ViewPoint™ Application Note

Title: Curved Display Measurement

Abstract: This bulletin explains how to use the new curved display features of Westar’s ViewPoint™ software

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1. Curved Display Overview

Curved display features have been added to ViewPoint™ software starting with version 4.30.4. These features allow the user to easily measure curved display surfaces while maintaining viewing angle and working distance.

The following illustrations will use a uniformity measurement as an example.

Figure 1 – Typical Uniformity Measurement of a Flat Display

Figure 1 shows an example of a horizontal uniformity measurement of a flat display, viewed from top down, with the viewing angle set to 0 degrees. The Light Measuring Device (LMD) is moved horizontally to discrete points along the display surface.
Figure 2 – Uniformity Measurement of a Curved Display Prior to ViewPoint™ version 4.30.4

Figure 2 shows an example of the same uniformity measurement made on a curved display prior to the curved display features added to ViewPoint™. There are several errors:

- The viewing angle changes as the LMD moves away from the center of the display.
- The working distance decreases as the LMD moves from the center of the display.
- The measurement spot locations are shifted on the display surface.

Figure 3 – Uniformity Measurement of a Curved Display after ViewPoint™ version 4.30.4
Figure 3 shows an example of a uniformity measurement made on a curved display using the curved display features of ViewPoint™. The software automatically maintains the user specified 0 degree viewing angle and maintains a constant working distance. The measurement spot locations now take into consideration the curvature of the display.

2. ViewPoint™ Manual Control Interface Changes

The changes to the ViewPoint™ Manual Control Interface (MCI) are minor. In the Motion Control Window two new fields are added under DUT Offsets. They are:

- Curve Orientation
- Radius of Curvature

The curve orientation selections are horizontal, vertical, or none.

These setting only affect the display relative moves: Ortho Display Move, Polar Display Move and Design Eye-Point (DEP) Move. Axis Jog and Axis Move are unaffected by the curved display settings.
3. **ViewPoint™ TestObject Changes**

The changes to the ViewPoint™ test objects for automated test sequences are located in the `WDT.Measurement.ViewPoint.Motion._TestObjects` root class. The `OrthoDisplayMove` and `PolarDisplayMove` now include parameters for Curve Orientation and Radius of Curvature.

`WDT.Measurement.ViewPoint.Motion._TestObjects` root class contains the old `OrthoDisplayMove` and `PolarDisplayMove` test objects for backward compatibility with existing test sequences.

### Ortho Display Move Parameters

- **Units**: Enum (WDT.Measurement.ViewPoint.Units) in `[cm]`
- **DisplayX**: Number (Double) in `[Locals.Xpos[Locals.Point]]`
- **DisplayY**: Number (Double) in `[Locals.Ypos[Locals.Point]]`
- **DisplayT**: Number (Double) in `[0]`
- **DisplayT**: Number (Double) in `[0]`
- **Instrument**: String (System.String) in `[RefGlobals.instrument]`
- **WorkingDistance**: Number (Double) in `[RefGlobals.WorkingDistance]`
- **DUTOFFexX**: Number (Double) in `[RefGlobals.OXX]`
- **DUTOFFexY**: Number (Double) in `[RefGlobals.OYY]`
- **DUTOFFexZ**: Number (Double) in `[RefGlobals.OOZ]`
- **Curve**: Enum (WDT.Measurement.ViewPoint.Units) in `[RefGlobals.CurveOrientation]`
- **CurveR**: Number (Double) in `[RefGlobals.CurveRadius]`
4. Summary

The curved display additions to ViewPoint™ are easy to use and simplify the measurement of curved displays while maintaining the spot tracking accuracy of Westar’s FPM systems.

In the display relative motion spaces (Ortho, Polar and Design-Eye Point) all spot positions and viewing angles are relative to the surface of the display under test, whether that surface is flat or curved.