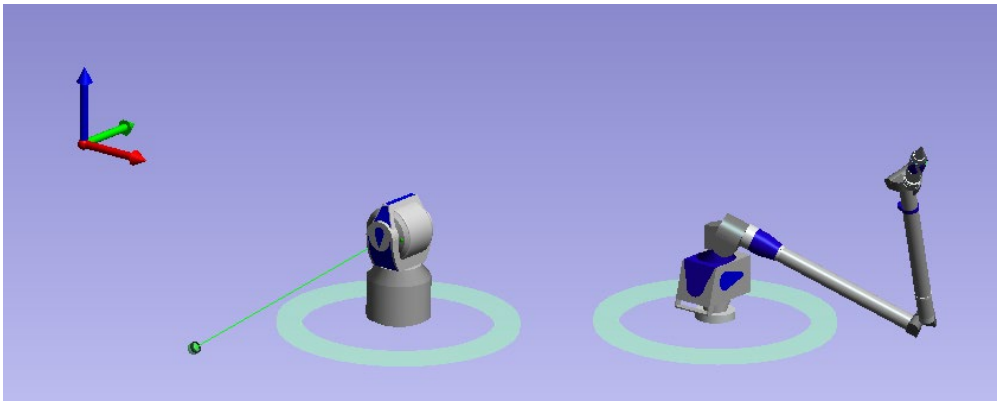
Scanning TrackArm Alignment in SA:

Setup:

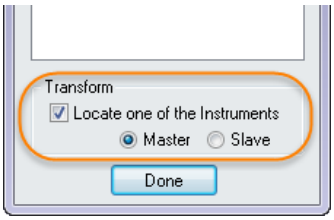
1. Add a tracker and an arm to the SA Job file and roughly position them using ***Instrument>Drag Instrument Graphically***.



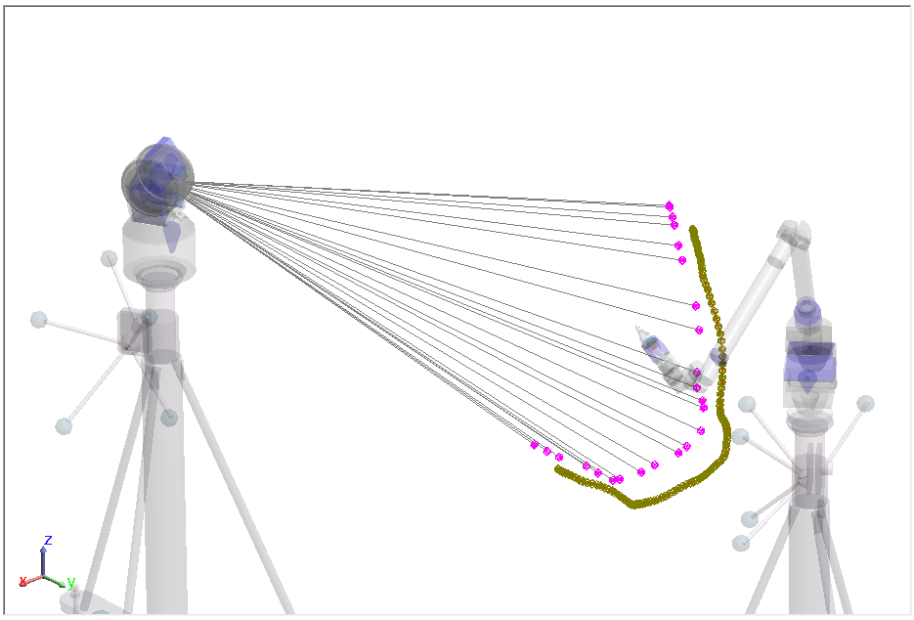
2. Start the instrument interfaces for both instruments
3. Set the correct probe for each instrument
    a. The Tracker: should be using the 7/8in SMR target mounted on the arm (although it doesn't really matter we will be fitting using the center points)
    b. The Arm: should be using the calibrated offset tip defining the SMR position for the reflector mounted on the collar attached to the arm.
4. Set the correct measurement profile parameters
    a. The Tracker: Set the Measurement Profile for the tracker to Temporal Scan at a high rate than 3 points per second, at least 10.
    b. The Arm: Should be set to a Streaming Points mode.

Measurement Process:

5. Start the operation ***Instrument>Synchronized Measurement>Master Slave***
    a. Choose the Arm as the Master then the tracker as the slave
    b. Ensure that Transform option to locate is checked and the Master is selected



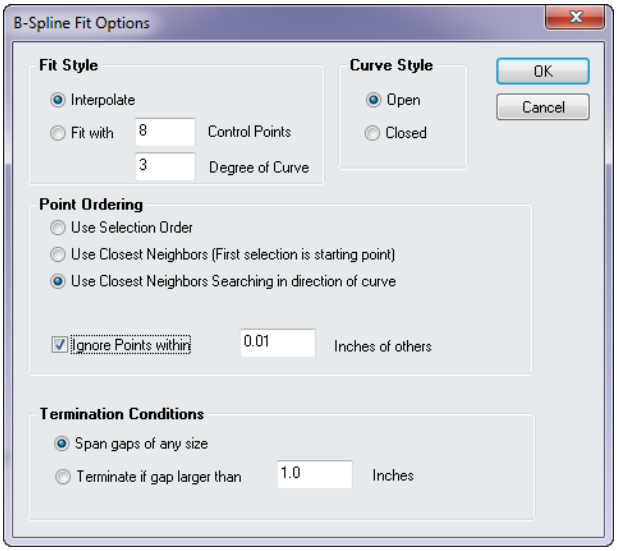
6. Make sure the Tracker's beam is locked onto the SMR mounted on the arm.
7. Start measuring by pressing the trigger button on the arm and move in a Z shaped patter to lock down the degrees of freedom (a relatively slow smooth motion is best).



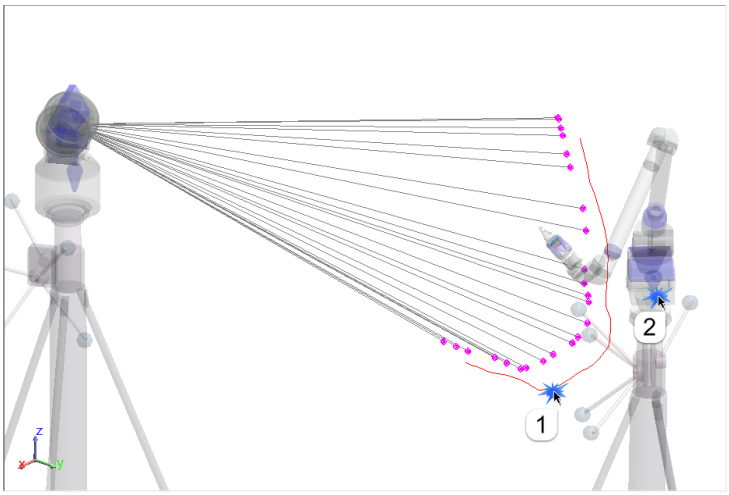
8. Stop taking points by again pressing the arm button and wait for the transform to occur (this should orient the instruments).

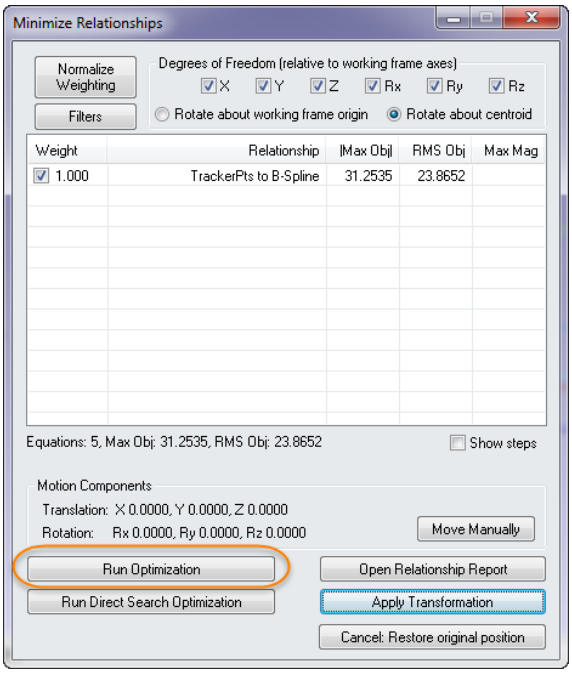
Refining the fit:

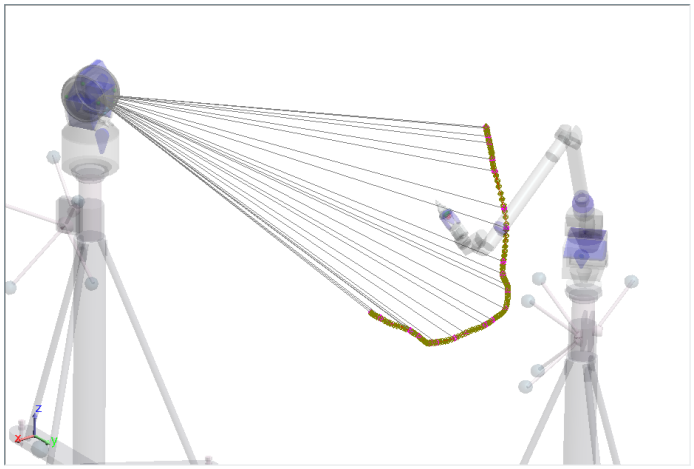
9. Fit a spline through the measurements taken by the arm using ***Construct>B-Spline> from Points*** and the following settings:



10. Build a relationship (***Relationship>Group to Objects***) between the Tracker measurements and the spline built from the arm measurements.
11. Run the optimization (Relationships>Move Objects by Minimizing Relationships)
    a. For objects to move select the B-Spline
    b. For Instruments to move select the Arm


2
1


Minimize Relationships
Normalize Weighting
Filters
Degrees of Freedom (relative to working frame axes)
X Y Z Rx Ry Rz
Rotate about working frame origin
Rotate about centroid
Weight
Relationship
|Max Obj|
RMS Obj
Max Mag
1.000
TrackerPts to B-Spline
31.2535
23.8652
Equations: 5, Max Obj: 31.2535, RMS Obj: 23.8652
Show steps
Motion Components
Translation: X 0.0000, Y 0.0000, Z 0.0000
Rotation: Rx 0.0000, Ry 0.0000, Rz 0.0000
Move Manually
Run Optimization
Run Direct Search Optimization
Open Relationship Report
Apply Transformation
Cancel: Restore original position



12. Voila'!