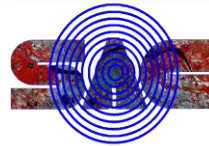




MAKE IN INDIA – WEEK

ISRO PARTICIPATION

13-18 FEBRUARY 2016 AT MMRDA GROUND , MUMBAI



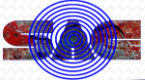
Prepared by :

Technology Transfer and Industrial Interface Division (TTID)

Planning and Projects Group, Space Applications Centre (SAC), ISRO

Ahmedabad, Gujarat, INDIA

ISRO -ANTRIX Pavilion



ISRO -ANTRIX Pavilion

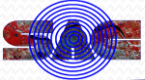


ISRO Pavilion Reception desk





Exhibits at ISRO Pavilion – Presentation on Launch Vehicles: Indigenisation & Business opportunities



Model of VIKAS, CUS & CE20 engine for PSLV and GSLV

GPS Aided Global Augmented Navigation (GAGAN)

GAGAN is a Satellite Based Augmentation System (SBAS) implemented jointly with Airport Authority of India (AAI). Objective: To provide Satellite-based Navigation services with accuracy and integrity required for civil aviation applications and to provide better Air Traffic Management over Indian Airspace. The system is interoperable with other international SBAS systems like WAAS (US), EGNOS (ESA), MSAS (Japan) and is providing seamless navigation across regional boundaries.

GAGAN system certified by the Directorate General of Civil Aviation (DGCA), India to RNP 0.1 (Required Navigation Performance, 0.1 Nautical Mile) and APV1 (Approach with Vertical Guidance Service) level.

Operational since April 2015 and India is the first nation in the world to have operational SBAS in equatorial region. It is the 4th nation after US, EUROPE, JAPAN to have Inter-operable SBAS and to offer safety of life, space based satellite navigation services to aviation sector in the world.

The GAGAN signal is being broadcast through two Geostationary Earth Orbit (GEO) satellites - GSAT-7 (launched on May 21, 2011) and GSAT-10 (launched on Sep 29, 2012) - covering whole Indian Flight Information Region (FIR) and beyond. An on-orbit spare GAGAN transponder will be flown on GSAT-15.



Benefits of GAGAN in Civil Aviation sector

- Vertical guidance improves safety in low visibility conditions.
- Optimization of circling approaches.
- Environmental benefits - Approach with Vertical guidance will help facilitate better energy on arrival management during the final approach.
- Global seamless navigation for all phases of flight, departure, enroute and on arrival.
- Allow direct routings, multiple approaches, and energy full savings, to utilities and provide better use of airspace.

Benefits to other sectors like

- Navigation and Safety Enhancement in Railways, Roadways.
- Spacecraft navigation.
- Geographic Data Collection.
- Scientific Research for Atmospheric Studies.
- Dynamics.
- Resource and Land Management.
- Location based services, Mobile, Tablets, etc.

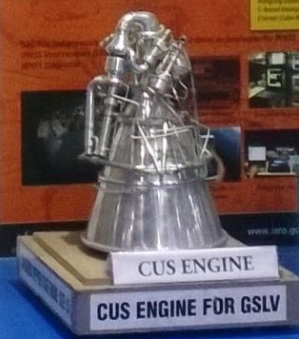


Indian Regional Navigation Satellite System (IRNSS)

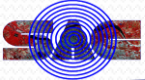
The IRNSS is ISRO initiative to build an independent satellite navigation system to provide precise Position, Velocity and Time to users over the Indian region. IRNSS provides the user with a targeted position accuracy of better than 20m. The primary service area includes Indian land mass and 1500 km from Indian Co-astal boundary. The extended service area covering 1.4 x 10⁷ km² includes Indian land mass and 1500 km from Indian Co-astal boundary. The extended service area covering 1.4 x 10⁷ km² includes Indian land mass and 1500 km from Indian Co-astal boundary. The extended service area covering 1.4 x 10⁷ km² includes Indian land mass and 1500 km from Indian Co-astal boundary.

Some applications of IRNSS are:

- Disaster Management
- Search and Rescue
- Navigation and Safety Enhancement in Railways, Roadways.
- Spacecraft navigation.
- Geographic Data Collection.
- Scientific Research for Atmospheric Studies.
- Dynamics.
- Resource and Land Management.
- Location based services, Mobile, Tablets, etc.



Presentation on Remote Sensing applications and Electro-Optical sensors



ASTROSAT Model



Electronic sub-systems, Mechanical sub-systems, Optical sub-systems Presentation on Technology Transfer and Business opportunities

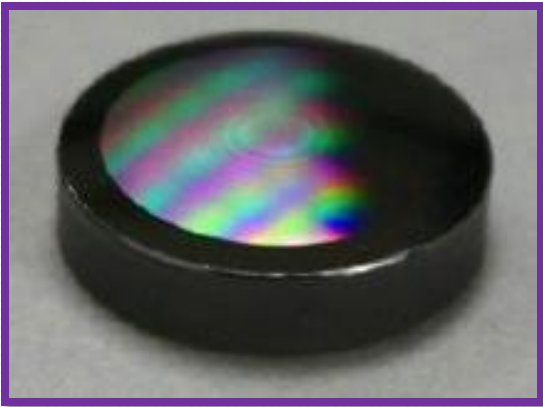
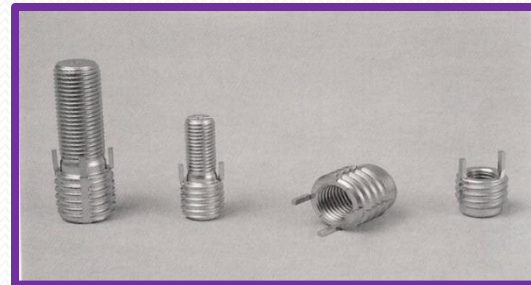


Image Processing and GIS software (IGIS developed by SAC/ISRO) on Demo and MOSDAC site live for Weather information



Some of the components used in space systems



Models & some of the parts used in Satellite Launch vehicle



Shri Manohar Parrikar, Hon'ble Union Minister for Ministry of Defence, showing keen interest in ISRO activities & technologies



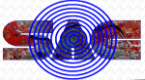
Shri Nitin Gadkari, Hon'ble Union Minister for Road Transport and Highways, and Shipping showing keen interest in ISRO activities & technologies



Hon'ble Union Minister for Ministry for Steel Shri Narendra Singh Tomar with delegation



Director, SAC with ISRO scientist

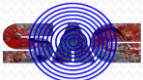


Shri S. Rakesh, Director, IPRC/ISRO with ISRO scientist





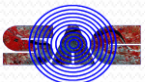
Shri Y V N Krisnamurthy, Scientific Secretary, ISRO, Shri P G Diwakar, Dy. Director, NRSC and Shri Samir Pal, Director - ANTRIX



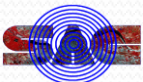
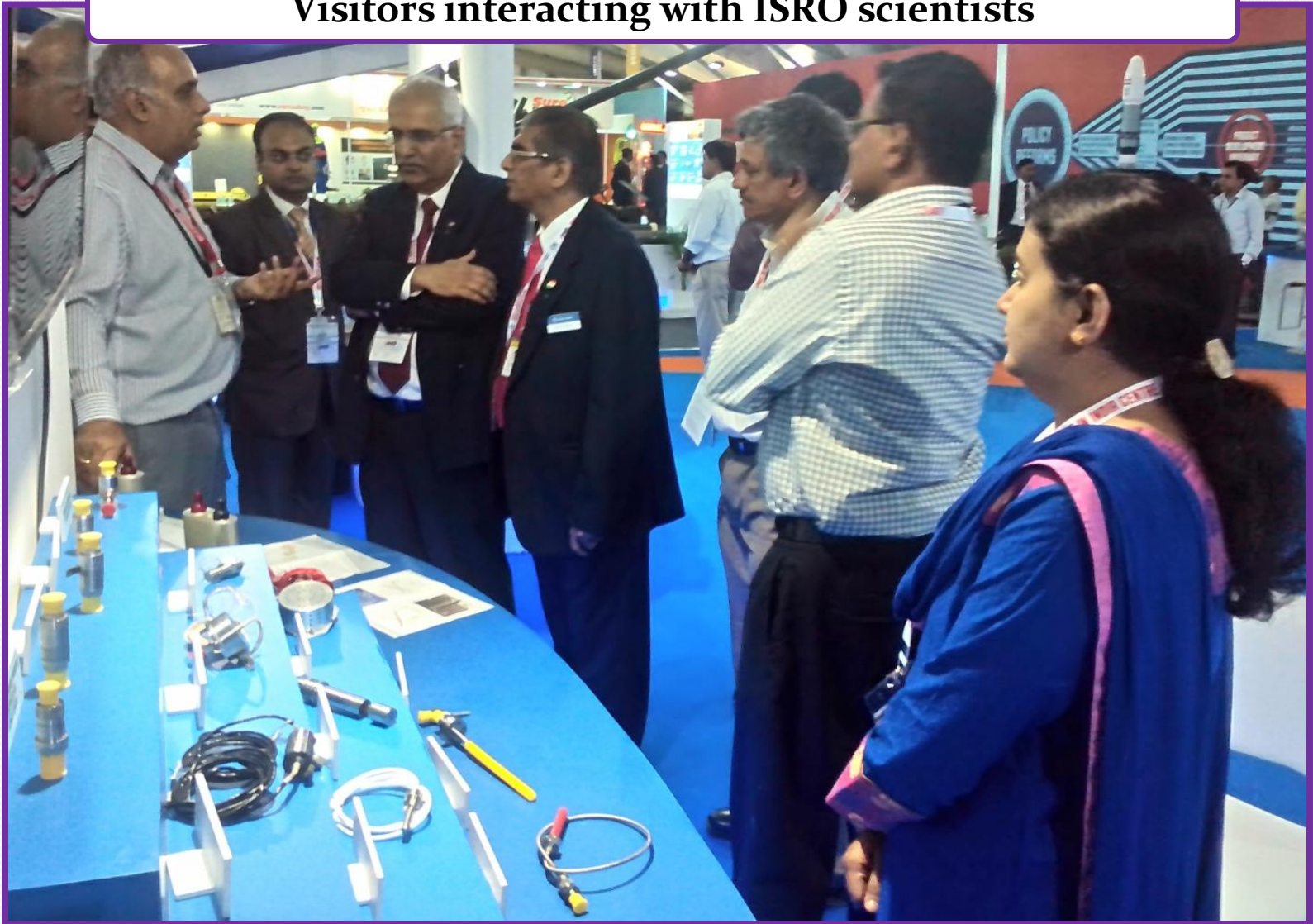
**Shri D.P. Karnik, Director P&PR, ISRO-HQ and
Shri Rajesh Kapoor, Director - CII**



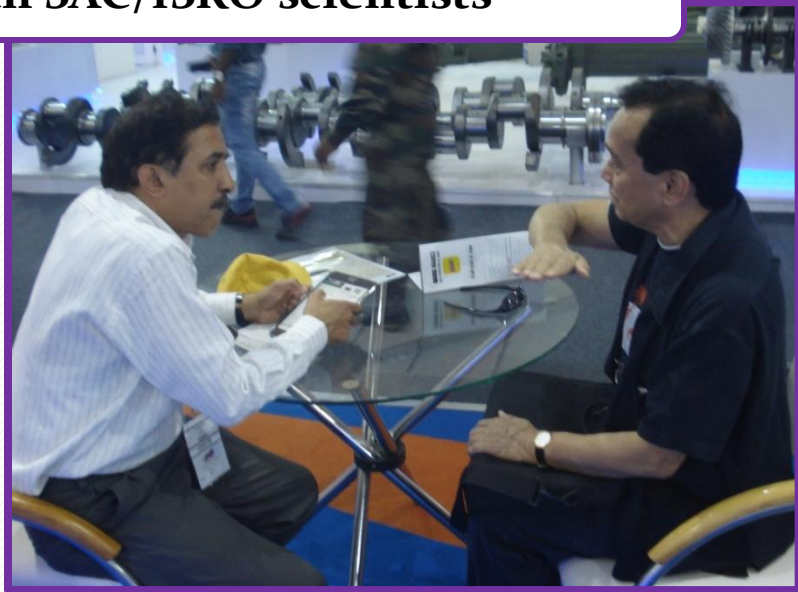
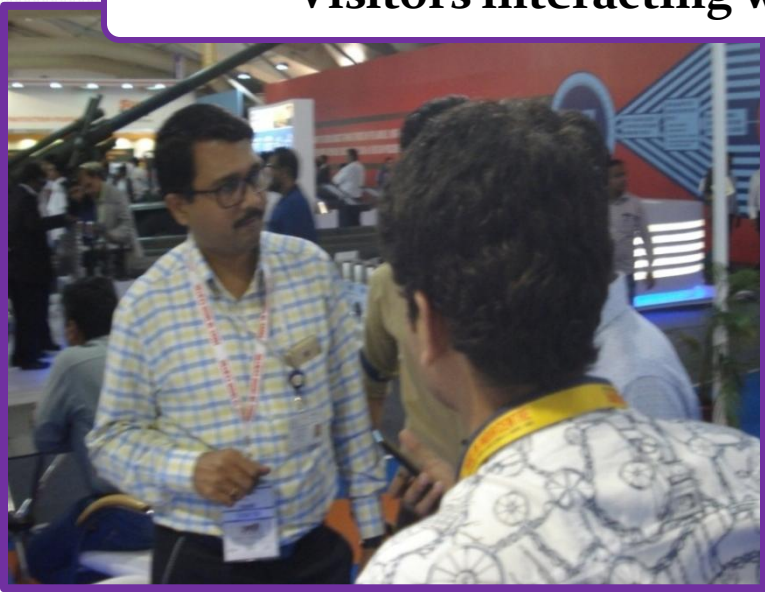
Shri V. Raghu Venkataraman, Executive Director, ANTRIX and ISRO team with Shri Baba N. Kalyani – Chairman & Managing Director Bharat Forge Ltd.



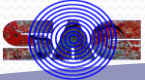
Visitors interacting with ISRO scientists



Visitors interacting with SAC/ISRO scientists



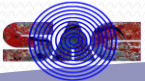
Visitors interacting with ISRO scientists



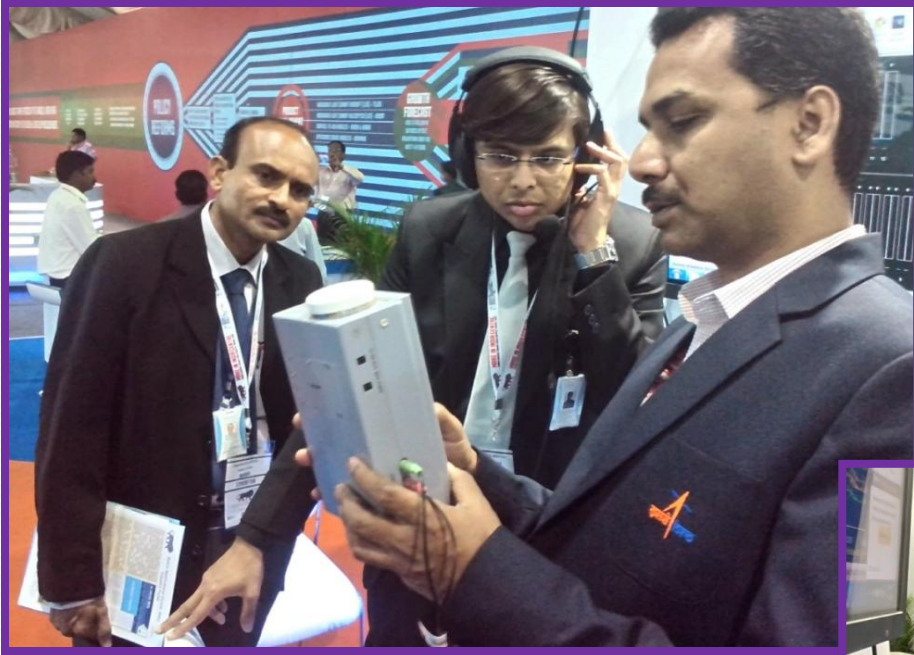
SAC/ISRO Team showcasing various literatures distributed at ISRO pavilion



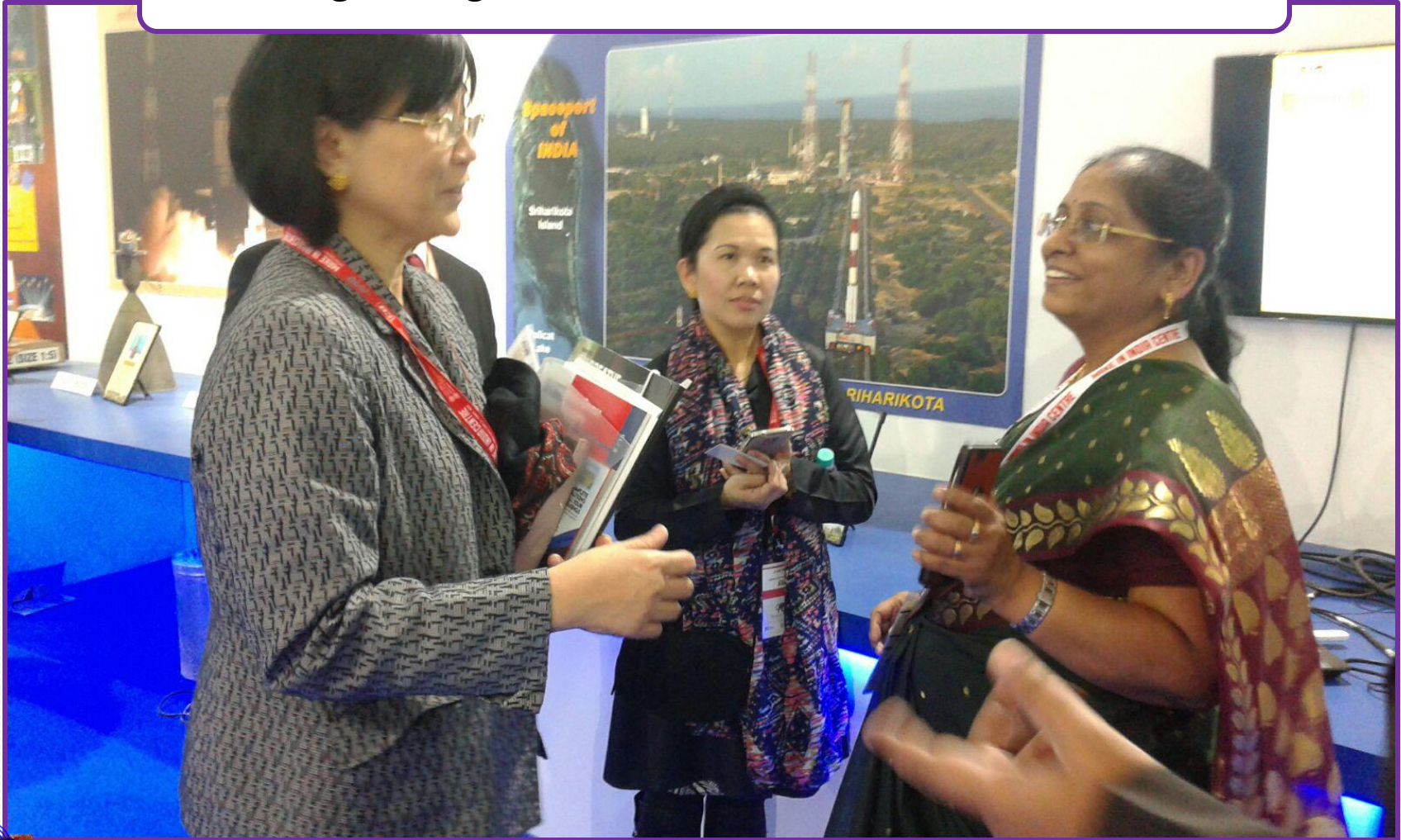
Students engrossed in film produced by DECU/ISRO



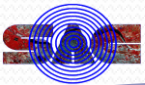
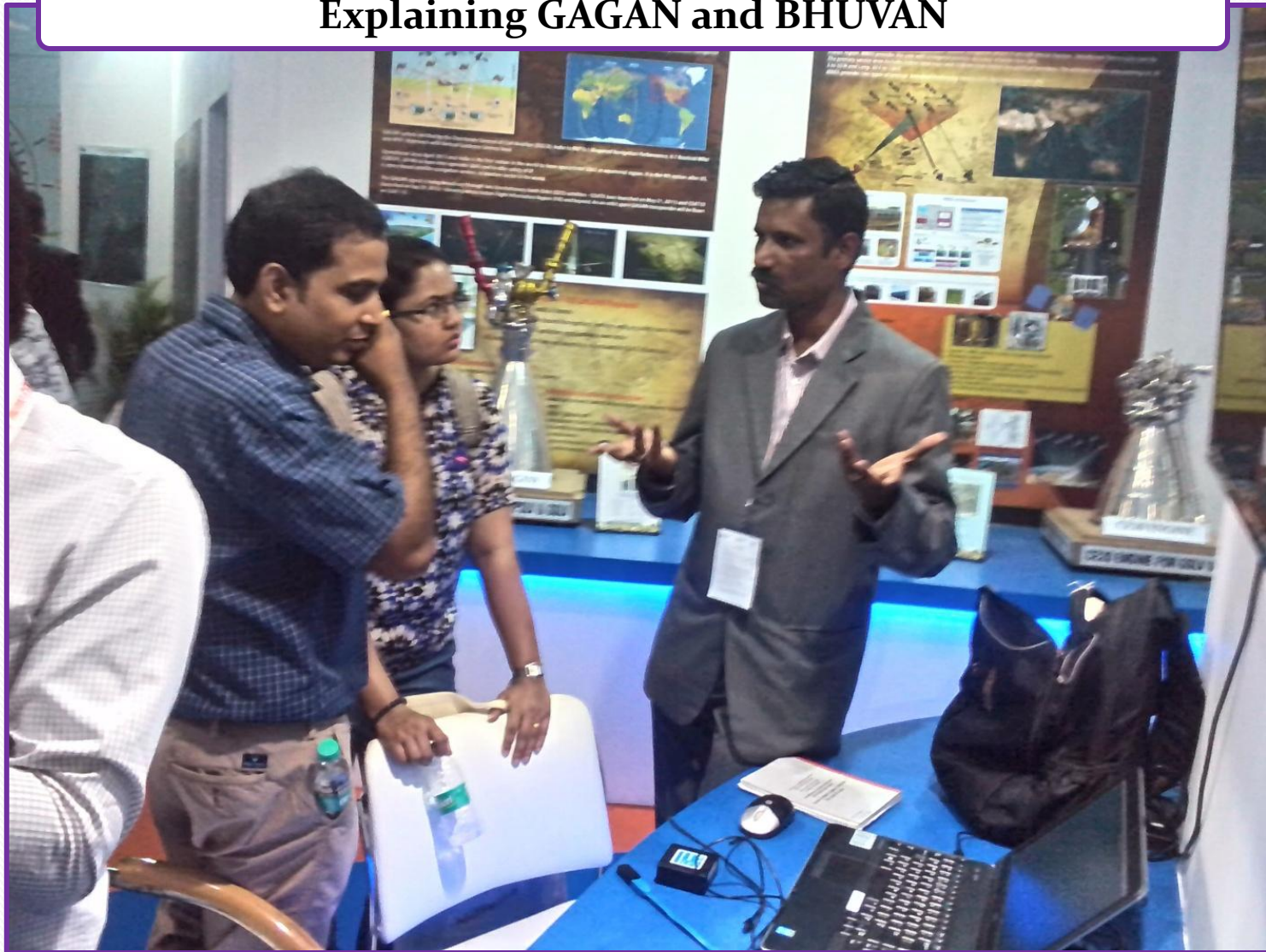
Live demo of SATCOM Ground Terminals developed by ISRO



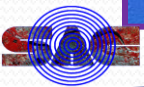
Foreign delegation Interested in MOSDAC activities



Explaining GAGAN and BHUVAN



SAC/ISRO team satisfying to kid's curiosity



IIT-Mumbai students shown interest in development of Ground Penetrating Radar (GPR)

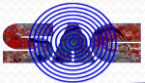


ISRO Pavilion – Centre of Attraction - Full of Visitors





Shri Tapan Misra Director SAC speaking in the Make in India - Space seminar



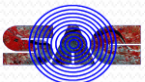


ISRO Senior Management on Dias in Make in India- Space Seminar





ISRO Scientist



SAC scientists with Shri Tapan Misra, Director SAC, ISRO



Shri Tapan Misra, Director-SAC/ISRO in a press interview with Doordarshan in ISRO Pavilion



Press Briefing





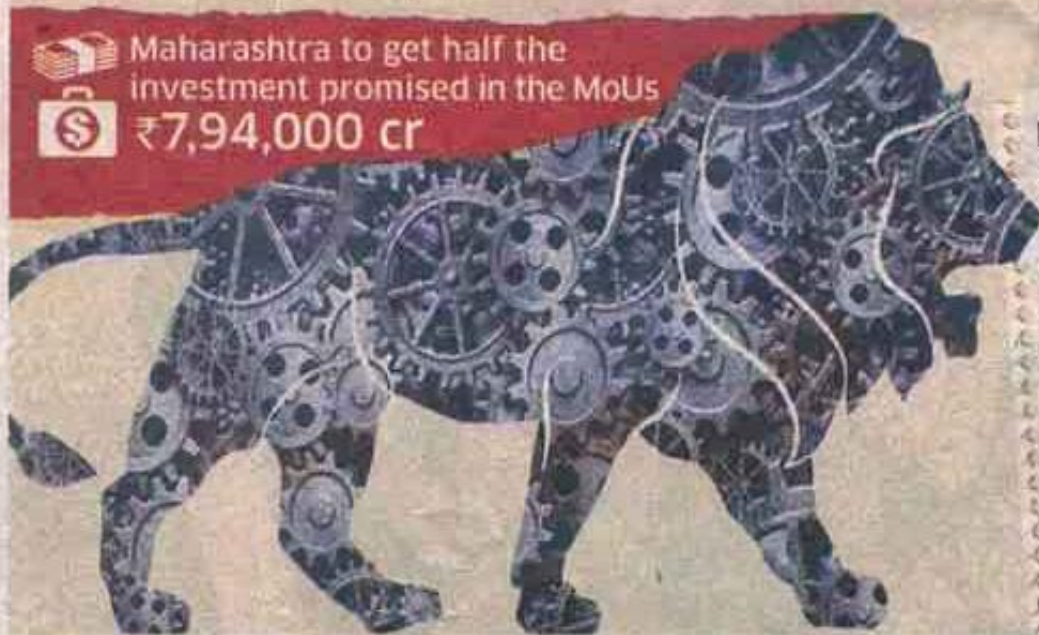
Media coverage- Economic Times February 19, 2016

The Event in Figures

- No. of states that participated - **17**
- NO. of MoUs signed - **2,094**
- Worth of MoUs signed **₹15,20,000 cr**

Foreign component of the MoUs are worth - **30%**
New projects billed to generate - **30 lakh jobs**

 Maharashtra to get half the investment promised in the MoUs
 **₹7,94,000 cr**



No. of business enquiries generated
1,05,000
No. of visitors at the venue
8,90,000

CEOs and CXOs who attended
1000
Indian companies that sent delegations
9000
Foreign companies that sent delegations
2000
Delegations from foreign countries
4000

No. of countries that participated - **102**
No. of exhibitors - **215**
No. of events - **150**
No. of speakers - **1,245**
No. of meetings - **8,245**
No. of PMs, Dy.PMs and finance ministers who attended the event - **20**
Union ministers who attended - **13**

PHOTO: BHARAT CHANDRA

Media coverage – The Economic Times (Feb 19, 2016) and Hindi News Paper

Isro Lures Pvt Cos with Tech Promise and Brand Benefits

Megha.Mandavia@timesgroup.com

Mumbai: The Indian Space Research Organisation (Isro) wants more private companies to make space and satellite components for the government-run enterprise. It has offered to assist them with technology transfer and in building the required infrastructure to help incubate a space industry in the country.

Tapan Mishra, director at Isro's Space Applications Centre, said the industry could expect about 20% of its annual budget in business opportunity.

Isro received about ₹6,000 crore this financial year from the government. The funding is expected to go up to ₹8,900 crore in the upcoming budget.

"This is not a large number but we are training people and sharing technology. You will also be able to monetise the reputation of working with us with the industry," said Mishra at the 'Make in India' week.

Scientific secretary at Isro YVN Krishna Murthy said the applications of the technology private industry could learn are "mind-boggling," pointing at a bigger business opportunity worldwide.

Space technology, according to them, can be used in commercial aerospace, defence, transportation, agriculture, metallurgy, space design and so on. The global space industry is as big as \$300

billion, according to estimates.

"It is a huge thing to be associated with a space programme. You get to work with the best in the world," said Dhiraj Mathur, executive director at global consultancy PricewaterhouseCoopers.

"Volumes will not be high and budgets will always be constrained, but once your capability improves to meet the stringent standards of a space programme, you are put on a launch pad to do business with civilian aerospace and defence companies in India and abroad," he said.

Currently, private participation is quite small in Isro as Indian companies have not been equipped enough in terms of technology and talent to make space components. Isro expects private companies to make satellite components, space radars, rocket engines, batteries, space electrical components and optical camera

components, among others, in the coming years.

Isro's commercial arm, Antrix Corp, provides space products and technical consultancy services to Indian and international customers. It launches satellites for international companies at competitive prices.



The global space industry is as big as \$300 billion, according to estimates

इसरो ने भी लिया मेक इन इंडिया में हिस्सा

रिपोर्टर, मुंबई

इंडियन स्पेस रिसर्च ऑर्गेनाइजेशन (इसरो) ने भी मुंबई में आयोजित मेक इन इंडिया वीक में हिस्सा लिया।



इस दौरान इसरो की सबसे शानदार प्रस्तुति रही जीआइएस एवं इमेज प्रोसेसिंग टेक्नॉलजी आइजीआइएस उत्पाद का प्रदर्शन। इसरो ने कहा कि इसका विकास स्पेस प्रोग्राम के अलावा कॉर्पोरेट सेक्टर के लिए भी कारगर है। स्वदेशी तकनीक के सफलतम विकास

और व्यवसायीकरण के लिए डीएसटी 'नेशनल अवार्ड' जीत चुकी इस आइजीआइएस टेक्नॉलजी का इस्तेमाल रक्षा, शहरी, स्मार्ट सिटी, खनन, लैंड रिकॉर्ड मॉडर्नाइजेशन, फॉरेस्ट्री, बिजली वितरण तंत्र, रिसोर्स एक्स्प्लोरेशन, कोस्टल जोन मैनेजमेंट, कृषि इत्यादि जैसे क्षेत्रों में किया जाता है। इसरो के चेयरमैन ए एस किरणकुमार ने कहा कि आगामी आइजीआइएस एंटरप्राइज वर्जन को 'डिजिटल इंडिया' की भविष्य की तैयारी के लिए इसरो और स्कैनप्वाइंट जियोमैटिक्स अहमदाबाद द्वारा संयुक्त रूप से विकसित किया गया है और अब देश को राष्ट्रीय जियोमैटिक्स प्रोग्राम के लिए विदेशी तकनीक पर निर्भर नहीं रहना पड़ेगा।

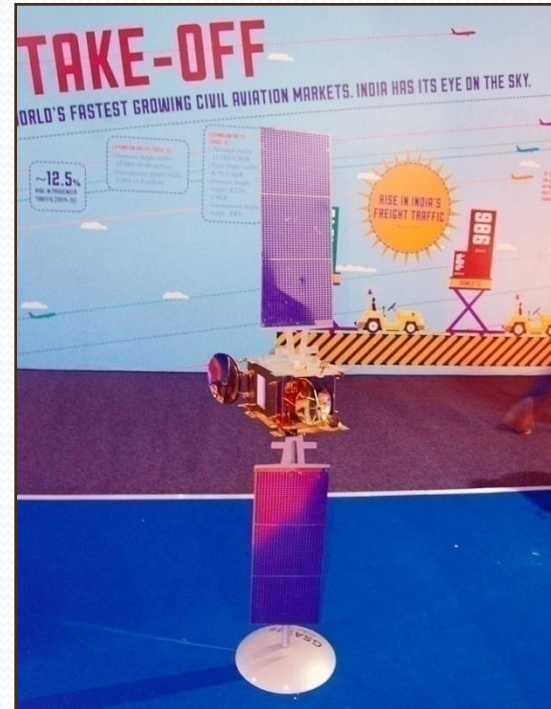


News

rediff.com/news (22/02/16)

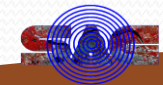
With pride and humility: Made in India @MakeInIndia

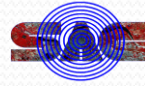
February 22, 2016 10:16 IST



The ISRO stall showcased the space organisation's strengths: Satellite launches loaded on indigenously developed rocket technology.

A prototype of an indigenously built Indian satellite that orbits around the earth and send data that is useful for farmers, fishermen...





Contact Us for :

Technology Transfer, Technical consultancy, Industry Interface from SAC/ISRO
Ahmedabad centre:

Head , Technology Transfer & Industrial Interface Division (TTID) ,
Planning and Projects Group (PPG) , Space Applications Centre (ISRO),
Jodhpur Tekra, Ahmedabad – 380 015, Gujarat, INDIA
FAX : +91-79-2691 5817, Email : ttid@sac.isro.gov.in

Useful Links:

- SAC Industry Portal - ww.sac.gov.in/SACSITE/TTIDWebsite/index.html
- ISRO site : www.isro.gov.in/isro-technology-transfer
- International Cooperation : www.isro.gov.in/international-cooperation
- Antrix Corporation Limited (Commercial arm of ISRO): www.antrix.gov.in