India's Own GPS System-A Commendable Feat

India had some jubilant moments on Thursday April 28, 2016, as it entered an exclusive club of five nations which have their own satellite navigation and positioning system, on the successful launch of the IRNSS-1G, country's seventh navigation satellite, thus completing a constellation of seven satellites launched for the purpose. These were moments of immense pride for the nation when, on April 28, at 12.50 pm sharp, a 44.4-metre-tall PSLV rocket, weighing 320 tonnes, blasted into the clear afternoon skies from Sriharikota in Andhra Pradesh with a blazing orange-red tail trailing behind, to put in orbit the seventh satellite in this series of seven. After zooming through the sky for nearly 20 minutes, the satellite IRNSS-1G was ejected from the rocket and injected into an elliptical orbit around the Earth. It swiftly opened its solar panels, and the nation rejoiced in having its own mini GPS, a regional positioning system. Now, the country will no more have to depend on any foreign power for military navigation. With the complete system now in place, the armed forces will be able to find their position accurately in the battleground and direct ammunition and missiles even deeper into enemy territory, as it would have an extended range of 1,500 km even beyond our borders.

This Indian Regional Navigation Satellite System (IRNSS) will be known to the world as NAVIC (Navigation with Indian Constellation), when the IRNSS-1G becomes operational in about a month's time. The NAVIC would offer services like terrestrial and marine navigation for aircraft, ships and the Railways, disaster management, vehicle tracking and fleet management, navigation aide for hikers and travelers and visual and voice navigation for drivers. It can also be integrated into phones. With this launch, the IRNSS constellation of seven satellites is now complete. This will allow the Indian Space Research Organisation (ISRO) to focus on the process of designing front end chips which will receive the navigational signals sent out by these satellites. The system will be similar to the Global Positioning System (GPS) operated by the United States with 24 satellites and the Glonass, Galileo and BeiDou systems of Russia, Europe and China respectively.

Earlier, India had already launched six regional navigational satellites (IRNSS-1A, 1B, 1C, ID, 1E and 1F) to provide accurate position information service to users across the country and the region, extending up to an area of 1,500 km beyond our borders. Although the full system comprises nine satellites-seven in orbit and two on the ground as standby, navigation services could be made operational with four satellites only. Each of these satellites has costed about Rs 150 crore and the PSLV-XL version rocket about Rs 130 crore. The seven rockets would entail an outlay of Rs 910 crore. The total project cost including other facilities is around Rs.1,420 crore, as per ISRO officials. The first satellite IRNSS-1A was launched in July 2013, the second IRNSS-1B in April 2014, the third on October 2014, the fourth in March 2015, and the fifth and sixth on January 20 and March 10, 2016. All satellites will have to undergo stabilization testing and verification of their performance over the next few months before being pushed into use, according to ISRO officials.

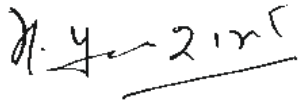
The Indian system provides positional accuracy of 10 metres. Civilian usage of GPS would bloom and costs would come down, when more and more manufacturers will start making the navigation signal receivers. That will soon happen once the IRNSS is formally declared operational.

It would also add to our strength in regional diplomacy. Since an area of 1,500 km from Indian boundaries will be covered under the navigational system, our Prime Minister Narendra Modi has already invited other countries to make use of this system as well. Thus, we would be able to secure

better international cooperation and leadership by giving access to the system to other countries of this region. We have seven neighbours who may rely on us for technology to be provided by us in this respect. They can use Indian services at their will. With an accuracy of better than 10 m being claimed by ISRO, the navigation system will be offered as an open or Standard Positioning Service and a superior, coded military Restricted Service.

An Indian-owned satellite navigation system is crucial to get positional accuracy during a war or a war-like situation as the country could be denied such information by countries owning similar systems during such times.

Therefore, NAVIC or the IRNSS is a unique gift of our scientists for our people and polity.



(Prof. Bhagwati Prakash Sharma)

Editor in chief