Large Scale Collaborative Project

7th Framework Programme

INFSO-ICT 224067

D4.10.2 Collated national FOT system technical performance specifications

Deliverable n.	4.10.2	Collated national FOT system technical performance specifications	
Sub Project	SP 4	Evaluation and Assessment	
Work package	WP 4.10	Technical evaluations	
Task n.	T 4.10.2	Actual system performance	
Author(s)	Stewart Birrell Mark Fowkes	File name	TeleFOT_D4.10.2_Collated national FOT system technical performance specifications_v1.1
Status	**Final**		
Distribution	Public (PU)		
Issue date	2012-07-25	Creation date	2012-02-08
Project start and duration	1st of June, 2008 – 54 months		

	Project co-funded by the European Commission DG-Information Society and Media in the 7th Framework Programme	
European Commission Information Society and Media		SEVENTH FRAMEWORK PROGRAMME

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

ABBREVIATION	DESCRIPTION
D-FOT	Detailed Field Operational Test
DoW	Description of Work
DWG	Data Working Group
FOT	Field Operational Test
L-FOT	Large Scale Field Operational Test
ND	Nomadic Device
WP	Work Package

REVISION CHART AND HISTORY LOG

REV	DATE	AUTHOR(S)	REASON
0.1	2012-02-08	S Birrell	Initial Draft of Excel framework
0.2	2012-03-31	S Birrell, M Fowkes	Finalising the collation of responses and initial draft of deliverable
1.0	2012-04-02	S Birrell, M Fowkes	Issue of deliverable to partners
1.1	2012-07-19	S Birrell, M Fowkes	Revisions made based on peer-review results
1.1	2012-07-25	S Birrell, M Fowkes	Issue of deliverable to partners
1.1	2012-09-15	P Mononen	Template edits before submission to EC

EXECUTIVE SUMMARY

This deliverable reports on the collated national FOT technical performance specifications completed for WP4.10 Technical Evaluations. This WP comprises two tasks; Task 4.10.1 System Performance Targets and Task 4.10.2 Actual System Performance. These tasks were planned to support the Sub-Project 4 of TeleFOT in Evaluation and Assessment of nomadic devices within the national Field Operational Tests (FOTs). The key objective of WP4.10 is to identify and define the target and actual technical performance metrics for the Nomadic Devices (NDs) used, it is not to assess the usability or quality of the data provided by the functions evaluated, but simply technical evaluations of the ND. This will allow cross community comparisons to be made, and assist with the answering of Research Questions (RQs; specifically the User Uptake RQs) which form the basis for SP4. This deliverable is intended to be used in conjunction with the raw data collected by individual test sites to assist those partners in answering questions which may arise from their analysis. For example UURQ4 focuses on if driving behaviour is affected by the use of the NDs. Raw data from data loggers and questionnaires my suggested that driving behaviour was affected more in the UK than Sweden when using GDS (test sites used for illustrative purposes only), this deliverable will assist in answering _why_ these differences may occur. For example factors such as screen size and quality, time to boot up, or method of information presentation may have affected perceived usefulness or amount that the ND was actually used, thus affecting actual driving performance differences.

This deliverable presents the results collected based on the framework developed and presented in D4.10.1. For Task 4.10.2 each national test site was asked to provide information about the technical performance of the devices evaluated, some summary information regarding User Uptake and other issues, ergonomic issues such as device location and HMI design, as we as providing some free text to highlight any issues regarding the ND which may have had an influence on the completion of the FOT.

Included in Annex 1 is a worked example of the framework to add some context to the results, which are presented in Annex 2. This deliverable should be used in conjunction with D4.10.1 which gives more background to the WP and evaluations. Whilst the results have been presented in tabular form in Annex 2, an Excel spreadsheet is also available which should be used for more detailed analysis of the results.

1. INTRODUCTION

TeleFOT is a Large Scale Collaborative Project under the Seventh Framework Programme, co-funded by the European Commission DG Information Society and Media within the strategic objective "ICT for Cooperative Systems".

Officially started on June 1st 2008, TeleFOT aims to test the impacts of driver support functions on the driving task with large fleets of test drivers in real-life driving conditions.

In particular, TeleFOT assesses via Field operational Tests the impacts of functions provided by aftermarket and nomadic devices, including future interactive traffic services that will become part of driving environment systems within the next five years.

Field Operational Tests developed in TeleFOT aim at a comprehensive assessment of the efficiency, quality, robustness and user friendliness of in-vehicle systems, such as ICT, for smarter, safer and cleaner driving.

This deliverable reports on the activities undertaken in WP 4.10 Technical Evaluations. This WP comprises two tasks; Task 4.10.1 System Performance Targets and Task 4.10.2 Actual System Performance. The main objective of this WP was to identify and define the target and actual technical performance metrics for the various nomadic systems used in the national Field Operational Trials (FOTs) to enable cross FOT comparisons to be made. Deliverable 4.10.2 builds on the framework set out in D4.10.1 – for a more detailed explanation of the WP please see this document.

Annex 1 shows a worked example of the 'System Performance Framework' described in D4.10.1, this was sent out to each TeleFOT partner who was conducting a FOT (either Detailed or Large Scale). Responses were collated by the WP leaders and combined into the tables which can be seen in Annex 2. An MS Excel version of Annex 2 is also available for partners who wish to either view and download the HMI screenshots, copy and paste the comments, or work with the raw data in Excel; this can be found at: http://telefot.openinno.fi:8080/bin/view/SP4Evaluation/FOT+System+Technical+Performance.

ANNEX 1: SYSTEM PERFORMANCE FRAMEWORK – WORKED EXAMPLE

General Instructions to Complete this Document

A separate template should be completed by EACH test site for EACH nomadic device/application trialled in both DFOT and LFOT.

This template should be completed by the Test Site Manager, or someone who has significant experience both using the system and also detailed knowledge of participants' views on the system under evaluation.

Please include any further comments that you may have on the 'Comments' sheet, this more detailed information will greatly assist the people using this document to answer RQs and add context to specific questions.

The template consists of:

- Definition of the Specific FOT and Personnel responsible for the assessment
- Date of Assessment
- Definition of the design of the Device
- Definition of factors related to User Uptake
- Definition of Other Factors related to Test Site experience of deploying and trialling the Device
- Definition of system performance in relation to time to activate, access to functionality and shut down
- Definition of number of control inputs to activate, access to functionality and shut down
- Definition of any further comments that the test site has in relation to system performance experienced during the FOT

In addition any manufacturer derived product information, including instruction manuals and any target performance manuals should also be collated at each test site for each device/application.

The completed templates should be completed in MS WORD or EXCEL format by the Test Site.
Instruction manual and any other manufacturer supplied information should be produced in Acrobat format (.pdf).

Both of these items should be sent to the WP4.10 leaders at MIRA.

MIRA   Stewart Birrell   stewart.birrell@mira.co.uk
       Mark Fowkes   mark.fowkes@mira.co.uk

Table A1.1: Evaluation of trialled system in TeleFOT – FOT Definition (Worked Example)

TeleFOT Country Code	UK
TeleFOT FOT Code	DFOT2
Primary Function of System Evaluated	Green Driving Support System (GDS)
Secondary Function(s) of System Evaluated	Lane Departure Warning (LDW), Forward Collision Warning (FCW)
System Name	Foot-LITE
Evaluation completed by	Stewart Birrell - MIRA
Role in Test Site	Test Site Manager
E-Mail Contact Details	stewart.birrell@mira.co.uk
Telephone Contact Details	+44 024 7635 8073
Date of Evaluation	06/02/2012

Table A1.2: Specific ND System/Function Physical Definition (Worked Example)

Host Device			Screen Specification					Preferences	
Nomadic Device (Y/N)	Secondary function	Vehicle Mounting	Screen Size (cm - HxW)	Screen Resolution	Colour (Y/N)	Orientation	User Interface (Touch/Hard/ Soft Key)	User Stored Favourites (Y/N)	Customisable Preferences (Y/N)
Y	Smartphone	Windscreen	5.7 x 9.4	480 x 800	Y	Portrait	Touchscreen	Y	N

HMI Feedback				Unit Specification				Adjustability	
Visual (Y/N) - (Text/ Graphic)	Audio (Y/N) - (Speech/ Tone)	Haptic (Y/N) - (Location)	Principle Feedback	Unit size (cm - HxWxD)	Weight (g)	Battery Life - Standby (h)	Battery Life - Usage (mins)	Volume - (Simple/ Complex/No)	Brightness - (Simple/ Complex/No)
Y - Graphic	Y - Speech	N	Visual	12.2 x 6.7 x 1.1	157	490	380	Simple	Complex

Notes to Complete A1.2

Host Device
- Is the host device 'Nomadic' i.e. can be removed from the car after use? Does the device have a secondary function, if so what is this? How is the device mounted in the vehicle: Windscreen holder, Specific vehicle mounting or No specific mounting etc?
- *In the worked example the Host Device is a Smartphone upon which the GDS is an application, device mounted on the windscreen*

Screen Specification
- These questions relate to the physical properties of the screen of the host device: Screen size, Resolution, Colour, Orientation, User Interface
- *In the worked example the characteristics of the visual display is described*

Preferences
- Does the system allow user defined preferences or favourites to be established?
- *In the worked example, these were judged as Yes and No respectively*

HMI Feedback
- How is the feedback presented to the driver in the vehicle by the host device: Visual (Text/Graphical), Audio (Speech/Tone) or Haptic (Location of the haptic feedback). In what form is the feedback principally offered to the driver: Visual, Audio or Haptic
- *In the worked example the Host Device has both an audio and visual interface, visual is primary*

Unit Specification
- Relates to physical properties of the host device: Size, Weight and Battery life
- *In the worked example these aspects are described and data on battery life quoted from manufacturers specifications*

Adjustability
- Can the volume and brightness be adjusted by a reasonably experienced user to enable use in all driving scenarios: Is this process Simple, Complex or Not possible
- *In the worked example, these were judged as Simple (Auditory Volume) and Complex (Visual Brightness)*

Table A1.3: User Aspects 1 (User Uptake) Definition – Test Site Perceptions (Worked Example)

Usability				Benefits	
To what extent was the system used	Initial reaction to the system	Impressions change during the test	Reasons given for this change	Benefit of having access to system	Main reason for benefit
100	Positive	N/A	N/A	Large benefit	Safety

Trust	Design		Future Usage
System would provide accurate information	Opinion on Design of Device	Opinion on Design of User Interface	Future use & paying to use system
Moderate	Attractive design	Learning	26-50

Notes to Complete A1.3

This section can only be completed if the User Uptake questionnaire has been completed for the FOT. If multiple questionnaires have been completed at different stages throughout the FOT, please use the 'Post' FOT User Uptake Questionnaire (UUQ) results.

Usability
- To what extent was the system used - Refers to Q1a of UUQ - Answers available: 0, <25, 50-75, >75, 100 (this will be 100% for systems only analysed during DFOTs)
- Initial reaction to the system - Q2 - Very negative, Negative, Neutral, Positive, Very positive (can be completed for L & DFOTs)
- Impressions change during the test - Q3a - Considerably negative, Somewhat negative, Unchanged, Somewhat positive, Considerably positive (N/A for DFOTs)
- Reasons given for this change - Q3b & d - Convenience, Efficiency, Safety, Reliability, Usability, Other
- *In the worked example, the system was used 100% of the time as it used during a DFOT, with the initial reaction to the system being stated as positive. As participants only used the system on the one occasion changes in impressions were not applicable*

Benefits
- Benefit of having access to system - Q4a - No benefit, Small benefit, Moderate benefit, Large benefit, Very large benefit
- Main reason for benefit - Q4b - Convenience, Efficiency, Safety, Reliability, Usability, Other
- *In the worked example, the system was judged as being a large benefit and the main reason given for this were safety features*

Trust
- System would provide accurate information - Q5 - Not at all, Small, Moderate, Large, Completely
- *In the worked example, participants rated their trust in the system according to the UUQ as moderate*

Design
- Opinion on Design of Device - Q8 - Easy to carry, Easy to transfer, Attractive design, Quality, Size of screen, Design match
- Opinion on Design of User Interface - Q9 - Installation, Manual, Learning, Text on screen, Symbol size, Symbol meaning, Control (stationary), Control (driving), System response, Understand info, Amount of info, Help function, Error messages
- *In the worked example, the most common answers given by participants related to the attractive design and learning*

Future Usage
- Future use & paying to use system - Q11, 12 & 13 - Not use, Not pay, 1-10, 11-25, 26-50, 51-100, >100
- *In the worked example, between £26-50 was the average amount being prepared to pay*

Table A1.4: User Aspects 2 (Other Factors) Definition – Test Site Perceptions (Worked Example)

Usability				Reliability	
Ease to interpret information given by user	System responds fast enough to user changes	Ease to amend driving based on advice given	Ease of set up & installation	Systems would rarely crash or freeze	System would always start up
4	3	5	NA	2	3

Trust		Usefulness		User Support	
User would follow the advice given	Systems would generally give good advice	Most useful aspect of the system	Least useful aspect of the system	User Manual Supplied (Y/N) - (Online/Paper)	After Sales Support (Y/N) - (Online/Phone)
4	3	Safety features	Audio	Y - Both	N

Notes to complete A1.4

NB: Questions not taken from a generic TeleFOT questionnaire.

Ratings on a general scale of, the higher the score the better it performed, i.e.:

1 = Poor, difficult, disagree, never;
5 = Good, easy, agree, always.

- **Usability:** Based on the general opinions of participants how would you summarise their experience using the system.
- *In the worked example, the system was rated as being easy to interpret the information given and amend driving based on this feedback, with the system generally responding fast enough, but ease of installation was not applicable during the DFOT*

- **Reliability:** How would you rate the reliability of the system evaluated, both in terms of starting up and then crashing when in use.
- *In the worked example, the test site manger rated the system as not always starting up when requested and that it would on occasion freeze or crash during operation*

- **Trust:** Would participants generally follow the advice given by the system or ignore it, and what was the interpretation of the participants regarding the accuracy and completeness of the advice given.
- *In the worked example, trust in the system by participants was generally high*

- **Usefulness:** Based on participant's feedback what were the most and least useful aspects of the system (please indicate as many as you feel appropriate).
- *In the worked example, the safety features were rated as the most useful aspect of the system with the audio given the least*

- **User Support:** Is a user manual supplied with system (either online, a physical paper copy or both), and is there any aftersales support offered with the system (whether or not participants use this support is not important, just if it is offered).
- *In the worked example, both an online and physical manual were available (however these were never offered or used by the participants), with no aftersales support offered as the system is not a current market ready product*

Table A1.5: Usability – Timings Definition (Worked Example)

System Activation				Total Time to System Activation	System Adjustments		Time to System De-Activation
Main Menu	Primary Function	Primary Application	Auto Start-up		Primary Function	HMI Function	
47	NA	24	NA	71	21	21	23

Notes to Complete A1.5

Note all time recorded in seconds. If there is variability in any of these timings based upon any system configuration aspects, then please give range of timings and record possible reasons for this in the later comments section.

- Time to access **'Main Menu'** or homepage of the host device, or first screen where multiple user options are available (i.e. not the disclaimer screen, passcode input, or screen unlock etc).
- *In the worked example, it took 47 seconds for the Smartphone to turn on and load the main menu*

- Time to access **'Primary Function'** of Satnav system from the main menu (i.e. navigation to destination mode with NS(S or D), relevant route or destination traffic information with TI, or ability to present speed limit of current location with SLI etc).
- *In the worked example, the host device is a Smartphone so the primary function is considered to be a phone so this is N/A*

- Time to access **'Primary Application'** of Smartphone system from the homepage (i.e. navigation to destination mode with NSS, or feedback being given in GDS).
- *In the worked example, it took a further 24 seconds to access the GDS application from the Smartphones main menu*

- Time for **'Auto Start-up'** from ignition on to system being fully functional.
- *In the worked example, the Smartphone requires turning on so there is no auto start up, hence N/A*

- **'Total Time to System Activation'** (i.e. from system off to fully functional).
- *In the worked example, the total time is the time to access the main menu, plus primary application, so 71 seconds in total*

- Time to adjust **'Primary Function'** parameter (i.e. something that is central to the primary function of the system, namely change a destination with NS(S or D), change threshold of SA, or sensitivity of GDS or ACC.
- *In the worked example, the time to adjust the sensitivity of certain information presented was 21 seconds*

- Time to adjust **'HMI Function'** (i.e. this will normally be changing the volume of the system, if no audio present then changing a visual aspect of the display).
- *In the worked example, the time to adjust the volume was also 21 seconds as it was accessed from the same menu*

- **'Time to System De-activation'** (i.e. from fully functional to system off).
- *In the worked example, from the GDS being active and feeding back information to the diver to fully off was 23 seconds*

Table A1.6: Usability – Interaction Definition (Worked Example)

System Activation			Total Number to System Activation	System Adjustments		Number to System De-Activation
Main Menu	Primary Function	Primary Application		Primary Function	HMI Function	
1	NA	5	6	5	5	4

Notes to Complete A1.6

Note interactions with the host device should be calculated, whether pressing physical buttons on the device or interacting with the touchscreen. Within this analysis inputting multiple values on the same screen (e.g. entering a four digit PIN code or a 6 digit post (aka zip) code only count as one interaction). However, entering a post code followed by a street number, then selecting to confirm the address will count as three different interactions on different screens not just one.

- Number of menu levels, pages which require user input, or screens which have to be negotiated to access **'Main Menu'** or homepage screen.
- *In the worked example, the number of interactions with the host device was calculated based on the same parameters as described previously in 'Notes to Complete A1.4'*

- Number of menu levels, pages which require user input, or screens which have to be negotiated to access **'Primary Function'** of Satnav system from the main menu.

- Number of menu levels, pages which require user input, or screens which have to be negotiated to access **'Primary Application'** of Smartphone system from the homepage.

- **'Total Number to System Activation'** (i.e. from system off to fully functional).

- Number of menu levels, pages which require user input, or screens which have to be negotiated to adjust **'Primary Function'** parameter.

- Number of menu levels, pages which require user input, or screens which have to be negotiated to adjust **'HMI Function'**.

- **'Number to System De-Activation'** (i.e. from fully functional to system off).

Table A1.7: Further Comments concerning ND performance observed in the FOT – (Worked Example)

Questions	Free Text Response
Please Indicate the TeleFOT FOT REFERENCE	UK DFOT2 – GDS: Foot-LITE
Please indicate here any comments you have regarding the Host Device	Participants liked the fact that the Foot-LITE system was hosted on a Smartphone as there was no need to carry another device into the car. As this was a DFOT no assumption can be made as to if participants would turn the system on for all journeys.
Please indicate here any comments you have regarding the User Uptake	Whilst participants were generally positive about the Foot-LITE system in the DFOTs some participants were irritated by the 'Lane positioning feedback' which was deemed too frequent and sensitive, this reduced user acceptance and future use.
Please indicate here any comments you have regarding Other issues - specifically reliability, usability and trust	As this was a DFOT the examiner controlled the system (start-up/shut down) and would reboot the system if it crashed or froze - which occurred to some extent on about 25% of journeys. This would not be tolerated by participants in an LFOT who would probably just not use the system in the future.
Please indicate here any comments you have regarding Timings and Number	Again as this was a DFOT the examiner controlled the system so there was no participant interaction.
Please indicate here any other comments you have	Foot-LITE was seen as a safety device first and foremost, with eco driving information an added value. Similar weather conditions were present through the trials.

Further Supporting Information – Please include Screenshots of HMI, Specific Issues etc (Worked Example)

UK DFOT2: The following images are screen shots of the ND display screen showing the GDS real-time feedback screen in operation.
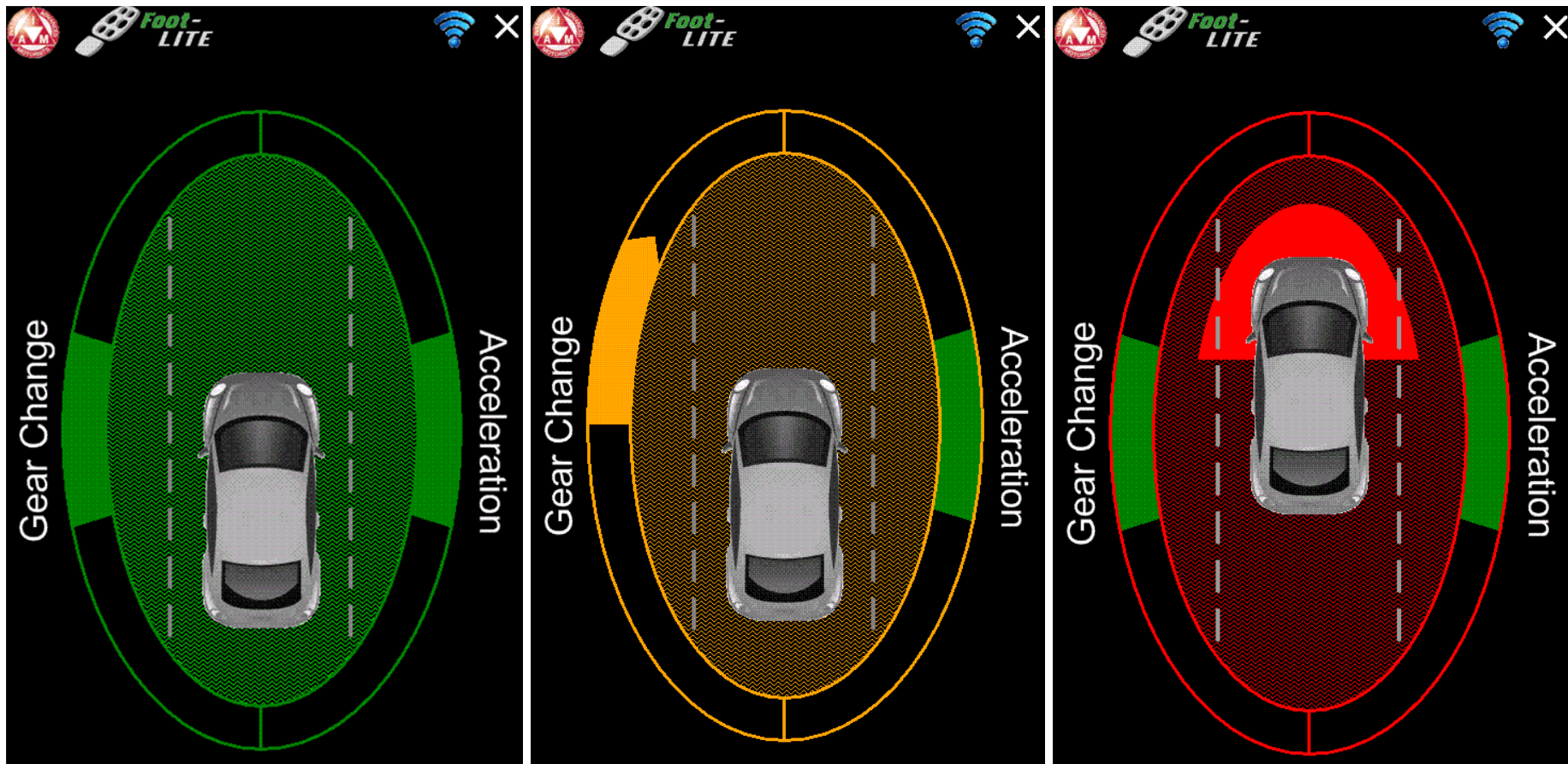
ANNEX 2: COLLATED NATIONAL FOT SYSTEM TECHNICAL PERFORMANCE SPECIFICATIONS

See PDF for a tabular version of the results, or MS Excel Workbook '4.10.2_Collated Results' for more detailed analysis.