



Promoting Cooperative Solutions for Space Sustainability

Space Zones and Guardians

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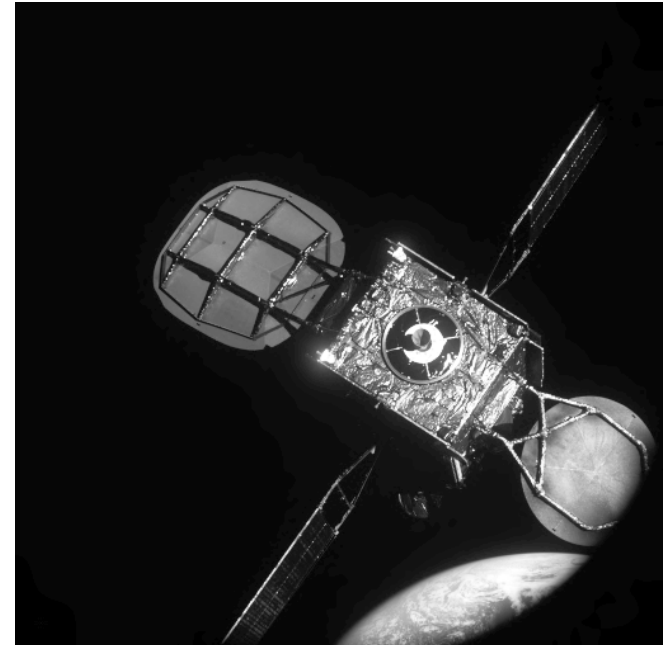
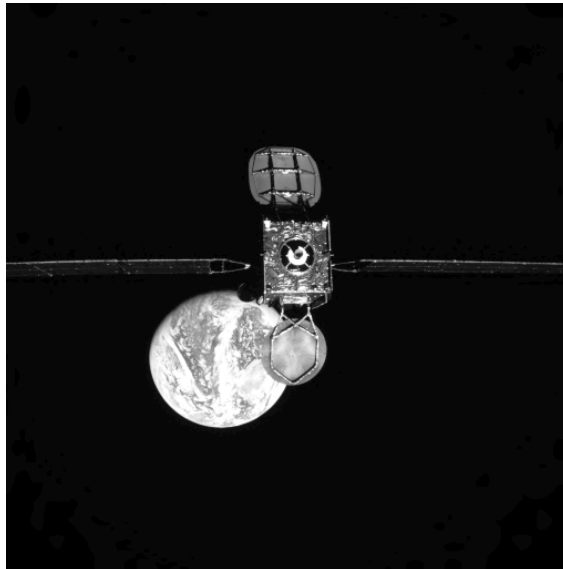
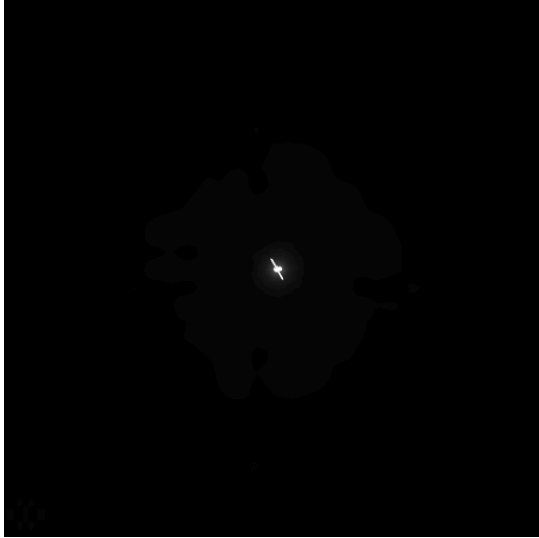
- RPO threat is misunderstood and overblown
 - Doing RPO is much more difficult and riskier than perceived by non-experts
 - Hard to see where RPO would provide better military effects than other options (hard kills, jamming, cyber)
- “Guardian” satellites are a lot less useful in practice than in theory
 - Increase awareness in local area
 - Complicate adversary RPO of protected satellite
 - Platform for countermeasure technologies
- “Space Zones” could have limited military benefits but face uphill battle
 - Primary utility is as part of indications and warnings of potential threats
 - Unlikely to find a strong legal footing or political support

2 Russian satellites are stalking a US spysat in orbit. The Space Force is watching.

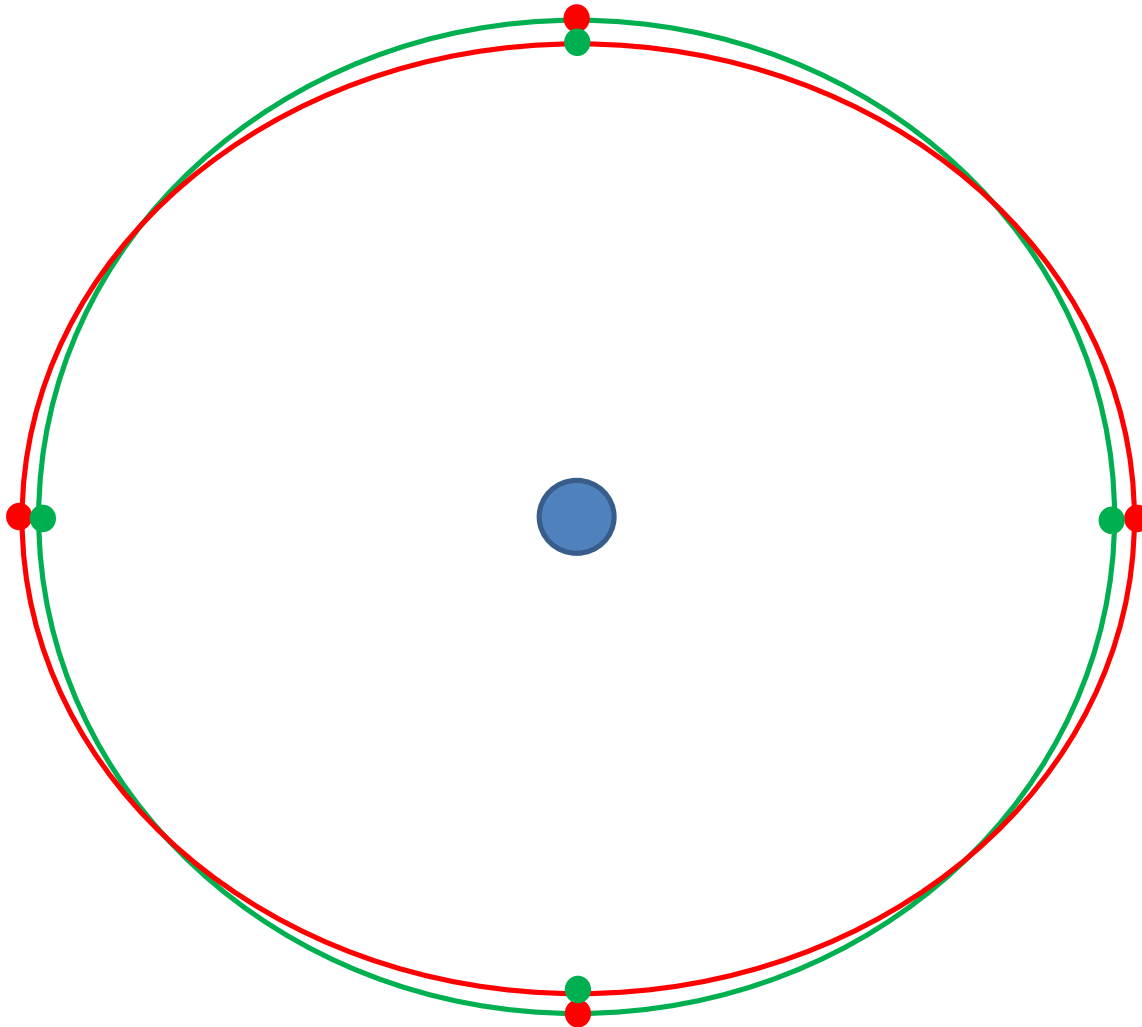
How China’s scavenger satellites are being used to develop AI weapons, drones and robots

New Space Robots Will Fix Satellites, or Maybe Destroy Them

Chinese Satellite Grabs Another in Orbit



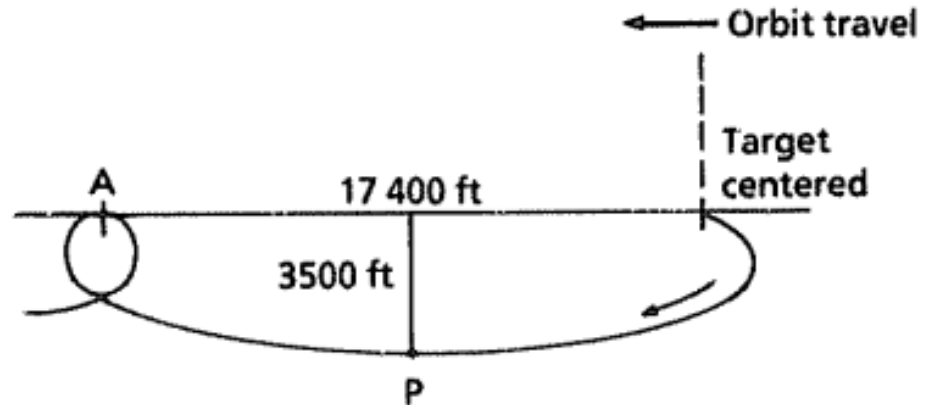
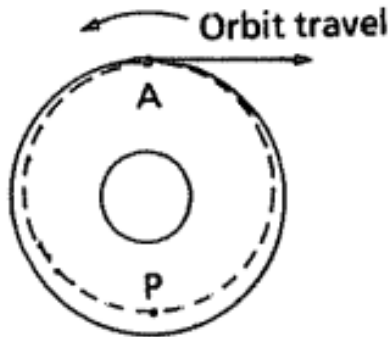
The reality of a GEO RPO



Orbital mechanics is different

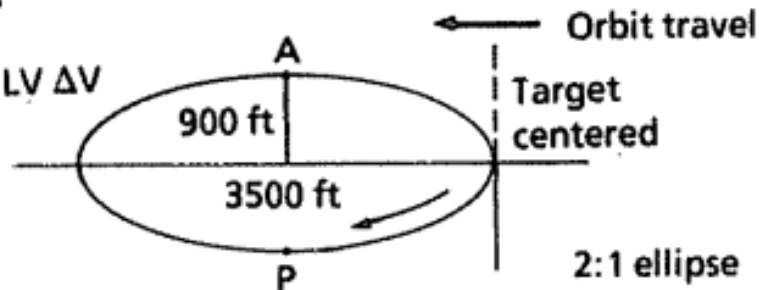
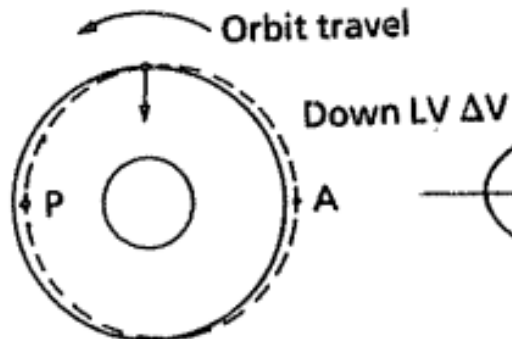
II.

Retrograde
 $\Delta V = -1.0 \text{ ft/s}$



III.

Radially inward
 $\Delta V = 1.0 \text{ ft/s}$



Credit: NASA Rendezvous and Proximity Operations Handbook (1985)

“Guardians” as countermeasure platforms

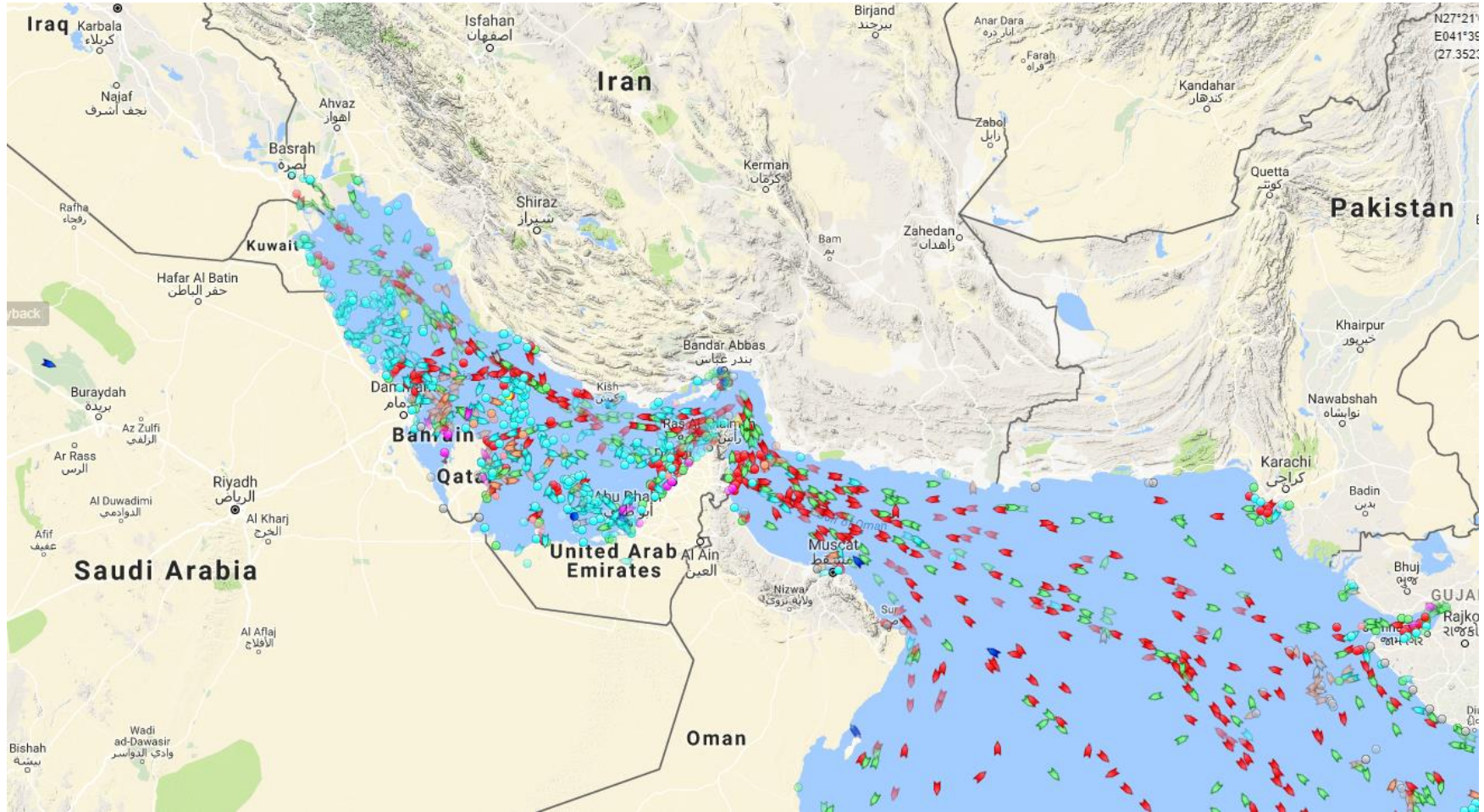


Flare and chaff anti-missile protections for transport aircraft
Credit: [Lacroix Defense](#)



BAE “Hot Brick” Infrared jammer
Credit: [Wikimedia Commons](#)

The future of space...



Credit: [MaritimeTraffic.com](https://www.maritimetraffic.com)



Credit: [The Associated Press](#)

RULES OF ENGAGEMENT

ALL ENEMY MILITARY PERSONNEL AND VEHICLES TRANSPORTING THE ENEMY OR THEIR SUPPLIES MAY BE ENGAGED SUBJECT TO THE FOLLOWING RESTRICTIONS:

- A. WHEN POSSIBLE, THE ENEMY WILL BE WARNED FIRST AND ASKED TO SURRENDER.
- B. ARMED FORCE IS THE LAST RESORT.
- C. ARMED CIVILIANS WILL BE ENGAGED ONLY IN SELF-DEFENSE.
- D. CIVILIAN AIRCRAFT WILL NOT BE ENGAGED WITHOUT APPROVAL FROM DIVISION LEVEL EXCEPT IN SELF-DEFENSE.
- E. CIVILIANS SHOULD NOT BE HARMED UNLESS DOING SO IS NECESSARY TO SAVE U.S. LIVES, IF POSSIBLE, CIVILIANS SHOULD BE EVACUATED BEFORE ANY U.S. ATTACK.
- F. IF CIVILIANS ARE IN THE AREA, ARTILLERY, MORTARS, ARMED HELICOPTERS, AC-130S, TUBE-LAUNCHED OR ROCKET-LAUNCHED WEAPONS, AND TANK MAIN GUNS SHOULD NOT BE USED AGAINST KNOWN OR SUSPECTED TARGETS WITHOUT THE PERMISSION OF A GROUND MANEUVER COMMANDER, LTC OR HIGHER.
- G. IF CIVILIANS ARE IN THE AREA, ALL AIR ATTACKS MUST BE CONTROLLED BY A FAC OR FO.
- H. IF CIVILIANS ARE IN THE AREA, CLOSE AIR SUPPORT, WHITE PHOSPHORUS WEAPONS AND INCENDIARY WEAPONS ARE PROHIBITED WITHOUT APPROVAL FROM DIVISION LEVEL.
- I. IF CIVILIANS ARE IN THE AREA, INFANTRY SHOOTS ONLY AT KNOWN ENEMY LOCATIONS.
- J. PUBLIC WORKS SUCH AS POWER STATIONS, WATER TREATMENT PLANTS, DAMS, AND OTHER UTILITIES MAY NOT BE ENGAGED WITHOUT APPROVAL FROM DIVISION LEVEL.
- K. HOSPITALS, CHURCHES, SHRINES, SCHOOLS, MUSEUMS, AND OTHER HISTORICAL OR CULTURAL SITES WILL BE ENGAGED ONLY IN SELF-DEFENSE AGAINST FIRE FROM THESE LOCATIONS.
- L. ALL INDIRECT FIRE AND AIR ATTACKS MUST BE OBSERVED.
- M. PILOTS MUST BE BRIEFED FOR EACH MISSION AS TO THE LOCATION OF CIVILIANS AND FRIENDLY FORCES.

Figure C-1. Example of rules of engagement.

Credit: [GlobalSecurity.org](#)

Keep commercial RPO separate

- Conflating commercial satellite servicing with national security risks stifling the commercial industry
 - Commercial operators are extremely wary of the optics of being associated with the DOD
 - Negative implications for insurance, investment, and international markets
- Like air traffic, best to keep commercial RPO norms and standards separate from military activities and discussions
 - Space traffic “rules” should be for commercial/civil only
 - Military RPO should operate with “due regard” like military aircraft do



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Thank you. Questions?

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