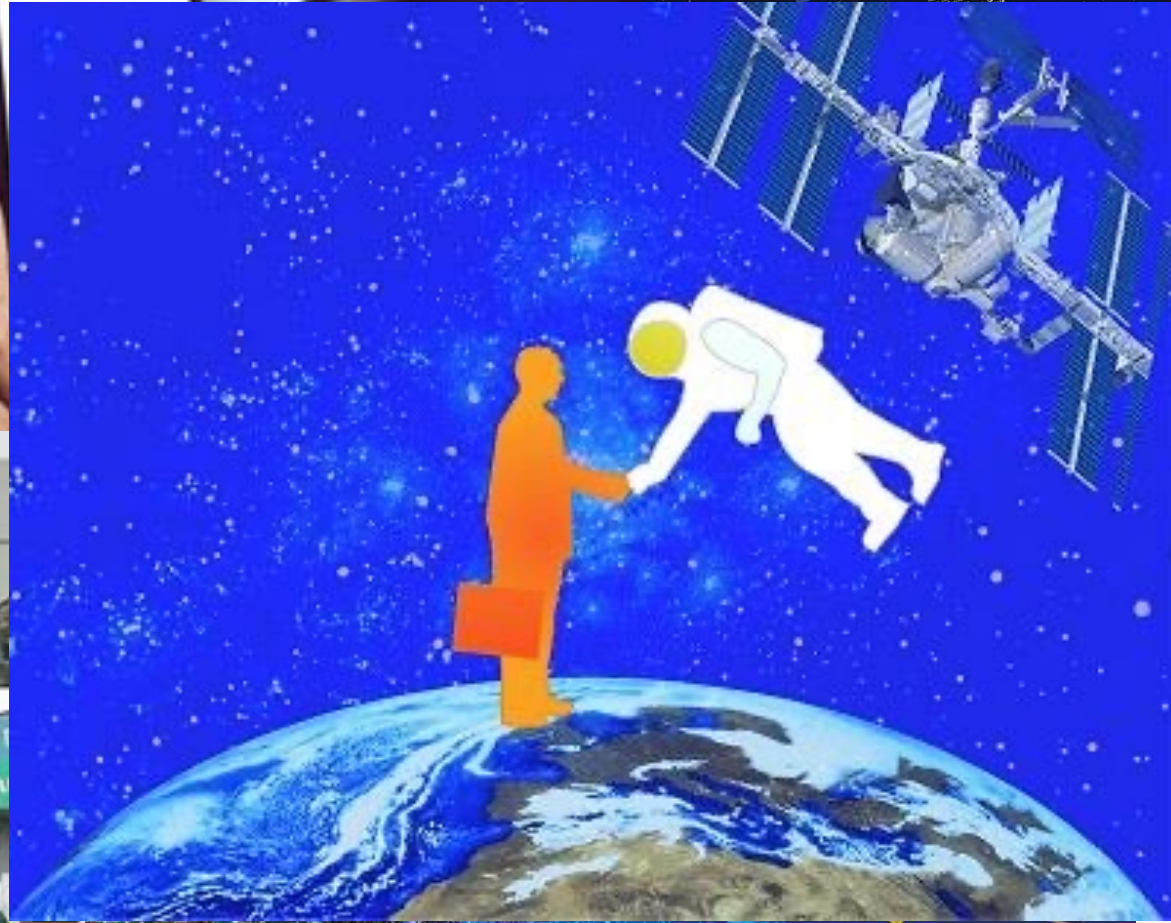
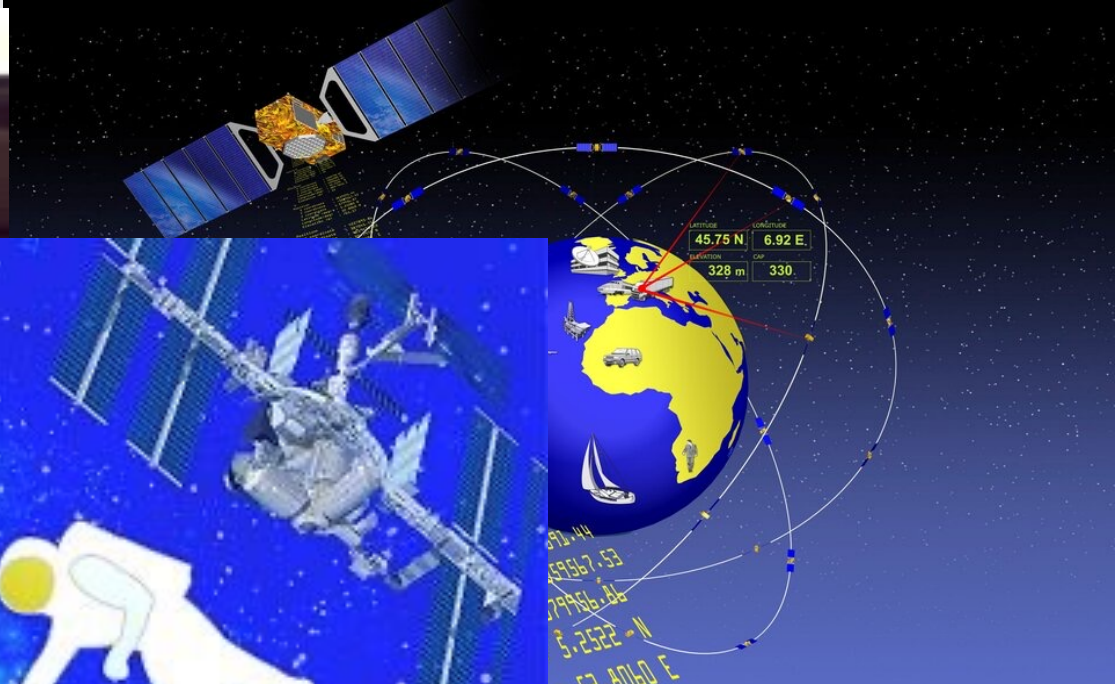
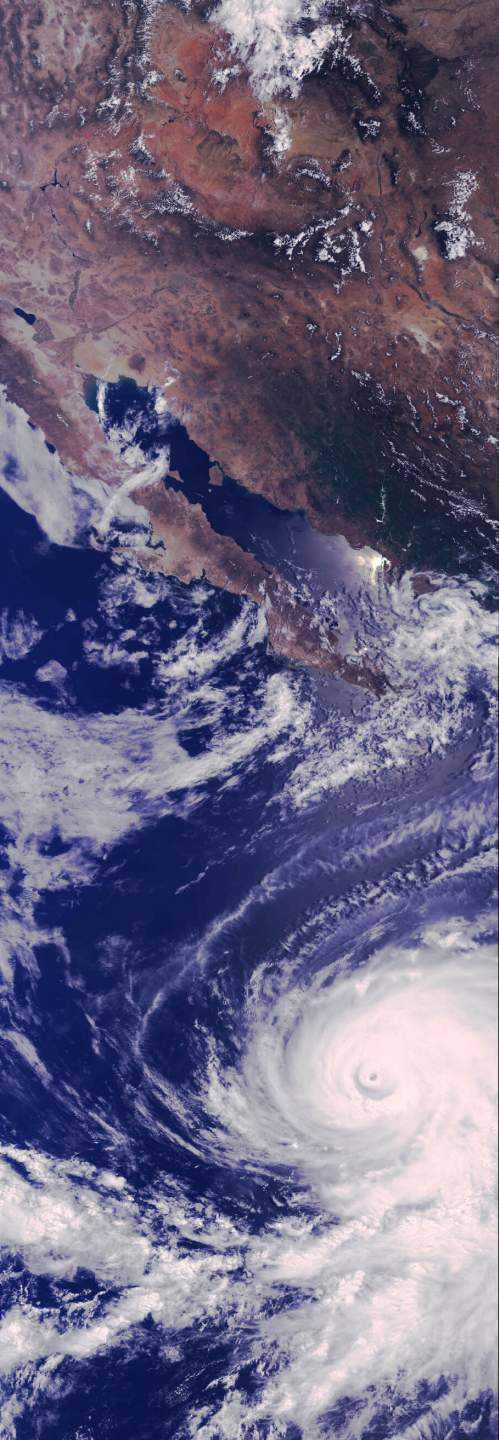


SPACE INFRASTRUCTURE FOR DEFENCE & SECURITY



BRIG G MANOJ
DEFENCE SPACE AGENCY





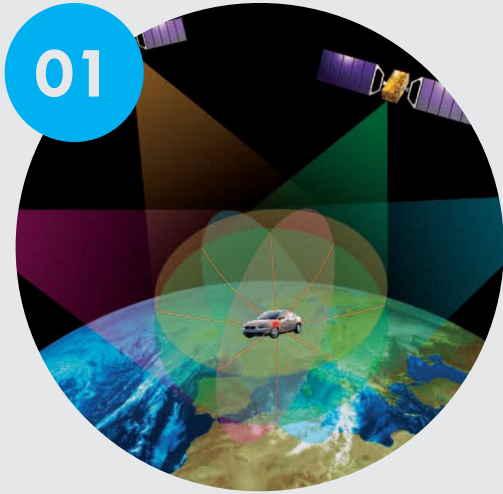
© ESA 2002



"SOMEWHERE, SOMETHING INCREDIBLE IS
WAITING TO BE KNOWN."

- CARL SAGAN

SCOPE



01

**TRENDS IN
WARFARE & SPACE**



02

SPACE SERVICES



03

**SPACE
INFRASTRUCTURE
FOR DEFENCE**



04

WAY AHEAD

TRENDS IN WARFARE : EARTH & SPACE



1

MULTI – POLAR WORLD

**No permanent friends
Shifting Alliances
Non State Actors**

HYBRID WARFARE

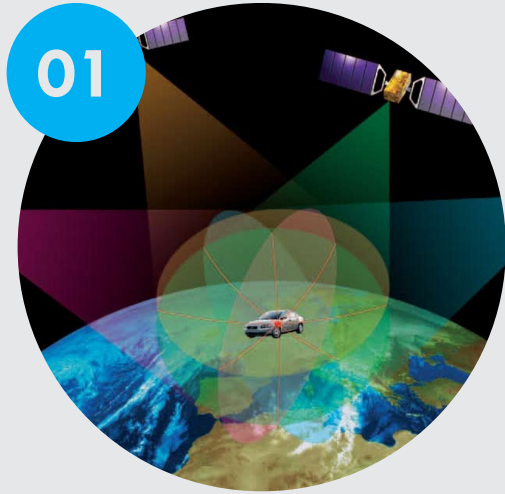
**Multi- mode, Sub- conventional
Deniability
Non- military targets**

2

3

SPACE WARFARE

**Through, From & In Space
Blurred lines – Commercial/ Military
Dual Use technologies**



01

**TRENDS IN
WARFARE & SPACE**



02

SPACE SERVICES



03

**SPACE
INFRASTRUCTURE
FOR DEFENCE**



04

WAY AHEAD

CHARACTERISTICS OF SPACE



**GLOBAL
REACH**



PERSISTENCE



**ULTIMATE HIGH
“GROUND”**

**IDEAL FOR REMOTE &
HOSTILE ENVIRONMENT**


SPACE BASED SERVICES FOR MILITARY



ISR

1

- MONITOR CRITICAL INFO
- BATTLEFIELD TRANSPARENCY
- MARITIME SURVEILLANCE
- MISSILE DETECTION



PNT

2


- NAVIGATION
- PRECISION WEAPONS
- NETWORK CENTRIC WARFARE



SATCOM

3


- REMOTE LOCATIONS
- BACKHAUL COMN
- MARITIME COMN



SSA

4

- COLLISION DETECTION
- CONJUNCTION
- SPACE WEATHER
- SATELLITE ANOMALY

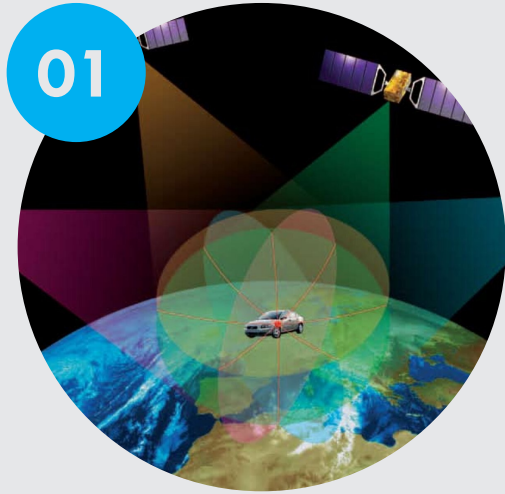


COUNTER MEASURES

5

- DEFENSIVE
- OFFENSIVE
- SOFT KILL
- HARD KILL





01

**TRENDS IN
WARFARE & SPACE**



02

SPACE SERVICES



03

**SPACE
INFRASTRUCTURE
FOR DEFENCE**



04

WAY AHEAD

SECURE COMMUNICATION NETWORKS

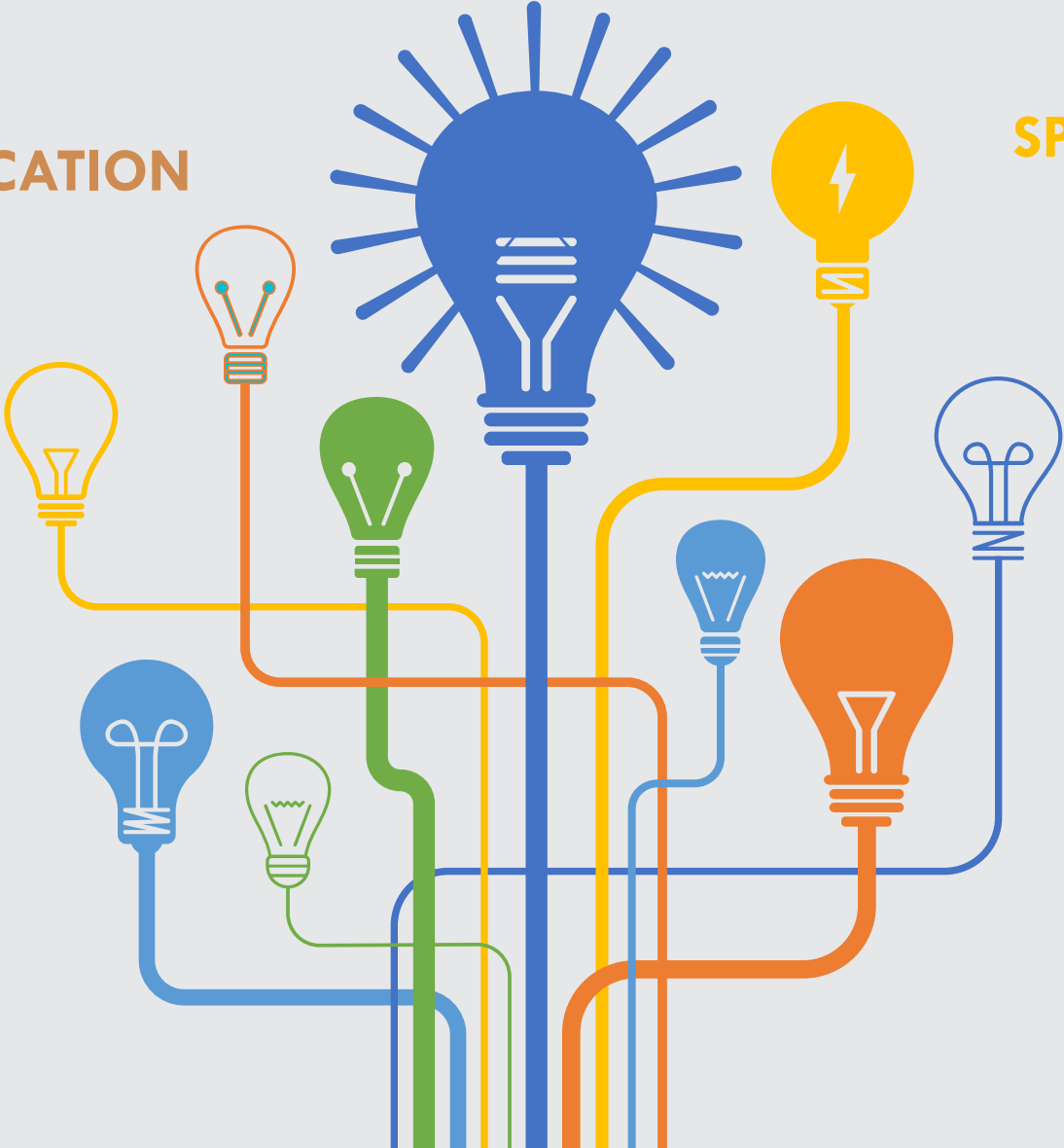
SATELLITE OPERATIONS CENTRE.

DATA ANALYSIS.

SPACEPORT

GROUND CONTROL STATION

AIT



TRENDS IN SPACE



**LEO COMN
CONSTELLATIONS**
Low Latency
Global Internet

AI/ ML
Automation,
Decision Support

**VERY HI RES
EO & SAR**
Transparency

**TRANSFORMATIONAL
TECHNOLOGIES**
DUAL USE

**IMPACTS LARGE POPULATION
COMMON MAN**



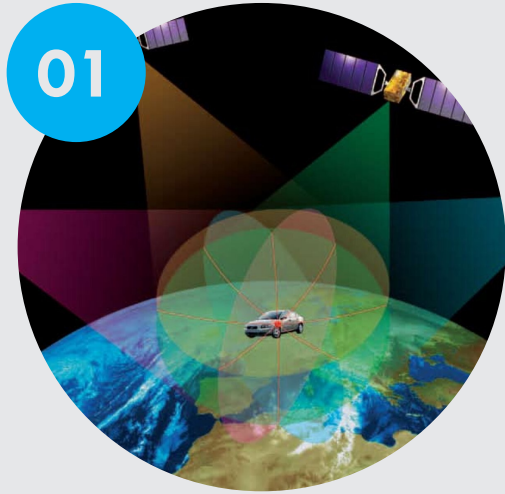
**MULTIPLE GNSS
OPTIONS**
Redundancy



**CYBER
PENETRATION**
Through SATCOM



RPO
Servicing, Hostile Actions



01

**TRENDS IN
WARFARE & SPACE**



02

**SPACE SERVICES &
INFRASTRUCTURE**



03

**SPACE
INFRASTRUCTURE
FOR DEFENCE**



04

WAY AHEAD

SPACE INFRASTRUCTURE FOR DEFENCE



01 | Invest in Development

- Satellites
- Specialised Sensors
- Communication Systems



02 | Develop New Technologies

- AI/ML
- Secure Communication
- Edge Computing
- ISL

SPACE INFRASTRUCTURE FOR DEFENCE



03 | Integrate with Military Ops

- **Manage flow of Info**
- **Command & Control Systems**
- **Integrate Space in Op Planning**



04 | Collaborate with Partners

- **Maximise Potential for Collective Security**
- **Share Data, Expertise & resources**

DEVELOPING MILITARY SPACE STRATEGY



01

Outline Objectives, Priorities & Resources Required
Ensure access to space resources

02

Consider risks, challenges to use of Space Assets
Competition & rivalry in Space Domain
Strategies to Mitigate risks

03

Collaborative effort
Govt agencies, Industry, Academia

A digital globe of the Earth is shown, partially obscured by a complex network of glowing white nodes and thin white lines. The globe is set against a dark blue background with a subtle pattern of white stars, suggesting a space or digital theme. The network overlay is dense and covers the entire visible surface of the globe.

CONCLUSION