Customizable User Displays have always been key to the utility of Test

SLATE. Test SLATE's built-in Display functions enable you to select from an array of display widgets linked to any I/O channel or calculated tag. Display widgets include alphanumeric text and tables, graphic trend plots, and analog gages and meters. Specialized planar displays are available to display pressure or temperature gradients across a test surface in real time. An almost unlimited number of each display widget can be combined on multiple Display windows for each configuration. Custom displays for facility control or other purposes can be developed for each application. At any time – whether before, during, or after a test – a user may configure new displays or modify existing displays.



Sample display widgets



Example integrated display

# **Test SLATE Interactive Controls and Displays**

# **Jacobs**

Test Execution Diagnostics Car Interior × Operation



#### Example integrated display

#### Test SLATE OPC data server.

Test SLATE can be configured to act as a data supplier using standard OPC protocol, enabling any off-the-shelf data display or analysis package to be a client to active Test SLATE tags such as analog measurements or calculated values. Standard HMI packages enable you to define custom displays or analyses with the software tool of choice as long as it is OPC compliant. The need to have programming skills to customize is eliminated, and you are able to implement user interface displays as simple or as complex as needed. This also enables other OPC compliant software packages, such as a programmable logic controller (PLC), to share real-time access to any measurement or control tag in the Test SLATE configuration.

#### Test SLATE test initialization forms.

Test SLATE includes configurable test initialization forms. A test initialization form allows the storage and printing of user-specified information with the test data. The Test Initialization window is displayed to the test operator when a test is initialized. The standard initialization window contains information such as run number, test number, test engineer, test operator, etc. Test SLATE also allows a user customizable initialization through Excel where Comments mark tag names that can define values imported for use in calculations, stored with test data, used for limit checking, etc.

# **Test SLATE Interactive Controls and Displays**

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| B11  |                        | Model S      | cale               |                 |                      |              |       |        |                    |                                   |                              |   |                   |               |                     |               |
|      | в                      | C            | D                  | F               | F                    | G            | н     | d in   | ĸ                  | 1                                 | м                            | N   | 0                 | Р             | 0                   |               |
| 1    | TEST VEHICLE DIMENSION | S REPORT     | - TS15             | -               | last update:         | 3-Dec-15     |       |        | MGP .geo FIL       | .E                                |                              |   |                   |               | 4                   |               |
| 2    | Test Description       | master confi | a                  |                 |                      |              |       |        | Test Description   | master config                     |                              |   |                   |               |                     |               |
| 3    | Test Engineer          | Jan          |                    |                 |                      |              |       |        | Test Engineer      | Jan                               |                              |   |                   |               |                     |               |
| 4    | Test Number            | 1            | (Numerals only)    |                 |                      |              |       |        | Test Number        | 1                                 |                              |   |                   |               |                     |               |
| 5    | Test Date              | 1-Jun-22     |                    |                 |                      |              |       |        | Test Date          | 1-Jun-2                           | 2                            |   |                   |               |                     |               |
| 6    |                        |              |                    |                 |                      |              |       |        |                    |                                   |                              |   |                   |               |                     |               |
| 7    | Excel Log Template     | C:\Excel Tem | plates\Excel I     | og Example Te   | emplate xitm         |              |       |        | Geo File for RRS   | \\XXXX\WT\RRS Geo                 | Files\Geo-K2CG               | reo.  |                   |               |                     |               |
| 8    |                        |              |                    |                 |                      |              |       |        | Geo File for AMI   |                                   | •                            |   |                   |               |                     |               |
| 9    |                        | blue number  | are calculate      | d values        |                      |              |       |        |                    |                                   |                              |   |                   |               |                     |               |
| 10   |                        | Model Dim    | Full Scale         | a raideo        | Database info        |              |       |        | Strut (PRP) Loca   | t Location (RPR Locai             | tons)                        | WDI Relt wid  | th                | Center Belt V | lidth               |               |
| 11   | Model Scale            | 0.4000       | <u>. un o'curo</u> |                 | Model Year           | 2015         | •     |        | Strut location LF  | G1                                | 1                            | 160 m   | m                 | 1             | 100 mm              |               |
| 12   |                        | •            |                    |                 | Make                 | GMC          |       |        | Strut location RF  | E1                                | 3                            | 160 m   | m                 |               |                     |               |
| 13   | Frontal Area           | 0.520        | 3.250              | m²              | Model                | Sierra       |       |        | Strut location LR  | G1                                | 5                            | 160 m   | m                 |               |                     |               |
| 14   | Side Area              | 1,197        | 7.483              | m²              | Platform Code        | K2CG         |       |        | Strut location RR  | E1                                | 5                            | 160 m   | m                 |               |                     | _             |
| 15   | Volume                 | 0.960        | 15.003             | m <sup>3</sup>  | Aerodynamic Drag?    | Y            |       |        |                    |                                   |                              |   |                   |               |                     |               |
| 16   |                        |              |                    |                 | Radiator Flow?       | Y            |       |        | WDU locations      | calculated base on<br>Veh. Dimen. | actual, after<br>adjustments | wdul Ev. m  | Rotation C        | enter Coordin | ates                |               |
| 17   | Overall Length         | 2327.0       | 5817.5 r           | nm              | Noise?               | N            |       |        | WDU LF x           | -731.                             | 5 -731.5                     |   | x_m               |               | 0.0 mm              |               |
| 18   | Overall Height         | 735.0        | 1837.5             | nm              | Underhood Flow?      | N            |       |        | WDU LF y           | 349.7                             | 5 0                          |   | y_m               |               | 0.0 mm              |               |
| 19   | Overall Width          | 802.0        | 2005.0 1           | nm              | Brake Cooling?       | N            |       |        | WDU RF x           | -731.                             | -731.5                       |   | z_m               |               | 0.0 <sup>°</sup> mm |               |
| 20   | Front Overhang         | 395.0        | 987.5 r            | nm              | Pressures?           | N            |       |        | WDU RF y           | 349.7                             | 349.75                       |   |                   |               |                     |               |
| 21   | Rear Overhang          | 470.0        | 1175.0 r           | nm              | Flow Visualization?  | N            | 1     |        | WDU LR x           | 731.                              | 731.5                        | R   | ide At measurn    | nent location |                     |               |
| 22   |                        |              |                    |                 | Underbody Flow?      | N            | ]     |        | WDU LR y           | 349.7                             | 349.75                       | F   | ont Axle Loc      | -73           | 31.5                |               |
| 23   | Wheelbeesleft          | 4400.0       | 0057 5             |                 | Deer Obuit Lee       | 5005         |       |        | WDU KR X           | 731.                              | 731.5                        | R   | ear Axle Loc      | 73            | 31.5                | $\rightarrow$ |
| 24   | Wheelbace Bight        | 1463.0       | 3057.51            | nm              | Rear Strut Loc.      | FURE         | -     |        | WDU KR y           | 349.7                             | 349.75                       |   |                   |               |                     | $\rightarrow$ |
| 25   | Wheelbace              | 1463.0       | 3057.5             |                 | Strut-Axie dist. FR1 | 294          | mm    |        | Diatton Lit 7 (DD) | P coordinator)                    |                              |   |                   |               |                     |               |
| 20   | Revnolds No. Length    | 1463.0       | 3657.5             | mm              | Suut-Aue dist. REAR  | 390          |       |        | WDILLE             | (coordinates)                     |                              |   |                   |               |                     | $\rightarrow$ |
| 27   | Front Tread            | 600.5        | 1748 0             | mm              | Struthase Left       | 701          | mm    |        | WDURE              | -91.                              | 7                            |   |                   |               |                     | $\rightarrow$ |
|      |                        | 058.5        | 1740.01            |                 | ou dibase, Leit      | 701          |       | -      | 100 M              | -92.                              |                              |   |                   |               |                     |               |
| -(   | CustomInit             | ÷            |                    |                 |                      |              |       |        |                    | -                                 |                              |   |                   |               |                     | ►             |
|      |                        |              |                    |                 |                      |              |       |        |                    |                                   |                              | B   | # @ U             | 1 -           |                     | 1 0.20/       |

### Test SLATE message logging.

Test SLATE keeps a log of messages that can be viewed through the Test SLATE application and exported into other text formats. Messages can contain information, warnings, and errors that are reported by various components of the system (i.e., drivers, Test SLATE menus, and Test SLATE background processes, etc.). Each entry in the log contains the severity of the message (i.e., information, warning, or error), the date and time of occurrence, the source of the message, a numeric message code, and the text message associated with the error code. Messages may be filtered by selecting options from a filter dialog box available from the Message Log display.

| M              | 107.0.0.1                   |                |                |                |   |
|----------------|-----------------------------|----------------|----------------|----------------|---|
| Message Log (. | 127.0.0.1)                  |                |                |                |   |
| 🔵 Errors 🛕 V   | Varnings 🕕 Info 🔆 Debug 🕟 📢 | S Export Clear |                |                |   |
| Туре           | Time Stamp                  | Code           | Node           | Source         | Text  |
| Info           | 09/27/2022 10:04:07.183 AM  | 4              | USTHA2LHZ7XCK3 | DATASTORE      | Group 1 Storage Request Complete  |
| Info           | 09/27/2022 10:04:07.283 AM  | 97             | USTHA2LHZ7XCK3 | DATASTORE      | Group 1 (Record 201) data storage initiated: Duration 0 min 10.00 secs , Samples to Average 1, Rate 0 min 1.00 secs .         |
| Info           | 09/27/2022 10:04:17.483 AM  | 4              | USTHA2LHZ7XCK3 | DATASTORE      | Group 1 Storage Request Complete  |
| Info           | 09/27/2022 10:04:17.733 AM  | 0              | USTHA2LHZ7XCK3 | TEST SEQUENCER | Test Sequence Completed Normally  |
| Info           | 09/27/2022 10:04:18.233 AM  | 2              | USTHA2LHZ7XCK3 | TEST SEQUENCER | TEST SEQUENCER Stopped  |
| Warning        | 09/27/2022 10:04:18.237 AM  | 361020         | USTHA2LHZ7XCK3 | Test Sequencer | The following Test Seg Tags are not defined: Test Seg. Current Selective Schedule, Test Seg. Current Selective Schedule. Desc |

#### Example message log

### Test SLATE diagnostics.

Diagnostic displays provide the capability to isolate problems using software tools that display raw inputs as well as engineering unit data. These features are important to avoid costly downtime and excessive operational complexities. Test SLATE's diagnostic capabilities enable you to view all values for analog input, digital input, analog output, digital output, frequency input, and calculated tags. Test SLATE also provides control of analog output and digital output tags and reports the status of all tags (i.e., high trip, high alarm, low alarm, low trip, etc.).

Jacobs

# Test SLATE Interactive Controls and Displays

# **Jacobs**

| Test Ex | ecution | Diagn     | ostics | х |
|---------|---------|-----------|--------|---|
| Analog  | Digital | Character |        |   |

| Drag a column header here to gr | oup by that column |             |            |           |          |           |                 |                  |        |
|---------------------------------|--------------------|-------------|------------|-----------|----------|-----------|-----------------|------------------|--------|
| Tag                             | ▲ Channel          | Tag<br>Type | Count Data | Millivolt | Cal Data | Cal Units | Display<br>Data | Display<br>Units | Source |
| AIRSPEED                        | AIRSPEED           | AI          | 0.0        | 0.0       | 0.0      | KPH       | 0.0             | KPH              | OPC    |
| AIRSPEED_Setpoint               | AIRSPEED_setpo     | AO          | 0.0        | 0.0       | 0.0      | KPH       | 0.0             | KPH              | OPC    |
| AIRSPEED_Slope                  | AIRSPEED_slope     | AO          | 1.0        | 1.0       | 0.0      | KPH       | 1.0             | KPH              | OPC    |
| AIRTEMP                         | AIRTEMP            | AI          | 0.0        | 0.0       | 0.0      | °C        | 0.0             | °C               | OPC    |
| AIRTEMP_setpoint                | AIRTEMP_setpoint   | AO          | 0.0        | 0.0       | 0.0      | °C        | 0.0             | °C               | OPC    |
| AIRTEMP_slope                   | AIRTEMP_slope      | AO          | 1.0        | 1.0       | 0.0      | °C        | 1.0             | °C               | OPC    |
| ASSP                            | ASSP               | AO          | 0.0        | 0.0       | 0.0      | °C        | 0.0             | °C               | OPC    |
| Avg_BL_L1                       | Avg_BL_L1          | AI          | 22.0       | 21.9      | 21.9     | °C        | 21.9            | °C               | OPC    |
| Avg_BL_L2                       | Avg_BL_L2          | AI          | 22.2       | 22.1      | 22.1     | °C        | 22.1            | °C               | OPC    |
| Avg_BL_R1                       | Avg_BL_R1          | AI          | 22.1       | 22.0      | 22.0     | °C        | 22.0            | °C               | OPC    |
| Avg_BL_R2                       | Avg_BL_R2          | AI          | 22.2       | 22.1      | 22.1     | °C        | 22.1            | °C               | OPC    |
| Avg_FL_L1                       | Avg_FL_L1          | AI          | 21.1       | 21.1      | 21.1     | °C        | 21.1            | °C               | OPC    |
| Avg_FL_L2                       | Avg_FL_L2          | AI          | 21.3       | 21.3      | 21.3     | °C        | 21.3            | °C               | OPC    |
| Avg_FL_R1                       | Avg_FL_R1          | AI          | 21.2       | 21.2      | 21.2     | °C        | 21.2            | °C               | OPC    |
| Avg_FL_R2                       | Avg_FL_R2          | AI          | 21.4       | 21.4      | 21.4     | °C        | 21.4            | °C               | OPC    |
| BatVlt                          | BatVlt             | AI          | 12.1       | 12.2      | 12.2     | Volts     | 12.2            | Volts            | OPC    |
| BloAmp_Frt                      | BloAmp_Frt         | AI          | 5.1        | 5.2       | 5.2      | AMPS      | 5.2             | AMPS             | OPC    |
| BloVlt_Frt                      | BloVIt_Frt         | AI          | 11.9       | 11.8      | 11.8     | Volts     | 11.8            | Volts            | OPC    |
| BlowerAirIn                     | BlowerAirIn        | AI          | 24.3       | 24.4      | 24.4     | °C        | 24.4            | °C               | OPC    |
| Cool_ATWU_In                    | Cool_ATWU_In       | AI          | 16.5       | 16.5      | 16.5     | °C        | 16.5            | °C               | OPC    |
| Cool_ATWU_Out                   | Cool_ATWU_Out      | AI          | 22.5       | 22.4      | 22.4     | °C        | 22.4            | °C               | OPC    |
| Cool_Htr_In_Frt                 | Cool_Htr_In_Frt    | AI          | 20.9       | 20.8      | 20.8     | °C        | 20.8            | °C               | OPC    |
| Cool_Htr_Out_Frt                | Cool_Htr_Out_Frt   | AI          | 26.4       | 26.3      | 26.3     | °C        | 26.3            | °C               | OPC    |
| Cool_PTC_In                     | Cool_PTC_In        | AI          | 4.9        | 4.9       | 4.9      | °C        | 4.9             | °C               | OPC    |
| Cool_PTC_Out                    | Cool_PTC_Out       | AI          | 25.0       | 24.9      | 24.9     | °C        | 24.9            | °C               | OPC    |
| Cool_Rad_Bypass                 | Cool_Rad_Bypass    | AI          | 36.0       | 35.9      | 35.9     | °C        | 35.9            | °C               | OPC    |
| Cool_Rad_In                     | Cool_Rad_In        | AI          | 64.9       | 64.8      | 64.8     | °C        | 64.8            | °C               | OPC    |
| Cool_Rad_Out                    | Cool_Rad_Out       | AI          | 34.9       | 34.8      | 34.8     | °C        | 34.8            | °C               | OPC    |
| CowlAir                         | CowlAir            | AI          | 18.5       | 18.4      | 18.4     | °C        | 18.4            | °C               | OPC    |
|                                 |                    |             |            |           |          |           |                 |                  |        |

## Diagnostics value screen

| Analog Digital Character      |             |                 | operation        |        |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
|-------------------------------|-------------|-----------------|------------------|--------|-------------|--------------|---------------|--------------|---------------|--------------|-----------|---------------|--------|------------|-------------|-----|--------------|------------|------------|------------|--------------|-------------|---|
|                               |             |                 |                  |        |             |              |               |              |               |              |           |               |        |            |             |     |              |            | Data       |            |              |             | 9 |
| Tag 🗕                         | Tag<br>Type | Display<br>Data | Display<br>Units | Source | Low<br>Trip | Low<br>Alarm | High<br>Alarm | High<br>Trip | Rate<br>Alarm | Rate<br>Trip | Saturated | Conv<br>Error | In Cal | In<br>Diag | Bad<br>Code | NaN | Bal<br>Limit | 1st<br>Bal | 2nd<br>Bal | 3rd<br>Bal | Var<br>Alarm | Var<br>Trip |   |
| AIRTEMP                       | AI          | 4.0             | °C               | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| AIRTEMP_setpoint              | AO          | 4.0             | °C               | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| AIRTEMP_slope                 | AO          | 1.0             | °C               | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| ASSP                          | AO          | 0.0             | °C               | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Avg_BL_L1                     | AI          | 21.7            | 7 °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Avg_BL_L2                     | AI          | 21.9            | 9 °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Avg_BL_R1                     | AI          | 21.8            | 9°C              | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Avg_BL_R2                     | AI          | 21.9            | •℃               | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Avg_FL_L1                     | AI          | 21.             | l °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Avg_FL_L2                     | AI          | 21.3            | 9°C              | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Avg_FL_R1                     | AI          | 21.3            | 2 °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Avg_FL_R2                     | AI          | 21.4            | + °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| BatVit                        | AI          | 12.4            | Volts            | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| BloAmp_Frt                    | AI          | 5.4             | AMPS             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| BloVIt_Frt                    | AI          | 11.6            | 6 Volts          | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| BlowerAirIn                   | AI          | 24.             | 5 °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Cool_ATWU_In                  | AI          | 16.4            | + °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Cool_ATWU_Out                 | AI          | 22.3            | 9°C              | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Cool_Htr_In_Frt               | AI          | 20.6            | 5 °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              | 13         |            |            |              |             |   |
| Cool_Htr_Out_Frt              | AI          | 26.             | 1 °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Cool_PTC_In                   | AI          | 4.8             | °C               | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Cool_PTC_Out                  | AI          | 24.9            | 9 °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Cool_Rad_Bypass               | AI          | 35.9            | 9°C              | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Cool_Rad_In                   | AI          | 68.6            | s ∘c             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Cool_Rad_Out                  | AI          | 38.6            | s ∘c             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| CowlAir                       | AI          | 18.4            | + °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| DEWPOINT                      | AI          | -6.4            | + °C             | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Dyno_A_Track_Road_Load        | AO          | 0.0             | NM               | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
| Dyno_Apply_Release_Roll_Brake | AO          | 0.0             | NM               | OPC    |             |              |               |              |               |              |           |               |        |            |             |     |              |            |            |            |              |             |   |
|                               | 1           | 1               |                  |        | 100         | -            | 100           | 100          | 100           | 100          | 121       | 100           | -      | 100        | 100         | -   | 1770         | 1111       |            | 100        | 11110        | 100         |   |

#### Diagnostics status screen

## Test SLATE control loops.

Test SLATE features user-definable PID loops and control loop tuning/troubleshooting tools. In-test controls are provided for the transfer between automatic, semi-automatic, and manual modes. You can define PID loops attributes, such as loop type (e.g., open and closed), loop activation tag, loop disabled tag, output tag, and feedback tag. Depending on the hardware being used in the application, sophisticated or high-speed PID controls may be implemented with external hardware and coordinated through Test SLATE.



Control loop tuning window