

## **IRNSS - The Failure**

### **Why in news?**

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The recent launch of IRNSS-1H satellite as part of the NavIC (Navigation in Indian Constellation) project was a failure.

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### **What went wrong in the launch?**

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- ISRO declared the “IRNSS-1H launch” a failure after a heat shield failed to separate.

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- The heat shield is a protective cover provided around the satellite to help it withstand the adverse temperatures felt when a rocket is launched into space.

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- Separation of the heat shield occurs mid-flight when the rocket leaves Earth’s atmosphere.

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- The performance of PSLV-C39 went as per plan up to the point where the satellite had to be inserted in orbit but the heat shield prevented it from being deployed in space.

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### **What is IRNSS & NavIC?**

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- IRNSS (Indian Regional Navigation Satellite Systems) is a group of satellites launched for providing satellite-based navigation services in the Indian subcontinent under the NavIC project on the lines of GPS - created by USA.

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- It was designed mainly to provide an “Restricted Encrypted Service” for authorised users like the defence forces.  
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- But it also provides for accurate “position information services” to general users in India as well as the region, up to 1,500 km from the boundary.  
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- ISRO will also sell its capabilities to service providers like mobile phone manufacturers, vehicle manufacturers etc.  
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- **The** main reason for the development of IRNSS is the reliability that it offers when used for defence purposes.  
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- ISRO started work on the IRNSS programme in 1999 after the Kargil War, where Indian defence forces could not use American GPS in the conflict zone to locate its soldiers.  
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### **What was IRNSS-1H supposed to do?**

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- NavIC project with an indented cost of Rs.1,420 crores essentially comprises only seven satellites.  
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- IRNSS-1H, was the eighth satellite, launched to replace IRNSS-1A, which developed problems last year.  
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- It was supposed to sit in a “Sub-Geosynchronous Transfer Orbit”.  
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### **What made replacing of IRNSS-1A necessary?**

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- IRNSS-1A was the first satellite of the NavIC, launched in 2013.  
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- Recently, all the three RAFS-Atomic Clocks (Rubidium Atomic Frequency Standard clocks) on IRNSS-1A had failed, due to probable short circuiting.

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- This rendered it ineffective for navigation services, which called for a replacement.

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- While the clocks had failed, the rest of satellite components were found to be functioning perfectly.

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- IRNSS-1A is currently being used for messaging activity.

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### **Why are these clocks important?**

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- Atomic clocks are a key component in a navigation system for accurate timekeeping.

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- This is crucial, as the determination of a person's position on earth is subject to the accurate calculation of delays in signal transmission from the satellite to earth.

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- Recognizing this importance, ISRO satellites are equipped with three clocks each — one being the primary timekeeper and two acting as backup.

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- Due to the IRNSS-1A failure, modified versions of the original atomic clocks are being used by new satellites to overcome the technical issues.

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Source: IndianExpress

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