DataVault – Message Interface
User Guide

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2 Introduction

This document describes the functionality of the DataVault Message Interface (MI) and shows how configuration files loaded into the DataVault can be used to change the lists of information presented to the pilot.

As well as this document, a PC based simulator is available to enable pilots to practise simulator operation outside the cockpit. The simulator mimics all key functionality of the MI. The illustrations in this document are drawn from the PC simulator.
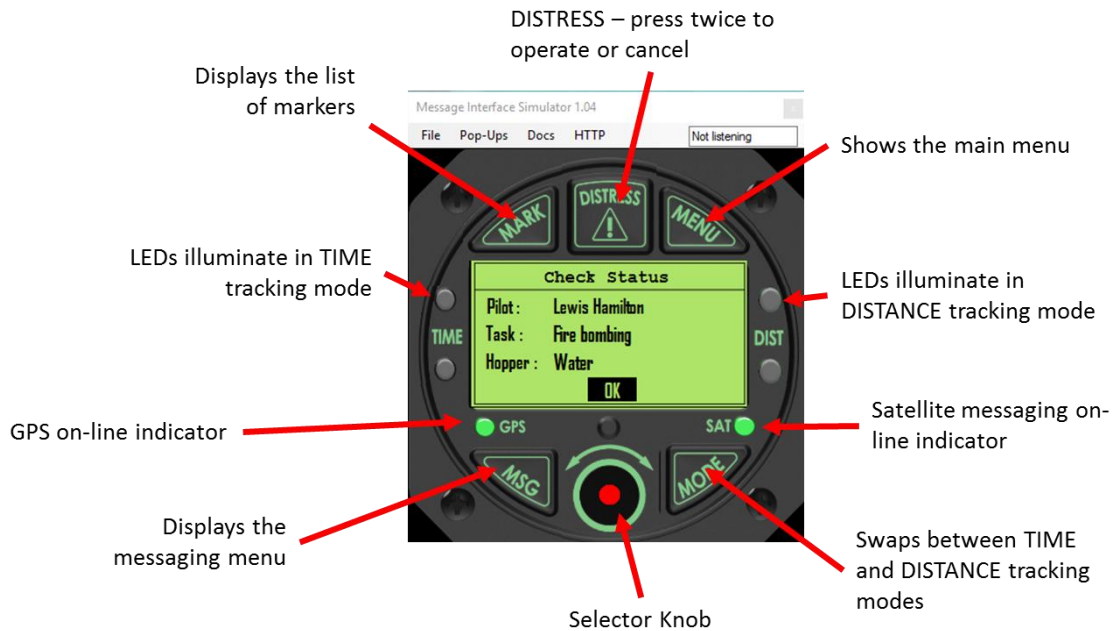
The simulator enables sending of certain message types to the MI, and also shows the responses sent back to the originator.

3 Document History

Version	Date	Reason For Issue
A	18 November 2016	First release
B	20 November 2016	Formatted document

4 Layout

The overall layout of the MI is shown below:

5   Screen Displays

5.1   Launch Screen

The launch screen (shown above) appears when the system is powered on. It is used to enable the pilot to confirm their name, the task type and material being carried in the hopper. These values are "remembered" from previous selections. This information is transmitted around 2 minutes after power on. If the pilot makes no adjustments, the display will change to the home screen at the same time the data is transmitted.

To change the selection, rotate the Selector Knob. Each field is highlighted in turn. To activate the field for adjustment, click/press the Selector Knob. To change the value, rotate to the Selector Knob, then click/press when the data is correct. To leave the launch screen, select and click/press "OK".
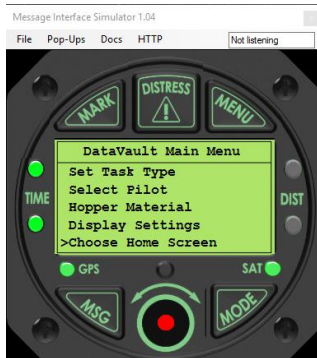
5.2   Home Screen

The default home screen shows hopper quantity and a countdown indicating the time in seconds until the next tracking interval. The tracking *__mode__* can be changed by clicking the "Mode" button. The LED illumination and the Tracker Box title will change accordingly, If the tracking mode is set to time, the Status window will show a brief message when the event is transmitted.

To change the *__distance__*, rotate the Selector Knob. To change the *__tracking time__* use the "Variations" menu item.

5.3   Setting the Home Screen

The menu system enables a variety of DataVault parameters to be adjusted. (The simulator illustrates the screens used to control the parameters, but some of the parameters themselves cannot be adjusted.)

To change the home screen, rotate the Selector Knob to highlight the relevant item and click. The display will change to show the corresponding screen.

The range of home screens is shown below:

Hppr/Dvcs/Trckr	**Hppr/GPS/Trckr**	**Trckr/GPS**	**Trckr/Dvcs**
Hppr/Dvcs	**AgLaser**	**Hppr/Cum**	
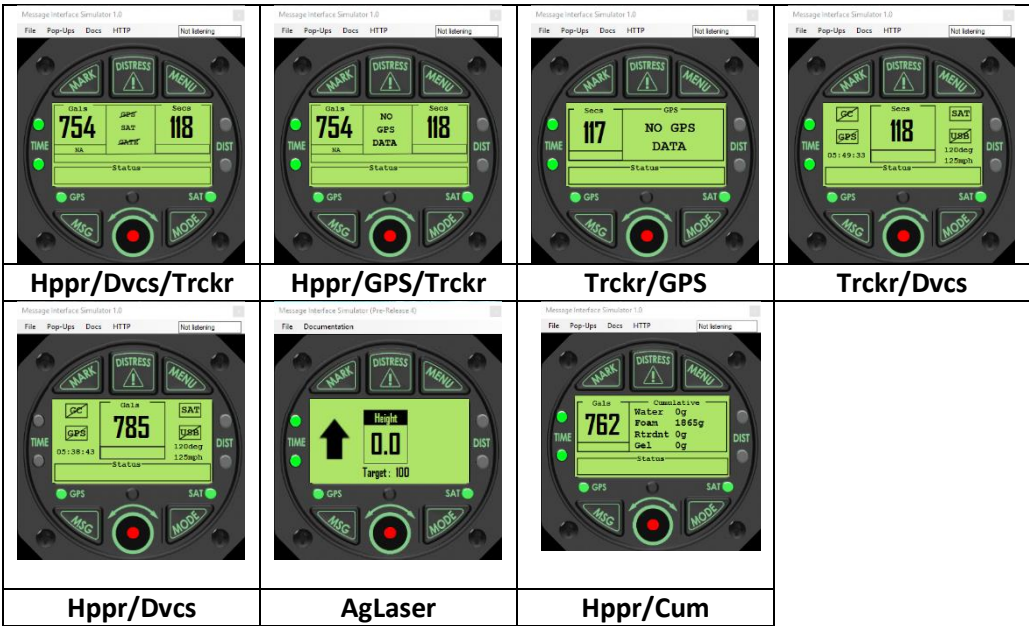
5.4   Display Units

The headings of the boxes containing values – hopper quantity, time or distance tracking – change to reflect the units selected in the "Display Units" menu item. The options are:

Value Type	Options
Volume	Gallons or litres
Distance	Statute miles (mph on speed displays)
	Nautical miles (knots/knt on speed displays)
	Kilometers (kmh on speed displays)
Height	Feet or metres
Lat/Lon	DD.ddddd or DD MM.mm

5.5   Cumulative Drop Data Screen
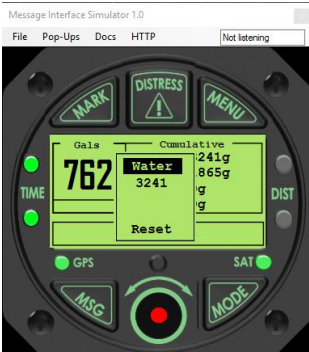
The "Hppr/Cumulative" screen shows the total quantity of fluid dropped by type. To reset this total, press Selector Knob, rotate it to select the type of fluid, then press the Selector Knob twice.

6   Menu Items

The table below explains the purpose of each menu item:

Item	Purpose	Shown In Flight
Time Summary	Provides a summary of the engine on/off and each flight time for the last mission. This is available after the engine has been switched off, so the avionics would have to be restarted for it to be complete.	No
Drop Summary	A screen of information summarising the drop quantities by retardant type since the last "Reset"	No
Waypoints	Presents a list of pre-loaded waypoints for use in the basic navigation display	Yes
Task Types	Provides the list of task types available to the pilot. These tasks are reported in the "System Start" message.	Yes
Pilots	Provides the list of pilots. The list is retrieved from the USB Flashdrive.	Yes
Hopper Material	Provides the list of materials which may be in the hopper (suppressant, retardant etc).	Yes
Display	Enables adjustment of screen brightness, contrast etc	Yes
Choose Home Screen	Enables the selection of the home screen	Yes
Motion Sensor	Shows the output of the internal motion sensor	No
GPS	Shows raw GPS data and fix quality	No
Analog Inputs	Shows the status and value of any analog inputs connected to DataVault	No
Digital Inputs	Shows the status and value of any digital inputs connected to DataVault	No
RockBlock	Shows data about the internal RockBlock and queue state.	No
Local Sensors	Shows the state of fuel sensors (if connected) and the engine on/off sensor.	No
Copy Sys Config	This will write a copy of the DataVault configuration information to a USB drive.	No
Copy File From SD	This will list log files on the internal SD card and enables them to be selected then copied to the USB Flashdrive	No
Flashdrive Test	This enables a replacement flash drive to be verified for DataVault compatibility. A file is written and read.	No
Variations	This enables the tracking time interval to be set as well as the GMT offset and Magentic variations	No
FRDS	This shows information from the gate controller.	No
Laser	This enables a laser height ranging device to be calibrated and the tolerance set.	No
Display Units	Changes the units in which information is displayed	No
About	This shows serial number and IMEI details	No

To exit from the Menu, click/press "Menu" at any time.

Notes:
1. The menu system is sensitive to the aircraft flight state so that the items most often used by a pilot are presented first.
2. Some items are not shown if the relevant equipment is not present (for example, the ability to copy files will not be shown if the Flashdrive is absent).

6.1   Time Summary

The Time Summary presents a list of flights in between "Engine Start" and "Engine Off". The summary uses the GMT Offset (set in "Variations") to the local times of each event. The display also shows the number of lifts (being a take-off with material in the tank), drops and the total flight time in hours and decimal minutes.

The Time Summary resets automatically whenever the engine starts. Therefore, the avionics would need to be re-powered after a normal engine off procedure to show the engine operating time.

6.2   Drop Summary

The drop summary shows the quantity of each type of material dropped since the last reset.

This display is updated automatically irrespective of the type of home screen selected. It is NOT automatically reset by any event to preserve daily quantities if the aircraft engine is stopped for refuelling.

6.3   Variations

The MI has a menu item to enable the operator to set special values as follows:

Value	Value	Purpose
	Tracker Time	Adjusts the time interval between dispatch of tracking messages.
	GMT Offset	The variation of the local time zone to GMT. This is used to calculate local times in the "Time Summary" menu item.
	Mag Variation	The magnetic declination of the region in which the aircraft is being operated. This is applied to the GPS ground track in navigation displays.

7 Distress Functionality

To send a distress message, the Distress key should be pressed twice. The display will show that a message has been sent. These messages are acknowledged automatically by the TracPlus service. When the acknowledgement is received, the display will indicate accordingly.

To cancel a distress call, press Distress twice.

8 Messaging to and from the Aircraft

Click "MSG" to show the list of message options. This is grouped into four sections:

- Tasks – these are special messages which provide key data about tasks including location, communication and text based information. They are sent to the device via satellite. The device shows the last 5 tasks received.
- Waypoints – waypoints can be loaded from the Flashdrive on the DataVault, or sent to the device by satellite. Selecting "Waypoint" from this menu is identical to selecting the same item from the main menu.
- Text Messages – this provides a list of text messages received.
- Check In/Out - this is a special type of outbound messaging, described below.

To exit messaging, press the "menu" key until the home screen is displayed.

8.1 Check In/Out

This feature is used to tell the fire control desk that a pilot is available for duty, or off duty, and the aircraft is serviceable. To access check-in, click "MSG" and select Check In/Out from the menu.

To change the pilot or the status, use the Selector Knob to highlight the required item, then click. The display will change to indicate that the item has been selected for adjustment and the Selector Knob can be used to change the information. When the pilot name is correct, click to select it.

Once the pilot has been chosen, rotate the Selector Knob to highlight and click "Send". The display will change to show that the message is being transmitted, and then the home screen will be shown.

8.2   Outbound Messaging – "Marking"

Outbound messaging is used to enable the pilot to "Mark" the position of a location of interest. This point will then be displayed along with the tracking data on the Tracplus map. The list of messages is configurable.

There is a special message called the "Pilot Marker". As well as sending a location message, this creates a waypoint, available from the Waypoint list, so that the pilot can return to it for further investigation if needs be.

8.3   Inbound Task Messages

Task Messages can be sent to the MI from an appropriately equipped and authorised ground station.

The MI indicates immediately that a task message has arrived. The pilot can accept or reject the message by rotating the Selector Knob and clicking the appropriate response.

The display will change to show heading to steer and the range to the target. A basic direction indicator is also provided. The range and bearing indicator update in real time.

The pilot can view the raw latitude and longitude data if, for example, they wish to enter it into the aircraft GPS. To do this, rotate the Selector Knob.

The display format can be changed between DD.ddddd and DD MM.mm using the "Display Units" option from the main menu.

To return to the NAV display, press the Selector Knob again.

The MI also shows COM and TXT data associated with the task. To move between the NAV, COM and TXT screens, press the Selector Knob.

The pilot can return to the home screen by pressing MSG at any time. Alternatively, press Menu and select Exit from the pop-up screen which appears.

8.4 Inbound Text Messages

TracPlus users can send basic text messages to the aircraft. These messages do not need to be acknowledged. The Selector Knob is used to scroll through a message which is longer than the available screen space.

To exit message display press the "MSG" or "Menu" button.

8.5 Sending Messages

The MI can send a variety of pre-programmed messages. Click "Mark" to display the list, then use the Selector Knob to select and send the message.

A pop-up window appears to confirm the despatch of the message. This example shows a "Pilot Marker" message, which also stores the location in the Waypoint list.

9   Pop Up Information Windows

The MI can inform the pilot of certain key event data via pop-up windows. These events are the times for take-off, landing and last drop quantity.

Pop up messages are displayed for about 1 minute. To close a pop-up message sooner, click the Selector Knob.

10   Configuring the Message Interface

The MI contains lists of waypoints, task types, pilots, retardants and the pre-defined outbound message texts. These lists are controlled by configuration files read from a USB Flashdrive when the system is initially powered on. Once a configuration file has been read by the DataVault, it is deleted from the Flashdrive.

These lists are the <u>only</u> way in which items in lists can be removed, added or amended.

The following sections describe the format of each configuration file.

> *Note: The format must be followed precisely, otherwise a DataVault may become unresponsive during or after attempting to load incorrectly formatted data. In particular, each file must have the "// end of file" marker.*

10.1   Waypoints

The filename must be "wpoints.txt". The format of a file is shown below:

```
<FT><UWPT><WPT_ID><YWGT><WPT><WANGARATTA><LAT><-36.4166><LON><146.3084><CTAF><><TWR><><APP><><TEL1><><TXT><>
<FT><UWPT><WPT_ID><YWBL><WPT><WARRNAMBOOL><LAT><-38.2936><LON><142.4477><CTAF><><TWR><><APP><><TEL1><><TXT><>
<FT><UWPT><WPT_ID><N/A><WPT><YANAKIE><LAT><-38.9546><LON><146.2844><CTAF><><TWR><><APP><><TEL1><><TXT><>
// end of file
```

Each line comprises a single waypoint, defined by a series of data fields. A reference to the data field types and permissible values is available on request.

10.2   Task Types

The filename must be "tsktypes.txt". The format of a file is shown below:

```
FBMB-C|Fire bombing (C)
FFRY-C|Ferry (C)
FOTH-C|Other (C)
FTRN-C|Training (C)
FOTH-N|Flight (NC)
FFRY-N|Ferry(NC)
FTRN-N|Training (NC)
FTST-C|Flight test (C)
FTST-N|Flight test (NC)
FTPT-C|Transport (C)
FTPT-N|Trnsprt (NC)
FAIG-C|Ignition (C)
FAAS-C|Supervision (C)
FLSC-C|Line scan (C)
GTST-N|Grnd test (NC)
GOTH-N|Grnd (NC)
// end of list
```

Each line comprises a 6 character code and the name of the task type, separated by the pipe character ("|"). The code is transmitted as part of a system startup message and must be exactly 6 characters in length.

The task type name appears on the MI and should be no more than 19 characters.

10.3   Pilots

The filename must be "pilots.txt". The format of the file is shown below:

```
FIELD AIR PILOT|FA Pilot
ArmsXXXX, D|111111
XXXX, D|222222
CXXXX, G|333333
DXXX, J|4444444
EXXX, M|55555
HXXXX, B|666666
//end of list
```

Each line comprises the pilot name, which is shown on the lists in the MI, and their identifier (licence number etc) seperated by "|". The pilot name and identifier must be no more than 20 characters each.

The identifier is sent in the system start message.

10.4   Retardants

The filename must be "retardant.txt". The format of the file is shown below:

```
Water|WT|Water
Foam|FM|Foam
Retardant Any|RT|Rtdnt
PhosChek MVP-F|RT|Rtdnt
PhosChek MVP-Fx|RT|Rtdnt
PhosChek LC95-A|RT|Rtdnt
Gel Any|GL|Gel
Gel BlazeTamer|G1|Gel
Gel FireIce|G2|Gel
Gel ThermoGel|G3|Gel
// end of list
```

Each line comprises three parts, each separated by the "|" character. By example:
- "Gel BlazeTamer" is the name shown to the pilot when a hopper is refilled, or the "Hopper Material" menu item is selected. This should be no longer than 19 characters to fit on the displays.
- "G1" is the code of the product sent in hopper refill and system start messages. This must be exactly 2 characters.
- "Gel" is the material group code used in the Drop Summary menu item and the cumulative drop screen. This should be no more than 5 characters.

10.5 Pre-Formatted Outbound Messages

The filename must be "messages.txt". The format of the file is shown below:

```
Fire
Groundcrew at risk
Public in danger
Property at risk
Fill point
Hazard
// end of list
```

This list is shown when the "MSG" button is pressed and is sent as text message. It should be no longer than 20 characters.