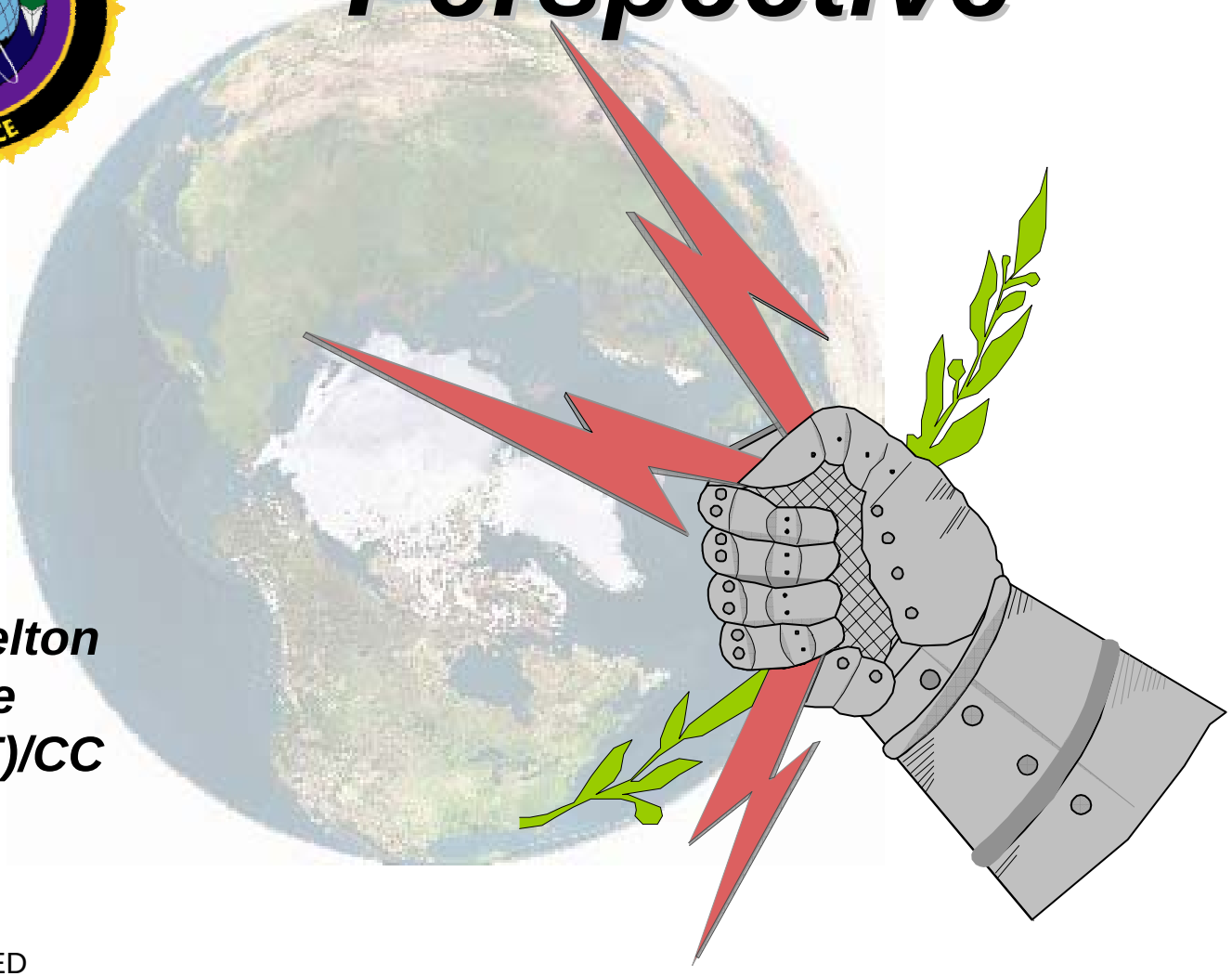
JFCC SPACE Perspective



Lt Gen Willie Shelton
CDR JFCC Space
14 AF (AFSTRAT)/CC
10 Jun 08

This Briefing is UNCLASSIFIED

Growing Importance of Space

Civil Space Applications

Navigation, Emergency Services, Weather & Scientific Research

National Security Space

Joint Operations & Intelligence Collection

Commercial Space Applications

Financial, Precision Farming & Wireless Communications

Percentage of U.S. Space Assets on Orbit

100

50

1957 1967 1977 1987 1997

JFCC SPACE Mission

- **<u>Mission Statement</u>: JFCC SPACE continuously *coordinates, plans, integrates, commands and controls* space operations to provide *tailored, responsive, local and global effects*, and on order, *denies the enemy the same*, in support of national, USSTRATCOM, and combatant commander objectives**

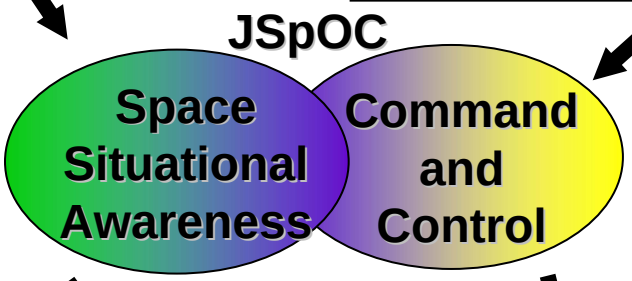
- **<u>End State</u>: *Unity of command* and *unity of effort* in the unimpeded delivery of *full-spectrum joint space effects* to supported commanders, and the ability to *deny the benefits of the space medium to adversaries* for purposes hostile to U.S. interest**

JFCC SPACE Synchronization

- Weather
- Blue Space Picture
- Red/Grey Picture
- Debris Tracking

COCOM Needs
↓
COA Development
↓
COA Selection
↓
Execution Assessment
↓
Retasking

Space Ops Directive
Master Space Plan
Joint Space Tasking Order



Joint Space Tasking Order

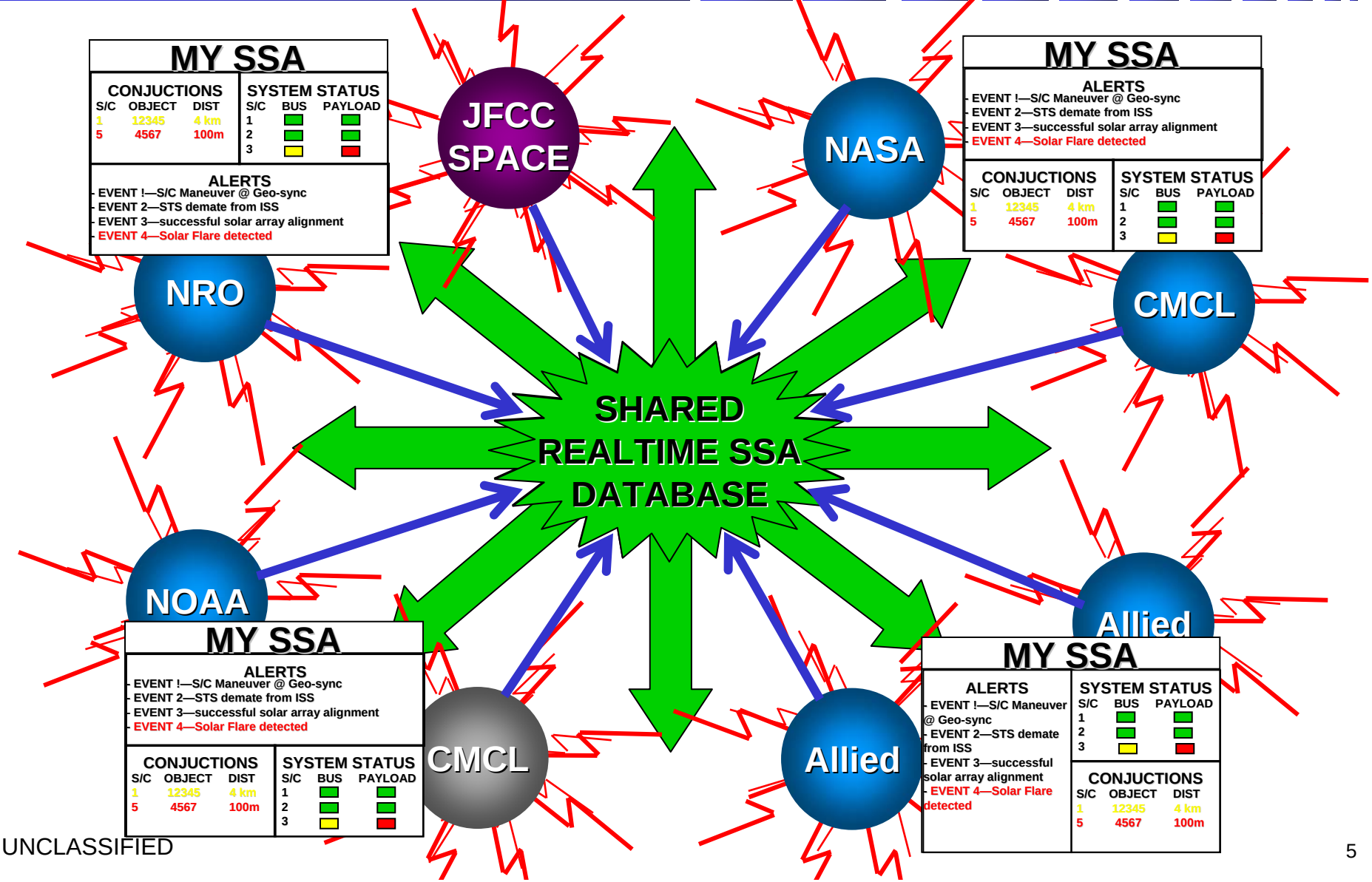
Offensive Counterspace
- Tactical Units (Joint)
- Deny Space Advantages

Routine Space Ops
- Tactical Units (Joint)
- Create Desired Effects
- Dynamic Tasking

Shared Situational Awareness
- Strategic, Operational, Tactical
- Enable UDOP

Defensive Counterspace
- Tactical Units (Joint)
- NRO
- Civil/Commercial
- Allies

JFCC SPACE VISION: An SSA Clearing House



Neighborhood Watch

- **Commercial SATCOM Emergency "Phone Book"**
  - **Used at JSpOC & Global SATCOM Support Center (GSSC)**

- **DOD Emergency Conjunction Assessment Procedures**
  - **USSTRATCOM guidance signed and published**
  - **This is a first step toward documenting National Security Presidential Directive-directed Expanded Space Situational Awareness (ESSA) responsibilities**

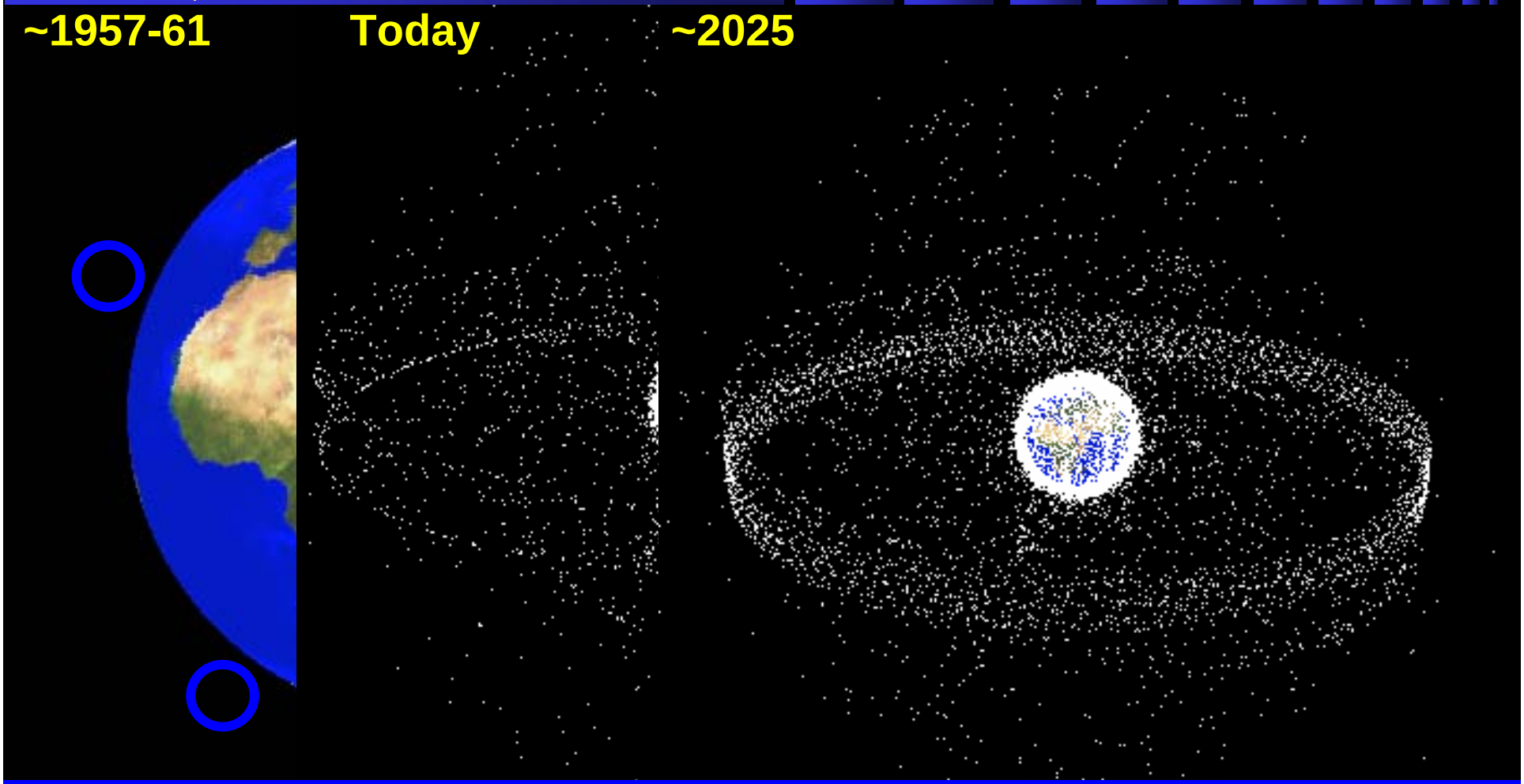
- **Exercise Global Storm 07: 14-21 March 2007**
  - **First "live-fire" interference event with industry exercised**

- **Exercise Global Lightning 08: 15-20 October 2007**
  - **US Govt Interagency/Iridium conjunction exercise event**

Initiatives

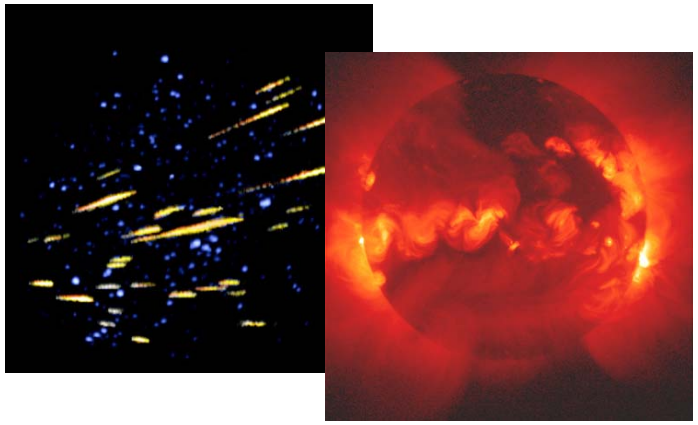
- **Electronic Attack/Electromagnetic Interference (EA/EMI) event management via the Joint SATCOM Management and Planning System (JSMPS)**
- **SATCOM apportioned to theater commanders for contingency planning**
  - **Includes assessment of commercial SATCOM needs**
- **Space Condition (SPACECON) notifications to industry partners**
- **Quarterly EMI review**
  - **“Lessons Learned” sessions between GSSC and industry**
  - **Foundation for trend reporting**
- **Visit to Space Ops Control & Network Ops Control centers**

The Space Environment



Evolution from a few, military only, assets to many, multi-agency, civil assets.

Multi-Faceted Hazards & Threats



Natural Environment

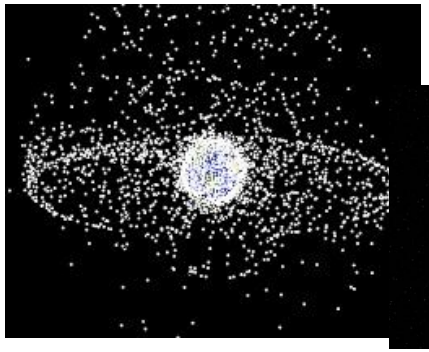
BBC NEWS

Last Updated: Friday, 13 January 2006, 11:39 GMT

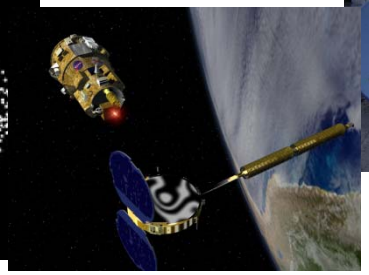
Libya jamming 'exposed vulnerability'

An incident involving Libya blocking a dissident radio station late last year highlighted the potentially devastating consequences of relying too much on satellites, a British MP has warned.

"A jammed satellite could seriously affect troop effectiveness"

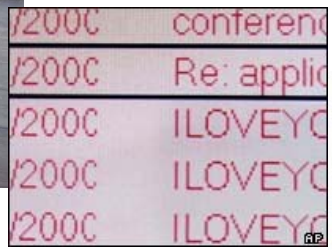


Debris

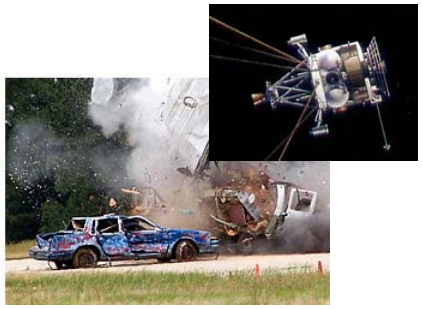


Unintentional Collisions

Radio Frequency Interference



Cyber Attacks



Physical Attacks

1/11/07: Chinese ASAT

- **Representative of the threats: jamming, attacks on ground sites, ASATs, high energy lasers, Nuclear Detonations (NUDETs)**

- **Irresponsible space ops: >2,380 catalogued objects as of 28 Mar 08; hundreds of thousands of smaller pieces; 25 pieces reentered so far, remainder expected to be in orbit for decades**

- **Lessons Learned**
  - **Tremendous wealth of data available**
  - **Consolidated effort between intelligence & ops required**
  - **Need for improved processing/analytic systems – security challenges**
  - **Development efforts guided by lessons learned**

"We are on notice, but we have not noticed"

- Space Commission Report. 11 Jan 01

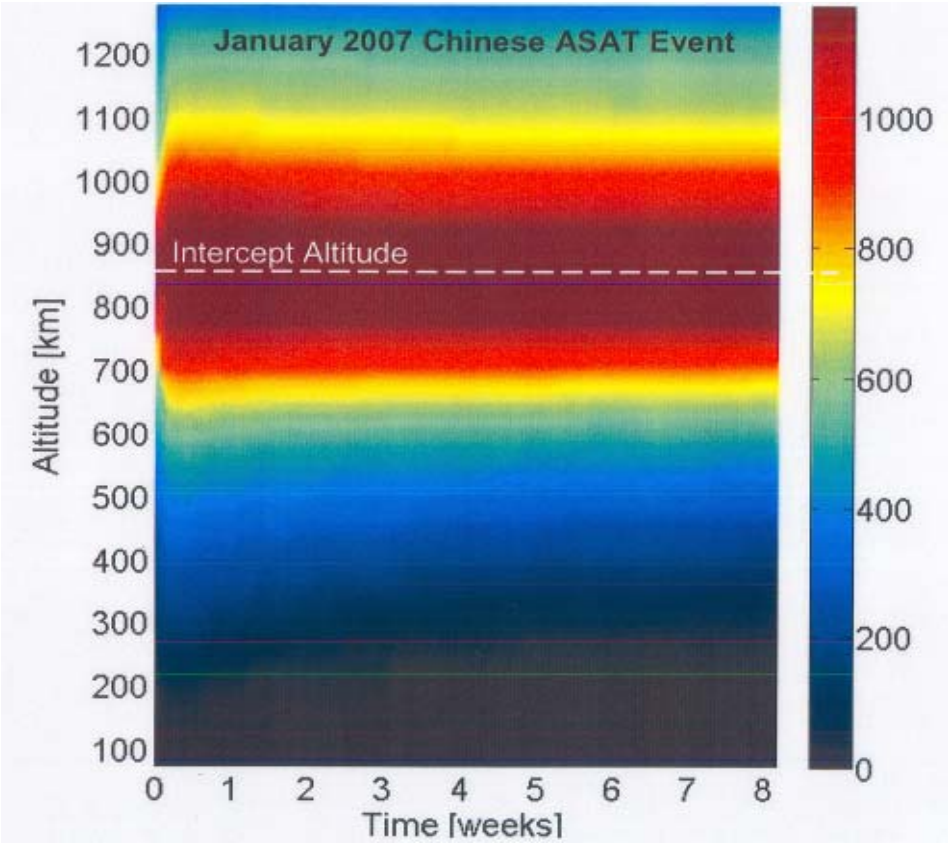
20 Feb 08: US Interception Op

- **Joint team effort, very short timeline**
- **JFCC SPACE supported Commander for Consequence Management**
- **JSpOC generated target quality orbital data accurate to within ± 50ms (< 1km)**
  - **“Engage on Ephemeris”**
- **Full range of radar, IR, optical sensors used – land, sea, air, space**
- **JSpOC continues orbital debris characterization, reentry assessments, and conjunction assessments**

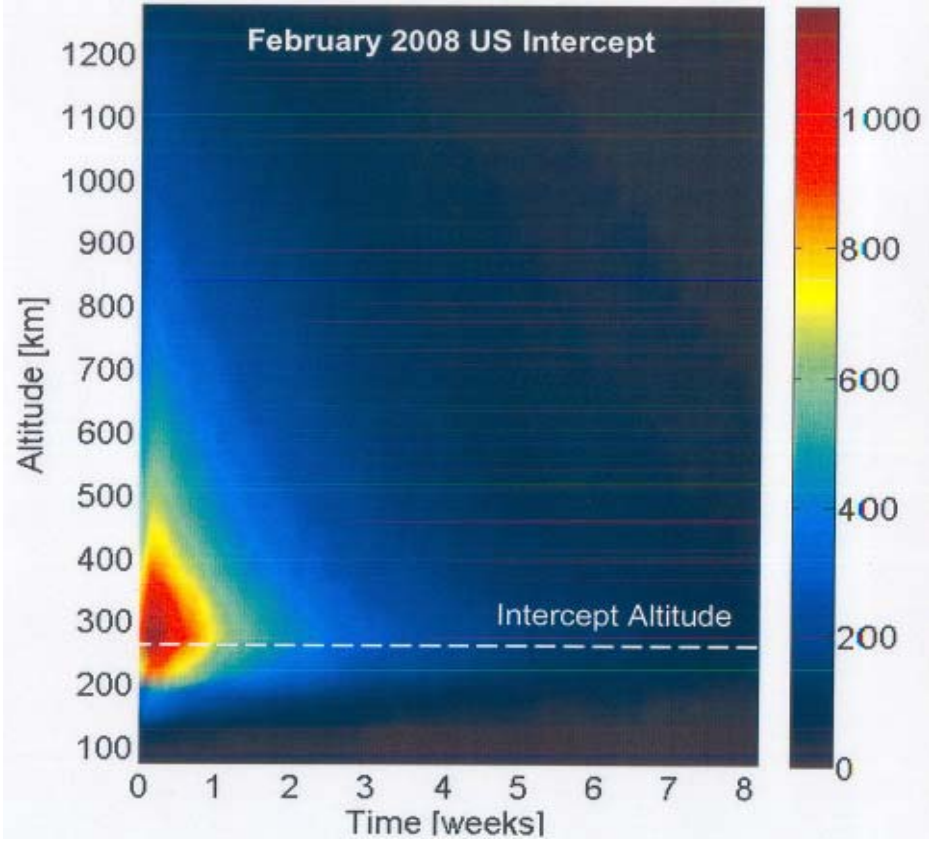
USS Lake Erie launches a missile as the satellite travels over the Pacific Ocean.

PRC vs. US Orbital Intercept

Colors represent density of debris at a given altitude. Higher density means higher probability of satellite encounter. Density drops as the debris reenters the atmosphere.



- **10% of debris decayed in 60 days**
- **18% in one year.**
- **31% after 5 years**



- **77% of particles decay in 1 day**
- **90% in 17 days & 99%+ in 97 days**
- **<.01% after 1 year**

A Persistent Challenge

- **Routine orbital conjunction screening revealed possible conjunction between an active US Weather Satellite and an unknown piece of debris**

- **Close conjunction predicted for 22 Apr 08**
  - **51 meter predicted miss distance**
  - **Approx 33,300 MPH closing velocity of the approach**
  - **No capability to perform collision avoidance maneuvers**

- **Collision could result in adding 1000s of pieces of debris**

- **100s of active LEO satellites potentially threatened**

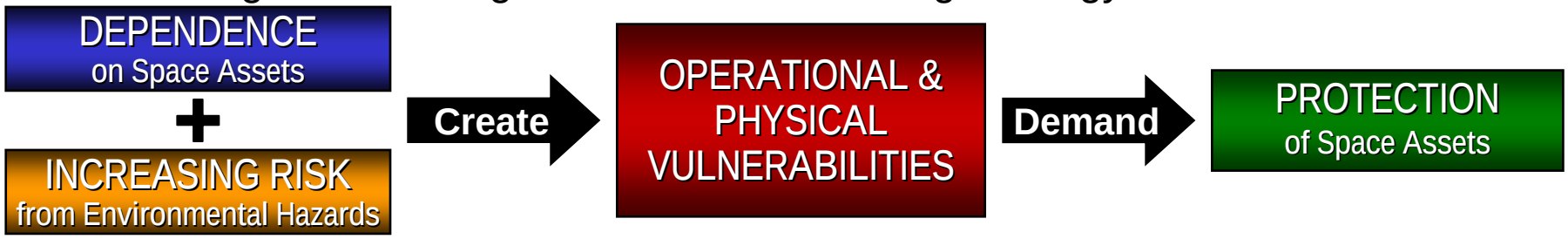
- **Final miss distance at time of closest approach: 63 meters**

Need for Protection (Dependence and Risk ⇨ Vulnerability)

"United States national security is critically dependent on space capabilities, and this dependence will grow."

National Space Policy, 2006

- **Space utilization is growing, increasing exposure to hazards within the medium, while technology drives the threat**
  - Access to space is cheaper & more widely available—you don't need to be a space-faring nation to have access to space or achieve space effects
  - Space is more crowded than ever (18,000+ man-made objects, including debris)
  - Improved & smaller spacecraft technologies provide protection challenges
  - Jamming, attacks on ground sites, ASATs, High Energy Lasers, NUDETs



- **Protection is about Preservation—requires Recognition & Attribution**
  - SSA enables recognition and attribution—must be able to say an event "will, is or has" & answer "who, what (threat or hazard), why, how, when & where"
  - Early recognition allows preservation—attribution enables response

Summary

- **Space represents an asymmetrical military advantage and an engine of economic growth**
- **Civil, commercial, and military activities in space are closely intertwined and mutually supporting**
- **The space environment continues to grow more crowded and more contentious**


UNITED STATES
STRATEGIC COMM
USSTRATCOM
JFCC SPACE