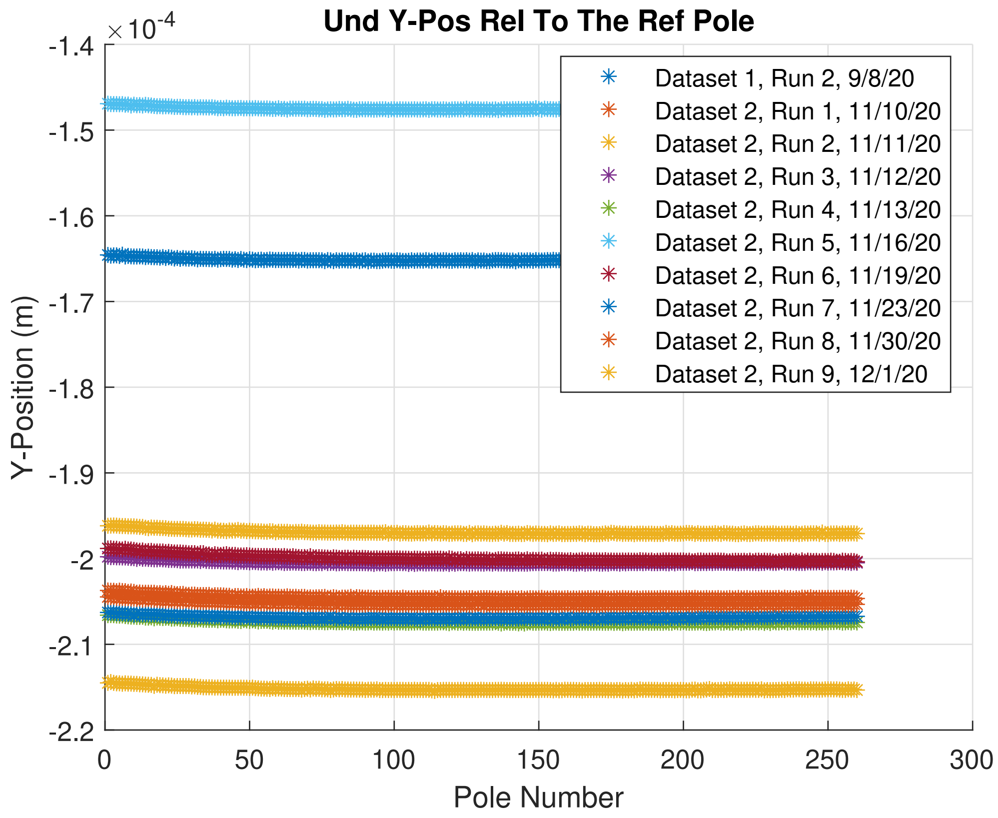
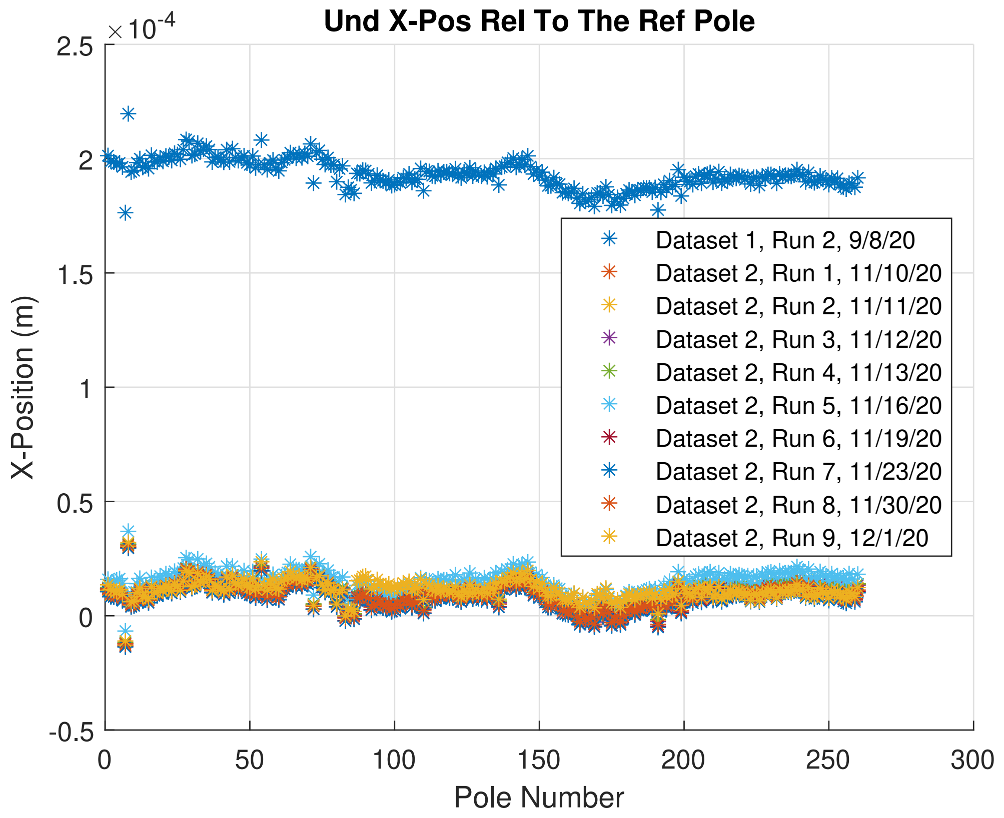
SLAC Magnetic Measurements
Capacitive Sensor Analysis Comparison

Title:
HXU-016 Lifetime Test

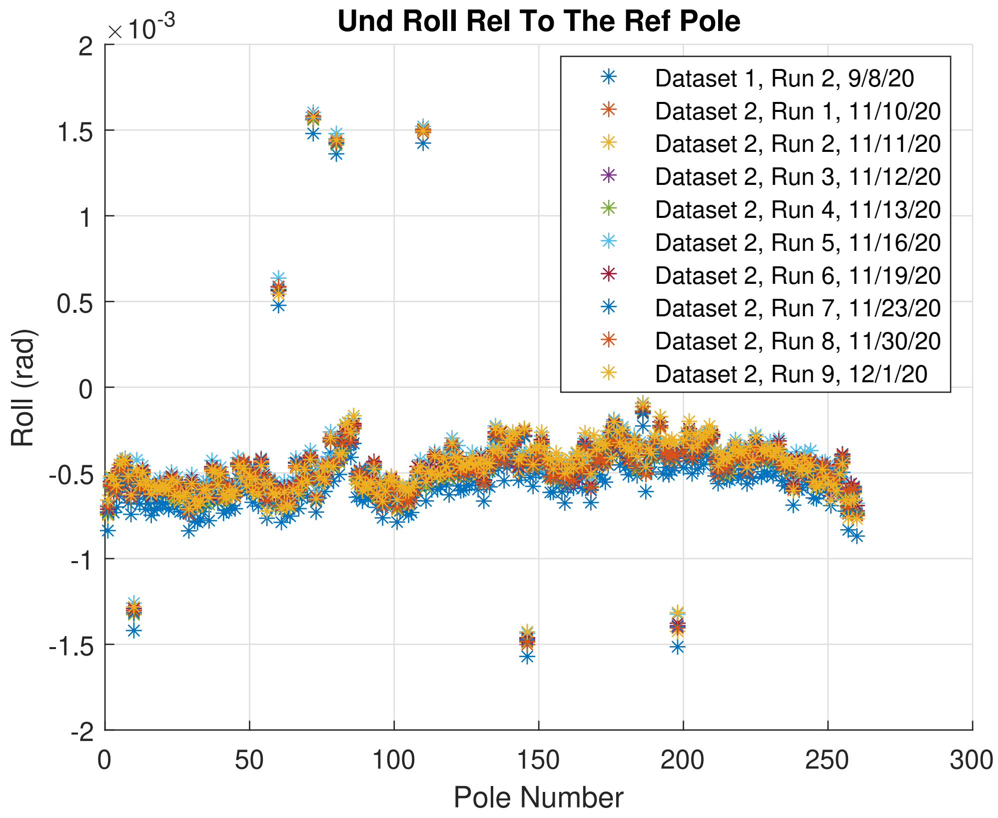
Input Files:
1) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0001\Tuning\Align Cap Sensor\Run 002\cap_sen_vp_anal.mat
2) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0002\Tuning\Align Cap Sensor\Run 001\cap_sen_vp_anal.mat
3) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0002\Tuning\Align Cap Sensor\Run 002\cap_sen_vp_anal.mat
4) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0002\Tuning\Align Cap Sensor\Run 003\cap_sen_vp_anal.mat
5) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0002\Tuning\Align Cap Sensor\Run 004\cap_sen_vp_anal.mat
6) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0002\Tuning\Align Cap Sensor\Run 005\cap_sen_vp_anal.mat
7) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0002\Tuning\Align Cap Sensor\Run 006\cap_sen_vp_anal.mat
8) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0002\Tuning\Align Cap Sensor\Run 007\cap_sen_vp_anal.mat
9) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0002\Tuning\Align Cap Sensor\Run 008\cap_sen_vp_anal.mat
10) S:\magdata\LCLS-II\Undulator\HXU_016\DATASET0002\Tuning\Align Cap Sensor\Run 009\cap_sen_vp_anal.mat



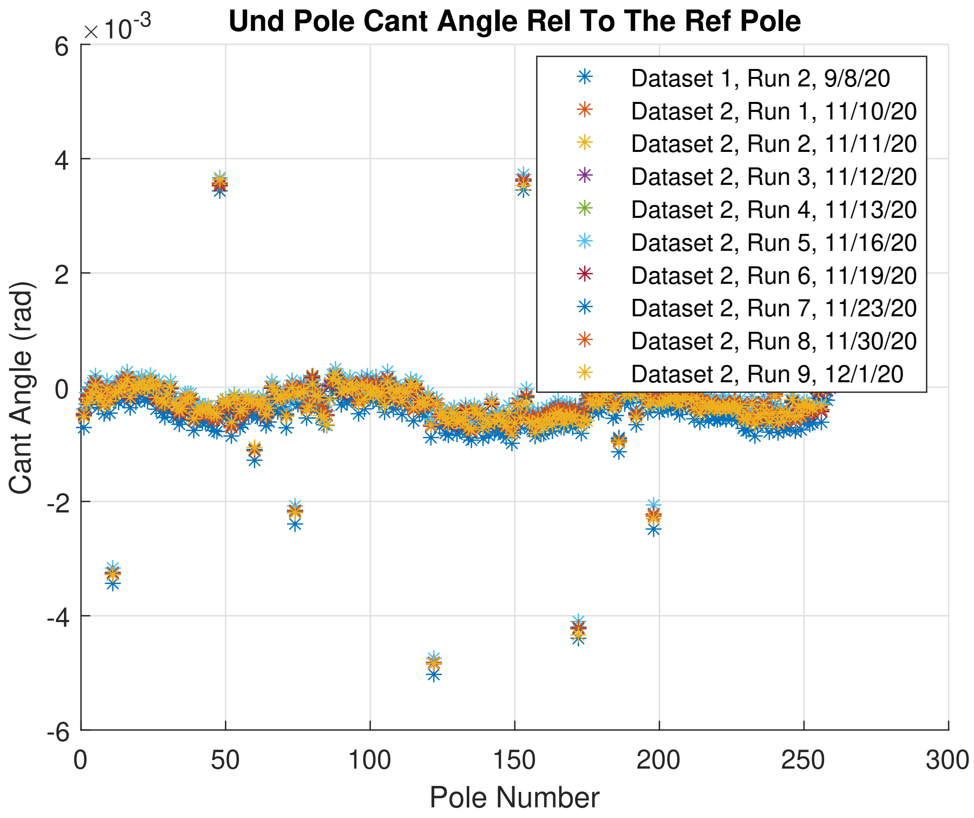
Und Y-Pos Rel To The Ref Pole
×10^-4
-1.4
-1.5
-1.6
-1.7
-1.8
-1.9
-2
-2.1
-2.2
Y-Position (m)
0
50
100
150
200
250
300
Pole Number
Dataset 1, Run 2, 9/8/20
Dataset 2, Run 1, 11/10/20
Dataset 2, Run 2, 11/11/20
Dataset 2, Run 3, 11/12/20
Dataset 2, Run 4, 11/13/20
Dataset 2, Run 5, 11/16/20
Dataset 2, Run 6, 11/19/20
Dataset 2, Run 7, 11/23/20
Dataset 2, Run 8, 11/30/20
Dataset 2, Run 9, 12/1/20

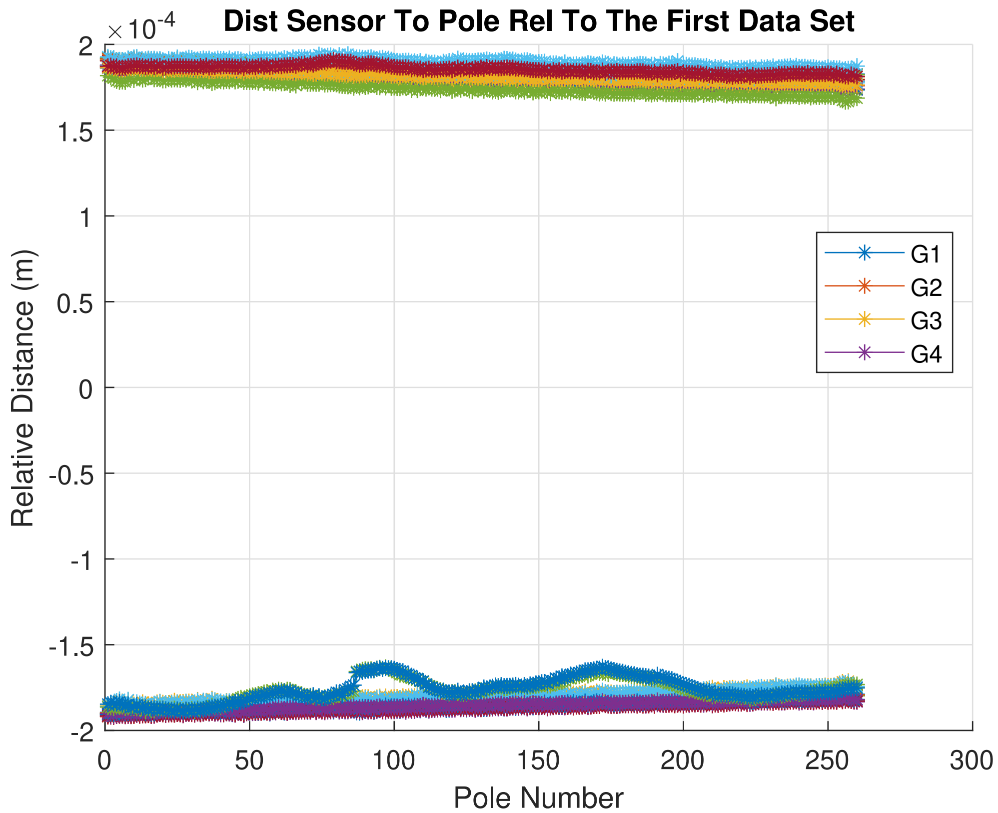


Und X-Pos Rel To The Ref Pole
×10^-4
2.5
2
1.5
1
0.5
0
-0.5
X-Position (m)
0
50
100
150
200
250
300
Pole Number
Dataset 1, Run 2, 9/8/20
Dataset 2, Run 1, 11/10/20
Dataset 2, Run 2, 11/11/20
Dataset 2, Run 3, 11/12/20
Dataset 2, Run 4, 11/13/20
Dataset 2, Run 5, 11/16/20
Dataset 2, Run 6, 11/19/20
Dataset 2, Run 7, 11/23/20
Dataset 2, Run 8, 11/30/20
Dataset 2, Run 9, 12/1/20

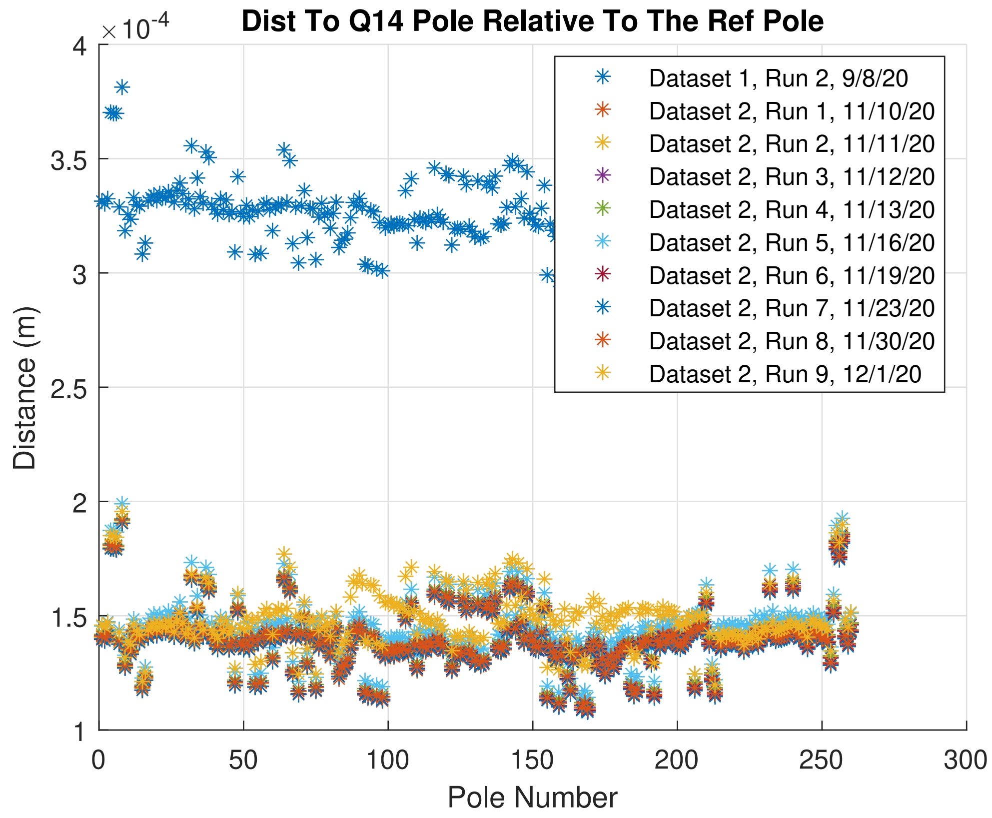


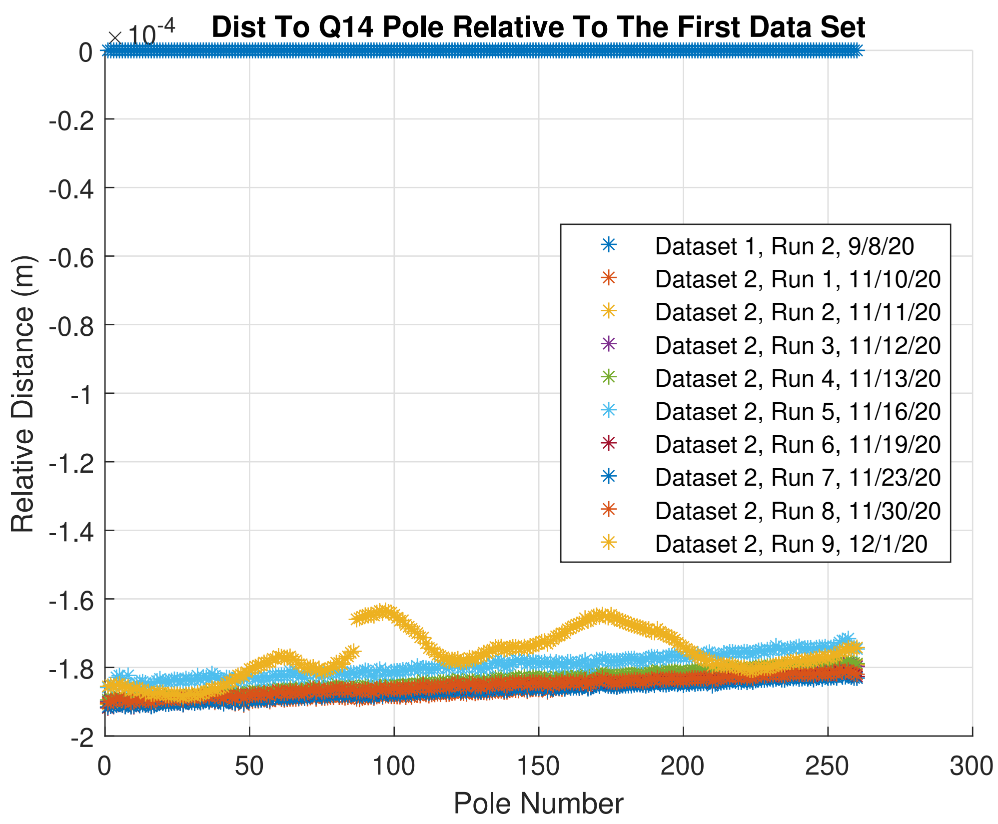
Und Roll Rel To The Ref Pole
×10^-3
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Roll (rad)
0
50
100
150
200
250
300
Pole Number
Dataset 1, Run 2, 9/8/20
Dataset 2, Run 1, 11/10/20
Dataset 2, Run 2, 11/11/20
Dataset 2, Run 3, 11/12/20
Dataset 2, Run 4, 11/13/20
Dataset 2, Run 5, 11/16/20
Dataset 2, Run 6, 11/19/20
Dataset 2, Run 7, 11/23/20
Dataset 2, Run 8, 11/30/20
Dataset 2, Run 9, 12/1/20


Und Pole Cant Angle Rel To The Ref Pole
×10^-3
6
4
2
0
-2
-4
-6
Cant Angle (rad)
0
50
100
150
200
250
300
Pole Number
Dataset 1, Run 2, 9/8/20
Dataset 2, Run 1, 11/10/20
Dataset 2, Run 2, 11/11/20
Dataset 2, Run 3, 11/12/20
Dataset 2, Run 4, 11/13/20
Dataset 2, Run 5, 11/16/20
Dataset 2, Run 6, 11/19/20
Dataset 2, Run 7, 11/23/20
Dataset 2, Run 8, 11/30/20
Dataset 2, Run 9, 12/1/20

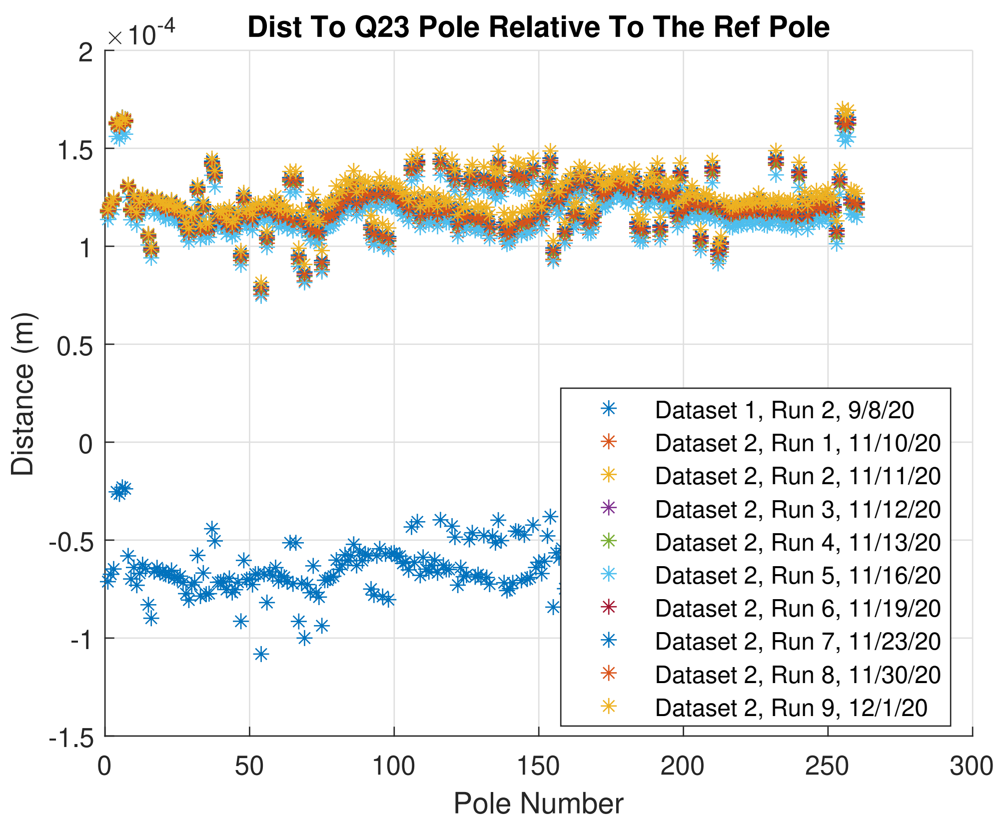


Dist Sensor To Pole Rel To The First Data Set
$\times 10^{-4}$
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
50
100
150
200
250
300
Pole Number
Relative Distance (m)
G1
G2
G3
G4

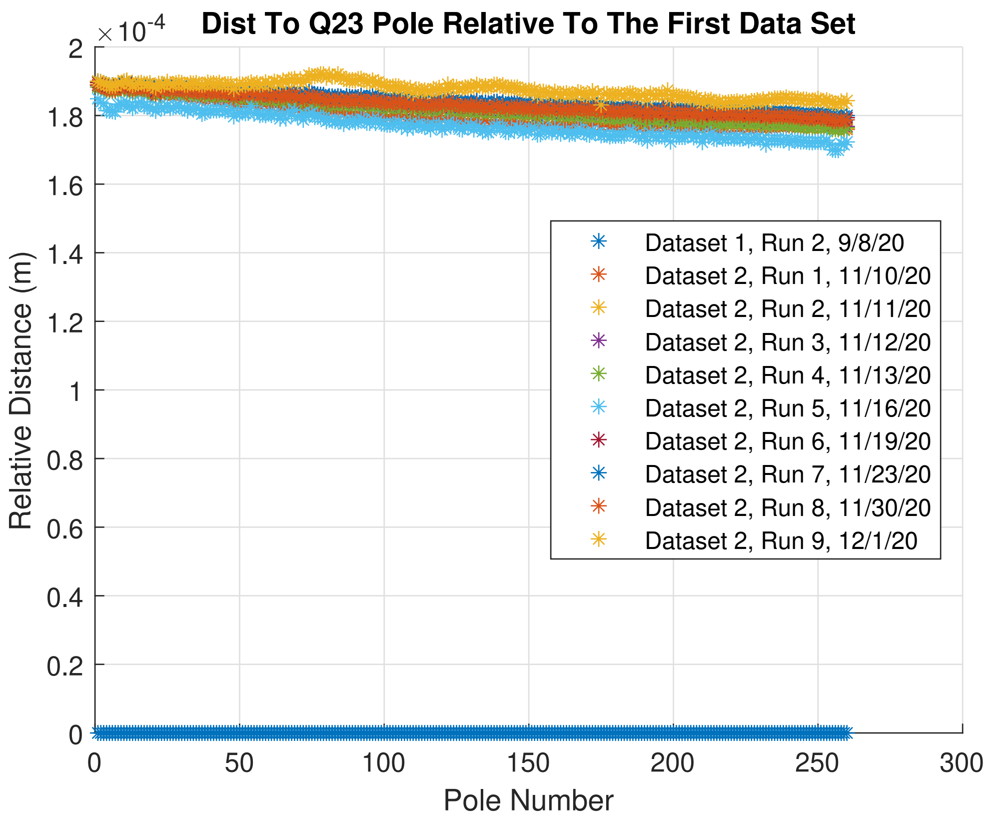

Dist To Q14 Pole Relative To The Ref Pole
×10^-4
Distance (m)
Pole Number
Dataset 1, Run 2, 9/8/20
Dataset 2, Run 1, 11/10/20
Dataset 2, Run 2, 11/11/20
Dataset 2, Run 3, 11/12/20
Dataset 2, Run 4, 11/13/20
Dataset 2, Run 5, 11/16/20
Dataset 2, Run 6, 11/19/20
Dataset 2, Run 7, 11/23/20
Dataset 2, Run 8, 11/30/20
Dataset 2, Run 9, 12/1/20



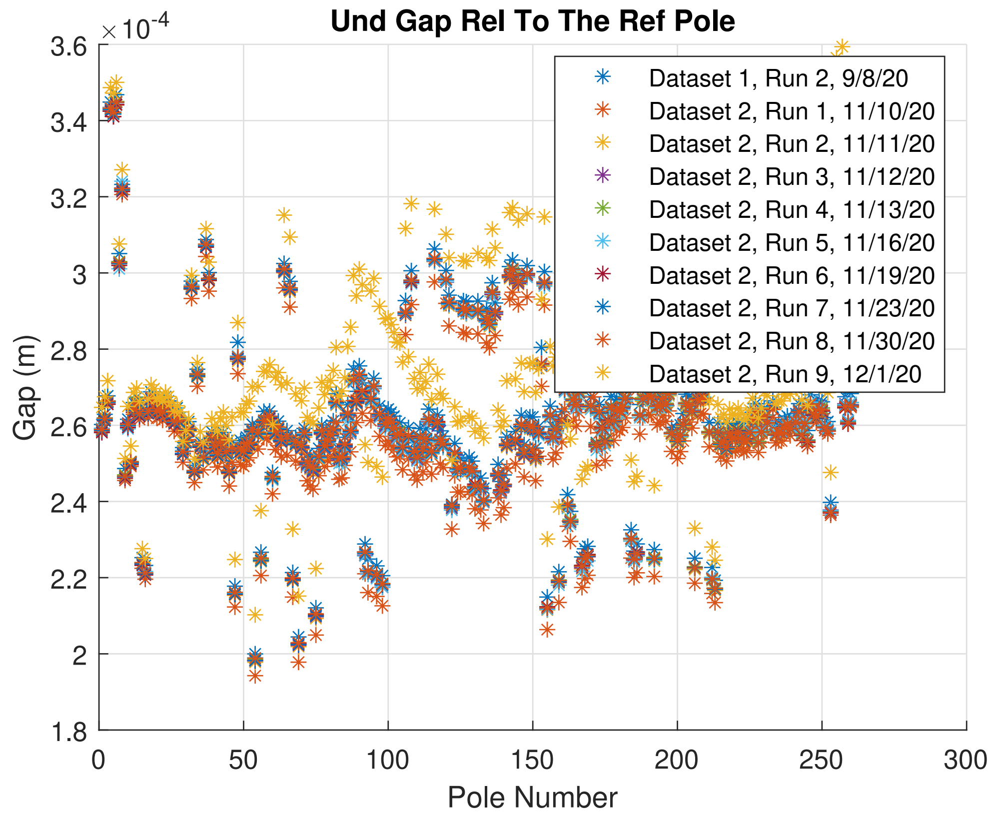
Dist To Q14 Pole Relative To The First Data Set
×10^-4
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
Relative Distance (m)
0
50
100
150
200
250
300
Pole Number
Dataset 1, Run 2, 9/8/20
Dataset 2, Run 1, 11/10/20
Dataset 2, Run 2, 11/11/20
Dataset 2, Run 3, 11/12/20
Dataset 2, Run 4, 11/13/20
Dataset 2, Run 5, 11/16/20
Dataset 2, Run 6, 11/19/20
Dataset 2, Run 7, 11/23/20
Dataset 2, Run 8, 11/30/20
Dataset 2, Run 9, 12/1/20



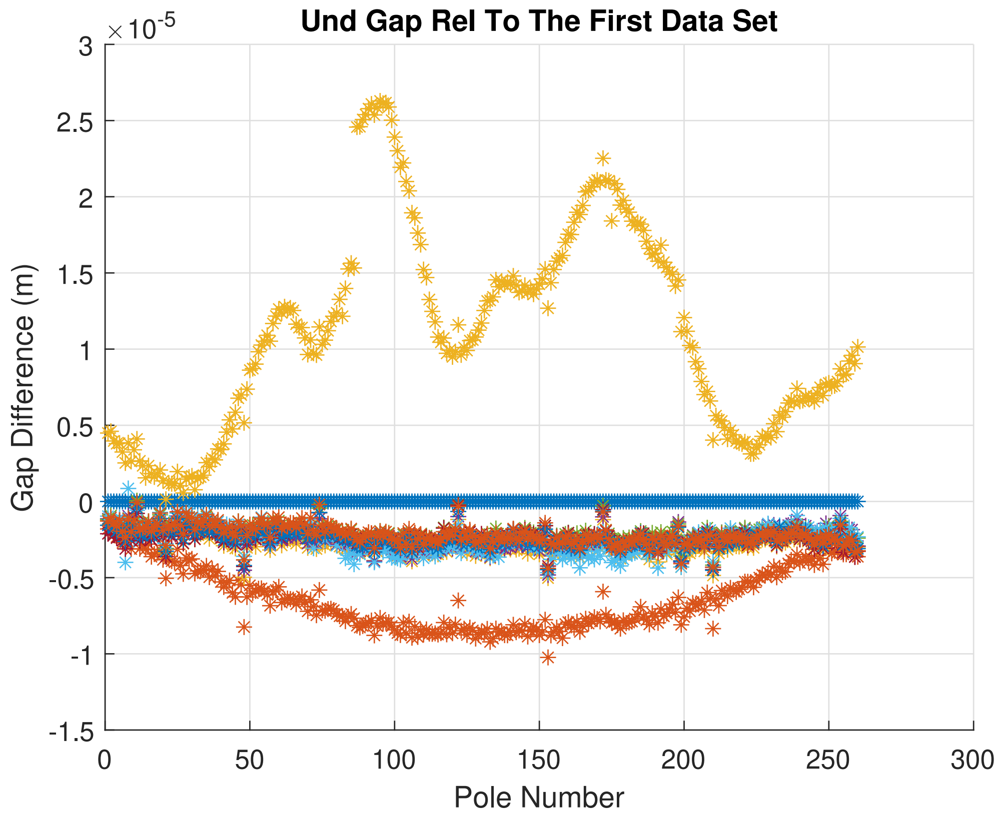
Dist To Q23 Pole Relative To The Ref Pole
×10^-4
2
1.5
1
0.5
0
-0.5
-1
-1.5
Distance (m)
0
50
100
150
200
250
300
Pole Number
Dataset 1, Run 2, 9/8/20
Dataset 2, Run 1, 11/10/20
Dataset 2, Run 2, 11/11/20
Dataset 2, Run 3, 11/12/20
Dataset 2, Run 4, 11/13/20
Dataset 2, Run 5, 11/16/20
Dataset 2, Run 6, 11/19/20
Dataset 2, Run 7, 11/23/20
Dataset 2, Run 8, 11/30/20
Dataset 2, Run 9, 12/1/20



Dist To Q23 Pole Relative To The First Data Set
$\times 10^{-4}$
Relative Distance (m)
Pole Number
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0
50
100
150
200
250
300
Dataset 1, Run 2, 9/8/20
Dataset 2, Run 1, 11/10/20
Dataset 2, Run 2, 11/11/20
Dataset 2, Run 3, 11/12/20
Dataset 2, Run 4, 11/13/20
Dataset 2, Run 5, 11/16/20
Dataset 2, Run 6, 11/19/20
Dataset 2, Run 7, 11/23/20
Dataset 2, Run 8, 11/30/20
Dataset 2, Run 9, 12/1/20



Und Gap Rel To The Ref Pole
×10^-4
3.6
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
Gap (m)
0
50
100
150
200
250
300
Pole Number
Dataset 1, Run 2, 9/8/20
Dataset 2, Run 1, 11/10/20
Dataset 2, Run 2, 11/11/20
Dataset 2, Run 3, 11/12/20
Dataset 2, Run 4, 11/13/20
Dataset 2, Run 5, 11/16/20
Dataset 2, Run 6, 11/19/20
Dataset 2, Run 7, 11/23/20
Dataset 2, Run 8, 11/30/20
Dataset 2, Run 9, 12/1/20



Und Gap Rel To The First Data Set
×10^-5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
Gap Difference (m)
0
50
100
150
200
250
300
Pole Number