2022 Challenges to Security in Space](#)
- Center for Strategic and International Studies (CSIS)
  - [Space Threat Assessment 2024](#)
- Secure World Foundation
  - [Global Counterspace Capabilities 2023](#)



# Density in Low Earth Orbit



- Congestion rapidly increasing
- Complicates
  - Space situational awareness
  - Space traffic management
  - Space domain awareness



## Space – Likely the First Domain to See Conflict

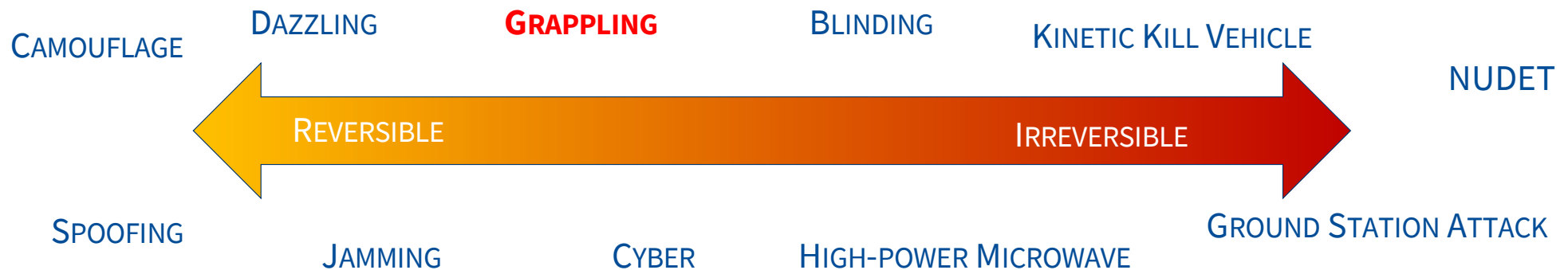
- Less escalatory than attacking ground, sea, or air targets
  - No loss of life (at least not directly)
    - "Satellites don't have mothers." - General John E. Hyten Vice Chairman, Joint Chiefs of Staff
    - Retribution likely to be significantly less
- Huge leverage point
  - Very effective because modern society and military apparatus are dependent on space
- Out of public view

In this visualization China's SY 12-01 surveillance satellite is seen passing by the U.S. satellite USA 332. Visual magnitude analysis suggests that SY 12-01 imaged USA 332 during this encounter.

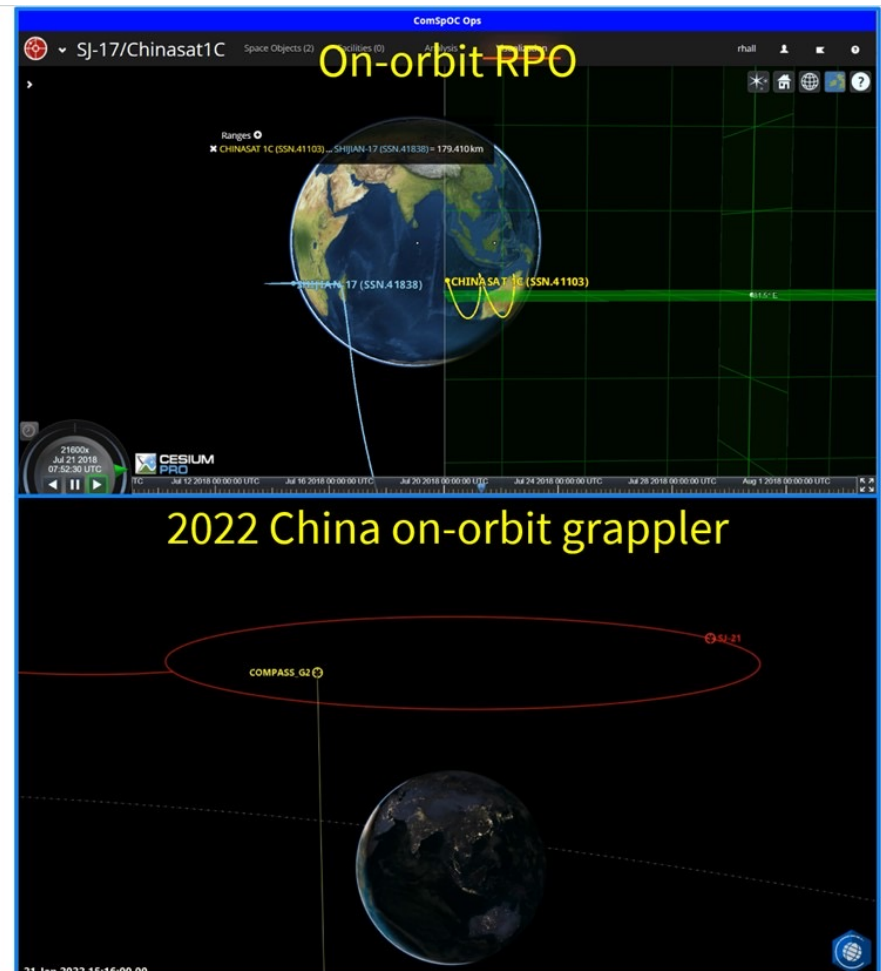
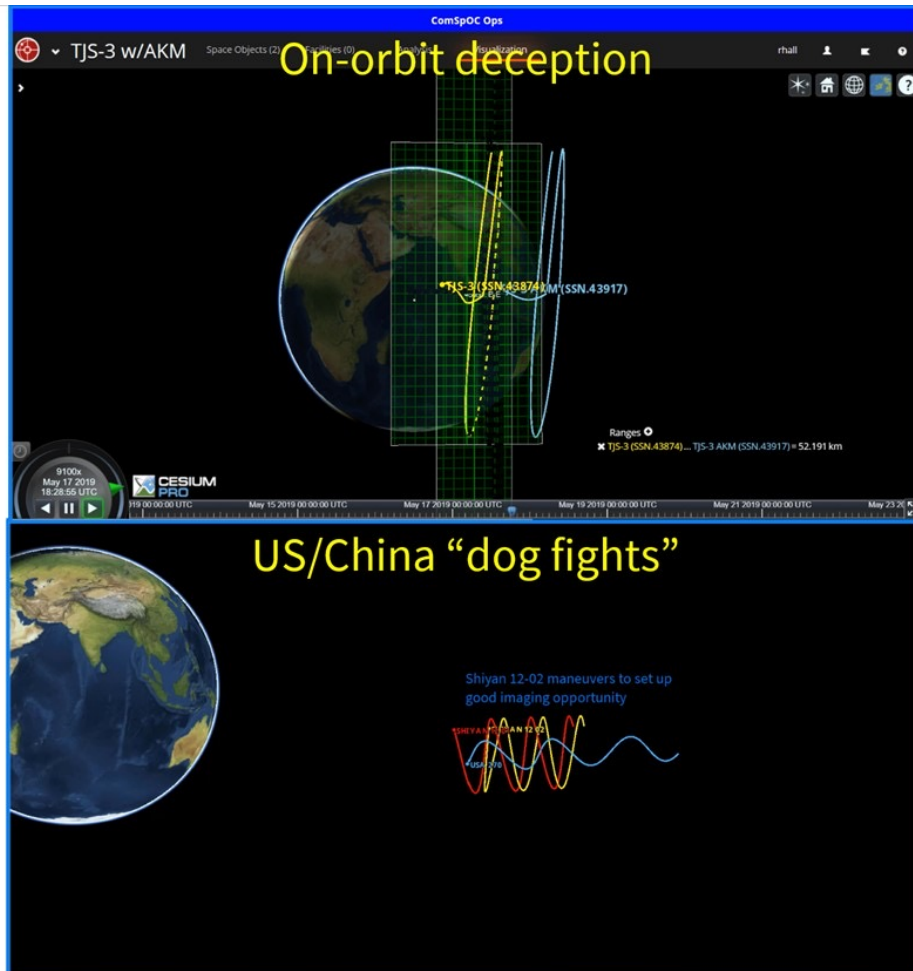
# Counterspace Threat Spectrum

China has demonstrated their ability to use one spacecraft to grapple another object and manipulate it. In this visualization you will see two examples that demonstrate this capability.

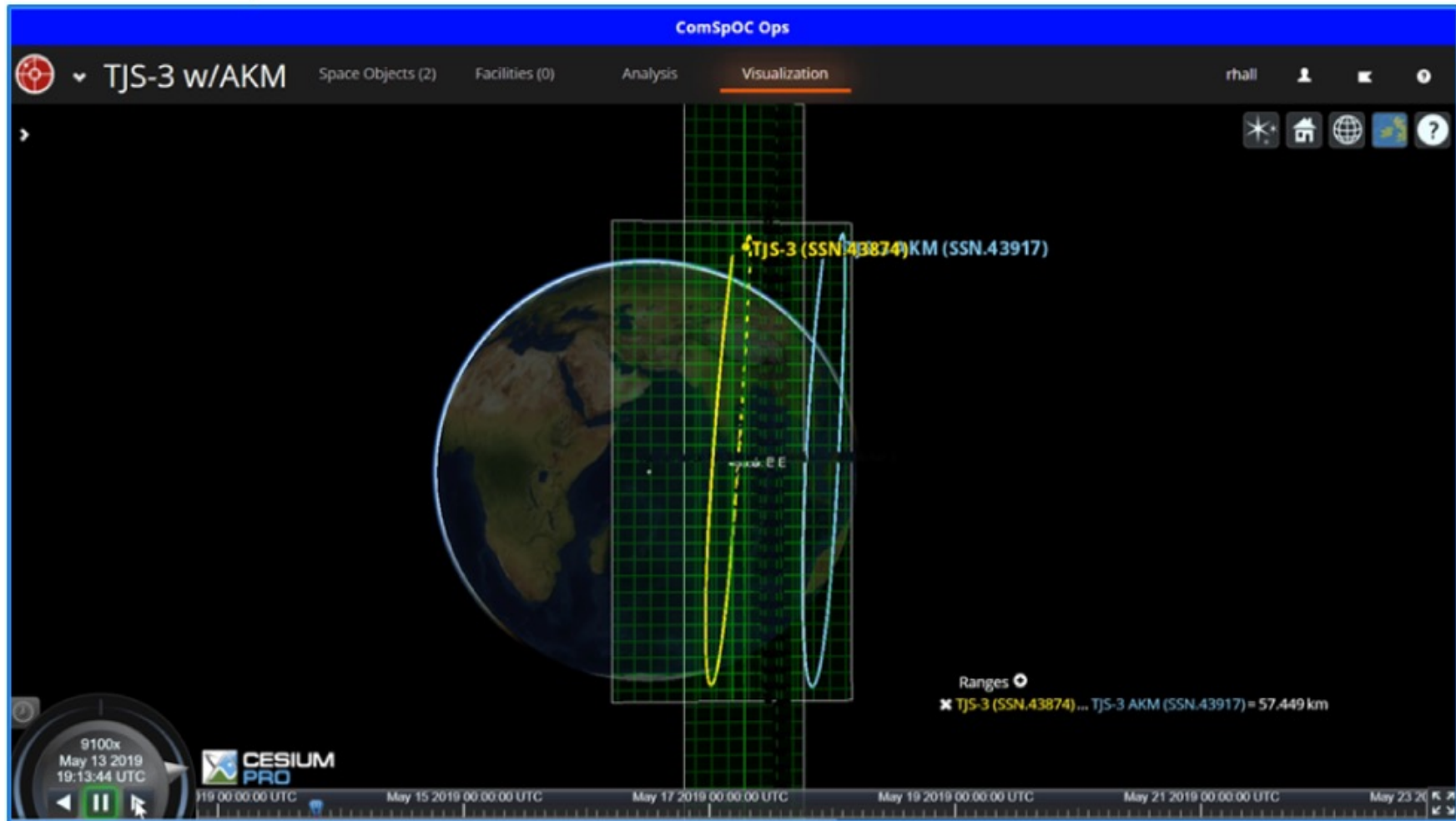
The first segment depicts a notional example of highly refined maneuvering — which Chinese spacecraft have been observed performing. This type of careful maneuvering is critical to achieve the result you see in the second segment.



# Space to Space Threats Advancing Rapidly

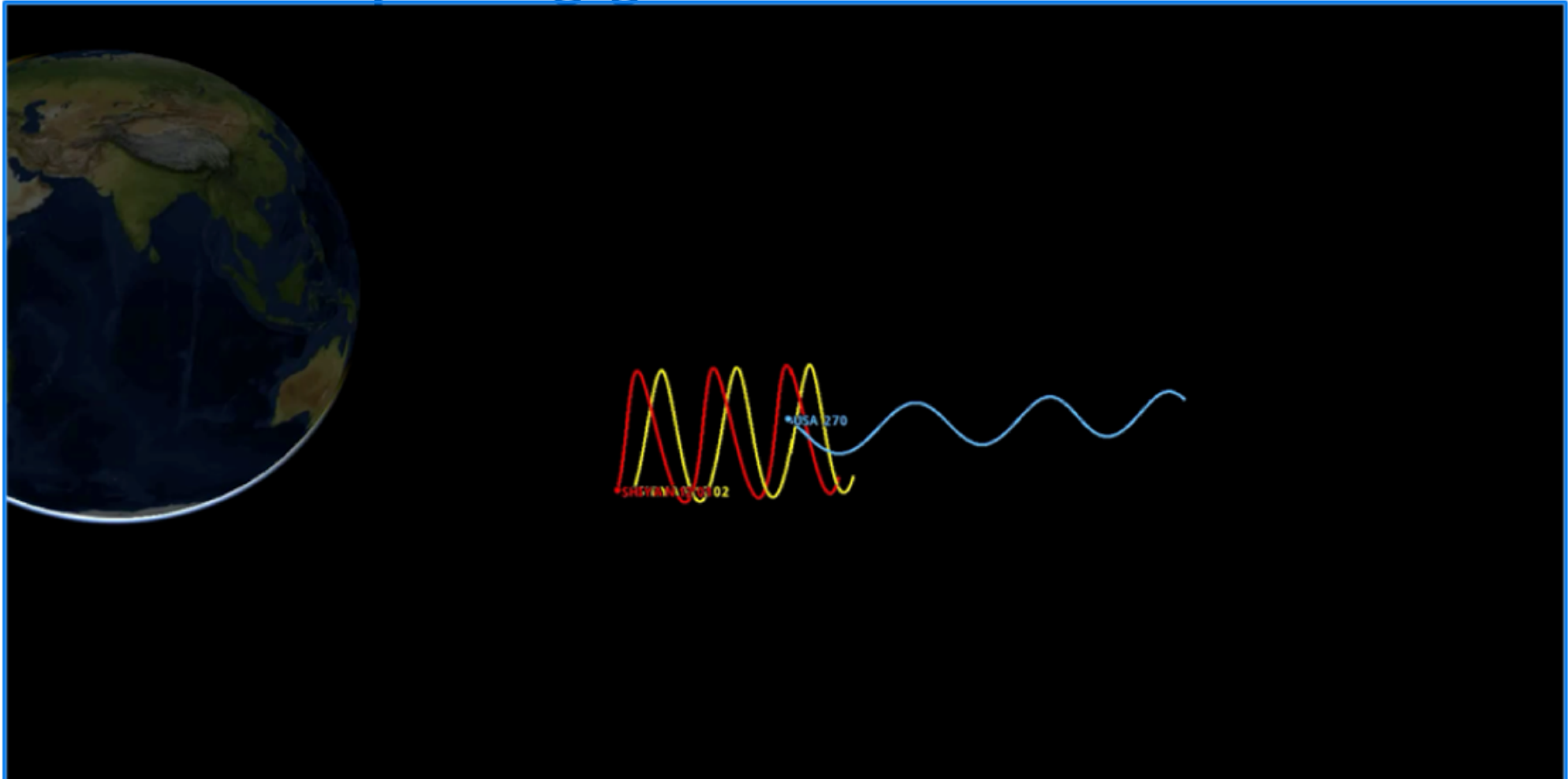


# On-Orbit Deception

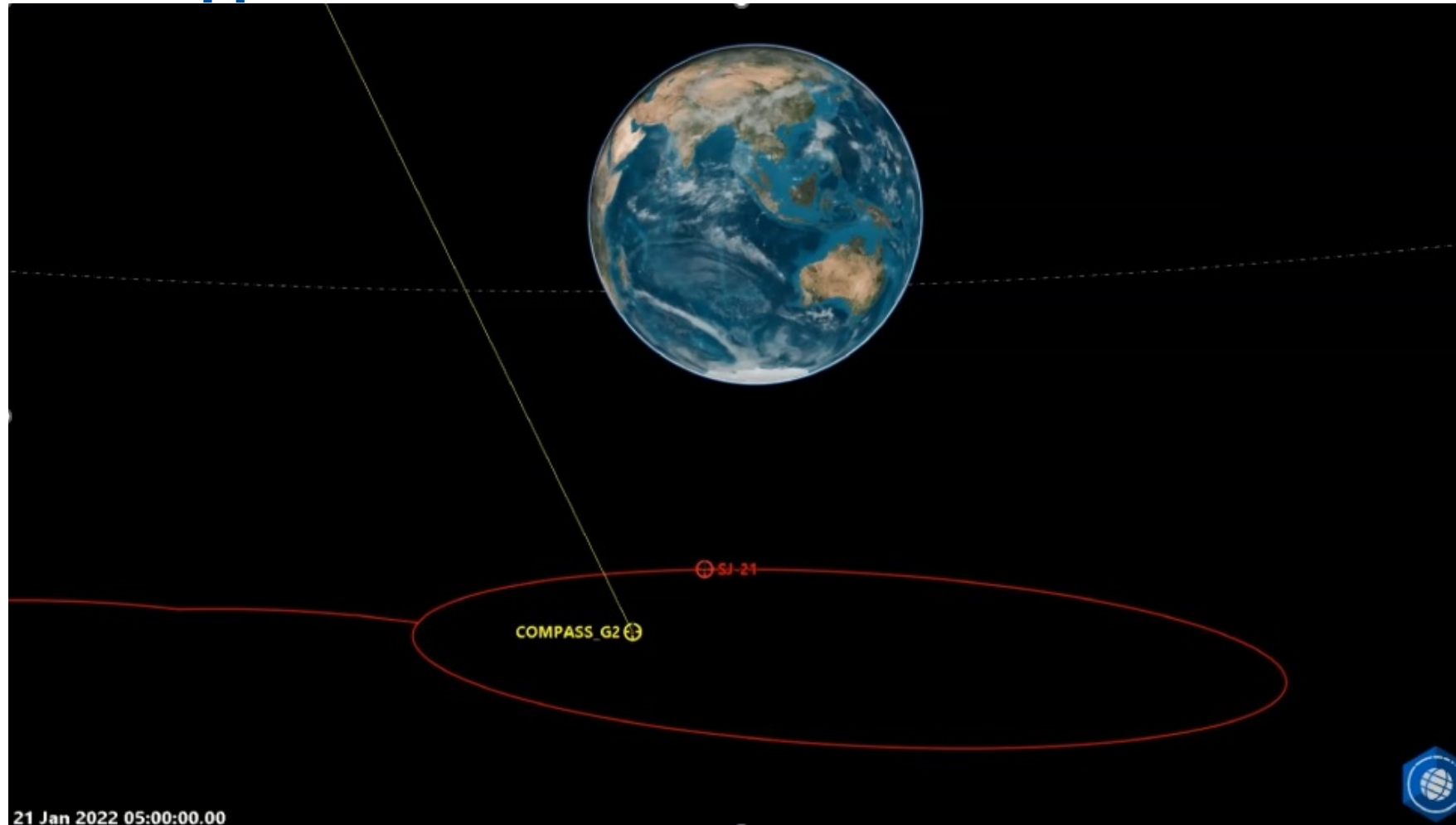




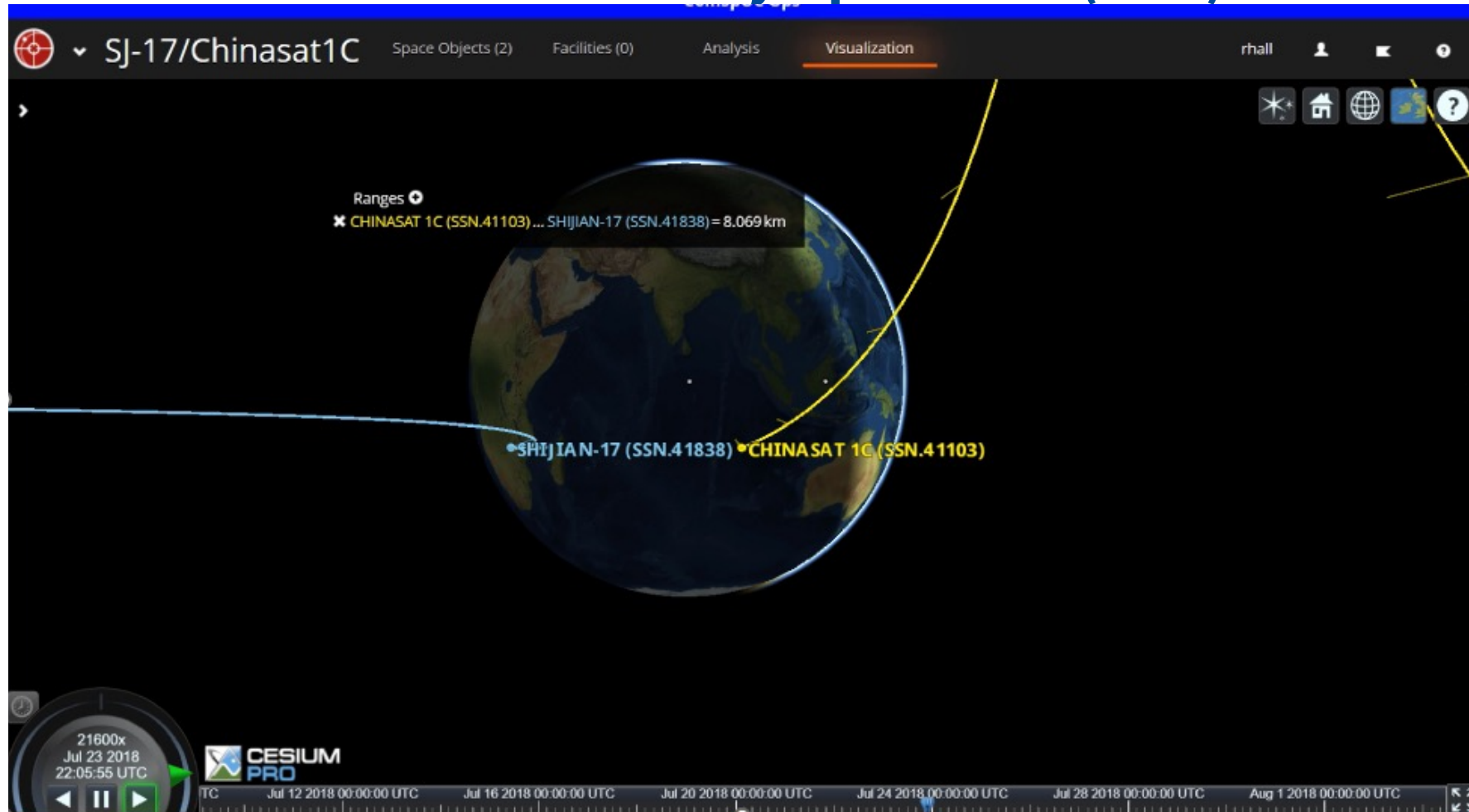
# US and China Space Engagements



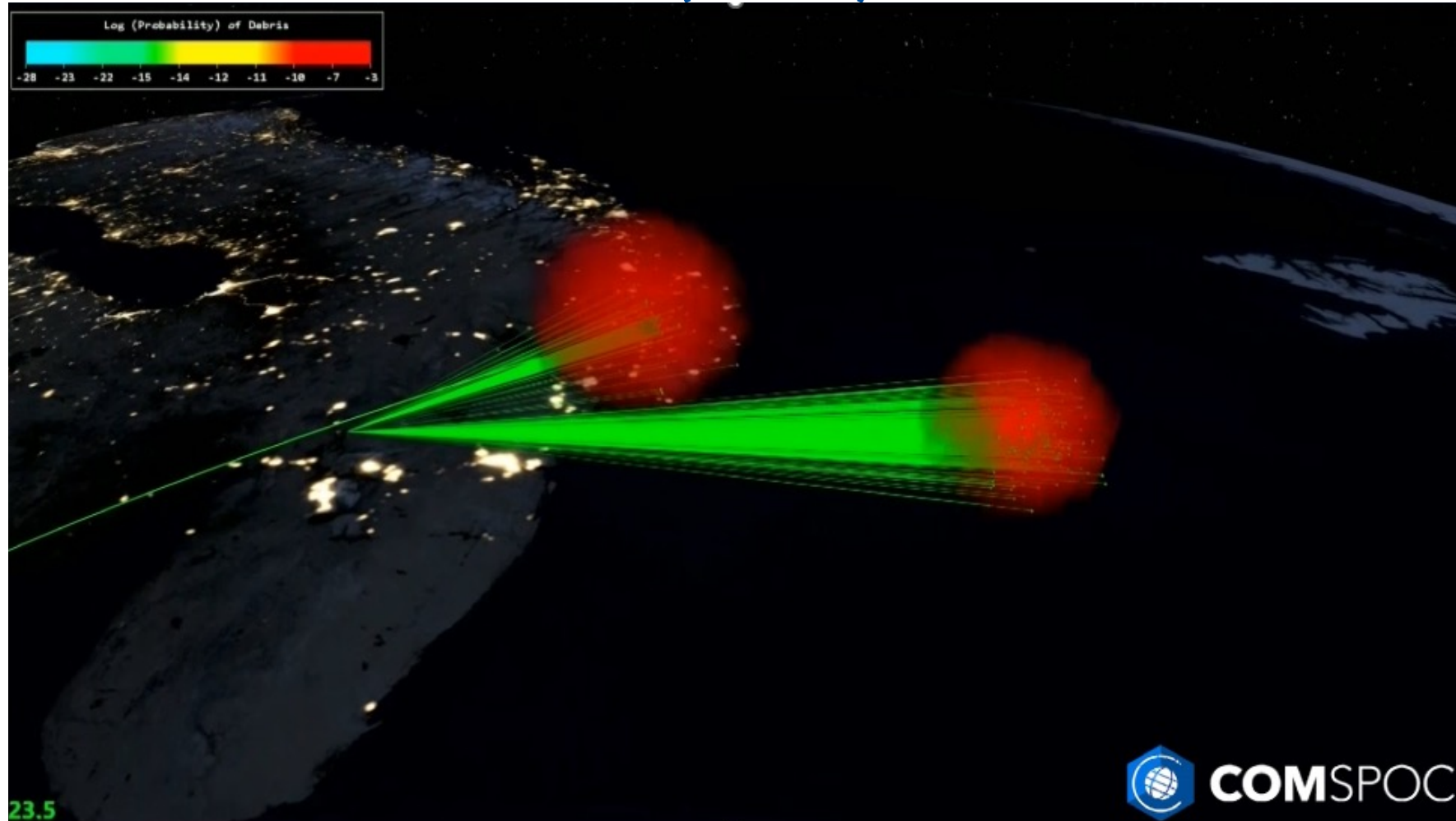
# On-Orbit Grapppler – 2022 Chinese Test



# On-Orbit Rendezvous and Proximity Operations (RPO)



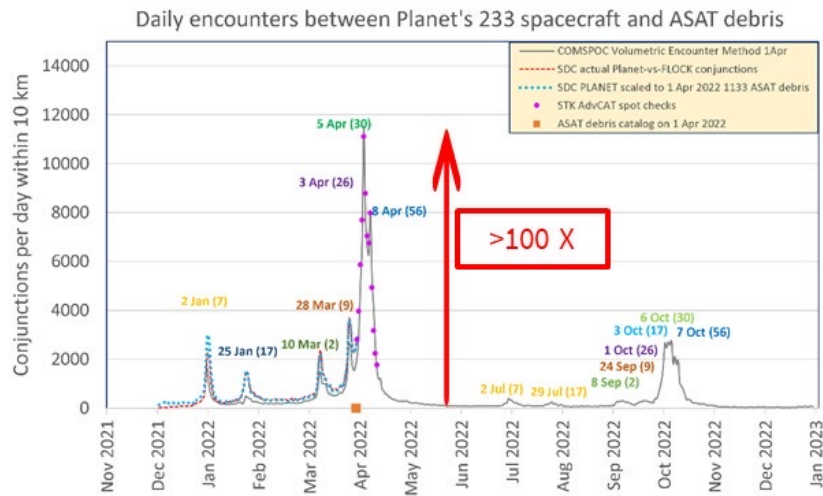
# Kinetic Kill – Direct Ascent ASAT (Russia)



# Direct Ascent Kinetic ASAT Weapon Testing

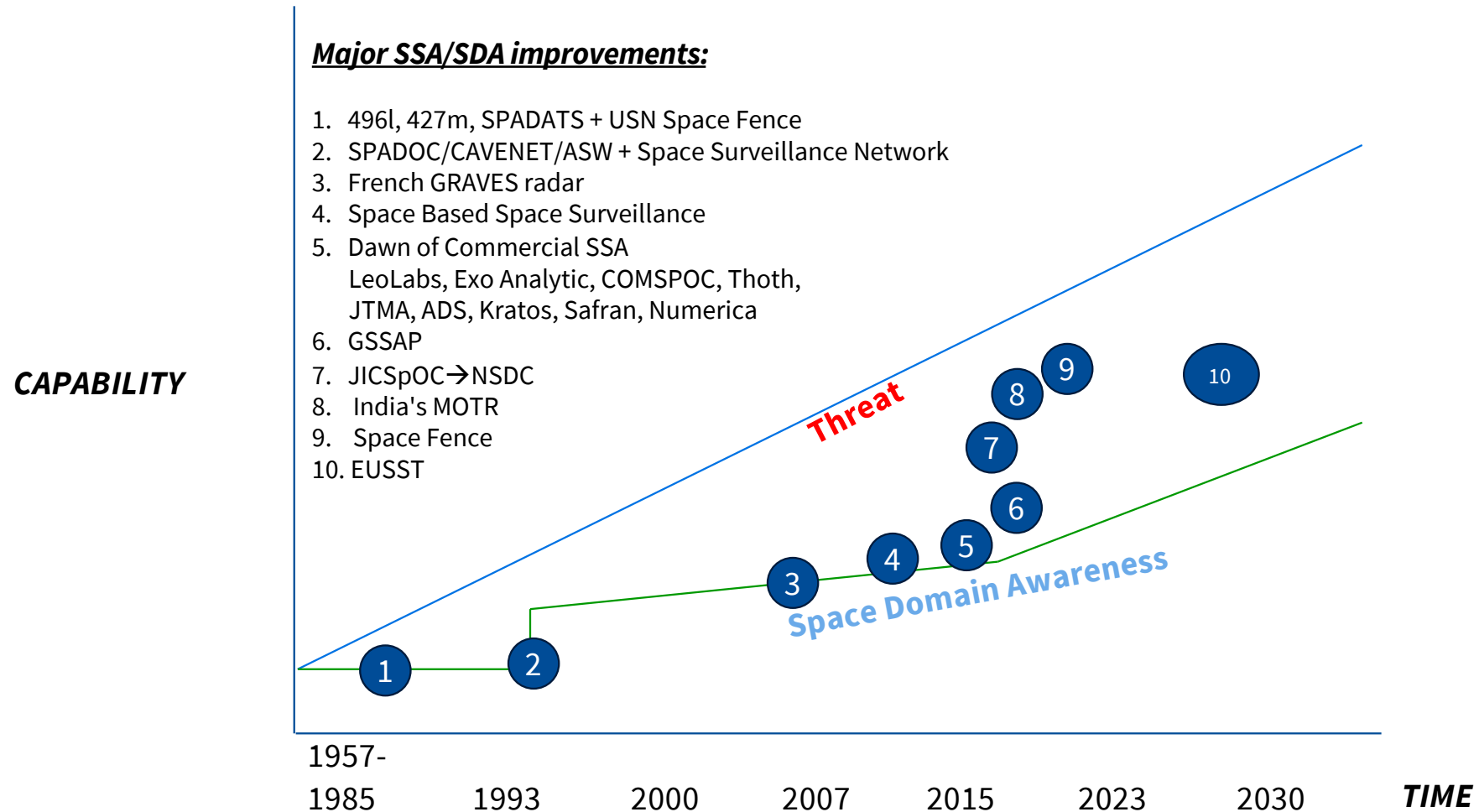
Extreme actions have extreme consequences

ASAT debris caused “conjunction squalls”





# Increasing Space Threats vs. Space Domain Awareness



## Conclusion

- Threats in space are already ahead of our space domain awareness. That's bad enough, but...
- **Threats are accelerating faster than the domain awareness is improving**
- We all need to come together to solve this ASAP
  - Allies, commercial, academia
  - **“Achieve integration prior to crisis.”** Major General Troy Endicott USSPACECOM J-3, 39<sup>th</sup> Space Symposium