

NATIONAL SECURITY SPACE FUNDAMENTALS

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Working Definitions

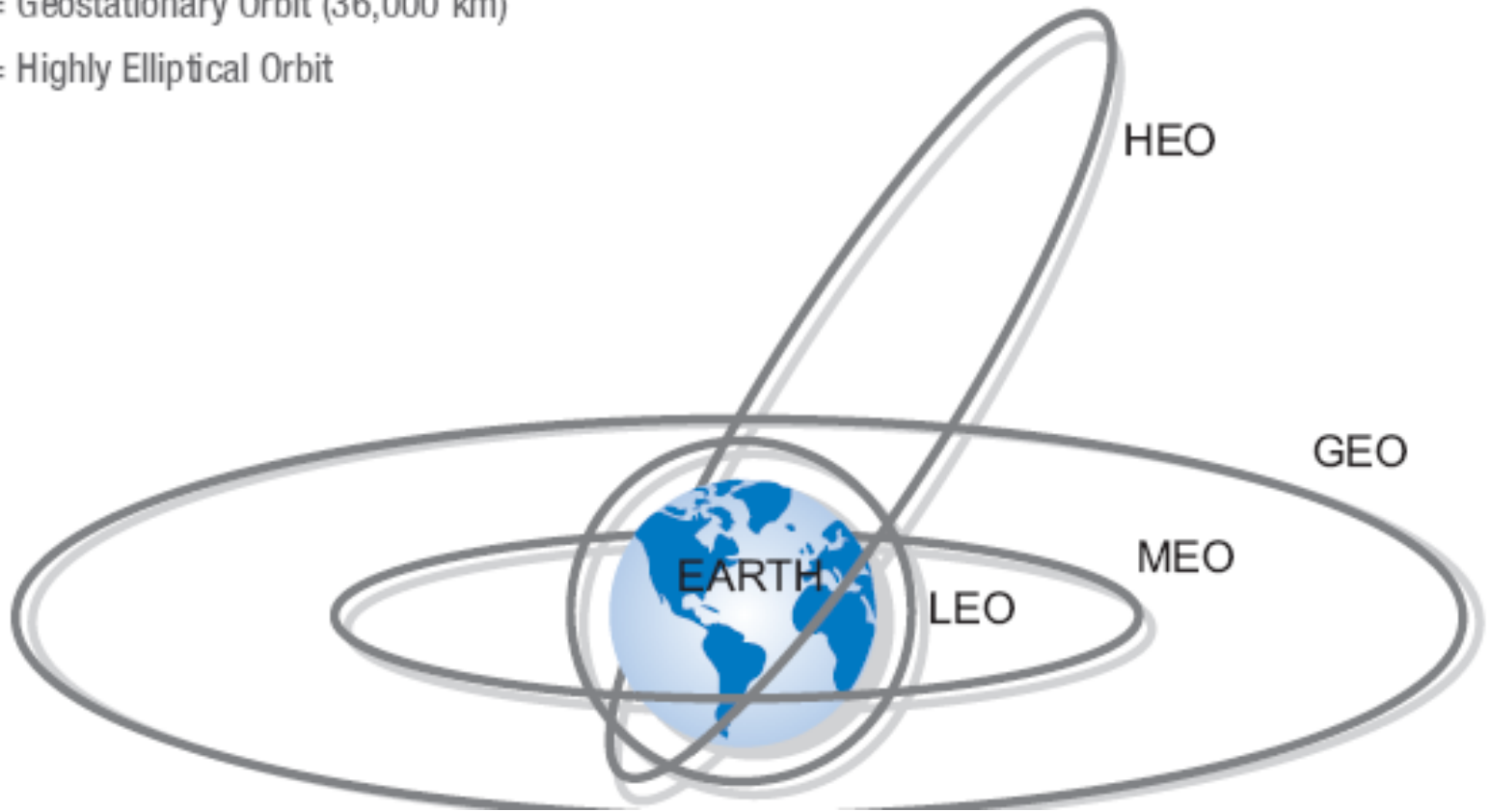
- ***Spacepower***: Spacepower is the ability in peace, crisis and war to exert prompt influence in, to and from space for the ends of policy (see below) using civil, commercial and national security space systems of the state and its allies.
- ***Policy***: Policy is the politically legitimate and agreed high-level overall plan that encompasses the general goals and acceptable procedures of a government and its bodies, departments and agencies. Policy is usually made at the highest political levels.
- ***Strategy***: Strategy, in the context of national security space, is the use made of satellites for the ends of policy (see above). Strategy is the bridge between policy objectives and military, operational, and technical feasibility. Strategy is the art of implementing policy.

Earth Orbits

MEO = Medium Earth Orbit (5,000-10,000 km)

GEO = Geostationary Orbit (36,000 km)

HEO = Highly Elliptical Orbit



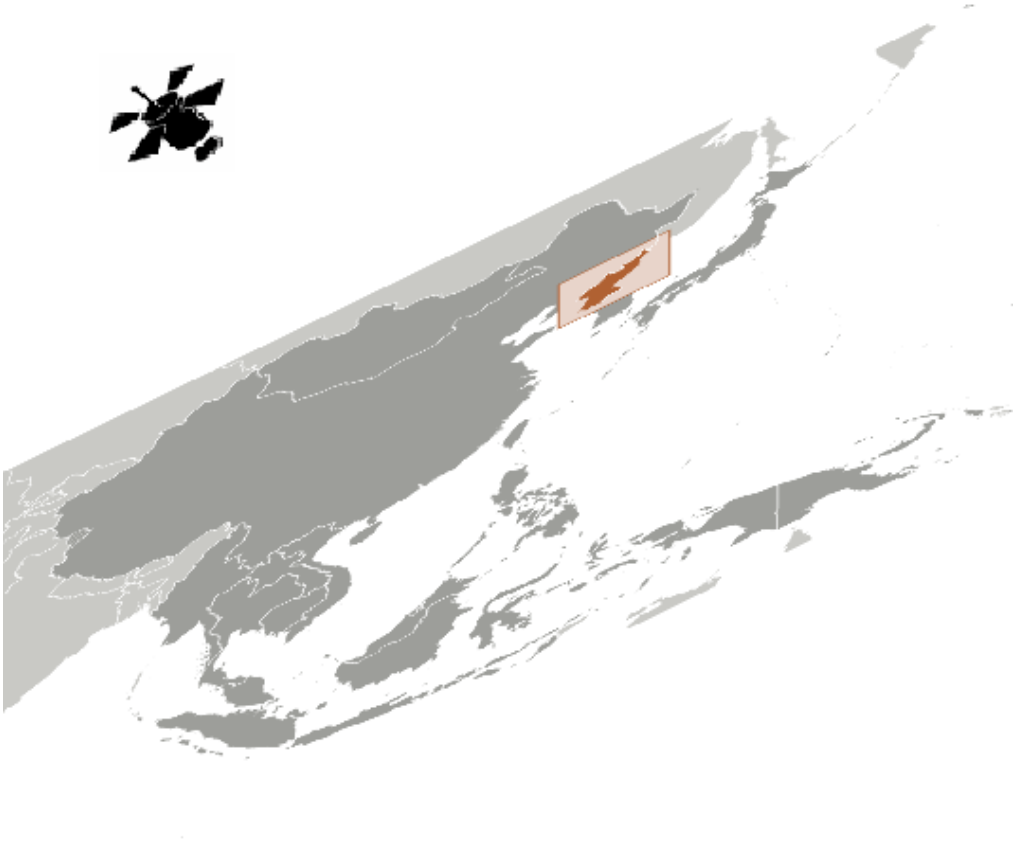
The Strategic Attributes of Spacepower: Perspective



The Strategic Attributes of Spacepower: Perspective

- The ability to see and communicate at great distances both within and from your borders.
- Perspective comes from wider view of Earth's surface.
- Strategic benefits of the high ground long recognized.

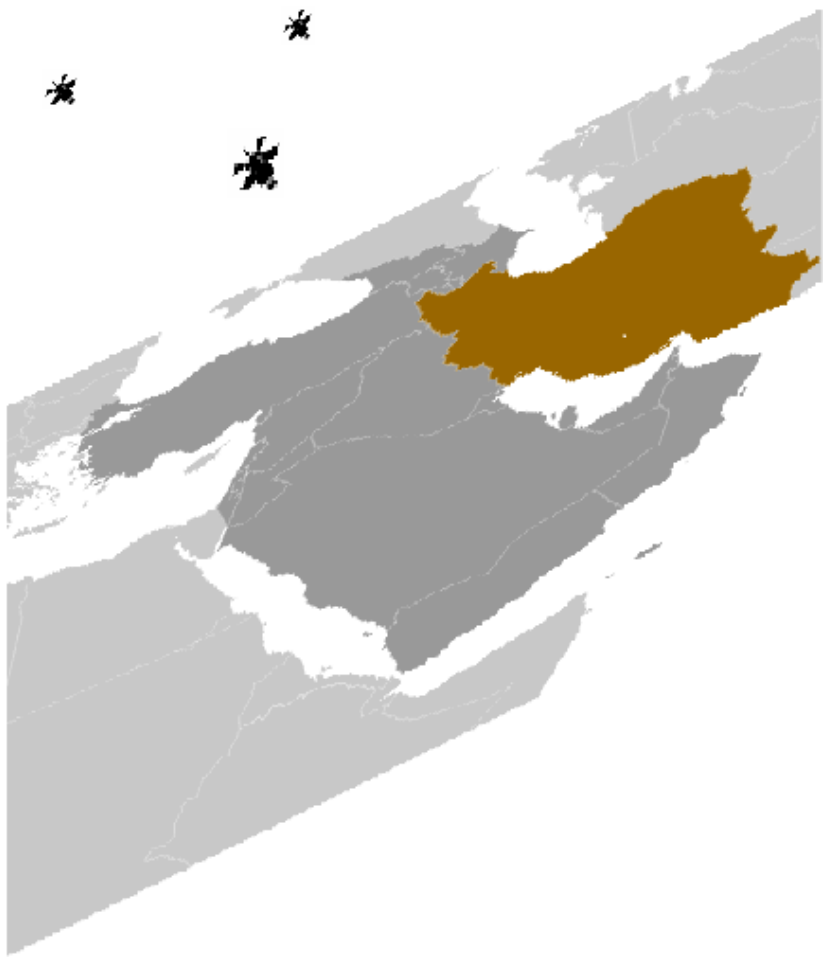
The Strategic Attributes of Spacepower: Global Access



The Strategic Attributes of Spacepower: Global Access

- Flows directly from Perspective.
- Orbital mechanics, Earth's rotation, & 1968 Outer Space Treaty legal regime combine to enable access from space to any point on Earth.
- Sovereignty cannot be claimed in space, but this has yet to be tested under duress.

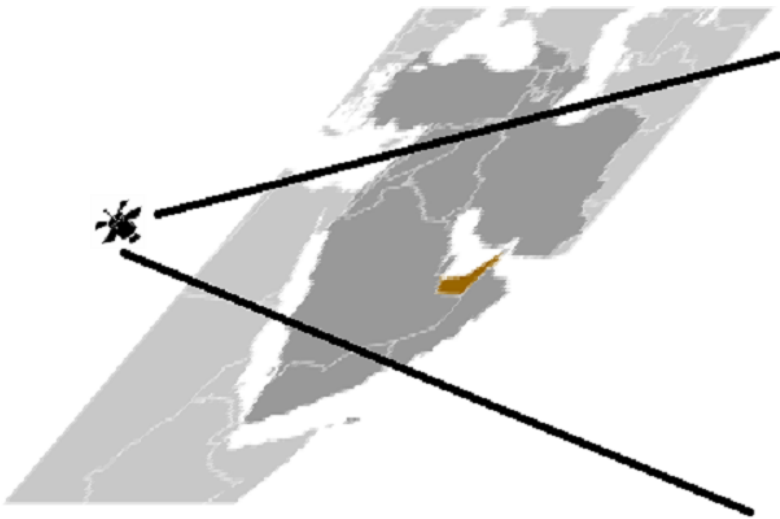
The Strategic Attributes of Spacepower: Global Presence



The Strategic Attributes of Spacepower: Global Presence

- Flows directly from Perspective & Access.
- Satellites in various orbits confer presence that sea and air power provide intermittently.
- Satellites are 'first on the scene'.
- Satellites provide a global 'eyes and ears' to those who possess them.

The Strategic Attributes of Spacepower: Strategic and Operational Depth



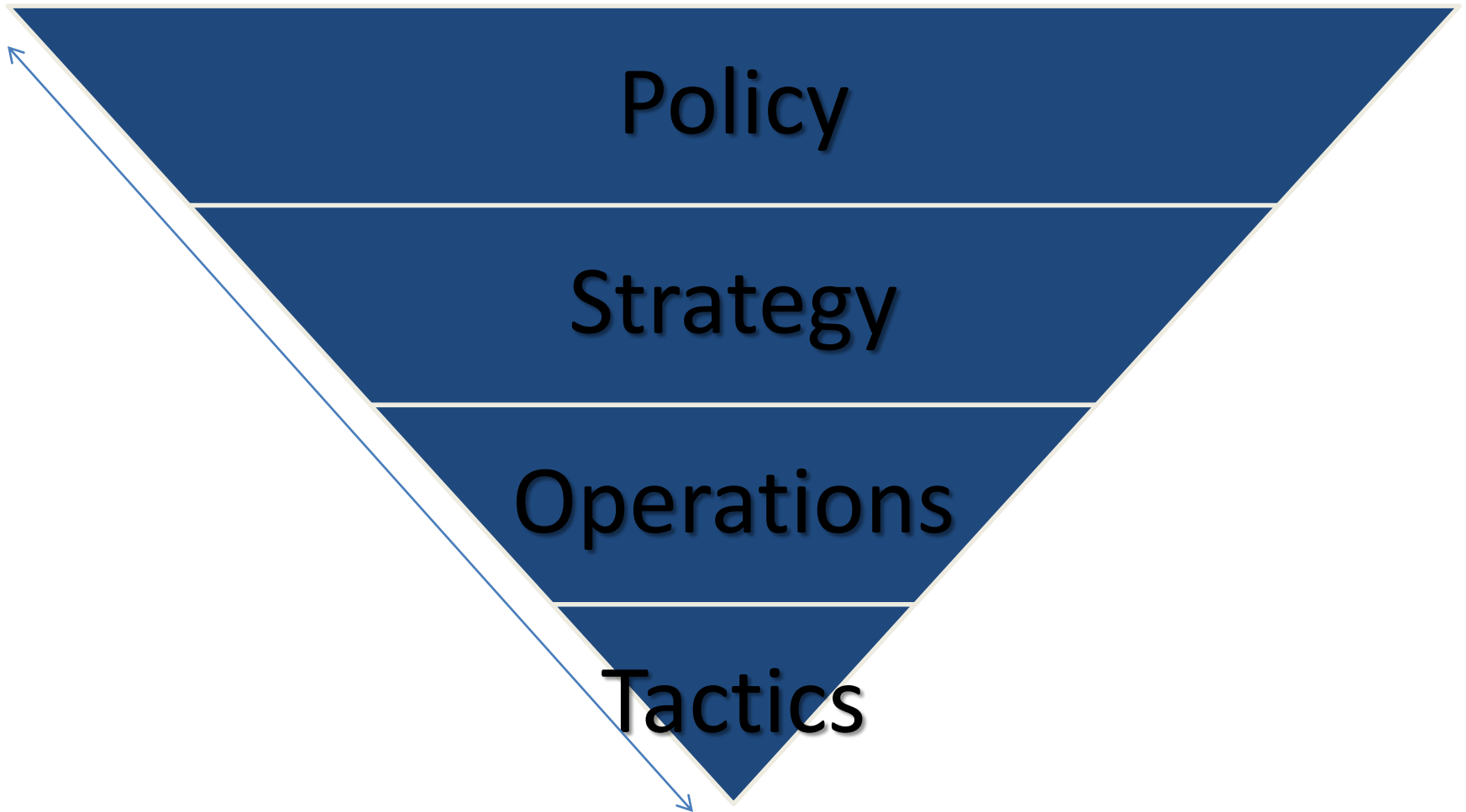
The Strategic Attributes of Spacepower: Strategic and Operational Depth

- Flows from previous three attributes.
- Space provides strategic and operational depth on vertical flank.
- This, in turn enhances horizontal strategic & operational depth.
- Trades physical space for time (preparation).
- Allows for qualitatively and quantitatively improved maneuver, contingency planning, and preparation.

The Strategic Attributes of Spacepower: Technical Attributes

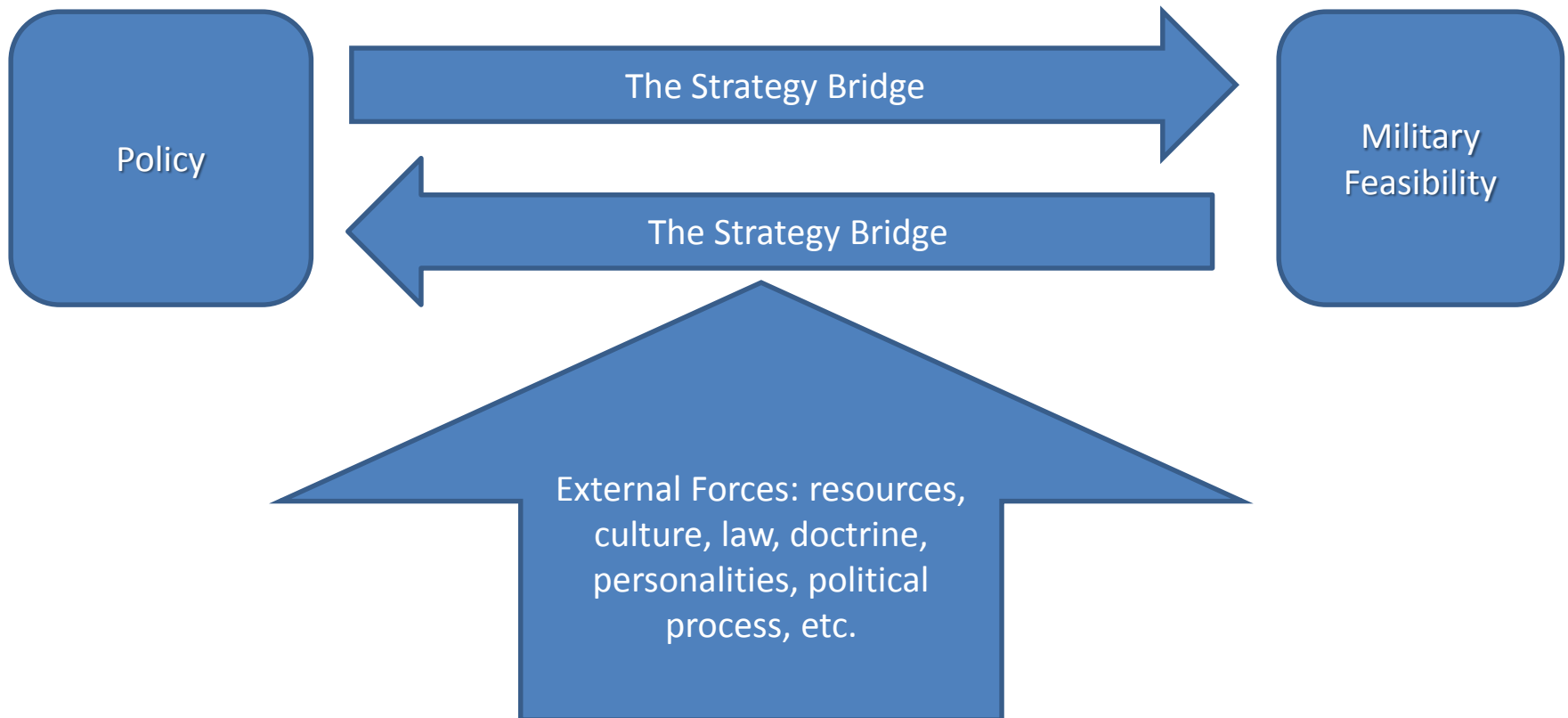
- Versatility: Satellites can be used for various functions – communications, PNT, strategic early warning, weather monitoring, damage assessment, surveillance, etc.
- Ubiquity: when linked to large constellations satellites can provide ubiquitous coverage.
- Continuity: Airplanes, ships, even unmanned systems need replenishment – satellites operate 24/7/365 for many years.

The Relationship Between Policy, Strategy and Spacepower: Policy



The Relationship Between Policy, Strategy and Spacepower: Strategy

The Strategy Bridge

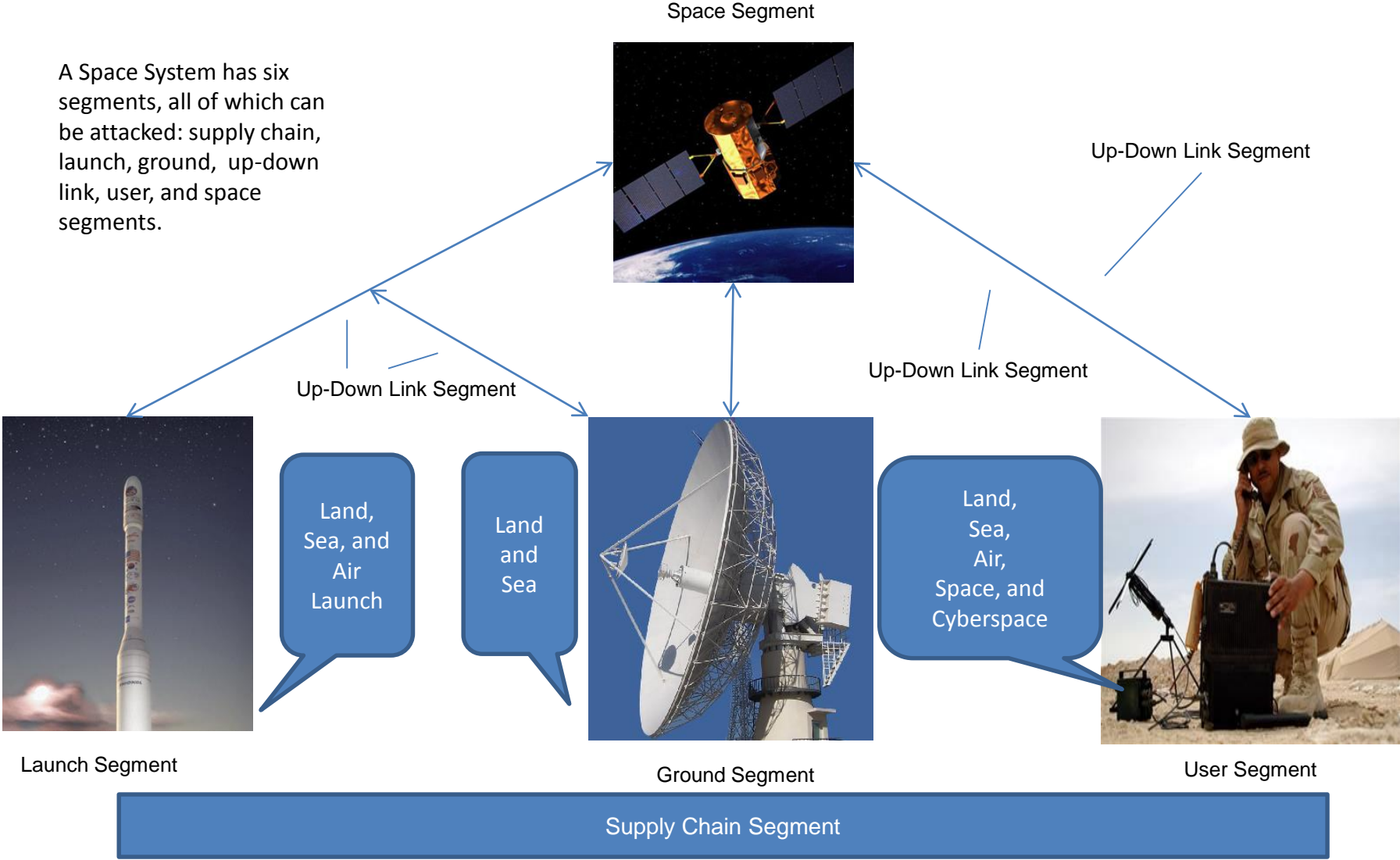


Satellite Applications for National Security

- Communications
- Intelligence, Surveillance and Reconnaissance (ISR)
- Positioning, Navigation and Timing (PNT)
- Environmental Monitoring
- Space Situational Awareness (SSA)

Space System Threats and Vulnerabilities

A Space System has six segments, all of which can be attacked: supply chain, launch, ground, up-down link, user, and space segments.



Space System Threats and Vulnerabilities

Kinetic Threats

- Conventional military forces
- Special Operations Forces
- Ballistic and cruise missiles
- Modified missile defenses
- Other satellites
- Space debris
- Anti-satellite (ASAT) weapons:
earth-to-space; space-to-space

Non-Kinetic Threats

- Radio-frequency jamming
- Spoofing
- Electromagnetic pulse (EMP)
weapons
- Satellite blockade
- Dazzling
- Cyber attacks against ground
segment, user segment, and/or
space segment

Discussion