Test Case Smart Tools and Procedures

for the

AWIPS

Contract

DG133W-05-CQ-1067

Prepared for:

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Revision History

Revision	Date	Affected Pages	Explanation of Change
1.0	27 June 2008	ALL	Initial Draft
2.0	8 August 2008	7, 9, 10, 12, 13	Redlines per PDT
3.0	4 September 2008	ALL	Redlines per DT

Table of Contents

1.0 SCOPE

See Software Test Plan.

2.0 APPLICABLE DOCUMENTS

2.1 Source Documents

- None

2.2 Reference Documents

- Legacy NWS GFE Acceptance Test Case ID Number: ac009
- Legacy NWS GFE Test Cases for Test Areas AC – VP
- Section 3.1.3 of the AWIPS D-2D User's Manual Build 8.1
- Software Test Plan for the Advanced Weather Information Processing System Project, Contract #DG133W-05-CQ-1067, August 2008
- The Silver Spring NWS AWIPS 1 test bed application
- Release OB8.1 and OB8.2 of the Weather Event Simulator (WES)
- Rational RequisitePro

3.0 TEST CASE DESCRIPTION

This test case exercises and demonstrates the Smart Tools functionality developed during TO9.

3.1 Assumptions, Constraints and Preconditions

- Several weather elements are loaded
- There are multiple grids available for the weather elements (at minimum T, Td, Wind, Wx, and Hazards weather elements)
- TO9 software has been installed successfully
- CAVE, EDEX and pgAdmin III are running
- Data has been ingested
- The GFE Perspective is displayed
- Actions, Results, and Requirements highlighted in yellow indicate requirements and/or capabilities to be included in the scope of future task orders. They are included here for purposes of continuity and traceability with the original AWIPS I test case documents. Items highlighted in blue are capabilities added and/or Deficiency Reports (DRs) corrected since the Delivery Test.

3.2 Recommended Hardware

See Software Test Plan.

3.3 Test Inputs

Section 4.0 below contains the test procedures for this test case. Sections 2.2 – 2.9 of the Software Test Plan contain general test inputs applicable to all TO9 test cases.

3.4 Test Outputs

The Smart Tools will be executed on images displayed in CAVE and the results outlined in section 4.0 are met. The GFE GUIs to be tested include:

- Copy All Grids From
- Edit Action Dialog
- Weather Element Browser
- Save Forecast
- ProcedureCmds Values
- QPF_SmartTool Values
- MixHgt_Init Values
- Item Delete

4.0 TEST SCENARIO

Step	Action	Result	Pass/Fail
Procedures			
1.	If weather elements are not populated in the Grid Manager (GM), Mouse Button (MB)1 click 'Populate' -> 'Copy All Grids From…'. From the Copy All Grids From dialog, select an available model and MB1 click 'OK'. Note: If the Empty Edit Area Warning dialog displays, MB1 click on the 'Do not show this message again' and MB1 click 'Yes'.	Grids are created from model data and placed into the Fcst database.	
2.	For all available grids, interpolate between all missing grids. For weather elements without grids, create scratch grids for the first hour and last hour and interpolate between these grids. MB1 click on the Edit Action Dialog button. Highlight all grids between the first hour and last hour grids. Then run the associated Smart Tools (e.g., MaxT_SmartTool). Close the Edit Actions dialog when completed.	All available grids have data. Smart Tools create additional grids for other weather elements. The Edit Actions Dialog window closes.	
3.	MB1 click 'WeatherElement' -> 'Weather Element Browser…'. From the Weather Element Browser dialog, load in the Fire Wx and Marine weather element groups selecting 'File' -> 'Load Weather Element Group' -> 'Fire Wx', and 'File' -> 'Load Weather Element Group' -> 'Marine'. MB1 click 'Load and Dismiss'.	The fire weather and marine weather elements load into the GFE.	
4.	Scroll through the weather elements in the GM. Use the Copy All Grids From functionality to populate the GM.	The GM populates with the fire weather and marine weather elements. Data is available for most of the elements. Some of the elements are 'very long', e.g., a single grid spanning many days. Examples of this include HrsOfSun and InvBurnOffTemp.	DR #1346

Step	Action	Result	Pass/Fail
5.	MB1 click 'WeatherElement' -> 'Weather Element Groups' -> 'Public' to load just the public elements. Then bring up the Weather Element Browser selecting 'WeatherElement' -> 'Weather Element Browser'. Add 'MixHgt' to the list of weather elements to be loaded by pulling down the Field menu. Then MB1 click 'Load and Dismiss'.	Only the public elements appear. MixHgt is added to the list of weather elements.	
6.	Save all forecast data by MB1 clicking the  toolbar button. From the Save Forecast dialog, ensure all weather elements are selected. Then MB1 click the 'Save Forecast' button.	The Save Forecast dialog appears. All weather elements are selected. The grids are saved as indicated by the replacement of the green locks with gray blocks. The Save Forecast dialog closes.	
7.	MB1 click 'Populate' -> 'ProcedureCmds'.	A ProcedureCmds Values dialog displays.	
8.	From the ProcedureCmds Values dialog, select 'All' for the Model Elements, select an entry for the Model, a beginning hour, and select an entry from the Initialize Model. Then MB1 click 'Run/Dismiss'.	A dialog will display stating 'Loading Grids'. When the procedure finishes, the small dialog is dismissed. Many grids will have been modified. Some will be interpolated. Some errors may be reported, such as no grids to interpolate or no corresponding grids.	
9.	Save all forecast data using the  toolbar button.	The weather elements are saved.	
10.	MB1 click 'GFE' -> 'Show Warnings' -> 'Show Empty Edit Area Warning' to unselect the option. MB1 click 'GFE' -> 'Show Warnings' -> 'Show Edit Action Time Range Warning' to unselect the option.	The Show Empty Edit Area Warning and Show Edit Action Time Range Warning lines are not checked.	

Step	Action	Result	Pass/Fail
11.	MB1 click on a T grid in the GM. Then MB1 drag over several T grids in the GM to select them. Include the grid that was just clicked upon. Select the Sample Tool  from the toolbar and MB1 click at several points on the displayed grid. Note the data values and the appearance of the grid. Clear any existing edit area using the  toolbar button. MB1 click 'Edit' -> 'ExProc1'.	The data selected in the GM is modified by running the Adjust_Up smart tool followed by the Smooth tool.	
12.	Save all forecast data using the  toolbar button.	The forecast is saved.	
13.	MB1 click 'Verify' -> 'ExProc2'. From the ExProc2 Values dialog, select one of the GFS80 or NAM12 models. Then MB1 click 'Run/Dismiss'.	Several T grids are created from scratch as shown by the S indicator in the GM and the green locks in the GM. Elements T, Wind, and Wx are copied from the selected model into the Fcst database, as shown by the model name (or abbreviation) in the GM and additional green locks in the GM. Another dialog is displayed labeled ExSS4 Values.	
14.	Choose one of the NAM12 models from the ExSS4 Values Dialog and press Ok.	The ExSS4 smart tool is executed which makes a numerical sounding, and then calculates the T based on the model sounding data and the topography. Some of the T grids which were created from scratch in step #10 will now show an 'm' for modified due to the smart tool execution.	
15.	Save all forecast data using the  toolbar button.		
Smart Tools			
16.	MB1 click on a QPF grid with some non-zero QPF values that also has a corresponding Wind grid. MB3 popup over the main area of the Spatial Editor (SE) and select 'QPF_SmartTool'.	A Title Values dialog appears.	

Step	Action	Result	Pass/Fail
17.	Set the Vertical Motion Influence to the maximum value and MB1 click 'OK'.	The grid indicator in the GM turns cyan to indicate that grid is being calculated. The progress bar in the status bar moves from left to right as the grid points are calculated. After the calculation is finished, the QPF field is modified based on upslope/downslope conditions derived from the wind and topography.	DR #1362
18.	MB1 click on the first T grid that corresponds to the time for the edited QPF grid. MB1 click between 20 and 30 on the color bar to set the pickup value. MB3 popup over the same T grid in the GM and select 'Assign xxx', where xxx is your pickup value. MB1 click on the corresponding (valid for the same time) FzLevel grid. MB1 click on the color bar on a value that represents the elevation that is below most of your terrain. MB3 popup over the same FzLevel grid in the GM and select 'Assign xxx', where xxx is your pickup value. MB1 click on the corresponding SnowAmt grid. MB3 popup over the main area of the SE and select 'SnowAmt_SmartTool'.	The SnowAmt data is changed based on the QPF, T, and FzLevel values. (You might need to use MB3 popup over the color bar and select 'Fit To Data' -> 'Single Grid' to see the detail.)	DR #1362
19.	Load the FireWx weather element group MB1 clicking 'WeatherElement' -> 'Weather Element Groups' -> 'FireWx'. Answer 'Save First' to the Modified Weather Element(s) dialog that is displayed.	The modified data is saved and the FireWx elements are loaded.	
20.	Bring up the Weather Element Browser MB1 clicking 'WeatherElement' -> 'Weather Element Browser'. Select 'T' from the Field pull-down and MB1 click 'Load and Dismiss'.	T is added to the GFE.	
21.	MB1 click 'GFE' -> 'Editing Preferences' -> 'Missing Data Mode' -> 'Create'.		

Step	Action	Result	Pass/Fail
22.	MB1 click on a MixHgt grid in the GM. MB3 popup over the main area of the SE and select 'MixHgt_Init'.	The MixHgt_Init Values dialog displays.	
23.	Choose one of the previous NAM12 models that are presented in the dialog and MB1 click 'Run/Dismiss'.	The mixing height grid is calculated.	
24.	Revert your modified grids by selecting 'Edit' -> 'Revert Forecast'. Load the Public weather element group MB1 clicking 'WeatherElement' -> 'Weather Element Groups' -> 'Public'.	Modified data is discarded and the public weather elements are displayed.	
25.	MB1 click on the same SnowAmt grid as in step #17. Bring up the Edit Actions Dialog window using the  toolbar button. Select 'ExTool1'.	The SnowAmt grid is modified to contain 10*QPF.	
26.	Select 'ExTool2'.	The SnowAmt grid is modified again, this time determined by T and QPF.	
27.	Select 'ExTool3'. The ExTool3 Values dialog appears. Enter a snow level corresponding to the topography in your area. MB1 click 'Run/Dismiss'.	The SnowAmt grid is modified again.	
28.	MB1 click on a QPF grid in the GM that contains some QPF values. Select 'ExSS1' from the Edit Actions Dialog window.	The QPF values are recalculated based on the existing QPF data and the QPF data from the NAM12 model.	
29.	Select 'ExSS2' from the Edit Actions dialog. The ExSS2 Values dialog displays. Select one of the models that generate QPF, but not NAM12.	The QPF values are recalculated. Areas where 0 QPF existed on the grid, but the model has QPF values are replaced with the model's QPF values.	
30.	MB1 click on a T grid that corresponds to 00z or 12z. Select 'ExSS4' from the Edit Actions dialog. Select one of the NAM12 models and MB1 click 'Run/Dismiss'.	A numerical sounding is calculated and the T determined from the model data.	
31.	MB1 click on another T grid that corresponds to 00z or 12z. Select 'ExSS5' from the Edit Actions dialog. Select a different model (e.g., GFS80) and MB1 click 'Run/Dismiss'.	A numerical sounding is calculated and T is determined from the model data.	
32.	MB1 click on a T grid that has a corresponding Td grid. Select 'ExSS6'	A new weather element is created with the name of TempRH and the	

Step	Action	Result	Pass/Fail
	from the Edit Actions dialog.	model name of TempModel. It appears near the bottom of the GM. It contains the calculated RH from the T and Td grids.	
33.	MB1 click on a Wx grid in the GM that has a corresponding PoP grid. The PoP grid should have a range of values from 0 through 100%. Select 'ExSS7' from the Edit Actions dialog.	The Wx grid is modified based on the PoP.	
34.	MB1 click on a PoP grid that has a corresponding Wx grid. The Wx grid should have some areas of <NoWx>, Chc RW-, Sct RW-, and Wide R. Select 'ExSS8' from the Edit Actions dialog.	The PoP grid is modified based on the Wx.	
35.	Click on a T grid. Select 'ExUtil1' from the Edit Actions dialog. The ExUtil1 Values dialog displays. Select one of the NAM12 models and MB1 click 'Run/Dismiss'.	The T grid is recalculated and on the terminal window where GFE was run, a statement of 'Using Utility Version of convertFtToM' displays.	
36.	Save all forecast data by MB1 clicking the  toolbar button.	The forecast data is saved.	
37.	MB1 click on a T grid in the GM that corresponds to a grid within the 'Tonight' period as displayed in the time scale. Select the Sample Tool  from the toolbar. MB1 click on several samples; some within the ISC_OAX edit area, and some outside.	The T grid displays. The Samples display within and outside of the ISC_OAX edit area.	DR #1364
38.	From a terminal window, and from the GFESuite 'bin' directory, issue the following command: runProcedure -n ExProc1 -d xxx_GRID__Fcst_00000000_0000 -u GFETEST -c gfeConfig -a ISC_Send_Area -t Tonight where xxx is your siteID.	T grids that overlap the Tonight period will be modified. The T data will be increased by 1 degree and then smoothed, within the ISC_Send_Area.	
New Smart Tool			
39.	Bring up the Edit Actions Dialog using the  toolbar button.	The Edit Action dialog box opens.	

Step	Action	Result	Pass/Fail
40.	MB3 popup over the Edit Actions Dialog window and select 'New'. On the dialog that will be displayed, ensure that 'Numeric' is selected on the radio buttons (at the bottom). Enter 'TEST001' for the tool name at the top. Select 'T' as the weather element to edit. MB1 click 'OK'.	The Python editor window/perspective appears containing the smart tool template.	

41.	Replace the execute() function in the template with the following code, leaving the rest of the template alone:
	def execute(self, T):
	'Increment T'
	# Determine new value
	T = T + 5
	# Return the new value
	return T
		The code is modified.	

42.	On the Python editor window, MB1 click 'File' -> 'Save'. MB1 click the 'X' on the Python Editor window. Then close the Python perspective.	The edited code is saved.	
43.	MB1 click the Draw Edit Area tool  icon. Draw a closed area using MB1 drag on the displayed grid.	An enclosed area appears on the GFE display.	
44.	MB1 click on the 'TEST001' entry in the Edit Actions dialog.	The smart tool is executed and the data values increase incrementally by 5.0.	
45.	MB1 drag across several T grids in the GM to select them. MB1 click on the 'TEST001' entry in the Edit Actions Dialog window.	The smart tool is executed and the data values increase incrementally by 5.0 in each of the grids.	
46.	MB3 popup over the Edit Actions Dialog window entry of TEST001 and select 'Modify'.	The Python editor window pops up, containing the smart tool template.	

Step	Action	Result	Pass/Fail

47.	Replace the execute() function in the template with the following code, leaving the rest of the template alone:
	def execute(self, T, Td):
	'Assign T to Td+10'
	# Determine new value
	T = Td + 10
	# Return the new value
	return T
		The code is modified.	

48.	On the Python editor window, MB1 click 'File' -> 'Save'. MB1 click the 'X' for the Python Editor window. Then close the Python perspective.	The edited code is saved.	
49.	Using the Draw Edit Area tool  icon, draw a closed area using MB1 drag on the displayed grid.	An enclosed area appears on the GFE display.	
50.	MB1 click on a T grid in the GM to make the T grid visible and editable. The T grid selected must have a corresponding Td grid (i.e., valid at the same time). If not, create from scratch a Td grid at the same time and then MB1 click again on the T grid.	The T grid is visible and in edit mode. If necessary, a Td grid is created.	
51.	MB1 click on the 'TEST001' entry in the Edit Actions Dialog window.	The smart tool is executed and the data values are set to 10 degrees above the corresponding Td field.	
52.	MB3 popup over the TEST001 entry on the Edit Actions Dialog window and MB1 click 'Delete'. Select 'OK' in the Item Delete dialog to remove the 'TEST001' smart tool. Verify the 'TEST001' smart tool entry is removed from the Edit Actions dialog.	The TEST001 entry is removed from the Edit Actions dialog window.	
53.	Exit GFE.	GFE closes.	
	End of test.		

5.0 TO9 REQUIREMENTS VERIFICATION TRACEABILITY MATRIX (RVTM)

Number	Description	Test Step(s)
SYSR2071	The AWIPS system shall implement the GFE Smart Tool Widgets (create a set of GUI widgets that are accessible from a Smart Tool script).	ALL
SYSR2072	The AWIPS system shall implement the GFE Smart Tool Interface.	ALL
SYSR2100	The AWIPS system shall implement the Smart Init Interface to enable initializing from model data.	1
SYSR2102	The AWIPS system shall implement the Smart Tool Interface with a library of functions for use by smart tools	2
SYSR2118	The AWIPS GFESuite shall implement the GFE Smart Tools and Procedures.	ALL
SYSR2491	The AWIPS GFESuite shall implement ifpServerText - Smart Tools.	ALL
SYSR2597	The AWIPS GFESuite shall implement Create, Modify, and Delete smart tools to modify scalar weather elements.	31-52
SYSR2601	The AWIPS GFESuite shall implement Create, Modify, and Delete a Procedure that consists of tools that modify the same weather element.	31-45, 52
SYSR2602	The AWIPS GFESuite shall implement Create, Modify, and Delete a Procedure that consists of tools that modify various weather elements.	46-52