



New Satellite-Based Toll Collection System

For Prelims: [GAGAN](#), [Global Positioning System](#), [FASTag](#)

For Mains: Significance of Satellite-Based Navigation Systems, Infrastructure

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Why in News?

Recently, the Ministry of Road Transport and Highways of India announced in [Parliament](#) that the government intends to roll out a **new highway toll collection system** based on the **global navigation satellite system (GNSS)** before the [model code of conduct for the 2024 election](#) becomes effective.

What is the New Proposed Highway Tolling System?

▪ Salient Features:

- The proposed highway tolling system utilises the GNSS, including the Indian **satellite navigation system** [GAGAN \(GPS Aided GEO Augmented Navigation\)](#) for accurate location tracking.
 - The GNSS is a term used to refer to any satellite-based navigation system, including the US' [Global Positioning System \(GPS\)](#).
 - It uses a large constellation of satellites to provide more accurate location and navigation information to users globally as compared to the GPS alone.
- Implementation involves fitting vehicles with an **On-Board Unit (OBU)**, or tracking device, which communicates with **satellites to determine location**.
- Coordinates of national highways are logged using **digital image processing**, allowing software to calculate toll rates based on distance travelled.
 - Toll amounts are deducted from a digital wallet linked to the OBU, ensuring seamless and cashless transactions.
- Enforcement measures including gantries equipped with CCTV cameras along highways to monitor compliance and deter evasion tactics.
- The new system will likely **coexist with the existing FASTag-based toll collection initially**. A decision on mandating OBUs for all vehicles is yet to be made.

▪ Benefits:

- **Smoother Traffic Flow:** Elimination of toll plazas is expected to significantly reduce traffic congestion, especially during peak hours.
- **Faster Commutes:** Frictionless toll collection should lead to quicker travel times and a more efficient highway network.
- **Fairer Billing:** The system aims to offer **users the benefit of paying tolls only for the actual distance travelled**, promoting a **pay-as-you-use model**.

▪ Challenges:

- **Payment Recovery:** Recovering tolls from users with depleted digital wallets or those who tamper with the system remains a concern.
- **Enforcement Infrastructure:** Setting up a nationwide network of **Automatic Number-**

Plate Recognition (ANPR) cameras for enforcement purposes requires significant infrastructure development.

- **Privacy Concerns: Data security and user privacy** need to be addressed effectively.

FASTag

- **FASTag** is a device that employs [Radio Frequency Identification \(RFID\)](#) technology for making toll payments directly while the vehicle is in motion.
- FASTag (RFID Tag) is affixed on the windscreen of the vehicle and enables a **customer to make toll payments directly from the account** which is linked to FASTag.
 - It is operated by the [National Highway Authority of India \(NHAI\)](#) under the supervision of the Ministry of Road Transport and Highways.

GAGAN

- **GPS Aided GEO Augmented Navigation (GAGAN)** is an initiative by the Indian Government for Satellite-based Navigation Services in India.
- It aims to enhance the accuracy of global navigation satellite system (GNSS) receivers through reference signals.
- The [Airports Authority of India \(AAI\)](#) and the [Indian Space Research Organization \(ISRO\)](#) have collaborated to develop the GAGAN as a regional **Satellite Based Augmentation System (SBAS)**.
- The GAGAN's goal is to provide a navigation system to assist aircraft in accurate landing over the Indian airspace and the adjoining area and applicable to safety-to-life civil operations. **GAGAN is interoperable with other international SBAS systems.**

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims:

Q.1 Which one of the following countries has its own Satellite Navigation System? (2023)

- (a) Australia
- (b) Canada
- (c) Israel
- (d) Japan

Ans: d

Q.2 With reference to the Indian Regional Navigation Satellite System (IRNSS), consider the following statements: (2018)

1. IRNSS has three satellites in geostationary and four satellites in geosynchronous orbits.
2. IRNSS covers entire India and about 5500 sq. Km beyond its borders.
3. India will have its own satellite navigation system with full global coverage by the middle of 2019.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) None

Ans: (a)

Mains:

Q.1 Why is the Indian Regional Navigational Satellite System (IRNSS) needed? How does it help in navigation? **(2018)**

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