



# Jefferson Lab Alignment Group

## Data Transmittal

**TO:** D. Higinbotham

**DATE:** 07/31/2018

**FROM:** Chris Curtis

**Checked:**

**# :** A1873

**DETAILS:**

Data: Data\Step2B\BSY1C\_12\180622A & 26A

Given below are the results of the recent survey carried out in Line A of the Beam Switch Yard in order to determine the angle between the superharp pairs. The previous surveys were carried out in 1998, 2000 and 2014 (DTMs #457, #624 and #A1571). As in the 2014 survey, this survey involved measuring the relative location of the tooling blocks previously located above the external wire reference of each harp. Additional measurements were made to the mount for the external wire reference and a newly installed reference nut.

The data was adjusted in the same way with the line between the first superharps was held fixed. Absolute and relative error ellipses from this adjustment were used to indicate the accuracy of the measurements; semi major (A) and semi minor (B) axes are shown. Harp coordinates (meters) and calculated azimuths and angles are given below.

An adjustment holding control points fixed was used to determine the location of the tooling ball blocks with respect to the ideal beam position. From this adjustment an offset to the beamline was calculated ("Bmline Offset"). The offsets and ellipse values below are given in millimeters.

**2014 results: Angle (07A-B) to (18A-B) : 34.2586 deg; 1 sigma: 1.6 sec or 0.0005 deg**

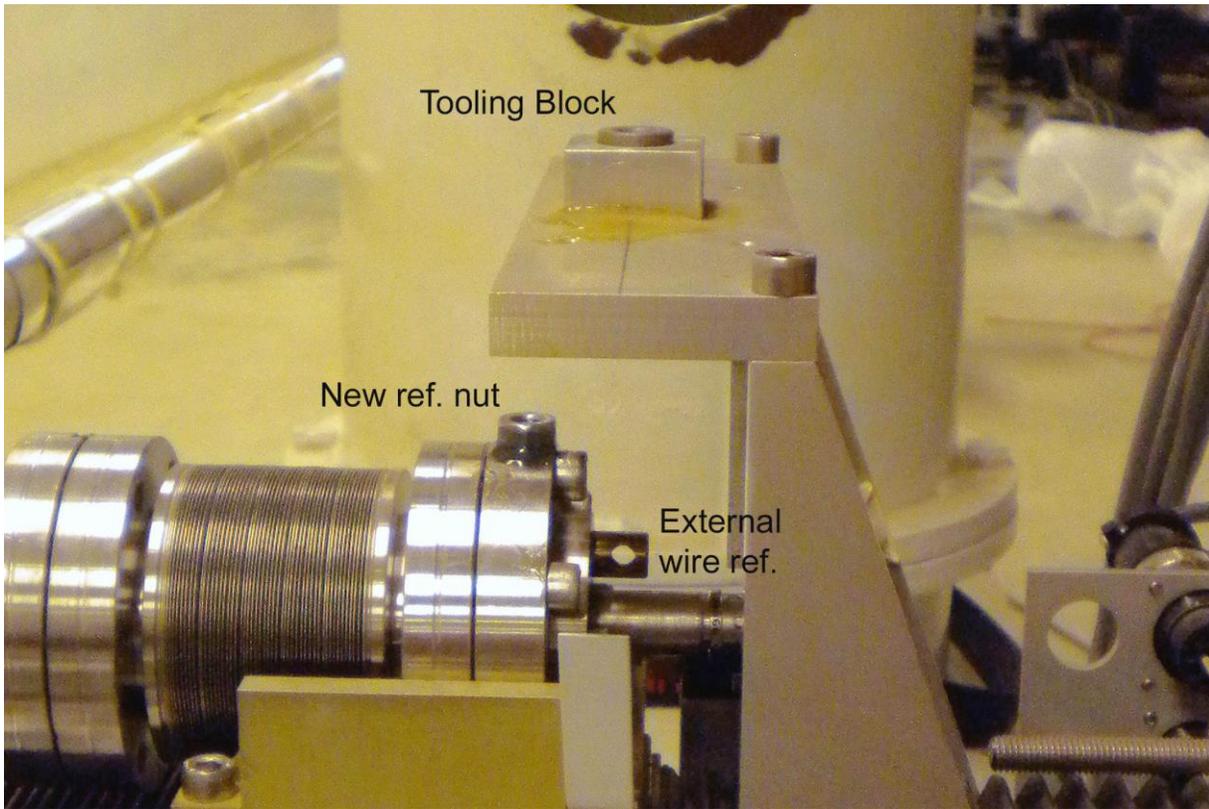
**2018 Tooling Block results:**

POINT	Z	X	A	B	Bmline Offset
HARP 07A	-309.03542	-78.94512	0.00	0.00	235.3
HARP 07B	-313.00199	-78.72280	0.02	0.01	234.8
Azimuth 07A-B : 176.7920 deg					
HARP 18A	-355.58078	-61.99026	0.14	0.04	233.8
HARP 18B	-358.52643	-59.73281	0.16	0.03	235.9

Azimuth 18A-B : 142.5346 deg

**Angle (07A-B) to (18A-B) : 34.2574 deg**

Estimated accuracy (1 sigma): 2.5 seconds or 0.0007 deg



As mentioned above, measurements were also made to the circle of the mount for the external wire reference. These were made with the encoder set at the ideal 118407, and provide an additional representation of the harp wire. This assumes that the wire is located at the center of the circle. The results (shown below) differ significantly from the tooling block survey. To resolve this it would be necessary to investigate whether the tooling block or the wire mount circle is the best representation of the external wire.

**2018 Wire Reference results:**

POINT	Z	X	Bmline Offset
HARP 07A	-309.03536	-78.94408	234.3
HARP 07B	-313.00193	-78.72170	233.7
Azimuth 07A-B : 176.7912 deg			
HARP 18A	-355.58008	-61.98935	232.7
HARP 18B	-358.52631	-59.73264	235.7
Azimuth 18A-B : 142.54914 deg			
<b>Angle (07A-B) to (18A-B) : 34.2420 deg</b>			