

Presentation

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Indian Space Programme

Presentation Layout

- Introduction
- Narrative
- Current and future agenda
- Space Technologies in support of national Power
- Conclusion

Narrative

India's Space Programme

- **Satellite Programme**

**Design & Development
of Satellites**

**Post launch
management of satellite
systems**

- **Launcher Programme**

**First few launches not
from Indian soil**

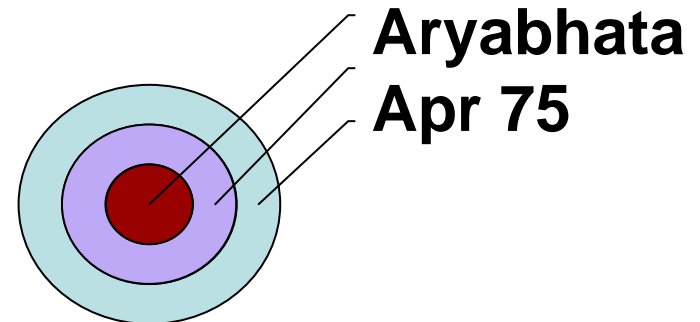
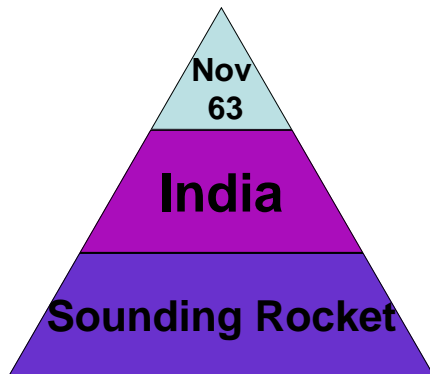
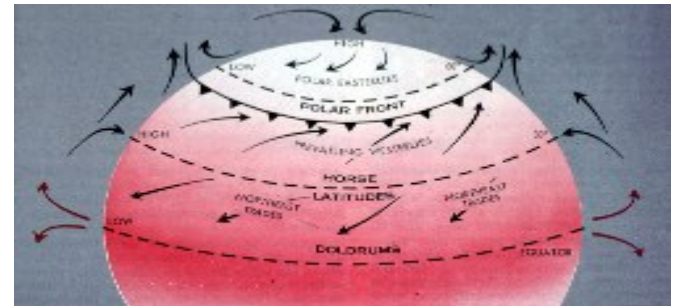
**Developed different
category of launch
vehicles**

**Yet to achieve 100%
self-reliance**

Space Journey



Explorer 1-Jan 58



Space Organization

- Under Dept of Atomic Energy (1962)-
Creation of Indian National Committee for
Space Administration (*INCOSPAR*)
- Under Dept of Atomic Energy (1969)-
Indian Space Research Organization
(*ISRO*) was formed
- ISRO under Dept of Space since 1972

Space Vision

◊ *Articulated by Dr. Vikaram Sarabhi*

“A civilian programme with focus on application of space technology as tool for socio economic development of the country”

The logo consists of the letters 'AIM' in a bold, blue, sans-serif font. The letters are centered within a light blue oval. A thin blue horizontal line is positioned directly beneath the letters. The entire logo is contained within a white rectangular box with a thin blue border.

AIM

A programme capable of using space technologies for communications, meteorology and natural resource management

Independent Projects

Dept of Space

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graph TD; A[Dept of Space] --- B[Indian National Satellite Space Segment Project]; A --- C[Natural Resources Management System]; A --- D[National Remote Sensing Agency]; A --- E[Physical Research Laboratory];
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**Indian
National
Satellite
Space
Segment
Project**

**Natural
Resources
Management
System**

**National
Remote
Sensing
Agency**

**Physical
Research
Laboratory**

A Humble Beginning

- 1962: Thumba Equatorial Rocket Launching Station (TERLS)
- Major focus on experimental and low capability projects
- Aim to gain experience in the construction and operation of satellite and launch vehicles

Launch Vehicle Programme

- SLV: Satellite Launch Vehicle
- ASLV: Augmented SLV
- PSLV: Polar SLV
- GSLV: Geosynchronous SLV

First Two Decades....

- Learning phase
- Aryabhata, Bhaskara, Apple
- First indigenous satellite launched July 1980 Rohini 1 with the help of SLV rocket
- Four test flights on SLV-3 1979 to 1983

A Decade of Consolidation

(Mid 80s to 90s)

- First-generation Insat-1D in June 1990
- Insat-2A, July 1992 & Insat-2B in July 1993
- May 1994 ASLV: Was a 5-stage solid propellant rocket-150 kg satellite into LEO

The last Decade

post 1995...

- PSLV emerged as a ***most dependable workhorse.***

Developed for IRS. Can also launch small size satellites into GTO.

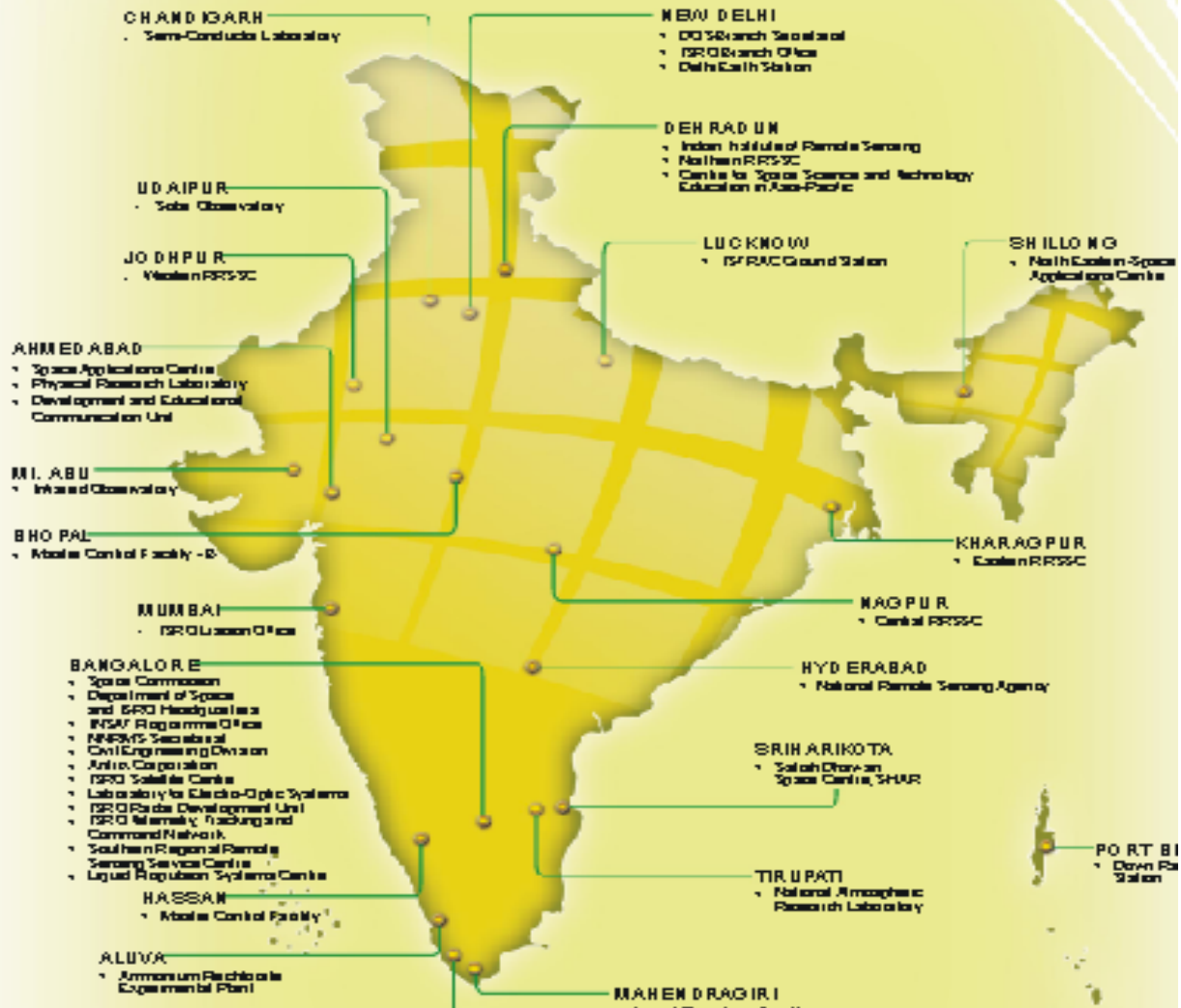
- GSLV: Developmental flight 2001-success

Mid-course Correction

- Brainstorming session: 7th-8th Nov 2006
- A shift in focus suggested
- Time is appropriate for India to undertake manned mission
- Is it a shift in policy or natural progression?

Existing & Futuristic **Missions**

Space Centres and Units in India



Remote Sensing

- **1st Gen: 1988-IRS 1A, 1B (Res-72.5m-36m)**
- **2nd Gen: 1995-IRS 1C, 1D (Res-70m-5.8m)**
- **Resourcesat1:2003 (Res- 5m)**
- **Cartosat1 & 2: 2005, 2007; (Res-2.5 & 1m)**

Communication

- INSAT Series: Initially multipurpose payloads (INSAT 1 series)
- INSAT 2 Series: Multipurpose & Communication
- INSAT 3 and 4 series: Communication
- By 2008/09: 251 transponders
- Ambition: 500 transponders

Commercial Aspects

- Antrix: 1992 ISRO sets up its commercial outlet
- Steady and significant progress
- Sales turnover exceeding \$ 100 million

A Plan Under Progress

- SRE (Space Recovery Capsule Experiment) Jan 2007
- Re-entry technology has proved its worth
- Will start sending unmanned vehicles to space
- Manned space mission by 2015
- Manned moon mission by 2020

Mapping the Moon

- Chandrayaan 1: 2008 launch planned
- 525kg satellite for remote sensing mission
- Payload: Two US and one each from ESA and Bulgarian space lab
- Helium 3 is on the agenda

Few Important Projects...

- Nano satellites
- **ASTROSAT**
- Indian Regional Navigation System
- **Dreaming Mars**

Military Space Programme

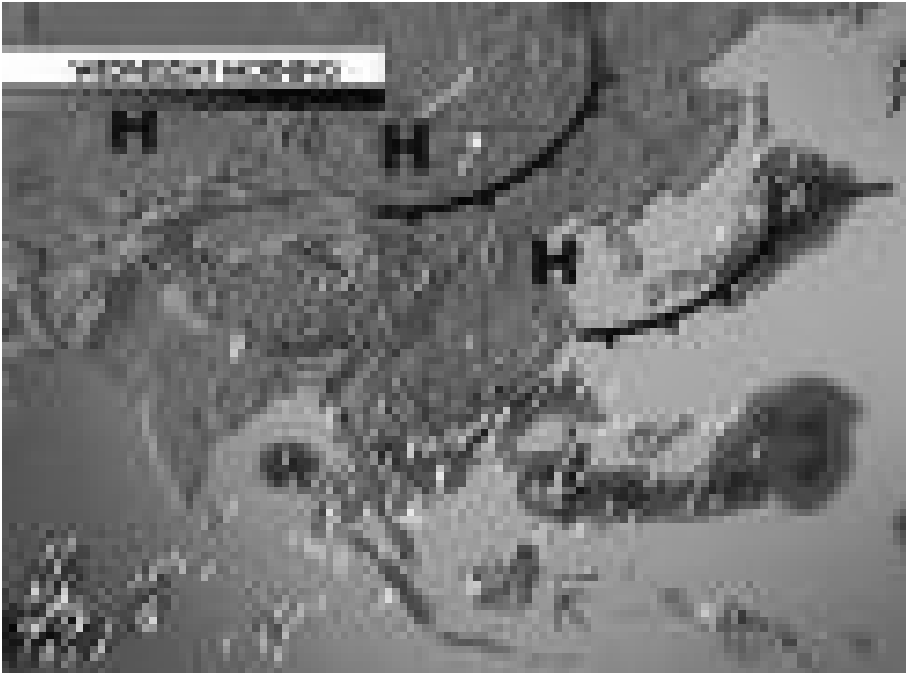
- Space programme is essentially civilian in nature
- Dual use nature of technology
- TES, Cartosat 1 & 2
- Cartosat 2A

Aerospace Command

- Still at conceptual level
- 'Space' important to armed forces
- India's location and strategic interests
- 21st century security threats

Space Technology
in support of
National Power

Instruments of National Power



- Political
- Economic
- Informational
- Military

Political Instrument

- Conduct of international relations
(instruments trade & technological collaborations)
- US, EU (particularly France & UK), USSR/Russia
- Space Programme suffered because of Non cooperation by these powers also
- Post 2004: NSSP, Indo-US nuclear deal

Political Instrument Contd

- New Collaborations: China has given encouraging signals
- Arms Control & Disarmament: Against weaponisation of outer space. Concerned about recent Chinese ASAT. OST, PAROS... is an issue
- Moon Mission has strategic relevance

Economic Instrument

- Growing economy: benefits to reach common people and to attract more investments
- Antrix: ISRO's commercial venture since 1992
- Commercial launch business
- Space Industry a new concept

Informational Instrument

- Collection and denial of information as well as ability to disseminate it
- Helps to and helped by IT Industry
- Meteorology, disaster management
- Intelligence agencies

Military Instrument

- Capabilities to influence the outcome of any war
- Dual use nature helps but has limitations
- Militarization vs Weaponization

Conclusion

- A journey of setbacks and achievements
- Belongs to the '**second-rung**' of space powers
- Mostly independent and application driven programme
- A definitive Road Map
- Investments are based on CBA
- Space resources are strategic assets

Thank You