Master Specification
Part TUN-ITS-DC4

Dangerous Goods Vehicle Detection and Enforcement

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Government of South Australia
Department for Infrastructure and Transport

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Contents

TUN-ITS-DC4 Dangerous Goods Vehicle Detection and Enforcement

1 General

a) This Master Specification Part sets out the requirements for the design, supply, installation, testing and commissioning of a dangerous goods vehicle detection and enforcement system including:

i) the documentation requirements, as set out in section 2;

ii) the technical requirements, as set out in section 3;

iii) the control and monitoring requirements, as set out in section 4;

iv) the reliability, Design Life, and functionality safety requirements, as set out in section 5;

v) the maintainability requirements, as set out in section 6;

vi) the Hold Point requirements, as set out in section 7; and

vii) the verification requirements and records, as set out in section 8.

b) For the purposes of this Master Specification Part:

i) the dangerous goods vehicle detection and enforcement system includes the following subsystems:

A. dangerous goods vehicle detection; and

B. dangerous goods vehicle enforcement; and

ii) vehicles displaying dangerous goods placards are referred to as “DGVs”.

c) The design, supply, installation, testing and commissioning of the DGV detection and enforcement system must comply with the Reference Documents, including:

i) Australian Code for the Transport of Dangerous Goods by Road and Rail, Edition 7.6, 2018;

ii) AS/NZS 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules); and

iii) AS 60529 Degrees of protection provided by enclosures (IP Code).

2 Documentation

2.1 Design Documentation

In addition to the requirements of PC-EDM1 “Design Management”, the Design Documentation must include a report detailing the design of the DGV detection and enforcement system, including:

a) evidence demonstrating compliance with all specified requirements of this Master Specification Part and the Contract Documents;

b) evidence demonstrating that the DGV detection and enforcement system will detect DGVs and capture discernible and legible images of display placards and registration number plates, as required by section 3.1b);

c) field of view and image resolution calculations; and

d) availability and reliability analysis of the proposed dangerous goods vehicle detection and enforcement system devices in accordance with PC-EDM6 “Systems Engineering Management”.

2.2 Quality Management Records

In addition to the requirements of PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable), the Quality Management Records must include:

a) a list of all DGV detection and enforcement system devices, together with spare part and replacement part information, as required by section 6b); and

b) all test documentation required by section 8.

2.3 O&M Manual

In addition to the requirements of PC-CN2 “Asset Handover”, the O&M Manual must include the following information about each type of supplied equipment forming part of the DGV detection and enforcement system:

a) equipment test sheets (including test results) where testing is required; and

b) recommended maintenance schedule and procedures which must list activities recommended by the equipment manufacturer, as supplemented by those additional activities which are recommended by the Contractor.

3 Technical requirements

3.1 General

a) The DGV detection and enforcement system must be able to synchronise its internal clock with the Principal’s NTP server via NTP protocol.

b) The DGV detection and enforcement system must:

   i) detect DGVs as specified in the Australian Code for the Transport of Dangerous Goods by Road and Rail, Edition 7.6, 2018;

   ii) capture and record colour digital images of detected DGVs:

      A. showing the whole front and rear of the DGV;

      B. showing discernible and legible images of the dangerous goods placards displayed on the front and rear of the DGV;

      C. showing discernible and legible vehicle registration number plates on the front and rear of the DGV;

      D. showing a data block with date, time and location; and

      E. in accordance with the requirements of the Authority responsible for enforcement.

c) The DGV detection and enforcement system must record and store a multimedia record for each detected DGV containing, but not limited to:

   i) all recorded digital images;

   ii) date and time of detection;

   iii) location of detection;

   iv) direction of travel; and

   v) sufficient additional metadata to support follow up DGV actions with the registered DGV owner, including legal prosecution.

d) The DGV detection and enforcement system must store multimedia records online for a minimum period of 12 months.

e) The DGV detection and enforcement system must provide for:

i) the archiving of records to offline media; and

ii) deletion of records.

f) The DGV detection and enforcement system must provide for the retrieval of stored multimedia records by operators using search parameters including:

i) date;

ii) time;

iii) number plate;

iv) location of detection; and

v) direction of travel.

g) The DGV detection and enforcement system must provide for the export of multimedia records to:

i) external media; and

ii) electronic formats readable by commonly used and commercially available applications.

3.2 Performance requirements

The DGV detection and enforcement system must:

a) detect at least 90% of DGVs displaying a compliant placard;

b) capture a readable image of a registration number plate for at least 90% of detected DGVs; and

c) have a false positive DGV detection rate less than:

i) 1 vehicle in 100,000 vehicles passing through a detection site; and

ii) 1 vehicle in 100 vehicles carrying a placard that is not indicating dangerous goods.

3.3 Environmental requirements

DGV detection and enforcement system components located outside of equipment rooms must:

a) operate reliably in an external air temperature range of at least of -15°C to +55°C; and

b) have an IP rating in accordance with AS 60529 Degrees of protection provided by enclosures (IP Code) of:

i) IP66 for instruments installed in areas that could be exposed to deluge, high-pressure water washing or external weather conditions; and

ii) IP65 for instruments installed elsewhere.

4 Control and monitoring requirements

The Contractor must ensure that the DGV detection and enforcement system satisfies the following control and monitoring requirements:

a) the DGV detection and enforcement system must be monitored through the STREAMS;

b) the DGV detection and enforcement system must report to the STREAMS the status of:

i) DGV detection sites; and

ii) DGV detection and enforcement sub systems used to record and store records;

c) the status reporting required by section 4b) must include:

i) on, off and standby states as applicable to the individual devices;

ii) faults (including fault reporting); and

iii) detection alarms; and

d) the DGV detection and enforcement system must report to the STREAMS detected DGVs including:

i) location and time of detection; and

ii) direction of travel.

5 Reliability, Design Life, and functional safety requirements

a) The DGV detection and enforcement system must be designed and provided to comply with the systems engineering requirements and the analysis for reliability, availability, maintainability and safety (RAMS) in accordance with PC-EDM6 “Systems Engineering Management”.

b) The Contractor must ensure that the DGV detection and enforcement system satisfies the following reliability, Design Life, and functional safety requirements:

i) the DGV detection and enforcement system must have a Design Life of:

A. at least 10 years for all supplied in-field DGV detection and enforcement system equipment and devices; and

B. at least 7 years for all supplied DGV detection and enforcement system equipment and devices, other than those the subject of section 5b)i)A; and

ii) the MTBF for each DGV detection and enforcement system Line Replaceable Unit must be at least 50,000 hours.

6 Maintainability

a) The Contractor must ensure that the DGV detection and enforcement system satisfies the following maintainability requirements:

i) the DGV detection and enforcement system devices must be Line Replaceable Units;

ii) with respect to spare parts for the DGV detection and enforcement system devices, the Contractor must:

A. determine the number of spare parts required to maintain and repair the DGV detection and enforcement system for at least 7 years; and

B. supply and deliver the spare parts required to maintain and repair the DGV detection and enforcement system for at least 2 years or as specified in the Contract Documents.

b) As part of the Quality Management Records, the Contractor must provide:

i) a list of all DGV detection and enforcement system equipment and devices; and

ii) a recommendation for spare and replacement parts to be held in stock.

7 Hold Points

Table TUN-ITC-DC4 7-1 details the review period or notification period, and type (documentation or construction quality) for each Hold Point referred to in this Master Specification Part.

Table TUN-ITC-DC4 7-1 Hold Points

Section reference	Hold Point	Documentation or construction quality	Review period or notification period
8e)	In-field testing of the DGV detection and enforcement system	Construction quality	10 days notification

8 Verification requirements and records

a) Testing and commissioning procedures and documentation must comply with the requirements of PC-CN1 “Testing and Commissioning”.

b) The Contractor must ensure that the Factory Acceptance Testing required by PC-CN1 “Testing and Commissioning” includes:

i) tests to verify the DGV detection and enforcement system can detect DGVs under conditions that accurately simulate those expected in the field to the required performance;

ii) tests to verify the DGV detection and enforcement system can capture discernible and legible registration number plates images under conditions that accurately simulate those expected in the field to the required performance;

iii) functional tests to verify the DGV detection and enforcement system can record, store and archive DGV multimedia records; and

iv) functional tests to verify an operator can retrieve, view and export DGV detection and enforcement system DGV multimedia records.

c) The Contractor must ensure that the Site Acceptance Testing required by PC-CN1 “Testing and Commissioning” includes:

i) tests to verify the DGV detection and enforcement system can detect DGVs under field conditions to the required performance;

ii) tests to verify the DGV detection and enforcement system can capture discernible and legible registration number plates images under field conditions to the required performance; and

iii) user acceptance tests to verify an operator can retrieve, view and export DGV detection and enforcement system DGV multimedia records.

d) The Contractor must supply to the Principal, records of all test activities completed, as part of the Quality Management Records.

e) The completion of testing required by this section 8 to the Principal’s satisfaction and the submission to the Principal of a detailed testing report constitutes a **Hold Point**. Ongoing operation of the DGV detection and enforcement system must not occur until the Hold Point is released.