NATIONAL
TELEMATICS
FRAMEWORK

TELEMATICS APPLICATION BUILDER

Using telematics to deliver improved outcomes

Transport Certification Australia

APPLICATION BUILDER

NATIONAL TELEMATICS FRAMEWORK

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NATIONAL TELEMATICS FRAMEWORK

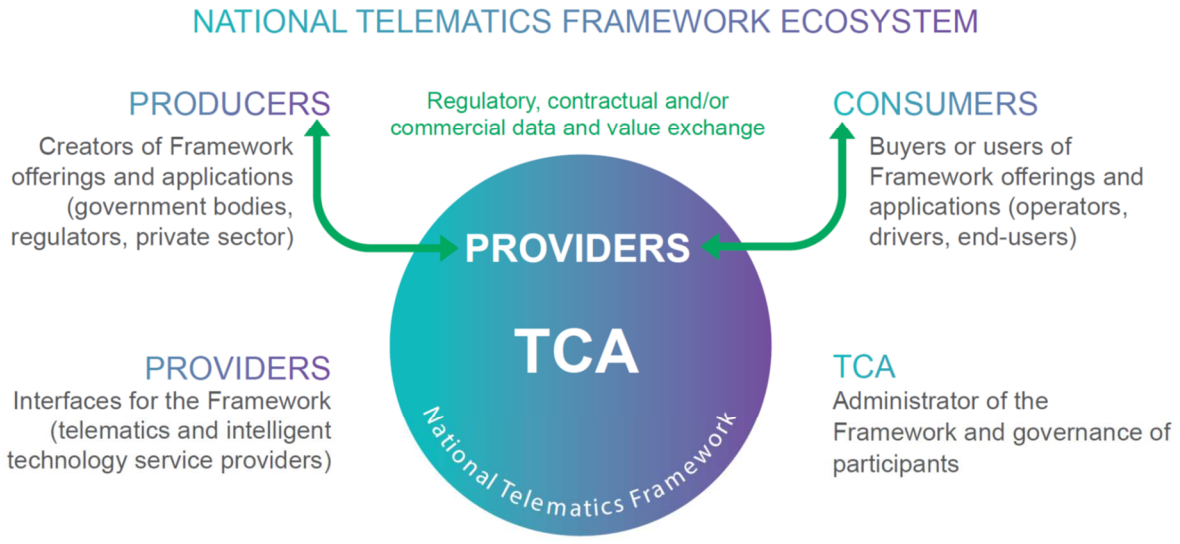
The National Telematics Framework is a digital business platform consisting of infrastructure and rules that support an open marketplace of telematics and related intelligent technology providers.

The National Telematics Framework:

- Provides a national platform for the use of telematics and related intelligent technologies
- Supports different applications across regulatory, contractual and commercial needs
- Supports different levels of assurance
- Is outcome focussed and encourages innovation.

> *The adoption of the National Telematics Framework for the delivery of offerings and applications both for public policy and private decision making is a world first. It has positioned Australia as the leader in the delivery of such services through the advent of the digital economy.*

The National Telematics Framework was established following a series of decisions made by Responsible Ministers between 2003 and 2008, and was globally recognised as an International Standard (ISO 15638) in 2012.



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1 INTRODUCTION

1.1 PURPOSE

The use of telematics can enable improved outcomes to be achieved through policies and operational programs.

In the context of this document, policies and programs may include:

- Public policies and programs which involve a broad range of stakeholders and/or industry sectors (e.g. taxi, hire cars and ridesharing regulations, heavy vehicle reforms, road charging reforms)
- Internal (private) policies and programs which involve specific stakeholders within organisations (e.g. Safe driving policies, Occupational Health and Safety (OHS) programs)

The following steps are intended to assist stakeholders involved in the development of policies and programs to make better informed decisions when exploring the potential use of applications through the National Telematics Framework.

TCA works with stakeholders to consider whether telematics applications are able to deliver upon intended outcomes, by giving consideration to policy, technical, commercial and operational dimensions (the Four Pillars of the National Telematics Framework).

2 STEP 1 – DEFINING THE INTENDED PURPOSE

When giving consideration to the possible use of telematics, clarity about the intended purpose – as well as the outcomes sought – is paramount.

The intended purpose may be informed by such things as:

- Policy statements (public or internal)
- An analysis of current gaps or shortfalls (which need addressing)
- A clear definition of the problem to be solved (agreed with stakeholders)
- Legislative or regulatory reforms.

There are well established guidelines used by government in the development of public policy and associated responses associated with this step. Private sector decision making also entails similar structured consideration processes, when defining the intended purpose and outcomes sought.

3 STEP 2 – CONFIRM WHETHER THE USE OF TELEMATICS IS A SUITABLE OPTION

At this point of the process, the use of telematics may be considered – along with other options – to deliver the intended outcomes.

The consideration of a telematics option should be assessed in relation to:

- Costs and benefits (both qualitative and quantitative)
- The policy and program design in which a telematics application is used (see Step 3)
- The data elements that should be collected (see Telematics Data Dictionary)
- The functions required from the application
- How data collected, and functions performed by the application, could help deliver the intended outcome
- Potential implementation and operational issues.

It may be determined through this step that the use of telematics is not suitable to achieve the intended purpose, and that other approaches may be deemed more suitable or effective.

4 STEP 3 – HOW WILL TELEMATICS BE USED WITHIN A POLICY OR PROGRAM?

If telematics is deemed to be a suitable option, detailed consideration should be given to:

- The policy or program 'design', and the proposed use of telematics within the policy or program, including:
  - The functions that would be performed within the telematics application

    and
  - The functions performed that are undertaken through operational practices (outside of the application).
- Enabling legislation or regulations (if required) – or alternatively, contractual instruments – to give effect to the use of telematics within a public policy or commercial program
- The establishment of relevant policies, procedures and operating guidelines (public or internal/private policies)
- The understanding of privacy principles
- Possible use case scenarios
- Possible risks and impacts.

The outcomes of Steps 1 to 3 should inform:

- The intended purpose and outcomes sought
- Whether the use of telematics can contribute towards the intended purpose
- The proposed use of telematics within the design of a policy or program.

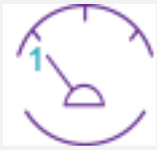
These outcomes will inform the next steps, including:

- The level of assurance required
- The selection of an appropriate telematics application
- The required functions of a telematics application.

5 STEP 4 – WHAT LEVEL OF ASSURANCE IS REQUIRED?

Each application needs to have an appropriate level of assurance, based on:

- The intended objective and outcome (Step 1)
- Understanding how a telematics application will be used (Step 3).

LEVEL		DESCRIPTION	USER
Level 1 Assurance 	Self-assessment or advisory No independent oversight	Self-assessment of data No independent oversight of telematics application	Consumers need to self-assess the use of data in relation to its intended use
Level 2 Assurance 	Independent assessment – periodic audit	Independent assessment of specific elements of telematics application Telematics data is combined with other data sources	The use of telematics data in combination with other data sources, to deliver an intended purpose
Level 3 Assurance 	Independent assessment – oversight	Certificate-based data and evidence Independent assessment and oversight of telematics application and service provision.	The use of telematics data as the primary source of data to deliver an intended purpose

Level 1 Assurance relies on self-assessment. It is associated with 'advisory' applications, and where the user does not depend on high levels of data accuracy or integrity.

Level 2 Assurance provides greater rigour in the collection and reporting of data from telematics applications, and that data is complemented with other data sources (such as data collected from other systems, administrative records and/or operational programs) which, when combined, deliver a commensurate level of assurance.

Level 3 Assurance provides the necessary environment for collection and secure storage of high-accuracy and high-integrity data, which may provide (subject to underlying legislative provisions) certificate-based data and evidence.

For further information, refer to the *National Telematics Framework - Levels of Assurance* document.

The level of assurance will also influence what telematics application should be used (see Step 5).

6 STEP 5 – SELECT A TELEMATICS APPLICATION

Depending on the policy objectives sought, consideration can then be given to:

- Using an existing telematics application within the National Telematics Framework

  or

- Constructing a new telematics application within the National Telematics Framework.

Consideration should also be given to the following dimensions at this step:

- Policy
- Technical
- Commercial
- Operational.

Refer to the National Telematics Framework document for further information about these inter-related dimensions.

Working with TCA – and referencing the Telematics Data Dictionary, the Telematics Data Exchange and the Telematics Business Rules – a new application can be constructed by:

- Establishing the functional requirements
- Selecting specific data elements
- Defining the composition of data records (including the use of existing data records when possible).

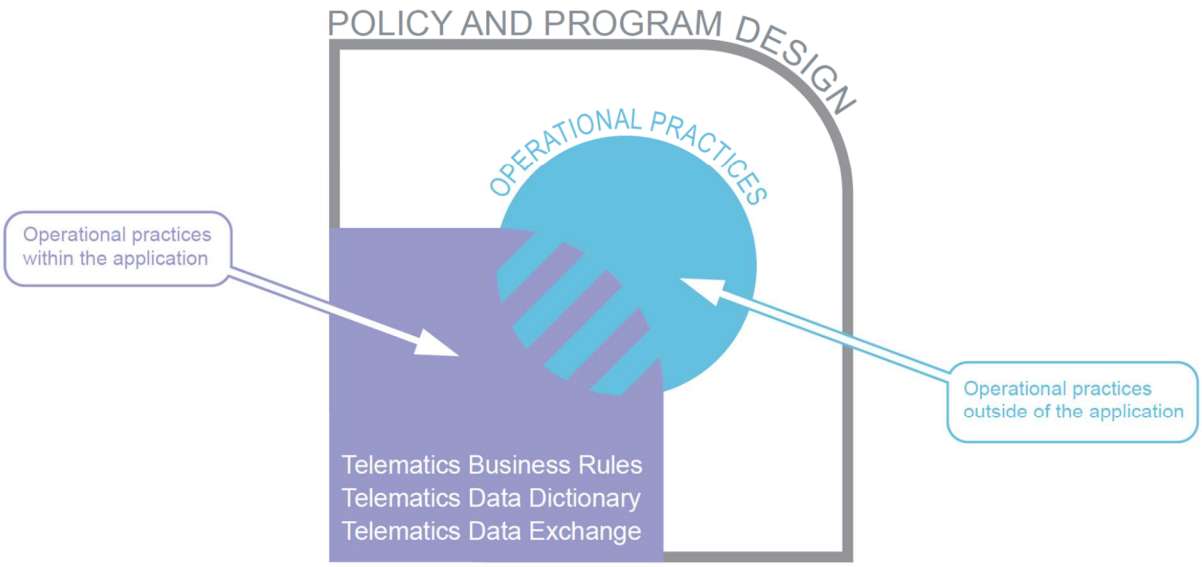
When combined, these items form a Functional and Technical Specification for a new application within the National Telematics Framework.

6.1 WHAT GIVES EFFECT TO A TELEMATICS APPLICATION WITHIN THE NATIONAL TELEMATICS FRAMEWORK?

There are two key dimensions to a telematics application.

1. Components which are specific to each application, including:
    - Functional requirements
    - Data elements
    - Data records.
2. Components which are common all applications, including:
    - Telematics Business Rules
    - Telematics Data Dictionary
    - Telematics Data Exchange.

The telematics application operates within the policy and program design established by producers, as depicted in the following image:



As part of Step 3, the policy or program 'design' should consider:

- The type and extent of operational practices that would be performed *within* the telematics application

  and

- The type and extent of operational practices that would be performed *outside* of the application practices (outside of the application), including:
    - Fleet safety management systems and practices
    - Occupational Health and Safety guidelines
    - Internal compliance management systems.

6.2 APPLICATIONS WITHIN THE NATIONAL TELEMATICS FRAMEWORK

A telematics application consists of different data elements, which when collected and combined, enable data records to be generated.

Each application:

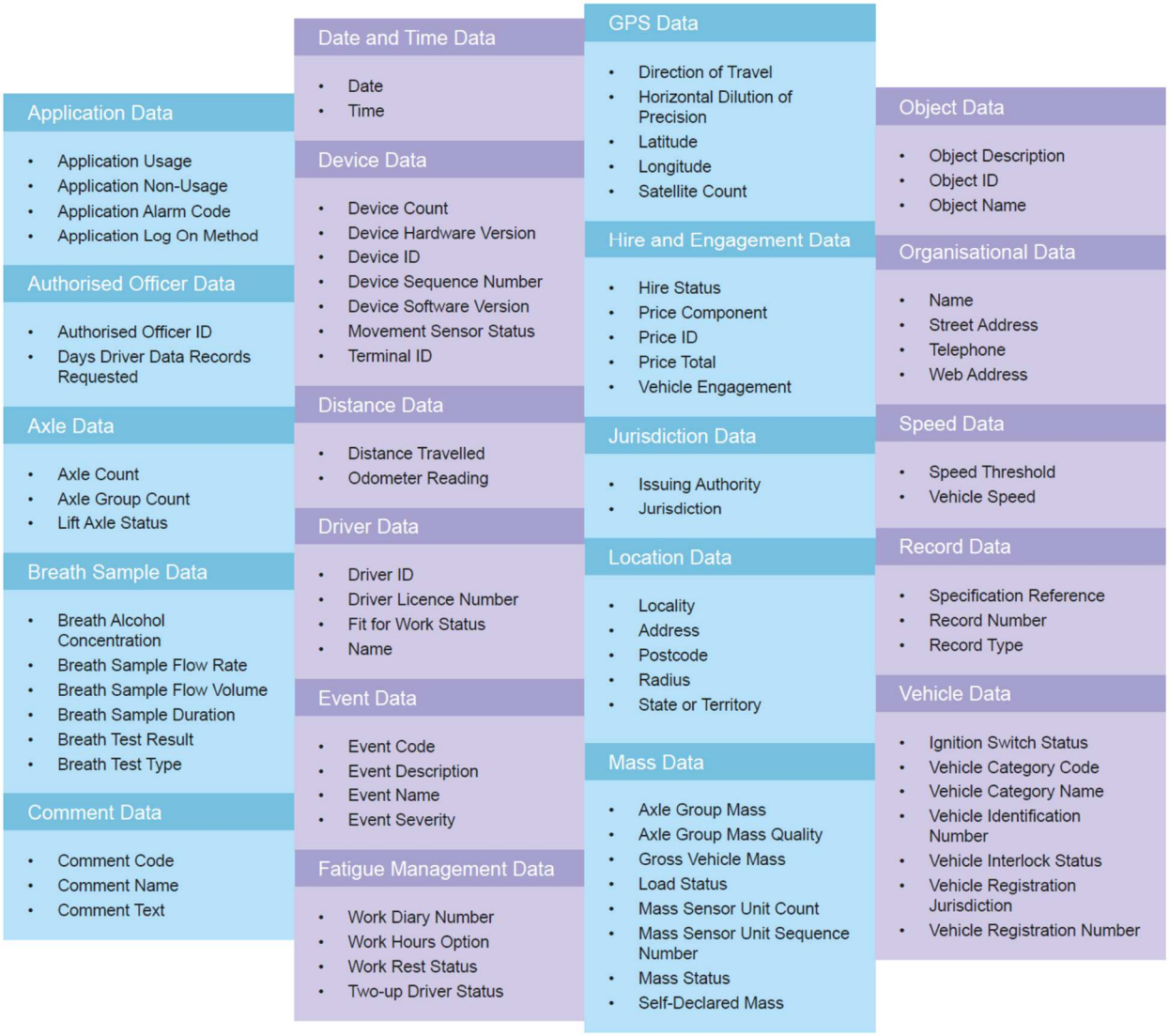
- References common:
  - Telematics Business Rules
  - Telematics Data Dictionary
  - Telematics Data Exchange.
- Collects data elements
- Articulates functional requirements
- Generates data records.

The data elements collected, the functional requirements and the type of records generated, are a function of:

- The intended purpose
- How telematics will be used to deliver upon the intended purpose
- The level of assurance required.

The full suite of data elements available for use through the National Telematics Framework is defined in the Telematics Data Dictionary and is summarised in Table 1.

Table 1: Broad groupings of data elements currently available through the National Telematics Framework



6.3 EXAMPLES OF HOW APPLICATIONS ARE USED BY PRODUCERS, FOR DIFFERENT PURPOSES

There are currently two applications within the National Telematics Framework which are used for the specific purpose of managing vehicle speed. These two speed-related applications are:

- Intelligent Speed Management (ISM)
- Intelligent Speed Compliance (ISC).

However, differences in:

- their intended purpose
- how these applications are used, and
- the level of assurance each requires

... have influenced the shape of these applications.

The following table summarises how each application has been shaped by different policy needs (and intended outcomes).

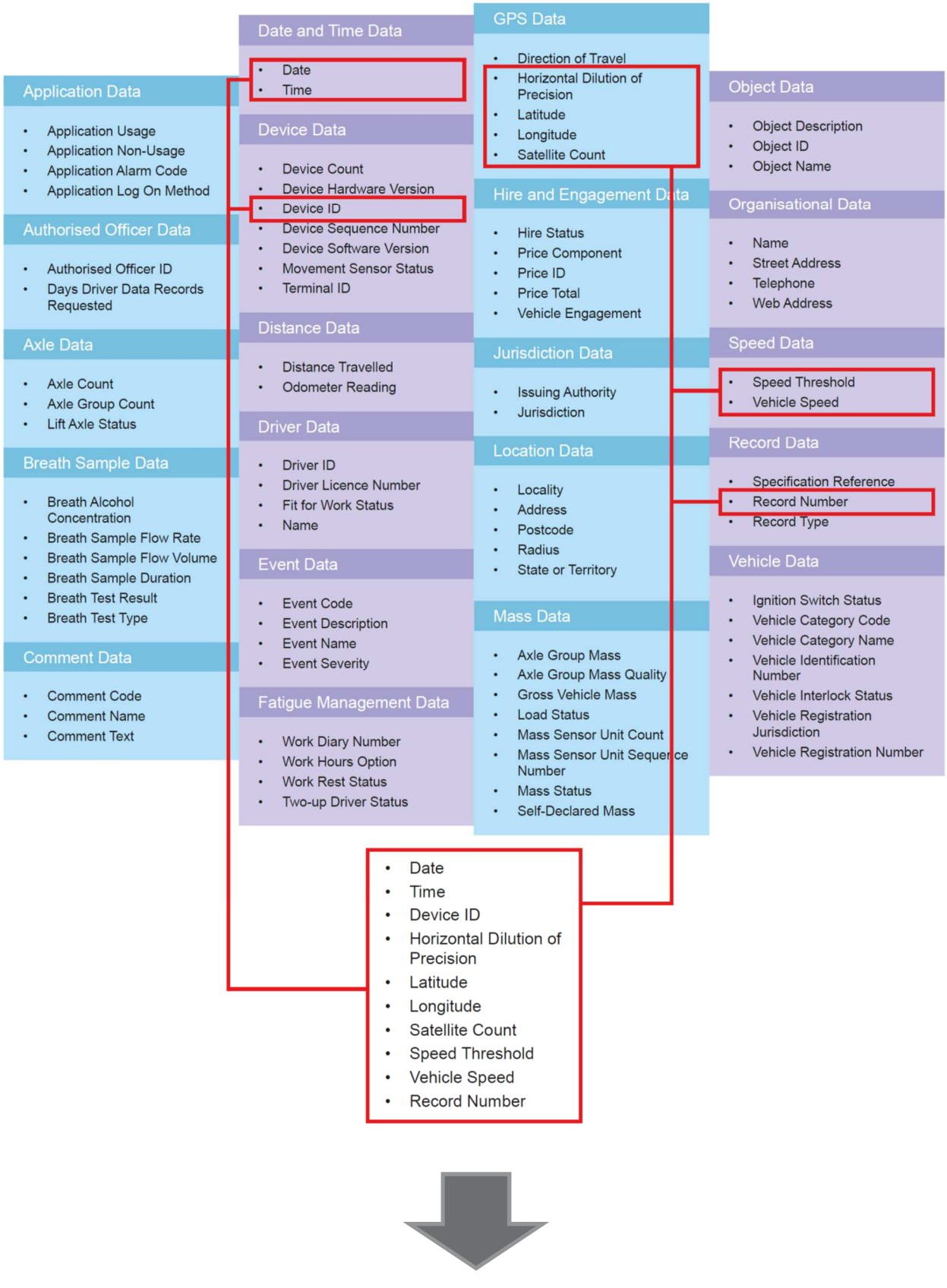
Table 2: ISM and ISC application Use

	ISM	ISC
INTENDED PURPOSE	To improve the accuracy and reliability of speed measurements using GPS-based systems	The direct compliance management and enforcement of vehicle speed using certificate-based telematics data and evidence.
POLICY AND PROGRAM DESIGN	The policy and program design relies on the functions performed *outside* of the ISM application to deliver the intended purpose.	The policy and program design relies primarily on the functions performed *within* the ISC application to deliver the intended purpose.
HOW THE APPLICATION IS USED	The ISM application may be used *in conjunction* with other approaches to deliver upon the intended purpose, which may include: • Fleet safety management systems and practices • Occupational Health and Safety guidelines • Internal compliance management systems.	The ISC application is the *primary* means to deliver upon the intended purpose. Government agencies and regulators may have enabling policies, legislation, regulation and administrative practices which give effect to the ISC application. The policy and program design will also anticipate the tampering and malfunctions, inclusive of processes to: • Manage the treatment of speeding events during a period when a tamper or malfunction had been recorded • Request certificates of evidence from TCA (if required) for enforcement action.
LEVEL OF ASSURANCE	Level 1 Self-assessment by consumers is sufficient, in recognition that the ISM application may be used with other approaches to deliver upon the intended purpose (see Levels of Assurance document)	Level 3 Independent oversight with high levels of integrity and assurance is required, in recognition that the ISC application is the *primary* means to deliver upon the intended purpose (see Levels of Assurance document)

	ISM	ISC
FEATURES OF THE APPLICATION	Performance-based requirements Overspeed warning to driver (if required) Generation of data records to operator (if required)	Performance-based requirements Overspeed warning to driver (if required) Tamper detection Malfunction detection Generation of data records to operator and/or regulator Certificate-based data and evidence
DATA ELEMENTS COLLECTED	See Table 3	See Table 5
DATA RECORDS GENERATED	Speed Records	Speed Records Alarm Records

6.4 HOW DIFFERENT TELEMATICS APPLICATIONS COLLECT DATA ELEMENTS AND GENERATE DATA RECORDS

Table 3: Data elements used in the ISM application



Using these data elements, Speed Records are generated through the ISM application:

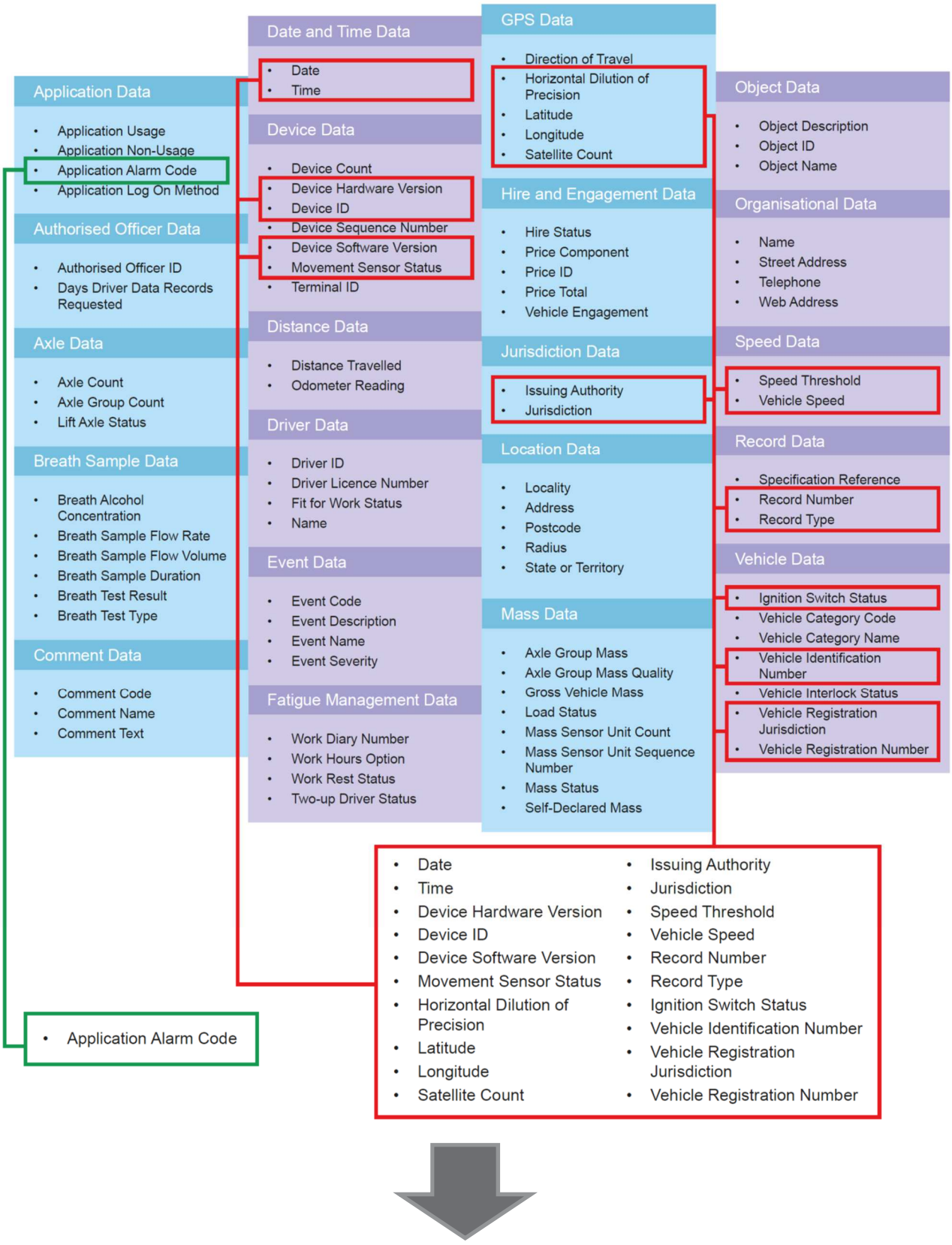
Given the nature of the ISM application, only one type of data (Speed Record) needs to be generated.

Table 4: Record Format of a *Speed Record* from the ISM application

Data Element	Field Name	Use	Data Type	Length	Decimals
Date	Date	Mandatory	Date	8*	
Time	Time	Mandatory	Time	6*	
Device ID	IVU ID	Mandatory	String	20	
Horizontal Dilution of Precision	HDOP	Optional	Decimal	4	1
Latitude	Position Latitude	Optional	Decimal	9	5
Longitude	Position Longitude	Optional	Decimal	10	5
Satellite Count	Satellite Count	Optional	Integer	2	
Speed Threshold	Speed Threshold	Optional	Decimal	5	1
Vehicle Speed	Speed	Mandatory	Decimal	5	1
Record Number	Record Number	Optional	Integer	10	

* In this use case, Date is encoded as YYYYMMDD, and Time is encoded as HHMMSS.

Table 5: Data elements used in the ISC application



Using these data elements, the following records are generated through the ISC application:

- Speed Records
- Alarm Records.

The generation of alarm records is it important to identify when the application, and the data being collected through the application, may be impacted by a malfunction or possible tamper event.

Alarm records are an essential component of the ISC application, as the intended purpose demands a high level of integrity from data, for the compliance management and enforcement of vehicle speed.

Table 6: Record Format of a *Speed Record* from the ISC application

Data Element	Field Name	Use	Data Type	Length	Decimals
Date	Date	Mandatory	Date	8*	
Time	Time	Mandatory	Time	6*	
Device Hardware Version	IVU Hardware Version	Mandatory	String	6	
Device ID	IVU ID	Mandatory	String	20	
Device Software Version	IVU Software Version	Mandatory	String	6	
Movement Sensor Status	Other Independent Movement Sensor Status	Mandatory	Enumerated	—	
Horizontal Dilution of Precision	HDOP	Mandatory	Decimal	4	1
Latitude	Position Latitude	Optional	Decimal	9	5
Longitude	Position Longitude	Optional	Decimal	10	5
Satellite Count	Satellite Count	Mandatory	Integer	2	
Issuing Authority	Issuing Authority	Mandatory	String	255	
Speed Threshold	Speed Threshold	Mandatory	Decimal	5	1
Vehicle Speed	Speed	Mandatory	Decimal	5	1
Jurisdiction	Jurisdiction	Mandatory	Enumerated	—	
Record Number	Record Number	Mandatory	Integer	10	
Record Type	Record Type	Mandatory	Integer	99	
Ignition Switch Status	Ignition Switch Status	Mandatory	Enumerated	—	
Vehicle Identification Number	Vehicle Identification Number	Mandatory	String	17	
Vehicle Registration Jurisdiction	Vehicle Registration Jurisdiction	Mandatory	Enumerated	—	

Data Element	Field Name	Use	Data Type	Length	Decimals
Vehicle Registration Number	Vehicle Registration Jurisdiction	Mandatory	String	10	

* In this use case, Date is encoded as YYYYMMDD, and Time is encoded as HHMMSS.

Table 7: Record Format of an *Alarm Record* from the ISC application

Data Element	Field Name	Use	Data Type	Length	Decimals
Application Alarm Code	Trigger Event	Mandatory	Enumerated	**	
Date	Date	Mandatory	Date	8*	
Time	Time	Mandatory	Time	6*	
Device ID	IVU ID	Mandatory	String	20	
Issuing Authority	Issuing Authority	Mandatory	String	255	
Jurisdiction	Jurisdiction	Mandatory	Enumerated	—	
Record Number	Record Number	Mandatory	Integer	10	
Record Type	Record Type	Mandatory	Integer	99	
Vehicle Identification Number	Vehicle Identification Number	Mandatory	String	17	
Vehicle Registration Jurisdiction	Vehicle Registration Jurisdiction	Mandatory	Enumerated	—	
Vehicle Registration Number	Vehicle Registration Jurisdiction	Mandatory	String	10	

* In this use case, Date is encoded as YYYYMMDD, and Time is encoded as HHMMSS.

** In this use case, events that trigger Alarm Records will be mapped to codes of 1 to 12.

7 ATTACHMENT A: EXAMPLE OF HOW AN APPLICATION CAN BE CREATED WITHIN THE NATIONAL TELEMATICS FRAMEWORK

The following table highlights how a new application can be created within the National Telematics Framework.

For illustrative purposes, this application is intended to provide Producers with road utilisation data for planning purposes.

7.1 STEP 1 – DEFINING THE INTENDED PURPOSE

Road managers seek to gain a better understanding of the level of road infrastructure utilisation by specific types of vehicles.

Specifically, road managers seek to:

- Gain access to specific kinds of telematics data to better inform heavy vehicle utilisation on specific parts of the road networks
- Collect road and bridge utilisation data in a standardised format.

7.2 STEP 2 – CONFIRM WHETHER THE USE OF TELEMATICS IS A SUITABLE OPTION

Conventional methods of collecting data typically only provide 'point-based' data samples on specific parts of the road network (i.e. road-based systems which count vehicle passes, vehicle configuration and/or loads).

The use of telematics has been identified as a way to:

- Improve the availability of data to road managers
- Link telematics data with other sources of data collected on the road network
- Gain improved knowledge about the level of use and consumption of specific infrastructure assets (which can better inform planning of maintenance and capital investments).

7.3 STEP 3 – HOW WILL TELEMATICS BE USED WITHIN A POLICY OR PROGRAM?

The policy or program design is based on the following principles:

- Transport operators will voluntarily opt-in vehicles to be monitored through the application
- The application shall leverage existing investments made by producers, providers and consumers
- Data collected from monitored vehicles will only be used for information and planning purposes
- Protections and safeguards will be implemented to prevent data from monitored vehicles being used for non-disclosed purposes (including compliance and enforcement activities).
- Road managers may offer transport operators incentives to voluntarily have their vehicles monitored through the application.

7.4 STEP 4 – WHAT LEVEL OF ASSURANCE IS REQUIRED?

Based on the intended purpose (Step 1) and the proposed policy and program (Step 3), a medium level of assurance is required for this application.

This reflects the need for road managers to have a sufficient level of accuracy in the collection of data, so it can be reliably used for road infrastructure planning purposes.

However, as the application is not being used for compliance and enforcement purposes, high integrity, certificate-based data and evidence is not required for the application.

Level 2 Assurance is therefore appropriate for this application.

7.5 STEP 5 – SELECT AN APPLICATION

Working with TCA – and referencing the Telematics Data Dictionary, the Telematics Data Exchange and the Telematics Business Rules – a new application can be constructed by:

- Establishing the functional requirements (and application-specific business rules)
- Selecting specific data elements
- Defining the composition of data records (including the use of existing data records when possible).

8 ESTABLISHING FUNCTIONAL REQUIREMENTS

The functional requirements that will be performed within the application include the ability to:

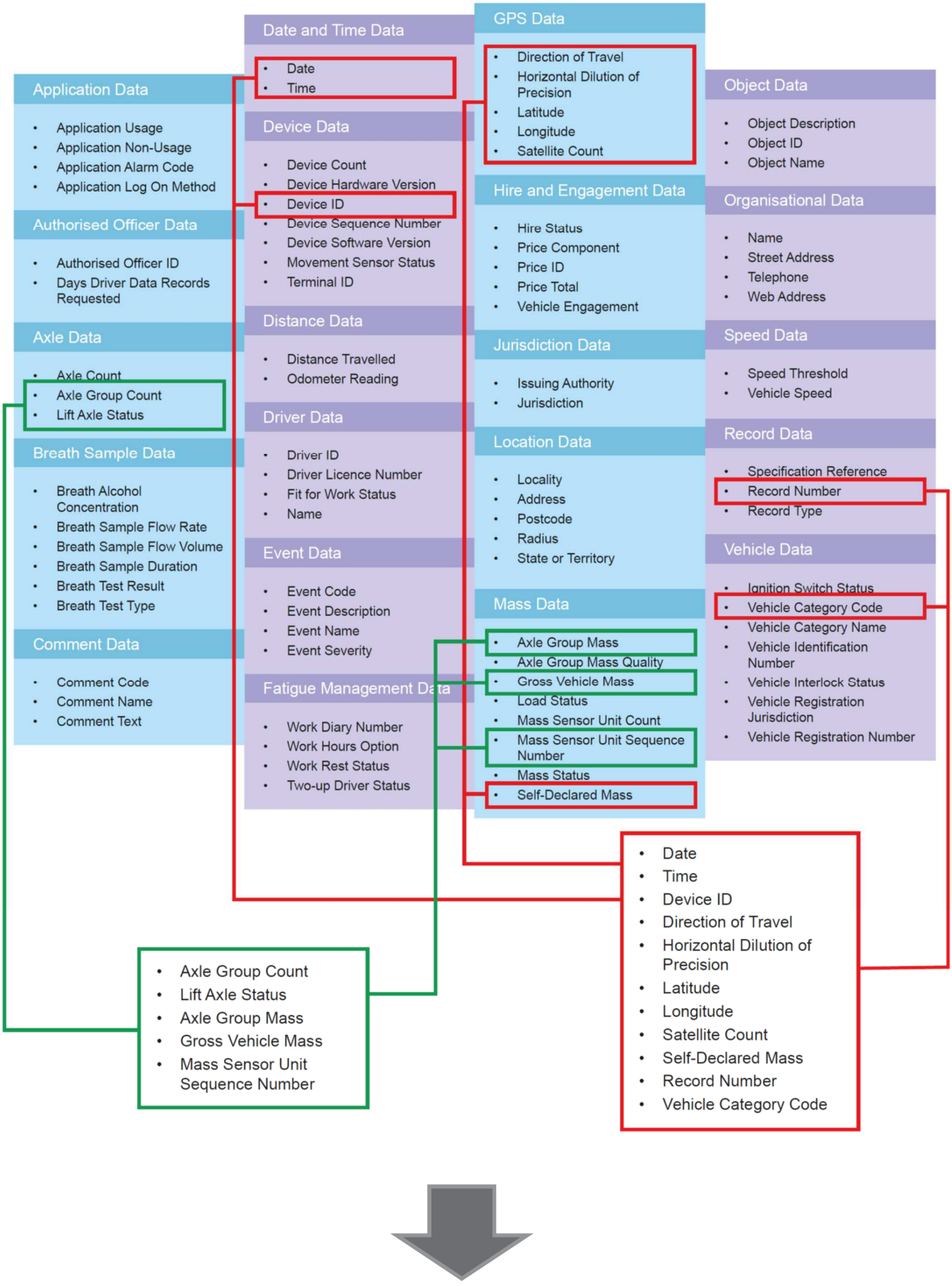
- *Define* specific road asset/s for monitoring
- *Identify* when a vehicle traverses a specific road asset/s
- *Generate* reports when a vehicle traverses a specific road asset/s.

8.1 SELECTING DATA ELEMENTS

Based on the intended purpose (Step 1), the policy and program design (Step 4), and the functional requirements that will be performed within the application (above), the data elements that need to be collected through the application can be determined.

Table 8 presents the data elements that can be used in the new application.

Table 8: Selection of data elements for Road Infrastructure Management application



Defining data records

One type of record is generated for this application, based on the data elements, as detailed in Table 5.

Table 5: Record Format of a *Utilisation Record* from the Road Infrastructure Management application

Data Element	Field Name	Use	Data Type	Length	Decimals
Date	Date	Mandatory	Date	8*	
Time	Time	Mandatory	Time	6*	
Device ID	IVU ID	Mandatory	String	20	
Direction of Travel	Direction of Travel	Mandatory	Decimal	5	1
Horizontal Dilution of Precision	HDOP	Optional	Decimal	4	1
Latitude	Position Latitude	Mandatory	Decimal	9	5
Longitude	Position Longitude	Mandatory	Decimal	10	5
Satellite Count	Satellite Count	Optional	Integer	2	
Self-Declared Mass	Total vehicle mass	Optional	Integer	6	
Record Number	Record Number	Mandatory	Integer	10	
Vehicle Category Code	Vehicle Category	Optional	Integer	2	

* In this use case, Date is encoded as YYYYMMDD, and Time is encoded as HHMMSS.

8.2 CREATING A NEW APPLICATION

When combined, these items form a Functional and Technical Specification for a new application (road utilisation data for planning purposes) within the National Telematics Framework.

Things to note:

Additional data elements could be included in this application as they become available through the use of On-Board Mass (OBM) Systems, namely:

- Axle Data
- Mass Data.

These items are highlighted in green.

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