



Space Strategies Center (SSC)

Space Warfare Estimation of Adversary Intent

Outer Space Warfare Theory, Doctrine,
Strategies & Tactics

- How to Fight and Win the Next Space War -

[Paul Szymanski](#)

President

Space Strategies Center
Albuquerque, New Mexico

National@Policy.Space

December 27, 2018

This is a Condensed Version
of This Brief – See Author for
Full Version

Outer Space Warfare
Space Control
Space Defense
Space Supremacy
Space Conflict Escalation

Disclaimer: This briefing reflects the viewpoints of the author only, and are not represented as official policy of any government or military organization.



Space Strategies Center Purpose

- **Develop Foundational Outer Space Warfare Theory, Doctrine, Strategies and Tactics that Enable Warfighters to Fight & Win the Next Space War**
 - ① **Based on Author's 42 Years Experience Developing Space Warfare Programs & Analyses, & 50 Years Studying Military History**
 - ② **Integrates Space Grand Strategies, Operational Strategies, & Tactics While Linking These to Terrestrial Warfare Courses of Action (COA's)**
 - ③ **Research Efforts Lead to More Timely & Comprehensive Space Battle Management**
 - ④ **Normalizes Space Battle Management to Reflect Terrestrial Warfighting Principles**

"The difficulty lays not so much in developing new ideas as in escaping from old ones."
(John Maynard Keynes)



Space Warfare Adversary Intent Estimation

- **Political / Military Adversary Intent**
 - The Most Difficult Intelligence Collection Mission, Yet Also the Most Important
 - Many Conflicts Have Started Due to Mis-Reading Adversary Intent
 - Intent Estimation Can Only be More Difficult With the Remoteness of Satellites From Earth's Space Surveillance Sensors, the Novelty of Space Warfare, and Lack of Extensive Previous Space Warfare Experiences
 - Intent From One Organization May Not Reflect the Intent From Country Senior Leadership
- **Space Warfare Intent Estimation Can be Categorized by:**
 - Strategic Intent
 - Operational Intent
 - Tactical Intent



Space Warfare Strategic Intent Examples (1)

- **Show Resolve and Willingness to Escalate Conflict**
 - Can Range From Reversible to Non-Reversible Effects on Satellites
 - Can Include or be Limited to Attacks on Space Systems' Terrestrial Support Elements
 - Can be Linked to Some Conflict on Earth that Has Nothing to Do With Space Systems
 - May be Threats Only (e.g., Maneuver Close to Adversary Satellite)
 - May Inspire Adversary to Counter Space Threats with Terrestrial Counter-Threats
- **Demonstrate One's Military Space Capabilities and Technological Superiority**
 - Sows Doubt in Adversary Planning
 - Gives Pause to Adversary's Action Timelines
 - May Inspire Your Adversary to Develop Future Counters
 - May Raise Terrestrial or Space [Conflict Escalation Ladder](#)



Space Warfare Strategic Intent Examples (2)

- **Show Support to Allies**
 - Demonstrating Willingness to Escalate Space Conflict Provides Solidarity with Current Allied Actions
- **Increases Status with Local Political Supporters**
 - May Energize Political Support Both In-Country and With Allied Populations
- **Force Internal Opponents to Come On-Board with Political / Military Objectives**
- **Show Displeasure with United Nations Sanctions and Prohibitions**
- **Energize and Inspire Own Military Forces and Industrial Base**
- **Demonstrate “Ownership” of Certain Regions of Orbital Space (e.g., Geosynchronous Belt Above Own Country)**



Space Warfare Strategic Intent Examples (3)

- **Change the Emphasis From Terrestrial to Space Warfare**
 - **Adversary May Perceive They are Better at Countering Adversaries in Space Rather than Terrestrial Warfare**
- **Attempt to Rebalance Worldwide Political Alliances by Defeating Major Space Players**
- **Make Certain Orbital Slots Unusable by the Western World Through Deliberate Debris or Radiation Generation**
- **Pre-Conflict, Have Very Visible, but Relatively Harmless, Space Control Development Programs, While the Real Space Weapon Systems are Covertly Developed.**



Space Warfare Strategic Intent Examples (4)

- **Adversary Threats and Actions in Space May Only be to Influence Space Control Agreements and Treaties**
- **Make a Lot of Noise About a Major Space Weapons Development Program that Ultimately is Never Built and Deployed, to Inspire Your Adversaries' to Waste Time and Resources Trying to Counter It.**
- **Attacks in Space May Only Serve to Redirect Public Opinion From Terrestrial Conflicts**
- **The Purpose of Space Attacks That are Very Dramatic and Complete in Their Destruction May be to Shock and Awe Their Adversaries, and Influence Them to Make Hasty, But Ill-Informed, Decisions in Response.**



Space Warfare Operational Intent Examples (1)

- **Types of Operational Space Attacks:**
 - Decapitation of Command Authorities (Anti-BMC³)
 - Deny Visibility of Terrestrial Battlefield From Space
 - Deny Positioning/Timing Information to Terrestrial Forces
 - Deny Weather Information to Terrestrial Forces
 - Deny Missile Warning Information to Terrestrial Forces
 - Spoof Perceptions of Actual Terrestrial and/or Space Events
- **Provide a “Loud” Demonstration Attack in One Orbital Location to Draw Attention Away From the Main Attack Axis Occurring Elsewhere**
- **Employ Multiple Attack Points of Application to Confuse Adversary Perceptions of Your Actual Plans**



Space Warfare Operational Intent Examples (2)

- Isolate One Portion of the Terrestrial Battlefield From Space Support
- Isolate One Portion of the Space Battlefield From Space Actions and Support
 - Isolate One Space Defense Region (SDR) From Adversary Space Activities (Including Surveillance) for a Given Time Period
- Use of Certain Types of Space Weapon Systems That First Isolate an Adversary's Satellites From Terrestrial Control, and Thus Fixes the Target Into Inaction, Until More Effective, But Possibly Slower Responding, Space Weapons Can be Made to Bear on the Target
- Probing / Testing of Potential Adversary Space Defenses to Determine His Intentions, Plans, Doctrine, Strategies and Tactics
- Defending and Holding the High Ground of Space (Centers of Gravity and Choke Points) to Exclude Adversary Use, Thus Frustrating His War Aims In Space



Space Warfare Operational Intent Examples (3)

- **Intent to Conduct Surprise Attacks**
 - Employ Orbits (Such as Highly Eccentric) That Make It Difficult to Track Threatening Space Objects and Enable Surprise Attacks (See [Missing Satellites](#))
 - Conduct Multiple Fake Space System Maneuvers (and Terrestrial Mobility Re-deployments) to Draw Away an Adversary's Space Systems From the Main Point of Attack
 - Conduct Covert information Dominance Attacks to Confuse Your Adversary and Inspire Him to Lose Confidence in His Space Systems
 - Start Maneuvering Specific Space Assets as Decoys to Draw Attention Away From Covert Assets That Are Preparing for Separate Attacks
 - Constantly Maneuvering Towards Your Adversaries' Space Assets as if to Attack, But Then Not Attacking, Will Confuse Him and Also Mask Your Real Attacks
 - If Your Weapons Appear to be Particularly Effective Against Their Assigned Targets, Then These Targets May be Simply Baits or Decoys From Your Adversaries



Space Warfare Operational Intent Examples (4)

- **Employing Multiple Phenomenologies of Space Weapon Systems Against the Same Target to Foil Defense Measures and Increase Probability of Kill (Pk)**
- **Attack Space Targets With Multiple Anti-Satellites (ASAT's) Coming From Multiple Directions**
- **You May Sacrifice Low-Value or Aging Satellite Systems for the Sole Purpose of Confusing Your Adversaries Through Meaningless Attacks**
- **Demoralizing Your Adversaries' Operational Space Forces Can Lead to Their Divided Efforts and Leadership**
- **Deploy Space Systems In Unusual Orbits to Confuse Your Adversary as to Their True Missions and Purpose.**



Space Warfare Tactical Intent Examples (1)

- **Reconnaissance of Targeted Satellite (RPO)**
 - Antennae Characteristics and Frequencies
 - Sensor Aperture Sizes, Types and Shutters
 - Solar Panel Type, Size and Power
 - Maneuvering / Attitude Change Capabilities
 - Assessed Satellite Lifetime Left
 - Self-Defense Capabilities and Reaction Timelines
 - Covert War-Reserve Modes and Subsystems (Hidden Doors)
 - Spacecraft Bus and Radiator Material Types
 - Vulnerability Assessments
 - Threat Assessments
 - Detection of Hidden Escort Satellites



Space Warfare Tactical Intent Examples (2)

- **Probing of Targeted Satellite**
 - Physical Response to Visiting Space Object (VSO)
 - Response to RF / Laser Injections
- **ASAT Actions**
 - Insert Cyber Code
 - Attach Space Mine
 - “Paint” Sensors (Including Earth Limb and Star Sensors), Solar Panels, Radiators, Antennae
 - “Tilt” or Attach Weights to Unbalance Satellite
 - Force Maneuver of Satellite Outside Normal Orbital Bounds
 - Drill, Cut, Bend, Mask, etc. Satellite Appendages
- **Intent May be Determined by How VSO Approaches Target Satellite (See [Assessment](#))**



Space Warfare Tactical Intent Examples (3)

- **Intent to Conduct Surprise Attacks**
 - **Attacking a Space Target From the Direction Where the Satellite's Self-Defense Sensors are Pointing Towards the Sun, Moon, Earth, or Earth Limb, in Order to Blind Him (Similar to "[Hun In the Sun](#)" Attack for WWI Aircraft)**
 - **Attacking a Space Target When it is Out of Range of an Adversary's Tracking, Telemetry and Control Stations, In Addition to Not Being Within a Sensor Envelope of His Space Surveillance Assets**
 - **Employing Low-Observables Spacecraft for Close Approaches of Targeted Satellites**
 - **Attacking Satellite “Acting” Like Harmless Commercial Satellite or Space Debris**



Additional Discussions

- Additional, More Detailed Strategic, Operational and Tactical Intent Examples Can be Viewed at:
 - [Sun Tzu's Teachings Applicability to Outer Space Warfare.xlsx](#)
- Close Approaches of Space Objects is a Normal Result of Natural Orbital Dynamics (See [Natural Close Approaches](#))
- Intelligence Indicators for Each of These Listed Intents Can be Developed Through Tasking From Interested Parties



BACKUP

**“It is not the object of war to annihilate those who have given provocation for it, but to cause them to mend their ways.”
- Polybius, History (2nd century B.C.) -**



BMC2 Support to Space Warfighters During Levels of War Phases

*“Why, you may take the most gallant
sailor, the most intrepid airman, or the
most audacious soldier, put them at a
table together and what do you get? The
sum of their fears.”
(Churchill)*



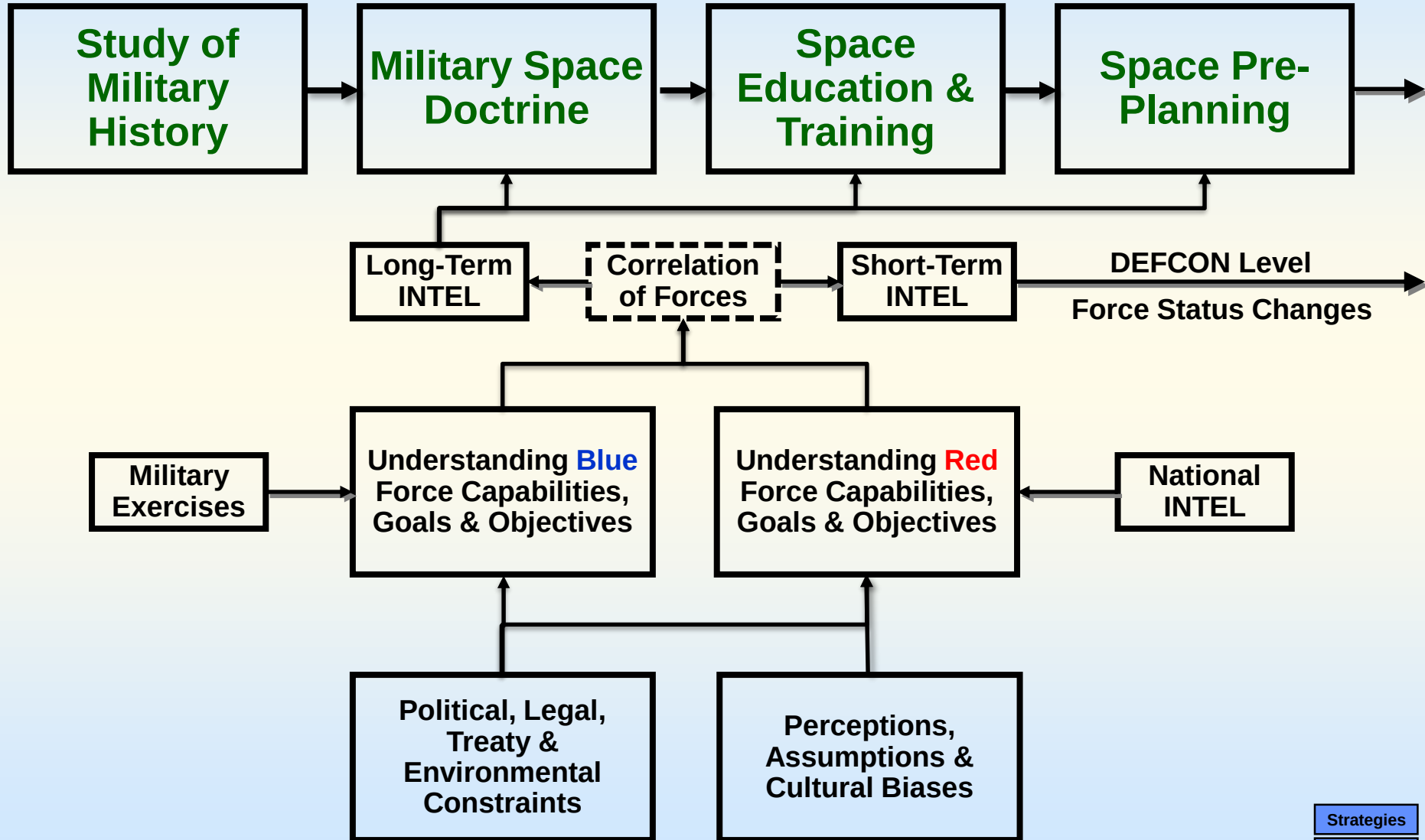
Fundamental Levels of War



Concepts From Terrestrial Warfare Can be Applied to Space Warfare

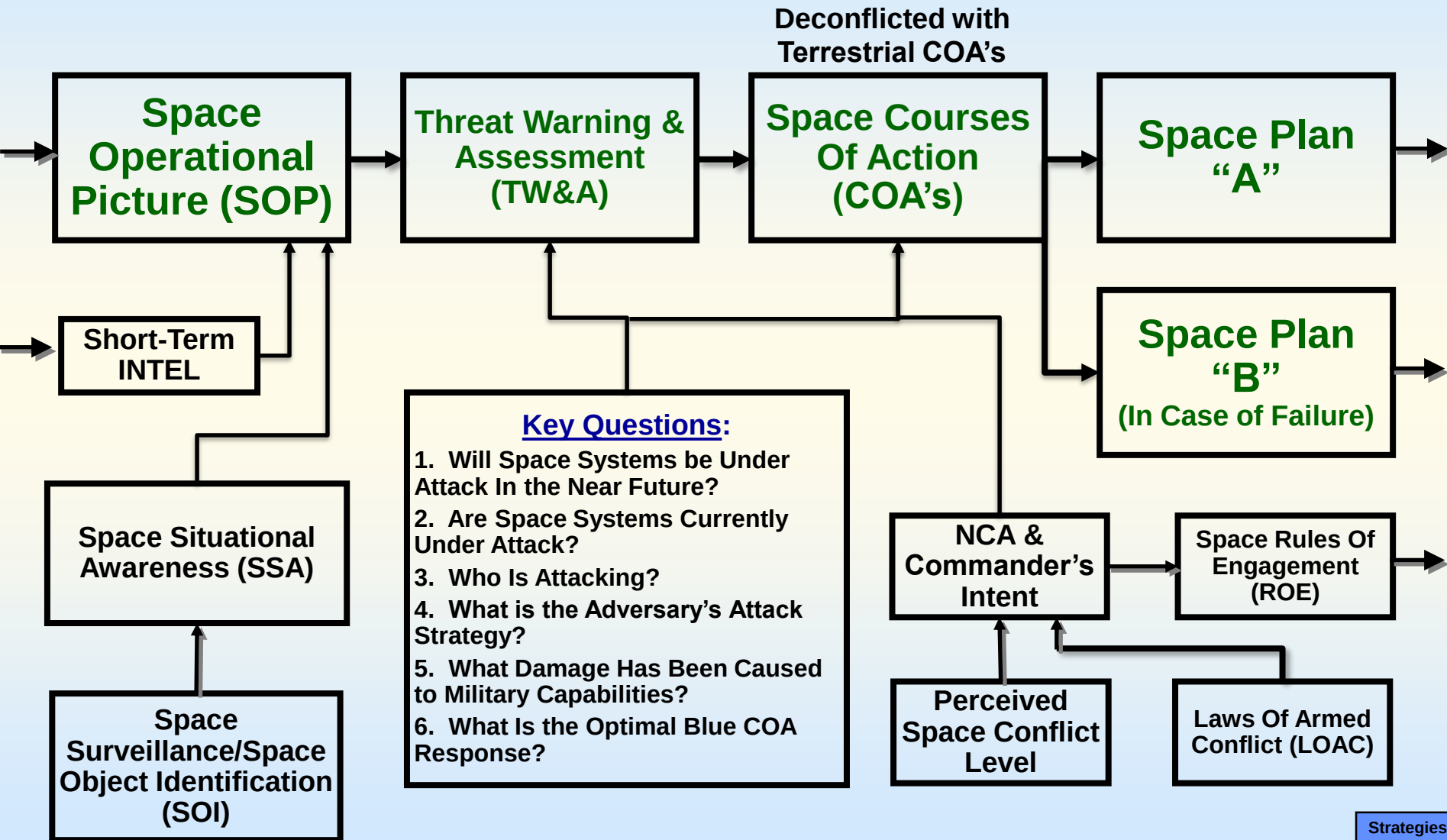


Space Grand Strategy



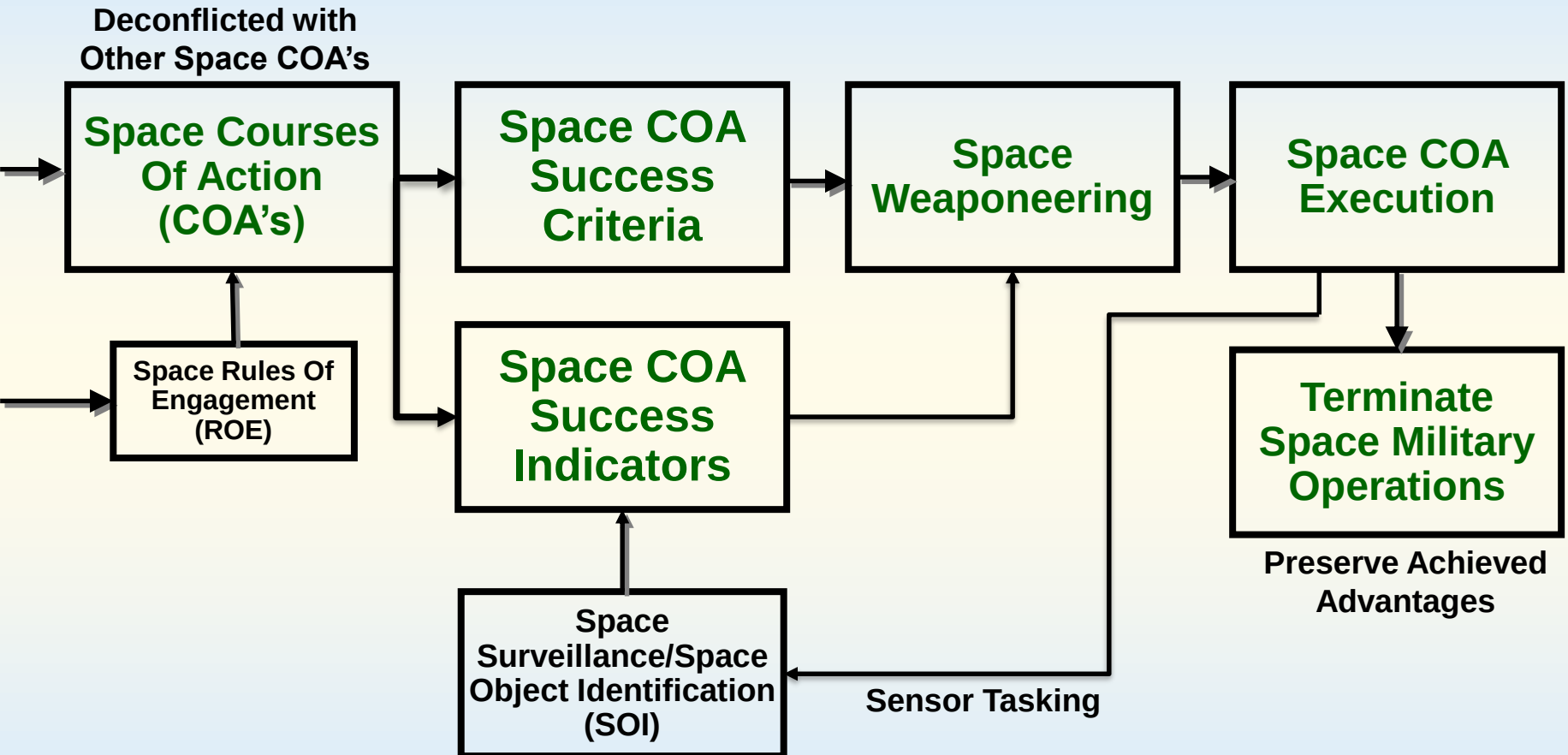


Space Operational Level



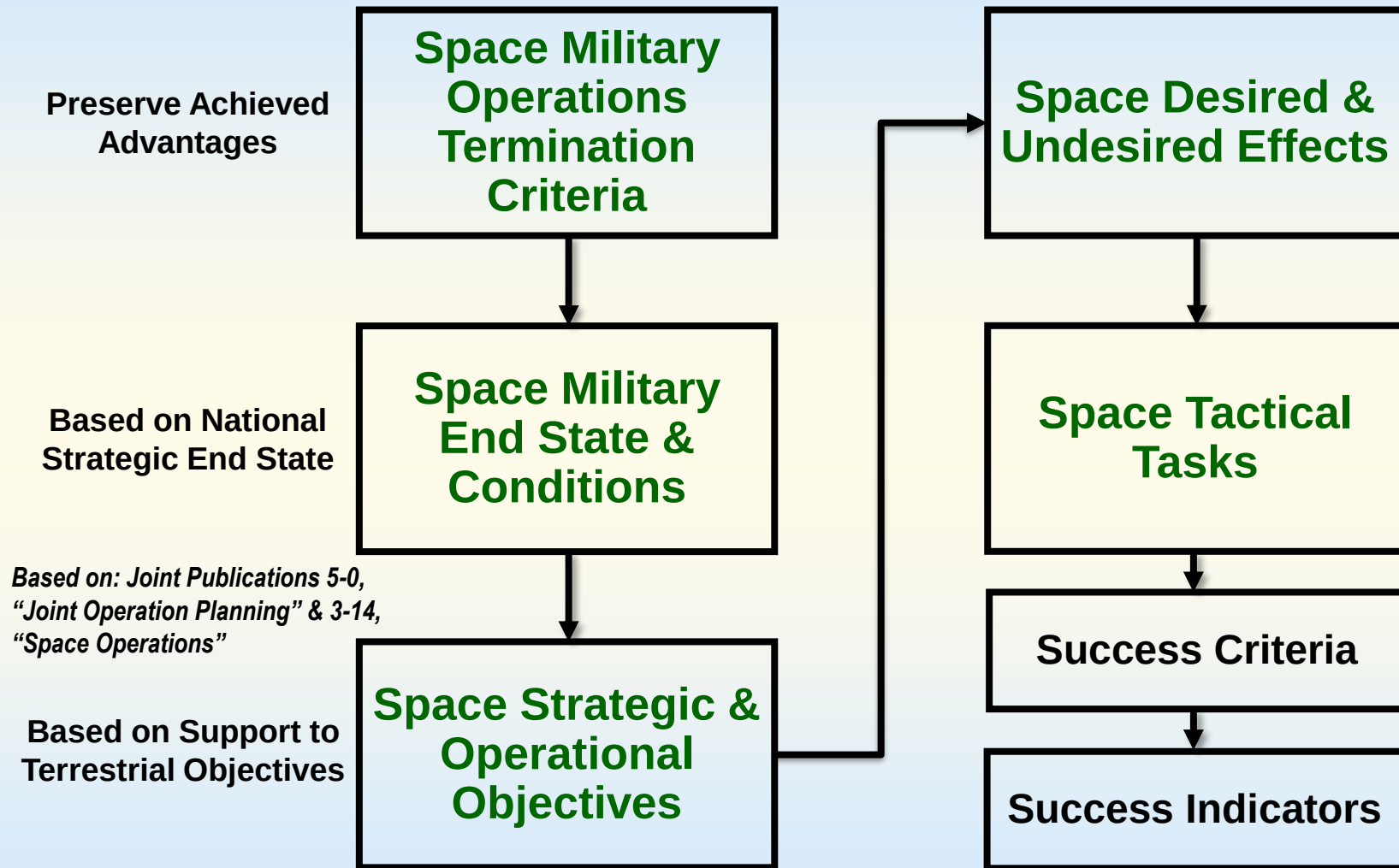


Space Tactical Level





Space Operational Art & Design



Space Objectives Primarily Support Terrestrial Military Operations, Though a Space War May Erupt Solely on Its Own & Have Its Own Objectives.



Space Operational Art & Design

- Fundamental Elements -

- Space Centers of Gravity (COG)
- Space Decisive Points
- Lines of Operation (LOO) – Linkage of Actions Against Nodes & Decisive Points With Objectives
- Lines of Effort (LOE)) – Linkage of Tasks & Missions to Cause & Effects
- Direct / Indirect Approach
- Expect Unexpected
- Operational Reach (Distance & Duration)
- Culmination (Change in Force Exchange Ratios)
- Simultaneous vs Sequential Operations
 - Simultaneity & Depth Across Multiple Domains
 - Timing & Tempo
- Effects Against Either Adversary Forces or Functions
- Flexible Deterrent Options (FDO's) to Show Resolve & Intent

Concepts Derived From Joint Publication 3-14 “Space Operations”



Space Escalation Ladder

WBS	Conflict Phase	Terrestrial Campaign Phase	Space Campaign Phase	Weapon Type	Space Campaign Phase Full Name	Weapon Category
P.1.A.0	Pre-Conflict	Phase 0: Pre-War Buildup (Shape)	1st Wave Attacks Phase A	Pre-Conflict Deter	1st Wave Attacks Phase A - Pre-Conflict Deter	Overt Weapons Testing & Deployment; Treaties; Saber Rattling; Space Alliances; Normal Space Surveillance, Tracking & Reconnaissance Activities; Satellite Close Inspectors
P.1.B.0	Pre-Conflict	Phase 0: Pre-War Buildup (Shape)	1st Wave Attacks Phase B	Persuade; Spying; Propaganda; Avoidance Maneuvering; Increased Space Surveillance & Close Satellite Inspections	1st Wave Attacks Phase B - Pre-Conflict Persuade	Diplomatic Requests & Démarches; Economic Actions; Embargos; Legal Actions; Administrative Actions; Transmitting Propaganda Broadcasts; Jamming Propaganda Broadcasts; Increased Spying & Surveillance; Unusual Increases in Space Surveillance and Tracking Activities; Threaten Allies of Your Adversaries; Maneuver to Avoid Attacks
P.1.C.0	Pre-Conflict Crisis	Phase 0: Pre-War Buildup (Shape)	1st Wave Attacks Phase C	Hide; Covert; Cyber; Political Disruptions; Mobilize Forces; Increase Military Alert Level; Threatening Satellite Maneuvers; Increase Space Radiation; Initiate Satellite Defensive Measures; Employ Nation's Astronauts on International Space Station for Military Uses	1st Wave Attacks Phase C - Pre-Conflict Hide	Camouflage; Stop Activities; Mobility; Covert Technology Developments; Small Covert SOF Attacks; Cyber Attacks; Covert Actions in Violation of International Treaties; Cutoff Diplomatic Relations; Inspire Social Disruptions and Agitation; Employ Lethal Force Against Your Own Citizens; Mobilize Forces; Increase Military Alert Level (DEFCON); Maneuver Close Enough to Adversary Satellites to Purposely Appear as a Threat; Reveal Covert Programs to Appear Threatening; Enter Into War-Reserve Modes (Hide) for Critical Satellites; Hide Senior Leadership; Increase Radiation Environment in Orbits Used by Adversaries; Initiate Satellite Defensive Measures; Employ Nation's Astronauts on International Space Station for Military Reconnaissance and Surveillance; Spoof and Falsify World-Wide Distribution of Satellite Location Orbital Tracking Data
P.2.A.0	Trans-Conflict	Phase I: Deployment / Deterrence (Deter)	2nd Wave Attacks	Trans-Conflict Deter	2nd Wave Attacks - Trans-Conflict Deter	Provocative but False Attacks; Linked Attacks; Demo Attacks; Alternate Country Attacks; Blockades; Major Covert SOF Attacks; Terrorist Attacks; Summarily Execute Saboteurs; Seize & Sequester Suspected Terrorists; Alert Anti-Satellite Systems; Arm Satellite Self-Defense Mechanisms; Alert Anti-Missile Defenses; Alert Anti-Aircraft Defenses; Arm Allied Astronauts on International Space Station

Space Actions May Be Conducted Pre-Conflict

Strategies

Operational

Tactical



Space Escalation Ladder (Cont.)

WBS	Conflict Phase	Terrestrial Campaign Phase	Space Campaign Phase	Weapon Type	Space Campaign Phase Full Name	Weapon Category
P.3.A.1	Trans-Conflict	Phase II: Halt Incursion (Seize Initiative)	3rd Wave Attacks Phase A1 – Gnd Based	From Terrestrial Partial Temporary Kill	3rd Wave Attacks Phase A1 – Terrestrial-to-Space Partial Temporary Effects	Delay, Deny, Covertly Assassinate Adversary Diplomatic Ambassador
P.3.A.2	Trans-Conflict	Phase II: Halt Incursion (Seize Initiative)	3rd Wave Attacks Phase A2 – Gnd Based	From Terrestrial Total Temporary Kill	3rd Wave Attacks Phase A2 – Terrestrial-to-Space Total Temporary Effects	Disrupt
P.3.B.1	Trans-Conflict	Phase III: Air Counter-Offensive (Dominate)	3rd Wave Attacks Phase B1 – Space Based	From Space Partial Temporary Kill	3rd Wave Attacks Phase B1 – Space-to-Space Partial Temporary Effects	Delay, Deny
P.3.B.2	Trans-Conflict	Phase III: Air Counter-Offensive (Dominate)	3rd Wave Attacks Phase B2 – Space Based	From Space Total Temporary Kill	3rd Wave Attacks Phase B2 – Space-to-Space Total Temporary Effects	Disrupt
P.4.A.1	Trans-Conflict	Phase IV: Joint Counter-Offensive to Restore Friendly Pre-Conflict Status (Stabilize Borders)	4th Wave Attacks Phase A1 – Gnd Based	From Terrestrial Partial Permanent Kill	4th Wave Attacks Phase A1 – Terrestrial-to-Space Partial Permanent Kill	Degrade
P.4.A.2	Trans-Conflict	Phase IV: Joint Counter-Offensive to Restore Friendly Pre-Conflict Status (Stabilize Borders)	4th Wave Attacks Phase A2 – Gnd Based	From Terrestrial Total Permanent Kill	4th Wave Attacks Phase A2 – Terrestrial-to-Space Total Permanent Kill	Destroy
P.4.B.1	Trans-Conflict	Phase V: Joint Counter-Offensive to Capture Adversary Capitol (Enable New	4th Wave Attacks Phase B1 – Space Based	From Space Partial Permanent Kill	4th Wave Attacks Phase B1 – Space-to-Space Partial Permanent Kill	Degrade
P.4.B.2	Trans-Conflict	Phase V: Joint Counter-Offensive to Capture Adversary Capitol (Enable New	4th Wave Attacks Phase B2 – Space Based	From Space Total Permanent Kill	4th Wave Attacks Phase B2 – Space-to-Space Total Permanent Kill	Destroy
P.5.A.0	Trans-Conflict	Phase VI: Defend Against Adversary Counter-Attacks Against Friendly Homeland (Defend Friendly Citizens)	5th Wave Attacks	Space-Manned Permanent Kill: Kill Adversary Astronauts	5th Wave Attacks - Space-Manned Permanent Kill	Degrade, Destroy: Kill Adversary Astronauts on International Space Station
P.6.A.0	Trans-Conflict	Phase VI: Defend Against Adversary Counter-Attacks Against Friendly Homeland (Defend Friendly Citizens)	6th Wave Attacks	Space-to-Earth Permanent Kill	6th Wave Attacks - Space-to-Earth Permanent Kill	Degrade, Destroy
P.7.A.0	Trans-Conflict	Phase VII: Defend Against Adversary Use of Nuclear Weapons in Space (Defend Friendly Military)	7th Wave Attacks	NBC Use - Space	7th Wave Attacks - NBC Use - Space	Degrade, Destroy
P.8.A.0	Trans-Conflict	Phase VIII: Defend Against Adversary Use of NBC Against Friendly Military Targets (Defend Friendly Military)	8th Wave Attacks; Phase A – Military Targets	NBC Use - Space & Terrestrial	8th Wave Attacks Phase A – NBC Use - Space & Terrestrial - Military Targets	Degrade, Destroy
P.8.B.0	Trans-Conflict	Phase IX: Defend Against Adversary Use of NBC Against All Friendly Targets (Defend Friendly Military & Civilians)	8th Wave Attacks; Phase B – Civilian Targets	NBC Use - Space & Terrestrial	8th Wave Attacks Phase B – NBC Use - Space & Terrestrial - Civilian Targets	Degrade, Destroy
P.9.A.0	Post-Conflict	Phase X: Post-Hostilities (Reconstruction & Stabilization)	9th Wave Attacks	Post-Conflict Deter	9th Wave Attacks - Post-Conflict Deter	Diplomatic Requests; Economic Actions; Legal Actions; Administrative Actions; Jamming Propaganda Broadcasts

Space Provides Finer Gradations & Thus Better Control During Conflict Escalation

Strategies

Operational

Tactical



Example Space Centers of Gravity

Launch corridors
GEO belt sectors
Sun-Synchronous LEO orbits
GEO satellites changing orbital position
Space-related command centers / commanders / INTEL Centers
Space surveillance systems
Space technicians / scientists
Electric grid serving ground space facilities
Space design and manufacturing facilities
Leader's confidence in their new space technologies
Blue and Red side political will to start and continue a space war
Space-related decision cycle times (OODA loops)
Low delta-v/transit time points in space to reach High Value Targets
Points in space with high/low coverage from space surveillance assets
Regions of space and time with advantageous solar phase angles
Times of high solar storm activity
On-orbit spares or launch replenishment or ability to reconstitute space capability with terrestrial systems
Antipodal nodes 180 degrees from launch sites around the world
Manned launch (Shuttle, Space Station) of satellites
Initial satellite checkout after launch or orbital insertion
Periods of solar eclipse / low battery charge for satellites
Approach trajectories outside the field of regard of the target's on-board sensors
Approach trajectories when the Sun/Moon/Earth is in the background of a target's sensors
Approach trajectories outside normally employed orbits
Near a satellite's thrusters
Near a satellite's high power antennas
Just after loss of contact with adversary satellite ground controllers / space surveillance assets

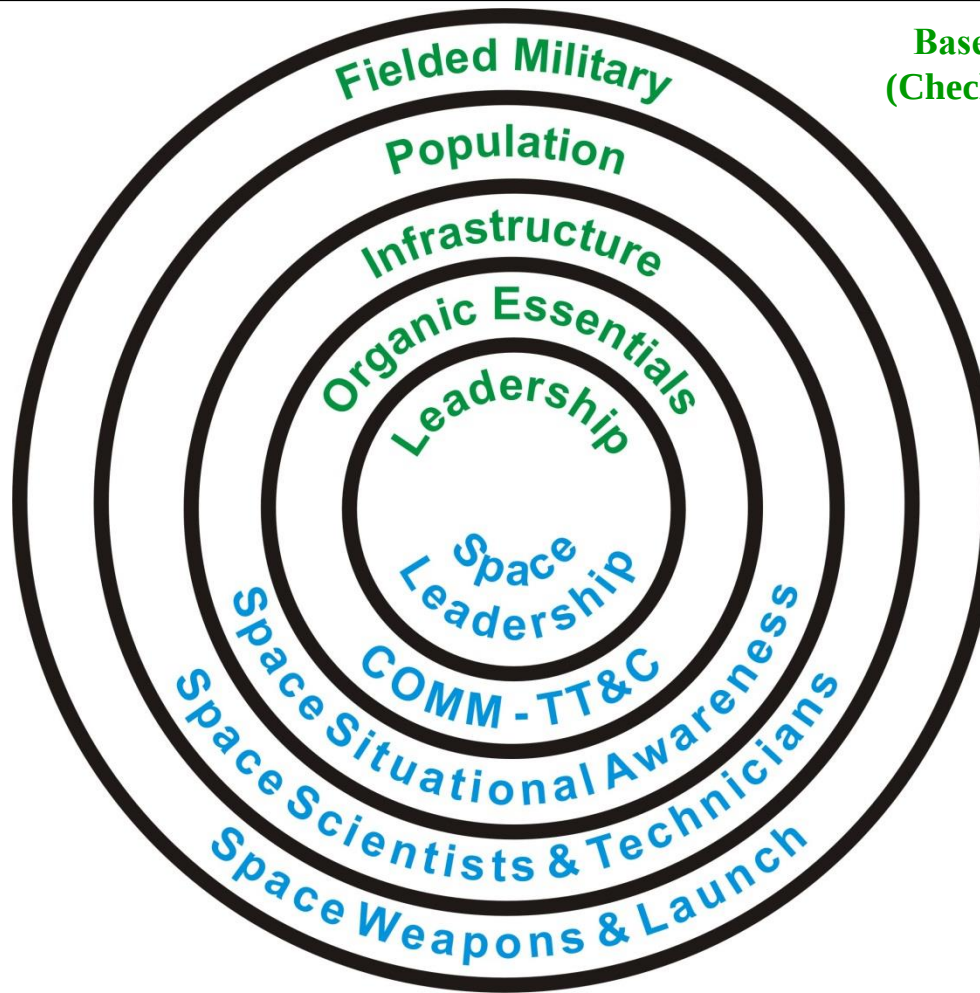
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SWAT Has Extensive Space Centers of Gravity Checklists



Space Centers of Gravity Model

Based On Col John Warden's
(Checkmate) 5-Ring COG Model



Space Equivalent
5-Ring COG Model

Space Systems Strategic Targeting Is Similar to Terrestrial Targeting Strategies



Example Space Objectives

⋮ ← 5,000 Other Space Objectives

	Blind Blue capabilities to observe the terrestrial battlefield
	Blind Blue capabilities to observe space from terrestrial sensors
	Blind Blue capabilities to observe space from space-based sensors
	Spoof Blue capabilities to observe the battlefield
	Deny Blue ability to launch new satellites
→	Destroy some Blue space capability as a warning to Gray space systems support to Blue
	Wear down Blue Defensive Counter-Space capabilities by instigating multiple false alarm attacks
→	Attack Blue satellites before the start of the terrestrial conflict
→	Spoof Blue perceptions of Red space strengths
→	Conduct diplomatic offensive to restrict Blue ability to employ ASAT's
→	Actively defend key launch corridors and orbits critical to Red conduct of war
	Preposition Red space assets to maximize their effectiveness at the start of the conflict
→	Disrupt Blue command and control capabilities for space systems
→	Embargo Blue access to space systems
→	Prevent Blue ability to service or re-fuel on-orbit satellites
→	Develop propaganda campaign against Blue use of ASAT's
	Shape and delay Blue plans for space warfare
	Deny Blue ability to achieve Space Situational Awareness
	Disrupt Blue space attacks so they become uncoordinated
→	Constantly shift points of application of space control weapons to confuse adversary response
	Herd Blue space communications paths to those that are more easily monitored by Red SIGINT assets
	Attack key Blue space personnel and technicians
	Disperse Red assets (maneuver satellites) just before launching first attack

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SWAT Has Space Objectives for Both Red & Blue Sides

Strategies

Operational

Tactical



Example Space COA Indicators



Are a small number of Blue and Gray satellites experiencing anomalies over a long time period

Are a small number of Blue and Gray satellites losing contact with terrestrial controllers

Are a small number of new Red satellites appearing in orbit



Are a small number of Red satellites changing orientation

Are a small number of Red satellites changing shape

Are a small number of Red satellites changing thermal signatures



Are a small number of Red satellites concentrating towards potential Blue and Gray satellites

Are Red ASAT forces appearing to line up in a sequence of timed attacks against Blue and Gray assets

Are Red forces capable of attacking space-related terrestrial sites in Blue countries appearing to line up in a sequence of timed attacks

Are Red SIGINT assets appearing to line up in a sequence of timed operations against Blue and Gray Communications assets



Are there indications of Red aircraft activities that appear to concentrate on space-related terrestrial sites around the world

Are there indications of Red missile activities that appear to concentrate on space-related terrestrial sites around the world

Are there a small number of new satellite launches from Red facilities

Many Insignificant Space Indicators May Add Up to Predicting a Major Attack



Example INTEL Indicators

1.2.5.1.5.21	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Wear On Roads at Sites
1.2.5.1.5.22	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Improved / New Roads at Sites
1.2.5.1.5.23	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Improved / New Parking at Sites
1.2.5.1.5.24	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Improved / New Railroad Tracks at Sites
1.2.5.1.5.25	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Improved / New Railroad Sidings at Sites
1.2.5.1.5.26	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Disturbed Vegetation / Soil at Sites
1.2.5.1.5.27	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Different Communications Patterns To / From Sites
1.2.5.1.5.27.1	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Communications Traffic To / From Sites
1.2.5.1.5.27.2	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Decreased (More Attempts to Hide) Communications Traffic To / From Sites
1.2.5.1.5.27.3	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers No Net Increase or Decrease of Communications Traffic To / From Sites, But Changed Patterns
1.2.5.1.5.27.4	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Encrypted Communications Traffic To / From Sites
1.2.5.1.5.28	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Hours / New Shifts for Personnel at Sites
1.2.5.1.5.29	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Scientists & Engineers at Sites
1.2.5.1.5.30	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Military Personnel at Sites
1.2.5.1.5.31	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Military Personnel of Higher Ranks at Sites
1.2.5.1.5.32	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Foreign Personnel at Sites
1.2.5.1.5.33	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of VIPs at Sites
1.2.5.1.5.34	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Housing Demand In Local Area
1.2.5.1.5.35	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers New / Expanded / Improved Housing Built On-Site
1.2.5.1.5.36	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers New / Expanded / Improved Recreational Facilities On-Site
1.2.5.1.5.37	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Food Intake
1.2.5.1.5.38	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Power Consumption
1.2.5.1.5.39	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Water Consumption
1.2.5.1.5.40	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Sewer Outake
1.2.5.1.5.41	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Refuse Outake
1.2.5.1.5.42	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Smoke Plumes from Sites
1.2.5.1.5.43	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Chemical Contamination at Sites
1.2.5.1.5.44	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers New or Increased Settling / Effluents Ponds at Sites
1.2.5.1.5.45	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Use of Data Processing Assets at Site
1.2.5.1.5.46	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased / Different Patterns of Thermal Images
1.2.5.1.5.47	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Large Mobile Vehicles with Erection Gantries at Sites
1.2.5.1.5.48	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Mobile Vehicles with Cooling at Sites
1.2.5.1.5.49	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Chemical Support Equipment at Sites
1.2.5.1.5.50	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Optical Test Equipment at Sites
1.2.5.1.5.51	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of RF Test Equipment at Sites
1.2.5.1.5.52	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Electrical Test Equipment at Sites
1.2.5.1.5.53	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Optical Test Stands at Sites
1.2.5.1.5.54	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of RF Test Stands at Sites
1.2.5.1.5.55	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Number of Large Mobile Vehicle Storage Sheds at Sites
1.2.5.1.5.56	Chicanean Yuan Hsi Mobile Direct Ascent ASAT Manufacturing Centers Increased Security at Sites



Example COA Reactions

Time Sequence	Category	Actor	Target	Escalation Ladder	Probability of Occurrence	WBS	Action	Reaction
35	Satellites	Califon	Newmex	P.4.A.1	8	N.S.R.3		Newmex Bicudo Large LEO Photo Satellite is permanently partially blinded when over flying the disputed oil fields
35A	Political	Newmex	Califon	P.1.C.0	1	N.S.R.3.0	→	Do nothing to increase escalation ladder
35B	INTEL	Newmex	Califon	P.1.A.0	10	N.S.R.3.1		Determine if degradation is caused by natural events, equipment failure or human actions, whether intentional or unintentional
35C	Forces	Newmex	Califon	P.1.C.0	9	N.S.R.3.2		Increase military alert level (DEFCON)
35D	Ground Stations	Newmex	Califon	P.1.A.0	9	N.S.R.3.3	→	Contact other Newmexian space-related ground facilities to determine if multiple ground outage incidents are occurring
35E	Satellites	Newmex	Califon	P.1.A.0	9	N.S.R.3.4		Contact other Newmexian TTC ground facilities to determine if multiple satellite outage incidents are occurring
35F	Satellites	Newmex	Califon	P.1.A.0	9	N.S.R.3.5		Check with Newmexian supreme military command to determine if other military incidents are occurring to Newmexian and allied forces
35I	Space Surveillance	Newmex	Califon	P.1.B.0	10	N.S.R.3.8	→	Increase surveillance and tracking for new and suspicious space objects
35J	Satellites	Newmex	Califon	P.1.B.0	10	N.S.R.3.9		Increase mission identification and country of origin determination for new and suspicious space objects (Space Object Identification - SOI)
35K	Satellites	Newmex	Califon	P.1.B.0	10	N.S.R.3.10		Increase signals intelligence collection on new and suspicious space objects
35L	Satellites	Orgonia	Califon	P.1.B.0	10	N.S.R.3.11		Maneuver Orgonian Abrahg Nano LEO Inspector Satellite close to Newmex Bicudo Large LEO Photo Satellite for close inspection to help determine origin of mission degradations
35M	Satellites	Newmex	Califon	P.1.B.0	9	N.S.R.3.12		Increase satellite imagery, OPIR and RADAR surveillance and signals intelligence collection of Newmexian border areas
35N	Satellites	Newmex	Califon	P.1.B.0	8	N.S.R.3.13		Increase satellite imagery, OPIR and RADAR surveillance and signals intelligence collection of Newmexian internal areas
35O	Satellites	Newmex	Califon	P.1.B.0	10	N.S.R.3.14		Increase satellite imagery, OPIR and RADAR surveillance and signals intelligence collection of internal Califon activities
35P	Satellites	Newmex	Califon	P.1.B.0	9	N.S.R.3.15		Increase satellite imagery, OPIR and RADAR surveillance and signals intelligence collection of Califon allied activities
35Q	Forces	Newmex	Califon	P.1.A.0	9	N.S.R.3.16		Increase critical infrastructures defenses and surveillance
35AG	Political	Newmex	Califon	P.1.C.0	5	N.S.R.3.32		Cutoff diplomatic relations with Califon
35AP	Political	Newmex	Califon	P.1.B.0	9	N.S.R.3.41		Increase world attention to the problems of orbital space debris in order to slow down Califon's launching of new satellites
35BB	Political	Newmex	Califon	P.1.A.0	10	N.S.R.3.53		Engage in negotiations for space treaties and mutual defense pacts with other countries to increase space defense protection
35BC	Political	Newmex	Califon	P.1.A.0	10	N.S.R.3.54	→	Publicly declare that any use of space weapons against Newmexian satellites will have a corresponding attack on the aggressor's space facilities associated with this attack, whether they be research centers, launch facilities, space surveillance sites, or command and control centers
35BD	Political	Newmex	Califon	P.1.B.0	9	N.S.R.3.55		Publicly declare that any use of space weapons against Newmexian satellites will have a corresponding attack on the aggressor's and their allies space facilities associated with this attack, whether they be research centers, launch facilities, space surveillance sites, or command and control centers
35BE	Forces	Newmex	Califon	P.1.C.0	8	N.S.R.3.56	→	Initiate multiple false starts, threatening space and terrestrial maneuvers, etc. to induce your adversaries to begin constant satellite maneuvering, so as to waste their on-board fuel reserves before actual conflict starts
35BF	Forces	Newmex	Califon	P.1.C.0	8	N.S.R.3.57		Initiate random military orders, communications traffic, re-deployments and satellite maneuvers to confuse potential adversaries of your immediate plans and goals
35BG	Forces	Newmex	Califon	P.1.C.0	7	N.S.R.3.58		Launch or maneuver a new mysterious satellite that comes close to critical Califon satellites, to make Califon pause in its military execution plans, to show resolve, and as a warning to Califon to back down
35BH	ASAT	Newmex	Califon	P.1.B.0	10	N.S.R.3.59		Jam Califon propaganda broadcasts from their communications satellites directed at Newmexian dissidents
35BI	ASAT	Newmex	Califon	P.1.C.0	10	N.S.R.3.60		Initiate operational deployment of Newmexian Anti-Satellite (ASAT) systems



Example COA Reactions (Cont.)

Time Sequence	Category	Actor	Target	Escalation Ladder	Probability of Occurrence	WBS	Action	Reaction
35BJ	ASAT	Newmex	Califon	P.3.A.1	8	N.S.R.3.61	→	Attack Califon Darapi Large LEO Photo Satellite with a Lagoa Mobile Ground Jammer-RF that temporarily denies Califon access to its intelligence collection capabilities, to show resolve and as a warning to Califon to back down
35BK	ASAT	Newmex	Califon	P.4.A.2	6	N.S.R.3.62		Attack Califon Darapi Large LEO Photo Satellite with an Ouro Space Launch ASAT Ground Mobile Missile that permanently destroys it, to show resolve and as a warning to Califon to back down
35BL	ASAT	Orgonia	Califon	P.3.A.2	9	N.S.R.3.63		Attack Califon Darapi Large LEO Photo Satellite with an Orgonian Dimbah Nano LEO Mine-Paint that temporarily denies Califon access to its intelligence collection capabilities (covers lenses with temporary paint), to show resolve and as a warning to Califon to back down
35BM	Cyber	Newmex	Califon	P.2.A.0	9	N.S.R.3.64	→	Attack Califon Jeanton Large Ground Fixed Command Center with a cyber attack that temporarily disables its ability to command forces, to show resolve and as a warning to Califon to back down
35BN	Forces	Newmex	Califon	P.3.A.2	5	N.S.R.3.65		Attack Califon Jeanton Large Ground Fixed Command Center with Newmexian Irece SOF forces that permanently disables its ability to command forces, to show resolve and as a warning to Califon to back down
35BO	Forces	Newmex	Califon	P.2.A.0	5	N.S.R.3.66	→	Attack a Califon terrestrial system of similar military and economic value to deter Califon from further aggression
35BP	Forces	Newmex	Califon	P.1.C.0	10	N.S.R.3.67		Attack by cyber means the Califon facility that caused the Newmex Bicudo Large LEO Photo Satellite to be temporarily or permanently damaged
35BQ	Forces	Newmex	Califon	P.2.A.0	5	N.S.R.3.68		Attack by Newmexian Irece SOF forces the Califon facility that caused the Newmex Bicudo Large LEO Photo Satellite to be temporarily or permanently damaged
35BR	Forces	Newmex	Califon	P.4.A.2	3	N.S.R.3.69		Attack by the Newmexian Air Force Califon's facility that caused the Newmex Bicudo Large LEO Photo Satellite to be temporarily or permanently damaged
35BY	Industrial	Newmex	Califon	P.1.A.0	10	N.S.R.3.76	→	Prepare any remaining satellite launch facilities for rapid reaction capabilities enabling quick satellite launches
35BZ	Satellites	Newmex	Califon	P.1.A.0	9	N.S.R.3.77	→	Increase on-orbit spares for critical satellites
35CA	Satellites	Newmex	Califon	P.1.A.0	9	N.S.R.3.78		Increase on-orbit satellite decoys to confuse Califon and its allies' space surveillance networks
35CB	Satellites	Newmex	Califon	P.1.C.0	8	N.S.R.3.79		Initiate war-reserve modes for critical Newmexian satellite assets that begin to maneuver and reduce RADAR and optical signatures to avoid Califon and its allies' space surveillance networks
35CC	Satellites	Newmex	Califon	P.1.C.0	9	N.S.R.3.80		Recharge Newmexian satellite batteries on-orbit
35CD	Satellites	Newmex	Califon	P.1.C.0	9	N.S.R.3.81		Refuel Newmexian satellites on-orbit
35CE	Satellites	Newmex	Califon	P.1.C.0	9	N.S.R.3.82		Refuel Newmexian space support sites backup generators
35CF	Satellites	Newmex	Califon	P.1.C.0	9	N.S.R.3.83	→	Maneuver Newmexian space weapons (space-based and terrestrial-based) into optimized offensive and defensive positions
35CG	Satellites	Newmex	Califon	P.1.C.0	9	N.S.R.3.84		Deploy Newmexian space support assets (space-based and terrestrial-based) into optimized offensive and defensive support positions
35CH	Satellites	Newmex	Califon	P.1.C.0	9	N.S.R.3.85		Maneuver and deploy space control assets that later enable sealing off the Earth from adversary satellites, in order to fix these adversary space assets into a steady state that cannot be changed from the ground. This would include positioning for jamming, spoofing and cyber attacks, along with denying an adversary the ability to launch new satellites
35CI	Launch	Newmex	Orgonia	P.1.A.0	8	N.S.R.3.86		Request Orgonia provide satellite launch support from its Nuwayr Space Launch Ground Mobile Systems for Newmexian satellites
35CJ	Forces	Newmex	Califon	P.1.A.0	10	N.S.R.3.87		Explore non-space mission replacements for reduced satellite capabilities
35CP	Forces	Newmex	Califon	P.1.C.0	9	N.S.R.3.93		Increase surveillance, protection and defenses of space systems terrestrial terminals, command and control sites, space sensor sites, launch sites, space weapons marshaling areas, research centers and factories
35CQ	Environmental	Space	Space	P.1.B.0	9	N.S.R.3.94	→	Increase surveillance of solar events to better determine if potential satellite outages are caused by natural or human intents
35CR	Forces	Newmex	Califon	P.1.C.0	10	N.S.R.3.95		Determine if Califon and/or their allies have terrestrial forces maneuvering or deploying to operational locations and appear to be pre-positioning for attack
35CS	Satellites	Newmex	Califon	P.1.C.0	10	N.S.R.3.96		Command critical Newmexian satellites to initiate defensive measures (spinning, close shutters, increased heat transfer, etc.)
35CT	Satellites	Newmex	Califon	P.1.B.0	9	N.S.R.3.97		Maneuver critical Newmexian satellites beyond the range of potential threats
35CU	Satellites	Newmex	Newmex	P.1.A.0	10	N.S.R.3.98		Conduct a full battery of diagnostic testing on Newmexian satellites to determine if intermittent failures are a possibility
35CV	Launch	Newmex	Califon	P.1.A.0	9	N.S.R.3.99		If critical Newmexian satellites are permanently damaged, then launch other satellites with similar capabilities
35CW	Forces	Newmex	Newmex	P.1.A.0	10	N.S.R.3.100		Determine the effects on the overall space system mission of any space systems degradations
35CX	Forces	Newmex	Newmex	P.1.A.0	10	N.S.R.3.101		Modify previously planned space strategies and tactics due to current adversary and their allies' actions
35CY	Satellites	Newmex	Califon	P.1.A.0	10	N.S.R.3.102		Increase training for satellite operators that allows them to recognize intentional attacks and respond promptly

Strategies

Operational

Tactical



Possible Space Strategies

Space Situational Awareness Tools (SSA-T)

Home Create External Data Database Tools Add-Ins

Space Warning and Assessment Tools Space Situational Awareness Tools Military Requirements Attack Strategies

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Space Strategies Briefing

Title	Strategy	Desired End State	Comments
Funnel COMM	Selectively disrupt select Red space systems communications assets so that critical Red sensor and C4 info gets directed to communications paths with low data rates, effectively delaying receipt of critical data beyond its useful life.	Delay receipt of critical info while conserving space control weapons employment.	
Herd COMM	Selectively destroy or temporarily disrupt specific Red space systems communications assets so that critical Red sensor and C4 info gets directed to known paths that can be monitored by Blue sensors.	Make Red more vulnerable to intelligence exploitation.	
Herd Sensors	Temporarily deny Red space sensors, or only certain sensors. This will blind them, until they are allowed to use them again when Blue side wants them to observe certain fake Blue force dispositions. This directs Red sensors to see only what Blue	Control Red perception of Blue strengths and battlefield situation.	
Herd Space Personnel	Destroy all Red space-related ground targets, except purposely lightly damage one ground center. Assume that key space support personnel will converge to this lightly damaged site to conduct repairs. 12 hours later, use anti-personnel weapons at	Destroys Red country's most import space asset: key technically trained space personnel. Also sends message to international community that foreign personnel supporting Red space efforts will be at risk.	
Hidden Disrupt	Employ weapons with low probability of detection and attribution, to minimize world reaction to Blue side counter space. Temporarily disrupt spacecraft operations at random times.	Red side loses confidence in his space systems. He is constantly kept off-balance by repeated disruption of his space capabilities That are timed within his decision cycle times. Political implications of space control need	
Hidden Negate	Employ weapons with low probability of detection and attribution, to minimize Red perception that Blue has begun counter space operations. Slowly increase tempo of Red satellite disruption, starting with minor anomalies easily	Red probably hasn't used space systems in a real conflict before, and their decreasing reliability under combat stress might be understandable and acceptable to them.	
Periodic Degrade	Use degrade type of weapons whose attack cycles are timed to correspond with the reconstitution or replacement time of that target's capability.	As Red starts to bring on-line an alternate space capability, it is negated. This minimizes space weapons employment, but does not have as much shock value as a Sweep The Skies attack.	
Rolling Disrupt	Temporarily disrupt Gray space assets for small lengths of time, then move on to other Gray assets. Use low probability of detection and attribution weapons. This will give the impression of reliability issues with Gray equipment, not intentional attack.	Keep Gray side guessing as to the ultimate fate of their space systems if they continue to support Red side.	
Sweep The Ground	Destroy all prime Red space-related ground targets with a minimum of collateral damage.	With all ground sites destroyed, satellites cannot be tasked or download data. Probably a more politically acceptable solution, but space-related ground sites can be replaced easier than satellites after the war, and data	
Sweep The Skies	Destroy all Red satellites whether military, civil, or commercial, in a synchronized simultaneous attack so that Red protective/reconstitution measures cannot be implemented in time.	One large synchronized blow keeps red off balance.	

Some Unique Space Strategies



Example Space Strategies

Title:

Herd Space Personnel

Action:

Destroy all Red space-related ground targets, except purposely lightly damage one ground center. Assume that key space support personnel will converge to this lightly damaged site to conduct repairs. 12 hours later, use anti-personnel weapons at this site, with destroy weapons 2 hours later.

Desired Effect:

Destroys Red country's most import space asset: key technically trained space personnel. Also sends message to international community that foreign personnel supporting Red space efforts will be at risk.

War Is Hell



Space Strategies Derived From Sun Tzu

- Sun Tzu's "The Art of War" (544 BC – 496 BC) Used to Derive Modern Space Strategies
- Analysis in Progress
 - 546 Space Warfare Strategies Already Derived
 - Only 1/3 the Way Through Sun Tzu's Teachings

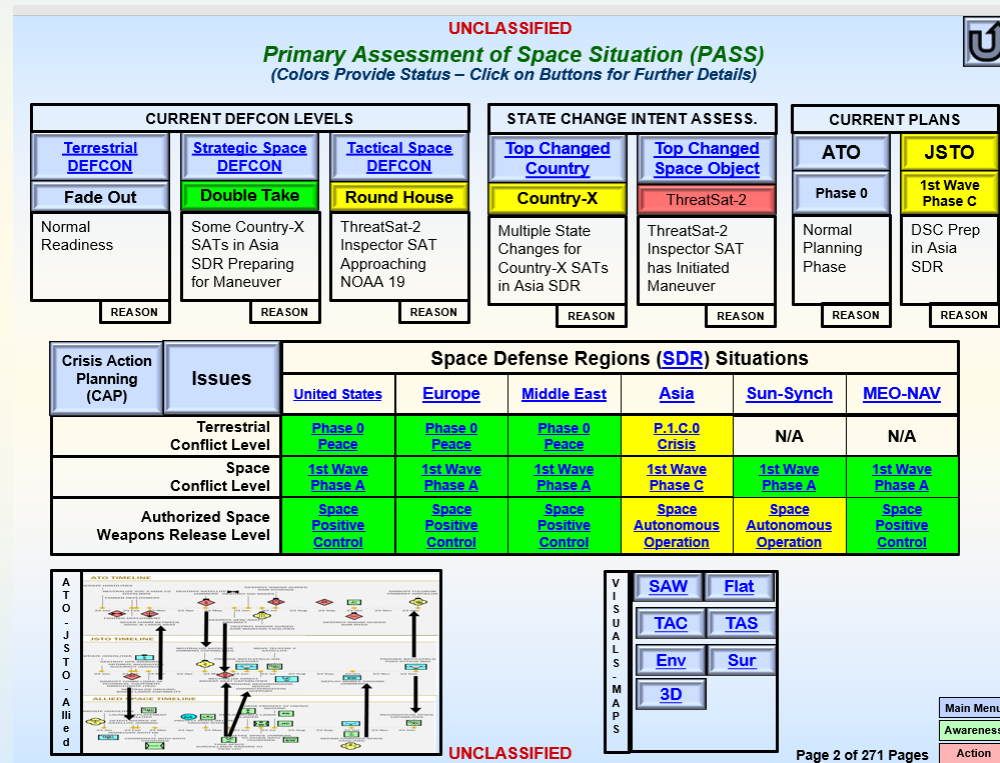
8	Info War
9	Force Status
10	Sun Tzu Statement 1: When able to attack, we must seem unable. When using our forces, we must seem inactive. Pretend to be weak, that he may grow arrogant.
11	Space Warfare Strategy 1: Deploy many covert space weapon systems & sensors with remote basing (air, sea, undersea, ground mobile, space, Moon).
12	Space Warfare Strategy 2: Deploy space weapon systems & sensors with multi-spectral camouflage coverings.
13	Space Warfare Strategy 3: Deploy space weapon systems & sensors in space with low observables coatings.
14	Space Warfare Strategy 4: Deploy space weapon systems & sensors in space with special shapes that do not readily reflect light back to the Earth.
15	Space Warfare Strategy 5: Deploy space weapon systems & sensors in space that can change attitude so they do not readily reflect light back to the Earth.
16	Space Warfare Strategy 6: Deploy covert space weapon systems & sensors in unusual orbits to avoid detection and precise targeting (highly eccentric, Lagrangian points, between geosynchronous orbits and the Moon, & beyond the Moon).
17	Space Warfare Strategy 7: Deploy covert space weapon systems & sensors that continuously change their orbits while outside an adversary's sensor coverage (e.g., maneuver over the South Pacific and the Poles). Continuous low-level thrusting may frustrate orbit sensors.
18	Space Warfare Strategy 8: Develop covert space weapon systems that hide inside innocuous space objects (civilian & science missions, space objects playing dead). Have exit doors on side of space object away from the Earth (zenith face) & most sensors.
19	Space Warfare Strategy 9: Develop some overt space weapon systems that stay in garrison, or are transported to other theaters that do not threaten the theater that one is planning to attack.
20	Space Warfare Strategy 10: Develop some overt space weapon systems that have limited technical and operational capabilities and appear to be the main space threat, but a covert weapon system is actually firing at the same time as the overt system.
21	Space Warfare Strategy 11: Develop some overt space weapon systems that have limited technical and operational capabilities and that will absorb an adversary's main spoiling or counter-attacks (including SOF, HUMINT, & Cyber attacks that may take considerable time).
22	Space Warfare Strategy 12: Develop some overt civil & commercial space systems that can also have space weapons capabilities (e.g., space maintenance robot).
23	Space Warfare Strategy 13: Develop a plan for space sensors to "ping" space objects according to a harmless, pre-planned schedule that does not reveal plans for a surprise attack against intended targets.
24	Space Warfare Strategy 14: Encourage allied space sensors to "ping" only space objects that are not part of an overall surprise attack plan.
25	Space Warfare Strategy 15: Do not deploy non-space forces in any threatening way, or deploy them in theaters other than those one intends to support with space weapons.
26	Space Warfare Strategy 16: Have the State Department devote considerable energy in emphasizing different political and social theaters that do not point to the intended targets and theater of the surprise attack.
27	Space Warfare Strategy 17: Have the State Department devote considerable energy in emphasizing no first use of space weapons.
28	Space Warfare Strategy 18: Have the State Department devote considerable energy in emphasizing no use of debris-causing space weapons, especially if these types of weapons will be used in the surprise attacks.
29	Space Warfare Strategy 19: Have the Military Departments devote some energy in emphasizing possessing limited, if any, space weapons capabilities.
30	Space Warfare Strategy 20: Develop alliances and treaties with more capable space partners so that you may make use of their space weapon systems in times of war.
31	Space Warfare Strategy 21: Deceive, Deny, Disrupt, Degrade, or Destroy adversary space sensors and intelligence collection capabilities. This includes use of cyber weapons and counterintelligence techniques. Cover up when adversary space intelligence collection is being disrupted.
32	Space Warfare Strategy 22: Shield indicators of space weapons beginning attack sequences (maneuvering, thrusters warming up, thrust plumes in space, other powering up, increased thermal signatures, new systems coming on-line, increased telemetry traffic, etc.).
33	Space Warfare Strategy 23: Fake the deaths of various satellites with covert, reserve space weapons missions, over a period of months and years before the surprise attacks.
34	Space Warfare Strategy 24: Determine the most threatening regions of space to pre-position space weapons for the best coordinated & optimized attack sequences. These are not necessarily physically close to the targets, but are close in orbital space (minimize travel time).
35	Space Warfare Strategy 25: Concentrate space forces only at the last moment before attack.
36	
37	Sun Tzu Statement 2: By discovering the enemy's dispositions and remaining invisible ourselves, we can keep our forces concentrated, while the enemy's must be divided. Let your plans be dark and impenetrable as night, and when you move, let it be like lightning.
38	Space Warfare Strategy 26: Develop & employ covert space surveillance systems.
39	Space Warfare Strategy 27: Only openly report space surveillance capabilities that are less capable (range, sensitivity, throughput, numbers of systems, mobility of systems, etc.) than reality.
40	Space Warfare Strategy 28: Hide space surveillance systems communications & data rate channels.
41	Space Warfare Strategy 29: Be careful of which & how many orbital elements are reported openly, so as not to give a potential adversary an idea of your space surveillance system's full capabilities.
42	Space Warfare Strategy 30: Conduct multiple fake space system maneuvers (& terrestrial mobility re-deployments) to draw away an adversary's space systems from the main point of attack.
43	Space Warfare Strategy 31: Conduct multiple small space system attacks to draw away an adversary's space systems from the main point of attack.
44	Space Warfare Strategy 32: Detect, understand & monitor both allied and adversary space choke points and centers of gravity (geographic, orbital, communications, social, doctrinal, etc.).
45	Space Warfare Strategy 33: Truly understand not only your adversary's space force status and dispositions, but also allied force status and dispositions. Do not let security restrictions obscure to competent commanders the true capabilities of your own forces, or of your allies.
46	Space Warfare Strategy 34: Concentrate anti-satellite resources only against key regions of space (sun-synchronous, part of the geo-synchronous belts, etc.) that are significant Centers Of Gravity both for allied and adversary space systems. Gain space superiority.
47	Space Warfare Strategy 35: Concentrate attacks against key regions of space only at the last moment when a shock & awe effect is warranted. For example, attack portions of the GEO belt from trans-lunar, vacant GEO belt sectors, highly eccentric orbits that are far from Earth.
48	Space Warfare Strategy 36: To attack Low Earth Orbits (LEO) space systems, use low inclination (close to zero degrees) anti-satellite systems that only need to increase altitude to engage their targets (low delta-v maneuver), yet would have little adversary space system impact.
49	Space Warfare Strategy 37: Employ mobile anti-satellite systems to attack adversary space systems, particularly those that can be based in regions of low or no adversary space surveillance coverage (e.g., South Pacific, South Pole, Equatorial regions, etc.) to e
50	Space Warfare Strategy 38: Pre-conflict, have very visible, but relatively harmless, space control development programs, while the real space weapon systems are covertly developed.
51	Space Warfare Strategy 39: For kinetic kill anti-satellites, deploy more than one on the same booster, so that subsequent ASATs can hide in the debris clouds of the first attack. They can also act as multiple weapons on target to increase probability of kill (PK).

Methods of War Are Eternal



Space Battle Management

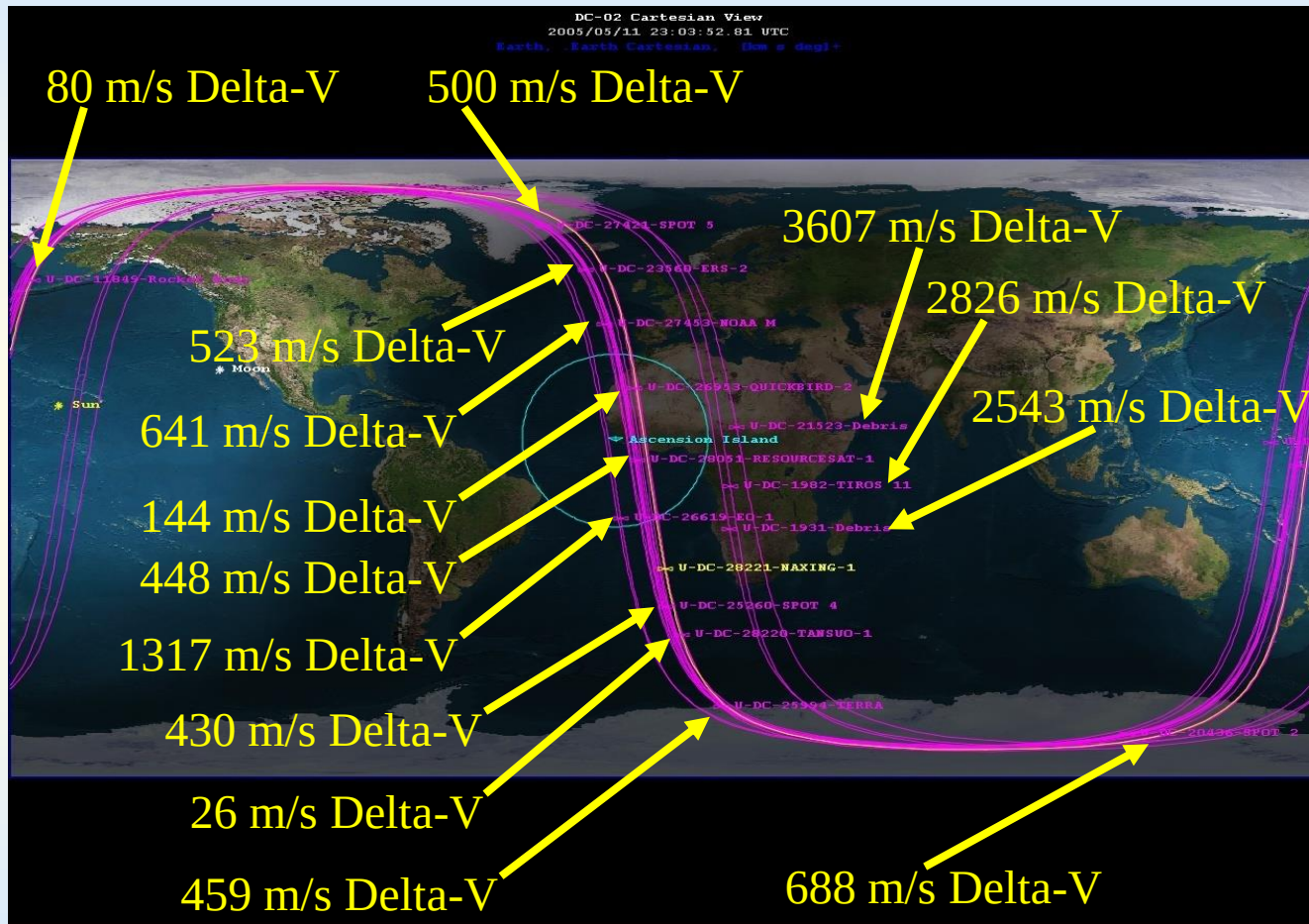
- Summary Briefing Demo of New Concepts for Space Battle Management Logic Flows and Displays
- Example:



- Document Link: [Space Decision Maker Brief.pptx](#)



Hide Satellite Among Others



**Goal: Appear Like
Nearby Satellite**

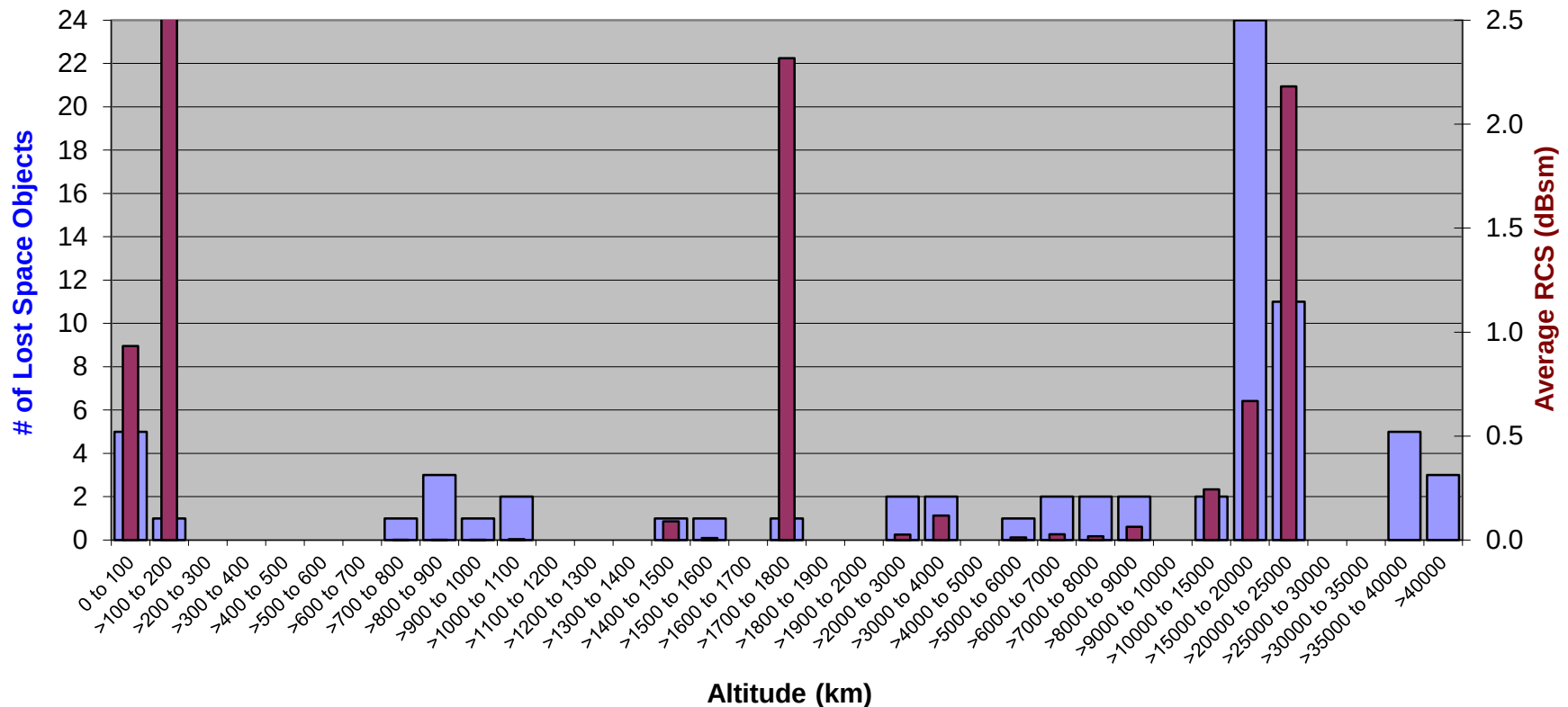
**Delta-V Required for
2-Burn Hohmann
Transfer Rendezvous**

Satellites Can Maneuver to Confuse Targeting Assets



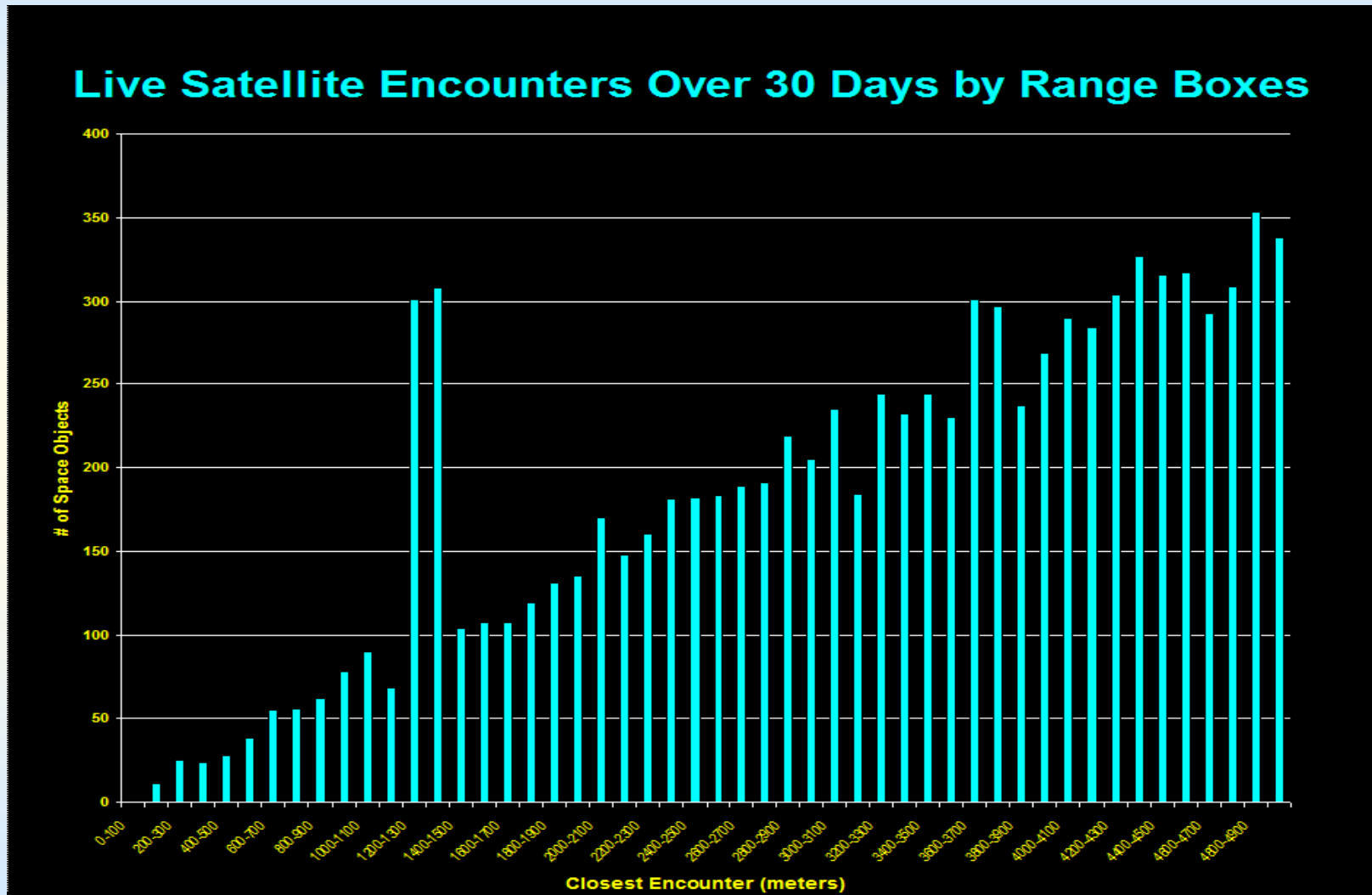
JSpOC Catalog Missing Space Objects

Number of Lost Satellites By Altitude and RCS





Space Objects Close Encounters Statistics



Space Objects Come Close to Each Other Many Times a Month



Waypoint Assessment Response (WAR) Concept

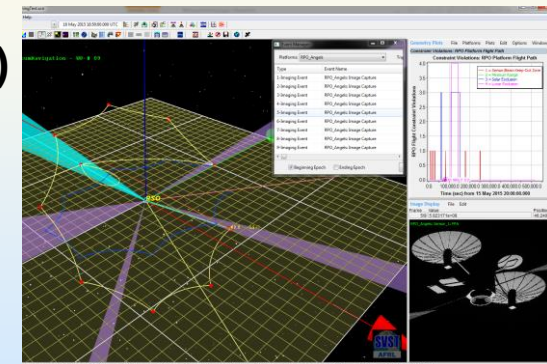
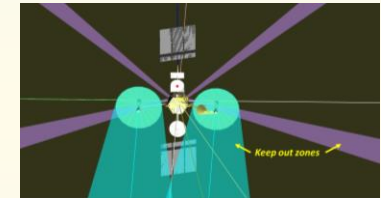
**“Victory smiles upon those who anticipate the changes in
the character of war, not upon those who wait to adapt
themselves after the changes occur.”**

(Giulio Douhet)



Waypoint Assessment Response (WAR) - 1

- **Purpose:** Employ Pattern Matching of RPO Orbital Adjustments to Assess Likely Adversary Tactical COA's & Intent
- **Typical RPO Constraints:**
 - Most Important Face of RSO to Observe
 - RSO / RPO Size & Component Placement
 - RSO / RPO Attitude, Pose, Articulation, Motion Dynamics & Time Behavior
 - Keep In / Keep Out Zone Limitations
 - RPO Sensor Line of Sight Aim Point to RSO
 - Image Quality Lighting / Shadow Constraints / Glint Avoidance
 - Satellite Brightness / BRDF Materials Properties
 - Optics System Specifications (Magnification / PSF)
 - Spectral / Filter Band Properties
 - Sensor Definition (Pixel Size, Integration Times)
 - Pixel on Target / Image Resolution
 - FPA Response, Noises, Defects, Blurring
 - Maximize Image Dynamic Range / Depth of Focus



Strategies

Operational

Tactical



Waypoint Assessment Response (WAR) - 2

- **RSO Change in Attitude / Articulation May be Able to Discern RPO Intentions as it Follows RSO State Changes**
- **Since RSO Change in Attitude / Articulation Does Not Impact RSO's Fuel Reserves (By Using Only Momentum Wheels Inside Spacecraft), RPO Satellite Must Continuously Respond by Thrusting & Changing Waypoints, and Thus Use Up It's Delta-V Fuel**
- **May be Able to Determine RPO Optics Properties or If It Has RADAR Sensors**



Waypoint Assessment Response (WAR) - 3

- **Potential Adversary RPO COA's (Each COA Corresponds to Differing & Detectible Waypoint Maneuvers):**
 - Conduct INTEL Assessment of RSO Optics Characteristics
 - Conduct INTEL Assessment of RSO Antenna Size / Frequency
 - Conduct INTEL Assessment of RSO Solar Panel Power
 - Conduct INTEL Assessment of RSO Thermal Control Characteristics
 - Conduct INTEL Assessment of RSO Ports / Doors
 - Collect SIGINT on RSO
 - Collect BRDF Signatures for RSO Materials Assessments



Waypoint Assessment Response (WAR) - 4

- **Potential Adversary RPO Intents (Each Intent May be Detectable by Waypoint Maneuvers):**
 - Determine if Adversary Intends Close RPO or Just Flyby
 - Determine RSO's Ability to Detect RPO Vehicle
 - Test RSO Potential Responses to RPO Close Maneuvers
 - Estimate if Adversary RPO is Simply Interested in INTEL Collection, or Has Anti-Satellite (D5) Intents
 - What is Potential Kill-Chain for Adversary RPO / Flyby
 - Determine Which Terrestrial Theater / Users RSO is Currently Supporting
 - Determine if RSO is Preparing to Maneuver or Reconfiguring to War-Reserve Modes
 - Send Political Warning Message of Adversary Determination & Resolve During Terrestrial Heightened Tensions



Space Courses of Action Examples

“If everyone is thinking alike, then somebody isn't thinking.”
(General George S. Patton)



Space Strategic COA's

- **Foundational COA's Applicable to the Overall Space Battle Across Multiple Space Defense Regions (SDR's)**

- **Examples:**

COA WBS: C.S.D.1.1

COA Name: Conduct space mutual defense treaty negotiations.

COA Description: Government conducts treaty negotiations with allied nations concerning mutual defense for space assets.

Intended COA Effect: Maximize the potential for defense against potential adversary space control systems.

COA WBS: C.S.D.1.1

COA Name: Conduct space arms limitations treaty negotiations.

COA Description: Government conducts treaty negotiations with potential adversary nations for arms limitations concerning space weapons.

Intended COA Effect: Delay, deny, limit or reduce the ability of potential adversaries to conduct long-range planning, development, deployment and employment of space control systems that may be contrary to allied strategic interests.

- **Document Link: Space Strategic COA's.Docx**
(94 COA's)



Space Tasks

- **Space Tasks (Operational Level of Warfare)
Applicable to the Space Battle for Specific
Space Defense Regions (SDR's)**

- **Examples:**

3.4.7 Covertly maneuver offensive and defensive Blue space systems to key choke points in space to provide optimized attack profiles and deter further adversary space aggressions

3.4.8 Quarantine Geosynchronous belt over Western Pacific so adversary cannot launch new satellites or communicate with their operational space systems

3.4.9 Prevent adversary use of their own and neutral country space systems for the Geosynchronous belt over Western Pacific, but do not apply permanent damage techniques, and minimize space debris generation

3.4.10 Prevent an adversary from communicating to his satellites so he cannot maneuver them or set up defensive measures while Blue and Allied anti-satellite systems maneuver into optimal attack positions

- **Document Link: [Space Tasks.docx](#)
(25 COA's)**



Space Tactical COA's

- Space COA's Applicable to the Space Battle for a Specific Close Attack Engagement Zone (CAEZ)

- Examples:

1. Maneuver

- 1.1. Pre-Warm Up Thrusters to Allow Quick Reaction Maneuvers to Counter Threats
- 1.2. Re-Orient Satellite to New Thruster Vectors to Allow Quick Reaction Maneuvers to Counter Threats
- 1.3. Slew Spacecraft Orientation to Hide Classified Components from View
- 1.4. Face Satellite Away by Changing Satellite Pose & Articulations
- 1.5. Spin Satellite (Attitude Rate Maneuver Rotisserie Mode)
- 1.6. Collision Avoidance Thrust Maneuver
- 1.7. Maneuver Satellite Away from Threat Sensors & Keep-Out Zones
- 1.8. Randomly Maneuver Satellite to Confuse Threat Space Object
- 1.9. Maneuver Satellite Towards Another Neutral Satellite or Space Junk to Hide
- 1.10. Maneuver Satellite Away from Threat Object to Test Its Responses & Intents

Change Date	Data Source	Classification	Priority	WBS - Original	WBS - New	Space COA's	Time (Min.) to Implement COA	Probability of Effectiveness	Probability of Conflict Resolution	Cost to Execute	Active	Passive	WBS - Green (Add/Remove 100-150 Min.)	CAEZ - Yellow (Add/Remove 150-200 Min.)	CAEZ - Red (Add/Remove 200+ Min.)
						Detect & Assess Threat									
29-Nov-16	Szymanski	UNCLASS	High	C.P.N.6.1	S.C.D.1.0	Task On-Board Sensors	10	80%	5%	Medium		X	X	X	X
27-Dec-16	Szymanski	UNCLASS	High	C.P.N.9.1	S.C.D.1.1	Collect INTEL on Threat Object	3	60%	5%	Low		X	X	X	X
27-Dec-16	Szymanski	UNCLASS	Medium		S.C.D.1.2	Continuously Point Towards Threat Object (Maintain Relative Range & Altitude)	3	80%	5%	Medium		X		X	X
27-Dec-16	Szymanski	UNCLASS	High		S.C.D.1.3	Conduct Local Area Search for Threat Objects & Track When Found	20	70%	5%	Low		X		X	X
27-Dec-16	Szymanski	UNCLASS	Medium		S.C.D.1.4	Request Neighborhood (Local SDR) Federated Asset Imagery of Own & Threat Spacecrafts	20	70%	10%	Low		X		X	X
29-Dec-16	Szymanski	UNCLASS	Low		S.C.D.1.5	Accept a Sensor Tasking Request from Another Federated Asset	20	90%	10%	Medium		X		X	X
27-Dec-16	Szymanski	UNCLASS	Low		S.C.D.1.6	Task Ground Based Spectral Signature Assets to Assess Spacecraft Changes	120	100%	10%	Low		X		X	X
27-Dec-16	Szymanski		High		S.C.D.1.7	Task Onboard Cameras to Determine if Anything Has Changed	20	80%	5%	Medium		X		X	X
27-Dec-16	Szymanski	UNCLASS	Medium		S.C.D.1.8	Blow Pyros & Automatically Deploy Pop-Off Self-Inspector	60	90%	10%	High		X		X	X
29-Dec-16	Szymanski	UNCLASS	Medium		S.C.D.1.9	Download to Ground Threat Space Object Characterization Data	40	100%	5%	Low		X	X	X	X

- Document Links: Space Tactical Courses of Action (COA's).docx AND Space Tactical Courses Of Action (COA's).xlsx (74 COA's)



Space Counter-Attack COA's

- Space COA's in Response to Specific Adversary Military Actions
- Examples:

Time Sequence	Category	Escalation Ladder	Probability of Occurrence	WBS	Action	Reaction COA
5	Industrial	P.1.A.0	9	O.S.M.1	Orgonian Sharidiyah Medium GEO Maintenance Satellite loses main propulsion capabilities	
5A	Political	P.1.A.0	5	O.S.M.1.0		Do nothing to increase escalation ladder
5B	Ground Stations	P.1.A.0	10	O.S.M.1.1		Employ Orgonian satellite mission control resources to determine probable causes and to attempt to recover this satellite
5C	Ground Stations	P.1.A.0	8	O.S.M.1.2		Employ Telarian satellite mission control resources to determine probable causes and to attempt to recover this satellite
5D	Environmental	P.1.A.0	9	O.S.M.1.3		Request recent space weather history through Orgonian sensors to determine if this may be the cause of the outage
5E	Satellites	P.1.A.0	7	O.S.M.1.4		Calculate whether another space object came close to the Orgonian Sharidiyah Medium GEO Maintenance Satellite during the recent past to determine whether it could have affected this satellite
5F	Satellites	P.1.A.0	7	O.S.M.1.5		Maneuver a nearby Orgonian Awsajah Micro GEO Inspector Satellite close to the disabled satellite to try to determine probable causes of the failure
5G	Launch	P.1.A.0	9	O.S.M.1.6		Maneuver another Orgonian Sharidiyah Medium GEO Maintenance Satellite to attempt repairing the failed one
5H	Launch	P.1.A.0	8	O.S.M.1.7		Launch another Orgonian Sharidiyah Medium GEO Maintenance Satellite to replace the failed one
5I	Political	P.1.B.0	7	O.S.M.1.8		Threaten Califon at the United Nations by accusing them of causing the outage
5J	ASAT	P.1.C.0	1	O.S.M.1.9		Initiate operational deployment of Orgonian Anti-Satellite (ASAT) systems
5K	Political	P.1.C.0	6	O.S.M.1.10		Covertly attack Califon space systems through cyber means as a subtle warning
5L	Satellites	P.2.A.0	1	O.S.M.1.11		Attack a Califon satellite of similar military and economic value to deter Califon from further aggression

- Document Link: [Operation Deep Blue.xlsx](#)
(~4,000 COA's)



Space Principles of War

- General Rules for Space Warfare Evolved from Classical US Air Force, Army, Navy, British and Russian Terrestrial “Principles of War”

- Examples:

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Space Principles of War (6)

- **Unity of Command**
 - **Terrestrial:** *“For every objective, seek unity of command and unity of effort”*
 - **Space:** Have space control, info war, and air/ground attack plans been integrated with each other and with intelligence collection requirements. Does the “classic” target allocation process give sufficient consideration of space/info targets. Is there adequate space/info war delineation of chain of command and decision responsibility. Are space target lists traceable back to objectives (both red and blue). Do blue and red commanders appreciate the importance of space to their conduct of the war.

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- Document Link: ['Space Principles of War' by Paul Szymanski.pptx](#) (9 Principles)



Sun Tzu's Teachings Applicability to Outer Space Warfare

- Based on an Analysis (Unfinished) of Sun Tzu's [The Art of War](#) (544 BC – 496 BC)
- Examples:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1							Sun Tzu							
2							The Art of War							
3							544 BC – 496 BC							
4							Applicability to Space Warfare							
5														
6		Force Status												
7		Sun Tzu Statement 1:	When able to attack, we must seem unable. When using our forces, we must seem inactive. Pretend to be weak, that he may grow arrogant.											
8		Space Warfare Strategy 1:	Deploy many covert space weapon systems & sensors with remote basing (air, sea, undersea, ground mobile, space, Moon).											
9		Space Warfare Strategy 2:	Deploy space weapon systems & sensors with multi-spectral camouflage coverings.											
10		Space Warfare Strategy 3:	Deploy space weapon systems & sensors in space with low observables coatings.											
11		Space Warfare Strategy 4:	Deploy space weapon systems & sensors in space with special shapes that do not readily reflect light back to the Earth.											
12		Space Warfare Strategy 5:	Deploy space weapon systems & sensors in space that can change attitude so they do not readily reflect light back to the Earth.											
13		Space Warfare Strategy 6:	Deploy covert space weapon systems & sensors in unusual orbits to avoid detection and precise targeting (highly eccentric, Lagrangian points, between											
14		Space Warfare Strategy 7:	Deploy covert space weapon systems & sensors that continuously change their orbits while outside an adversary's sensor coverage (e.g., maneuver over											
15		Space Warfare Strategy 8:	Develop covert space weapon systems that hide inside innocuous space objects (civilian & science missions; space objects playing dead). Have exit door											
16		Space Warfare Strategy 9:	Develop some overt space weapon systems that stay in garrison, or are transported to other theaters that do not threaten the theater that one is planning to											
17		Space Warfare Strategy 10:	Develop some overt space weapon systems that have limited technical and operational capabilities and appear to be the main space threat, but a covert w											
18		Space Warfare Strategy 11:	Develop some overt space weapon systems that have limited technical and operational capabilities and that will adsorb an adversary's main spoiling or cou											
19		Space Warfare Strategy 12:	Develop some overt civil & commercial space systems that can also have space weapons capabilities (e.g., space maintenance robot).											
20		Space Warfare Strategy 13:	Develop a plan for space sensors to "ping" space objects according to a harmless, pre-planned schedule that does not reveal plans for a surprise attack a											
21		Space Warfare Strategy 14:	Encourage allied space sensors to "ping" only space objects that are not part of an overall surprise attack plan.											
22		Space Warfare Strategy 15:	Do not deploy non-space forces in any threatening way, or deploy them in theaters other than those one intends to support with space weapons.											
23		Space Warfare Strategy 16:	Have the State Department devote considerable energy in emphasizing different political and social theaters that do not point to the intended targets and th											
24		Space Warfare Strategy 17:	Have the State Department devote considerable energy in emphasizing no first use of space weapons.											
25		Space Warfare Strategy 18:	Have the State Department devote considerable energy in emphasizing no use of debris-causing space weapons, especially if these types of weapons will											
26		Space Warfare Strategy 19:	Have the Military Departments devote some energy in emphasizing possessing limited, if any, space weapons capabilities.											
27		Space Warfare Strategy 20:	Develop alliances and treaties with more capable space partners so that you may make use of their space weapon systems in times of war.											
28		Space Warfare Strategy 21:	Deceive, Deny, Disrupt, Degrade, or Destroy adversary space sensors and intelligence collection capabilities. This includes use of cyber weapons and c											
29		Space Warfare Strategy 22:	Shield indicators of space weapons beginning attack sequences (maneuvering, thrusters warming up, thrust plumes in space, other powering up, increase											
30		Space Warfare Strategy 23:	Fake the deaths of various satellites with covert, reserve space weapons missions, over a period of months and years before the surprise attacks.											
31		Space Warfare Strategy 24:	Determine the most threatening regions of space to pre-position space weapons for the best coordinated & optimized attack sequences. These are not ne											
32		Space Warfare Strategy 25:	Concentrate space forces only at the last moment before attack.											
33														

- Document Link: [Sun Tzu's Teachings Applicability to Outer Space Warfare.xlsx](#) OR [Sun Tzu's Teachings Applicability to Outer Space Warfare.docx](#) (546 COA's)



Space Warfighting Rules

- **Top 40 Rules for Space Warfare Based on Paul Szymanski's 43 Years of Military Space Doctrinal Analyses**
- **Examples:**

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Space War Rule # 3
- Pre-Conflict Positioning -

- Since it is very difficult to change orbits at the last minute (especially changing orbital inclination), immediate space combat can only be fought with the current resources on hand in the local area. There will be no trans-conflict redistribution of space forces to help those forces under immediate attack. Thus, pre-conflict positioning of space assets is possibly the most important aspect of space strategies. This principle is related to the other fundamental principle of maximizing high maneuvering abilities of space assets.

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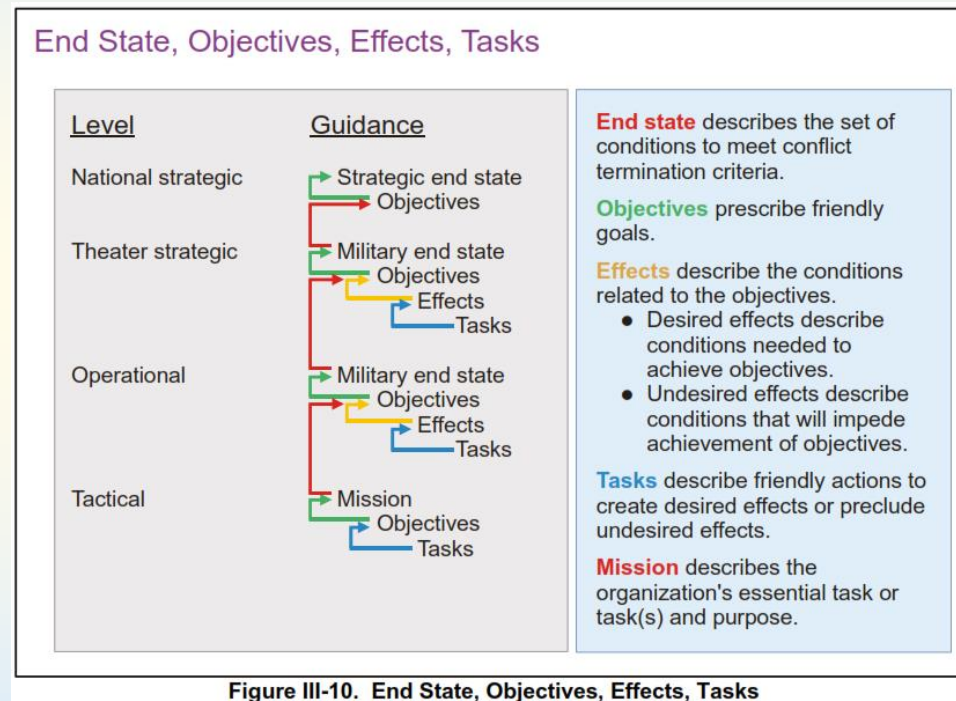
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- **Document Link: [Top 40 Rules for Space War.ppt](#) OR [How to Win the Next Space War – An Assessment.docx](#) (40 Rules)**



Space Operational Art and Design (SOAD)

- Complete Detailed Doctrinal Concepts Enabling Space War Execution Planning in Accordance with Joint Publication 5-0, "Joint Operation Planning"
- Examples:

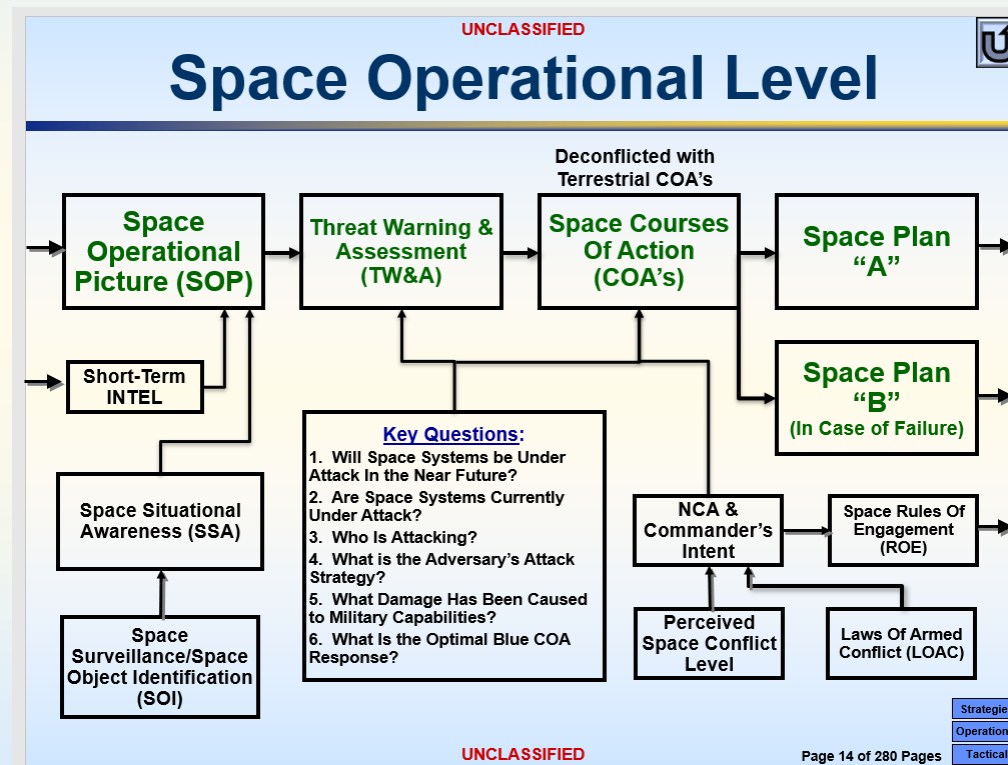


- Document Link: [Space Operational Art and Design \(SOAD\).xlsx](#)
(100's COA's)



Space Warfare Analysis Tools (SWAT)

- Detailed Summary Briefing of How to Fight and Win the Next Space War
- Example:



- Document Link: [SWAT Summary.pptx](#)



Space COA's Baseline Considerations

*“Control of space means control of the world, far more certainly, far more totally than any control that has been achieved by weapons or troops of occupation.
Space is the ultimate position, the position of total control over Earth.”
(President Lyndon Baines Johnson)*



Command and Control Relationships

Level of Command	OODA Loop			
	Observe	Orient	Decide	Act
Strategic	National Intelligence Assets	National INTEL Center	JFACC	Theater Forces
Operational	SSN	Space INTEL Center	JSpOC/ JICSPOC	AFSCN
Tactical	On-Board Sensors	On-Board Sensor Fusion	On-Board Decision Algorithms	On-Board Execution Algorithms

Strategies

Operational

Tactical



Conflict Level of War

Level of War	Rules Of Engagement (ROE)				
	<u>Deception</u>	<u>Disruption</u>	<u>Denial</u>	<u>Degradation</u>	<u>Destruction</u>
Peace	Yes	Maybe	No	No	No
Space Crisis	Yes	Yes	Yes	No	No
Conventional Terrestrial	Yes	Yes	Yes	No	No
Conventional Terrestrial & Space	Yes	Yes	Yes	Yes	Yes

Space Crisis - Does not necessarily mean a terrestrial crisis, but certainly means a crisis concerning on-orbit space systems. This would include space objects making controlled close approaches to potential targets in a threatening manner.

Note: D6 Actions Also Include “Deterrence”

Strategies

Operational

Tactical



Weapons Release Authorization Levels

Assumes Satellite **Does** Support Area Of Responsibility (AOR) of Current Concern or Conflict

Level of War	Weapons Release Authorization Level				
	<u>Space Positive Control</u>	<u>Space Autonomous Operation</u>	<u>Space Weapons Hold</u>	<u>Space Weapons Tight</u>	<u>Space Weapons Free</u>
Peace	Yes	No	No	No	No
Space Crisis	Yes	Maybe	Maybe	No	No
Conventional Terrestrial	Yes	Yes	Yes	Maybe	No
Conventional Terrestrial & Space	Yes	Yes	Yes	Yes	Maybe

Extended lost communications from ground controllers (e.g., 24 hrs.) automatically increases Weapons Release Level by one step



GEO Areas Of Responsibility (AOR's)

Assumes Satellite Does **Not** Support Area Of Responsibility (AOR) of Current Concern or Conflict

Level of War	Weapons Release Authorization Level				
	<u>Space Positive Control</u>	<u>Space Autonomous Operation</u>	<u>Space Weapons Hold</u>	<u>Space Weapons Tight</u>	<u>Space Weapons Free</u>
Peace	Yes	No	No	No	No
Space Crisis	Yes	Maybe	Maybe	No	No
Conventional Terrestrial	Yes	Maybe	Maybe	No	No
Conventional Terrestrial & Space	Yes	Yes	Yes	Maybe	No

Extended lost communications from ground controllers (e.g., 24 hrs.) automatically increases Weapons Release Level by one step



Potential Conflict Escalation

Assumes Satellite **Does** Support Area Of Responsibility (AOR) of Current Concern or Conflict

Level of War	Weapons Release Authorization Level				
	<u>Space Positive Control</u>	<u>Space Autonomous Operation</u>	<u>Space Weapons Hold</u>	<u>Space Weapons Tight</u>	<u>Space Weapons Free</u>
Peace	0%	10%	20%	80%	90%
Space Crisis	0%	20%	30%	90%	90%
Conventional Terrestrial	0%	30%	50%	100%	100%
Conventional Terrestrial & Space	0%	20%	30%	40%	50%

Numbers listed are probabilities that satellite actions taken at their authorized Weapons Release Level will cause conflict escalation to next Level of War



Fundamental Command Decisions

*“Strategy is the art of making use of
time and space. I am less concerned
about the latter than the former. Space
we can recover, lost time never.”*
(Napoleon Bonaparte)



General Considerations for Commanders' Decisions to Execute Space COA's (1)

- **Conflict Escalation Ladder**
 - Estimate of Current Conflict Escalation Ladder Level
 - Assumption of Conflict Escalation Ladder Level Changes Due to Space COA Execution
- **Space COA Coverttness**
 - Required Space COA Coverttness
 - Confidence in Space COA Coverttness
 - Have Steps Been Taken to Reduce the "Fog of War"
- **Space COA Execution Impact on Post-Conflict World**
 - New Space Treaties Required?
 - Potential Adversary Buildup of Space Warfare Capabilities
 - Attacked Adversary Reconstitution of Space Warfare Capabilities Post-Conflict
 - Impacts on Allies



General Considerations for Commanders' Decisions to Execute Space COA's (2)

- **Space COA Restrictions (A)**
 - Satisfies Commanders Intent
 - Exhibits Commander Decisiveness
 - Within Required Effect Timelines
 - Space COA's Keeps Inside Adversary OODA (Observe, Orient, Decide, Act) Loops
 - Execution Results Can be Verified
 - Target is Within Effective Range of Space Weapon
 - Within Rules of Engagement (ROE)
 - Within Laws of Armed Conflict (LOAC)



General Considerations for Commanders' Decisions to Execute Space COA's (3)

- **Space COA Restrictions (B)**
 - Within Acceptable Probability of Kill (Pk) – May Require Multiple Attacks by Different Phenomenology Weapon Systems to Increase Pk
 - Target is Not on Restricted Target List (RTL)
 - Target Does Not Have Radiological (Satellite Manufacturing Facilities – RTG's) or Prone to Toxic Chemical Leaks (e.g., Space Launch Sites)
 - Has Decisive Impact on Terrestrial Battlefield (Impacts Space Centers of Gravity & Space Choke Points)
 - Has Acceptable Cost Exchange Ratio (ASAT Cost vs Target Cost)
 - Minimizes Space Debris Creation



General Considerations for Commanders' Decisions to Execute Space COA's (4)

- **Space COA Restrictions (C)**
 - Does Space COA Take Advantage of Regions of Space & Time With Advantageous Solar Phase Angles / Terrestrial Sensor Coverage?
 - Does Space Weapon Approach Target From its “Blind” Side?
 - Approach Trajectories Outside the Field Of Regard of the Target's On-Board Sensors
 - Approach Trajectories When the Sun/Moon/Earth Is In the Background of a Target's Sensors
 - Approach Trajectories Outside Normally Employed Orbits
 - Does Space Weapon Approach When Target is Out of View of Adversary?
 - Just After Loss of Contact With Adversary Satellite Ground Controllers
 - Just After Loss of Contact With Adversary Space Surveillance Assets
 - Times of Cloud Cover/Weather/Natural Disasters for Terrestrial-Based Space Surveillance Systems



General Considerations for Commanders' Decisions to Execute Space COA's (5)

- **Space Force Readiness (A)**
 - Space Forces Available & Ready to Execute
 - Confidence Space Forces Have Adequate Training to Execute Mission Correctly
 - Confidence in Exotic Space Weapons Technologies that May Have Not Been Employed Previously
 - Have Space Weapons Been Available to Previous Space Conflicts & Have Been Able to be Used in Training & Doctrine Development?
 - Are Space Forces Executing COA Survivable?
 - Impact on Space Forces Re-Load Timelines



General Considerations for Commanders' Decisions to Execute Space COA's (6)

- **Space Force Readiness (B)**
 - Amount of Delta-V Space Forces Must Expend to Execute Mission
 - Have Space Sensors Adequately Located Targets & Defending Assets
 - Many Times a Space COA May Simply be Pre-Positioning Your Space Forces to Critical Space Choke Points to Possibly Deter Your Enemy
 - Does the Employment of Blue Space Weapons Impact the Ability to Use Them Later?
 - War-Reserve Covert Weapons are Now Observable, and Kill Mechanisms May No Longer be Effective
 - Space Weapons are Probably Limited in Quantities, & Use for One specific COA Ensures They Are Not Available for Other Subsequent Attacks



General Considerations for Commanders' Decisions to Execute Space COA's (7)

- **Political Restrictions**

- Is There Decisive Political Will to Execute Space COA's & Accept Potential Trans-Conflict & Post-Conflict Consequences
- Can Space Weapon Employment Approval be Gained in a Timely Manner From Higher Authorities?
- Space COA's Impact on Space Alliances & Treaties
- Will Space COA Execution Re-Align Both Blue & Red Allies?
- Space COA Execution Impact on United States Population Attitudes About War in Space
- Space COA Execution Impact on Post-Conflict Commercial / Civil Use of Space
- Is the Intended Target Employed by Both Military & Commercial / Civil Users that May Require Surgical Targeting?



General Considerations for Commanders' Decisions to Execute Space COA's (8)

- **Military Considerations (A)**
 - Have You Delineated the Definition of “Wining” the Space War?
 - Do Space COA's Have Well-Defined Goals, End States, Branches, Sequels & Expected Action-Reaction Consequences?
 - Does the Space COA's Vary Employed Space Weapon Phenomenology Types & Basing Locations?
 - Has Space Strategy / Tactic Been Tried Before?
 - Space COA Ability to Surprise / Confuse, Shock & Awe Adversary
 - Ability of Adversary to Frustrate Space COA Preparations, Execution, & Attack Verifications



General Considerations for Commanders' Decisions to Execute Space COA's (9)

- **Military Considerations (B)**
 - Has Space COA Been Co-ordinated / De-conflicted With Terrestrial & Other Space COA's?
 - Are Potential Adversary Counter-Actions to Blue Space COA Executions Acceptable?
 - What is the Probability of Collateral Damage?
 - Are Allied Intelligence Agencies Collecting on the Intended Target, and Thus They May Lose Valuable Intelligence Data?
 - Are You Attacking at Adversary Organizational Boundaries Between Competing Space Departments' Responsibilities. Similar to Attacking at the Geographic Boundaries Between Two Different Infantry Divisions
 - Do You Understand & Assess the Many Unknowns Associated with Space Warfare? Do you Believe in the Confidence Levels of These Unknowns?



General Considerations for Commanders' Decisions to Execute Space COA's (10)

- **Space COA's Satisfy Space Principles of War (A)**
 - **Objective** – “Set Clear Goals”
 - Are space COA's clearly defined, decisive, & have attainable objectives with measurable effects?
 - **Offensive** – “Seize, Retain, & Exploit the Initiative”
 - Do space COA's seize, retain, & exploit the initiative?
 - Are you setting the time, place & terms of the space battle?
 - Does the battle tempo include space attacks on a continuing basis to keep your adversary off-balance?
 - Is there a pre-approved ramp-up of space attack severity to exploit successes for further gain?
 - **Mass** – “Mass the Effects of Overwhelming Combat Power at the Decisive Place and Time”
 - Are there sufficient weapons to achieve continuous, or sustained space control?
 - Are the space weapons overwhelming to the military function they are trying to deny?
 - Is there political will to implement massed space attack?
 - Can space weapons get into position at the decisive place and time?
 - Do You know the decisive place and time for space weapons application?
 - Can space weapons be synchronized for employment simultaneously?



General Considerations for Commanders' Decisions to Execute Space COA's (11)

- **Space COA's Satisfy Space Principles of War (B)**
 - **Economy** of Force – “Allocate Minimum Essential Combat Power”
 - Are all space control efforts and weapon systems integrated into one deployment / employment plan?
 - Are all space control systems employed purposefully at all times of the conflict, even in delay, limited or deceptive kinds of attack that focus the adversary's attention away from the main space attack?
 - **Maneuver** – “Place the enemy in a position of disadvantage through the flexible application of combat power”
 - Have space weapons been deployed in optimal positions and time-space phasing?
 - Are there critical orbits/time phasing/launch corridors/communications paths around the world contributing to the battlefield that need space superiority consideration?
 - Has blue freedom of action been maximized while minimizing red freedom of action in space?
 - Are points of application of space control weapons constantly shifted to confuse adversary response, and avoid predictable patterns of operation, for survivability reasons?



General Considerations for Commanders' Decisions to Execute Space COA's (12)

- **Space COA's Satisfy Space Principles of War (C)**
 - **Unity of Command** – “For every objective, seek unity of command and unity of effort”
 - Have space control, info war, and air/ground attack plans been integrated with each other and with intelligence collection requirements?
 - Is there adequate space/info war delineation of chain of command and decision responsibility?
 - Are space target lists traceable back to objectives (both red and blue)?
 - Do blue and red terrestrial commanders appreciate the importance of space to their conduct of the war?
 - **Security** – “Never permit the enemy to acquire unexpected advantage”
 - Are space forces survivable in the battlefield environment?
 - Have OPSEC and fratricide concerns been met?
 - Have blue space choke points (orbits/time phasing/launch corridors/communications paths), centers of gravity (TT&C and launch sites), logistics, and command structures been identified and protected?
 - Does blue have alternative space-related sensor, processing, command, and communications paths?
 - Are red space strategies, tactics, doctrine, organization, and intentions assessed?



General Considerations for Commanders' Decisions to Execute Space COA's (13)

- **Space COA's Satisfy Space Principles of War (D)**
 - **Surprise** – “Strike the enemy at a time or place or in a manner for which he is unprepared”
 - Are space control weapons existence known to an adversary, or does he know they have been deployed to the theater, or do they have war operating modes to surprise the enemy by their use?
 - Are there a series of surprise space control weapons that can be alternated in use to maintain cover?
 - Is the use of these weapons detectable or attributable to a specific country by an adversary?
 - Timing and tempo of space weapon use can surprise also, even if their existence is known
 - Threat of weapon use, even if does not exist, can effectively surprise



General Considerations for Commanders' Decisions to Execute Space COA's (14)

- **Space COA's Satisfy Space Principles of War (E)**
 - **Simplicity** – “Prepare clear, uncomplicated plans and concise orders to ensure thorough understanding”
 - How complex are space weapons, and are the effects of their use easily understandable by non-space blue and red commanders (do they know they've been hurt bad)?
 - Are there branches and sequels to space control operations if they fail or if they are successful?
- **All Space COA's Must Also Consider Post-Conflict Reconstruction / Reconstitution**



General Considerations for Commanders' Decisions to Execute Space COA's (15)

- **Space COA's Use of Combined Arms**
 - Space vs Terrestrial Attack
 - Delay vs Kill Effects
 - Deterrence vs Employment
 - Covert vs Overt Weapons
- **Space COA's Balance**
 - Offense vs Defense
 - Levels of Attack Also Include Deterrence
 - Deter
 - Pre-Conflict
 - Trans-Conflict
 - Deceive
 - Deny
 - Disrupt
 - Degrade
 - Destroy



General Considerations for Commanders' Decisions to Execute Space COA's (16)

- **Space COA Considerations Based on a Few of Sun Tzu's Ancient Military Teachings (A)**
 - Employ Feint Attacks Along With Space COA Main Attack Directions
 - Constantly or intermittently conduct small maneuvers to frustrate an adversary's ability to calculate precise orbital parameters in order to target allied satellites, and prevent him from understanding allied space plans, doctrine, strategies and tactics
 - Only use space weapons if the effect is commensurate with the political and financial costs, loss of future surprise, and loss of future capabilities (weapon system magazines used up and consequences of adversary responses affecting Blue and Gray systems)



General Considerations for Commanders' Decisions to Execute Space COA's (17)

- **Space COA Considerations Based on a Few of Sun Tzu's Ancient Military Teachings (B)**
 - Study an adversary's space doctrine, strategies, tactics, organizations, and leadership personalities to discover his strengths and weaknesses so that you may better catch him off-guard during surprise space systems attacks
 - Continually harass your adversaries' fixed space systems defenses, so that they are constantly off balance, more hurried and less timely in fulfilling their mission objectives
 - Remember, you are not fighting an adversary's forces and machines as much as you are fighting an adversary commander's perceptions, biases, experiences, training, organizational structures, his upper military and political managers, intelligence, mental, and emotional strengths, weaknesses and endurances. The weakest point in a space system may be the human element, including scientists, engineers, technologist and additional supporting staff



General Considerations for Commanders' Decisions to Execute Space COA's (18)

- **Space COA Considerations Based on a Few of Sun Tzu's Ancient Military Teachings (C)**
 - Dangle out in front of your adversaries tempting space systems targets to draw out his space control resources and military plans and intents
 - Those who start conflicts and attack first, best know the place and time of the coming space battle
 - Due to orbital dynamics, and continual satellite movement, the place and time of the coming battle is constantly moving and changing. This requires different strategic and tactical perspectives than terrestrial battles, and demands unique graphical solutions and highly dynamic computer processing to support battle planning
 - Many times, those that get to the battle the quickest are the winners, not those who wait in order to concentrate the most forces



General Considerations for Commanders' Decisions to Execute Space COA's (19)

- **Space COA Considerations Based on a Few of Sun Tzu's Ancient Military Teachings (D)**
 - A good space plan requires your adversaries to come at you, and use up their maneuvering resources more so than yourself, allowing allied systems to perform better aggressive attacks later on
 - You may sacrifice some space assets to make your adversaries believe in your carefully falsified military objectives
 - Periodically launch new space vehicles to keep your adversaries confused and off balance
 - Launch or maneuver a new mysterious satellite that comes close to critical adversary satellites, to make your adversaries pause in their military execution plans, and to show resolve, and as a warning for them to back down



General Considerations for Commanders' Decisions to Execute Space COA's (20)

- **Space COA Considerations Based on a Few of Sun Tzu's Ancient Military Teachings (E)**
 - Heavily defend certain orbits to force an adversary's spacecraft to other orbits of your choosing
 - During space conflicts you may decide to trade orbital space for time - in other words you may give up key orbits and maneuvering room solely because it will take your adversaries some time to fill this void, or chase you down, or simply force him to use up valuable satellite fuel, while giving yourself more time to make better counter-attack preparations
 - Initiate multiple false starts, threatening space and terrestrial maneuvers, etc. to induce your adversaries to begin constant satellite maneuvering, so as to waste their on-board fuel reserves before actual conflict starts
 - The most easily accessed orbits might also be the best killing zones



Space Scenarios Details

*“If everyone is thinking alike, then
somebody isn't thinking.”*
(General George S. Patton)



Scenarios Purpose

- **Develop Detailed and Stressing Military Space Scenarios that Combine Strategic and Tactical Courses of Action (COA's) to Test Automated Space Battle Management Command & Control (BMC²) Systems and Space Commanders' Fundamental Decision-Making Processes**

Delineates Fundamental Space Battle Management Issues



“Operation Blue Talon (OBT)” Scenarios

- Scenario Notional Space Systems Names, [Mil-STD 2525 Icons](#), and Photos Are Automatically, Randomly Generated and Assigned by SWAT to Non-Attribution Country Names to Keep Scenarios UNCLASSIFIED

Operation Blue Talon		
Country-Blue	Country-Gray	Country-Red
Newmex (NX)	Washorgon (WO)	Califon (CA)
		Orgonia (OR)
		Nevidah (NV)



Operation Blue Talon (OBT) Scenarios

OBT Scenario	Scenario Sequence	Scenario Name	Attacker	<u>Conflict Escalation Ladder</u> Space Campaign Phase	Attacker Mission
 A	Space Scenarios Phase I	Troubled Peace	RED attacks BLUE	1st Wave Attacks Phase A - Pre-Conflict Deter	Satellite Close Inspection INTEL Collection
B	Space Scenarios Phase IIA	Regional Crisis - Deter -	RED attacks BLUE	2nd Wave Attacks - Trans-Conflict Deter	Show of Force Deterrence
C	Space Scenarios Phase IIB	Regional Crisis - Reversible Effects -	RED attacks BLUE	3rd Wave Attacks Phase A1 – Terrestrial-to-Space Partial Temporary Effects	Temporarily Jam Satellites
D	Space Scenarios Phase III	Beginning Salvos of Space Conflict	RED attacks BLUE	4th Wave Attacks Phase A2 – Terrestrial-to-Space Total Permanent Kill	"Combined Arms" Satellite Destruction
E	Space Scenarios Phase IV	Terrestrial & Space Conflict	RED attacks BLUE	4th Wave Attacks Phase B2 – Space-to-Space Total Permanent Kill	"Combined Arms" Satellite Destruction
F	Space Scenarios Phase V	Blue Space Counterattacks	BLUE attacks RED	4th Wave Attacks Phase B2 – Space-to-Space Total Permanent Kill	Blue Counterstrike in Space

 Baseline Scenario



Space Scenarios Phase I

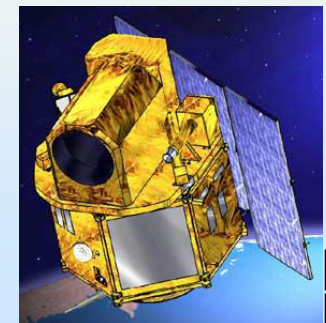
– Troubled Peace –

Conflict Escalation Ladder Space Campaign
Phase: “1st Wave Attacks Phase A - Pre-
Conflict Deter”



OBT Scenario A - Background

- Scenario A:
 - Conflict Level: Peace
 - Weapons Release Authorization Level: Space Positive Control
 - Space Rules Of Engagement (ROE): Only Deception
 - Space WX Condition: Unusually High Solar Storm Activity
 - Space Defense Region: GEO ASIA
 - Satellite at Risk: **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01003) **[Eagle Satellite]**
 - Pre-Event Satellite Condition: Nominal
 - Possible **Red** ASAT Satellite: Califon Savanne Micro GEO Inspector Satellite (BE CA90F08005) **[Gladiator Free Flyer]**



Strategies

Operational

Tactical



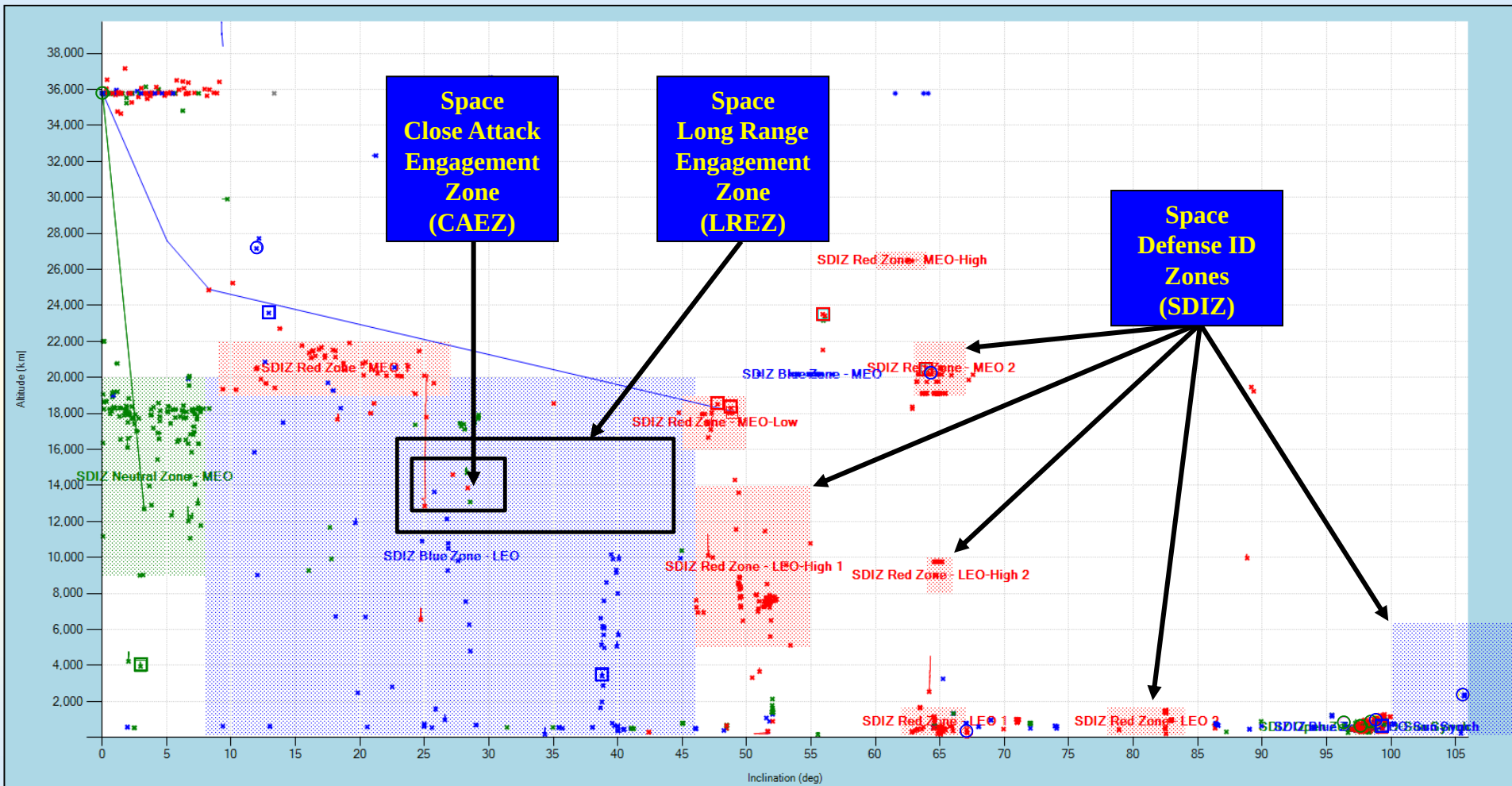
OBT Scenario A - Description

- **Scenario A Events:**
 - During a period of intense Solar activity the **Blue Newmex** Itatingui Large GEO COMM Satellite (BE NX90F01003) experiences unusual upset events and internal systems dysfunctional behaviors, degrading communications antennas power output, causing reductions of about 20%.
 - During these outages the Itatingui GEO COMM Satellite was supporting **Newmex** military exercises in the Western Pacific
 - Also during these outages a **Califon** Savanne Micro GEO Inspector Satellite may have been nearby



Space Defense Identification Zones

- Space Areas Of Responsibility (AOR's) -

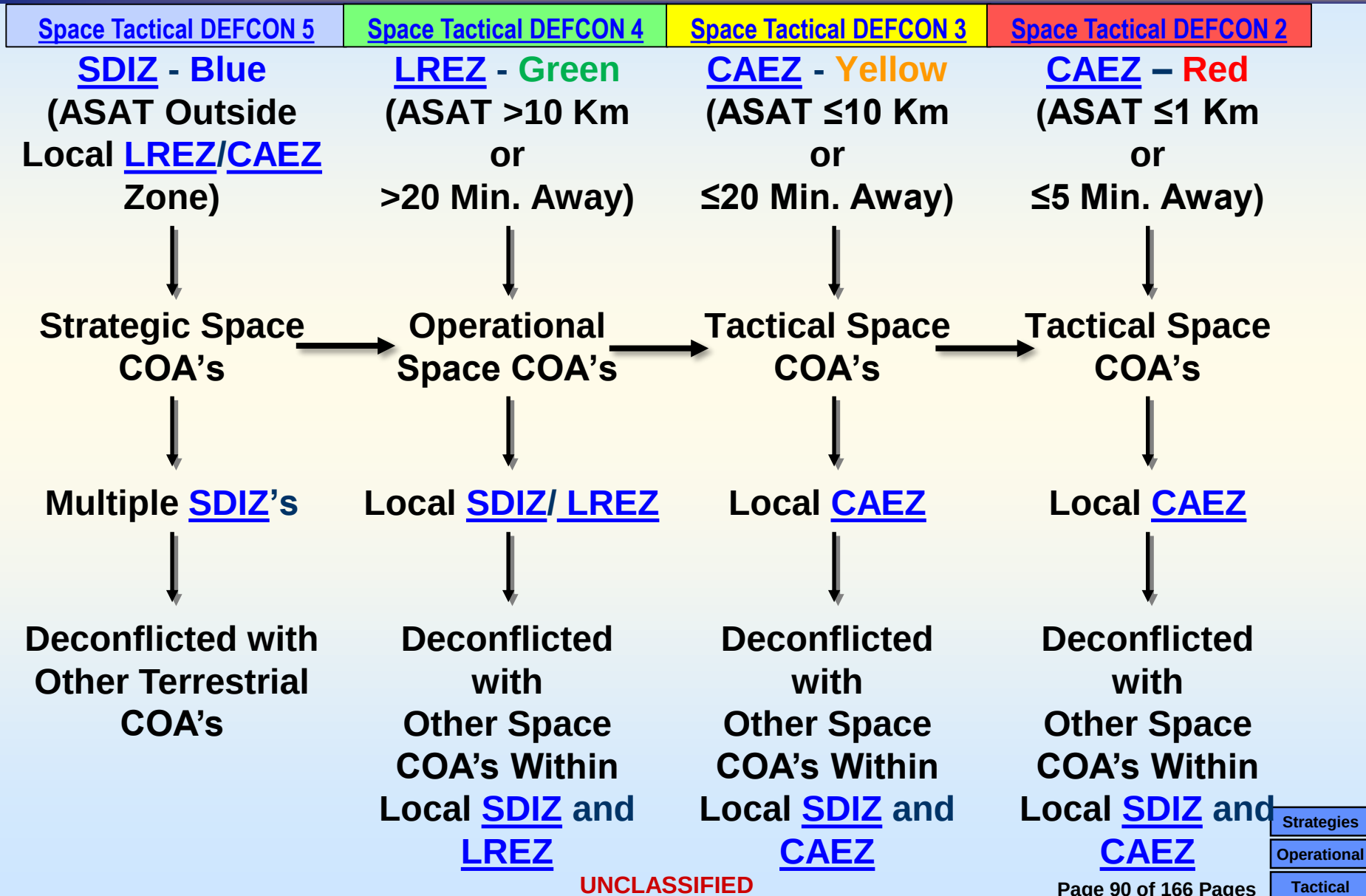


SSA Detection Zones Help Partial Out Operational Responsibility



OBT Scenario A – Space COA's

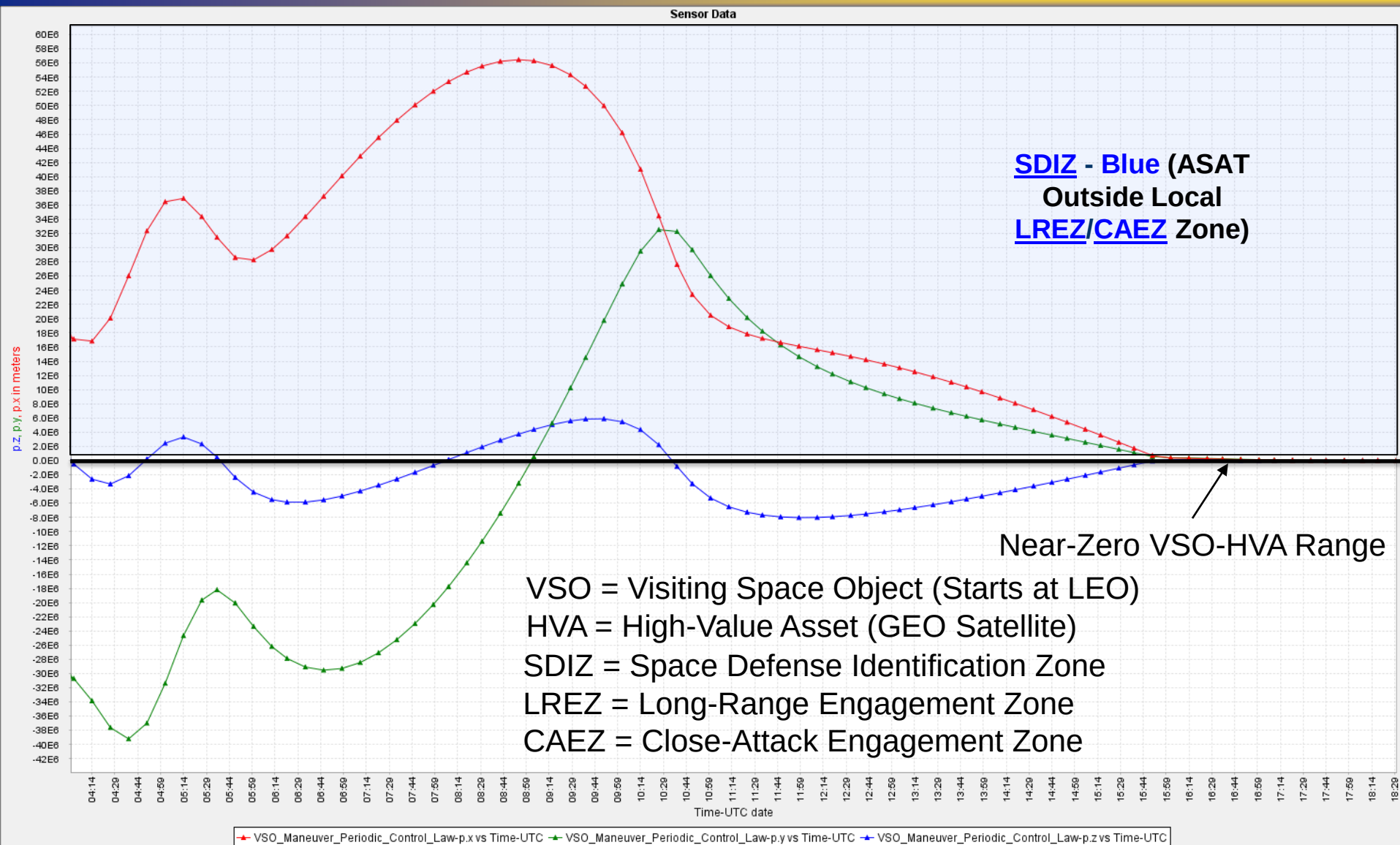
Strategic – Operational – Tactical Relationships





Proposed Orbital Keep-Out Zones

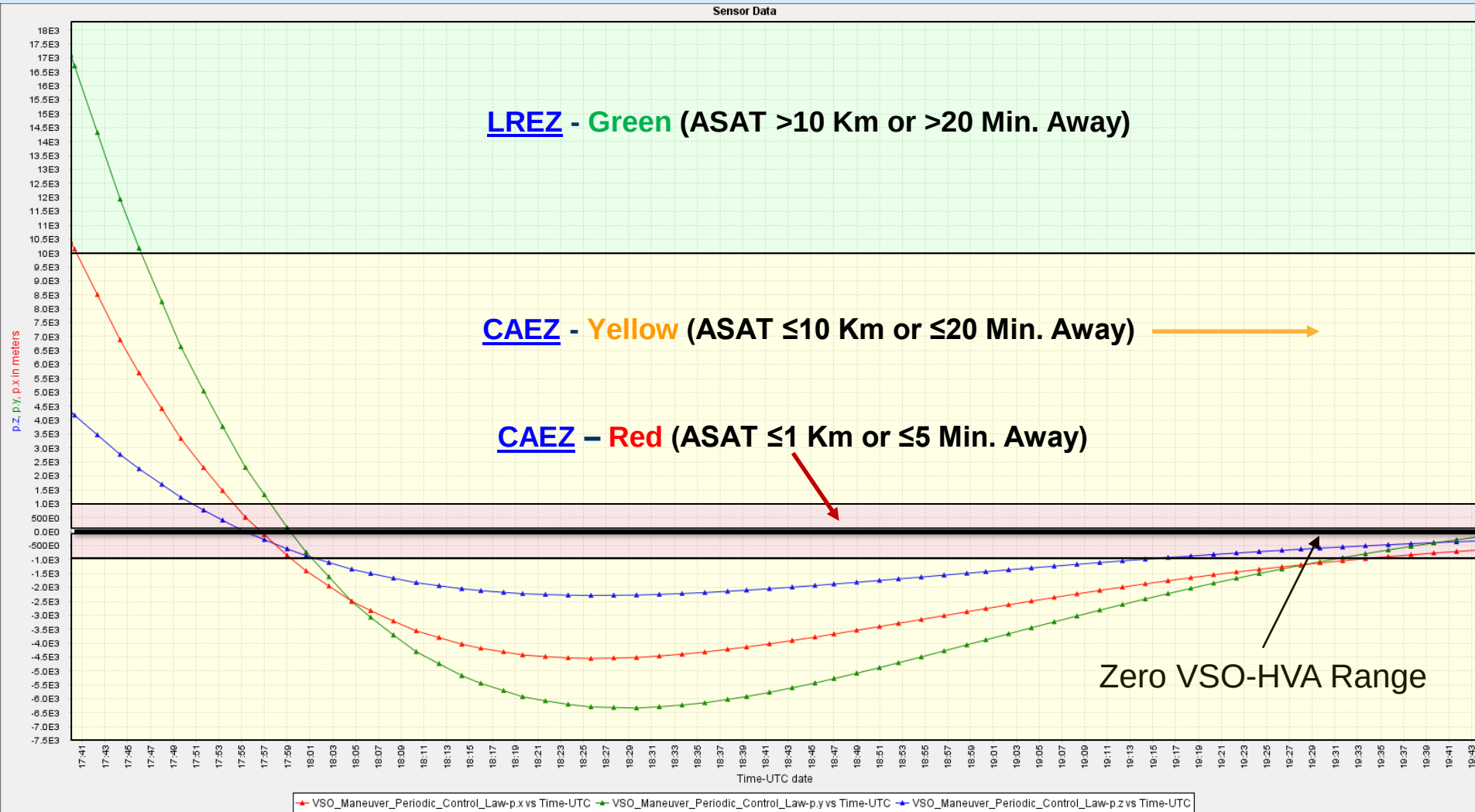
Typical Approach Trajectories - Overview





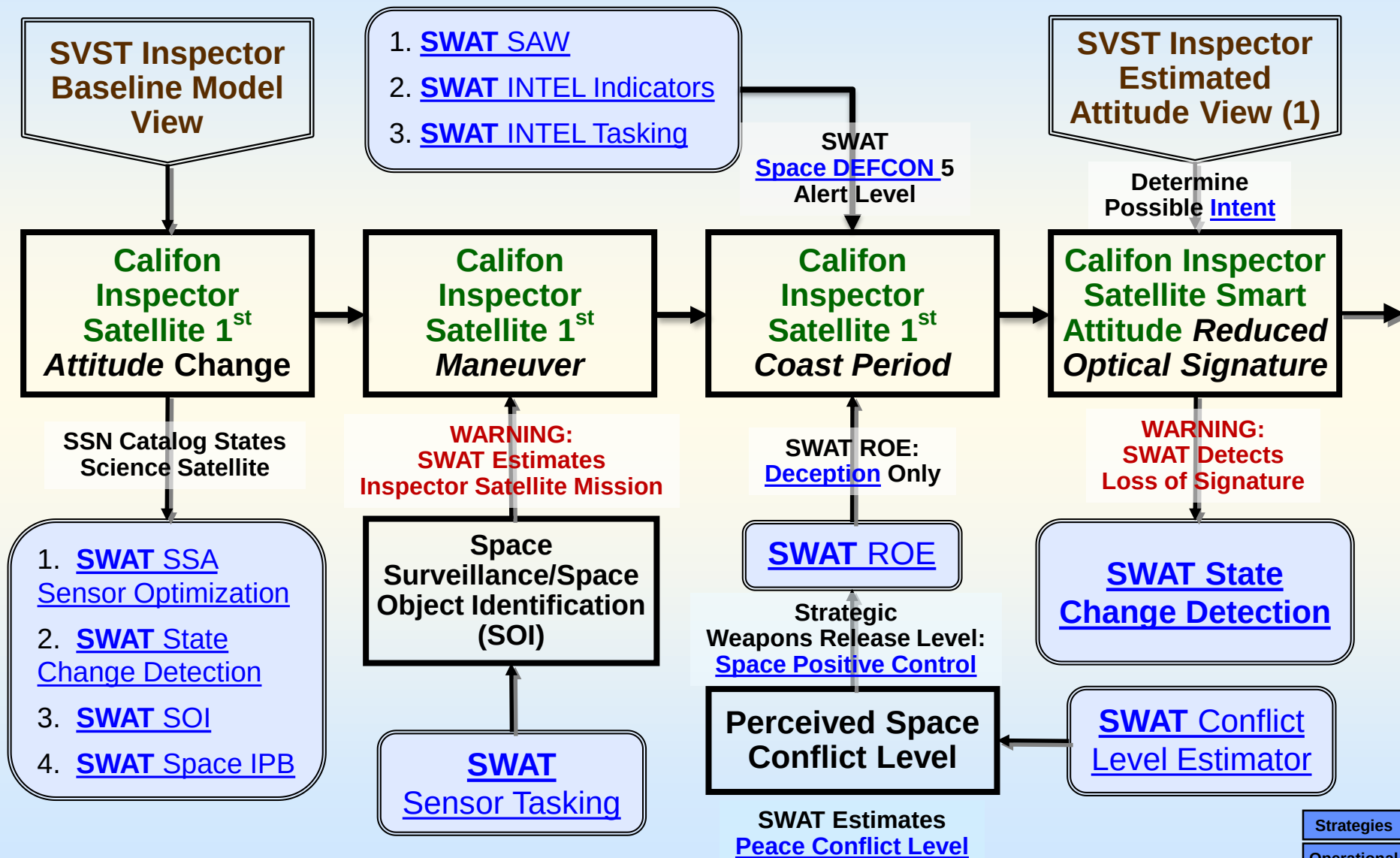
Proposed Orbital Keep-Out Zones

Typical Approach Trajectories - Detail



OBT Scenario A – Sequence of Events

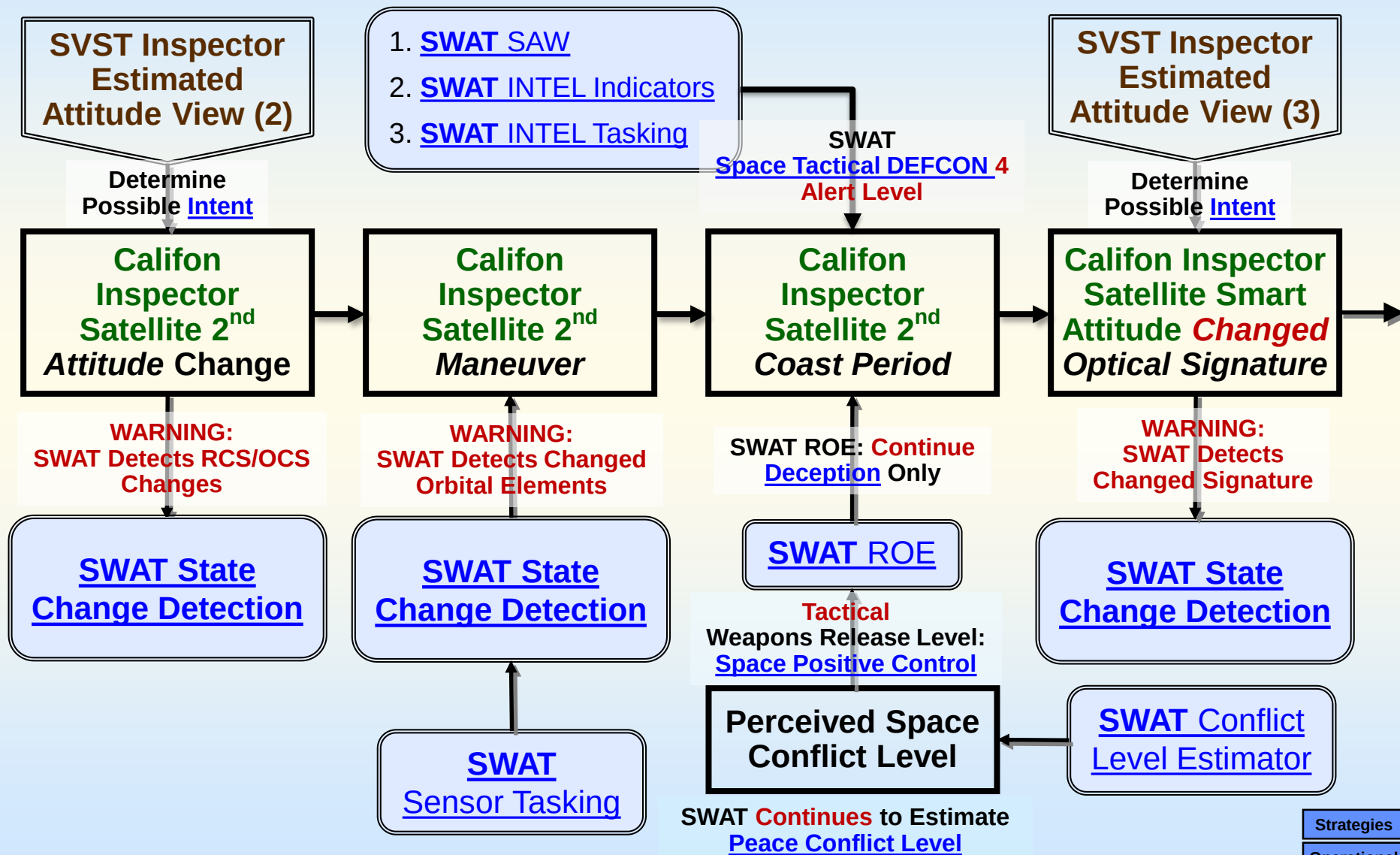
SDIZ - Blue (ASAT Outside Local LREZ/CAEZ Zone)





OBT Scenario A – Sequence of Events

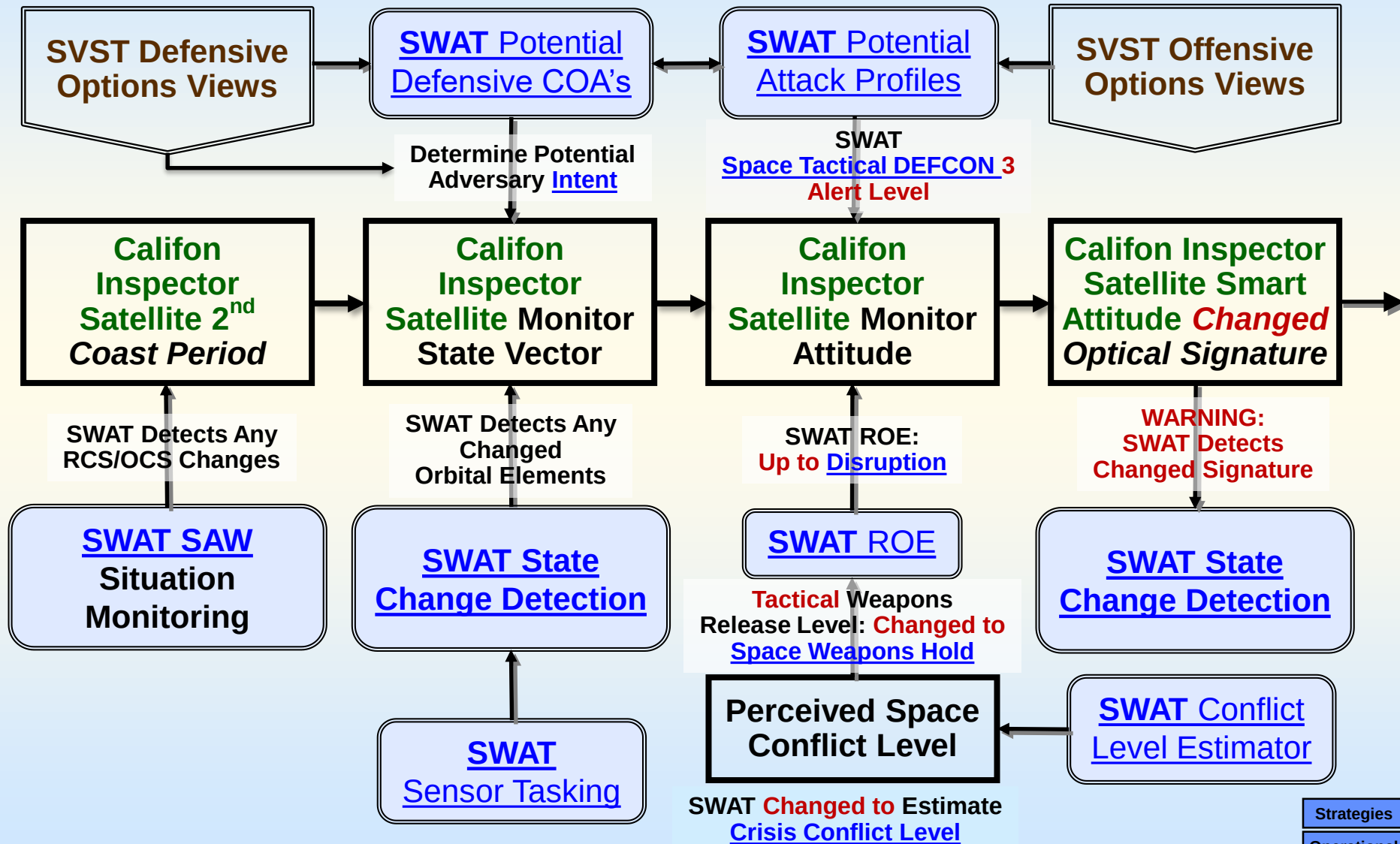
LREZ - Green (ASAT More Than 10 Km or 20 Min. Away)





OBT Scenario A – Sequence of Events

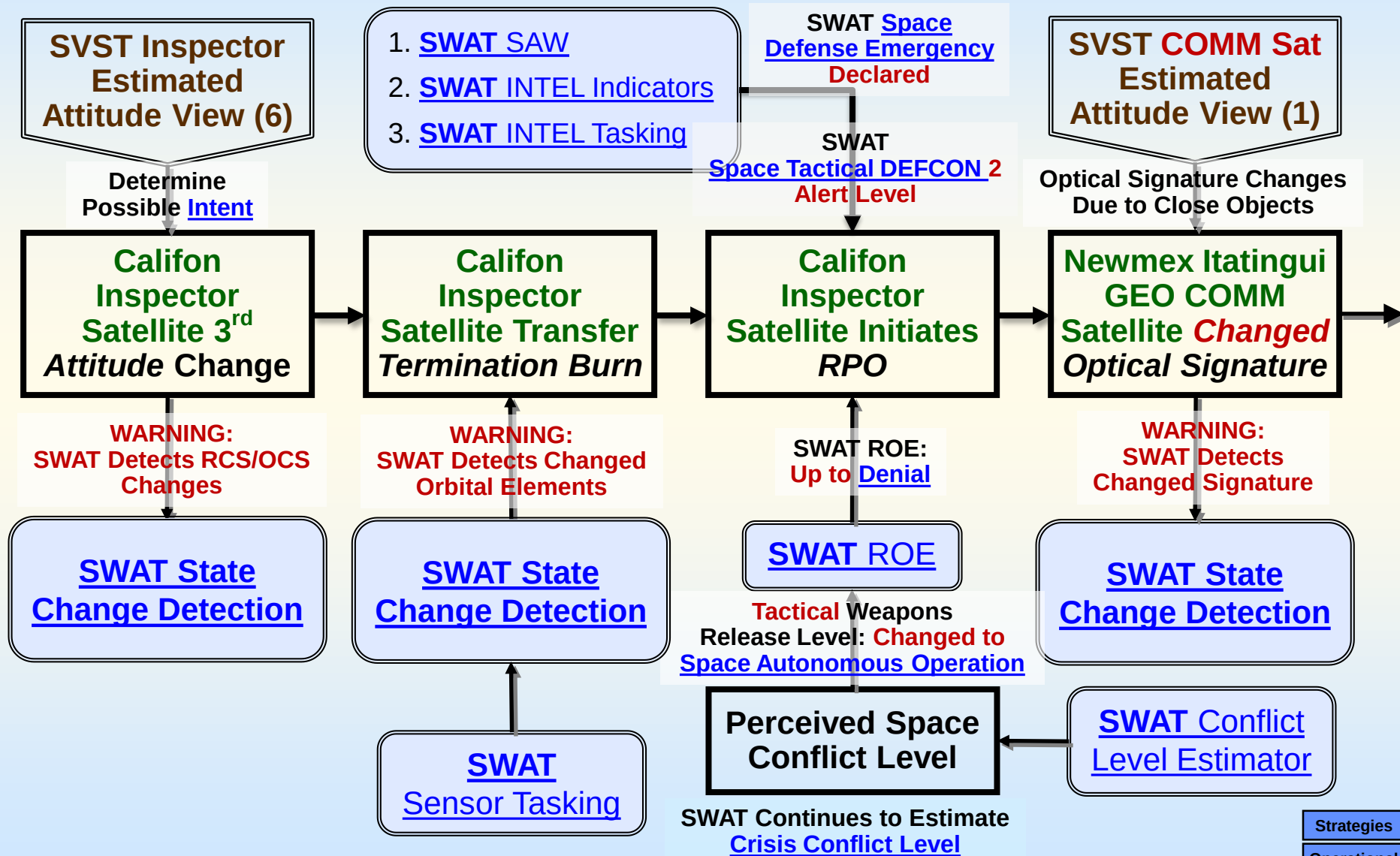
CAEZ - Yellow (ASAT <10 Km or <20 Min. Away)





OBT Scenario A – Sequence of Events

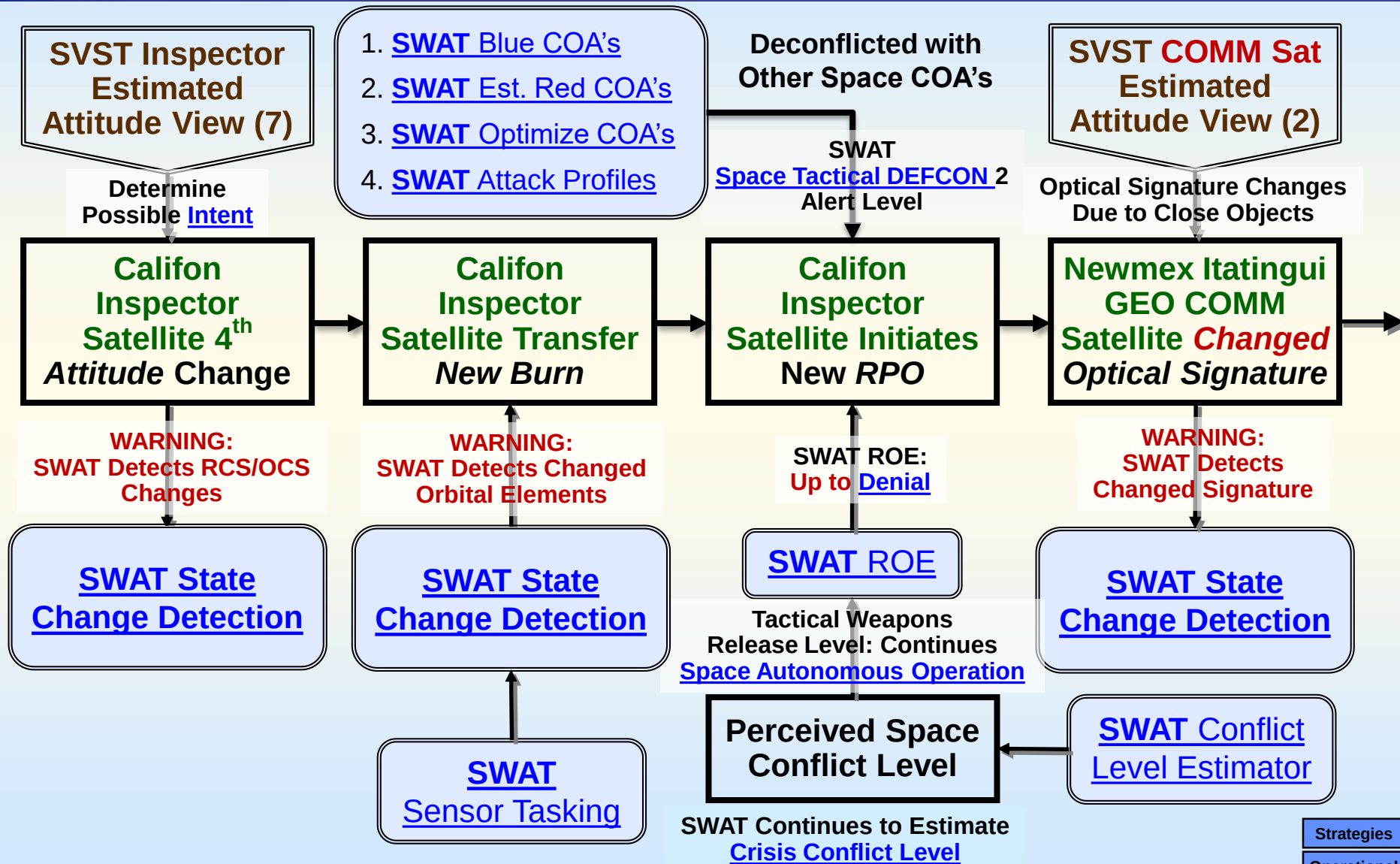
CAEZ - Red (ASAT <1 Km or <5 Min. Away) – Initial RPO





OBT Scenario A – Sequence of Events

CAEZ - Red (ASAT <1 Km or <5 Min. Away) – RPO OPS





OBT Scenario A – Potential Tactical COA's

LREZ - Green (ASAT More Than 10 Km or 20 Min. Away)

- Do Nothing since the satellite degradation did not significantly impact the satellite mission, and any counteractions may be observable by potential future adversaries. **Califon** inspection satellite may have only been testing **Nemex** war-reserve mode responses
- Turn Classified Components Away from approaching satellite to prevent discovery of critical technical parameters
- Reboot Satellite, though this degrades satellite mission, and risks that satellite may never come out of re-boot
- Coordinate & Warn other nearby satellites (within own SDR) if they were experiencing similar difficulties
- Task On-Board Sensors to develop better information
- Report Back to Higher Headquarters and INTEL agencies on the nature of this possible attack

SDIZ = Space Defense Identification Zone

SDR = Space Defense Region



OBT Scenario A – Potential Tactical COA's

CAEZ - Yellow (ASAT 10 Km or 20 Min. Away)

- Face Satellite Away from ASAT threat, by changing attitude so RADAR Cross Section (RCS) and optical visual magnitude are reduced, along with moving sensitive parts of the satellite away from potential attacks (alternative is to possibly face heat radiators towards ASAT due to their inherent hardness)
- Spin Satellite to make it more difficult and uncertain for any other satellite to conduct close operations, and may deplete fuel reserves of attacking satellite. In addition, this may distribute any energy impinging onto the satellite across a broader surface, increasing the likelihood that the satellite will be able to withstand a Directed Energy attack
- Maneuver Satellite outside immediate danger zone, which may temporarily cease satellite missions, and reduce lifetime
- Randomly Maneuver Satellite within immediate danger zone, to make it more difficult and uncertain for any other satellite to conduct close operations. However, this may temporarily cease satellite missions, and reduce lifetime
- Maneuver Satellite to Blind approaching ASAT so Sun is behind Blue satellite (reverse “Hun Out of the Sun” tactic)
- Collect INTEL data from approaching **RED** satellite



OBT Scenario A – Potential Tactical COA's

CAEZ - Red (ASAT <1 Km or <5 Min. Away)

- Conduct Cyber Attack against any suspected satellites in Rendezvous & Proximity Operations (RPO). This would violate Weapons Release Authorization and ROE if more severe than a Deception attack and conducted automatically
- Employ Electrostatic Shock defense mechanism to neutralize any ASAT that may come in contact with Blue satellite
- Increase Power, which may risk burning out some satellite subsystems
- Point High-Power Antennas towards approaching threat satellite
- Close Shutters for sensitive optical components that may be vulnerable
- Isolate Electronics from potential High-Power Microwave (HPM) attacks
- Cease Transmissions to prevent SIGINT INTEL assessment by Red or Neutral approaching satellite
- Declare a Space Defense Emergency



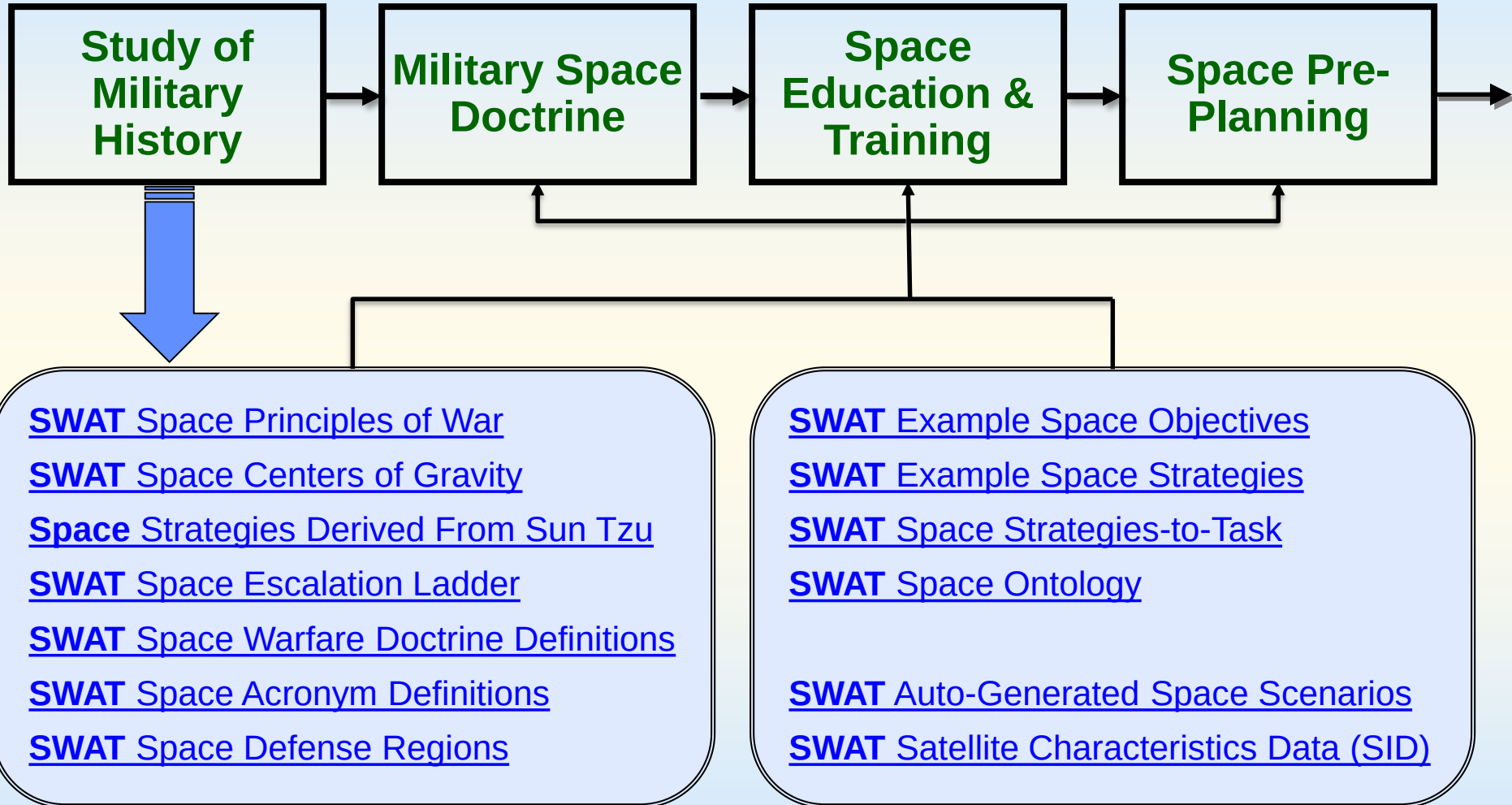
OBT Scenario A - Truth

- **Blue Perceptions:**
 - It is uncertain whether the upset conditions are caused by natural phenomena (Solar storm) or the approaching **Red** satellite. Due to this uncertainty, and the currently low Conflict Level (Peace), only passive protective COA's are taken that do not significantly impact the **Blue** satellite mission
- **Actual Red Satellite Mission:**
 - **Red** waited until high Solar activity to approach the **Blue** satellite to cover its tracks
 - **Red** satellite was near **Blue** satellite to monitor the effects of a covert terrestrial-based cyber weapon that was tested against **Blue** satellite



OBT Scenario A

- Commander's Actions -

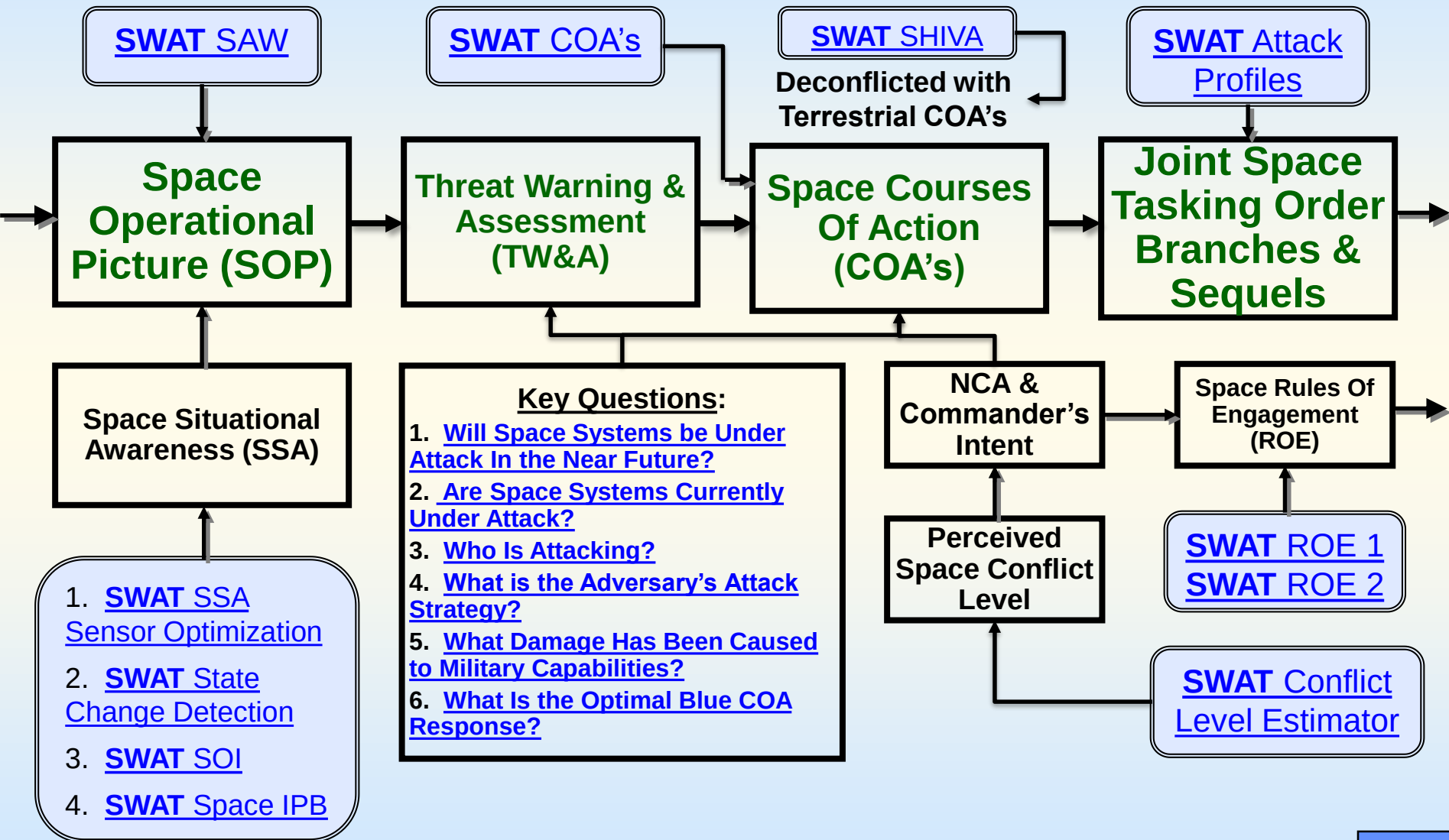


SWAT Hyperlinks to Specifics in [Blue](#) (Must be in PowerPoint Slide Show Mode)



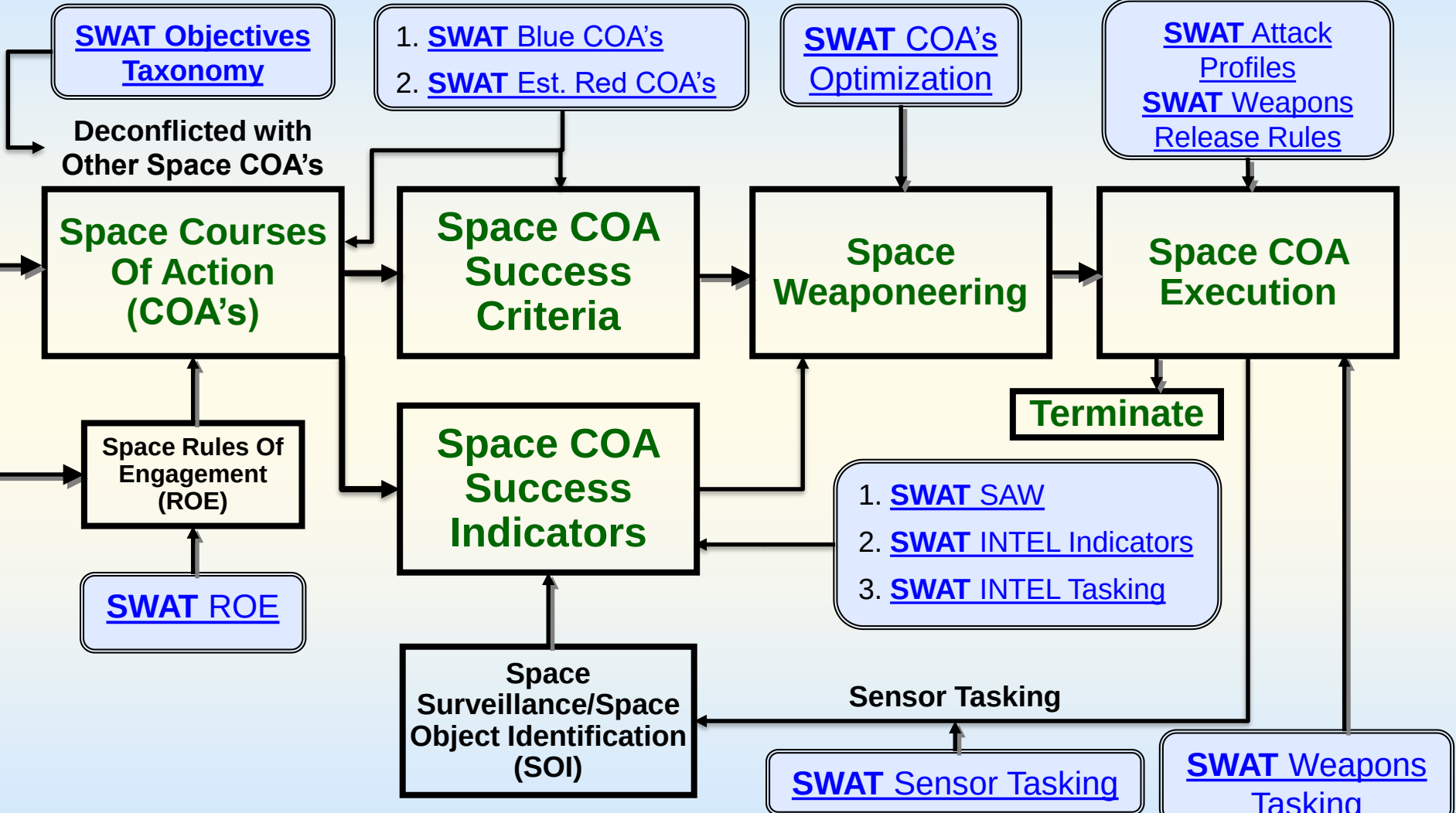
OBT Scenario A

- Commander's Actions -



SWAT Hyperlinks to Specifics in **Blue** (Must be in PowerPoint Slide Show Mode)

OBT Scenario A



SWAT Hyperlinks to Specifics in **Blue** (Must be in PowerPoint Slide Show Mode)



OBT Scenario

– Potential Commanders' Decisions (A) –

- Decide on Perceived Space Threat Level
 - Previous Military Actions (Space & Terrestrial, Red & Blue) Affecting Space Forces
 - Declare a Space Defense Emergency
- Increase Space Weapons Release Authorization Level
 - Terrestrial Military Forces Supporting Space Control
 - On-Orbit Satellite Self-Defenses
 - Impacts on Conflict Escalation Ladder
 - Political Implications of Precipitating “Space War”
 - Rules of Engagement (ROE)
 - Laws of Armed Conflict (LOAC)



OBT Scenario

– Potential Commanders' Decisions (B) –

- Chose Space Course(s) of Action in Response, if Any
 - Active Measures
 - Passive Measures
 - Increase Readiness Posture of In-place Forces (Terrestrial & Space)
 - Upgrade Alert Status
 - Increase Intelligence, Surveillance, & Reconnaissance
 - Initiate or Increase Show-of-Force Actions
 - Increase Training & Exercise Activities
 - Increase Defense Support to Public Diplomacy
 - Increase Information Operations
 - Deploy Forces Into or Near the Potential Operational Area
 - Increase Active & Passive Protection Measures
 - Flexible Deterrent Options (FDO's)
 - Declare Demarche Through Diplomatic Channels



OBT Scenario A

– Potential Commanders' Decisions (1) –

- Increase Space Weapons Release Authorization Level (A)

① INFO REQUIRED TO MAKE DECISION (A):

- Perceived **Current** Space & Terrestrial **Conflict Level** (*Data Source: Space Coordinating Authority (SCA); COMAFFOR/JFACC; DIRSPACEFOR*)
- **Current** Blue Space **Weapons Release Authorization Level** (*Data Source: Space Coordinating Authority (SCA); COMAFFOR/JFACC; DIRSPACEFOR*)
- Blue & Red **Allied Relationships** (*Data Source: State Department*)
- Blue Relationships with **Non-Military Organizations** (e.g., NRO, NASA, NOAA, Intelsat, etc.) (*Data Source: USSTRATCOM*)
- **Red** Space & Terrestrial Military/Political/Diplomatic/Economic/Cyber **Intentions** (*Data Sources: NASIC, CIA, DIA, Cyber Command, State Department*)
- **Blue** NCA & Commanders' **Intents** (*Data Source: Space Coordinating Authority (SCA); COMAFFOR/JFACC; DIRSPACEFOR*)



OBT Scenario A

– Potential Commanders' Decisions (2) –

- Increase Space Weapons Release Authorization Level (A)
 - ① INFO REQUIRED TO MAKE DECISION (B):
 - Blue Rules of Engagement (**ROE**), Laws of Armed Conflict (**LOAC**) & Which Space Systems Are on the Restricted Target List (**RTL**) (*Data Sources: Space Coordinating Authority (SCA); COMAFFOR/JFACC; DIRSPACEFOR*)
 - **Previously** Executed Blue & Red Space & Terrestrial **COA's** (*Data Source: CAOC*)
 - **Current** & Planned Blue/Allied Air Tasking Order (**ATO**) / Space Tasking Order (**STO**) (*Data Source: CAOC*)
 - Possible **Red Counteractions** (*Data Sources: NASIC; CAOC Plans*)
 - Most Probable Red COA
 - Most Dangerous Red COA
 - Possible Blue, Red, Neutral **Collateral Damage** Effects (*Data Sources: NASIC; CAOC Weaponneering*)
 - Space & Terrestrial Weather (**WX**) Conditions (*Data Source: CAOC*)



OBT Scenario A

– Potential Commanders' Decisions (3) –

- Increase Space Weapons Release Authorization Level (A)

① INFO REQUIRED TO MAKE DECISION (C):

- Red Active & Passive Space Systems **Defensive Measures** (*Data Source: NASIC*)
- **Red Force Status**, Estimated Probabilities of Kill (**P_k**), Potential Execution **Timelines**, & **Re-Fire** Capabilities (*Data Source: NASIC*)
- **Blue Force Status**, Probabilities of Kill (**P_k**), Potential Execution **Timelines**, & **Re-Fire** Capabilities (*Data Source: CAOC Weaponeering*)
- **Red** Potential Threat Space Objects **TLE's** (Orbital Elements)
 - **General Accuracy** (*Data Source: SSN*)
- **Blue** Potentially Threatened Space Objects **TLE's** (Orbital Elements) – **General Accuracy** (*Data Source: SSN*)



OBT Scenario A

– Potential Commanders' Decisions (4) –

- Increase Space Weapons Release Authorization Level (A)

② REQUIRED DECISION TIMELINE:

- ~24-48 Hours = REASONS:

- Typical Maneuver Timeline for Anti-Satellites (ASAT's) to Match Target Orbits
- Probable Political Cycle Time for Adversary to React to Deterrence Attacks
- Future ATO/JSTO (Air Tasking Order/Joint Space Tasking Order) Cycle Timelines

③ POSSIBLE CONSEQUENCES OF DECISION:

- Possible **Increase** in Space & Terrestrial **Conflict Level**
- May Inspire Subsequent **Red Space Counter-Actions**
- May Inspire Subsequent **Red Terrestrial Military Actions**
- Blue & World **Negative Public Opinion** Reactions
- Blue **Allied Negative Reactions**
- **Red** May **Increase Allied Solidarity** & Add New Allies
- **Reveals SSA** Capabilities to Potential Adversaries



OBT Scenario A

– Potential Commanders' Decisions (5) –

- Declare Demarche Through Diplomatic Channels (B)

① INFO REQUIRED TO MAKE DECISION (A):

- Current Conflict Level (*Data Source: Higher HQ*)
- Current Weapons Release Authorization Level (*Data Source: Higher HQ*)
- Blue & Red Allied Relationships (*Data Source: State Department*)
- Red Intentions (*Data Sources: NASIC, CIA, Cyber Command, State Department*)
- Blue Commanders' Intents (*Data Source: Higher HQ*)
- Blue ROE, LOAC, & RTL (*Data Source: Higher HQ*)



OBT Scenario A

– Potential Commanders' Decisions (6) –

- **Declare Demarche Through Diplomatic Channels (B)**
 - ① **INFO REQUIRED TO MAKE DECISION (B):**
 - **Previous COA's** (*Data Source: CAOC*)
 - **Current ATO / JSTO** (*Data Source: CAOC*)
 - **Red Force Status, Pk, Execution Timelines, & Re-Fire** (*Data Source: NASIC*)
 - **Blue Force Status, Pk, Execution Timelines, & Re-Fire** (*Data Source: CAOC Weaponneering*)
 - **Red Counteractions** (*Data Source: CAOC Plans*)
 - **Space & Terrestrial Weather (WX)** (*Data Source: CAOC*)
 - **Diplomatic Corps Security Clearances** to be Able to Fully Understand Proposed ASAT Employments (*Data Source: State Department*)
 - **Current United Nations Attitudes** Towards Affected Countries (*Data Source: State Department*)



OBT Scenario A

– Potential Commanders' Decisions (7) –

- **Declare Demarche Through Diplomatic Channels (B)**

② REQUIRED DECISION TIMELINE:

- ~24-48 Hours = REASONS:
 - Typical Maneuver Timeline for Anti-Satellites (ASAT's) to Match Target Orbits
 - Probable Political Cycle Time for Adversary to React to Diplomatic Requests
 - ATO/STO Cycle Timelines

③ POSSIBLE CONSEQUENCES OF DECISION:

- Increase in Space & Terrestrial Conflict Level
- May Inspire Subsequent Red Terrestrial Military Actions (Red Deterrence/Show Resolve Actions)
- Adverse Adversary Counter-Actions
- Blue & World Negative Public Opinion Reactions
- Blue Allied Negative Reactions
- Red May Increase Allied Solidarity & Add New Allies
- Reveals SSA Capabilities to Potential Adversaries



Space Scenarios Phase IIA

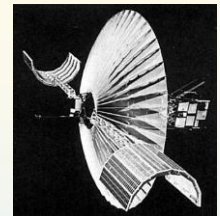
– Regional Crisis –

Conflict Escalation Ladder Space Campaign
Phase: “2nd Wave Attacks - Trans-Conflict
Deter”



OBT Scenario B - Background

- Scenario B:
 - Conflict Level: Crisis
 - Weapons Release Authorization Level: Space Autonomous Operation
 - Space Rules Of Engagement (ROE): Up to Disruption
 - Space WX Condition: Nominal
 - Space Defense Region: GEO EU (Europe)
 - Satellite at Risk: **Blue** Newmex Curaja Large GEO SIGINT Satellite (BE NX90F06001)
 - Pre-Event Satellite Condition: **10% of Mission NON-OP**
 - Possible **Red** ASAT Satellite: Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08007)





OBT Scenario B - Description

- **Scenario B Events:**
 - **Blue Newmex** Curaja Large GEO SIGINT Satellite (BE NX90F06001) detects a suspicious space object possible approaching for RPO
 - The approaching suspicious space object is an Un-Correlated Target (UCT) that is new to the Space Surveillance Network (SSN) sensors
 - The **Newmex** Curaja GEO SIGINT Satellite was supporting **Newmex** intelligence collection for the growing political and military crisis in Eastern Europe
 - There are additional critical military satellites near the **NX** Curaja GEO SIGINT Satellite that may also be a target for the **Califon** Pangnol Large GEO Maintenance Satellite



OBT Scenario B – Potential Tactical COA's

SDIZ - Green (ASAT More Than 10 Km or 20 Min. Away)

- Do Nothing since some COA responses risk increasing the Conflict Escalation Ladder
- Turn Classified Components Away from approaching satellite to prevent discovery of critical technical parameters
- Coordinate & Warn other nearby satellites (within own SDR) if they were experiencing similar difficulties
- Task On-Board Sensors to develop better information
- Report Back to Higher Headquarters and INTEL agencies on the nature of this possible attack

SDIZ = Space Defense Identification Zone

SDR = Space Defense Region



OBT Scenario B – Potential Tactical COA's

SDIZ - Yellow (ASAT 10 Km or 20 Min. Away)

- Face Satellite Away from ASAT threat, by changing attitude so RADAR Cross Section (RCS) and optical visual magnitude are reduced, along with moving sensitive parts of the satellite away from potential attacks (alternative is to possibly face heat radiators towards ASAT due to their inherent hardness)
- Spin Satellite to make it more difficult and uncertain for any other satellite to conduct close operations. In addition, this may distribute any energy impinging onto the satellite across a broader surface, increasing the likelihood that the satellite will be able to withstand a Directed Energy attack
- Maneuver Satellite outside immediate danger zone, which may temporarily cease satellite missions, and reduce lifetime
- Randomly Maneuver Satellite within immediate danger zone, to make it more difficult and uncertain for any other satellite to conduct close operations. However, this may temporarily cease satellite missions, and reduce lifetime
- Maneuver Satellite to Blind approaching ASAT so Sun is behind Blue satellite (reverse “Hun Out of the Sun” tactic)
- Collect INTEL data from approaching **RED** satellite



OBT Scenario B – Potential Tactical COA's

SDIZ - Red (ASAT 1 Km or 5 Min. Away)

- Conduct Cyber Attack against any suspected satellites in Rendezvous & Proximity Operations (RPO). This would violate Weapons Release Authorization and ROE if more severe than a Denial attack
- Employ Electrostatic Shock defense mechanism to neutralize any ASAT that may come in contact with **Blue** satellite
- Increase Power, which may risk burning out some satellite subsystems
- Point High-Power Antennas towards approaching threat satellite
- Close Shutters for sensitive optical components that may be vulnerable
- Isolate Electronics from potential High-Power Microwave (HPM) attacks
- Cease Transmissions to prevent SIGINT INTEL assessment by **Red** or **Neutral** approaching satellite
- Ram ASAT by maneuvering **Blue** satellite into the path of **Red** ASAT
- Declare a Space Defense Emergency



OBT Scenario B - Truth

- **Blue Perceptions:**
 - It is unknown which **Blue** satellite is the intended target. Since the Conflict Level is already in Crisis, it is uncertain whether this is just an intelligence gathering mission, or a setup for start of a full-blown space war that may be a precursor for full military actions on the ground. NCA and JFACC Rules Of Engagement (ROE) specifically proscribe any actions that might be interpreted as escalatory
- **Actual Red Satellite Missions:**
 - **Red** intends to approach a critical **Blue** satellite to appear threatening, temporarily disrupt some satellite operations, and deter **Blue** from taking any new military actions on the ground
 - **Red** satellite also is getting into pre-attack position against **Blue** satellite in case the potential terrestrial conflict escalates to space war



Space Scenarios Phase IIB

– Regional Crisis –

Conflict Escalation Ladder Space Campaign

Phase: “3rd Wave Attacks Phase A1 –

Terrestrial-to-Space Partial Temporary Effects”

Strategies

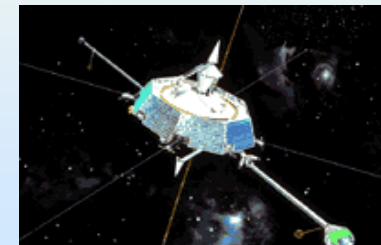
Operational

Tactical



OBT Scenario C - Background

- **Scenario C:**
 - **Conflict Level: Conventional Terrestrial (No Previously Verified Space Attacks)**
 - **Weapons Release Authorization Level: Space Weapons Hold**
 - **Space Rules Of Engagement (ROE): Up to Denial**
 - **Space WX Condition: Nominal**
 - **Space Defense Region: GEO EU (Europe)**
 - **Satellite at Risk: **Blue** Newmex Imbiara Large GEO MSL Warning Satellite (BE NX90F02001)**
 - **Pre-Event Satellite Condition: Nominal**
 - **Possible **Red** ASAT Satellite: Califon Galiffet Nano GEO Mine-Jammer (BE CA90F09003)**



Strategies

Operational

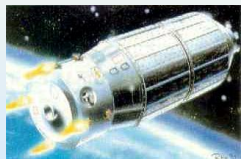
Tactical



OBT Scenario C- Description

- Scenario C Events:

- During the terrestrial conflict (with no previous overt damaging satellite attacks) the **Blue** Newmex Imbiara Large GEO Missile Warning Satellite (BE NX90F02001) is employed to detect tactical (SCUD) missile attacks and jet engine afterburner use.
- Because of the impact on the battlefield of employing this **Newmex** satellite, **Califon** deploys its Galiffet Nano GEO Mine-Jammer (BE CA90F09003) against this **Newmex** Missile Warning Satellite.
- At the same time, a **Neutral** Nevidah (NV) Papaokena GEO Maintenance Satellite (BE NV90F08002) happens to be passing by on its way to refuel a commercial COMM satellite. For a time, the Space Surveillance Network (**SSN**) confuses the orbital tracks of both the **Neutral** and **Red** satellites





OBT Scenario C – Potential Tactical COA's

SDIZ - Green (ASAT More Than 10 Km or 20 Min. Away)

- Do Nothing since some COA responses risk increasing the Conflict Escalation Ladder
- Turn Classified Components Away from approaching satellite to prevent discovery of critical technical parameters
- Coordinate & Warn other nearby satellites (within own SDR) if they were experiencing similar difficulties
- Task On-Board Sensors to develop better information
- Report Back to Higher Headquarters and INTEL agencies on the nature of this possible attack

SDIZ = Space Defense Identification Zone

SDR = Space Defense Region



OBT Scenario C – Potential Tactical COA's

SDIZ - Yellow (ASAT 10 Km or 20 Min. Away)

- Implement Anti-Jam techniques
- Increase Power, which may risk burning out some satellite subsystems
- Face Satellite Away from ASAT threat, by changing attitude so RADAR Cross Section (RCS) and optical visual magnitude are reduced, along with moving sensitive parts of the satellite away from potential attacks (alternative is to possibly face heat radiators towards ASAT due to their inherent hardness)
- Spin Satellite to make it more difficult and uncertain for any other satellite to conduct close operations. In addition, this may distribute any energy impinging onto the satellite across a broader surface, increasing the likelihood that the satellite will be able to withstand a Directed Energy attack
- Maneuver Satellite outside immediate danger zone, which may temporarily cease satellite missions, and reduce lifetime
- Randomly Maneuver Satellite within immediate danger zone, to make it more difficult and uncertain for any other satellite to conduct close operations. However, this may temporarily cease satellite missions, and reduce lifetime
- Maneuver Satellite to Blind approaching ASAT so Sun is behind **Blue** satellite (reverse “Hun Out of the Sun” tactic)
- Collect INTEL data from approaching **RED** satellite



OBT Scenario C – Potential Tactical COA's

SDIZ - Red (ASAT 1 Km or 5 Min. Away)

- Conduct Cyber Attack against any suspected satellites in Rendezvous & Proximity Operations (RPO). This would violate Weapons Release Authorization and ROE if more severe than a Denial attack
- Employ Electrostatic Shock defense mechanism to neutralize any ASAT that may come in contact with **Blue** satellite
- Point High-Power Antennas towards approaching threat satellite
- Close Shutters for sensitive optical components that may be vulnerable
- Isolate Electronics from potential High-Power Microwave (HPM) attacks
- Cease Transmissions to prevent SIGINT INTEL assessment by **Red** or **Neutral** approaching satellite
- Ram ASAT by maneuvering **Blue** satellite into the path of **Red** ASAT
- Declare a Space Defense Emergency



OBT Scenario C - Truth

- **Blue Perceptions:**
 - Though the approaching satellite is known as a **Red** asset, its particular mission and capabilities are uncertain. In addition, there is uncertainty between the orbital tracks of both the **Califon** and the Neutral **Nevidah** satellites in the area. NCA and JFACC Rules Of Engagement (ROE) specifically proscribe any actions that might be interpreted as escalatory leading to outright space war. In addition, since this missile warning satellite also supports the nuclear war mission, there is additional **Newmex** sensitivity to the possibility of it being attacked, though this sensitivity is not shared by **Califon** leadership
- **Actual Red Satellite Missions:**
 - **Red** intends to approach the **Blue** satellite and jam its ability to transmit missile launch tracking information to terrestrial users
 - **Red** satellite also is getting into position against **Blue** satellite to attach a remote-controlled space mine as an insurance policy if the current terrestrial conflict spreads to general space war



Space Scenarios Phase III

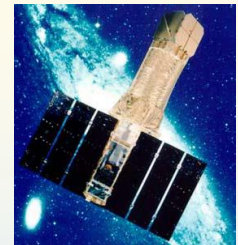
– Beginning Salvos of Space Conflict –

Conflict Escalation Ladder Space Campaign
Phase: “4th Wave Attacks Phase A2 –
Terrestrial-to-Space Total Permanent Kill”



OBT Scenario D - Background

- **Scenario D:**
 - **Conflict Level: Conventional Terrestrial (No Previously Verified Damaging Space Attacks)**
 - **Weapons Release Authorization Level: Space Weapons Hold**
 - **Space Rules Of Engagement (ROE): Up to Destruction**
 - **Space WX Condition: Nominal**
 - **Space Defense Region: LEO EU (Europe)**
 - **Satellite at Risk: Blue Newmex Bicudo Large LEO Photo Satellite (BE NX90F05001)**
 - **Pre-Event Satellite Condition: Nominal**
 - **Possible Red ASAT System: Califon Legriel Ground Mobile Kinetic ASAT (BE CA90F28019)**





OBT Scenario D - Description

- Scenario D Events:

- During the terrestrial conflict (with no previous overt damaging satellite attacks) the **Blue** Newmex Bicudo Large LEO Photo Satellite (BE NX90F05001) is employed to detect tactical (SCUD) missile launchers.
- Because of the impact on the battlefield of employing this **Newmex** satellite, **Califon** deploys its **Red** Legriel Ground Mobile Kinetic ASAT (BE CA90F28019) against this **Newmex** Photo Reconnaissance Satellite.
- At the same time, a **Califon** Denignon Nano LEO Mine-Shrapnel (BE CA90F09012) is deployed to hang back to verify the success of the attack, and, if necessary, re-attack the **Blue** Newmex Bicudo Large LEO Photo Satellite (BE NX90F05001) to assure adequate P_k (Probability of Kill)





OBT Scenario D – Potential Indicators

Pre-Attack ASAT Mission Setup



- **Red** Califon L'Anneau Large Ground Research RF Sensor [BE XCA0F18008 – Civilian Facility so it is on the Restricted Target List (RTL) in the Air Tasking Order (ATO), and Does Not Receive INTEL Monitoring] Pays Increased Space Surveillance Attention Towards **Blue** Newmex Bicudo Large LEO Photo Satellite (BE NX90F05001)
- **Red** Califon Legriel Ground Mobile Kinetic ASAT (BE CA90F28019) Garrison / Storage Sites Have Increased Number of Sub-Assemblies Entering Site
- **Red** Califon Legriel Ground Mobile Kinetic ASAT (BE CA90F28019) Remote Surveyed Operational Deployment Sites Experience Increased Traffic with Movement of IRBM-Sized Missiles & TELs along with Increased Military Personnel Around TELs
- **Red** Califon Jeanton Large Ground Fixed Command Center (BE CA90F22001) that Control the **Red** Califon Legriel Ground Mobile Kinetic ASAT (BE CA90F28019) Experience Increased Number of Military Personnel of Higher Ranks than Normal



Strategies

Operational

Tactical



OBT Scenario D – Potential Indicators

Trans-Attack ASAT

- **Red** Califon Legriel Ground Mobile Kinetic ASAT (BE CA90F28019) Remote Surveyed Operational Deployment Sites Experience Increased Traffic with Movement of IRBM-Sized Missiles & TELs Along with Increased Military Personnel Around TELs
- **Red** Califon Jeanton Large Ground Fixed Command Center (BE CA90F22001) that Control the **Red** Califon Legriel Ground Mobile Kinetic ASAT (BE CA90F28019) Experience Increased Number of Military Personnel of Higher Ranks than Normal
- **Red** Califon Legriel Ground Mobile Kinetic ASAT (BE CA90F28019) Countdown Sequence Initiated
- **Blue** Newmex Imbiara Large GEO MSL Warning Satellite (BE NX90F02001) Detects IR Signal Corresponding to Missile Launch in Last Know Location of **Red** Califon Legriel Ground Mobile Kinetic ASAT (BE CA90F28019)





OBT Scenario D – Potential Indicators

Post-Attack ASAT

- **Red** Califon Legriel Ground Mobile Kinetic ASAT (BE CA90F28019) Exhibits TEL Without Missile
- **Blue** Newmex Tres Pontas Large Ground Space RF Sensor (BE NX90F18024) Reports Debris Field at **Blue** Newmex Bicudo Large LEO Photo Satellite (BE NX90F05001) Location
- **Red** Califon Denignon Nano LEO Mine-Shrapnel (BE CA90F09012) Satellite Begins Maneuver Sequences for a New Operational Orbit





OBT Scenario D - Truth

- **Blue Perceptions:**
 - Though the approaching satellite is known as a **Red** asset, its particular mission and capabilities are uncertain. In addition, there is uncertainty between the orbital tracks of both the **Califon** orbital ASAT and the Neutral **Nevidah** satellites in the area. NCA and JFACC Rules Of Engagement (ROE) specifically proscribe any actions that might be interpreted as escalatory leading to outright space war. In addition, **Newmex** appears to have greater sensitivity to the possibility of space war escalation, though this sensitivity is not shared by **Califon** leadership
- **Actual Red Satellite Missions:**
 - **Red** intends to completely destroy the **Blue** satellite and does not care about political acceptability of space debris generation
 - **Red** believes in the concept of “Combined Arms” when it comes to space warfare, and employs two different kinds of ASAT’s to assure mission success against High-Value Targets (HVT’s)



Space Scenarios Phase IV

– Terrestrial & Space Conflict –

Conflict Escalation Ladder Space Campaign
Phase: “4th Wave Attacks Phase B2 – Space-
to-Space Total Permanent Kill”



OBT Scenario E - Background

- **Scenario E:**
 - Conflict Level: Conventional Terrestrial & Space
 - Weapons Release Authorization Level: Space Autonomous Operation
 - Space Rules Of Engagement (ROE): Up to Destruction
 - Space WX Condition: Nominal
 - Space Defense Region: GEO EU (Europe)
 - Satellite at Risk: **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001)
 - Pre-Event Satellite Condition: **5% Mission NON-OP**
 - Possible **Red** ASAT Satellite: Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08008)





OBT Scenario E - Description

- **Scenario E Events:**
 - **Blue Newmex** Macahe Large Ground Optical Sensor (BE NX90F19003) detects a suspicious space object possibly approaching for RPO (Rendezvous & Proximity Operations) against **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001)
 - The approaching suspicious space object is an Un-Correlated Target (UCT) that is new to the Space Surveillance Network (SSN) sensors
 - The **Blue** Newmex Itatingui Large GEO COMM Satellite was supporting **Newmex** military communications for the growing political and military crisis in Eastern Europe
 - There is one additional UCT near the **Blue** Newmex Itatingui Large GEO COMM Satellite that does not appear to be setting up for RPO



OBT Scenario E – Potential Indicators

Pre-Attack ASAT Mission Setup

- **Red** Califon Pouillant Large Ground Optical Sensor (BE CA90F19003) Pays Increased Space Surveillance Attention Towards **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001)
- **Red** Deschapelle Large Ground Fixed TTC Site (BE CA90F22005) that controls **Red** Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08008) Experiences Increased Encrypted Communications Traffic To / From Site
- **Red** Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08008) Changes Attitude to Align Thrust Vectors and then Opens Valves & Commences Thrusting With a Corresponding Bright IR Signal



OBT Scenario E – Potential Indicators

SDIZ - **Green** (ASAT More Than 10 Km or 20 Min. Away)

- Un-Correlated Targets (UCT's) are Approaching **SDIZ** near **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001) that is Providing Military Communications for the Growing Political and Military Crisis in Eastern Europe
- UCT-1 [**Red** Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08008)] Conducts Attitude Change to Re-Direct Solar Speculars Away from **Blue** Newmexian Sensors to Attempt Covert Termination Burn
- UCT-1 [**Red** Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08008)] Appears to Maneuver to Conduct RPO Against **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001)
- UCT-2 [**Red** Califon Blain Large GEO Inspector Satellite (BE CA90F08001)] Appears to Enter Stable Stationkeeping Far from **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001) While Avoiding COMM/Sensor Occultation

SDIZ = Space Defense Identification Zone

SDR = Space Defense Region



OBT Scenario E – Potential Indicators

SDIZ - Yellow (ASAT 10 Km or 20 Min. Away)

- UCT-1 [**Red** Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08008)] Conducts Attitude Change to Apparently Conduct Target Acquisition with On-Board Sensors Against **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001)
- UCT-1 [**Red** Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08008)] Conducts Final Burn Using CG (Center of Gravity) Management & Tight Attitude Control
- UCT-2 [**Red** Califon Blain Large GEO Inspector Satellite (BE CA90F08001)] Stops Maneuvering and Enters Into an Orbit that Appears Coordinated with UCT-1 Fields of Regard (FOR) Against **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001)



OBT Scenario E – Potential Indicators

SDIZ - Red (ASAT 1 Km or 5 Min. Away)

- UCT-1 [**Red** Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08008)] Enters Into a Tight RPO Orbit Oriented Against **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001)
- **Red** Califon Deschapelle Large Ground Fixed TTC (BE CA90F22005) that controls **Red** Califon Pangnol Large GEO Maintenance Satellite (BE CA90F08008) Experiences Increased Communications Traffic to Its Controlled Satellite
- **Red** Califon Chaderne Large Ground Fixed TTC Site (BE CA90F22006) that controls **Red** Califon Blain Large GEO Inspector Satellite (BE CA90F08001) Experiences Increased Communications Traffic (High-Bandwidth Laser Links) to Its Controlled Satellite
- **Blue** Newmex Cinzas Large Ground Fixed TTC Site (BE NX90F22006) Controlling **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001) Reports Loss of TT&C Signals. Later, Military Users Report Loss of Communications Capabilities
- **Blue** Newmex Allianca Large Ground Deep Space RF Sensor (BE NX90F18020) Reports Debris Field at **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001) Location



OBT Scenario E - Truth

- **Blue Perceptions:**
 - It is unknown what **Red** intentions are until the loss of the **Blue** Newmex Itatingui Large GEO COMM Satellite (BE NX90F01001). Since the Conflict Level is already in Crisis, it is uncertain whether this is just an intelligence gathering mission, or a setup for start of a full-blown space war that may be a precursor for full military actions on the ground. NCA and JFACC Rules Of Engagement (ROE) specifically proscribe any actions that might be interpreted as escalatory
- **Actual Red Satellite Missions:**
 - **Red** intends to attack a critical **Blue** satellite to show resolve and deter **Blue** from taking any new military actions on the ground
 - **Red** inspection satellite was near the **Blue** target to observe / validate **Red** ASAT capabilities to senior leadership, and to conduct BDA (Battle Damage Assessment)



Space Scenarios Phase V

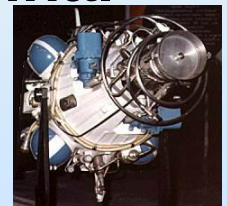
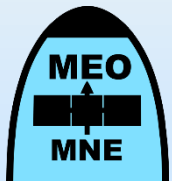
– Blue Space Counterattacks –

Conflict Escalation Ladder Space Campaign
Phase: “4th Wave Attacks Phase B2 – Space-
to-Space Total Permanent Kill”



OBT Scenario F - Background

- Scenario F:
 - Conflict Level: Space Anti-Satellite Attacks
 - Weapons Release Authorization Level: Space Weapons Tight
 - Space Rules Of Engagement (ROE): Up to Destruction
 - Space WX Condition: Nominal
 - Space Defense Region: LEO EU (Europe)
 - Satellites at Risk: **Red** Califon La Preville Medium MEO NAV Satellites (BE CA90F0400x)
 - Pre-Event Target Satellite Condition: Nominal
 - **Blue** ASAT System: Newmex Coary Large MEO Mine Carrier (BE NX90F09004)





OBT Scenario F - Description

- **Scenario F Events:**
 - During the terrestrial & space conflict **Blue** intends to show resolve by attacking & destroying several **Red** Califon La Preville Medium MEO NAV Satellites (BE CA90F0400x) that are being used to effectively support **Red** terrestrial forces.
 - Because of the impact on the battlefield of **Califon** employing their **Red** Califon La Preville Medium MEO NAV Satellites (BE CA90F0400x), multiple coordinated satellite attacks must be simultaneously accomplished.
 - The **Blue** Newmex Coary Large MEO Mine Carrier (BE NX90F09004) must deploy multiple anti-satellite mines at key locations, while avoiding **Red** space surveillance sensors. This attack must also be coordinated with terrestrial military operations for the maximum battlefield effect.



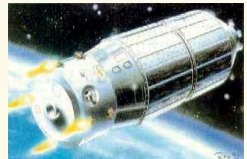
OBT Scenario F – Potential Indicators

Pre-Attack ASAT Mission Setup

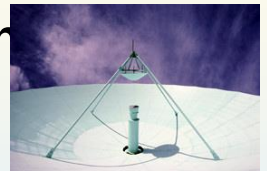
- **Blue** Newmex Aricaria Large Ground Fixed Command Center (BE NX90F22002) Must Coordinate With Space Command Centers to Include Space Attacks in the Air Tasking Order (ATO)



- It is Decided that a Diversion Attack Employing **Blue** Newmex Seabra Large MEO Maintenance Satellite (BE NX90F35001) Will be Accomplished to Fix the Attention of **Red** Califon Space Surveillance Systems

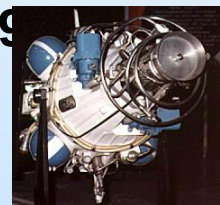


- **Blue** Newmex Bela Vista Large Ground Sensor-RF (BE NX90F18019) Will Pay Increased Attention to **Red** Califon Preville



Medium MEO NAV Satellites (BE CA90F0400x) to Track Precise Orbits & Verify Attack Execution

- **Blue** Newmex Coary Large MEO Mine Carrier (BE NX90F0400x) Begins Maneuvering to Attack Position



Strategies

Operational

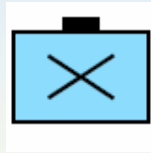
Tactical



OBT Scenario F – Potential Indicators

Trans-Attack ASAT

- **Blue** Newmex Serieme Large Ground Fixed Space Command Center (BE NX90F22003) Calculates the Best Attack Sequences to Avoid **Red** Space Surveillance Sensors & Have the Attacking Space Mines Arrive at Their Designated Targets as Close to the Same Time as Possible to Maximize Surprise, & then Submits This Space Tasking Order (STO) for Approval
- **Blue** Newmex Cinzas Large Ground Fixed TTC (BE NX90F22006) Executes the Space Tasking Order
- In Addition, **Blue** Newmex Prequeiro Large Ground Sensor-RF (BE NX90F18018) Monitors this Attack Sequence to Verify Success



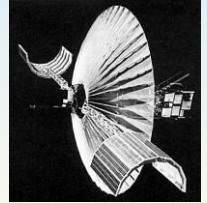


OBT Scenario F – Potential Indicators

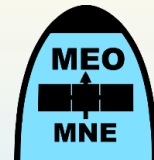
Post-Attack ASAT



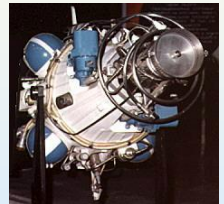
- **Blue** Newmex Curaja Large SIGINT Satellite (BE NX90F06001)
Detects Decreased **Red** Califon Navigation Signals



- **Blue** Newmex Prequeiro Large Ground Sensor-RF
(BE NX90F18018) Detects Several Debris Fields in MEO Orbit



- **Blue** Newmex Coary Large MEO Mine Carrier (BE NX90F09004)
Begins Maneuvering to New Attack Position





OBT Scenario F - Truth

- **Blue Perceptions:**
 - Due to Extensive Military Use of Space, **Blue** Believes in the Value of Space to Terrestrial Warfighters, and Assumes that **Red** Military Forces Will be Significantly Impacted by Loss of Navigation Services
- **Actual Red Perceptions:**
 - **Califon** Leadership has Limited Experience With Space Systems and is Ultimately Not Impressed With the Loss of **Red** Navigation Services
 - Due to the Very Mountainous Terrain Constraints on the Battlefield, Attack Corridors Are Well Know & Easily Navigated by **Red** Commanders Already Familiar With Local Geography
 - Nevertheless, Loss of Navigation Services Leads to Decreased **Red** Military Effectiveness & More Casualties, Which is Made Up for by the Fanaticism of **Red** Forces



Space Scenario with SWAT Links

*“The past tempts us, the present confuses us
and the future frightens us.”*
(Science Fiction Series, Babylon 5)



Space Scenarios Phase V

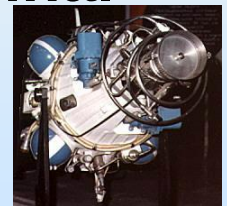
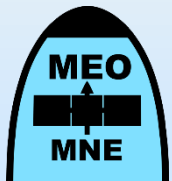
– Blue Space Counterattacks –

Conflict Escalation Ladder Space Campaign
Phase: “4th Wave Attacks Phase B2 – Space-
to-Space Total Permanent Kill”



OBT Scenario F - Background

- Scenario F:
 - Conflict Level: Space Anti-Satellite Attacks
 - Weapons Release Authorization Level: Space Weapons Tight
 - Space Rules Of Engagement (ROE): Up to Destruction
 - Space WX Condition: Nominal
 - Space Defense Region: LEO EU (Europe)
 - Satellites at Risk: **Red** Califon La Preville Medium MEO NAV Satellites (BE CA90F0400x)
 - Pre-Event Target Satellite Condition: Nominal
 - **Blue** ASAT System: Newmex Coary Large MEO Mine Carrier (BE NX90F09004)





OBT Scenario F - Description

• Scenario F Events:

[SWAT SAW](#)

[SWAT COA's](#)

[SWAT ROE](#)

- During the terrestrial & space conflict **Blue** intends to show resolve by attacking & destroying several **Red** Califon La Preville Medium MEO NAV Satellites (BE CA90F0400x) that are being used to effectively support **Red** terrestrial forces.

[SWAT Conflict Level Estimator](#)

- Because of the impact on the battlefield of **Califon** employing their **Red** Califon La Preville MEO NAV Satellites (BE CA90F0400x), multiple coordinated satellite attacks must be simultaneously accomplished.

[SWAT SHIVA](#)

- The **Blue** Newmex Coary Large MEO Mine Carrier (BE NX90F09004) must deploy multiple anti-satellite mines at key locations, while avoiding **Red** space surveillance sensors. This attack must also be coordinated with terrestrial military operations for the maximum battlefield effect.

[SWAT Sensor Tasking](#)

[SWAT COA's Optimization](#)

[SWAT Attack Profiles](#)



OBT Scenario F – Potential Indicators

Pre-Attack ASAT Mission Setup

SWAT Objectives Taxonomy

SWAT SHIVA

SWAT Space IPB



- **Blue** Newmex Aricaria Large Ground Fixed Command Center (BE NX90F22002) Must Coordinate With Space Command Centers to Include Space Attacks in the Air Tasking Order (ATO)



- It is Decided that a Diversion Attack Employing **Blue** Newmex Seabra Large LEO Maintenance Satellite (BE NX90F35001) Will be Accomplished to Fix the Attention of **Red** Califon Space Surveillance Systems



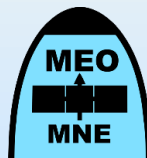
1. SWAT Blue COA's
2. SWAT Est. Red COA's

- **Blue** Newmex Bela Vista Large Ground Sensor (BE NX90F18019) Will Pay Increased Attention to **Red** Califon La Preville MEO NAV Satellites (BE CA90F0400x) to Track Precise Orbits & Verify Attack Execution



SWAT Sensor Tasking

- **Blue** Newmex Coary Large MEO Mine Carrier (BE NX90F09004) Begins Maneuvering to Attack Position



1. SWAT SAW
2. SWAT INTEL Indicators
3. SWAT INTEL Tasking

1. SWAT SSA Sensor Optimization
2. SWAT State Change Detection
3. SWAT SOI



OBT Scenario F – Potential Indicators

Trans-Attack ASAT

- **Blue** Newmex Serieme Large Ground Fixed Space Command Center (BE NX90F22003) Calculates the Best Attack Sequences to Avoid **Red** Space Surveillance Sensors & Have the Attacking Space Mines Arrive at Their Designated Targets as Close to the Same Time as Possible to Maximize Surprise, & then Submits This Space Tasking Order (STO) for Approval

[SWAT Attack Profiles](#)

- **Blue** Newmex Cinzas Large Ground Fixed TTC (BE NX90F22006) Executes the Space Tasking Order

[SWAT Weapons Tasking](#)

- In Addition, **Blue** Newmex Prequeiro Large Ground Sensor-RF (BE NX90F18018) Monitors this Attack Sequence to Verify Success

1. [SWAT SSA Sensor Optimization](#)
2. [SWAT State Change Detection](#)
3. [SWAT SOI](#)

1. [SWAT SAW](#)
2. [SWAT INTEL Indicators](#)
3. [SWAT INTEL Tasking](#)



Strategies

Operational

Tactical



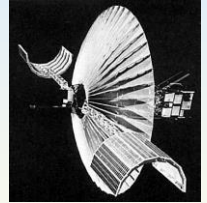
OBT Scenario F – Potential Indicators

Post-Attack ASAT

- **Blue** Newmex Curaja Large SIGINT Satellite (BE NX90F06001) Detects Decreased **Red** Califon Navigation Signals



1. [SWAT SAW](#)
2. [SWAT INTEL Indicators](#)
3. [SWAT INTEL Tasking](#)



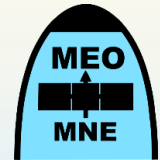
- **Blue** Newmex Prequeiro Large Ground Sensor-RF (BE NX90F18018) Detects Several Debris Fields in MEO Orbit



1. [SWAT SSA Sensor Optimization](#)
2. [SWAT State Change Detection](#)
3. [SWAT SOI](#)



- **Blue** Newmex Coary Large MEO Mine Carrier (BE NX90F09004) Begins Maneuvering to New Attack Position



[SWAT Conflict Level Estimator](#)

[SWAT Space IPB](#)

[SWAT Weapons Tasking](#)

[SWAT ROE](#)

[SWAT Attack Profiles](#)

[SWAT COA's Optimization](#)

Strategies

Operational

Tactical



OBT Scenario F - Truth

- **Blue Perceptions:**
 - Due to Extensive Military Use of Space, **Blue** Believes in the Value of Space to Terrestrial Warfighters, and Assumes that **Red** Military Forces Will be Significantly Impacted by Loss of Navigation Services
- **Actual Red Perceptions:**
 - **Califon** Leadership has Limited Experience With Space Systems and is Ultimately Not Impressed With the Loss of **Red** Navigation Services
 - Due to the Very Mountainous Terrain Constraints on the Battlefield, Attack Corridors Are Well Know & Easily Navigated by **Red** Commanders Already Familiar With Local Geography
 - Nevertheless, Loss of Navigation Services Leads to Decreased **Red** Military Effectiveness & More Casualties, Which is Made Up for by the Fanaticism of **Red** Forces



Space Warfare Definitions

“Mere tonnage of explosives is a fallacious criterion. In the final analysis, victories are achieved because of the effect produced, not simply because of the effort expended.”
(Brigadier General Haywood S. “Possum” Hansell, Jr.,
Memorandum to Army Air Force Chief of Staff General
“Hap” Arnold, 26 July 1944)

Strategies

Operational

Tactical



Space Defense Definitions (1)

- **Space Sovereignty** - A nation's inherent right to exercise absolute control and authority over the orbital space near its satellites. Also see Space Sovereignty Mission.
- **Space Sovereignty Mission** - The integrated tasks of surveillance and control, the execution of which enforces a nation's authority over the orbital space near its satellites.
- **Space Control Operations** - The employment of space forces, supported by air, ground and naval forces, as appropriate, to achieve military objectives in vital areas of concern to space systems. Such operations include destruction of enemy in-space assets, space-related ground systems and surface-to-space forces (launch), interdiction of enemy space operations, protection of vital space lines of communication (links from ground to space to ground), and the establishment of local military superiority in areas of space operations.

Definitions Derived from Joint Pub 3-01.1 Modified for Space Control



Space Defense Definitions (2)

- **Space Autonomous Operation** - In space defense, the mode of operation assumed by a space system after it has lost all communications with human controllers. The space system assumes full responsibility for control of weapons and engagement of hostile targets, based in accordance with on-board surveillance and weapon system control logic. This automatic state may occur on a regular basis due to orbital movements outside regions of ground coverage and control.
- **Space Positive Control** - A method of space control which relies on positive identification, tracking, and situation assessment of spacecraft within a Space Defense Area, conducted with electronic means by an agency having the authority and responsibility therein.
- **Space Weapons Hold** - In space defense, a weapon control order imposing a status whereby weapons systems may only be fired in self defense or in response to a formal order.
- **Space Weapons Tight** - In space defense, a weapon control order imposing a status whereby weapons systems may be fired only at targets recognized as hostile.
- **Space Weapons Free** - In space defense, a weapon control order imposing a status whereby weapons systems may be fired at any target in orbital space of defined altitude and inclination, not positively recognized as friendly.

Definitions Derived from Joint Pub 3-01.1 Modified for Space Control



Space Defense Definitions (3)

- **Active Space Defense** - Direct defensive action taken to destroy, nullify, or reduce the effectiveness of hostile space actions. It includes the use of anti-satellite weapon systems, defensive counter space weapons, electronic warfare, and other available weapons not primarily used in a space defense role. See also Space Defense.
- **Passive Space Defense** - All measures, other than Active Space Defense, taken to reduce the probability of and to minimize the effects of damage to space systems caused by hostile action without the intention of taking the initiative. These measures include camouflage, deception, dispersion, and the use of protective construction and design. See also Space Defense.
- **Space Centralized Control** - In space defense, the control mode whereby a higher echelon makes direct target assignments to fire units.
- **Space Decentralized Control** - In space defense, the normal mode whereby a higher echelon monitors unit actions, making direct target assignments to units only when necessary to ensure proper fire distribution or to prevent engagement of friendly spacecraft. See also Centralized Control.
- **Broadcast-Controlled Space Interception** - An interception in which the interceptor is given a continuous broadcast of information concerning the space defense situation and effects interception without further control.
- **Close-Controlled Space Interception** - An interception in which the interceptor is continuously controlled to a position from which the target is within local sensor range.

Definitions Derived from Joint Pub 3-01.1 Modified for Space Control



Space Defense Definitions (4)

- **Suppression of Adversary Counterspace Capabilities** - Suppression that neutralizes or negates an adversary offensive counterspace system through deception, denial, disruption, degradation, and/or destruction. These operations can target ground, air, missile, or space threats in response to an attack or threat of attack. (AFDD 2-2.1)
- **Space Control Sector** - A sub element of the space control area, established to facilitate the control of the overall orbit. Space control sector boundaries normally coincide with space defense organization subdivision boundaries. Space control sectors are designated in accordance with procedures and guidance contained in the space control plan in consideration of Service component and allied space control capabilities and requirements.
- **Space Deconfliction In The Combat Zone** - A process used to increase combat effectiveness by promoting the safe, efficient, and flexible use of space systems. Space Deconfliction is provided in order to prevent fratricide, enhance space defense operations, and permit greater flexibility of operations. Space Deconfliction does not infringe on the authority vested in commanders to approve, disapprove, or deny combat operations. Also called combat space deconfliction; space deconfliction.
- **Space Point Defense** - The defense or protection of special vital elements, orbital positions (geosynchronous slots, and advantageous orbits, such as sun-synchronous) and installations; e.g., command and control facilities, space launch facilities, Tracking, Telemetry and Control facilities, space surveillance sensors, and high-value satellites.

Definitions Derived from Joint Pub 3-01.1 Modified for Space Control



Space Defense Definitions (5)

- **Space Defense Operations Area** - An area and the orbital space around it within which procedures are established to minimize mutual interference between space defense and other operations; it may include designation of one or more of the following: Space Defense Action Area, Space Defense Area; Space Defense Identification Zone, and, or firepower umbrella.
- **Space Defense Action Area** - An orbit and the space around it within which friendly spacecraft or surface-to-space weapons are normally given precedence in operations except under specified conditions.
- **Space Defense Area** - 1.) A specifically defined orbit for which space defense must be planned and provided. 2.) An orbit and a region surrounding it of defined dimensions designated by the appropriate agency within which the ready control of space borne vehicles is required in the interest of national security during a **Space Defense Emergency**.
- **Space Defense Region** - An orbital subdivision of a Space Defense Area.
- **Space Defense Sector** - An orbital subdivision of a Space Defense Region.
- **Space Defense Division** - A geographic subdivision of a Space Defense Region.
- **Space Defense Identification Zone (SDIZ)** - Orbital space of defined parameters within which the ready identification, location, and control of space borne vehicles is required.
- **Space Defense Battle Zone** - A volume of space surrounding a space defense fire unit or defended area, extending to a specified orbital altitude and inclination, in which the fire unit commander will engage and destroy targets not identified as friendly under criteria established by higher headquarters. In other words, this would be a **free-fire zone around a defended satellite**.

Definitions Derived from Joint Pub 3-01.1 Modified for Space Control



Space Defense Definitions (6)

- **Space Weapon Engagement Zone (SWEZ)** - In space defense, orbital space of defined altitude and inclination within which the responsibility for engagement of space threats normally rests with a particular weapon system.
- **Direct-Ascent Engagement Zone (DAEZ)** - In space defense, that orbital space of defined altitude and inclination within which the responsibility for engagement of space threats normally rests with a direct-ascent anti-satellite system of terrestrial launch origin.
- **Directed Energy Engagement Zone (DEEZ)** - In space defense, that orbital space of defined altitude and inclination within which the responsibility for engagement of space threats normally rests with a directed energy (laser or microwave) ASAT or electronic warfare system of terrestrial location.
- **Electronic Warfare Engagement Zone (EWEZ)** - In space defense, that orbital space of defined altitude and inclination within which the responsibility for engagement of space threats normally rests with an electronic warfare system of terrestrial location.
- **Close Attack Engagement Zone (CAEZ)** - In space defense, that orbital space of defined altitude and inclination within which the responsibility for engagement of space threats normally rests with a defense system that is stationed within 10 kilometers of its target.
- **Long Range Engagement Zone (LREZ)** - In space defense, that orbital space of defined altitude and inclination within which the responsibility for engagement of space threats normally rests with long range space defense weapons, that are space-based, but are normally stationed at more than 10 kilometers from its target.
- **Joint Engagement Zone (JEZ)** - In space defense, that orbital space of defined altitude and inclination within which multiple space defense systems (from both terrestrial and space-based locations) are simultaneously employed to engage space targets.

Definitions Derived from Joint Pub 3-01.1 Modified for Space Control



Space Defense Definitions (7)

- 1) **Deception** consists of those measures designed to mislead the adversary by manipulation, distortion, or falsification of evidence to induce the adversary to react in a manner prejudicial to their interests.
- 2) **Disruption** is the temporary impairment of the utility of space systems, usually without physical damage to the space segments. These operations include delaying critical mission data support to an adversary. Given the perishability of information required to effectively command and control military operations, this disruption impedes the effective application or exploitation of that data. Examples of this type of operation include jamming or refusing or withholding data support or spare parts.
- 3) **Denial** is the temporary elimination of the utility of the space systems, usually without physical damage. This objective is accomplished by such measures as denying electrical power to the space ground nodes or computer centers where data and information are processed and stored.
- 4) **Degradation** is the permanent impairment of the utility of space systems, usually with physical damage. This option may include attacks against the terrestrial or space element of the space system. For example, a ground-based laser could be used to damage the optics of an imaging sensor without impairing other functions of the satellite bus.
- 5) **Destruction** is the permanent elimination of the utility of space systems, usually with physical damage. This last option includes special operations forces (SOF) missions to interdict critical ground nodes, airpower missions to bomb uplink/downlink facilities, and attacks against space elements with either kinetic-kill or directed-energy weapons.

Definitions Derived from AFDD 2-2



Space Defense Definitions (8)

Defense Readiness Conditions for Space Systems - Strategic

Readiness condition	Exercise term	Description	Readiness
SPACE DEFCON 1	COCKED PISTOL	Global Space War is imminent	Maximum space readiness
SPACE DEFCON 2	FAST PACE	Preparations for multiple attacks in multiple regions in space have been detected	Terrestrial-based weapons ready to deploy and engage in less than 6 hours
SPACE DEFCON 3	ROUND HOUSE	Preparations for a single attack in space have been detected	Space-based weapons ready to maneuver for engagement in 15 minutes
SPACE DEFCON 4	DOUBLE TAKE	Increased intelligence watch and strengthened security measures for space systems	Above normal space systems readiness
SPACE DEFCON 5	FADE OUT	Lowest state of readiness	Normal space systems readiness

Defense Readiness Conditions for Space Systems - Tactical

Readiness condition	Exercise term	Description	Readiness
SPACE TACTICAL DEFCON 1	COCKED PISTOL	Multiple space attacks in local SDIZ are imminent.	Maximum space readiness
SPACE TACTICAL DEFCON 2	FAST PACE	Potential ASAT <1 Km or <5 Min. Away. Preparations for space attack against a single satellite have been detected.	Space-based weapons/defenses ready for target engagements immediately
SPACE TACTICAL DEFCON 3	ROUND HOUSE	Potential ASAT <10 Km or <20 Min. Away. Preparations for a single attack in space have been detected.	Space-based weapons/defenses ready to maneuver/prepare for target engagements in 15 minutes
SPACE TACTICAL DEFCON 4	DOUBLE TAKE	Potential ASAT More Than 10 Km or 20 Min. Away. Increased intelligence watch and strengthened security measures for space systems.	Above normal space systems readiness
SPACE TACTICAL DEFCON 5	FADE OUT	Potential ASAT Outside Local LREZ/CAEZ Zone. Lowest state of readiness.	Normal space systems readiness

SDIZ - Blue (ASAT Outside Local LREZ/CAEZ Zone)

LREZ - Green (ASAT More Than 10 Km or 20 Min. Away)

CAEZ - Yellow (ASAT <10 Km or <20 Min. Away)

CAEZ - Red (ASAT <1 Km or <5 Min. Away)

SDIZ = Space Defense Identification Zone

LREZ = Long Range Engagement Zone

CAEZ = Close Attack Engagement Zone

Definitions Derived from Joint Publication 1-02