Wavefront Control System
Wavefront Correction Procedure
S-AB-P-138 Rev B

Intent: The procedure corrects the beamline wavefront errors, introduces a PID/USD and prepares the Wavefront Control System for a specific shot. This procedure is executed by the BLO during PRESHOT operations. A wavefront correction is valid for one hour or until System Science changes the PID/USD file for the shot.

Prerequisites:

- □ WCS software startup has been performed per S-AB-P-127
- □ IRAT startup has been performed per S-AB-P-040
- □ Beamline is aligned, from IRAT to IRDP
- □ WCS calibration has been performed per in the last 12 hours per S-AB-P-130
- □ A reference wavefront has been taken in the last week or since the last change in the output chain to the WFS in question, which ever is more recent per S-AB-P-139

Procedure:

1	On the WCS GUI open "options and parameters" (Screw Driver and Wrench Icon).	❑
2	Select the Auto Mode tab	❑
3	Browse to and select the most recent "Calibration" file using the path below: **/u/epbl/WCS/*Directory*/Calibrations/YYYYMMDD_HHMM/** ***Directory*** is listed for each WFS in the table below then click "**OK**".	❑
4	Browse to and select the most recent "Reference Centroid" file using the path below: **/u/epbl/WCS/*Directory*/References/YYYYMMDD_HHMM.dat** ***Directory*** is listed for each WFS in the table below then click "**OK**".	❑
5	Browse to and select the "PID/USD Centroid" file specified by System Science using the path below: **/u/epbl/WCS/*Directory*/PID/** ***Directory*** is listed for each WFS in the table below then click "**OK**".	❑
6	Select the Shack-Hartmann Sensor tab.	❑

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	Browse to and select the most recent "ROI Pattern" file using the path below:	
7	**/u/epbl/WCS/*Directory*/ROIs/** ***Directory*** is listed for each WFS in the table below then click "**OK**".	❑
	If the SHSSGUI is not running for this WFS, open a new terminal window and type	
8	**startSHSSGUI*ID*** ***ID*** is listed for each WFS in the table below then click "**OK**".	❑
9	Change the exposure time until most of the 77 spot are visible. • The threshold should be set to 20 counts. • Note: Click *Apply* after every attempt in order for the changes to take effect. Click *Acquire Image* between attempts to set the exposure. Repeat this empirical process until none of the center spots are saturated. Note: some of the edge spots may not be visible.	❑
10	Enter the exposure time and threshold on the SHSS Configuration Parameter window and click *Apply*.	❑
11	Click on the button that looks like a circle with an arrow, to obtain a screen that has 77 circles on it.	❑
12	Click the button that looks likes like two gears  (the start algorithm button). The circles will start changing color (green and red). When all of the circles have turned green you can stop the algorithm by clicking the stop button (circle with an X). If all of the circles do not turn 'green' contact System Science for assistance.	❑

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Test the PID/USD
Click the *plus* button to add the PID/USD to the reference wavefront.

14 Then click the button that looks likes like two gears  (the start algorithm button). ❑

When all of the circles have turned 'green' click Ready_4_Charge on the WCS GUI.

(End of Procedure)

Notes: The PID/USD may be subtracted from the reference wavefront by stopping the algorithm (circle with an X), re-clicking the *plus* button and starting the algorithm again. When all of the circles have turned green again, stop the algorithm by clicking the stop button (circle with an X).

If all of the circles do not turn green, inform System Science and the Shot Director.

A wavefront correction is valid for one hour or until System Science changes the PID/USD file for the shot.

WCS Lookup Table

ID	DM Location	Directory	WFS Location	Computer Name
1	Beamline 1 Cavity	BL1	Beamline 1 IRDP	trinculo
2	Beamline 2 Cavity	BL2	Beamline 2 IRDP	galatea
3	Beamline 3 Cavity	BL3	Beamline 3 IRDP	himalia
4	Beamline 4 Cavity	BL4	Beamline 4 IRDP	despina
5	Upper Compressor	UC	Upper Compressor SPDP	lysithea
6	Lower Compressor	LC	Lower Compressor SPDP	thalassa
7	NA	PAD	PAD	TBD

Document Release:

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