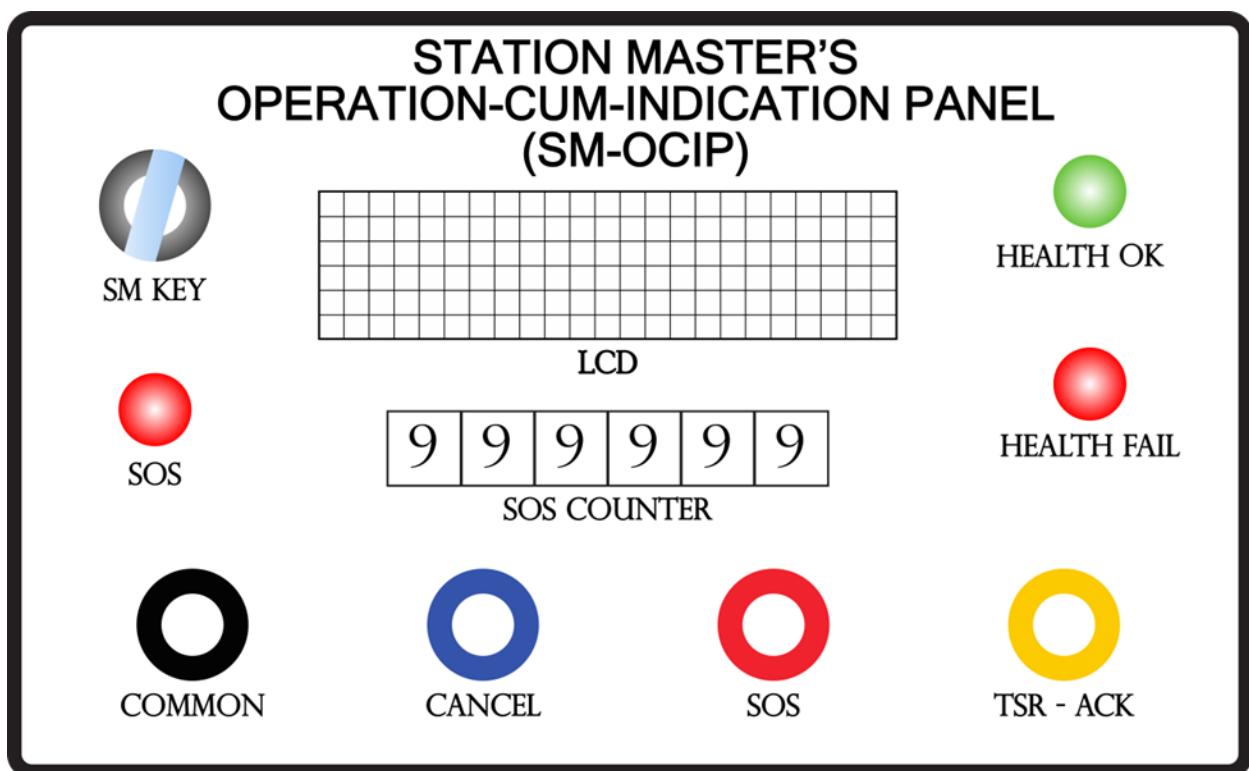


Kavach

Indian Railway's

Automatic Train Protection System (IR-ATP)



CoE/Kavach/2024/008 Issue 2.0

ISSUED BY
CENTER OF EXCELLENCE - KAVACH



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Notes:

- (a) There is mention of TSR related button available on SM-OCIP, however, the Temporary Speed Restrictions (TSR) related procedures will be included on incorporation of TSR functionality progressively.
- (b) The document might also be required to be updated on approval of G&SR Committee Report.
- (c) Some gaps have been observed among Functional Requirement Specifications of Kavach and the logics implemented, which are under trials. The prominent among them is related to appearance of On Sight Mode without ensuring locking of route. Unlike Kavach Ver 3.2, On Sight Mode is appearing quite frequently in Kavach Ver 4.0, and might have implications on operations in form of misleading indications on Loco Pilots- Operation-cum-Indication Panel. The matter has been referred to RDSO, and is under review, the response is awaited from RDSO. The document will be updated as per decision of RDSO.

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Acronyms

Acronym	Explanation
ACK	Acknowledgement
ATP	Automatic Train Protection
BIU	Brake Interface Unit
CPU	Central Processing Unit
DAY	07:00 to 19:00 Hours
DMI	Driver Machine Interface
EB	Emergency Brake
EoA	End of Authority
EVL	Event Logger Card
GEN	Generate
GPS	Global Positioning System
GSM	Global System for Mobile Communications
GPRS	General Packet Radio Service
IRSEM	Indian Railways Signal Engineering Manual
Kavach	Indian Railways' Automatic Train Protection (ATP) system, previously known as the cab signaling based Train Collision Avoidance System (TCAS)
KMS	Key Management System
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LP-OCIP	Loco Pilot's Operation Cum Indication Panel
LTE	Long-Term Evolution
MA	Movement Authority
NIGHT	19:00 to 07:00 Hours
NMS	Network Monitoring System
PSR	Permanent Speed Restriction
RFID	Radio Frequency Identification
RF	Radio Frequency
RIU	Remote Interface Unit
SIL	Safety Integrity Level
SM	Station Master
SM-OCIP	Station Master Operation Cum Indication Panel
SOS	Save Our Souls
SPAD	Signal Passing at Danger
SVK	Stationary Vital Kavach
TCAS	Train Collision Avoidance System
TSR	Temporary Speed Restriction
TSRMS	Temporary Speed Restriction Management System
UHF	Ultra-High Frequency

Course Content

The following are the broad topics in this module on Kavach System for Traffic Staff viz...

- Traffic Inspectors
- Station Masters
- Train Managers
- Section Controllers

S. No	Topic
1	Introduction to Kavach
2	Station Master Operation Cum Indication Panel (SM-OCIP)
3	Operational Modes of Onboard Kavach for Version 4.0
4	General Guidelines for Kavach

1. Introduction

Indian Railways has developed its own indigenous Automatic Train Protection (ATP) Systems for enhancing safety of running trains. The system was formerly known as Cab-signalling Train Collision Avoidance System (TCAS) which is now called as 'Kavach'. It has been adopted as our Automatic Train Protection (ATP) System in line with Atma Nirbhar Bharat mission.

Kavach is being provided on sections equipped with Multi Aspect Colour Light Signalling controlled by relay or electronic interlocking. It will be an additional aid to the Loco Pilot and hence, Loco Pilot shall continue to follow prevalent operating and safety rules.

For train speeds beyond 140 KMPH, Automatic Train Protection (ATP) System with Cab Signaling for SPAD mitigation is compulsory in Indian Railways as per Para 7.8.9, table-3 of IRSEM. Based on the Railway Board instructions of date 09.08.2024, Kavach system is getting proliferated in its current RDSO specification - Version 4.0 of Kavach on UHF spot frequencies (MComm) without waiting for LTE. Some of the features like LTE, Temporary Speed Restriction Management System (TSRMS), Neutral Section and Fouling Mark protection will be implemented progressively. The information and procedures about upcoming TSRMS will be included after finalization for field installations.

This training module has been meticulously designed based on the RDSO specification No. RDS0/SPN/196/2020, Version 4.0 (Functional Requirement Specification dated 11.04.2022, System Requirement Specification 16.07.2024, first Product approval awaited) to equip Traffic Staff with the essential knowledge and skills required to understand the Kavach system of working. It intends to achieve effective operations pertaining to Traffic Staff, and ensure the optimal performance of the systems in their professional duties. In today's rapidly advancing technological landscape, the ability to swiftly and properly operate the system is critical in enhancing operational safety. This module is expected to serve both a guide and a resource to help to achieve these goals.

The training module covers a wide range of topics, including:

- Familiarizing with the various sub systems of Kavach.
- Working of Station Master Operation Cum Indication Panel (SM-OCIP).
- Various Operational Modes of Onboard Kavach for Version 4.0.
- General Guidelines.

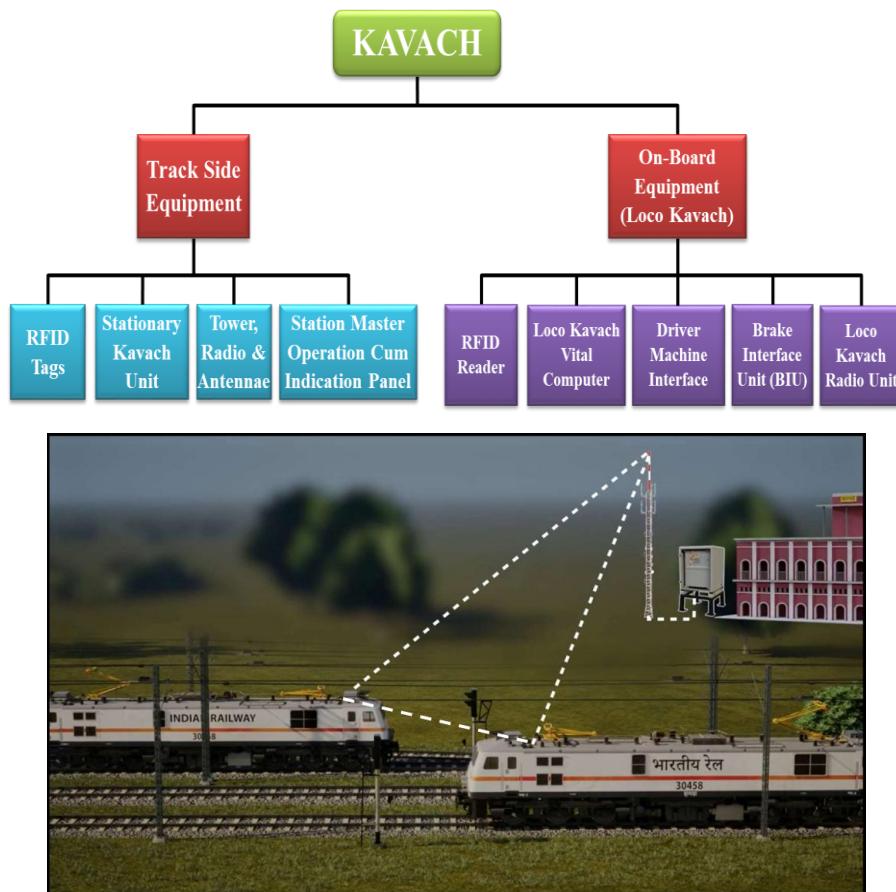
2. Kavach and its Sub Systems

2.1 Salient features of Kavach

- Kavach is only an additional safety aid to the Loco Pilot to avoid unsafe situations arising out of non-adherence to signalling indications or speed restrictions by the Loco Pilot.
- The provision of Kavach shall, in no way absolve the railway staff of their responsibilities in respect of observance and compliance of Speed restrictions and aspects of signals.
- The operation of Kavach shall, in no way infringe or override the rules pertaining to the regular or unusual train operations as mentioned in G&SR.
- Basic functions of KAVACH (*These vary depending on the operational modes*)
 - ✓ An additional aid to the loco pilot for mitigation of risks arising out of SPAD. It automatically applies brakes if the loco pilot violates speed restrictions or fails to act in time to prevent Signal Passed at Danger.
 - ✓ Continuous Speed Supervision: Controlling over-speeding beyond Sectional speed, PSRs, Loop Line Speed Control – at present. (TSRs will be included once TSRMS becomes operational).
 - ✓ Kavach uses continuous supervision of Movement Authority to maintain train speed within specified limits.
 - ✓ Kavach also provides protection from head-on, rear-end and side collisions by estimating track occupancy and identifying the track. This feature works only between trains with locomotives having functional on board Kavach.
 - ✓ Capable of displaying Signal Aspect of approaching signal in loco pilot's cab along with the movement authority aiding Loco Pilot.
 - ✓ Displays the section speed, permitted speed, target speed and current speed on a single dial.
 - ✓ Auto whistling at Level Crossing Gate in certain conditions.

- ✓ Kavach has broadly two categories of protections:
 - Category (I): Protection against inadequate braking by Loco Pilot in his own Loco. Examples: Protection against Collisions due to SPAD, Protection against Over-speeding (Speed Restrictions, Turnouts), Protection against Rollback of Train. For such kind of protections, functional Onboard Kavach in his own Loco (defaulting) is adequate and the protections are guaranteed as claimed.
 - Category (II): Protection against unusual caused due to factors external to his own Loco. Examples: Protection against hitting another derailed train causing infringement, Protection against routing of train inconsistent with signal aspect, Protection when SoS is generated. Such protections and their level of protection are not guaranteed. Further, some of these protections are available merely with installation of RFID tags even without station equipment and tower, owing to Direct Onboard-to-Onboard Communication feature of Kavach's existing radio communication backbone (MComm).

2.2 Components of Kavach



The Kavach System comprises of

1. Track side equipment: RFID tag, Stationary Kavach Unit, Tower, Radio & Antenna, SM Operating cum Indication panel.
2. On-board equipment (Loco Kavach): RFID reader, Loco Kavach Vital computer, LP-OCIP (Driver Machine Interface), BIU (Brake Interface Unit, Loco Kavach Radio Unit.

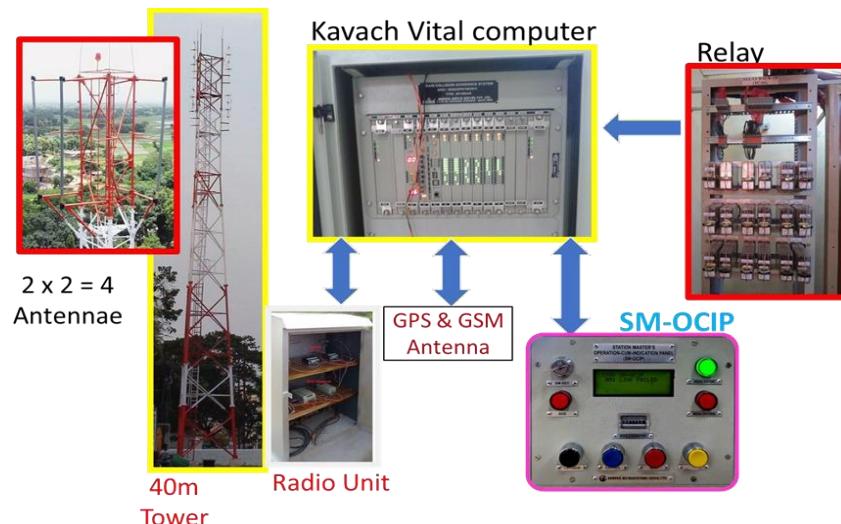
Key Components - a brief

- ✓ **RFID Tags**: Fastened to track sleepers at regular intervals, these tags transfer track information and location data to the on-board KAVACH computer.
- ✓ **Stationary Kavach Unit**: Stationary Kavach Unit is located in Relay Room/ Electronic Interlocking Room. It consists of a Vital Computer and Radio Modems, receiving information from signalling and interlocking systems and generating messages for the Onboard (Locomotive).
- ✓ **Tower, Radio and Antenna**: Towers are located at the block stations, Interlocked LC gates, IB huts and Mid-section for auto signals wherever Stationary Kavach is installed, as per need.
- ✓ **SM Operation cum Indication panel**: SMOCIP is a part of Station Kavach. It is a display unit provided to the Station Master. It is placed in SM office. It is operated by Station Master as and when necessary, like manual SOS generation etc.
- ✓ **RFID reader**: It is placed underneath the Locomotive to read the RFID tags.
- ✓ **Loco Kavach Vital Computer**: The Vital Computer interfaces with the locomotive and its subsystems. It receives information from signaling and interlocking systems, and relays messages to the locomotive through the Radio Unit.
- ✓ **Driver Machine Interface**: It is a part of Loco Kavach. DMI is a display panel in the locomotive cab that provides real-time information about the track conditions, movement authority, signal aspects, and allows LP to acknowledge warnings or initiate emergency actions through buttons.
- ✓ **Brake Interface Unit**: It is a part of Loco Kavach. It executes the brake commanded by Onboard Vital Computer automatically when Loco pilot is not controlling the speed in commensuration with permitted speed which

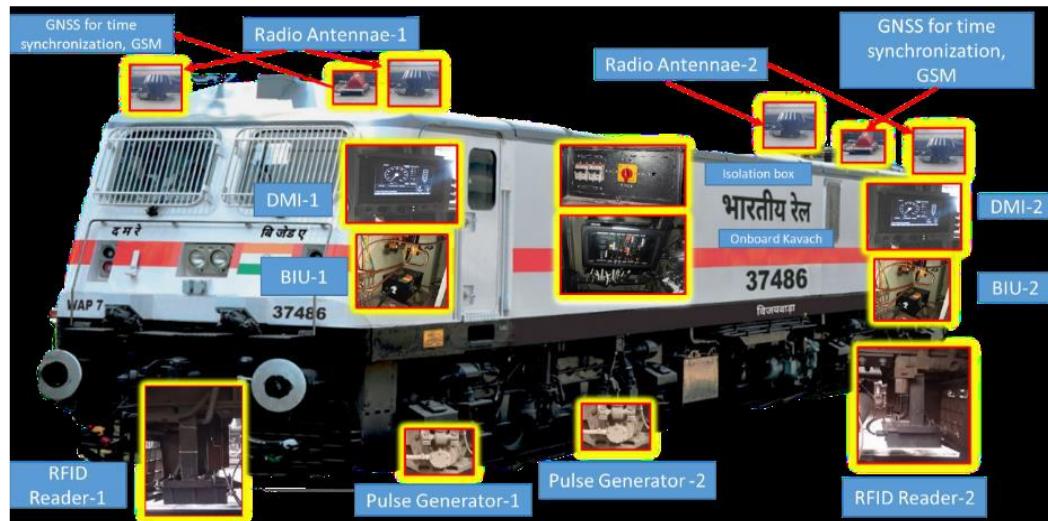
is based on signalling information including permanent speed restrictions, gradient, braking characteristics of train.

- ✓ **Loco Kavach Radio Unit:** It is fitted in the Loco. It is the onboard radio communication device that enables the Loco to receive signaling information from trackside Kavach units via radio waves. There is provision of Direct Onboard-to-Onboard Communication also in existing radio communication backbone (MComm) of Kavach.
- ✓ **Network Monitoring System (NMS):** Logs train movements, inputs, and fault messages. It automatically alerts the fault teams to address issues.
- ✓ **Key Management System (KMS):** Ensures secure exchange of Movement Authorities between Stationary Kavach and Onboard Kavach systems.
- ✓ **Kavach Communication:**
 - Radio communication network is used for the bi-directional exchange of information between Stationary Kavach and Onboard Kavach and direct Communication among Onboard to Onboard Kavach.
 - Radio communication channels are in dual arrangement which are used in alternate time cycles with separate cable and antenna for each radio, which also acts as hot standby.
 - Timeout due to radio communication failure shall be deemed to occur when 30 seconds (configurable) for Absolute Block Section and 10 seconds (configurable) for Automatic Block Section have passed since the last packet received from SKavach in the communication mandatory area.

2.3 Kavach Arrangements in Station at a glance



2.4 Loco Kavach at a glance



2.4 Radio Frequency Identification (RFID) Tags

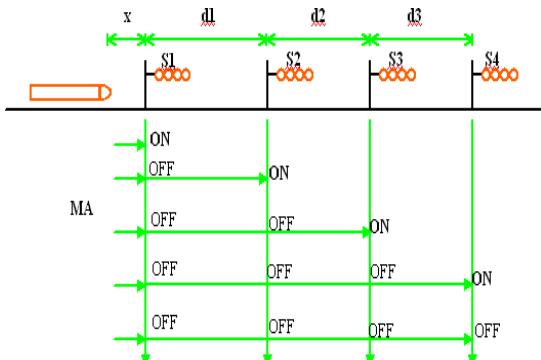


- RFID Tags are provided in station yard for each signal, signal approach and turnouts and in block section within 1000m for giving Trackside information to Loco Kavach unit.
- RFID tags shall be fixed at the center of PSC Sleepers. No holes shall be drilled in the Sleepers and the arrangement of fixing must be through clamps only.
- These RFID tags are suitable for reliable working for train speed up to 200 kmph.
- These RFID tags are able to work even when submerged in water up to rail level.

2.5 Working Principle:

Movement Authority

It is the distance up to which the train is permitted to travel safely. When deployed with lineside signals, the calculation of Movement Authority (MA), depends upon signal aspect sequence.



End of Authority (EoA)

It is the location up to which the train is permitted to proceed and where the target speed is zero.

Kavach system uses radio communication for exchanging information between Loco and Station, through the RF Communication towers which are located near stations, interlocked LC gates, IB huts and mid-section for auto signals. Station Kavach and Loco Kavach units communicate with each other for every 2 seconds.

Speed profiles

Kavach supervises the speed of Loco/Train based on certain parameters like Dynamic Speed Profile and Static Speed Profile.

- (a) Dynamic Speed Profile: the speed-distance curve which a train shall follow without violating the static train speed profile till the end of Movement Authority. This curve depends on the braking characteristics of the train and train length.
- (b) Static Speed Profile: it is a description of the fixed speed restriction at a resolution of 5 kmph for a part of track sent from trackside to train.

3. Station Master Operation cum Indication Panel (SM-OCIP)

3.1 Introduction to SM-OCIP

- The Station Master Operation Cum Indication Panel (SM-OCIP) is installed on Station Master's table or a nearby place such that it is accessible and visible to the Station Master.
- The system of working and Station Master's operations pertaining to Station Master Operation Cum Indication Panel (SM-OCIP) shall be incorporated in Appendix-C of Station Working Rules (SWR) of the stations which are equipped with Kavach.
- The Station Master can monitor the statuses of SOS reception, SOS generation and System health through LED indications mounted on the SM-OCIP module.
- All operations on SMOCIP can be performed only when the SM's key is inserted and turned to 'IN' position. On duty SM is responsible for operation of SM-OCIP and safe custody of keys to prevent unauthorized operation.

3.2 Provisions in Station Master Operation Cum Indication Panel

3.2.1 Following indications / buttons / buzzer are given in the SMOCIP:



Station Master's Key (with ON/OFF or IN/OUT Position)

- LCD display (4 Line x 20 characters).
- SOS indication
- Health indications (Green and Red)
- Audio Buzzer
- Three Push Buttons (Common, Cancel and SOS)
- Electromechanical non-resettable 6-digit counter for recording SOS operation.

- g) TSR / Ack button (Ack Function currently in use, TSR Functionality for future use).

3.2.2 The various indications of the LED on the Console, what it means & action required by SM is tabulated below:

Sl.	LED Name	Indication	What it means	Action by SM
1	HEALTH OK	GREEN	Normal	-
2	HEALTH OK	Blank	Station Kavach Unhealthy	Inform S&T staff
3	HEALTH FAIL	RED	Station Kavach Unhealthy	Inform S&T staff
4	HEALTH FAIL	Blank	Normal	-
5	SOS	RED (blink)	When SOS generated from Station	Inform all concerned
			When SOS received from on board Kavach	Acknowledge in SMOCIP and inform all concerned
6	SOS	Blank	Normal	-

3.2.3 The various buttons on the Console & their description for usage is tabulated below.

Sl.	Button	Color	Description
1	COMMO N	BLACK	Common switch to press along with SOS/Cancel switch
2	CANCEL	BLUE	To cancel the SOS from station
3	SOS	RED	To generate SOS from Station
4	TSR / ACK	YELLOW	To acknowledge (TSR usage will be instructed later when TSRMS becomes operational)

3.2.4 The SM-OCIP shall display the following information on LCD:

- i. Station ID, KMS Key Index, TSR Count (for future use) along with the Station Kavach OK or FAIL.
- ii. Sub - System faults information and Station Kavach Manual SOS generated and Cancelled information shall be displayed and SOS messages shall disappear after 30 seconds.
- iii. The display on LCD panel is as follows

Line-1: ID:00531 KI: XX T: XX

Line-2: SOS GENERATED,

Line-3: SOS CANCELLED

Line-4: STN Kavach OK/SYSTEM LINK FAIL

3.2.5 Audio buzzer – This will sound along with SOS LED Red blinking when

manual SOS is generated / received along with which the counter will register next number.

3.3 Manual SOS generation/ Cancellation

- i. As soon as SM notices or receives any information/message that endangers or may endanger train movement and needs to stop a train, SM shall insert the SM's Key and turn it to 'In/ON' and press 'SOS' and 'Common' buttons simultaneously to generate the SOS.
- ii. The SOS as generated above will be communicated to all the functional Kavach locos/trains in vicinity and brakes will be applied automatically to those Onboard / Loco Kavach within a radius of 3000m from SOS generating Station Kavach to bring the train/trains to STOP DEAD (STANDSTILL).
- iii. After the train is brought to STOP DEAD (STANDSTILL), Loco Pilot shall acknowledge the SOS, for releasing the brakes. Loco Pilot shall further handle the train based on the information received from station Master. Further, train speed shall be supervised by KAVACH for 30kmph (configurable) till the train passes the originating Location of "SOS" message.
- iv. After taking suitable precautionary actions and the cause of obstruction is removed, the SM shall cancel the SOS message by pressing 'Cancel' and 'Common' buttons simultaneously.
- v. The Manual SOS generated as above, will be communicated by Station KAVACH every 2 seconds and the speed of such trains shall be restored only if any one of the following conditions is satisfied: -
 1. SOS message is cancelled by the source.
 2. Train is moved away more than 1500m (Configurable) from the source.
 3. If the SOS message reception is not there from the source for more than three minutes.

Kavach equipment shall log the events of sending and receiving of SOS in the Event Logger.

3.4 SOS acknowledgement by SM

TSR-ACK button (Yellow colour) has to be pressed to acknowledge display screen and buzzer.

3.5 Reporting of Kavach Failures

A log of every failure displayed and its restoration has to be maintained in a separate register and information to be given to S&T department.

3.6 Variations in Station Master Operation Cum Indication Panel (SMOCIP) in different makes

At present, there are three makes of SM-OCIP being used in SCR namely- Medha make, Kernex make and HBL make. There may be slight variation of the indications/ provision of buttons. For reference, the photographs of different makes of SM-OCIP are provided below-

Medha



Kernex

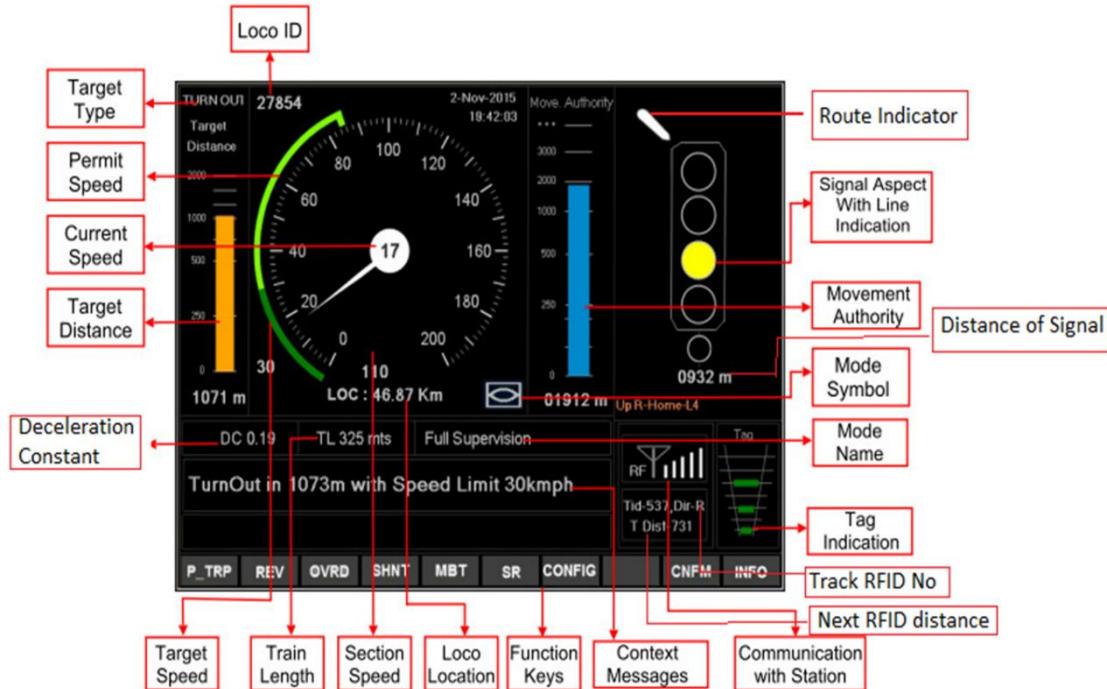


HBL



4. Operational Modes of Onboard Kavach for Version 4.0

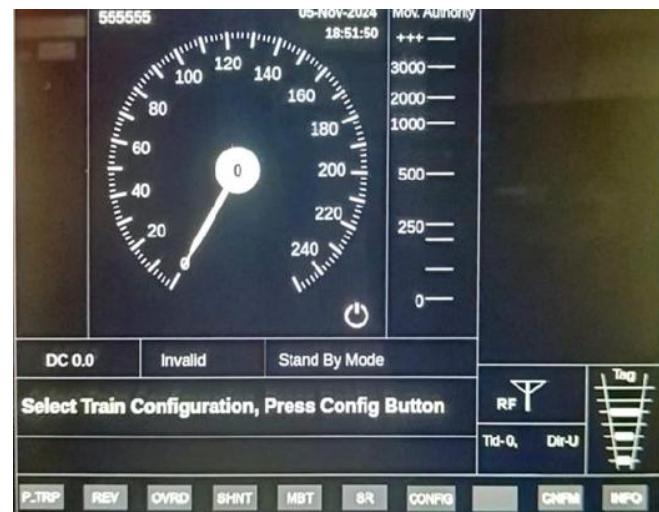
4.1 Driver Machine Interface (DMI) at a glance



4.2 Different Types of Operational Modes of Onboard Kavach for Version 4.0

4.2.1 Standby Mode (SB):

- When Loco is energized and Kavach unit is switched on, the Kavach unit comes into Standby (SB) mode
- The SB mode is the default mode.
- In this mode, train is supervised for STOP DEAD (STANDSTILL) only. If any movement is detected, it applies Emergency Brake.
- The loco pilot cannot move the train in this mode.
- Kavach performs brake system health test when Onboard Kavach is energized and DMI activated.
- Once Train configuration is completed, Loco pilot can opt for changing the mode from 'Standby' to 'Staff Responsible' or 'Shunt' Mode.



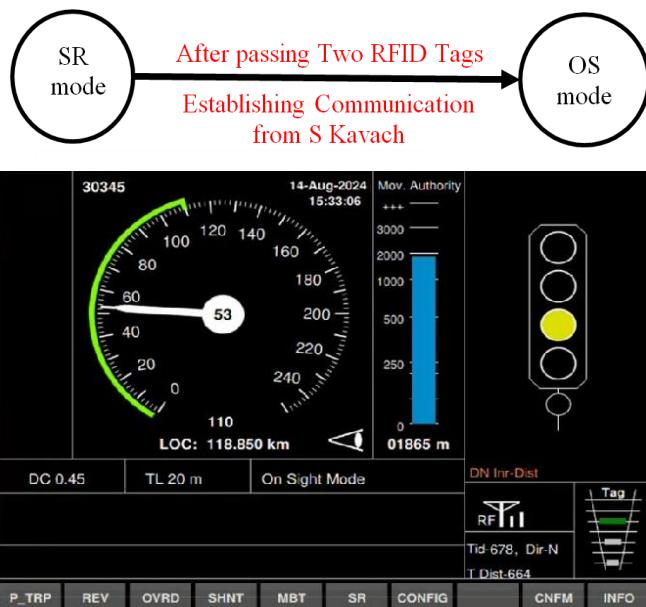
4.2.2 Staff Responsible Mode (SR):

- This mode needs to be selected by LP in order to start the train.
- In this mode, Kavach will only supervise a ceiling speed (MPS of Loco).
- In this mode, LP moves the train under his/her direct responsibility. LP to respect line side information (signals, speed boards).
- After passing two RFID tags (for getting direction) and communication from stationary Kavach, the on board Kavach will automatically enter in to 'On sight' mode.



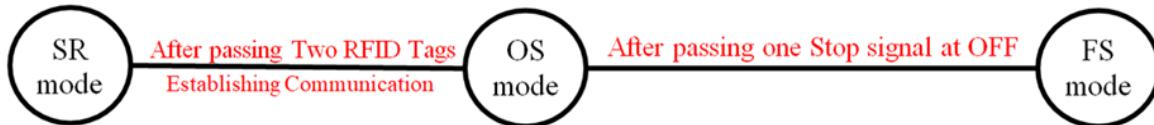
4.2.3 Onsight Mode (OS):

- Onsight mode appears in multiple scenarios
 - Once the Onboard Kavach is SR mode and it passes two RFID tags (on establishment of direction) and on reception of information from Skavach, the Onboard Kavach transits from SR mode to OS mode with a speed permitted up to the Maximum Sectional Speed.
 - When there is a failure of communication from Skavach which is subsequently restored, the Onboard transits from LS/SR to OS mode, allowing speeds up to the MRSP (Most Restrictive Speed Profile).
 - When the loco pilot presses the OVRD and CNFM buttons to pass a signal at ON, the locomotive enters Onsight mode with a speed restriction of 15 km/h (except for LSS/IBS) and MPS for LSS/IBS respectively.



- In P-Trip mode, Onboard Kavach enters into OS mode on pressing the OVRD and CNFM buttons
- When a Calling-on signal taken OFF, the system enters into OS mode and prompts the LP for acknowledgement for OS mode.
- When the train crosses at least one stop signal in OFF position then OS mode automatically shifts to FS mode.
- This Mode is under review and the features / conditions are subject to change.

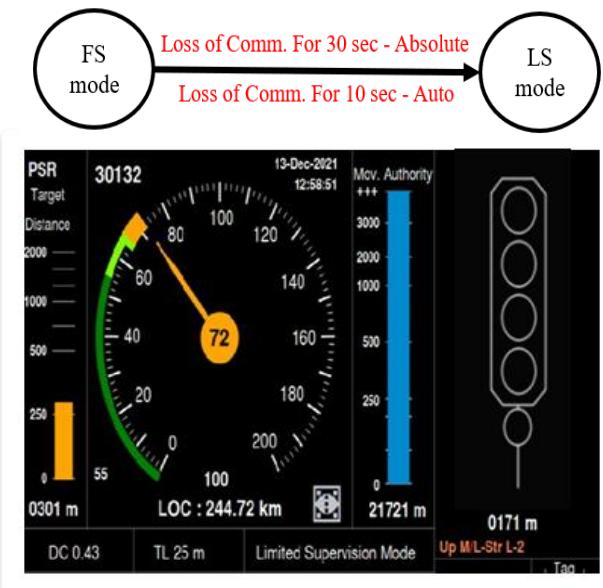
4.2.4 Full Supervision Mode (FS):



- Full Supervision mode shall be entered automatically when all the following necessary conditions are fulfilled:
 - i. Track profile Available (Including Traffic Direction) up to 3000m or Movement Authority, whichever is less.
 - ii. Valid Radio Packets are receiving in communication mandatory area.
 - iii. Movement Authority is valid.
 - iv. After coming to On Sight mode, train has crossed at least one stop signal in OFF condition
- The loco Kavach unit shall supervise train movements against a dynamic speed profile.
- Onboard Kavach will revert to Staff Responsible (SR) mode if any of the following conditions occur:
 - (i) Valid Radio packets are not available in communication mandatory area and track profile is not available upto 3000m or Movement Authority, whichever is less.
 - (ii) When three consecutive tags are missed.
 - (iii) Kavach Territory Exit tag is read.
 - (iv) Train traffic direction is unknown.

4.2.5 Limited Supervision Mode (LS)

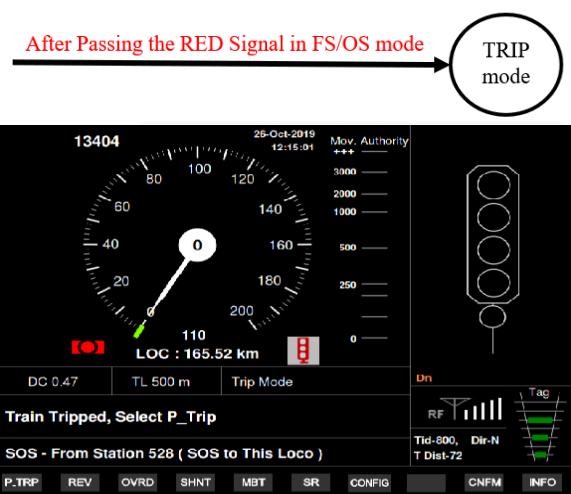
- The Kavach will automatically enter LS mode from FS mode when Radio packets are not available/received for 30 seconds (configurable) for Absolute Block System and 10 seconds (configurable) for Automatic Block System from SKavach in Communication Mandatory Area but track profile is available up to 3000m.



- Limited supervision mode enables Onboard Kavach to supervise track profile in case of communication failure.
- It supervises train movement against a dynamic speed profile.
- It obeys general SOS from station if loco is within 3000m.
- It also supervises roll away and reverse movement protection.
- Kavach will transit from LS to SR in case track profile is not available upto 3000m (configurable) or when three consecutive tags are missed or Kavach territory exit tag is read or traffic direction is unknown.

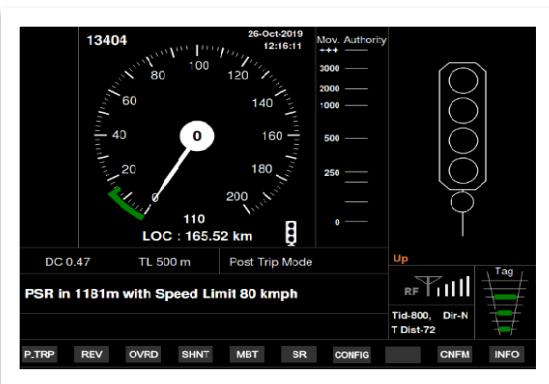
4.2.6 TRIP Mode (TR)

- When Loco Kavach is in FS/OS mode and the train passes a stop signal at ON or end of authority, Kavach will automatically enter into trip mode
- Loco applies EB continuously.
- Loco pilot has to acknowledge by pressing P_Trip followed by CNFM, then it releases EB.



4.2.7 Post Trip Mode (PT)

- LP shall manually select Post Trip Mode in order to come out of Trip Mode
- LP can do this only when the train is at STOP DEAD (STANDSTILL).
- The post trip mode shall be entered by pressing P_Trip followed by CNFM. P_Trip button followed by CNFM button, and then Kavach releases EB.
- As the train has passed signal at ON, necessary rules as in G&SR shall be followed. Required authorities shall be made and obtained before starting the train.
- After obtaining the above authorities, for the train to start, LP is required to press OVRD button followed by CNFM button in order to enter to OS mode from PT mode.



4.2.8 Reverse Mode (RV)

- This mode shall be used by LP only when reverse movement without cab change is permitted in rules. Else cab change must be done.
- This mode allows the LP to change the direction of movement of the train and drive from the same cab, i.e., the train orientation remains unchanged.
- LP shall enter manually when the train is at STOP DEAD (STANDSTILL) by pressing REV button, followed by CNFM soft keys on DMI.
- The loco Kavach unit shall supervise train movements against a ceiling speed (Default 25 kmph), distance (Default 500 mts) and time out (Default 300 sec) for which reverse movement is allowed.



4.2.9 Non-Leading Mode (NL)

- The non-leading mode is defined to manage the loco Kavach unit of a slave engine that is either electrically coupled to the leading engine or not electrically coupled to the leading engine.
- LP shall enter manually when the train is at STOP DEAD (STANDSTILL).
- The loco Kavach shall not perform any train movement supervision in this mode.



4.2.10 Shunt Mode (SH)

- Shunt mode shall be selected by loco pilot for shunting movements. It shall only be accepted by Kavach when the train is at STOP DEAD (STANDSTILL).
- It shall be possible to manually select shunting mode from SB, SR, LS, FS mode by pressing SHNT followed by CNFM soft key on DMI.
- Supervises Shunt mode speed (default: 15 kmph) within station section.
- SKavach generates SOS if the train crosses the shunting limits.



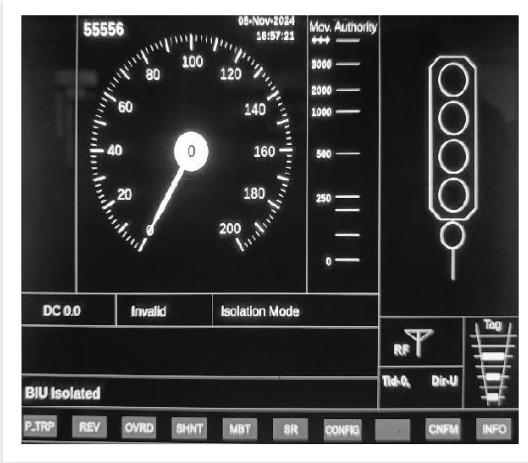
4.2.11 System Failure Mode (SF)

- The loco Kavach unit shall switch automatically to this mode in case of a fault which affects the functioning of loco Kavach.
- The Loco Pilot shall isolate Kavach, which means that Loco shall be no more under the control of Loco Kavach unit.

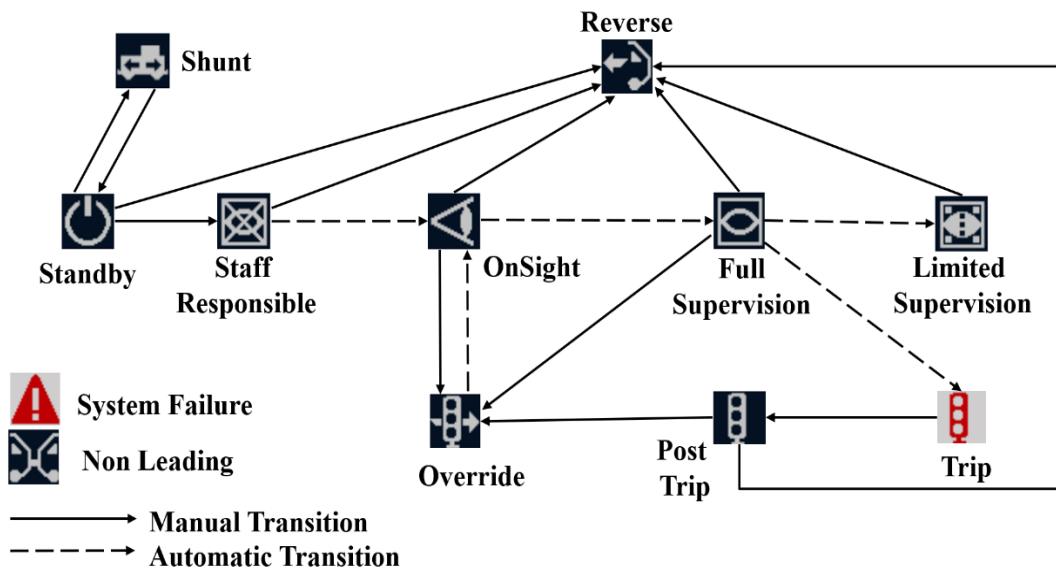


4.2.12 Isolation Mode (IS)

- This mode is manually selected by LP during malfunctioning of Kavach.
- In this mode, the loco Kavach unit shall be physically isolated from the brakes and shall not perform any train supervision.
- There shall be a clear indication on DMI that the loco Kavach is isolated (Manual isolation)



4.3 Mode Transitions in KAVACH Ver. 4



4.4 Kavach Features functional in Different Operational Modes (Subject to conditions)

Features → Mode ↓	Kavach Functions				Kavach ensures following inputs from underlying signalling	
	Preventing Roll Away	Observing PSR	Speed (Configurable) beyond which Kavach will apply brake	Display of Signal Aspect on LP-OCIP	Route Locking upto Movement Authority	Track Occupancy
SB	Yes	N/A	Standstill	N/A	N/A	N/A
SR	Yes	No	Ceiling Speed (MPS of Loco)	No	No	No
OS	Yes	Under Review	Under Review	Under Review	Under Review	No
FS	Yes	Yes	Based on Dynamic Speed Profile	Yes	Yes	Yes
LS	Yes	Yes	Based on Dynamic Speed Profile	No	Yes	No
TR	Yes	N/A	Standstill	N/A	N/A	N/A
PT	Yes	No	15 Kmph	No	No	No
RV	Yes	No	25 Kmph	No	No	No
SH	Yes	No	15 Kmph	No	No	No
NL	No	No	No	No	No	No
SF	No	No	No	No	N/ A	No
IS	No	No	No	No	N/ A	No

Yes – Kavach supervises this feature subject to conditions and will act on its own.

No – These functions will not be provided by Kavach automatically /Kavach will not require to take cognizance of these function.

N/A – Not Applicable.

5. General Guidelines

- The operation of Kavach shall, in no way, bypass the standard operating rules and procedures required to deal with train operations.
- Kavach should be isolated to dispatch train into wrong line in double line section (for cases of Temporary Single Line Working), for shunting beyond station section and during Non-Interlocked (NI) working.
- As on date, no G&SR amendment has been issued regarding Kavach.

6. Frequently Asked Questions (FAQs)

1. What action is to be taken when a RFID tag missing/Damage observed in station premises?

RFID tags do not control conventional Line side Railway Signals. Hence, absence or damage or deterioration of RFID tags does not cause Signal failures. However, absence or damage or deterioration of RFID tags of Kavach would render non-availability of supervision features provided by Kavach. Hence, information regarding missing /Damages of RFID tags when brought to his knowledge, SM shall communicate to Divisional Signal Control.

2. Where to get the complete working instructions of the SM-OCIP?

The system of working and Station Master's operations pertaining to Station Master Operation Cum Indication Panel (SM-OCIP) is incorporated in Appendix-C of Station Working Rules of stations equipped with Kavach.

3. During the case of generation of manual SOS, SM is supposed to put back already given signals?

Yes, as soon as SM notices or receives any message which endangers through traffic and needs to stop a train, SM has to follow the all the operating procedures required as per G&SR and in addition to above, SM has to generate SOS.

4. Is it possible to have Kavach protections among Kavach and Non-Kavach trains?

- (a) In case of availability of signaling information from Stationary Kavach, the protection will be available in case defaulting train is fitted with Communicating Kavach.
- (b) In absence of Stationary Kavach Unit or non-availability of Signalling information from Stationary Kavach, the protection will not be available between Kavach and Non-Kavach trains.
- (c) In absence of Stationary Kavach Unit or non-availability of Signalling information from Stationary Kavach, the protection will be available only when both the trains are fitted with Communicating Kavach and section is provided with RFID tags.

5. How to restore the normalcy, if by mistake SOS is generated by SM by operating SM-OCIP?

SM has to cancel the wrongly generated SOS by pressing CANCEL and COMMON buttons on the SM-OCIP together with SM's Key is in "IN" position.
