

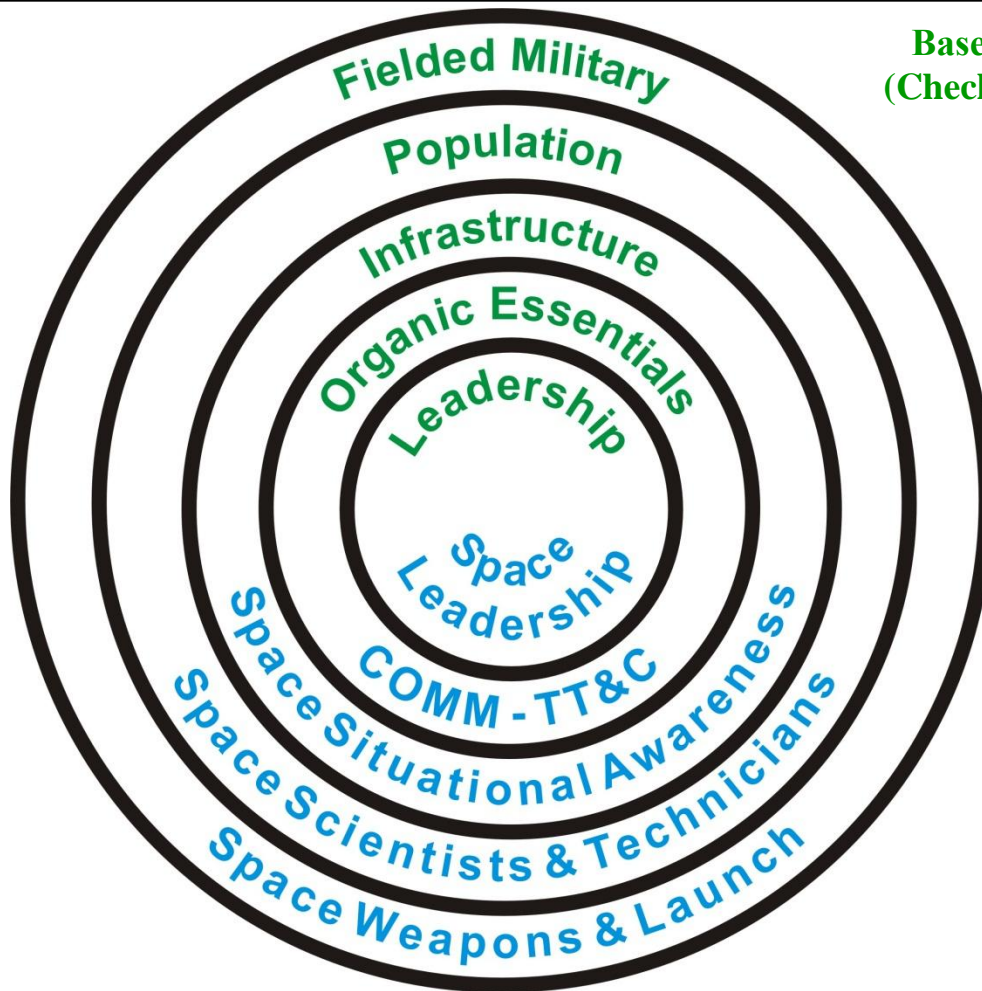
# Space Policy Issues

## - Space Centers of Gravity -

3 June, 2014

# 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**

# Space Centers Of Gravity - Strategic COG (1) -

- **Launch Corridors**
- **GEO Belt Sectors**
  - **Above AO**
  - **Atlantic/Pacific COMM Relay Points**
- **Sun-Synchronous LEO Orbits**
- **GEO Transfer Orbits**
- **Earth-Lunar Orbits**
- **Space Launch Facilities**
- **Petrochemical Facilities Producing Rocket Fuel**
- **Terrestrial-Based Space Telemetry & Control Systems**
- **Space-Related Command Centers**
- **Space-Related Commanders**

# Space Centers Of Gravity - Strategic COG (2) -

- **Terrestrial-Based Space Weapon Systems**
- **Space-Based Space Weapon Systems**
- **Terrestrial-Based Space Surveillance Systems**
- **Space-Based Space Surveillance Systems**
- **Space Weather Systems**
- **Terrestrial-Based Satellite Heavy Communications Terminals**
- **Space Technicians**
- **Space Scientists**
- **Electric Grid Serving Ground Space Facilities**
- **Roads, Bridges, Tunnels & Passes Serving Ground Space Facilities**
- **Space Design & Manufacturing Facilities**
- **Space-Related INTEL Centers**
- **Air Force Satellite Control Network (AFSCN)**

# Space Centers Of Gravity - Strategic COG (3) -

- **Leader's Confidence In Their New Space Technologies**
- **Blue & Red Side Political Will to Start & Continue a Space War**
- **Key Phases of the Battle**
  - **Pre-Conflict Use of Space War**
  - **Just Before Major Terrestrial Offenses**
  - **Just Before the End of the Conflict**
- **Space-Related Decision Cycle Times (OODA Loops)**
- **Knowledge Of Classified Space Systems Existence or War Reserve Modes**
- **Status of Space Forces**
- **Attack on Alternate Country Space Systems**
- **Blue May be Self-Deterred From Attacking Gray Space Systems**
- **Space Alliances & Treaties**

# Space Centers Of Gravity

## - Strategic COG (4) -

- **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 & Time With Advantageous Solar Phase Angles**
- **Times of Solar Alignment Interference to Communications (Two Times a Year for 4-8 Minutes for Geosynchronous Satellites)**
- **Gravity Wells at GEO Disposal Orbits Where Dead Satellites Tend to Group**
- **Space Radiation Belts**
- **Times of High Solar Storm Activity**
- **Zones Outside a Satellite's or Constellation's Collective Sensors' Field Of Regard**

# Space Centers Of Gravity - Strategic COG (5) -

- **Times When Adversary Military Is Concentrating on In-theater Actions, & Is Less Aware of Space-related Actions on the Other Side of the Globe**
- **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**
- **Other Satellites Being Launched on the Same Booster**
- **Manned Launch (Shuttle, Space Station) of Satellites**
- **Times When a Full Moon Degrades an Adversary's Ability to Optically Track Dim Space Objects From Terrestrial Locations**

# Space Centers Of Gravity - Tactical COG (1) -

- **Space Tactics, Techniques & Procedures**
- **Initial Satellite Checkout After Launch or Orbital Insertion**
- **GEO Satellites Changing Orbital Position**
- **Periods of Solar Eclipse for Satellites**
- **Periods When a Satellite Has a Low Battery Charge**
- **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**



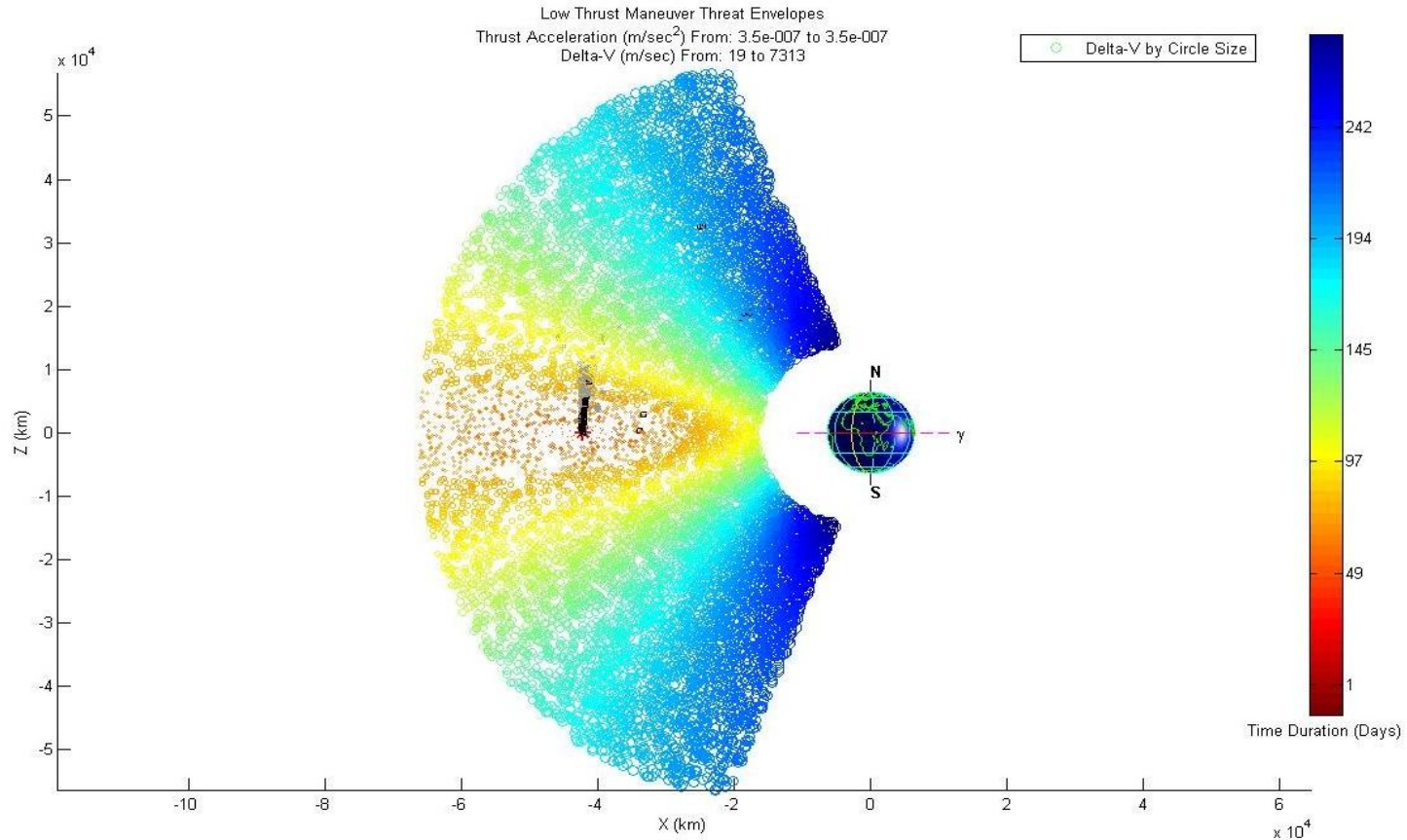
# Space Centers Of Gravity

## - Tactical COG (2) -

- **Near a Satellite's Thrusters**
- **Near a Satellite's High Power Antennas**
- **Anti-Satellite Launch/Attack Rate**
- **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 Weapons Systems**
- **Times of Cloud Cover/Weather/Natural Disasters for Terrestrial-Based Space Surveillance Systems**
- **Times When the Satellite Passes Through Space Radiation Belts**
- **Communications or Telemetry Frequencies That Can be Jammed or Spoofed**

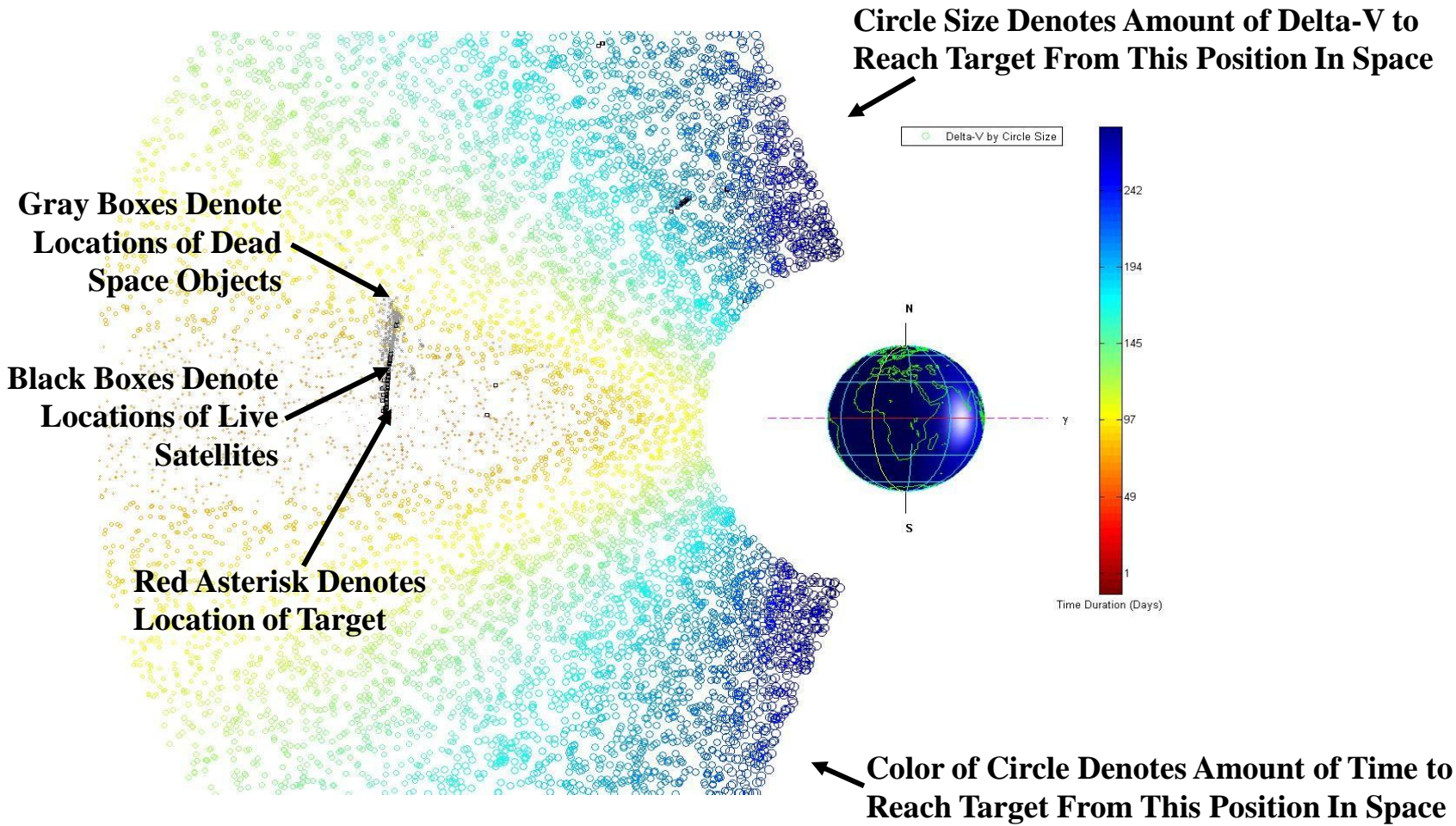


# Threat Envelope Chart (TEC) View 1



**Some Orbits are Easier to Maneuver to Than Others**

# Example Threat Envelope View 2



**Some Regions of Space May be More Threatening than Others**



# Example Threat Envelope View 3

