ROADS AND MARITIME SERVICES

TRAFFIC SYSTEMS

SPECIFICATION NO. TSI-SP-062

USER MANUAL REQUIREMENTS FOR ITS FIELD EQUIPMENT

Version: 1.0
Dated: 5/12/2016
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# RECORD OF AMENDMENTS

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<th>Version</th>
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<tr>
<td>0.1</td>
<td>Spec numbering and format updated to TSI-SP template. This specification superseded the requirements in HB/1.</td>
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1 INTRODUCTION

1.1 Scope

This specification outlines the general requirements for user manual of ITS field equipment or referred to as just 'equipment' in this specification. This specification is only applicable when referenced by an ITS field equipment specification.

This specification does not contain any project-specific requirements on the user manual.

Note: The information presented in this specification is not exhaustive and covers the basics for a generic user manual. Dependent on the complexity of the equipment more or less information may be required in the user manual to ensure that RMS is able to install, commission, operate and maintain the equipment supplied.

1.2 Requirements precedence

If this specification is in conflict with other project-specific contract documents or other specifications, then the order of precedence shall be as follows:

   a) Project-specific RMS contract documents or specifications;

   b) This specification; and

   c) Australian Standards.

1.3 Mandatory requirements

All mandatory requirements in this specification utilise the word “shall” in the text of the requirement.

1.4 Australian standard and RMS standard reference


[5] TS 201 – Approval of ITS Field Equipment

1.5 Definitions

<table>
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<th>Term</th>
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<td>Intelligent Transport System (ITS)</td>
<td>An integrated technology solution using computer-based control systems which communicate with field equipment to provide a functional outcome designed to improve journeys through the transport network.</td>
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<td>Principal Manager – ITS</td>
<td>Central RMS authority responsible for RMS ITS solution design approval, including approval/acceptance for supply of ITS field equipment and for ITS solutions.</td>
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<tr>
<td>ITS Helpdesk</td>
<td>Central email for external communications with RMS on ITS.</td>
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2 GENERAL REQUIREMENTS

2.1 User manual overview

2.1.1 RMS requires the following sections shall be provided in the user manual:

a) System Overview;
b) Installation;
c) Commissioning;
d) Operations; and
e) Field Maintenance including troubleshooting.

Note: Each of the above sections may be presented in separate document(s) but are collectively referred to as the user manual.

2.2 Format of user manual

2.2.1 The submission of user manual shall be in common electronic format such as 'portable document file' (pdf) format.

2.2.2 The user manual shall be submitted using a common portable storage media acceptable to the RMS such as email, USB memory stick or CD.

2.3 Version control

2.3.1 The Supplier shall version control the user manual, such that updates in the user manual can be tracked.

2.3.2 User manual shall be identified with a unique version number.

2.4 Changes to the user manual

2.4.1 The Supplier shall provide a summary of document changes and updates when a new version of the user manual is issued.

2.5 Arrangement of user manual

RMS prefers that user manual is separated into dedicated document volumes of System Overview, Installation Manual, Commissioning Manual, Operations Manual and Field Maintenance Manual. However, it is acceptable for the user manual to be organised in other manners based on the complexity of the equipment, such that the user manual contains all the required information and this information can be easily located.

2.5.1 The user manual shall be self-contained as far as feasible and appropriately cross referenced.

2.5.2 The user manual shall be divided appropriately into sections, with appropriate heading including a table of contents.

2.5.3 The user manual's page layout, margin, pagination and font size shall be adequate to ensure ease of reading.

2.5.4 The manual shall include an appropriate glossary of terms and abbreviations.
2.6 Details of the user manual

While a paragraph or two are appropriate to describe simple activities, detailed step-by-step instructions and appropriate diagrams/photographs maybe required for complex functions or activities related to the equipment.

2.6.1 The user manual shall contain appropriate level of detail dependent upon the complexity of the activity related to the equipment.

2.6.2 The user manual shall be structured appropriately dependent on the level of detail required for the equipment.

Note: the level of detail in the user manual will be dependent of the complexity of the equipment from the user's perspective.

2.7 Risk, hazard and safety

All sections within the user manual should contain safety notice(s) that give a clear and simple statement of any risky or hazardous situations associated with the equipment (a pictorial form may be used where this provides the clearest presentation) while undertaking an activity or procedure.

2.7.1 All user manual sections shall highlight precautions for working with the equipment in particular personnel safety, risk and hazards.

2.7.2 Each activity/procedure in the user manual shall clearly identify the safety equipment required, and all risks, hazards associated with undertaking that activity/procedure on the equipment.

2.8 Illustrations for user manual

Drawings, tables, graphs, photographs, screen shots and other illustrations should be used when appropriate to demonstrate examples, and to facilitate clear understanding of the user manual.

2.8.1 The user manual shall use commonly used graphic symbols, techniques for creating circuit diagrams, drawings, graphs and diagrams. Guidance may be taken on the common practices within Australia as described in references [1], [2] and [3].

3 SYSTEM OVERVIEW

3.1 Purpose for system overview

The purpose of the system overview section is to describe the overall functionality, capability, operation of the equipment and its intended applications. While detailed design is not required, high level design and block diagram descriptions should be provided to facilitate the understanding the overall functionality, operation and interfaces of the equipment.

4 INSTALLATION

4.1 Purpose of the installation section

The purpose of the installation section is outline the information required for the installation of the equipment including handling and placement. It should cover both mechanical and electrical connection(s), in a sequence that follows a typical installation procedure, with the text in a step by step format supported by information in clear pictorial or tabular form.
Illustrations may be used wherever practical including annotated photographs that are clearly labelled.

4.2 Information overview for installation section

4.2.1 A typical installation section shall contain the following sections:
   a) Equipment type;
   b) Packaging and handling;
   c) Preparatory works;
   d) Physical installation; and
   e) Setting up for operation.

The description of the information to be presented in these sections is provided in section 4.3 to section 4.7.

4.3 Equipment type

4.3.1 This section shall contain a definition of equipment type and model to which the installation instructions apply.

Basic physical parameters of dimension, weight and if relevant, colour as well as the location of equipment markings, name plates and any other identification marks may be included.

4.4 Packaging and handling

4.4.1 This section shall contain a description of packaging and method of handling both in transit and at the point of installation.

It should include the following, if applicable:
   a) Precautions when unpacking;
   b) A checklist of parts provided within the packaging;
   c) Location of lifting lugs and handles;
   d) Places to which slings and hooks may be attached;
   e) Places that shall not be subject to external loads;
   f) Parts that need to be provided with additional protection, support or fixing during transport.

4.5 Preparatory works

4.5.1 This section shall cover details of site works that must be completed before installation can take place, where relevant.

4.5.2 This information shall be presented in the form of dimensioned mechanical drawings showing the location of mountings, access doors or panels, cable terminations, ducts and conduits in relation to the ITS equipment.

The drawings, where necessary, should contain explanatory notes or text.
4.6 Physical installation

4.6.1 Prior to any step in the installation that could prove hazardous; a clear warning shall be included in the instructions with particulars of precautions to be taken or checks to be made before proceeding.

4.6.2 This section shall cover details of the placement and connection of the equipment in the form of a step by step procedure.

This section should include the following, if applicable:
   a) Details of the hauling operation;
   b) Details of fixing bolts or other types of fasteners;
   c) Details of sign face alignment; and
   d) Details of size and type of electrical connections, e.g. lug size, cable socket capacity, and type, minimum cable size, preferred routing for external cables etc.

4.7 Setting up for operation

If required, a post-installation checklist should be provided including any set-up adjustments required prior to undertaking the commissioning of the equipment.

5 COMMISSIONING

5.1 Purpose for the commissioning section

The commissioning section is specifically prepared for commissioning and testing of the installed equipment(s). It should contain procedures tests that are applicable to the installation of new or repaired equipment. These tests may be a sub-set version of other factory/acceptance testing conducted previously, but the section should stand alone and should not require the presence of other parts of the user manual for execution of the test procedures.

The commissioning section should be structured to enable qualified personnel to perform tests, and make adjustments to commission the equipment. The tests should be designed to demonstrate that the equipment has been installed correctly and is functioning as required. Any diagnostic steps or tests associated with fault finding may be covered in maintenance section however reference must be provided if the equipment does not perform as described during the commissioning procedure.

A typical commissioning section may contain the following sections described in section 5.2 to section 5.4.

5.2 Initial checks

5.2.1 A concise list of checks shall be described which allow the commissioning staff to confirm that the equipment has been correctly installed and connected before switching on power.

Where necessary these initial checks should include sighting of installation sign-off and measurements e.g. resistance to ground, supply voltage etc.
5.3 Turn-on and turn-off procedures

5.3.1 A step-by-step turn-on procedure(s) shall be provided to turn-on and set the equipment into operational mode with reference to possible error(s) that may be countered.

5.3.2 The turn-on procedure(s) shall be illustrated to clearly identify the position of controls or the state of any visual indicators on the equipment.

5.3.3 Where inappropriate action can result in a state that differs from the normal this shall be noted, with particular reference to abnormal or unsafe conditions for which no external indication will be given.

5.3.4 A step-by-step turn-off procedure (or a reference) shall be provided for turning of the equipment.

5.4 Test procedures and form

5.4.1 A test procedure(s) shall be provided with the tests to confirm the correct operation of the equipment (following turn-on).

The test procedures should include the following details, if applicable:

a) A unique reference number;
b) An explanatory statement of the purpose of each test;
c) A listing of the test equipment required for the test with general characteristics and representative types;
d) Step by step procedures for setting up and performing each test with diagrams showing the method of connection. This should include the procedures for calibration of built-in meters, indicators or test equipment;
e) Template test data forms to record test results.

The test data form should include a header for the name and number of the test, the date, the name of the commissioning staff and a series of self-explanatory columns for the test data. Test descriptions may be broken into short paragraphs each describing a step in the test. Descriptions should be brief and functional with notes on a series of do’s and don’ts.

6 OPERATIONS

6.1 Purpose for the operation section

The operation section details the operations of the equipment across all operation modes including failure modes. It will be mainly used by operators of the equipment however on occasion it will be used by technical personnel to ascertain equipment malfunction.

6.2 Information overview for operation section

The operation section should cover the practical aspects of equipment operation. The information should be presented in ready reference form so that equipment operators may readily consult the operation section and extract basic data on operating procedures, techniques and routine checks.

A typical operation section may contain sections describing the following:

a) Detailed equipment operation; and
b) Software operation.
6.3 **Detail system operation**

6.3.1 This section shall contain a description of the operational and functional elements of the equipment.

This may include (where applicable):

a) Equipment layout including the location and function of controls, meters and indicators;

b) Equipment functions;

c) Configuration settings;

d) Operation programming;

e) Communications with external control systems;

f) Fault and error monitoring, logging and reporting;

g) Fault diagnosis (remote or local);

h) Fall-back systems;

i) Storage of operational data;

j) Operator access and access level management;

k) Power indicator;

l) Other applicable system operations and its indicators.

6.3.2 This section shall contain a set of procedures and instructions, and guidance, for the operation of the equipment.

These procedures and instructions may cover the following (where applicable):

a) Starting up and shutting down the equipment;

b) Changing from one operation mode to another;

c) Aborting a mode change;

d) Changing configuration settings;

e) Dwelling the equipment in a particular operation mode;

f) Setting up local control;

g) Setting up of configuration and operational data;

h) Running test or verification programs;

i) Handling of various faults or alarms on the equipment;

j) Simple fault diagnosis;

k) Work health and safety instructions in connection with the operation of the equipment.
6.4 Software operation

Note: As an alternative, it is acceptable for the software operation documentation to be captured within the help section of the software itself.

6.4.1 The relevant operating procedures for software operation shall be described with examples given to illustrate the syntax and format of all operator selectable commands and the sequence in which they must be employed.

6.4.2 Where the equipment employs software that the user interacts with then the user manual shall contain sufficient information to operate and maintain the associated software for the intended purpose of the equipment.

6.4.3 All user-programmable features and options shall be provided with examples of the methods used to modify the features and options, alarm identification and any software-controlled data analysis.

The software documentation should be supported by (if applicable):

- detailed operating section complete with diagnostics;
- error message codes;
- command formats;
- input/output formats;
- instructions for file management;
- support data.

7 FIELD MAINTENANCE

7.1 Purpose for field maintenance section

Field maintenance Section will be used by technical maintenance staff to perform routine and corrective (remedial) maintenance on the installed equipment in the field.

7.1.1 Wherever maintenance staff could be exposed to hazardous conditions or where maintenance procedures could generate conditions that are potentially dangerous to the general public or RMS staff, these conditions shall be highlighted in the field maintenance section.

7.2 Information overview for field maintenance section

A typical field maintenance section could contain sections describing the following:

- Routine maintenance (if applicable);
- Corrective maintenance including fault diagnosis and restoration of services.

7.3 Routine maintenance

The function of the routine maintenance section (if applicable) is to guide maintenance staff in undertaking the required activities. This section will briefly also describe the impact on the operation or life of the equipment if routine maintenance is not undertaken.

7.3.1 The routine maintenance shall clearly identify the routine maintenance activities required for the equipment including the required frequency.

7.3.2 A step-by-step procedure shall be provided for each routine maintenance activity.

7.4 Corrective maintenance

The corrective maintenance section provides procedures for the tracing of equipment faults down to a field replaceable module. The fault diagnosis procedures should provide a series
of checks or tests which will isolate the general region of the fault first and then the faulty field replaceable module.

It is preferred that this should be presented in the form of a "fault tree" or pyramid diagram which comprise of a range of identifiable faults at the top level and a series of logical steps based on observation, tests or measurements which lead to the faulty module. Instructions should be given for the connection of test equipment with references to the relevant block diagram or drawing.

The text should be supported by diagrams in which the level of detail applies specifically to the diagnostic procedures. Modules or parts for which the internal construction is irrelevant should be presented as a block only but particulars of interconnection, cable routing, mechanical fixings and method of access and external monitoring points should be provided.

7.4.1 This section shall provide instruction for the removal and replacement of parts and setup of the equipment after a part has been replaced.

7.4.2 It shall contain the information necessary to ascertain the correct operation of the equipment.

Note: This information should be presented in the same format as per the test procedures defined in section 0.

7.4.3 It shall contain cautionary notes on the effects of testing when the equipment is connected as part of an integrated system. Where testing could cause malfunction to other parts of an interconnected network this shall be highlighted, and detailed instruction given for the elimination or control of undesirable side effects.

7.4.4 The field maintenance section shall describe the minimum information required by the Supplier to undertake repair of the equipment e.g. fault symptoms, site description, date of removal from service and serviceman's identification.

8 DOCUMENTATION QUALITY CONTROL

8.1 Documentation quality control system

8.1.1 Supplier shall operate a quality control system for documentation to a level not below AS/NZS 9001.

8.2 Update of user manual

8.2.1 Any major updates to the latest non project-specific user manual shall be submitted for review via email to ITS HelpDesk. Project-specific manual should be submitted to the relevant RMS Project Manager.

8.2.2 Document changes and updates shall be accompanied with a summary of changes as specified in section 2.4.