NSSR Handbook for Commercial Vehicles (LCV, MCV, HCV)

By

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unbound

Being detailed

Commercial vehicles are motor vehicles used for transporting "goods or paying passengers" for business purposes

Key Learning Pull-out Forms

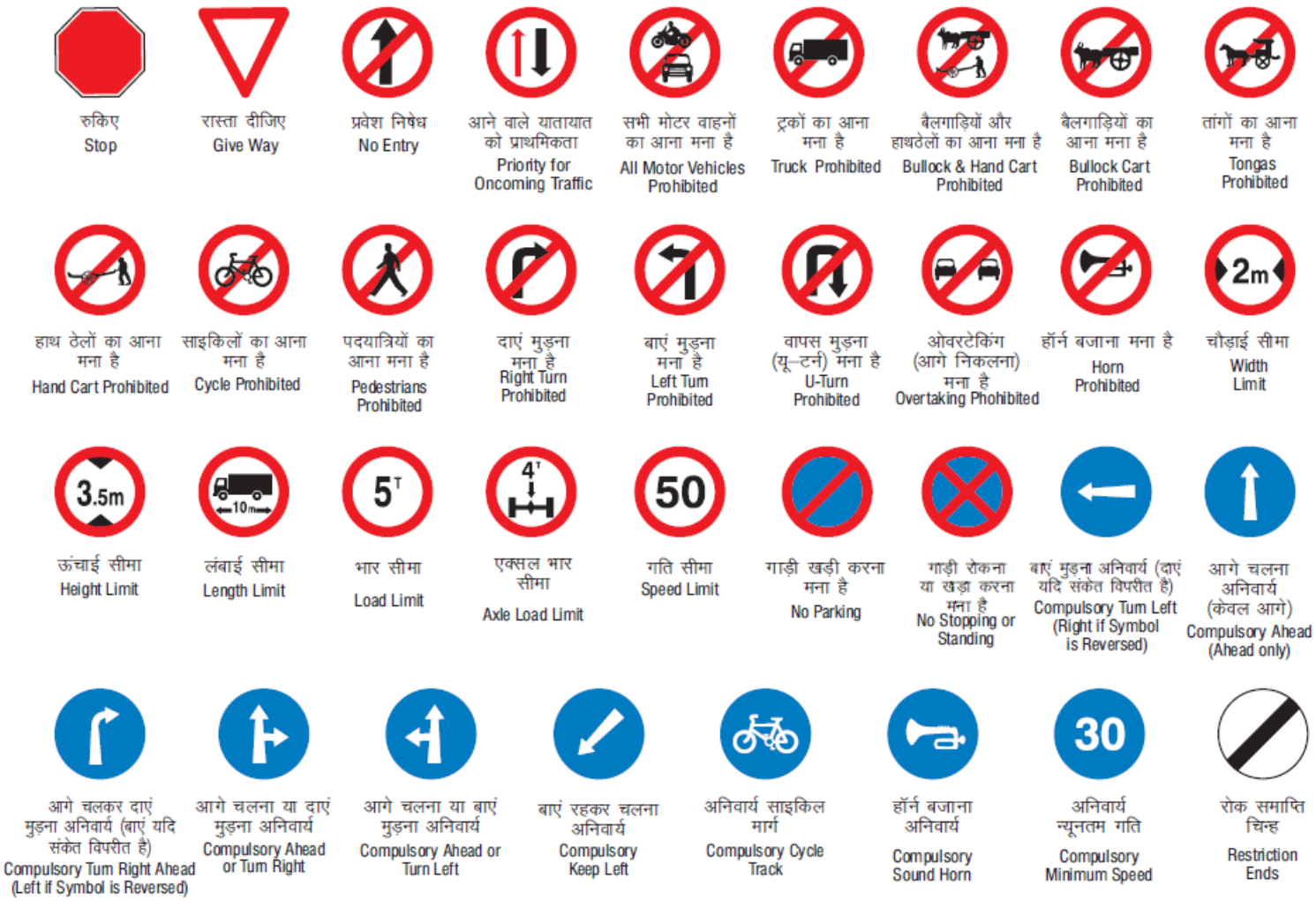
(Pull-out marks are WIP)

Key Learning Pull out for **Unit 1 (Mandatory Traffic Signs)**

ii. **The Key Learning of the unit**

1. Violation of these signs could lead to serious accidents

2. Violation of these signs lead to punishments, penalties and fines



The NSSR-RS programme expects to collect unit specific

- ❑ Feedback
- ❑ Complaints
- ❑ Tickets

from senders of the printed pull-out forms that are duly filled, scanned as e-documents and sent via Whatsapp or Email to the mentioned mobile numbers and ID(s) which will be shared soon

Key Learning Pull out for Unit 2 (Cautionary Traffic Signs)

ii. **The Key Learning of the unit**

1. Violation of these signs could lead to sudden collisions, crashes and accidents due to lack of preparedness for the road conditions

2. Violation of these signs do not Lead to punishments, penalties and fines

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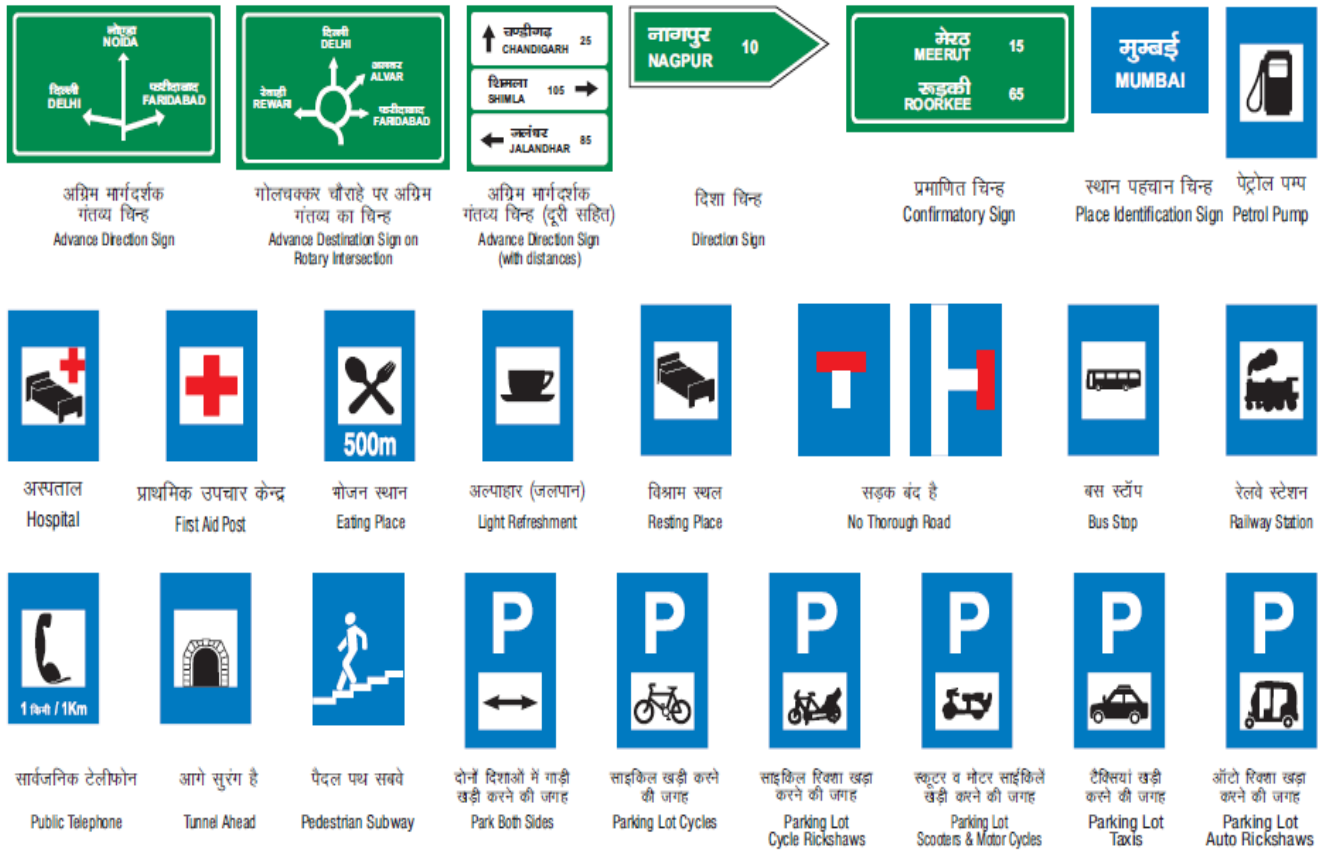
Key Learning Pull out for **Unit 3 (Informatory Traffic Signs)**

ii. **The Key Learning of the unit**

1. These signs help provide Information on direction, destination, road side facilities

2. These signs help a driver save time in driving and in deciding upon the well-equipped routes to be taken



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Key Learning Pull out for **Unit 4 (Drowsy Driving)**

ii. **The Key Learning of the unit**

Awareness of warning signs (is a part of the new self-assessment)
(Public domain reference: http://www.sleepeducation.org/sleep-topics/drowsy-driving)

- Yawning
- Inability to keep eyes open
- Talking incoherently or inability to respond to questions from passengers or co-drivers
- "Nodding off" and trouble keeping your head up
- Inability to remember driving the last few miles
- Ending up too close to nearby cars
- Missing road signs or turns
- Drifting into other lanes or onto rumble strips on the shoulder

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Key Learning Pull out for **Unit 5 (Fog or Night Driving)**

ii. **The Key Learning of the unit**

Driving in Fog

Reduced Visibility:

Fog significantly reduces visibility, making it difficult to see road signs, other vehicles, and potential hazards.

Increased Risk of Accidents:

The combination of reduced visibility and potential for sudden braking or maneuvers can lead to accidents, especially at higher speeds

Night Driving

Reduced Light Levels:

Night driving involves navigating in reduced light levels, making it harder to see road signs, pedestrians, and other vehicles.

Glare from Headlights:

The headlights of other vehicles can cause glare, making it difficult to see ahead.

Increased Fatigue:

Driving at night can lead to fatigue, which can impair reaction time and judgment.

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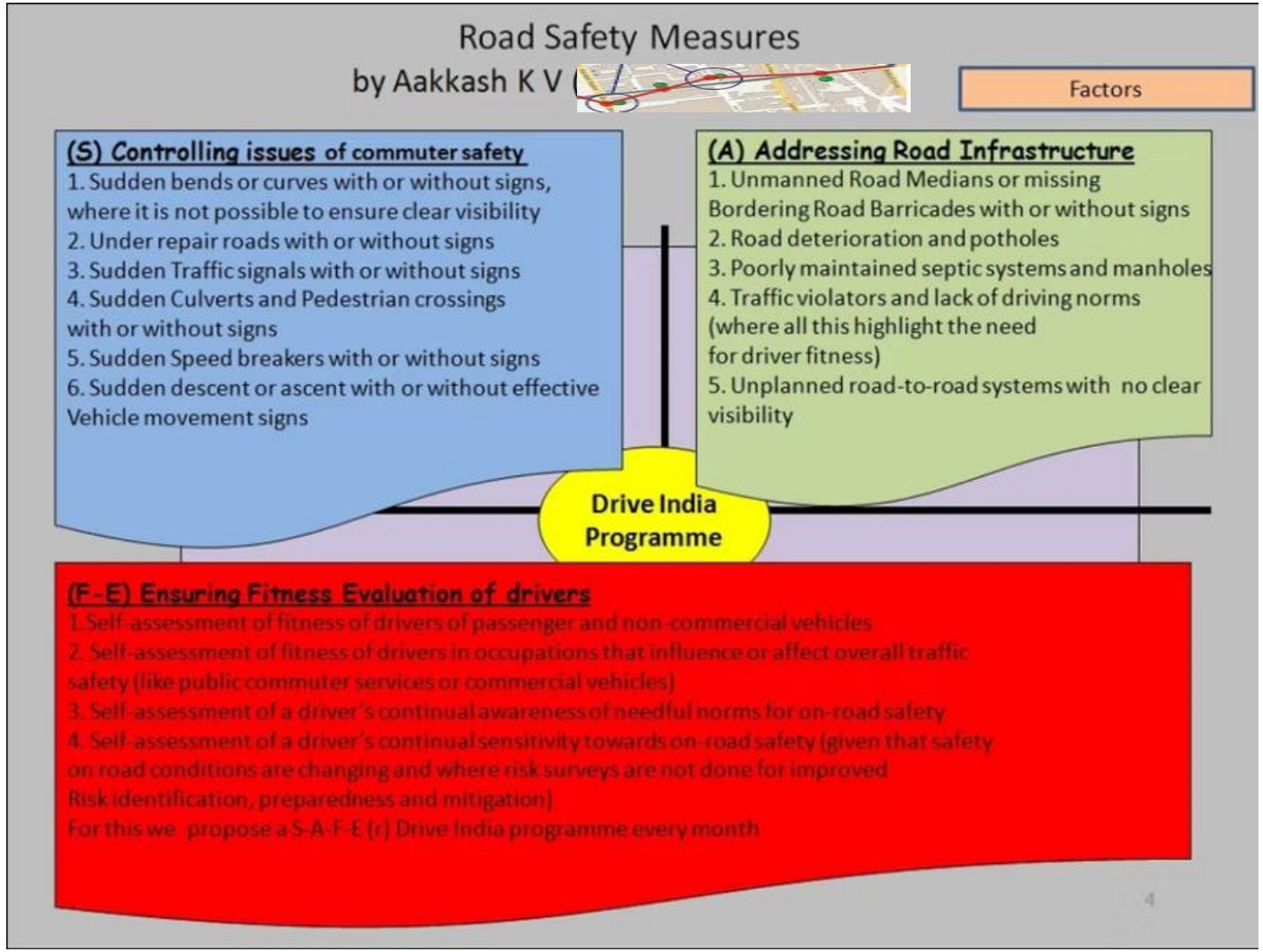
Key Learning Pull out for Unit 6 (Road System responsiveness)

ii. **The Key Learning of the unit**



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Key Learning Pull out for Unit 7 (Driving conditions responsiveness)

ii. **The Key Learning of the unit**

To develop more driving-condition-responsiveness in automobile brands, the universal & NSSR expectations in automobile brands for improving road safety are important.

The key contributors for driving-condition-responsiveness are

- ❑ Improved sales & marketing, service operations and process efficiency
- ❑ Connected & Responsive Quality of service enablers by the dealer network or independent automobile businesses
- ❑ New BI & CQI led Deep Interaction (DIL) links for a Service Centre's "RADIUS OF COVERAGE", "Road Safety Liability with Responsive Resolution" for dynamics seen in Road System understanding and Alpha Assistance
- ❑ Key opinion led nutshell inventory, parts management and disposal for a Service Centre's "RADIUS OF COVERAGE", "Road Safety Liability with Responsive Resolution"

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Key Learning Pull out for **Unit 8 (First Aid and Fire Safety responsiveness)**

ii. **The Key Learning of the unit**

Goals of First-Aid

(1) The immediate priority being to restore and maintain the vital functions of the injured person via certain steps for basic life support

(a) Ensuring the AIRWAY is open so that the injured person's body gets a proper supply of oxygen

(b) Enabling and ensuring BREATHING so that oxygen passes through lungs into the blood stream

(c) Helping and ensuring CIRCULATION where there must be circulation of blood to all parts of the body, so that there is sufficient supply of blood and oxygen

First aid assistance on-road is more related to losing consciousness or fainting, burns or vehicle fire incidences, electrocution, bleeding from cuts, wounds, and injuries, fracture symptoms, unforeseen poisoning incidences, preparation and equipping of a first aid knit in vehicles

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Key Learning Pull out for **Unit 9 (Alpha Assistance responsiveness)**

ii. <u>The Key Learning of the unit</u>

- The person with or without any affliction needs to learn or incorporate responsiveness to deal with limitations that affect the ability to do things or work with productivity/skills/competence .
- It is recommended to subscribe to or develop a NSSR-RS Unit specific programme and project that helps Alpha Assistive solutions for people while travelling, where the focus could be on the following:.

❑ Alpha Assistive System for brain impairment

❑ Alpha Assistive System for vision impairment

❑ Alpha Assistive System for speech impairment

❑ Alpha Assistive System for hearing impairment

❑ Alpha Assistive System for multiple sense organ impairment

❑ Strategy for coping up (for example a NSSR-RS Alpha Assistance (Help) Card/Process/Desk)

Alpha Assistance (Help) Card

Key Learning Pull out for Unit 9

PHOTO

Strategy for coping up - Alpha Assistance (Help) Card

Date: **Version:**

Name: **Age:** **Gender:**

Type of impairment (Tick as applicable): Brain/Vision/Hearing/Speech/Multiple sense organs/Handicapped

Address:

Landmark to locate address:

Name of contactable parent/guardian:

Phone/Mobile:

Name of contactable caretaker:

Phone/Mobile:

Emergency contact for (any on-road incidence):

Phone/Mobile:

Key Learning Pull out for Unit 9

PHOTO

Alpha Assistance (Help) Card

Date: **Version:**

Name: **Age:** **Gender:**

Alpha Assistance Processes (factors to be considered):

1. Perception ability for help/response/needful action (Tick as applicable):
Poor/ Fair/ Medium score/ Good

2. Intelligence level for help/response/needful action (Tick as applicable):
Poor/ Fair/ Medium score/ Good

3. Emotional makeup/quotient for help/response/needful action (Tick as applicable);
Poor/ Fair/ Medium score/ Good

4. Volition (Self enabled Action) level for help/response/needful action (Tick as applicable);
Poor/ Fair/ Medium score/ Good

Key Learning Pull out for Unit 9

PHOTO

Alpha Assistance (Help) Card

Date: **Version:**

Name: **Age:** **Gender:**

Languages understood: **Sign Language:**

Interpretation for scores:

PIEV Ability	Poor	Fair	Medium	Good
Self awareness	x	√	√	√
Social interaction	x	√	√	√
Response to new/ unmanaged environment / Weather conditions	x	x	x	√
Recognition level for people/vehicle/immediate kin/ co-passengers	x	x	√	√
Led by available assistance and instruction	x	√	x	√
Led by peer / mirrored behaviour	√	√	√	√
Led by known person's communication	√	√	√	√

Key Learning Pull out for Unit 9

PHOTO

Alpha Assistance (Help) Card

Date: **Version:**

Name: **Age:** **Gender:**

Alpha Assistance Processes (needed):

1. Assistance procedure in Emergency (Tick as applicable):

Ask me/ Refer Help Card/ Call parent/guardian/ Call contact/ Contact Alpha Assistance Desk

2. Assistance procedure in Vehicle Breakdown (Tick as applicable):

Ask me/ Refer Help Card/ Call parent/guardian/ Call contact/ Contact Alpha Assistance Desk

3. Assistance procedure in Due Relief for any situation (Tick as applicable):

Ask me/ Refer Help Card/ Call parent/guardian/ Call contact/ Contact Alpha Assistance Desk

4. Assistance via Alpha Assistance Desk (Tick as applicable):

Responsive to instructions/ Trained to respond/Under training/Not under training/Cannot be trained

Key Learning Pull out for Unit 9

PHOTO

Alpha Assistance (Help) Card

Date: **Version:**

Name: **Age:** **Gender:**

Additional Alpha Assistance Processes (notes):

Key Learning Pull out for Unit 9

PHOTO

Alpha Assistance (Help) Card

Date: **Version:**

Name: **Age:** **Gender:**

Alpha Assistance Desk (notes):

Registered (Tick as applicable): Yes/No/Not applicable

Expectation for PIEV Ability (Tick as applicable):

Self-ability/Responsive/Needs Guidance/Needs Careful interaction/ Not known

Trained for PIEV Ability (Tick as applicable):

Via Self-development programmes/Via Family Services/ Via Awareness & Advocacy programmes/ Not trained

Part of any Alpha Assistance R&D Project (Tick as applicable):

Yes/No/Not applicable

Details:

Has a Deep Interaction Link (DIL) for Alpha Assistance (Tick as applicable):

Yes/No/Not applicable

Details:

Key Learning Pull out for Unit 9

PHOTO

Alpha Assistance (Help) Card

Date: **Version:**

Name: **Age:** **Gender:**

Additional Alpha Assistance Desk (notes):

Key Learning Pull out for **Fleet Maintenance**

ii. **The Key Learning of the unit**

(1) Know your Vehicle Sheet / Specification

(2)

Red: Primary components G: Secondary components Y: Tertiary components and B: Timeline interactive components

YOUR VEHICLE SHEET

Vehicle Sheet

A. Exteriors
B. Interiors
C. Engine and Performance
D. Battery and Battery Management System*
E. Electric Motor and Motor Controller*
F. Safety
G. Comfort and Convenience
H. Seats and Upholstery
I. Entertainment/Multimedia
J. Other Features and Specifications
K. Onboard Diagnostics
L. ***Added systemic intelligence (plus editioned*** Timeline Monitors)

**** For Electric Vehicles amd Hybrids***

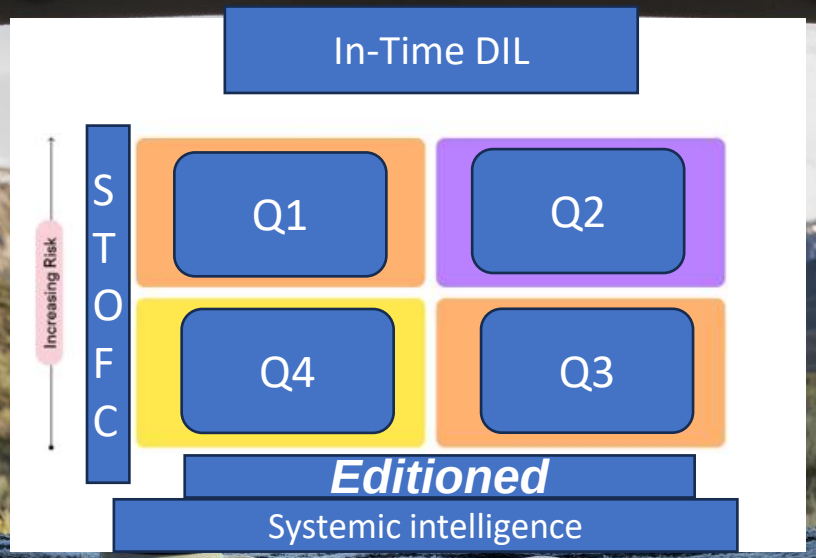
Q 1

Q 2

Q 3

Q 4

S: strategic T:Tactical
O: Operational FC Future Connected: (Systemic Intelligence)



YOUR VEHICLE DETAILS

Vehicle Details

Vehicle Identification Number/ Vehicle Registration Number:

Make:

Type:

Year

Model & Variant:

TGMB Quadrants: SI (Q1/Q2/Q3/Q4)

Colour:

Petrol/Diesel/Electric/Hybrid

YOUR VEHICLE DETAILS

Vehicle Information:

Engine power (kW):

Engine number/code:

Chassis number/code:

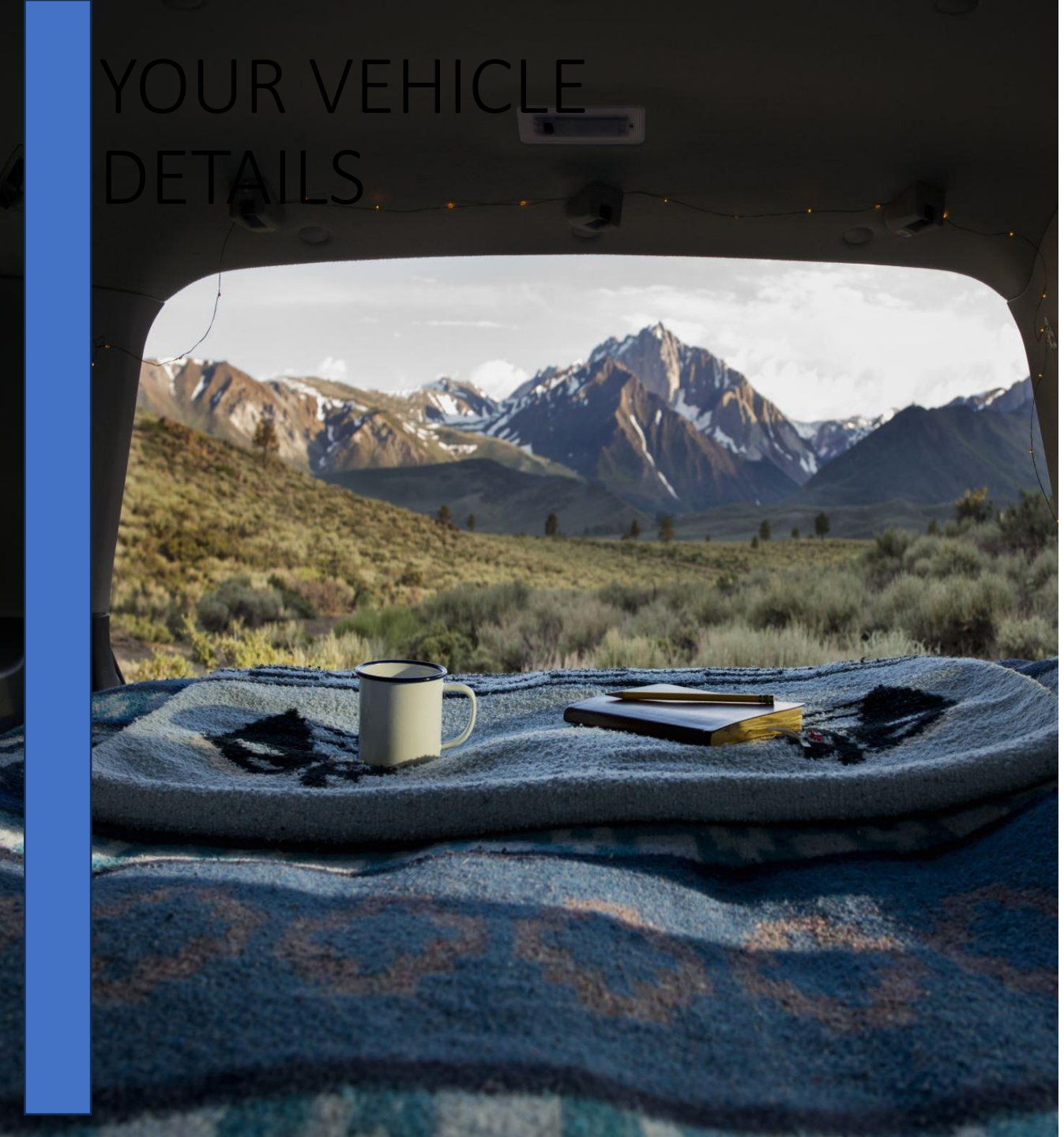
Paint and Bodywork code:

Recommended engine oil:

OBD2 version:

Road Safety on-boarding:

In-Time DIL Edition (WIP):



Typical Vehicle Management policies

1. A reactive maintenance strategy results in the reduction of the lifetime of a vehicle and also adds expense or costs in maintaining and using a vehicle.

2. Predictive maintenance helps overcome this issue.

3. Among the different types of maintenance

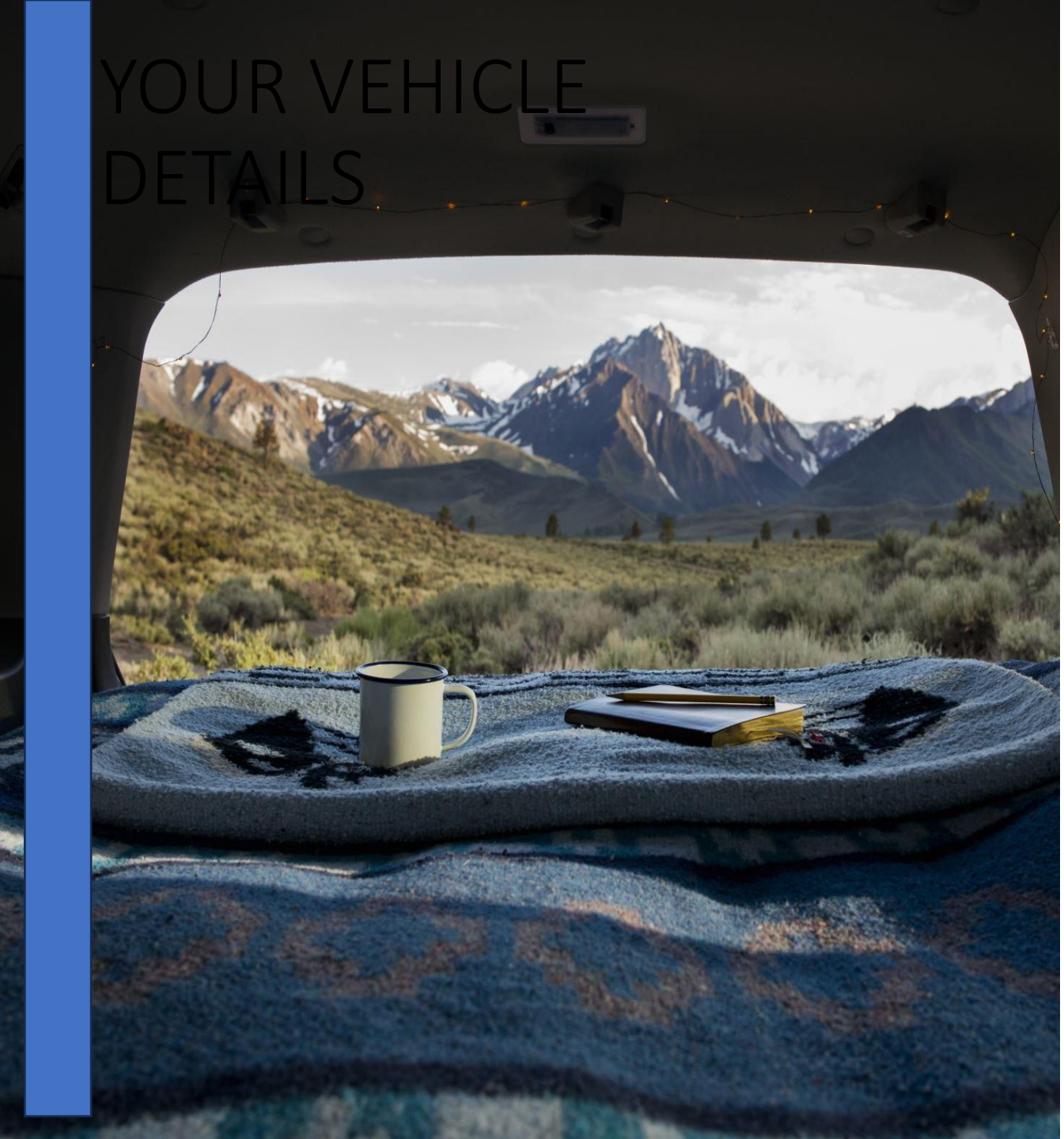
(a) Preventive maintenance is performed after a fault has occurred. It is used for infrequent failures and for parts upgradation

(b) Corrective maintenance is performed as breakdown maintenance

© Predictive maintenance uses the analysis of the current condition of the vehicle to predict a failure

4. For vehicle health monitoring the typical mechatronic systems and subsystems are

(a) Engine (b) Gearbox (c) Brakes (d) Ignition (e) Fuel injection (f) Emission (g) Cooling (h) Battery (i) Sensors (j) Actuators (k) Other subsystems associated with electromechanical processes



Typical Vehicle Management policies

5. Engine Control Unit (ECU) controls sensors and actuators to screen and diagnose faults or problems

The ECU is also associated with the Controller Area Network (CAN) through which a distinctive subsystem and driver communicate with each other

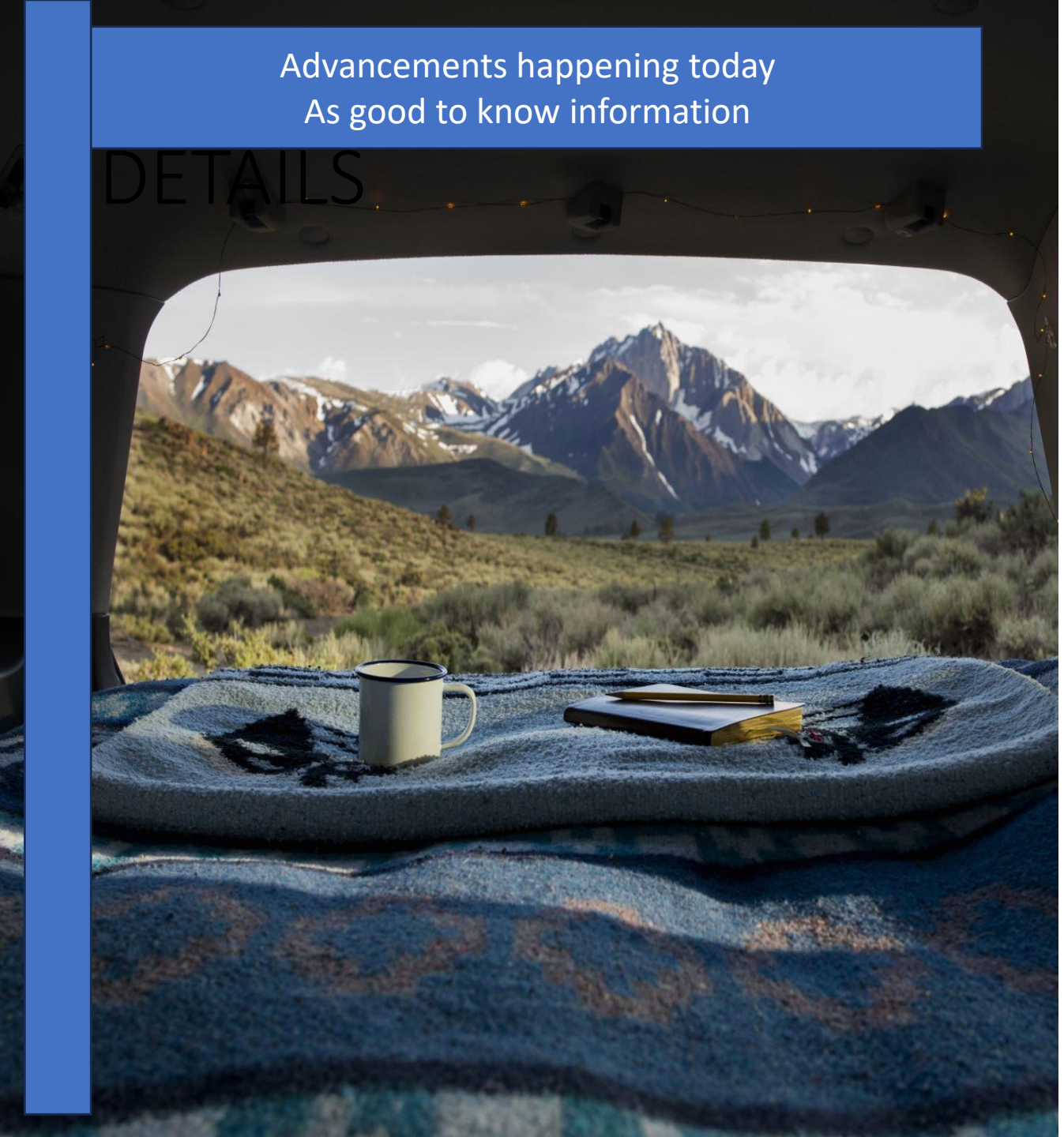
ECU communication is done via a high-level diagnostic protocol i.e the OBD2 and UDS

The OBD2 protocol allows the vehicle to diagnose and self-report codes

The OBD framework allows a vehicle owner or repair professional to access diagnostic data about the current condition of the subsystems

The UDS provides specific details

Thereon system maintenance is done via a diagnostic and prognostic ability related to the current state and futuristic state of the system or subsystem



Typical Vehicle Management policies

6. Remote health monitoring involves the monitoring of different systems and subsystems remotely and using prognostics to predict faults in advance

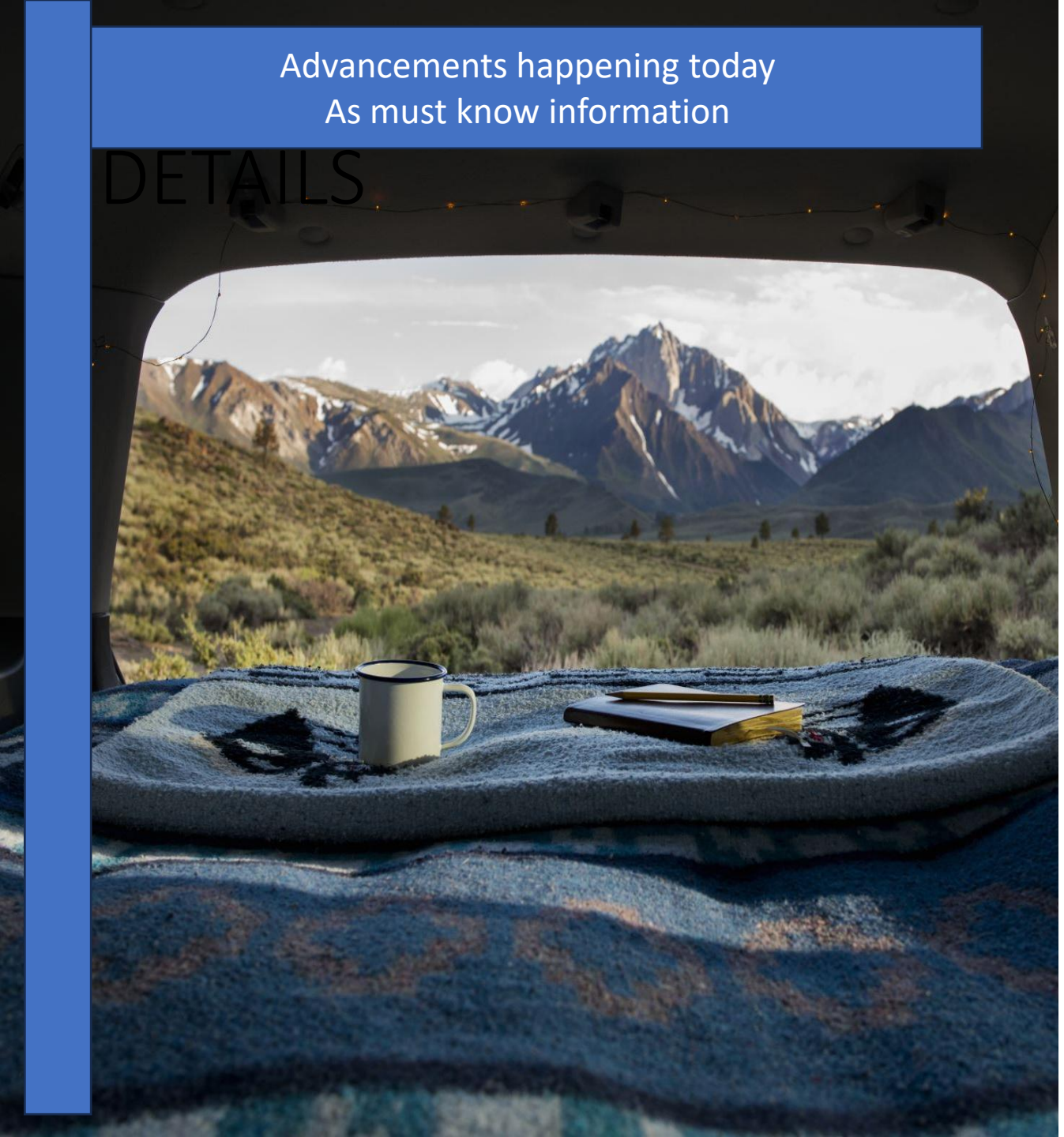
7. Sequential Pattern Learning Algorithm – the algorithm learns patterns from warranty data of the vehicle and converts these patterns to a rule based expert system that helps diagnose conditions or use fault patterns

8. COSMO (Consensus self-organized models for fault detection) helps increase vehicle and parts/systems lifetimes

9. BRACID (Bottom up induction of rules and cases for imbalanced data) to deal with imbalanced data via learning classifiers

10. Kalman model to monitor vehicle health via sensor data for fault prediction and engine abnormal behavior via anomaly detection

11. Least Square Support Vector Machine (SVM) classifier for diagnostics and remote



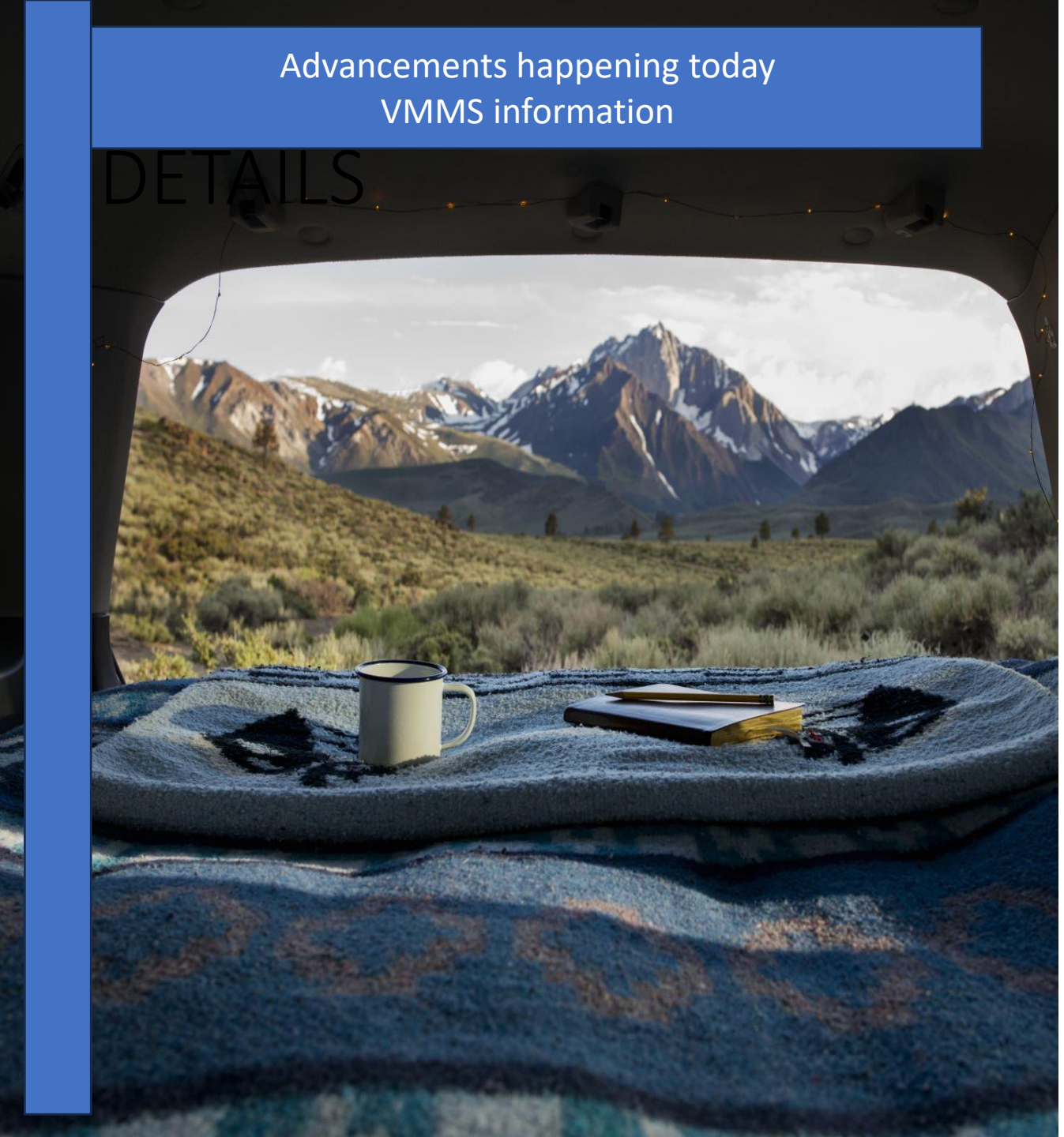
Typical Vehicle Management policies

12. Predictive maintenance via the use of a vehicle database for storing maintenance records of vehicles visiting a workshop

13. vehicle monitoring system that monitors driver activity and status of engine via SMART phones for communications between the vehicle and back end server

14. Comprehensive analysis of vehicle's on-board and off-board data using supervised and unsupervised learning techniques usin a telematics gateway

15. Multi-sensor fusion technique that monitors vehicle health using oil data and vibration signals



Typical Vehicle Management policies

16. VMMS – A real time vehicle monitoring and fault prediction system , which diagnoses main subsystems such as (a) Ignition (b) Exhaust (c) Fuel injection (d) Cooling and Other mechatronic subsystems

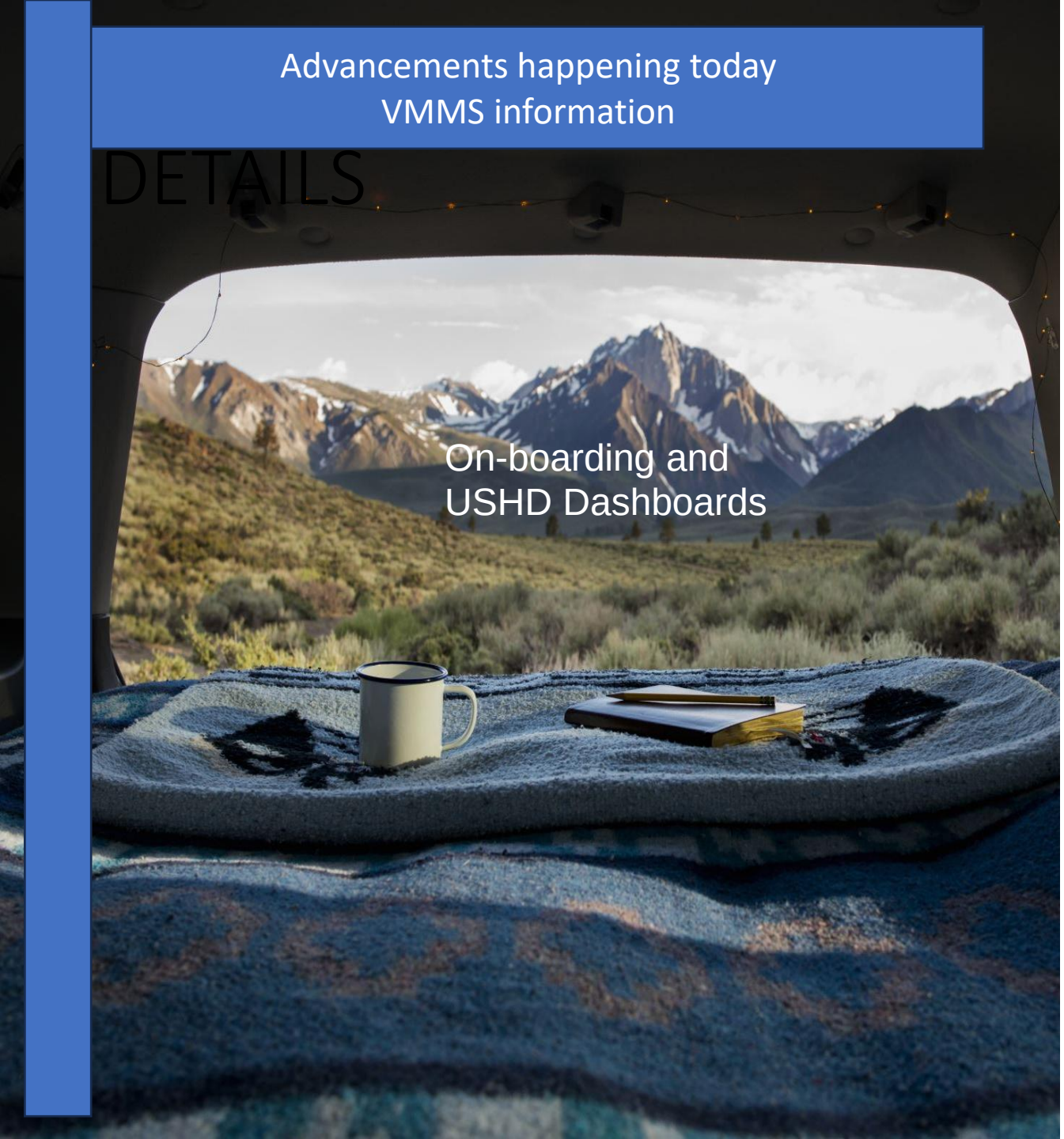
It uses machine learning techniques such as Decision tree, Support Vector Machine, K-Nearest Neighbor and Random Forest

It uses a SMART Phone App, OBD scanner, Bluetooth protocol to communicate DTC from scanner to SMART Phone and wireless mobile data communication from SMART Phone to the back-end server

It uses a classification algorithm for pattern learning

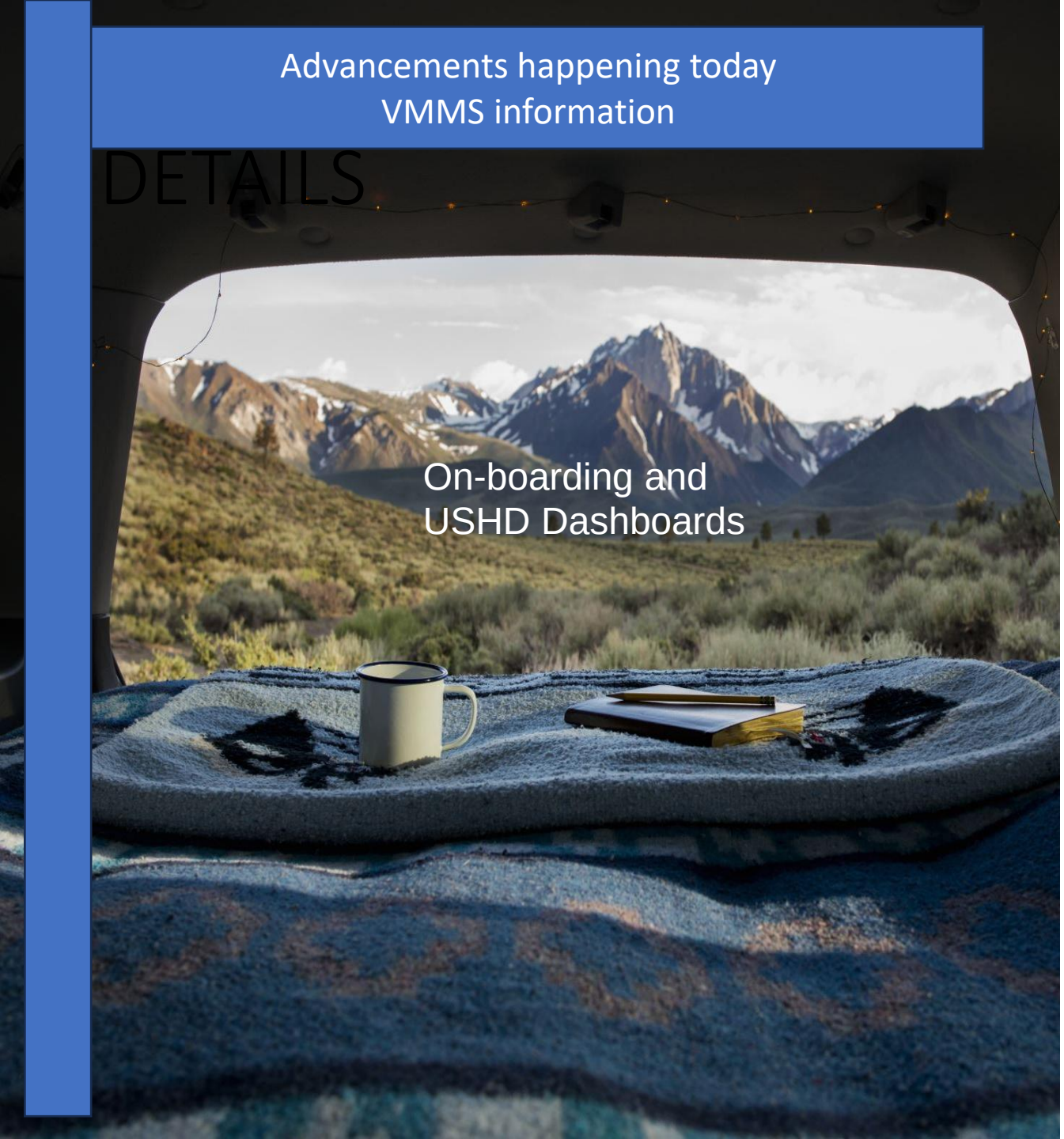
It relies on push notifications of abnormal condition via SMART Phone alerts or emails

17. The cost constraints in using sensor data based systems is the need for large memory space, high processor speed and custom made SMART Phone Apps



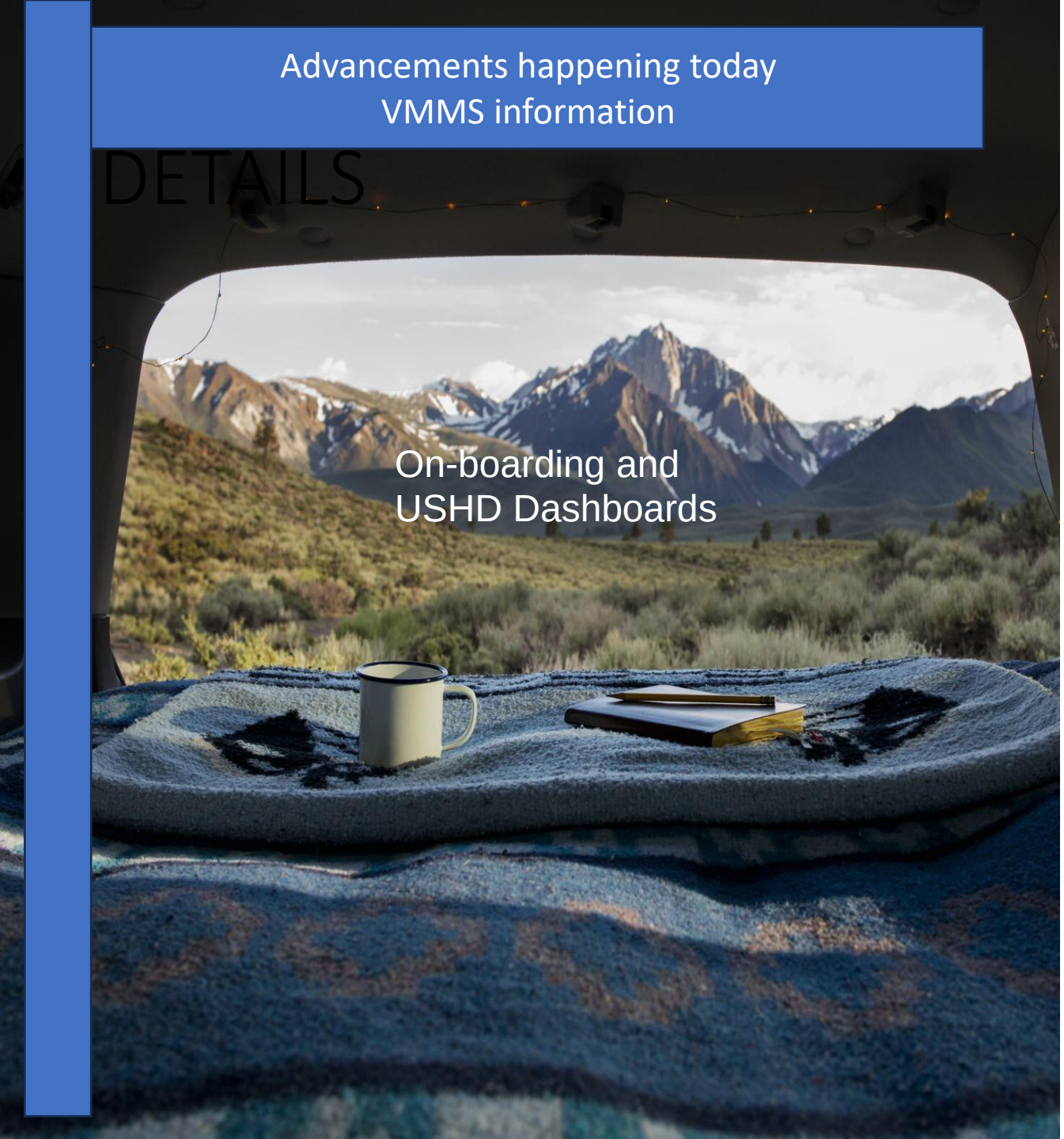
Deep Interaction Link or Lifecycle Maintenance for Service Anywhere Anytime Theories

- As maintenance is mostly a reactive strategy for a vehicle pr fleet owned by a customer, we find certain aspects are important such as
- (a) Predicting of remaining useful lifetimes of vehicles and their parts/ components
- (b) Assessing the effect of remaining useful lifetimes on the cost of repairs or replacements
- (c) Considerations of the safety of using a vehicle whose parts/ components need periodic maintenance
- (d) Optimization of the maintenance schedule of the fleet to support objectives such as
- (1) reduced expenses
- (2) efficient resource utilization
- (3) consistent service delivery via the fleet
- (4) reduced carbon footprint
- (5) high-performance customer experience of owning, selling or creating the brand (6) TGMB KOL ANALYZERS
-



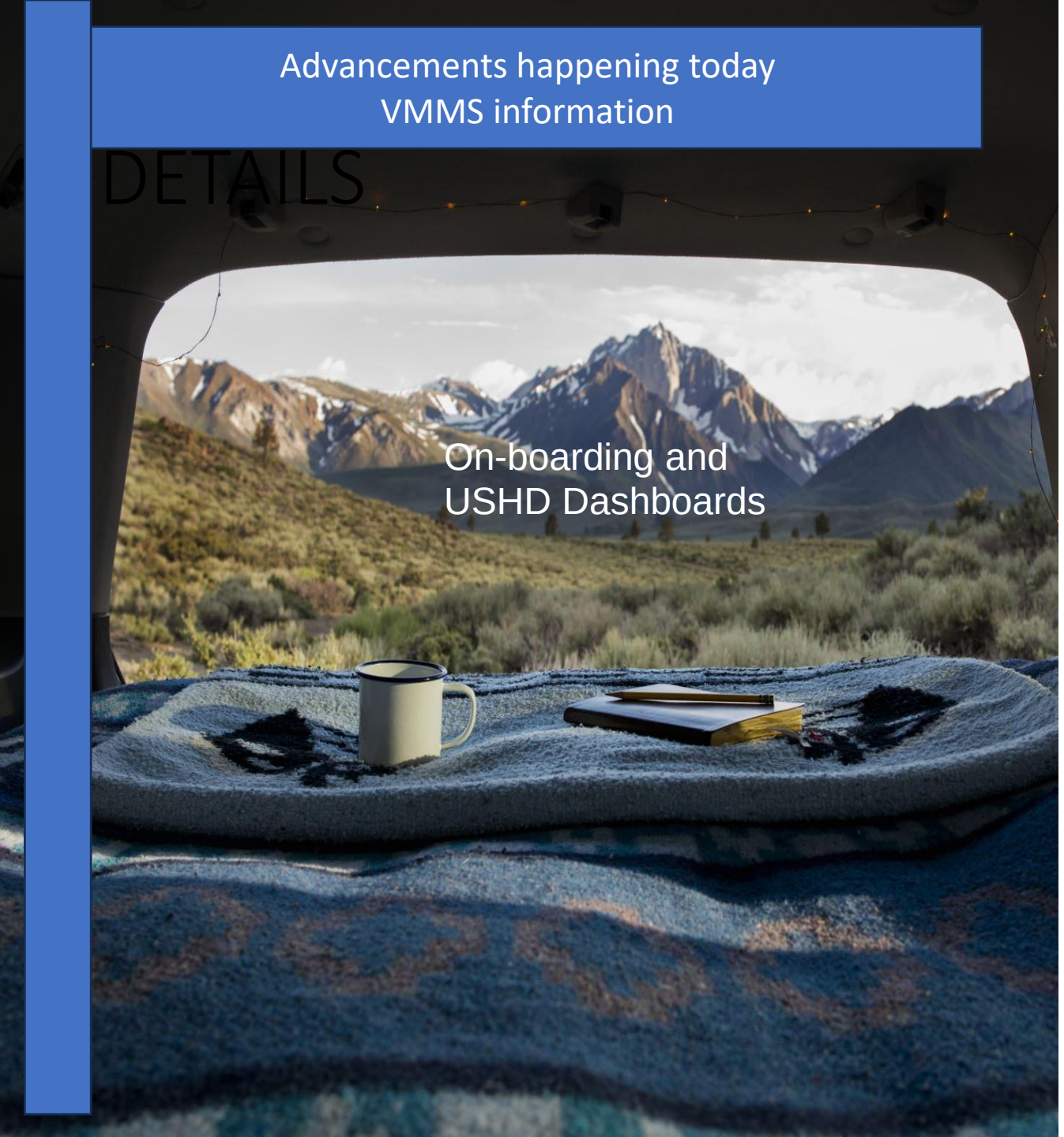
Deep Interaction Link or Lifecycle Maintenance for SAAT

- For optimizing a maintenance schedule, it is important to acknowledge that each vehicle has certain parts or components that have to be maintained in a predictive and/or preventive manner based on their respective damage from wear & tear and subsequent reduction in remaining useful lifetimes.
- To optimize maintenance schedules, the common practice is to use Multi- objective Evolutionary Algorithms (MOEA) to find the Pareto optimal set of schedules
- To understand this better, in order to predict or heuristically-schedule maintenance, such an algorithm must
- (1) identify the usage of the vehicle and driving tasks
- (2) use a rolling time window horizon to predict the remaining useful lifetimes of parts or components
- (3) minimize process changes between the previous maintenance schedule and the next
- (4) help maintenance-specific estimation, spares management, and other service analytics



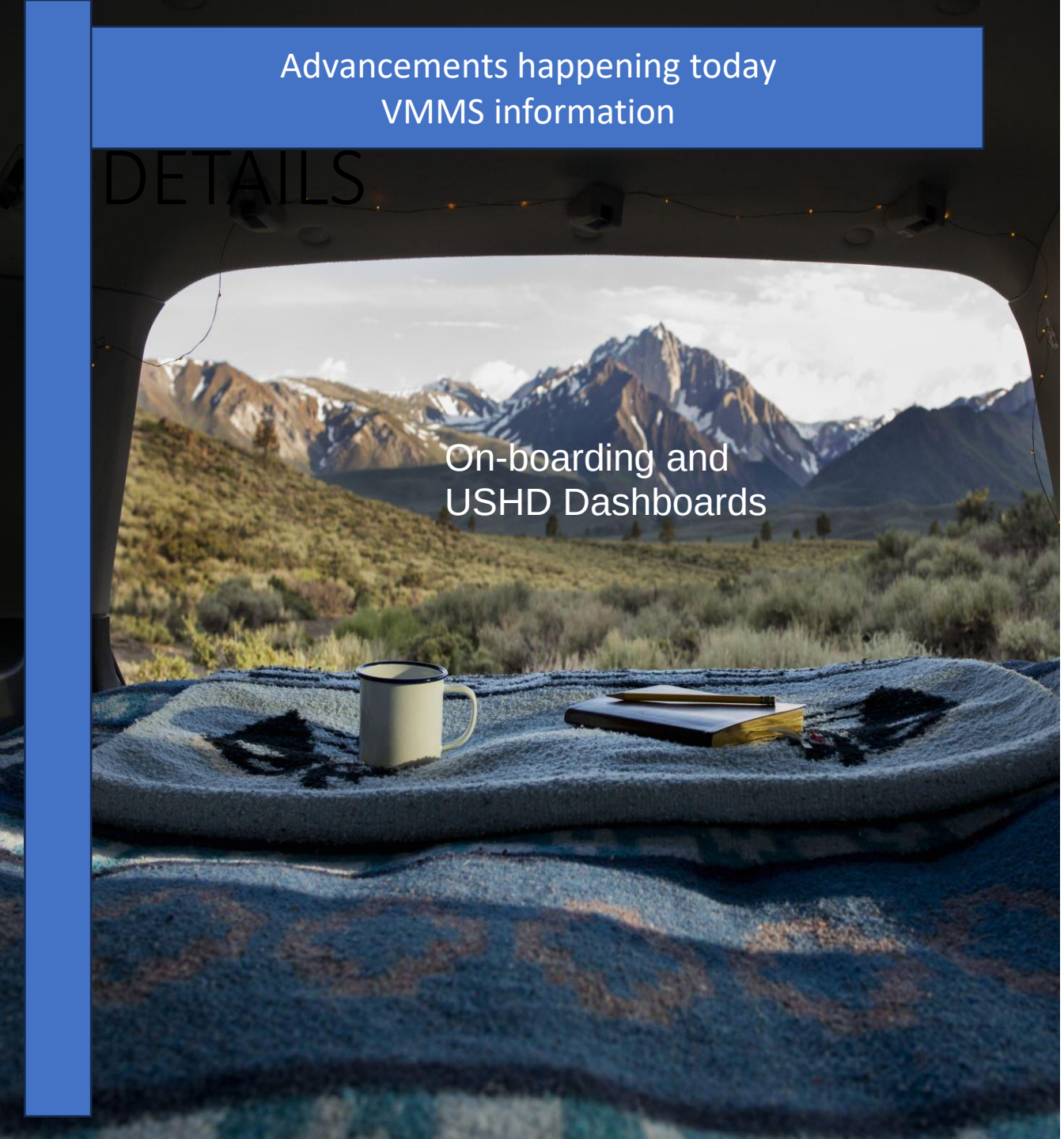
Deep Interaction Link or Lifecycle Maintenance for SAAT

- **From the (dealer's) Service Centre's or Workshop's point of view, the considerations that matter are**
- **(1) maintenance estimation**
- **(2) fixed setup costs and fixed schedule costs**
- **(3) preparation of the Workshop for the nature of work**
- **(4) resource allocation for the total workload**
- **(5) spares (availability) management to control the expected number of failures or faults that the vehicle or fleet of vehicles may experience on the road**
- **(6) optimization of the next maintenance schedule to reduce or control maintenance costs and workload**
-



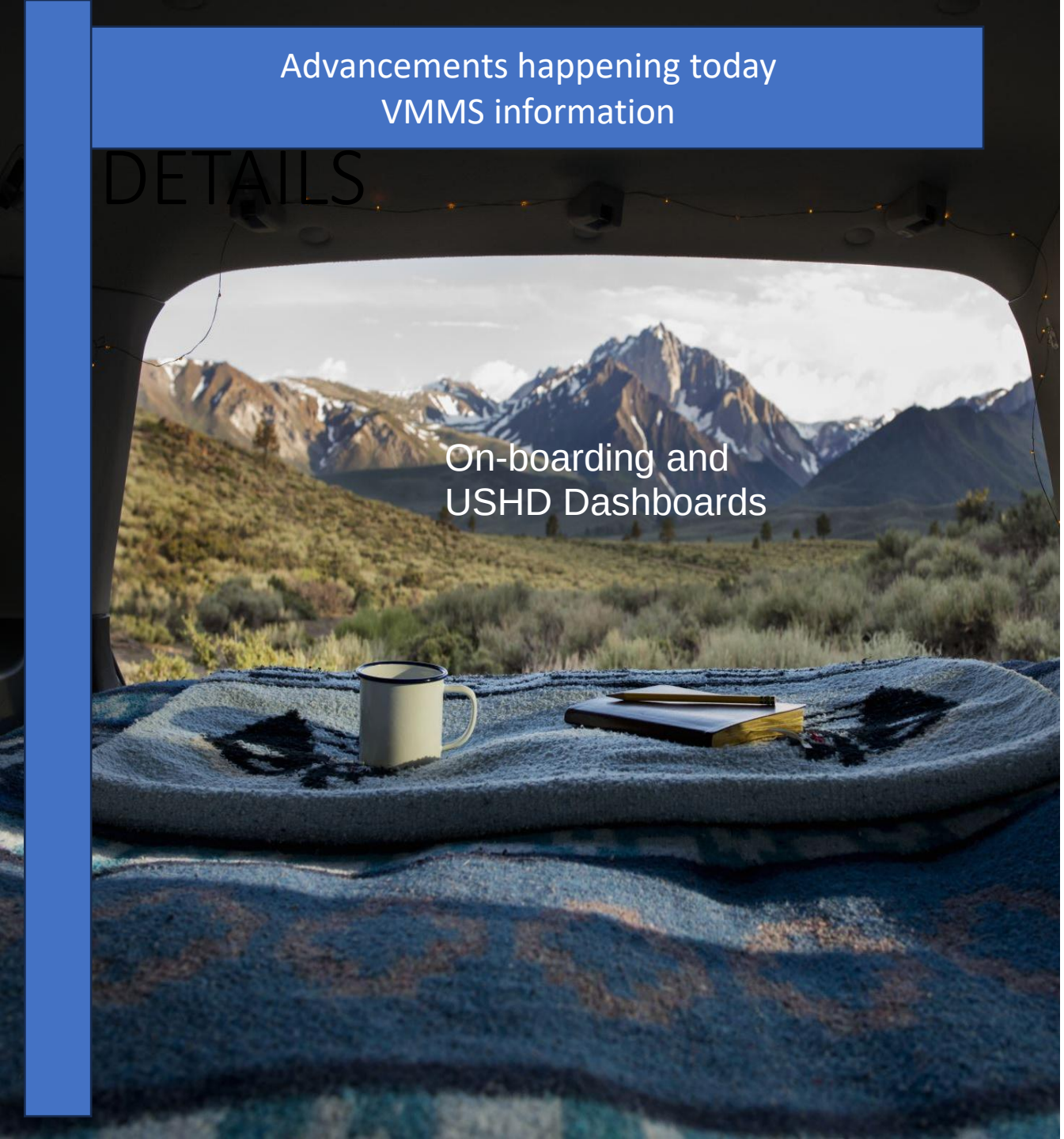
Deep Interaction Link or Lifecycle Maintenance for SAAT

- **A real-time concern is that from the time a maintenance schedule is released for a vehicle or vehicle fleet, continuous changes could occur to**
- **(1) the vehicle condition**
- **(2) prediction of the remaining useful lifetimes of the parts or components**
- **(3) responsiveness of the maintenance schedule and its objectives of meeting the TGMB benefits of buying, using and owning a vehicle**
- **(4) cost variance in terms of setup costs, maintenance costs and penalty costs**
- **The emerging degradation of a high investment EV or fleet of EV(s), needs in-time editioning by the manufacturer, where the end of lifecycle or need for costlier maintenance will need TGMB quadrants to be incorporated into the design and architecture of the EV to permit TGMB value enabling during and after expected lifetimes. The TGMB value enabling we propose is called TGMB** Asset Creation to enable **D2L or CQI-R**esidual value management



Deep Interaction Link or Lifecycle Maintenance for SAAT

- **Here penalty costs are based on the assumption that**
- **(1) if a part or component is serviced before it's due date the penalty cost is equal to the full maintenance costs**
- **(2) if the component is serviced on the due date the penalty costs are zero**
- **(3) if the component is serviced after the due date, failure expectation increases to lead to selective parts replacement or upgradation where the working out of penalty costs will need to add spares costs too**



- **<u>Deep Interaction Link or Lifecycle Maintenance for SAAT</u>**
- **Highlight of degradation seen in a vehicle**
- **Reference:** Vehicle Inspection methodology used today
- (1) Degradation in the oil filter and/or air filter
- (2) Degradation in the performance of suspension and springs
- (3) Degradation of brake pads
- (4) Degradation of tyres
- (5) Degradation of chassis and it's expected condition
- (6) Degradation of engine
- (7) Degradation of the manual gear system or automatic transmission
- (8) Degradation in vehicle's ingress protection from dust and water
- For optimizing maintenance schedules, vehicle inspection status and estimation of damage or degradation is known to help.
- Here degradation of components (numbered 2, 3, 4, 5, and 6) can be calculated based on physical condition (or wear and tear) but in case of components (numbered 1 and 7) degradation occurs due to lack of periodic counter measures (or preventive maintenance).

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