Department of Science & Technology
DST

Last Three Years & the Road Ahead

Budget 2017-18: Rs. 4837.37 Crore
Department of Science & Technology

Major New Directions & Initiatives (2015-2017)

1. Strengthening Quality Basic Sciences/ Number Scientists

1. Aligning our S & T with National Needs: Water, Energy, Environment, Transport,… (Make in India, Startup India, Digital India, Swacch Bharat, Swasth Bharat, …)

3. Technology Translation, Innovation and Startups

New Programs - 2016-17

Startup India: Innovation and Startup Ecosystem

❖ **Innovation Reaching the Grassroots:** INSPIRE Awards-MANAK (Million Minds Augmenting National Aspiration and Knowledge) being implemented through NIF (2016).

❖ **National Initiative for Developing & Harnessing Innovation (NIDHI)—**Harmonizing ALL stages of innovation—awareness, scouting, mentoring, training, prototyping, fellowship, seed funding, accelerating, grand challenges, Incubators, Research parks (IIT Gandhinagar in 2017).

Doubling : Target—25 new Incubators per year
ONE Example of Incubating Success: Literally Thousands of Such Stories!

Products Licensed to Industry, Hospitals and Institutions by the TBI at IIT Bombay - BETiC (Biomedical Engineering & Technology (Incubation) Centre)

**SURGERY SOFTWARE AND INSTRUMENTS**
- Surgery Planner (AlgoSurg, Mumbai)
- Nasal Osteotomy Forceps (Om Surgical, Mumbai)
- Aortic Valve Template (Fortis Hospital, Mumbai)

**Flexible Laparoscope**
*(Eclipse Instrumentation, Thane)*

**REHAB AIDS**
- Customized Socket for Leg Prosthesis (Ratna Nidhi Trust, Mumbai)

**SCREENING, DIAGNOSTIC AND MONITORING DEVICES**
- Diabetic Foot Screening (MGM Hospital, Navi Mumbai)
- Digital Stethoscope (Health ATM, Mumbai)
- Clubfoot Sensor (Miraclefeet & Wadia Hospital)
- Biopsy Gun (Biorad Medisys, Pune-101)
New Programs 2016-17

1. Bringing the Best of Global Science to India:
   2. From Brain Drain to Brain Gain

- Visiting Advanced Joint Research (VAJRA) Faculty Scheme (SERB/2017)
- Overseas Doctoral Fellowship (SERB)
- National Post-doctoral Fellowships (2016)
- Early Career Research Awards (2016)
- LIGO Laser Interferometer Gravitational-Wave Observatory
New Programs: National Missions

- **Swacch Bharat**: Clean Coal Technology for Power: *(BHEL, DHI; NTPC, MoP)*
- **Swacch Bharat**: Waste Processing (MoUD); Climate change; Electric Mobility (DHI)
- **Digital India**: Digital reconstruction of Heritage structures (Culture & Tourism)
- **Swasth Bharat**: Science and Technology of Yoga and Meditation (SATYAM)
- **Make in India**: Advanced Manufacturing Technologies
Being Future Ready

- Technology Vision 2035 (TIFAC);
- Plus Sectoral Reports (2016):

1. Materials
2. Manufacturing
3. ICT
4. Medical Science and Health Care
5. Transportation.
Digital India: Threats and Opportunities

Interdisciplinary Cyber-Physical-Systems (ICPS):
- IoT; AI; Big data; Deep Learning; Robotics; Industry 4.0;
- Smart Sensors; Quantum Computing and Communication;

Already Launched Examples:

- National Supercomputing Mission (with DeitY):
  6 Supercomputers being established in 2017
- DST-Intel PPP Collaborative Research for Real-Time River Water and Air Quality Monitoring with Smart Pebbles
- Networked programme on Imaging Spectroscopy (NISA)
- Cyber-Security Center for Critical Infrastructure (at IITK)
- Smart Grids for Power

- India and Israel: Cyber Space and Water in Agriculture
- Indo-Japan Joint Laboratories: IoT; Big data
Large Scale New Initiatives (GoS) 2017-18

✓ National Mission in Cyber-Physical Systems: Seamless R&D to Technology Development to Human Resources to Startups to Industry 4.0…

✓ Vigyan Jyoti: Developing Leadership for Girls/Women in under-represented areas of S&T

✓ Vigyan Prasar: One stop S&T connect through India Science News Feature Service and India Science & Technology Portal

✓ Accelerate Vigyan: Training for effective use and maintenance of S&T infrastructure
Small Sample of Achievements – 2016-17
Hon. Prime Minister of India, Sh. Narendra Modi, and Hon. Prime Minister of UK, Ms. Theresa May at the India-UK Technology Summit.

Remote Activation of Optical Telescope at Devasthal, India from Brussels on March 30, 2016 by the Prime Ministers of India and Belgium.
Largest mobile science exhibition
Science Express, a unique mobile science exhibition mounted on a custom-built 16 coach AC train, has been travelling across the country since 2007 and has set up unprecedented milestones in its eight years of journey so far. A mega outreach programme of Department of Science & Technology, Govt of India, the mobile exhibition is managed by Vikram A Sarabhai Community Science Centre, Ahmedabad since inception.

The eighth phase of the science exhibition on wheels, titled ‘Science Express Climate Action Special (SECAS)’ travelled across India from Oct 15, 2015 to May 7, 2016. SECAS was a unique partnership between Department of Science & Technology, Ministry of Environment, Forest & Climate Change, Department of Biotechnology, Govt of India, Ministry of Railways, Centre for Environment Education and Vikram A Sarabhai Community Science Centre (VASCSC).

To its credit, the Science Express has set six records:

Largest Climate Change awareness programme
SECAS with an awareness programme on Climate Change travelled across India from Oct 15, 2015 to May 7, 2016 reaching out directly to over 20 lakh visitors. The 19,800 km journey halted at 64 locations in 20 states for the interactions.

Most expensive train ticket
Indian Railways issued the most expensive train ticket of Rs 12,64,37,164 in the name of Dr ABP Mishra, Scientist, Department of Science & Technology on Oct 13, 2015. The ticket was for the one phase journey of the SECAS across India from Oct 15, 2015 to May 7, 2016.

WR: Longest running mobile science exhibition
Science Express is the longest running mobile science exhibition in the world. Since its launch on Oct 30, 2007, it has travelled 1,37,115 km as of March 22, 2016. In its eight tours of India, the train made halts at 442 stations with 1,554 exhibition days.

Most visited mobile science exhibition
During its 442 halts on the Indian Railways network since Oct 30, 2007, Science Express has attracted over 1.52 crore visitors, as on March 22, 2016.

Most students performing experiments
Joy of Science (JOS) Lab, the first such mobile science lab in the world, which forms an integral part of Science Express has so far had 4,01,227 students performing experiments in Science, Maths and Environment, as on March 22, 2016. JOS Lab was set up and managed by VASCSC in one of the coaches of the train.

Most visitors to a science exhibition in a day
SECAS had 63,996 visitors at Anajmandi Railway station near Rewari in Haryana on Dec 11, 2015.
Rural Micro-Industrialization: Indigenous Technology for Appropriate and Sustainable Rural Industrialization

Example: Establishment of Rural-Industry Complex, Village- Malunga, Jodhpur
Micro Solar Dome: Surya Joyati

- Potential Users: 10 million households not having access to electricity
- Energy Saving: 1750 million units
- 2000 units demonstrated
- Simple manufacturing technique entrepreneurs being trained.
- Scheme linked to solar energy subsidy and to rural and urban Shelter Construction Schemes
- Distribution to end users by MPLADS Scheme.
- Current Cost of non PV Solar Dome: Rs.1200/- After Scale up: 600/-

Next in PPP Mode: Ghats of Varanasi; Buddhist Circuit; Taj; Delwara, etc.
Clean Energy Research

Mitigating Harsh Environments on Photovoltaics – Impact of dust, heat, humidity and pollution

Minimizing dust (test site at IITB)

Manufacturing for Future - Roll to Roll Processing of PV on Flexible Substrates

Efficient thermocline based molten salt storage

Six micro-hydel plants for off grid power in North-East.
Clean Energy Research Achievements

Testing System for Energy Efficient Windows for commercial buildings

Smart power strip for monitoring loads

Dedicated Outdoor Air System for energy efficient cooling

Surya Jyoti – Micro Solar Dome in Operation

Energy Efficient Phase change material tiles
Water Initiatives (Conservation, Utilization, Purification)

AMRIT Water Purifier- Inline and Storage
Water purifiers based on nanomaterials

Moving Bed Biofilm Reactor for Waste water treatment for 1.5 mld

Portable Nitrate Sensor

Embedded Water Level Measurement & Control System Experimental Setup

Water Quality testing facility established at Andhra Pradesh and Nagaland
Science, Technology & Innovation in Accelerating National Development

1st
Mechanization, water power, steam power

2nd
Mass production, assembly line, electricity

3rd
Computer and automation

4th
Cyber Physical Systems