Presentation

by

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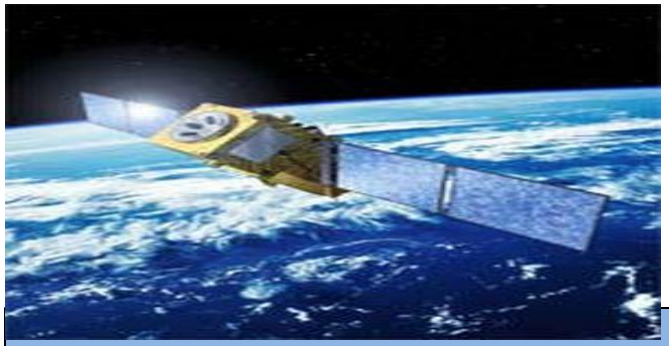
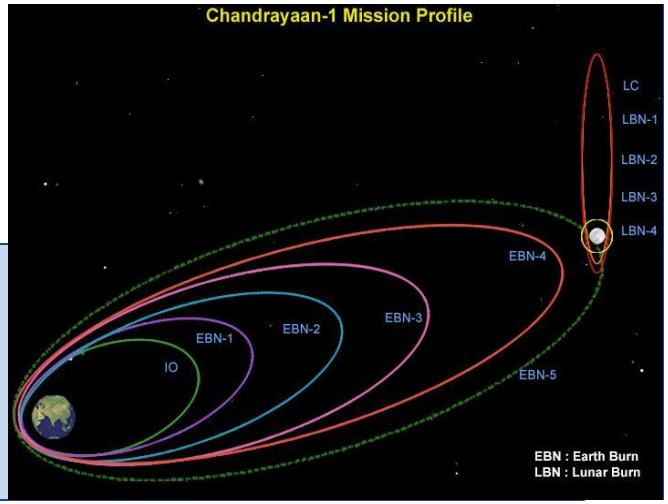


Indian Armed Forces

&

Space Technology

Caveat



The views expressed are my own and the information used is from the open sources

Presentation Layout

- *Introduction*
- **India's Space Programme-a narrative**
- **India's security threats**
- **Military Space Programme**
- **Capabilities of Potential Adversaries**
- *Conclusion*

Fundamental Questions

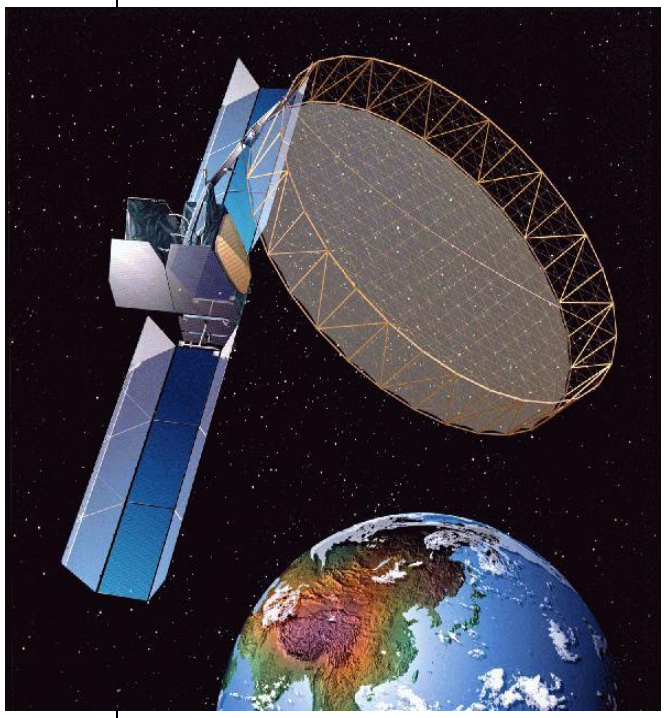
- What are India's threat perceptions?
- How India views space in its overall security calculus?
- Is 'full-scale RMA model' valid in Indian context?
- What is the present & future of India's military space programme?

India's multilayered security architecture

- Indian Army is the world's second largest army
- IAF is the world's fourth largest air force
- Indian navy is the world's fifth largest navy
- Support services: Border Security Force (BSF), Central Reserve Police Force (CRPF), Indian Cost Guard and few other services including intelligence agencies

Technology is the Key

- RMA is a reality in Indian context/hybrid RMA/NCW
- C4ISR structure exists
- Standoff & other modern state-of-art weapons
- Weapon delivery platform technologies
- "**Space**" *-an extremely important segment for India's security architecture*



India's Space Programme

- Civilian in nature, not born out of any military programme
- Tool for socio-economic development
- Nascent beginning-mainly experimental, low capability projects
- Communications, meteorology, and natural resource management. Launchers..2500kg satellites
- Present Era: Nano-satellites to deep space missions

Military Understanding of Security

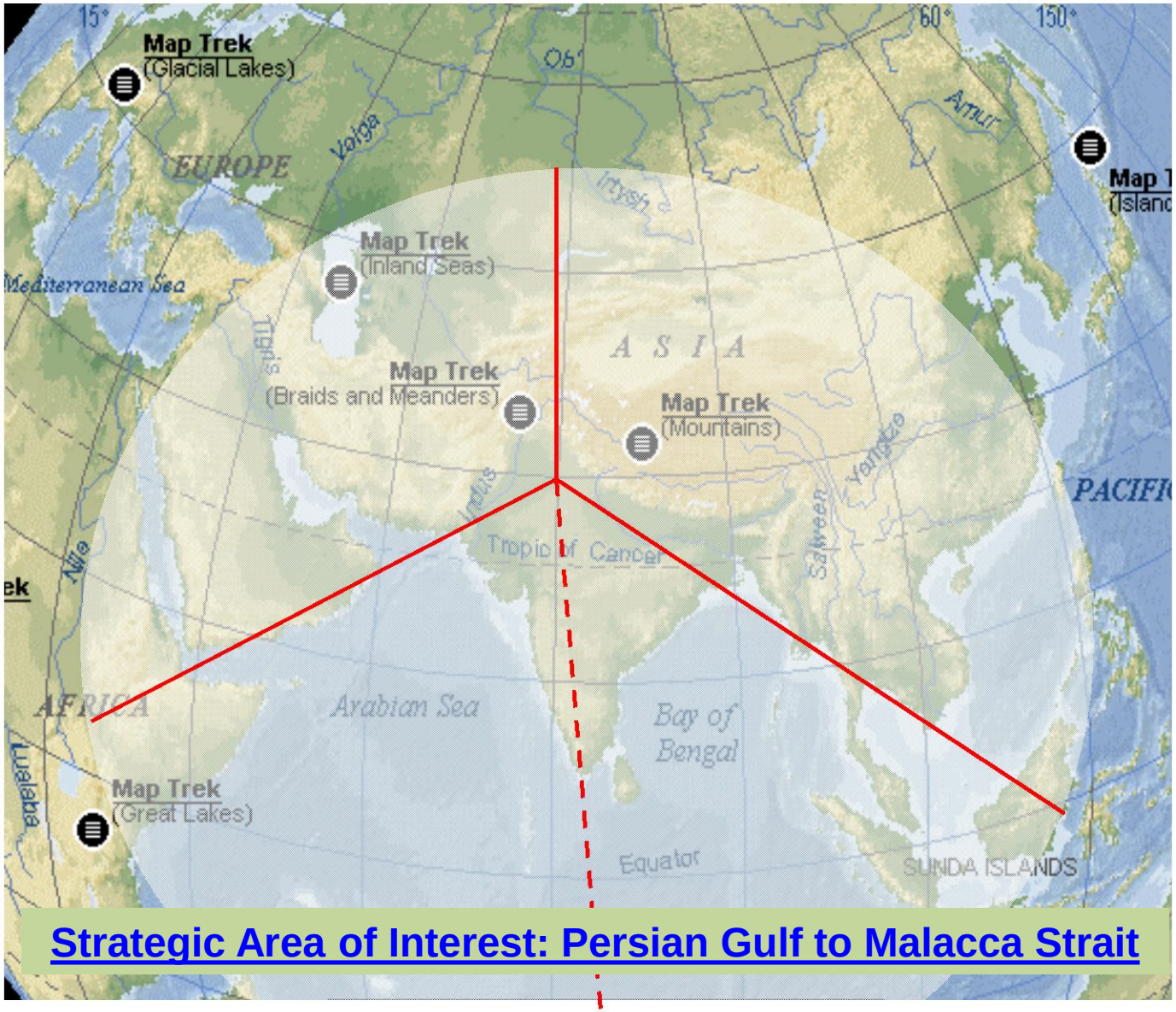
- A narrow view, hinging on military security alone
- Is war fighting the only role for the armed forces?
- Economic, environmental, energy, food, social & human security

Role of Security Forces

- Conventional role
- In aid of civil authorities
- UN peace keeping missions
- Out of area of operations?
- **Aim** is to *safeguard* India's strategic interests

Military Space

- Communication, reconnaissance and navigation
- 1991 Gulf War & subsequent military campaigns have highlighted the importance of military space
- 'Militarization of space' *vs* 'Weaponisation of space'



Strategic Area of Interest: Persian Gulf to Malacca Strait

India's security establishment & Space

- Obvious usages-Communication, reconnaissance & navigation
- Indian military dependence on space assets is likely to deepen in future
- Future: counter space capabilities to cyber operations

Space Assets of Security Importance

- One meter resolution Technology Experiment Satellite (TES) was launched by ISRO in 2001
- Cartosat 1 and Cartosat 2 high resolution satellites with 2.5 m and 1 m resolution
- Cartosat 2A (Apr 2008) with a resolution of 0.8 meters. Carosat-2B (Jul 2010)
- All these satellites together allow India a 24*7 capability to monitor its region and the surroundings

Use of Space by IAF

A theoretical appreciation

- To build real time situational awareness through space communication and space sensors
- To link radar and other communications networks over the entire length and breadth of the country
- To assist in Ballistic Missile Defence
- To gather real time intelligence about enemy aircraft, missiles and space borne threats
- To prevent enemy for using its space assets by resorting to jamming

IAF and Space

- Using space for telecommunications, reconnaissance, navigation targeting and various other operations
- Has plans to integrate space based applications extensively into conventional strategies and operations
- Adopting a focused and fast tracked approach
- A dedicated satellite would be launched in near future

IAF's Force Development Priorities

- Better sensors, a strong air defence network, and a strike capability
- A credible nuclear and conventional deterrent posture
- A highly networked and information technology-intensive orientation
- Capability to exploit space-based ISR, command and control, and navigation assets that will offer both real-time and predictive battlespace awareness

Anticipated Force Mix (2020)

- 11 or 12 squadrons (272) Su-30MKIs
- Three squadrons (50) MiG-29s & (50) Mirage 2000s
- Five squadrons (110) Jaguars
- Six squadrons (126) MRCA… & (126) Tejas LCA…
- Transport and helicopter/attack helicopter fleets

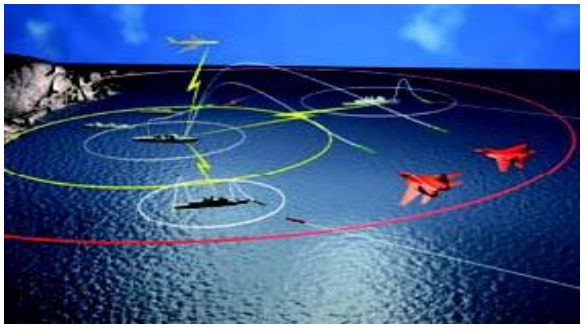
Force Enhancement

- Use of PGMs, BVR combat
- AWACS , network of aerostat-mounted radars
- Air to air refueling
- Unmanned air vehicle (UAV), UCAVs
- Pursuing effects-based operations (EBO)

Policy Making Structures

- Aerospace Command: Remains at a level of academic debate
- Has established a "Space Cell" under the command of the Integrated Defence Services (IDS) Headquarters
- HQ IDS has developed Defence Space Vision (DSV) 2020

Future Plans



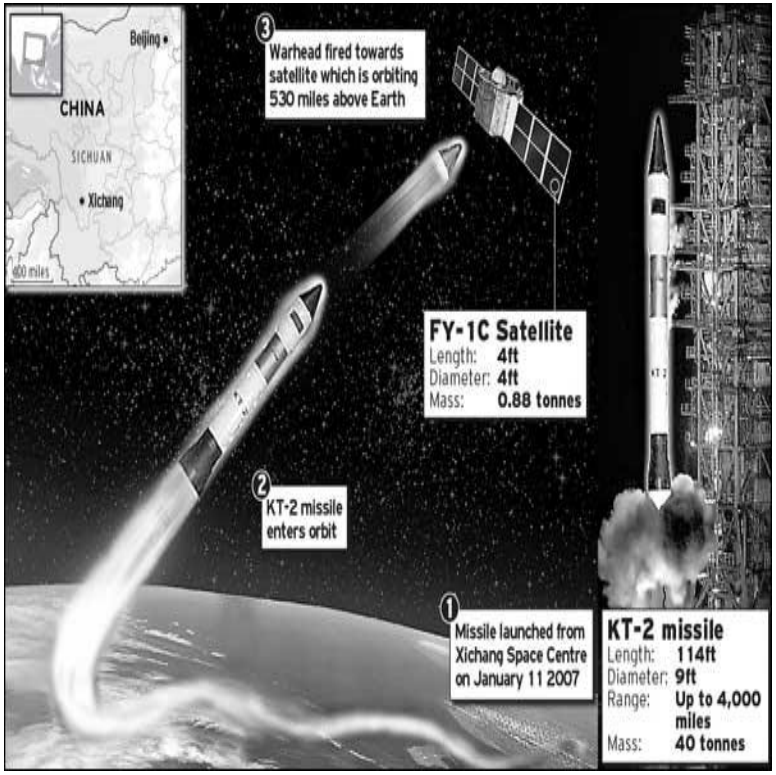
- India could launch one to two satellites every year to boost the country's capability to scan multiple activities on and across its borders. India is expected to send data and commands through such satellites to its cruise missiles

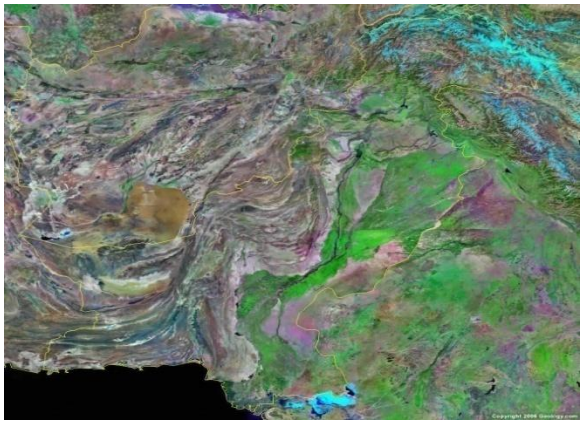
- EILINT Satellite developing a dedicated network-centric communication intelligence satellite for detecting conversations and espionage activities in the region

- Indian Regional Navigation Satellite System (IRNSS)

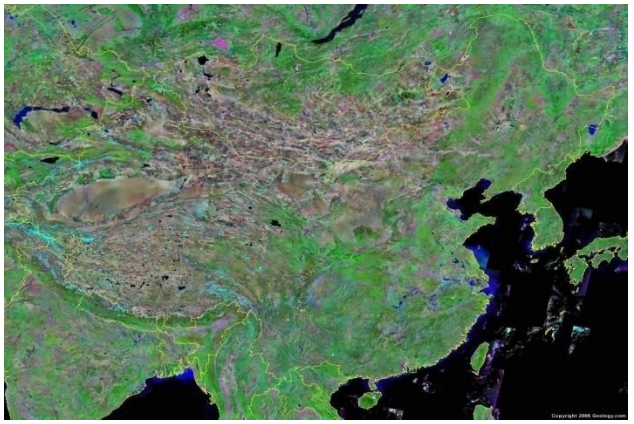
ASAT: A Serious Threat to India

- Jan 2007 China ahs conducted an ASAT
- Probably China has developed technologies like the Parasitic satellite, jamming techniques
- Pakistan has got significant missile capabilities
- What are India's options?





Capabilities *of* Neighbours



- China has made significant progress:

1. Earth orbiting satellites for a large number of duties, human spaceflight abilities, multi-step programme of Lunar & Mars exploration, space station
2. Network of space-based ISR sensors, space-based SAR, Beidon/Compass Nav System, Spy satellites…..

- Pakistan's space ambitions are still in a nascent stage

Limitations

- ISRO's mandate is civilian in nature
- Technically few ISRO and DRDO labs are still under "restrictions"/entity list
- ISRO has a significant roadmap for future..hands are full
- No dedicated agency is in place that would look specifically towards development of mil aspects of space (technical and policy)

Conclusion

- Indian Armed forces are relying on space both for *strategic and tactical purposes*
- The dependence is expected to increase in coming years
- IAF would be the major user of space technologies
- In Indian context ASAT is an issue

Thank you