

Third Navigational Satellite of India Indian Regional Navigational Satellite System-1C

Leena rani

Preeti Narula

Neeti Panchal

taiwalleena@gmail.com

preeti92narula@gmail.com

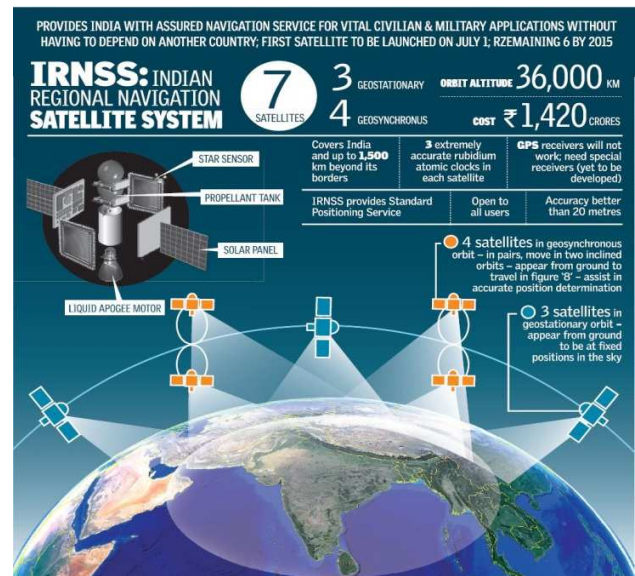
nitipk92@gmail.com

ABSTRACT:

A Satellite is an artificial object which has been intentionally placed into orbit. Satellites are used for a large number of purposes. Common types include military and civilian Earth observation satellites, communications satellites, navigation satellites, weather satellites, and research satellites.

A satellite navigation or satnav system is a system of satellites that provide autonomous geospatial positioning with global coverage. It allows small electronic receivers to determine their location (longitude, latitude, and altitude) to high precision (within a few metres) using time signals transmitted along a line of sight by radio from satellites. The signals also allow the electronic receivers to calculate the current local time to high precision, which allows time synchronisation. This Paper includes the description of IRNSS-1C which is India's third Navigational satellite that is launched by ISRO (Indian Space Research Organisation) on 15 October 2014.

KEYWORDS: Geostationary orbit, Code division multiple access, Global Positioning System, Laser-retro reflector



INTRODUCTION: IRNSS-1C is the third out of seven in the Indian Regional Navigational Satellite System (IRNSS) series of satellites after IRNSS-1A and IRNSS-1B. The IRNSS constellation of satellites is slated to be launched to provide navigational services to the region. It was launched on 15 October 2014 at 20:02 UTC by PSLV-C26 and will be placed in geostationary orbit. The satellite will help augmenting the satellite based navigation system of India which is currently under development. The navigational system so developed will be a regional one targeted towards South Asia. The satellite will provide navigation, tracking and mapping

services. IRNSS-1C satellite will have two payloads: a navigation payload and CDMA ranging payload in addition with a laser retro-reflector. The payload generates navigation signals at L5 and S-band. The design of the payload makes the IRNSS system inter-operable and compatible with Global Positioning System (GPS) and Galileo systems. The satellite is powered by two solar arrays, which generate up to 1,660 watts, and has a life-time of ten years. IRNSS-1C was launched successfully on 16 October 2014 at 1:32 am IST from Satish Dhawan Space Centre in Sriharikota. An update from ISRO's official Facebook page on 18 October 2014 states that Navigation Satellite IRNSS 1C Update: The second orbit raising operation of IRNSS-1C is successfully completed by firing the Apogee Motor for 1,563 seconds. The current orbital parameters are: Perigee Altitude: 7187 km Apogee Altitude: 35634 km

| | |
|------------------|------------|
| Mission type | Navigation |
| Operator | ISRO |
| COSPAR ID | 2014-061A |
| SATCAT No | 40269 |
| Mission duration | 10 years |

| | |
|-----------------------|--|
| Spacecraft properties | |
| Bus | I-1K |
| Manufacturer | ISRO Satellite Centre Space Applications Centre |
| Launch mass | 1,424.5 kilograms (3,140 lb)[1] |
| Power | 1,660 watts[1] |
| Start of mission | |
| Launch date | 15 October 2014, 20:02 UTC |
| Rocket | PSLV-XL C26 |
| Launch site | Satish Dhawan FLP |
| Contractor | ISRO |
| Orbital parameters | |
| Reference system | Geocentric |

| | |
|-----------|---------------|
| Regime | Geostationary |
| Longitude | 83° East[1] |
| Epoch | Planned |

Navigation Satellite System (IRNSS) is a major step towards boosting India’s navigation satellite programme. This Satellite has been sent to Mars and Its mission duration is 10 years. In July 2013, PSLV-C22 had launched IRNSS-1A, which is operating satisfactorily from its designated geostationary orbital position. The launch of the second IRNSS that also marked the 25th success in a row for the PSLV had boosted the image of the launching vehicle. “The PSLV is going miles, as evident from the launching orders we are getting from foreign countries, thanks to its quality and dependability,” said John P Zachariah, director, research and development wing, Vikram Sarabhai Space Centre. That indeed bodes well for India.

FEATURES:

- Worldwide, continuous coverage
- User passive (No detectable electronic emissions)
- Capable of being denied to an enemy
- Able to support an unlimited number of users
- Resistant to countermeasures
- Real time responsiveness
- Support joint and combined operations
- No frequency allocation problems
- Common grid or map datum reference for all users
- Position accuracy that is neither degraded by changes in altitude nor by the time of day or year.
- Maintained by operating personnel
- Not dependent on externally generated signals

CONCLUSION: The successful launch by ISRO(Indian Space Research Institute) of the second of the string of seven satellites that will comprise the Indian Regional

FUTURE SCOPE: IRNSS will provide geospatial coverage of India and offer accurate all-weather signals for military use. The system offers a reliable alternative for military applications, which alone makes it worth building. However, about 95 per cent of IRNSS usage is likely to be in the civilian domain and there’s plenty of scope for commercial payoffs there. The system will be used for terrestrial, aerial and marine navigation, disaster management, vehicle tracking and fleet management, integration with mobile phones, mapping and geodetic data capture. The navigational system developed by India is designed to offer accurate position information service to users within the nation and up to 1,500km from its boundary line. The system is similar to the global positioning system of the US, Glonass of Russia, Galileo of Europe, China’s Beidou or the Japanese Quasi Zenith Satellite. IRNSS-1D will be the Fourth out of seven in the Indian Regional Navigation Satellite System series of satellites system. Its launch is planned in December 2014. IRNSS-1E will be the fifth out of seven in the Indian Regional

Navigation Satellite System series of satellites system. Its launch is planned in March 2015. IRNSS-1F will be the sixth out of seven in the Indian Regional Navigation Satellite System series of satellites system. Its launch is planned in March 2015. IRNSS-1G will be the seventh out of seven in the Indian Regional Navigation Satellite System series of satellites system. Its launch is planned in March 2015.

REFERENCES:

1. K. Raghu (2007-09-05). "India to build a constellation of 7 navigation satellites by 2012". Livemint.com. Retrieved 18 May 2013.
2. Jump up^ "ISRO opens navigation centre for satellite system". Zeenews.com. 2013-05-28. Retrieved 30 June 2013.
3. Jump up^ "India Making Strides in Satellite Technology". Defence News. Retrieved 26 July 2012.
4. ^ Jump up to:a b "India's first ever dedicated navigation satellite launched". DNA India. 2 July 2013. Retrieved 24 July 2013.
5. ^ Jump up to:a b "India's first dedicated navigation satellite placed in orbit". NDTV. 2 July 2013. Retrieved 24 July 2013.
6. Jump up^ S. Anandan (10 April 2010). "Launch of first satellite for Indian Regional Navigation Satellite system next year". Beta.thehindu.com. Retrieved 2010-12-30.
7. Jump up^ H. Pathak. "3 Satellites To Be Launched By ISRO".
8. ^ Jump up to:a b c "ISRO's Future programme". ISRO. Retrieved 18 May 2013.
9. ^ Jump up to:a b "Countdown begins for PSLV-C22 launch". thehindubusinessline.com. Retrieved 2013-06-29.
10. Jump up^ "ISRO puts India's Navigation satellite IRNSS 1B into orbit". IANS. news.biharprabha.com. Retrieved 4 April 2014.
11. Jump up^ "First IRNSS satellite by December". Magazine article. Asian Surveying and Mapping. 5 May 2009. Retrieved 2009-05-05.[dead link]
12. Jump up^ A. Bhaskaranarayana Director SCP/FMO & Scientific Secretary Indian Space Research Organisation – Indian IRNSS and GAGAN
13. ^ Jump up to:a b c d e "IRNSS". space.skyrocket.de. Retrieved 2012-04-08.
14. Jump up^ "ISRO Forthcoming Satellite launches". ISRO.
15. Jump up^ "India to launch first navigational satellite on June 12". Zee news. 18 May 2013. Retrieved 18 May 2013.