

30. India

Institutional framework

India has an ambitious and wide-ranging space programme, aiming to develop independent capabilities and indigenous high technologies. The Indian Space Programme has been active for more than half-a-century, since its first experiments with sounding rockets in the early 1960s. The Department of Space, which is responsible for managing the Indian Space Research Organisation (ISRO), is directly under the authority of the Indian Prime Minister. The budget and policies of the Department of Space and ISROs are determined in 5-year planning cycles by the Indian Planning Commission; the latest plan was launched in 2012 and ends in 2017. This *Twelfth Five Year Plan* assigned INR 397.5 billion (Indian Rupees) to the Department of Space (around USD 7.4 billion). In 2013, ISRO's budget estimate amounted to INR 68 billion (USD 1.2 billion). The main objectives until 2025 include the strengthening/expanding of operational services in communications and navigation; developing enhanced imaging capabilities for natural resource management, weather and climate change studies; space science missions for better understanding of the solar system and the universe; planetary exploratory missions; development of heavy lift launcher and reusable launch vehicles; and a human space flight programme (Indian Planning Commission, 2013). Even after adjustment for inflation, the Indian space budget saw significant increases in 2010 and 2011, followed by decreases more pronounced in constant USD due to exchange rates impacts.

In recent years, the biggest budget line in the space programme has been devoted to access to space technologies, i.e. developing the Polar Satellite Launch Vehicle (PSLV) and the Geostationary Launch Vehicle (GSLV). The Indian Space Research Organisation is currently working on a larger geostationary launch vehicle, the GSLV-MkIII, which could launch commercial telecommunications satellites, making the country fully autonomous for all types of satellite launches and giving it access to the commercial geostationary launch market. The satellite programme has received significantly more allocations in recent years, funding the implementation of the regional satellite navigation programme IRNSS (Indian Regional Navigational Satellite System), with the first satellite of seven launched in July 2013. The country currently has 26 satellite missions

with another 7 missions planned to launch by 2017. The 11 INSAT telecommunications satellites provide telephone services to remote areas and send direct-to-home television to 85% of the Indian population. There is extensive use of telemedicine and tele-education in rural areas. India has one spaceport with two independent launch pads, from which it launched its first Mars orbiter, Mangalyaan, in November 2013, scheduled to reach Mars orbit in September 2014.

Indian space industry

Unlike many other space agencies, the Indian Space Research Organisation is also the main space manufacturer in India. It assembles satellites and launch vehicles from parts provided by ISRO's eleven centres spread around the country, with production mainly carried out in the southern part of India, in Thiruvananthapuram (launchers), Bangalore (satellites) and Sriharikota. Important centres are also the Space Applications Centre in Ahmedabad and National Remote Sensing Centre in Hyderabad. ISRO had 14 716 employees in 2012, distributed between the different centres, and its commercial branch, Antrix, located in Bangalore. It sells remote sensing data imagery, ground station services, satellite launches and exports of satellite components and other products. Antrix is also responsible for selling transponder leases on Indian telecommunications satellites, a market that has seen considerable growth in the last years (turnover in 2011 amounted to about USD 200 million). Private space manufacturers are expected to become more important as the demand for PSLV launch vehicles currently surpasses ISRO's production capacity. About 80% of the parts of the PSLV are now produced by industry. The *Twelfth Five Year Plan* clearly states the need to increase the capabilities of private industry to take over some production and assembly tasks (Indian Planning Commission, 2013).

Note

30.1 and 30.2: The data include only budgets for the civil space programme. India's fiscal year runs from 1 April to 31 March.

Information on data for Israel: <http://dx.doi.org/10.1787/888932315602>.

Key facts for India

Space budget as share of GDP (2013): 0.063%.

Space budget per capita (2013): USD 2.4 (PPP).

Number of regional clusters including space industry: 3 (Bangalore, Thiruvananthapuram, Sriharikota).

Share in scientific production in satellite technologies (2013): 5.1%.

Share of space-related patent applications filed under PCT (2009-11): 0.62%.

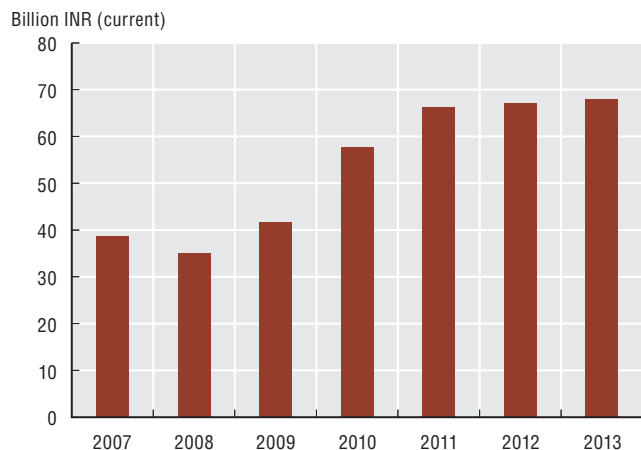
Subscribers of Direct-to-home (DTH) satellite services (2013): 56.5 million.

Number of operational satellites: 30.

Student performance in science (PISA 2012 mean score): n/a.

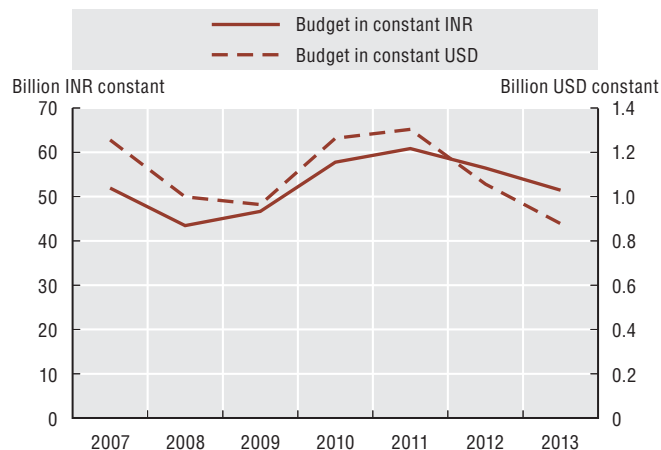
30.1. Indian space budget

In INR billion (current), 2007-13



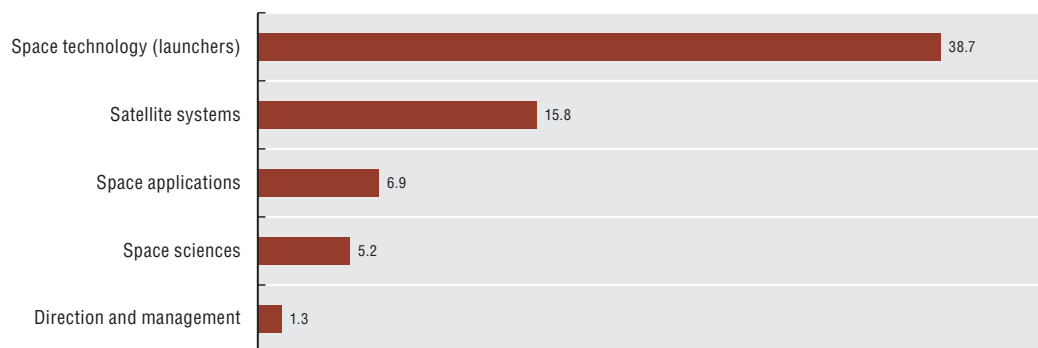
30.2. Indian inflation-adjusted space budget

Constant INR and USD billion, 2007-13



30.3. ISRO budget by main programmes

In INR billion (current), 2013



Source: ISRO, 2013 and OECD calculations.

Indian aerospace industry

The rising technological and manufacturing capabilities of the Indian aerospace industry, which now cover all segments in the industry (e.g. civil and military aviation, missiles) contribute to a larger share of commercial activities in the Indian space sector. Aerospace companies can be found throughout India, with main clusters located in Bangalore, Hyderabad, Thiruvananthapuram and Sriharikota. The major actors are organised in the Society of Indian Aerospace Technologies and Industries (SIATI), which has membership of around 300 industries from both the public and private sector, including Hindustan Aeronautics Ltd. (HAL), Indian Space Research Organisation (ISRO), DRDO Labs, the Aeronautical Development Agency (ADA) and the National Aerospace Laboratories (NAL). The aerospace sector in India expects a considerable increase in domestic demand in the coming years for both civilian and defence programmes. India is among the top world spenders on defence, and two of the key objectives under the *Twelfth Five Year Plan* is to increase the share of domestic procurement from 30 to 75% in the next 10 years, and are to create one million new direct and indirect jobs in defence manufacturing (Indian Planning Commission, 2013). The civil aviation sector in India is also expecting significant growth, with some market studies suggesting a requirement for 1 000 new aircraft by 2020 (Indian Planning Commission, 2013).

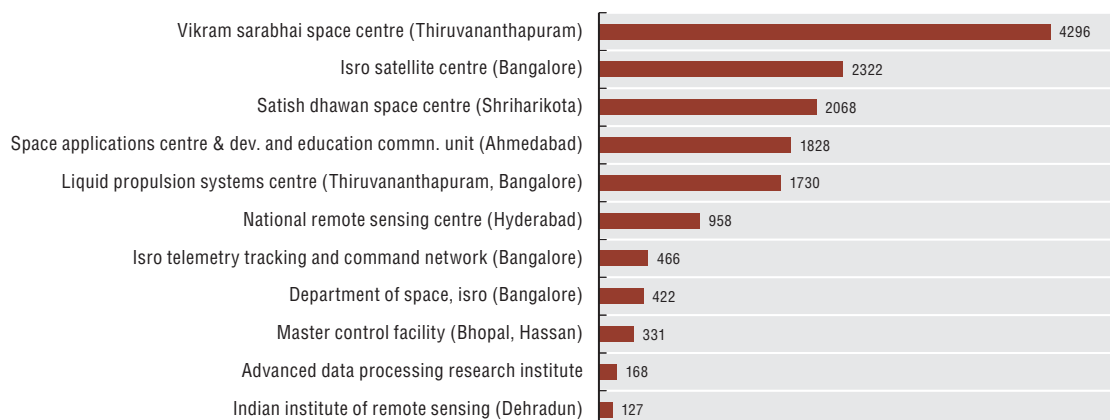
According to OECD data, India exported aerospace goods in 2012 for a total of USD 2 billion, while importing for USD 2.6 billion. Main OECD trading partners in the aerospace sector were the United States, United Kingdom and France, with imports of US and French aerospace products amounting to 60% of total imports.

Methodological notes

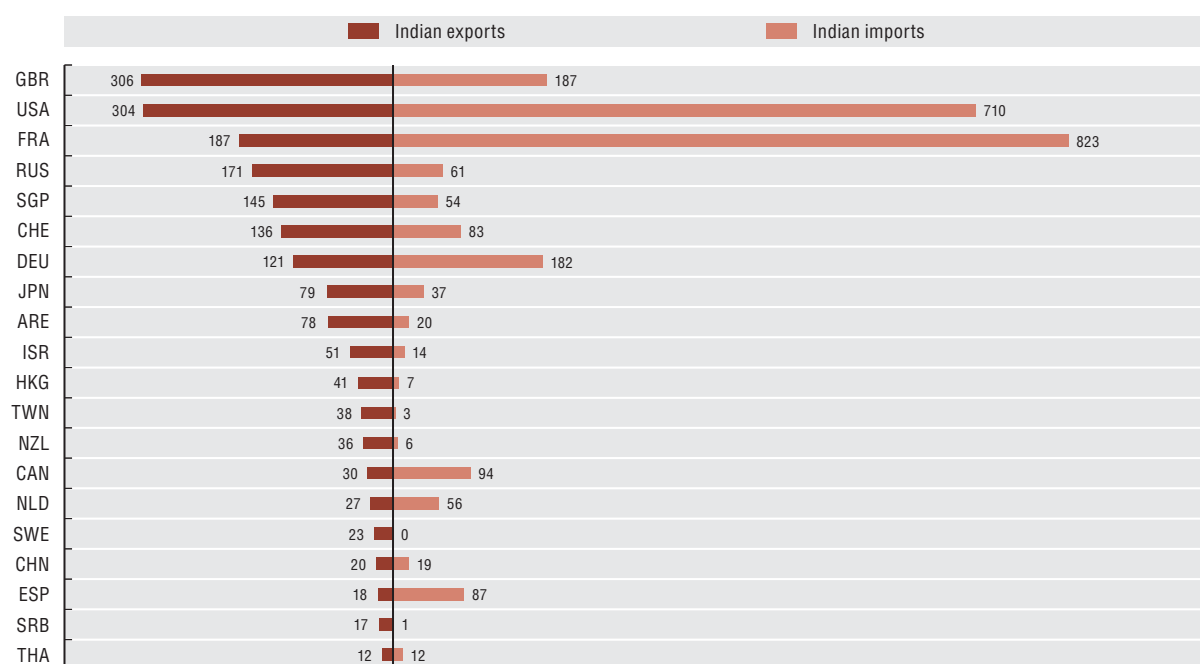
The budget figures use the Indian rupee (INR) as currency and US Dollars, USD, if not stated otherwise. In official Indian documents, the Rupee amounts are often given in Crores, a unit which corresponds to 10 million rupees.

Sources

- Indian Planning Commission (2013), *Twelfth Five Year Plan (2012–2017): Volume 1*, Delhi.
- Indian Space Research Organisation, www.isro.org.
- OECD STAN Bilateral Trade Database by Industry and End-use (BTDIxE), data extracted April 2014, www.oecd.org/sti/btd.
- OECD, *Main Science and Technology Indicators database*, www.oecd.org/sti/msti.

30.4. Employment at ISRO space centres*Number of employees, 2012*

Source: ISRO, 2013.

30.5. India's main aerospace trade partners*Million USD (current), 2012*Source: OECD STAN Database, 2014, www.oecd.org/sti/btd.StatLink  <http://dx.doi.org/10.1787/888933142102>



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