

Test Case MPE
for
Contract DG133W-05-CQ-1067
Advanced Weather Interactive Processing System (AWIPS)
Operations & Maintenance

AWP.TE.SWCTR/TO10-0014

Prepared for:

U.S. Department of Commerce
NOAA/NWS Acquisition Management Division
SSMC2, Room 11220
1325 East-West Highway
Silver Spring, MD 20910

Prepared by:

Raytheon Company
STC Office
6825 Pine Street
Omaha, NE 68106

6 February 2009

This document includes data that shall not be duplicated, used, or disclosed – in whole or in part – outside the Government for any purpose other than to the extent provided in contract DG133W-05-CQ-1067. However, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in all sheets.

HARD COPY UNCONTROLLED

Submitted By:

Test Engineer

Date

Approved By:

Program Manager

Date

Mission Assurance Quality

Date

Change History

Revision	Date	Affected Pages	Explanation of Change
Draft	21 Nov. 2008	ALL	Initial Draft
1	16 Jan. 2009	ALL	Result of NWS comments and PDT
2	6 Feb. 2009	3-6, 9, 10, 12, 13, 15	

Table of Contents

	Page
1.0 SCOPE	1
2.0 APPLICABLE DOCUMENTS	2
2.1 Source Documents	2
2.2 Reference Documents	2
3.0 TEST CASE DESCRIPTION.....	3
3.1 Assumptions, Constraints, and Preconditions.....	3
3.2 Recommended Hardware.....	3
3.3 Test Inputs.....	3
3.4 Test Outputs	3
4.0 TEST SCENARIO	4
5.0 REQUIREMENTS VERIFICATION TRACEABILITY MATRIX (RVTM).....	21

SCOPE

See TO10 Software Test Plan.

APPLICABLE DOCUMENTS**Source Documents**

None.

Reference Documents

- Legacy NWS Test Cases: Baseline_HYDRO_WHFS_MPE_OB8.1.
- TO10 Software Test Plan for the Advanced Weather Interactive Processing System Project, Contract #DG133W-05-CQ-1067, January 2009.
- The Silver Spring NWS AWIPS 1 test bed application.
- Rational RequisitePro.

TEST CASE DESCRIPTION

This test case tests and verifies the functionality found within the WHFS MPE Data Viewer application known as MPE Editor. As new functionality is added to this application, these test procedures will be updated to contain the steps required to test this new functionality. The MPE FieldGen application is also demonstrated in this test case.

Assumptions, Constraints, and Preconditions

- TO10 software has been installed successfully.
- CAVE and EDEX are running.
- Data has been ingested.
- Actions, Results, and Requirements highlighted in gray 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.

Recommended Hardware

See TO10 Software Test Plan.

Test Inputs

Section 4.0 contains the test procedures for this test case. Sections 2.2 – 2.9 of the TO10 Software Test Plan contain general test inputs applicable to all TO10 test cases. Grayed out test step(s) indicate functionality not yet delivered.

Test Outputs

The results outlined in section 4.0 are met.

TEST SCENARIO

Step #	Action	Result	Pass/Fail
1.	In CAVE, Mouse Button (MB) 1 click on the Perspectives icon and select 'MPE' from the dropdown menu if available. If not available, select 'Other...'. Then select 'MPE' from the Open Perspective dialog.	The MPE Perspective and MPE Choose Data Period window displays in CAVE.	
2.	Under the MPEControl menu, select 'Choose Hour'. On the 'Choose Data Period' window, select the date along the top of the window and the hour from the MPE Options. MB1 click the 'Display MPE Data' button.	The Choose Data Period window opens. The Choose Data Period window closes. A MPE field for the selected date and hour displays in the MPE viewer. Note: If no precipitation is available to verify DPA data has been ingested, open pgAdmin3 and navigate to 'Databases' -> 'hd_ob83oax' -> 'Schemas' -> 'public' -> 'Tables' -> 'dpradar' and open the table.	
3.	From the 'Help' pull-down menu (on the right side top corner of the window), select 'About CAVE'.	An About CAVE window displays the application's name, version number and date.	
4.	Select 'OK' from the About CAVE window.	The About CAVE window closes.	
5.	From the 'File' pull-down menu, select 'Save Image As...'	The Save Image As window launches.	
6.	In the Save Image As window, use the Filter and Directories selection boxes to choose a directory to save a PNG screen capture. In the Name box, enter the name of the file (including the directory) followed by the '.png' file extension. For best results move the Save Image As... window off of the MPE display. Click 'OK'.	The Save Image As window closes. The file is saved in the location specified as xxxx.png	
7.	In a terminal, go to the directory in which the screen capture was saved. Use the display command to display the PNG file.	The MPE screen capture displays.	
8.	From the 'File' pull-down menu, select 'Print Image'. Note: You can print in color (lp2) printer by uncomment out the 'whfs_print_color and whfs_printcommand_LX' tokens under /awips/hydroapps/.Apps_defaults_site file.	The MPE image is sent to the printer specified by the whfs_printcommand_LX token. By default it is printed on lp1 (gray) printer.	
9.	From the 'File' pull-down menu, select 'Print Reverse Image'.	The MPE image is sent to the printer specified by the whfs_printcommand_LX token. The image displays in reverse video (i.e., black as white and white as black).	

Step #	Action	Result	Pass/Fail
10.	From the 'Tools' pull-down menu, select 'Point Zoom'. Then click 'Out'.	The center of the geographic display zooms out.	
11.	From the 'Tools' pull-down menu, select 'Point Zoom'. Then click 'In'.	The center of the geographic display zooms in.	
12.	From the 'Tools' pull-down menu, select 'Areal Zoom', or select the magnifying glass button on the toolbar. Draw a rectangle on the geographic display by holding down and dragging MB1.	The geographic display zooms in on the rectangular area drawn by the MB1 button.	
13.	From the 'Tools' pull-down menu, select 'Areal Zoom' again. From the toolbar, select the Pan button.	The display returns to its previous zoom level. The Panning capability is activated.	
14.	From the 'Tools' pull-down menu, select 'Pan'. Then click 'Up'.	The geographic display moves North.	
15.	From the 'Tools' pull-down menu, select 'Pan'. Then click 'Down'.	The geographic display moves South.	
16.	From the 'Tools' pull-down menu, select 'Pan'. Then click 'Right'.	The geographic display moves East.	
17.	From the 'Tools' pull-down menu, select 'Pan'. Then click 'Left'.	The geographic display moves West.	
18.	From the Toolbar, MB1 click the 'Up' button.	The geographic display moves North.	
19.	From the Toolbar, MB1 click the 'Down' button.	The geographic display moves South.	
20.	From the Toolbar, MB1 click the 'Right' button.	The geographic display moves East.	
21.	From the Toolbar, MB1 click the 'Left' button.	The geographic display moves West.	
22.	From the 'Tools' pull-down menu, select 'Recenter'.	The cursor changes from an arrow into a leftward pointing hand that indicates that recenter functionality is active.	
23.	Click on an area that is not in the center of the display.	The display recenters on the selected area.	
24.	From the 'Tools' pull-down menu, select 'Recenter' again. Then click on the area that was originally at the center of the display.	The geographic display returns to its previous viewing state and center.	
25.	From the 'Tools' pull-down menu, select 'Tool Bar'.	A tool bar appears just below the row of pull-down menus. The icons shown perform the same functions as the Zoom and Pan options found in the 'Tools' pull-down menu.	
26.	From the 'Tools' pull-down menu, select 'Tool Bar' again.	The tool bar disappears.	

Step #	Action	Result	Pass/Fail
27.	From the 'Gages' pull-down menu, select 'Show Gage Identifiers'. (Note: The user may have to adjust the hour to see data appear.)	Alphanumeric gage labels appear on the MPE display.	
28.	From the 'Tools' pull-down menu, select 'Set Font'. Then try selecting different font sizes.	The alphanumeric gage labels change size.	
29.	From the 'Gages' pull-down menu, select 'Show Gage Identifiers'.	The gage labels disappear from the display.	
30.	From the 'Tools' pull-down menu, select 'MPE Color Manager...'	The MPE Color Scale Manager window appears.	
31.	MB1 click 'PrecipFields' -> 'Gage Only Analysis'.	The Gage Only Analysis displays in CAVE.	
32.	On the MPE Color Scale Manager window, select 'Gage Only Analysis' from the 'Data Type' dropdown menu. Then select the '<Min' item on the top bar. MB1 click the 'Change...' button. Select 'BLUE1' from the Color Chooser list and then MB1 click 'OK'. MB1 click the 'Add/Update' button. MB1 click the 'Save as: root' button.	The selections are saved.	
33.	Close the MPE Color Scale Manager window	The MPE Color Scale Manager window closes.	
34.	MB1 click 'MPEControl' -> 'Next Hour'.	The image updates with the new colorbar.	
35.	MB1 click 'MPEControl' -> 'Previous Hour'.	The image maintains the colors in the updated new colorbar.	
36.	From the 'Tools' pull-down menu, select 'MPE Color Manager...'	The MPE Color Scale Manager window appears.	
37.	On the MPE Color Scale Manager window, select 'Gage Only Analysis' from the 'Data Type' dropdown menu. Then select the '<Min' item on the top bar. MB1 click the 'Change...' button. Select 'BLACK' from the Color Chooser list and then MB1 click 'OK'. MB1 click the 'Add/Update' button. MB1 click the 'Save as: root' button.	The selections are saved.	
38.	Close the MPE Color Scale Manager window.	The MPE Color Scale Manager window closes.	
39.	MB1 click 'MPEControl' -> 'Next Hour'.	The image updates with the saved colorbar.	
40.	MB1 click 'MPEControl' -> 'Previous Hour'.	The image maintains the colors in the updated/saved colorbar.	

Step #	Action	Result	Pass/Fail
41.	On the 'Tools' pull-down menu, select 'View'. Then click 'Split Screen'.	The MPE display splits into two geographic areas, each with its own legend.	DR #1914
42.	On the 'Tools' pull-down menu, select 'View'. Then click 'Full Screen'.	The MPE display shows one geographic area with only one legend.	
43.	On the 'MPEControl' pull-down menu, select 'Clear MPE Data'.	A dialog box indicating that the data has not been saved displays. Click 'OK' in this dialog box. All the data on the map will be cleared and returned to the blank map.	
44.	On the 'Tools' pull-down menu, verify the 'Restore Initial' option exists.	Verified.	
45.	On the 'Tools' pull-down menu, verify the 'Find Station' option exists.	Verified.	
46.	From the 'Projections' pull-down menu, select 'Polar Stereographic'.	The geographic display uses a Polar Stereographic projection.	
47.	From the 'Projections' pull-down menu, select 'HRAP'.	The geographic display uses a HRAP projection.	
48.	From the 'Projections' pull-down menu, select 'Flat Lat/Lon'.	The geographic display uses a Flat Latitude/Longitude projection.	
49.	From the 'Overlays' pull-down menu, select 'State/County Boundaries'.	MPE displays a blank screen (no maps).	
50.	From the 'Overlays' pull-down menu, select 'Lakes'.	All streams or lakes display on the geographic display if defined in the Overlay Configuration file.	
51.	From the 'Overlays' pull-down menu, select 'Lakes'.	The streams and lakes are removed from the geographic display.	
52.	From the 'Overlays' pull-down menu, select 'River Drainage Basins'.	This toggles the display of Basin Boundary outlines on the geographic display if defined in the Overlay Configuration file.	
53.	From the 'Overlays' pull-down menu, select 'River Drainage Basins'.	The River Drainage Basins are removed from the geographic display.	
54.	From the 'Overlays' pull-down menu, select 'County Boundaries'.	This toggles the display of County outlines on the geographic display if defined in the Overlay Configuration file.	
55.	From the 'Overlays' pull-down menu, select 'County Boundaries'.	County Boundaries are removed from the geographic display.	
56.	From the 'Overlays' pull-down menu, select 'County Warning Areas'.	This toggles the display of CWA outlines on the geographic display if defined in the Overlay Configuration file.	
57.	From the 'Overlays' pull-down menu, select 'County Warning Areas'.	The County Warning Areas are removed from the geographic display.	

Step #	Action	Result	Pass/Fail
58.	From the 'Overlays' pull-down menu, select 'RFC Boundaries'.	This toggles the display of RFC Boundary outlines on the geographic display if defined in the Overlay Configuration file.	
59.	From the 'Overlays' pull-down menu, select 'RFC Boundaries'.	The RFC Boundaries are removed from the geographic display.	
60.	From the 'Overlays' pull-down menu, select 'State Boundaries'.	This toggles the display of State Borders on the geographic display if defined in the Overlay Configuration file.	
61.	From the 'Overlays' pull-down menu, select 'State Boundaries'.	The State Boundaries are removed from the geographic display.	
62.	From the 'Overlays' pull-down menu, select 'Forecast Zones'.	This toggles the display of Zones on the geographic display if defined in the Overlay Configuration file.	
63.	From the 'Overlays' pull-down menu, select 'Forecast Zones'.	The Forecast Zones are removed from the geographic display.	
64.	From the 'Overlays' pull-down menu, select 'Cities/Towns'.	This toggles the display of City locations on the geographic display if defined in the Overlay Configuration file.	
65.	From the 'Overlays' pull-down menu, select 'Cities/Towns'.	The Cities/Towns are removed from the geographic display.	
66.	From the 'Overlays' pull-down menu, select 'Interstates'.	This toggles the display of Interstates on the geographic display if defined in the Overlay Configuration file.	
67.	From the 'Overlays' pull-down menu, select 'Interstates'.	The Highways or Roads are removed from the geographic display.	
68.	From the 'Overlays' pull-down menu, select 'ACARS Airport Locations'.	This toggles the display of ACARS Airport Locations on the geographic display if defined in the Overlay Configuration file.	
69.	From the 'Overlays' pull-down menu, select 'ACARS Airport Locations'.	The ACARS Airport Locations are removed from the geographic display.	
70.	From the 'Overlays' pull-down menu, select 'ARTCC hi-level sectors'.	This toggles the display of ARTCC hi-level sectors on the geographic display if defined in the Overlay Configuration file.	
71.	From the 'Overlays' pull-down menu, select 'ARTCC hi-level sectors'.	The ARTCC hi-level sectors are removed from the geographic display.	
72.	From the 'Overlays' pull-down menu, select 'Airports'.	This toggles the display of Airports on the geographic display if defined in the Overlay Configuration file.	
73.	From the 'Overlays' pull-down menu, select 'Airports'.	The Airports are removed from the geographic display.	
74.	From the 'Overlays' pull-down menu, select 'Canada'.	This toggles the display of Canada on the geographic display if defined in the Overlay Configuration file.	
75.	From the 'Overlays' pull-down menu, select 'Canada'.	The Canada map is removed from the geographic display.	

Step #	Action	Result	Pass/Fail
76.	From the 'Overlays' pull-down menu, select 'County Names'.	This toggles the display of County Names on the geographic display if defined in the Overlay Configuration file.	
77.	From the 'Overlays' pull-down menu, select 'County Names'.	The County Names are removed from the geographic display.	
78.	From the 'Overlays' pull-down menu, select 'Fire Wx Zones'.	This toggles the display of Fire Wx Zones on the geographic display if defined in the Overlay Configuration file.	
79.	From the 'Overlays' pull-down menu, select 'Fire Wx Zones'.	The Fire Wx Zones are removed from the geographic display.	
80.	From the 'Overlays' pull-down menu, select 'FireWxAOR'.	This toggles the display of the FireWxAOR overlay on the geographic display if defined in the Overlay Configuration file.	
81.	From the 'Overlays' pull-down menu, select 'FireWxAOR'.	The FireWxAOR overlay is removed from the geographic display.	
82.	From the 'Overlays' pull-down menu, select 'Fixed Buoy Locations'.	This toggles the display of Fixed Buoy Locations on the geographic display if defined in the Overlay Configuration file.	
83.	From the 'Overlays' pull-down menu, select 'Fixed Buoy Locations'.	The Fixed Buoy Locations are removed from the geographic display.	
84.	From the 'Overlays' pull-down menu, select 'High_Sea_Marine Zones'.	This toggles the display of High_Sea_Marine Zones on the geographic display if defined in the Overlay Configuration file.	
85.	From the 'Overlays' pull-down menu, select 'High_Sea_Marine Zones'.	The High_Sea_Marine Zones are removed from the geographic display.	
86.	From the 'Overlays' pull-down menu, select 'HiRes Topo Image'.	This toggles the display of the HiRes Topo Image on the geographic display if defined in the Overlay Configuration file.	DR #1913
87.	From the 'Overlays' pull-down menu, select 'HiRes Topo Image'.	The HiRes Topo Image is removed from the geographic display.	
88.	From the 'Overlays' pull-down menu, select 'ISC_all'.	This toggles the display of the ISC_all overlay on the geographic display if defined in the Overlay Configuration file.	
89.	From the 'Overlays' pull-down menu, select 'ISC_all'.	The ISC_all overlay is removed from the geographic display.	
90.	From the 'Overlays' pull-down menu, select 'Interstates_and_US_Highways'.	This toggles the display of Interstates and US Highways on the geographic display if defined in the Overlay Configuration file.	
91.	From the 'Overlays' pull-down menu, select 'Interstates_and_US_Highways'.	The Interstates and US Highways are removed from the geographic display.	
92.	From the 'Overlays' pull-down menu, select 'METAR Station Locations'.	This toggles the display of METAR Station Locations on the geographic display if defined in the Overlay Configuration file.	

Step #	Action	Result	Pass/Fail
93.	From the 'Overlays' pull-down menu, select 'METAR Station Locations'.	The METAR Station Locations are removed from the geographic display.	
94.	From the 'Overlays' pull-down menu, select 'RAOB Station Locs'.	This toggles the display of RAOB Station Locations on the geographic display if defined in the Overlay Configuration file.	
95.	From the 'Overlays' pull-down menu, select 'RAOB Station Locs'.	The RAOB Station Locations are removed from the geographic display.	
96.	From the 'Overlays' pull-down menu, select 'Railroads'.	This toggles the display of Railroads on the geographic display if defined in the Overlay Configuration file.	
97.	From the 'Overlays' pull-down menu, select 'Railroads'.	The Railroads are removed from the geographic display.	
98.	From the 'Overlays' pull-down menu, select 'Synoptic Station Locations'.	This toggles the display of Synoptic Station Locations on the geographic display if defined in the Overlay Configuration file.	
99.	From the 'Overlays' pull-down menu, select 'Synoptic Station Locations'.	The Synoptic Station Locations are removed from the geographic display.	
100.	From the 'Overlays' pull-down menu, select 'TWEB Routes'.	This toggles the display of TWEB Routes on the geographic display if defined in the Overlay Configuration file.	
101.	From the 'Overlays' pull-down menu, select 'TWEB Routes'.	The TWEB Routes are removed from the geographic display.	
102.	From the 'Overlays' pull-down menu, select 'HRAP'.	This toggles the display of the HRAP grid on the geographic display if defined in the Overlay Configuration file.	
103.	From the 'Overlays' pull-down menu, select 'Lat/Lon 10 Over Ocean'.	This toggles the display of Latitude and Longitude lines on the geographic display if defined in the Overlay Configuration file.	
104.	From the 'Overlays' pull-down menu, select 'Lat/Lon 10 Over Ocean'.	The Lat/Lon Lines are removed from the geographic display.	
105.	From the 'Overlays' pull-down menu, select 'Time Zones'.	This toggles the display of Time Zone boundaries on the geographic display if defined in the Overlay Configuration file.	
106.	From the 'Overlays' pull-down menu, select 'Time Zones'.	The Time Zones are removed from the geographic display.	
107.	From the 'Overlays' pull-down menu, select 'WSR-88D Stations'.	This toggles the display of Radar locations on the geographic display if defined in the Overlay Configuration file.	
108.	From the 'Overlays' pull-down menu, select 'WSR-88D Stations'.	The Radar Locations are removed from the geographic display.	

Step #	Action	Result	Pass/Fail
109.	From the 'Overlays' pull-down menu, select 'State/County Boundaries'.	This toggles the display of State/County Boundary locations on the geographic display if defined in the Overlay Configuration file. (Note: To view the county boundaries, the user may have to zoom in to a level where the county lines appear.	
110.	From the 'Overlays' pull-down menu, select 'Radar Rings'.	This toggles the display of the outline of the Radar's coverage area on the geographic display if defined in the Overlay Configuration file. Note the colors of the radar rings. A red radar ring indicates that there is no data for that radar site. A green radar ring indicates that there is data for the radar site.	
111.	On the Overlays pull-down menu, verify the 'Basin Names', 'Hydro Service Areas', and 'Maps Foreground' options exist.	Verified.	
112.	From the 'MPEcontrol' pull-down menu, select 'Previous Hour'.	A dialog box indicating that this hour's MPE field has not been saved displays. Select 'OK' from this dialog to display the previous hour's MPE field.	
113.	From the 'MPEcontrol' pull-down menu, select 'Next Hour'.	A dialog box indicating that this hour's MPE field has not been saved displays. Select 'OK' from this dialog to display the next hour's MPE field.	
114.	From the 'MPEcontrol' pull-down menu, select 'Choose Hour'.	The Choose Data Period window displays.	
115.	From the Choose Data Period window, click the 'Close' button.	The Choose Data Period window closes.	
116.	From the 'MPEcontrol' pull-down menu, select 'Save Best Estimate Top'.	The currently displayed MPE field is saved as the best estimate QPE. To verify this, go to /awips/hydroapps/precip_proc/local/data/mpe/qpe and verify the time stamp on the xmrq file for this hour.	
117.	From the 'MPEcontrol' pull-down menu, the 'Save Best Estimate Bottom' option only applies when in split screen mode. When in split screen mode, this option saves the MPE field displayed in the lower window as the best estimate QPE.	The MPE field displayed is saved as the best estimate QPE.	
118.	From the 'MPEcontrol' pull-down menu, select 'Regenerate Hour Fields'.	The Regenerate Hour Fields Dialog window displays.	

Step #	Action	Result	Pass/Fail
119.	From the 'Regenerate Hour Fields Dialog' window, click 'Yes'. In the Data not Saved, ok to proceed? popup window, MB1 click 'OK'	<i>MPE Fieldgen</i> is rerun for the displayed hour's MPE data. To verify this, go to <code>/awips/hydroapps/precip_proc/local/data/mpe/rmosaic</code> and verify the timestamp on the RMOSAIC file for this hour or verify in pgAdmin3 the 'rwresult' table has updated (last_saved_time).	
120.	From the 'Precipfields' pull-down menu, select 'Radar Mosaic'.	The Radar Mosaic Precip Field displays.	
121.	From the 'Precipfields' pull-down menu, select 'Average Radar Mosaic'.	The Average Radar Mosaic field displays. If the 'Average Radar Mosaic' option is grayed out, then AVGRMOSAIC is not listed in either the mpe_generate_list token or the mpe_base_radar_mosaic token.	
122.	From the 'Precipfields' pull-down menu, select 'Max Radar Mosaic'.	The Maximum Radar Mosaic field displays. If the 'Max Radar Mosaic' option is grayed out, then MAXRMOSAIC is not listed in either the mpe_generate_list token or the mpe_base_radar_mosaic token.	
123.	From the 'Precipfields' pull-down menu, select 'Field Bias Radar Mosaic'.	The Field Bias Radar Mosaic displays. If the 'Field Bias Radar Mosaic' option is grayed out, then BMOSAIC is not listed in the mpe_generate_list token or MMOSAIC is not listed in the mpe_generate_list token.	
124.	From the 'Precipfields' pull-down menu, select 'Local Bias Radar Mosaic'.	The Local Bias Radar Mosaic displays. If the 'Local Bias Radar Mosaic' option is grayed out, then LMOSAIC is not listed in the mpe_generate_list token or MLMOSAIC is not listed in the mpe_generate_list token.	
125.	From the 'Precipfields' pull-down menu, select 'Gage Only Analysis'.	The Gage Only Analysis displays. If the 'Gage Only Analysis' option is grayed out, then GAGEONLY is not listed in the mpe_generate_list token.	
126.	From the 'Precipfields' pull-down menu, select 'Satellite Precip'.	The Satellite Precipitation field displays. If the 'Satellite Precip' option is grayed out, then SATPRE is not listed in the mpe_generate_list token.	
127.	From the 'Precipfields' pull-down menu, select 'Local Bias Satellite Precip'.	The Local Bias Satellite Precipitation field displays. If the 'Local Bias Satellite Precip' field option is grayed out, then LSATPRE is not listed in the mpe_generate_list token.	

Step #	Action	Result	Pass/Fail
128.	From the 'Precipfields' pull-down menu, select 'Multisensor Mosaic'.	The Multisensor Mosaic displays. If the 'Multisensor Mosaic' option is grayed out, then MMOSAIC is not listed in the mpe_generate_list token.	
129.	From the 'Precipfields' pull-down menu, select 'Local Bias Multisensor Mosaic'.	The Local Bias Multisensor Mosaic displays. If the 'Local Bias Multisensor Mosaic' option is grayed out, then LMOSAIC is not listed in the mpe_generate_list token.	
130.	From the 'Precipfields' pull-down menu, select 'Triangulated Local Bias Mosaic'.	The Triangulated Local Bias Mosaic displays. If the 'Triangulated Local Bias Mosaic' option is grayed out, then P3LMOSAIC is not listed in the mpe_generate_list token.	
131.	From the 'PrecipFields' menu, select 'Best Estimate QPE'.	The Best Estimate QPE field displays.	
132.	From the 'Basefields' pull-down menu, select 'Local Span'.	The Local Span Field displays if LMOSAIC or MLMOSAIC is listed in the mpe_generate_list token.	
133.	From the 'Basefields' pull-down menu, select 'Local Bias'.	The Local Bias Field displays if LMOSAIC or MLMOSAIC is listed in the mpe_generate_list token.	
134.	From the 'Basefields' pull-down menu, select 'Height Field'.	The Height Field displays.	
135.	From the 'Basefields' pull-down menu, select 'Radar Coverage Field'.	The Radar Coverage Field displays.	
136.	From the 'Basefields' pull-down menu, select 'Gage Triangles'.	The Gage Triangles displays if P3LMOSAIC is specified in the mpe_generate_list token. (note**: it is grayed out)	
137.	On the 'Gages' pull-down menu, verify the 'QC Precipitation' option exists.	Verified.	
138.	On the 'Gages' pull-down menu, verify the 'QC Temperature' option exists.	Verified.	
139.	On the 'Gages' pull-down menu, verify the 'QC Freezing Level' option exists.	Verified.	
140.	On the 'Gages' pull-down menu, verify the 'Save Level 2 Data' option exists.	Verified.	
141.	From the 'Precipfields' pull-down menu, select 'Gage Only Analysis'.	The Gage Only Analysis displays.	
142.	From the 'Gages' pull-down menu, select 'Add Pseudo Gage'.	The mouse pointer turns into a left pointing hand.	
143.	Double MB1 click on a location inside the currently displayed 'Gage Only Analysis' field.	The Add Pseudo Gage window appears.	

Step #	Action	Result	Pass/Fail
144.	Using the Pseudo Gage Accumulation slider bar on the Add Pseudo Gage window, choose '0.50 inches' and click the 'OK' button.	The Add Pseudo Gage window closes.	
145.	From the 'MPEcontrol' pull-down menu, select Regenerate Hour Fields. Select 'Yes' in the pop up confirmation window. MB1 click 'OK' in the Data not Saved window.	The <i>MPE_Fieldgen</i> process is run for the chosen hour. After <i>MPE_Fieldgen</i> has run, the Gage Only Analysis field is regenerated. The field appears to be altered in the vicinity of the newly created pseudo gage.	
146.	From the 'Gages' pull-down menu, select 'Gage Table'.	The Gage Table displays.	
147.	Select 'by Gage Value' from the 'Gage Table Sort Gages' menu.	The gages are sorted by descending value.	
148.	Select by 'by Radar ID' from the 'Gage Table Sort Gages' menu.	The gages are grouped and sorted by ascending Radar ID.	
149.	Select 'by Gage ID' from the 'Gage Table Sort Gages' menu.	The gages are grouped and sorted by ascending Gage ID.	
150.	From the 'Gages' pull-down menu, select 'Show Gage Identifiers'.	The gage identifiers are drawn on the MPE display.	
151.	From the 'Gages' pull-down menu, select 'Show Gage Values'.	The gage values are drawn on the MPE display.	
152.	Find a zero-valued gage on the MPE display and locate this gage in the Gage Table window.	The gage is located.	
153.	In the Edit column, modify the value of this gage to a large non-zero amount.	The value of the gage is modified to a large non-zero amount.	
154.	Select 'Quit' from the 'Control' menu in the Gage Table window.	The Gage Table closes. The edited gage value is saved. Note**: Value is not saved	
155.	From the 'MPEcontrol' pull-down menu, select 'Regenerate Hour Fields'.	The Rerun FieldGen Dialog window displays.	
156.	From the Rerun FieldGen Dialog window, click 'Yes'.	<i>MPE_Fieldgen</i> is rerun for the hour's MPE data being displayed. After <i>MPE_Fieldgen</i> has run, the MPE window shows the results of the gage edit on the Gage Only Analysis precipitation field.	
157.	From the 'Gages' pull-down menu, select 'Show Missing Gages'. Then select 'All Missing' from the 'Missing Gages' submenu.	Gages with missing values display in the MPE window with values of 'M'. There may not be any.	
158.	MB1 click 'Gages' -> 'Gage Color' -> 'Contrast Color'.	The gage identifiers and gage values display in white.	
159.	MB1 click 'Gages' -> 'Gage Color' -> 'Color By QC'.	The gage identifiers and gage values display in a sandy brown color.	

Step #	Action	Result	Pass/Fail
160.	MB1 click 'Gages' -> 'Gage Color' -> 'Color By Value'.	The gage identifiers and gage values display in the color as assigned by the colorbar.	
161.	From the 'Gages' pull-down menu, select 'Gage Color' -> 'Solid Color'.	The gage identifiers and gage values display in a sandy brown color.	
162.	Select 'Display 7 x 7' from the 'Gages' pull-down menu.	The pointer changes shape so that the user can choose a gage.	
163.	Double click MB1 near a gage in the grid region ("area of responsibility"). The tester should choose a gage in an area that has precipitation (e.g., a pseudo gage).	A Display 7x7 Gage Editing Utility window opens for the precipitation gage closest to the area selected.	
164.	In the Display 7x7 Gage Editing Utility window, slide the Edit Gage Value bar partially to the right. Then select 'Set Value'. From the Display 7x7 Gage Editing Utility window, select 'Close'.	The Display 7x7 Gage Editing Utility window closes.	
165.	Select 'Regenerate Hour Fields' from the 'MPEcontrol' pull-down menu.	The Rerun FieldGen Dialog window appears.	
166.	Select 'Yes' in the Rerun FieldGen Dialog window. MB1 click 'OK' in the Data not Saved window.	The <i>MPE_Fieldgen</i> process is run for the chosen hour. After <i>MPE_Fieldgen</i> has run, the MPE window shows the results of the gage edit on the Gage Only Analysis precipitation field. The change is accepted. The gage value shown directly beneath the gage identifier in the Display 7x7 Gage Editing Utility window updates to the value chosen on the Edit Gage Value slider bar. The <i>rwresult</i> table in <i>pgAdmin3</i> also updates.	
167.	From the Polygons pull-down menu, select 'Draw Polygons'.	The option is selected.	
168.	Using single MB1 clicks, draw a polygon on the displayed MPE data field.	A line connecting the polygon vertices defined by the MB1 click points is drawn on the MPE display.	
169.	Perform a single MB3 click to close the polygon.	The displayed polygon outline is closed by a line connecting the last polygon vertex to the first polygon vertex. The Edit Precipitation window displays.	
170.	From the Edit Precipitation window, select a nonzero value on the Adjust Precipitation Value slider. Then click the 'Set' button below the slider.	The drawn polygon fills with a solid color representing the value chosen on the Adjust Precipitation Value slider.	
171.	From the Edit Precipitation window, select 'Close'.	The Edit Precipitation window closes.	

Step #	Action	Result	Pass/Fail
172.	From the 'Polygons' pull-down menu, select 'Delete Polygons'.	The Delete Polygons window displays. In its text field, there should be an entry for the polygon just drawn.	
173.	In the Delete Polygons window, select the entry corresponding to the polygon just created. Click the 'Undisplay' button.	The polygon is removed from the MPE display. Its displayed flag is set from 'T' to 'F'.	
174.	In the Delete Polygons window, select the 'Display' button.	The polygon is shown on the MPE display. Its displayed flag is set from 'F' to 'T'.	
175.	In the Delete Polygons window, select 'Delete'.	The polygon is permanently removed from the MPE display. Its entry is removed from the Delete Polygons window.	
176.	In the Delete Polygons window, select 'Close'.	The Delete Polygons window closes.	
177.	From the 'Polygons' pull-down menu, select 'Draw Polygons'.	The option is selected.	
178.	Using single MB1 clicks, draw a polygon on the displayed MPE data field. Try to draw the polygon around one or more areas of precipitation on the MPE display.	A line connecting the polygon vertices defined by the MB1 click points is drawn on the MPE display.	
179.	Perform a single MB3 click to close the polygon.	The displayed polygon outline is closed by a line connecting the last polygon vertex to the first polygon vertex. The Edit Precipitation window displays.	
180.	On the Edit Precipitation window, set the 'Adjust Precipitation Value' to a value midway between the highest and lowest precipitation values contained within the polygon. For example, if the polygon encompasses precipitation amounts ranging from 0 to 0.50 inches, then set the slider bar to 0.25 inches.	The slider bar is set.	
181.	On the Edit Precipitation window, click the 'Raise' button.	All values within the edit polygon drawn on the MPE display which are below the value selected on the Adjust Precipitation slider bar are raised to the slider bar value. All values within the edit polygon which are above the value set on the slider bar are left unchanged.	
182.	Using single MB1 clicks, draw another polygon on the displayed MPE data field. Try to draw the polygon around one or more areas of precipitation on the MPE display. Try to draw this polygon so it does not overlap the previously drawn polygon.	A line connecting the polygon vertices defined by the MB1 click points is drawn on the MPE display.	

Step #	Action	Result	Pass/Fail
183.	Perform a single MB3 click to close the polygon.	The displayed polygon outline is closed by a line connecting the last polygon vertex to the first polygon vertex. The Edit Precipitation window displays.	
184.	On the Edit Precipitation window, set the Adjust Precipitation Value slider bar to a value midway between the highest and lowest precipitation values contained within the polygon. For example, if the polygon encompasses precipitation amounts ranging from 0 to 0.50 inches, then set the slider bar to 0.25 inches.	The slider bar is set.	
185.	On the Edit Precipitation window, click the 'Lower' button.	All of the values within the polygon which have a value higher than the value selected on the Adjust Precipitation Value slider bar are lowered to the slider bar value. All values within the polygon which have a value lower than the value on the slider bar are left unchanged.	
186.	On the Edit Precipitation window, set the Adjust Precipitation Value slider bar to 0.50. Click the 'Scale' button.	All values within the previously drawn polygon are reduced by half (multiplied by 0.50).	
187.	On the Edit Precipitation window in the Select Field to Substitute section, select an MPE field different from the one currently shown in the MPE display. Click the 'Substitute' button.	Precipitation data from the selected field are placed into the previously drawn polygon.	
188.	On the Edit Precipitation window, select the 'Close' button.	The Edit Precipitation window closes.	
189.	From the 'Climo' pull-down menu, select the 'Monthly Prism Precip' option.	PRISM data representing average precipitation for the current month display in the MPE display.	
190.	From the 'Misc' pull-down menu, select the 'Display Bias Table' option.	The Edit Bias Table window displays.	
191.	From the Edit Bias Table window, click a button corresponding to a radar site in the radar column.	A window appears listing the number of gage/radar pairs, the mean gage value, the mean radar value, and the resulting bias for each of 10 memory spans.	
192.	In the Edit Bias Table window, for a radar site, modify the bias value by entering a new value in the text field located to the right of the radar id button.	The 'NO' label in the manually specified box should change to 'YES'.	
193.	From the radar-specific memory span window, select 'Close'.	The radar-specific memory span window closes.	
194.	From the 'Edit Bias' table, click the 'Close' button.	The Edit Bias table closes.	

Step #	Action	Result	Pass/Fail
195.	Select 'Review Hourly Radar' from the 'Misc' pull-down menu.	The Radar Sites window displays. It contains a list of all of the radars which contribute to the MPE analysis.	
196.	Select a radar site from the Radar Sites window. Then select 'OK'.	The four paned Single Radar Site window displays. Clockwise from the upper left pane, it displays the Raw Radar, Radar Climatology, Radar Coverage Map, and the Mean Field Bias Corrected Radar for the selected radar site for the selected hour.	
197.	From the Single Radar Site window 'Options' pull-down menu, select 'Edit Bias Value'.	The Edit Bias Value window appears.	
198.	On the Edit Bias Value window, use the slider bar to adjust the bias value for the radar for which the Single Site Radar window was opened. Click the 'OK' button.	The Edit Bias Value window closes.	
199.	On the Single Radar Site window 'Options' pull-down menu, select 'Ignore Radar'.	The 'Ignore Radar' option on the Single Radar Site window Options pull-down menu relabels to 'Unignore Radar'.	
200.	On the Single Radar Site window 'Options' pull-down menu, select 'Unignore Radar'.	The 'Unignore Radar' option on the Single Radar Site window 'Options' pull-down menu relabels to 'Ignore Radar'.	
201.	On the Single Radar Site window 'Options' pull-down menu, select 'Display Adaptable Param'.	The Adaptation Parameter Viewer displays. It shows the adaptation parameters for the selected radar site.	
202.	On the Adaptation Parameter Viewer window, click the 'Close' button.	The Adaptation Parameter Viewer window closes.	
203.	On the Single Radar Site window 'Options' pull-down menu, select 'Display Supplemental Data'. Note**: It is grayed out.	The Supplemental Data Viewer displays. This shows the supplemental data for the selected radar.	
204.	On the Supplemental Data Viewer, select the 'Close' button.	The Supplemental Data Viewer closes.	
205.	Select 'Close' from the 'Control' menu of the Single Radar Site window.	The Single Radar Site window closes.	
206.	From the 'Misc' pull-down menu, select 'Time Lapse'. Then select '6 Hr' from the 'Time Lapse' submenu.	The currently displayed MPE field will time lapse over the past 6 hours worth of data.	
207.	From the 'Misc' pull-down menu, select 'Time Lapse'. Then select 'End Loop' from the 'Time Lapse' submenu. Note**: It is grayed out.	The 6 hour time lapse ends. The MPE field from the original date and hour displays.	
208.	From the 'Misc' pull-down menu, select 'Multi-Hour QPE'.	The Multi-Hour Precipitation Accumulation window displays.	

Step #	Action	Result	Pass/Fail
209.	From the Multi-Hour Precipitation window, select 'Accumulation Interval Setup' and set the duration to 24 hours. From the Accumulation Display Control, click the 'Show Data' button.	The MPE display shows an accumulation of the past 24 hours worth of Best QPE fields.	
210.	From the Multi-Hour Accumulation window, select the 'Close' button.	The Multi-Hour Precipitation Accumulation window closes.	
211.	Close the MPE Perspective.	The MPE Perspective closes.	
Test – MPE Output for Display in CAVE			
212.	In CAVE, Mouse Button (MB) 1 click on the Perspectives icon and select 'MPE' from the dropdown menu if available. If not available, select 'Other...'. Then select 'MPE' from the Open Perspective dialog.	The MPE Perspective and MPE Choose Data Period window display in CAVE.	
213.	In the Choose Data Period window, adjust the 'Hours' field and click 'Display MPE Data' button to check if there is data (image) shown for that hour. It is better to have data for the test. But if not, it is still ok. <i>Note:</i> Write down the year/month/data/hour from the Choose Data Period for later validation.	The data (image) for the selected hours displays.	
214.	Under the 'Polygons' menu, select 'Draw Polygons'.	The polygon is selected.	
215.	MB1 click on the black area of the screen repeatedly to draw a circle or oval shape. Then MB3 click to join the end of the shape.	The Edit Precipitation window displays.	
216.	Adjust the precipitation value to the desired position by using the slider bar. Click on the 'Set' button. Then select the 'Close' button.	The new polygon (shape) drawn displays on the screen.	
217.	Under the 'MPEControl Menu' in the main window, select 'Save Best Estimate Top'.	The polygon is saved.	
218.	Navigate to the OHD xmrq files located at /awips/hydroapps/precip_proc/local/data/mpe/qpe. Look for the xmrq file with the date/time written in step 154 (e.g., xmrqmmddyyyyhhz)	The xmrq file should match.	
219.	Navigate to the generated GRIB files in /awips/hydroapps/precip_proc/local/data/mpe/qpe_grib. Look for the grib file with the date/time written in step 154. (e.g., yyyyymmddhhz.grib)	The grib file should match.	

Step #	Action	Result	Pass/Fail
220.	Toggle to the D2D Perspective.	The D2D Perspective and associated main window opens.	
221.	Click on the 'Scale' drop-down menu and select 'Region' or 'State'.	The selected scale displays.	
222.	Under 'NCEP/Hydro' menu, go to the 'Hydro' section and select 'QPE >> 1 hour WFO Local MPE'.	The '1 hour WFO Local MPE' option is selected.	
223.	Click on the icon '<' (Step Back) to the date/time written in step 154.	The polygon (shape/image) from step 158 displays.	
224.	Close the MPE Perspective	The MPE Perspective closes.	
End of Test			

REQUIREMENTS VERIFICATION TRACEABILITY MATRIX (RVTM)

Number	Description	Test Step(s)
SYSR3100	The AWIPS system shall implement Precipitation processing storage in the IHFS database (initial pattern for Precipitation Processing Library).	112-211
SYSR3109	The AWIPS system shall implement MPE (Multisensor Precipitation Estimator) Interactive Editor in an MPE perspective (reuse CAVE GFE look and feel).	ALL
SYSR3114	The AWIPS system shall integrate the MPE_Fieldgen capability with configuration controls.	119-211