

Made-in-India Automatic Train Protection System Kavach 4.0 Commissioned in Gujarat's Bajwa (Vadodara)–Ahmedabad Section

Over 2,200 Route Kilometres Covered Under Kavach

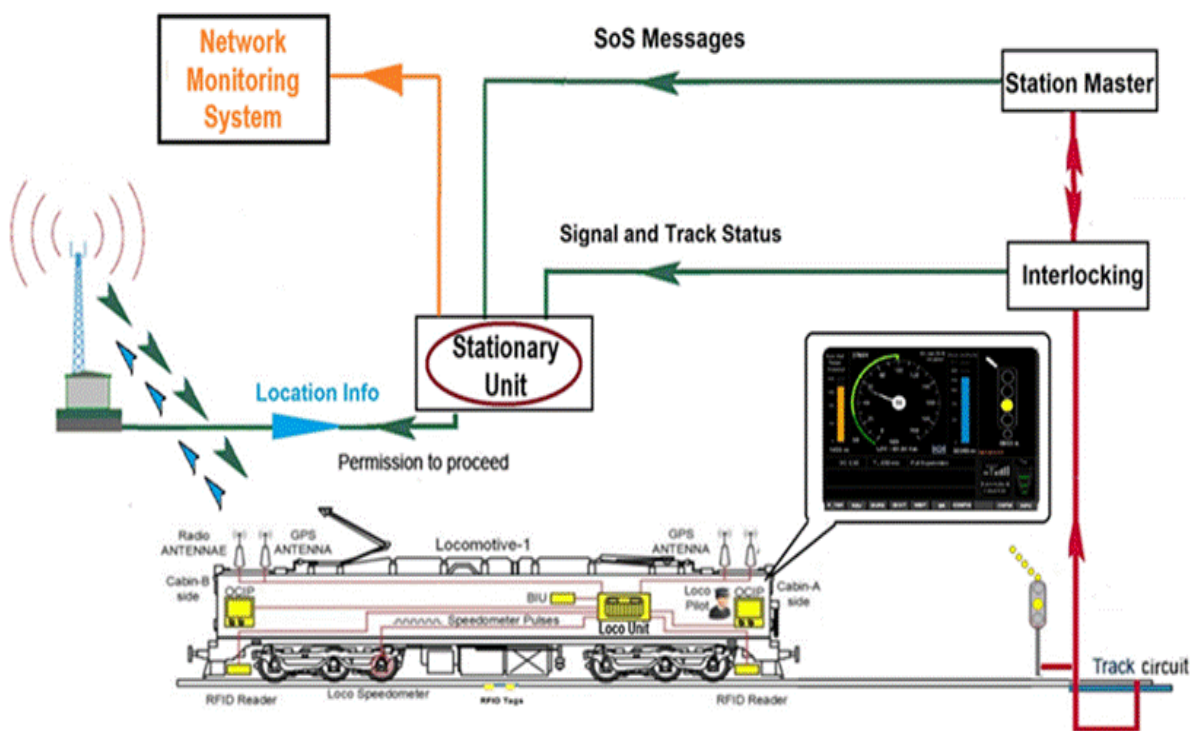
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In line with the expansion of Kavach, now Kavach 4.0 has been commissioned in Gujarat's first Bajwa(Vadodara)–Ahmedabad section(96-km). **The project covers 17 stations and includes robust infrastructure such as 23 towers, 20 Kavach buildings/huts, 192 km of optical fibre cable, and installation of 2,872 RFID tags.**

The maiden Kavach-enabled train on this route was the Sankalp Fast Passenger (59549/59550), operated with WAP-7 locomotives and 11 LHB coaches.



Kavach 4.0 is now fully functional on this section and is designed to automatically mitigate safety risks by preventing consequences arising from Signal Passed at Danger (SPAD), enforcing automatic speed control including sectional speed, loop line and Permanent Speed Restriction supervision, and providing protection against head-on and rear-end collisions. Additional safety features include an SOS facility and automatic whistling at level crossing gates.



So far, Kavach has been implemented on **more than 2200 Route Kilometres**.

Kavach is an indigenously developed Automatic Train Protection (ATP) system of Indian Railways, designed to provide the highest level of operational safety. It is a highly technology-intensive system certified to Safety Integrity Level-4 (SIL-4), one of the highest safety standards in signalling systems, reflecting Indian Railways' commitment to world-class safety and reliability.

Kavach assists Loco Pilots by automatically applying brakes in situations where prescribed speed limits are exceeded or when safety is compromised, thereby preventing accidents and enhancing safe train operations, including during adverse weather conditions. Continuous improvements based on operational experience and independent safety assessments led to the approval of Kavach Version 4.0 by RDSO. Kavach 4.0 is a significant milestone in Railway safety and is designed to meet the requirements of India's diverse and high-density rail network.

Kavach 4.0 represents a significant technological leap. Key enhancements include:

- Improved location accuracy, enabling precise train positioning.
- Better signal aspect information in large and complex station yards.
- Station-to-station Kavach interface through optical fibre cable, ensuring faster and more reliable communication.
- Direct integration with existing electronic interlocking systems, enabling seamless coordination with current signalling infrastructure.

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