



Laser Interferometer Gravitational Wave Observatory

*LIGO Laboratory / LIGO Scientific Collaboration*

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**Arm Cavity Baffle  
Installation/De-installation Procedure**

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## 1 Scope

This document covers the procedure for installation and de-installation of the SLC Arm Cavity Baffle:

1. onto an overhead mechanical interface for testing (Section 1 of document)
2. onto the BSC ISI Stage-0 (D0900896) structure inside a BSC chamber (Section 2 of document)

NOTE: This procedure must be read before beginning the installation of an Arm Cavity Baffle.

Note that the installation of the Arm Cavity Baffle is one element of the Stray Light Control (SLC) subsystem. The installation plan for all SLC components is covered in “SLC and Viewports Installation plan”, LIGO-[E1000099](#).

## Section 1 – Arm Cavity Baffle installation onto Test Stand

### 2 Installation Preparation

#### 2.1 Insertion of ACB Suspension Assembly into ACB Installation Stand

1 - Position the **ACB Installation Stand** on the clean room floor on top of aluminum foil

D1200575 – used for BSC1 and BSC3

D1101957 – used for BSC4, BSC5, BSC9 and BSC10

2 - Remove the **Upper Clamp** (D1102062) - save the hardware for later use

3 - Place **ACB\_Stage-0 Dog Clamp, End** on top of stand at the side nearest the three horizontal clearance holes in the side beam. Place **ACB\_Stage-0 Guide Block** on top of stand on the other side.

IFO	CHAMBER	GUIDE BLOCK	END BLOCK
L1/H1	BSC1	D1101610	D1101622
L1/H1	BSC3	D1101609	D1201454
L1	BSC4	D1101673	D1101619
L1	BSC5	D1101595	D1101613
H1	BSC9	D1101673	D1101619
H1	BSC10	D1101595	D1101613

**Table 1: Installation Tooling**

4 – Verify that the **Transport Locking Bracket** (D1101285) and the “**Variable Height Bracket, Flat**” (D1102323) are attached.

5 - Two people lift the **Arm Cavity Baffle Suspension Assembly** (D1200275 OR D1200655), while a 3<sup>rd</sup> person holds the stand, and place the **Interface Plate** on top of the stand between the **Dog Clamp, End** and the **Guide Block** with the wide end of the interface plate supported by the **Guide Block**.



6 - Replace and fasten the **Upper Clamp** with the saved hardware.

## 2.2 Installation Set-up

### 2.2.1 Items required for Installation Set-up:

1 – Lifting Table (D1002192) or similar

3 – Tall step stands for reaching to top of Test Stand

2 - “Wedge Lift, Baffle, Suspension Table” (D1101952) and hardware

1 - “Arm Cavity Baffle Box Assembly”

1 – Installation Stand with Suspension Assembly

1 - **Suspension Lift Assembly** (D1101953), with **Table, Secondary, Suspension** (D1101962) and four **Table Dog Clamps** (D1001376-2) and hardware.

2 - SHCS ( $\frac{1}{4}$ -20 x .62”)

2 - 3/16” Hex Allen tool of  $\frac{1}{4}$ -20 SHCS

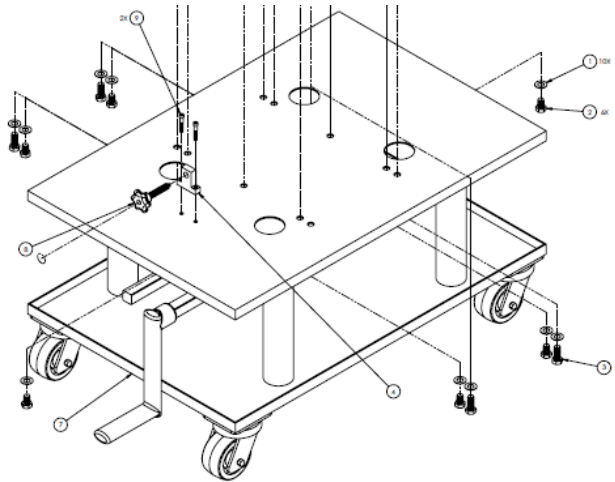
2 - 5/16” Hex Allen tool of 3/8-16 SHCS

2 - Plain Grip Looped T-Handle Hex Key 3/16” Hex

12 – Dog clamps and hardware for mounting to the Test Stand Table

Verify all hardware and tools

- 2.2.2 **CHECK THE LEVEL OF THE MOUNTING SURFACE OF THE TEST STAND!** It is important that this surface be level to within 0.14 deg. This will ensure that the upper tube can be positioned after balancing to within 1 mm of the centerline position of the earthquake stop flange opening and allow a range of motion > 2 mm of the upper tube.
- 2.2.3 Set-up “Suspension Lift Table” (D1102061), with “Table, Secondary, Suspension” (D1101962) and four “Table Dog Clamps” (D1001376-2) attached, under Test Stand on top of the cranked lifting table (D1002192) that will allow the Suspension Stand to be mated to the Test Stand ceiling. The Suspension Lift Table weighs about 62 lbs. and the Secondary Table weighs about 20 lbs. **Note: orient the crank opposite to the “BEND FIXTURE PLATE” (D1101184) of the Suspension Assembly.**



- 2.2.4 **Adjust position of Lifting Table (D1002192) to sit directly below Baffle attachment area on Test Stand.**
- 2.2.5 **Verify Jacks are in completely collapsed state.**

### **3 Arm Cavity Baffle installation**

#### **3.1 ACB Suspension Assembly (D1200275 or D1200655) installation onto Test Stand**

##### **3.1.1 Items required for Arm Cavity Baffle Suspension Assembly Installation:**

1 - “ACB\_Installation Stand” (D1101957), with “Arm Cavity Baffle Suspension Assembly” (D1200275 or D1200655), “ACB\_Stage Zero Narrow\_Guide Block” and “ACB\_Stage Zero Narrow-Dog Clamp, End” [refer to Table 1: Installation Tooling for part number] installed.

NOTE: The Arm Cavity Baffle Suspension Assembly must have the following tooling attached: “BEND FIXTURE PLATE” (D1101184), “Transport, Locking, ACB” (D1101285), and “Variable Height Bracket, Flat” (D1102323).

NOTE: “ACB\_Stage Zero Interface Fixture Mover” (D1101700) must **NOT** be installed.

- 2 - 3/16” Hex Allen tool of ¼-20 SHCS
  - 2 - Plain Grip Looped T-Handle Hex Key 3/16” Hex
  - 2 - 5/16” Hex Allen tool of 3/8-16 SHCS
  - 5 - SHCS (3/8-16 x 2 1/2”)
  - 5 – 3/8” washers
  - 4 - SHCS (3/8-16 x 2 1/2”)
  - 4 – 3/8” washers
  - 2 - 3/16” Hex Allen tool of ¼-20 SHCS
  - 3 – Tall step stands (class B) to reach top of test stand table
  - 4 – Interface Mounting Clamps (D1001700)
- 3.1.2 **Two people carry the Arm Cavity Baffle Suspension Assembly, which is secured in the expandable Installation Stand in its collapsed and locked configuration, and carefully place it on top of the Secondary Table; the orientation on the table should match the orientation of the ACB Box when it is installed later. Total weight is about 100 lbs. There are handles on the Installation Stand for lifting and carrying.**





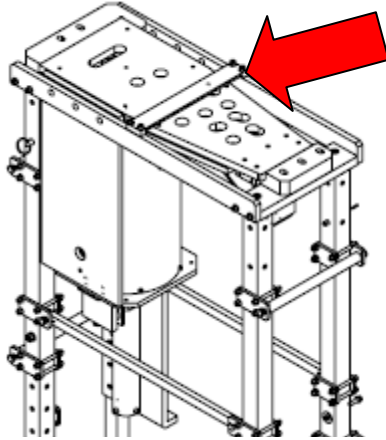
3.1.3 **NOTE: Two people remain on each side of the Installation Stand.**

3.1.4 **Secure Installation Stand to Secondary Table with four Table Dog Clamps attached to the table.**

3.1.5 **Loosen Table Dog Clamps that secure the Installation Stand and align to placement location on Test Stand.**



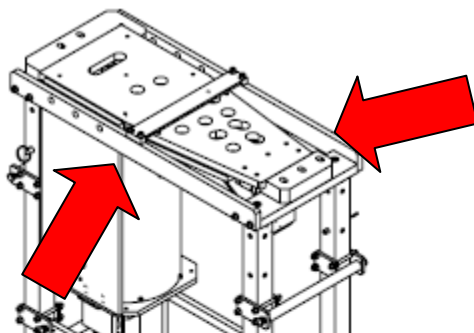
- 3.1.6 **Tighten Table Dog Clamps to secure Installation Stand.**
- 3.1.7 **With Installation Stand secured, remove Upper Clamp from top of Installation Stand. Remove parts and set aside.**



- 3.1.8 **Crank the lifting table to the lowest position.**
- 3.1.9 **Two people grab the lifting bars on each side of the Installation Stand and a 3<sup>rd</sup> person removes the Locking Pins that secure the telescoping legs. Raise the installation stand to the nearest telescoping leg locking hole that brings the installation stand closest to the Test Stand mounting surface. Insert the locking pins and secure the telescoping legs.**
- 3.1.10 **Slowly crank the Lifting Table (D1002192) upwards and to lift the Installation Stand while positioning it to align the Interface Mounting Plate to the Test Stand plate mounting locations. Continue cranking until top of Interface Mounting Plate touches the Test Stand.**



3.1.11 Remove Side Beam from Installation Stand from each side one at a time, clamping that side with Dog Clamps before removing the other side. Remove parts and set aside.





- 3.1.12 **Slowly crank the lifting Table (D1002192) downwards with attached Installation Stand. Watch the Suspension Assembly for any possible obstruction. Note: Describe the rework needed to keep the installation stand from catching on the bolt heads of the dog clamps.**
- 3.1.13 **Loosen the four Table Dog Clamps on the Secondary Table securing the Installation Stand, rotate to release and tighten.**
- 3.1.14 **Carefully remove empty Installation Stand and set aside.**
- 3.1.15 **Remove the twelve 1/4-20 SHCS attaching the Secondary Table to the Lift Table. Set screws aside for use in next step.**
- 3.1.16 **Carefully remove the Secondary Table and set aside.**

## **3.2 Arm Cavity Baffle Box Assembly installation onto Test Stand**

### **3.2.1 Items required for Arm Cavity Baffle Box Assembly Installation:**

- 2 - Plain Grip Looped T-Handle Hex Key 3/16" Hex
- 2 - "Wedge Lift, Baffle, Suspension Table" (D1101952)
- 2 - 3/16" Hex Allen tool of 1/4-20 SHCS
- 1 - "Slide, Baffle Carrier Assembly" (D1101958)
- 1 - "Arm Cavity Baffle Box Assembly" [refer to Table 2: ARM CAVITY BAFFLE BOX ASSEMBLIES for part numbers]
- 1 - Shoulder Screw #10-24 (D1101293)
- 3 - #10 Flat Washers
- 1 - #10 Silver-Plated Nut
- 1 - 3/8" Wrench for #10 Shoulder Screw Nut
- 1 - 1/8" Hex L-Key tool for #10 Shoulder Screw
- 4 - SHCS (1/4-20 x 7/8")

**3.2.2 Use the Lifting Table (D1002192) that was used for installation of the Suspension Assembly and crank it to the lowest level. Verify Jacks are in completely collapsed state.**

**3.2.3 Attach the two Wedge Lifts (D1101952) to the Jacks with eight 1/4-20 SHCS from Step 2.1.14.**

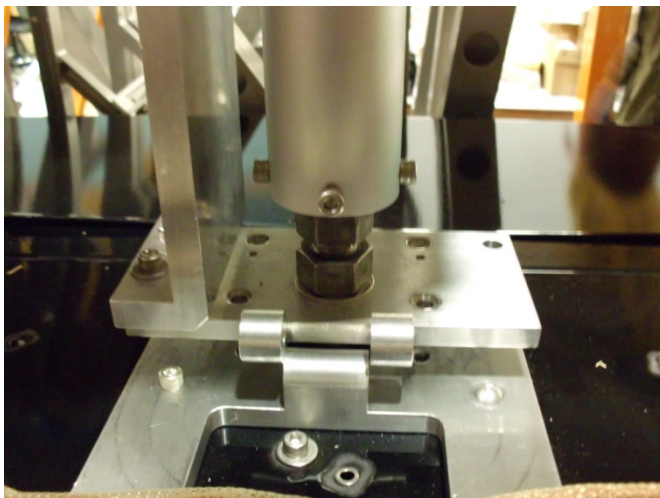
**3.2.4 Set the Baffle Carrier Slide Assembly (D1101958) into guides on top of the Table.**

**3.2.5 Four people must assist with the lift of the Arm Cavity Baffle Box Assembly. The Baffle Box weighs about 160 lbs. Carefully lift the Baffle Box and place centered onto Slide Assembly which is on the Table making sure the screws on the bottom of the Baffle Box clear the Slide Assembly.**

**3.2.6 Position the Baffle Box under the Suspension Assembly, stopping at the approximate location needed to raise and mate the Baffle Box Assembly with the Suspension Assembly.**



**3.2.7 Crank Lifting Table (D1002192) upwards to lift Baffle Box Assembly and align to Top Hinge Plate at bottom of Suspension Assembly. Adjust Baffle Box position by moving the cranked lower lifting table as needed for alignment. Continue lift until plates touch.**

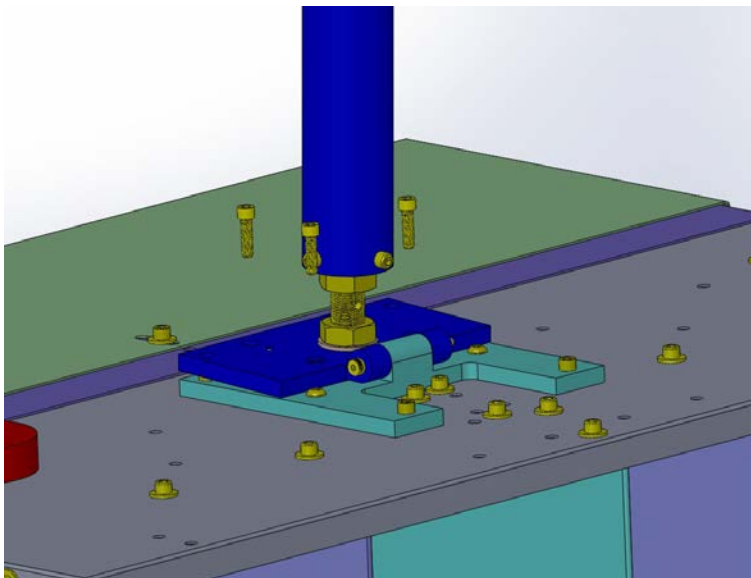


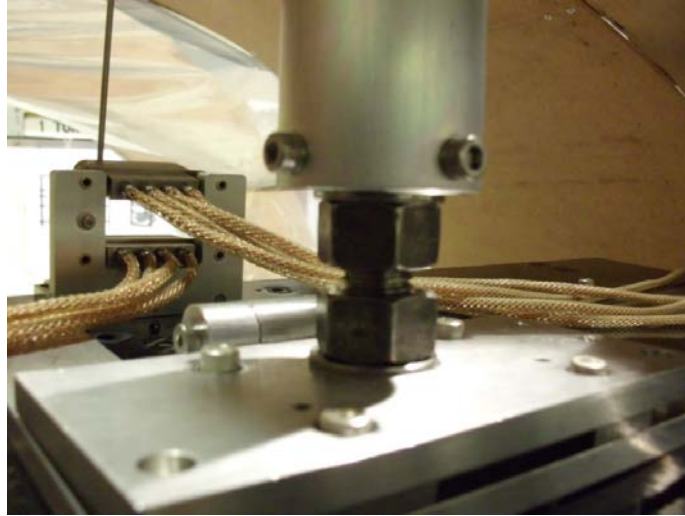


3.2.8 **Attach Baffle Box Assembly to Suspension Assembly with Shoulder Screw (D1101293), three #10 Flat Washers, and one #10-24 Silver Plated Nut**



3.2.9 **Attach four captive 1/4-20 SHCS in the Top Hinge Plate on Suspension Assembly to Bottom Hinge Plate on Baffle Box Assembly.**





3.2.10 **Slowly crank the lifting table downwards until the lifting table is approximately one inch below the bottom of the ACB box.**

### 3.3 Initial Baffle Balance

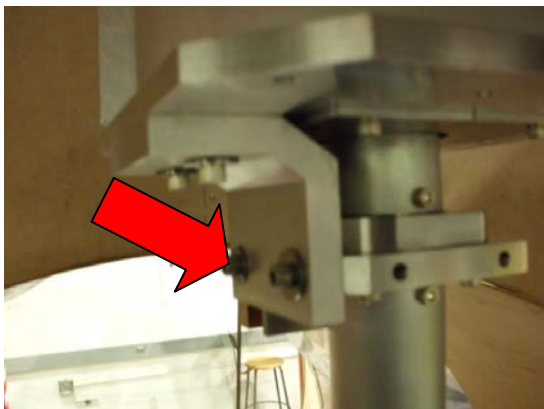
3.3.1 **Items required for Baffle Balance:**

2 - 3/16" Hex L-Key tool for 1/4-20 SHCS

3.3.2 **Note: The following balancing steps are critically dependent upon the mounting surface of the Test Stand being level in Step 1.3.2!!**

3.3.3 **Determining the Magnitude of Balance Weights**

3.3.3.1 Verify that the short **Transport Locking Bracket** is in place. Loosen the two SHCS in the slotted holes of the **Transport Locking Bracket** attached to the **Lower Tube Connector Plate** (D1002618) so that the Lower Tube can slide freely in the vertical direction.



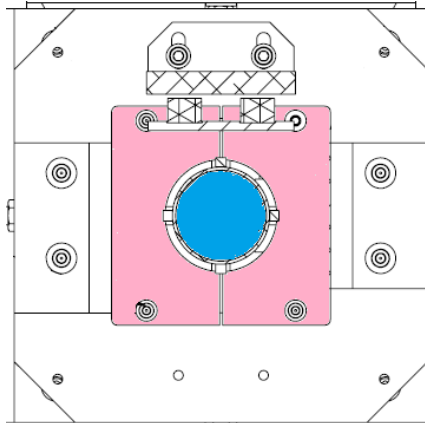


- 3.3.3.2 Remove the “**Variable Height Bracket, Flat**” (D1102323) and hardware. Set aside with hardware for Step 2.3.7.
- 3.3.3.3 Slowly lower the lifting table with the crank while watching to see if the **ACB Bend Fixture** (D1101184) pulls away from the interface plate.
  - 3.3.3.3.1 If the **Bend Fixture** becomes free, STOP!! Raise the lifting table with the crank until the bend fixture is again captured by the tip of the blade spring, proceed to Step 2.3.2.3.2. If the **Bend Fixture** does not become free, proceed to Step 2.3.2.3.5.
  - 3.3.3.3.2 Remove some of the free balance weights and repeat Step 2.3.2.3, continuing to repeat this process and removing weights until there is a stable gap of approximately 0.010 between the **Bend Fixture** and the **Interface Plate** after the lifting table has been lowered so that it no longer supports the **ACB**. At this point, the proper amount of balance weight has been determined, proceed to Step 2.3.3.
  - 3.3.3.3.3 If, after removing all of the free **Balance Weights**, the baffle is still hanging too low, as seen by observing the gap between the hole in the **Upper Tube** and the **Earthquake Rods**, proceed as follows:

NOTE: THIS STEP SHOULD ONLY BE UNDERTAKEN WITH THE APPROVAL OF THE COGNIZANT ENGINEER!

    - 1) Estimate the vertical offset of the **Upper Tube** within the earthquake stop rods, and note this dimension.
    - 2) Verify that the **Bend Fixture** is in place.
    - 3) Remove the ACB assembly from the Test Stand following the procedure of Section 3; disassemble the Suspension Assembly and repeat the assembly step described in E1100867 in which the length of the **Pivot Rod** was set by screwing it into the **Upper Tube**. However, this time insert the **Pivot Rod** into the **Upper Tube** by the additional amount noted in 2.6.3.4 to raise the **Upper Tube** within the **Earthquake Rod** holes.
    - 4) After repeating re-assembly steps, start over at Step 2.1.
  - 3.3.3.3.4 Add additional **Balance Weights** and repeat Step 2.3.2.3, continuing to repeat this process and adding weights until there is a stable gap of approximately 0.010 between the bend fixture and the interface plate after the lifting table has been lowered so that it no longer supports the ACB. At this point, the proper amount of balance weight has been determined, proceed to Step 2.3.3.
- 3.3.4 **Remove the Bend Fixture.**
- 3.3.5 **Detach the Transport Locking Bracket at the suspension and park the two screws in the Bracket. Loosen the two screws attached to the 8’ Tube. Slide Bracket away from suspension. Tighten screws.**
- 3.3.6 **Balance the ACB in the axial and transverse directions by shifting the Balance Weights axially and laterally until the SLC Baffle Tube Up Assembly (D1002582) is evenly spaced inside SLC Earthquake Stop Ring (D1001120) circumference.**

**Note: DO NOT ROTATE THE ACB BOX WHILE THE TRANSPORT LOCKING BRACKET IS REMOVED!!**



3.3.7 When balancing is complete, re-attach the Transport Locking Bracket and the Height, Adjustment, ACB.

3.3.8 NOTE: Do not re-insert Bend Fixture.

## 4 Removal from Test Stand

### 4.1 Removal Preparation

4.1.1 Items required for Removal Preparation:

Tool for SHCS

Transport Locking Bracket

Variable Height Bracket

4.1.2 Verify “Transport Locking Bracket” and “Variable Height Bracket, Flat” are in place. Verify all SHCS are tight.



4.1.3 Verify Jacks are in completely collapsed state.

4.1.4 Position Slider underneath the Baffle Box.

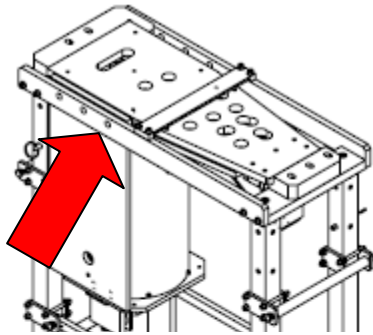
## 4.2 Baffle Box Removal

- 4.2.1 Items required for Baffle Box Removal:
- 4.2.2 Use the Lifting Table (D1002192) that was used for installation of the Baffle Box with the two Wedge Lifts attached to Jacks from Step 2.2.3.
- 4.2.3 Verify Jacks are in completely collapsed state.
- 4.2.4 Raise the lifting table with the crank until the table touches the bottom of the Baffle Box and partially supports it.
- 4.2.5 Remove the four 1/4-20 SHCS that attach the Top Hinge Plate on Suspension Assembly to Bottom Hinge Plate on Baffle Box Assembly.
- 4.2.6 Remove the Shoulder Screw, #10 Flat Washers, and #10 Silver Plated Nut that attach the Baffle Box Assembly to the Suspension Assembly.
- 4.2.7 Lower the lifting table with the crank until the Baffle Box is free from the Suspension Assembly.
- 4.2.8 Four people must assist with the lift of the Baffle Box Assembly. The Baffle Box weighs about 100 lbs. Carefully lift the Baffle Box and set aside.

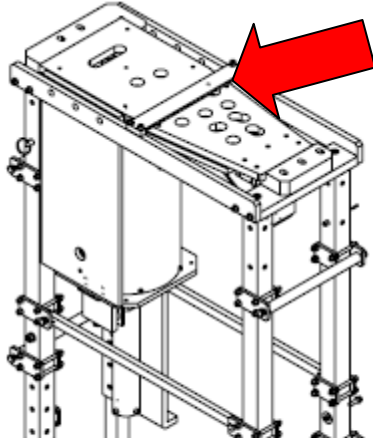
## 4.3 Suspension Assembly Removal

- 4.3.1 ***This step is for BSC1 and BSC3 (D1200275) ONLY!!*** - Remove “Variable Height Bracket, Flat” (D1102323) and replace with “Variable Height Bracket, 9 Degree” (D1201251). Loosen the Anti-Rotation Bracket at the Tube and large nuts above Top Hinge Plate to mate Bracket. Rotate Top Hinge Plate and align scribe on Bracket to Anti-Rotation Assembly. Tighten large nuts and Anti-Rotation Bracket when done.
- 4.3.2 Use the Lifting Table (D1002192) that was used for installation of the Baffle Box with the two Wedge Lifts attached to Jacks from Step 3.2.2.
- 4.3.3 Remove the Wedge Lifts from Jacks, set screws aside for use in next step.
- 4.3.4 Verify Jacks are in completely collapsed state.
- 4.3.5 Verify Dog Clamps are mounted on Secondary Table.
- 4.3.6 Attach Secondary Table to Lift Assembly with screws from Step 3.3.3.  
  
NOTE: Two people must remain beside the Suspension Lift Assembly.
- 4.3.7 Secure Installation Stand to Secondary Table with the four Table Dog Clamps attached to the Table.
- 4.3.8 Loosen Table Dog Clamps that secure the Installation Stand and align to suspended Suspension Assembly

- 4.3.9 **Tighten Table Dog Clamps to secure Installation Stand**
- 4.3.10 **Verify Upper Clamp from top of Installation Stand and Side Beams are removed.**
- 4.3.11 **Crank the Lifting table to the lowest position. Two people grab the lifting bars on each side of the Installation Stand and a 3<sup>rd</sup> person removes the locking pins that secure the telescoping legs. Raise the installation stand to the nearest telescoping leg locking hole that brings the installation stand closest to the Test Stand mounting surface with the Suspension Assembly nested inside. Insert the locking pins and secure the telescoping legs.**
- 4.3.12 **Slowly crank the Lifting Table upwards until the Suspension Assembly rests on top of the Installation Stand.**
- 4.3.13 **NOTE: The Guide Block and Dog Clamp, End must be present in the Stand.**
- 4.3.14 **Remove Dog Clamps and attach the Side Beams to the Installation Stand on each side, one at a time. Remove parts and set aside.**



- 4.3.15 **Two people on each side of the Table uniformly lower the Jacks to completely collapsed state which causes the Installation Stand to lower in preparation for removal.**
- 4.3.16 **Then the two people on each side of the Table completely lower (collapse) the Installation Stand with the Suspension Assembly in side.**
- 4.3.17 **Attach the Upper Clamp to top of Installation Stand.**



- 4.3.18 **Slowly crank the lifting table downwards with attached Installation Stand. Watch the Suspension Assembly for any possible obstruction.**
- 4.3.19 **Loosen the four Table Dog Clamps on the Secondary Table securing the Installation Stand, rotate to release Stand and tighten.**
- 4.3.20 **Carefully remove Installation Stand with Suspension Assembly from Secondary Table and place in secure location.**

## Section 2 – Arm Cavity Baffle Installation onto the BSC ISI Stage-0

### 5 Installation Preparation

#### 5.1 Requirements for Installation

5.1.1 BSC flooring must be in place before installation can begin.

5.1.2 QUAD must be secured and protected by SUS –

- a) put at least the penultimate and final masses on their stops
- b) attach the "face guard" (the plate attached to the frame in front of the optic -- not sure if this is its proper name)
- c) cover with a C3 fabric "sock"

#### 5.2 Assemblies required for Installation

5.2.1 "Rail, ACB Assembly" (D1101724)

5.2.2 "Slide, Baffle Carrier Assembly" (D1101958)

5.2.3 "Box Assembly" [See Table 2: ARM CAVITY BAFFLE BOX ASSEMBLIES]

5.2.4 "Suspension Lift Assembly" (D1101953), with "Table, Secondary, Suspension" (D1101962), refer to "Installation Suspension Table-Rail Assembly" (D1101971) drawing. Attach four "Table Dog Clamps" (D1001376-2) using four SHCS (1/4-20 x 2").

5.2.5 "ACB\_Installation Stand" (D1101957), with "Arm Cavity Baffle Suspension Assembly" (D1200275 OR D1200655), "ACB\_Stage Zero Narrow\_Guide Block" and "ACB\_Stage Zero Narrow-Dog Clamp, End" [refer to Table 1: Installation Tooling for part number] installed.

NOTE: The Arm Cavity Baffle Suspension Assembly must also have the following tooling attached: "Transport, Locking, ACB" (D1101285), "Variable Height Bracket" (D1102323 or D1201251), "["Swingback Plate" \(D1101597\) for ETM Suspension Assembly \(D1200655\) ONLY!](#)" and "ACB\_Stage Zero Interface Fixture Mover" (D1101700).

#### 5.3 Other Vacuum Parts required for Installation

5.3.1 5 - SHCS (3/8-16 x 2 1/2")

5.3.2 5 – 3/8" washers

5.3.3 1 - Shoulder Screw #10-24 (D1101293)

5.3.4 3 - #10 Flat Washers

5.3.5 1 - #10-24 Silver Plated Nut

- 5.3.6 4 – SHCS (1/4-20 x 7/8”)
- 5.3.7 2 – “SLC Photodetector Cable Upper Assembly” (D1003117-2)
- 5.3.8 1 - pre-set Counter Weight Assembly, from Step 2.6.12.
- 5.3.9 6 - SHCS (1/4-20 x 1”)
- 5.3.10 12 – ¼” washers
- 5.3.11 6 – ¼-20 silver-plated Nuts
- 5.3.12 **Cable Ties and Hardware**
- 5.3.13 4 - “SLC Interface Mounting Clamps” (D1001700)
- 5.3.14 4 - SHCS (3/8-16 x 2 1/2”)
- 5.3.15 4 - 3/8” washers

#### **5.4 Other Non-Vacuum Parts required for Installation**

- 5.4.1 1 - Teflon Mat
- 5.4.2 2 - “Wedge Lift, Baffle, Suspension Table” (D1101952)
- 5.4.3 2 - SHCS (¼-20 x .62”)
- 5.4.4 2 - “Pusher Screw” (D1201369)
- 5.4.5 4 – SHCS (3/8-16 x 1”)
- 5.4.6 4 – 3/8” washers
- 5.4.7 4 - SHCS (3/8-16 x 2 1/2”)
- 5.4.8 4 – 3/8” washers
- 5.4.9 1 – Chain Assembly

#### **5.5 Tools required for Installation**

- 5.5.1 2 - Plain Grip Looped T-Handle Hex Key 3/16" Hex for Jacks
- 5.5.2 2 - 3/16” Hex L-Key tool for ¼-20 SHCS
- 5.5.3 2 - 5/16” Hex L-Key tool of 3/8-16 SHCS
- 5.5.4 1 – 3/8” Wrench for #10 Shoulder Screw Nut



5.5.5 1 - 1/8" Hex L-Key tool for #10 Shoulder Screw

5.5.6 2 – 1/4" Hex L-Key tool for Pushers

5.5.7 2 - Stainless Steel Open-End Wrench for 1-1/8" Nuts

5.5.8 Tool to attach Cables

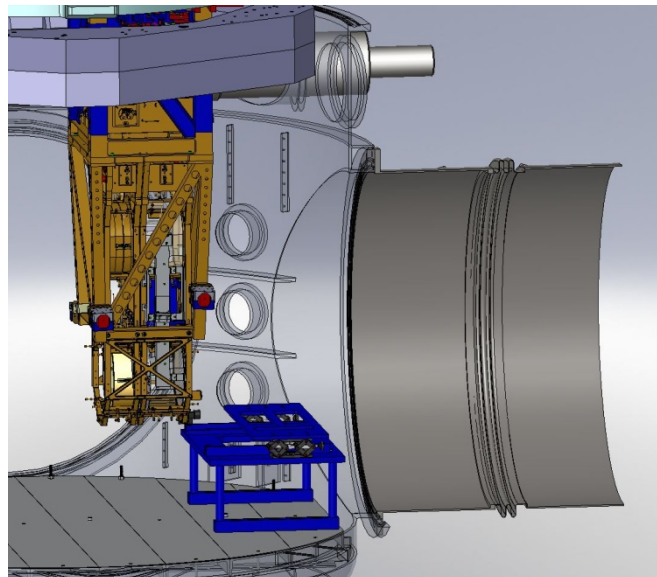
5.5.9 Torque Wrenches

## 6 Installation Procedure

### 6.1 Installation Set-up

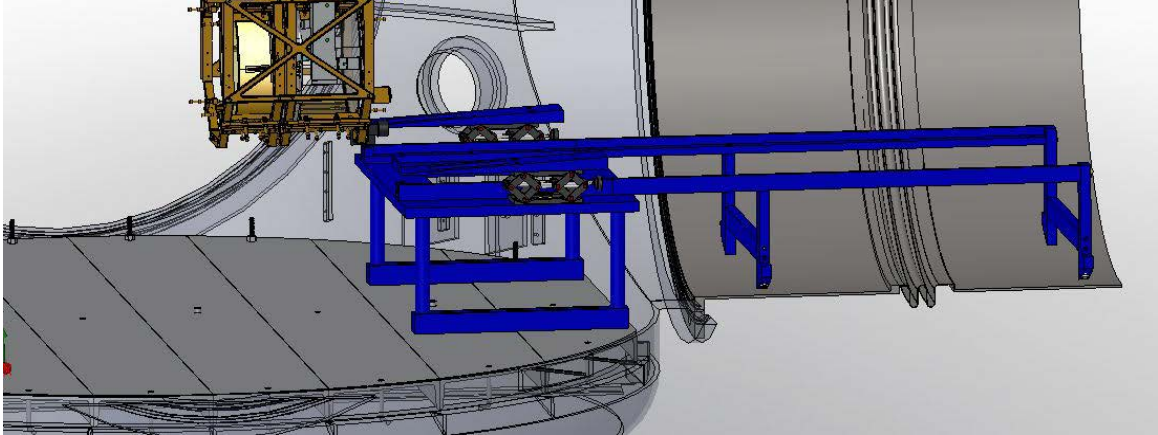
6.1.1 Verify all items in Section 4.2 have been fully assembled.

6.1.2 One person inside the spool piece will help pass the Suspension Lift Assembly with Table, Secondary, Suspension and 4 Table Dog Clamps attached, to two people inside the chamber; where they will place it beneath the Stage 0 position where the ACB will be attached. The Lift Assembly weighs about 100 lbs. and the Secondary Table weighs about 20 lbs.



6.1.3 Adjust position of installation tooling to sit secure and below baffle installation area.

6.1.4 Verify Jacks are in completely collapsed state.



6.1.5 Attach the “Rail, ACB Assembly” (D1101724) to the “Suspension Lift Assembly” (D1101953) using two SHCS (1/4-20 x .62”).

## 6.2 Arm Cavity Baffle Suspension Assembly Installation (D1200275 OR D1200655)

### 6.2.1 Items required for Arm Cavity Baffle Suspension Assembly Installation:

1 - “ACB\_Installation Stand” (D1101957), with “Arm Cavity Baffle Suspension Assembly” (D1200275 OR D1200655), “ACB\_Stage Zero Narrow\_Guide Block” (D1101595) and “ACB\_Stage Zero Narrow-Dog Clamp, End” (D1101613) installed.

NOTE: The Arm Cavity Baffle Suspension Assembly **must** have the following tooling attached: “Transport, Locking, ACB” (D1101285), “Variable Height Bracket” (D1102323 OR D1201251), **“Swingback Plate” (D1101597) for ETM Suspension Assembly (D1200655) ONLY!**, and “ACB\_Stage Zero Interface Fixture Mover” (D1101700).

2 - 3/16” Hex L-Key tool for 1/4-20 SHCS

2 - Plain Grip Looped T-Handle Hex Key 3/16” Hex

5 - SHCS (3/8-16 x 2 1/2”), **CLASS A**

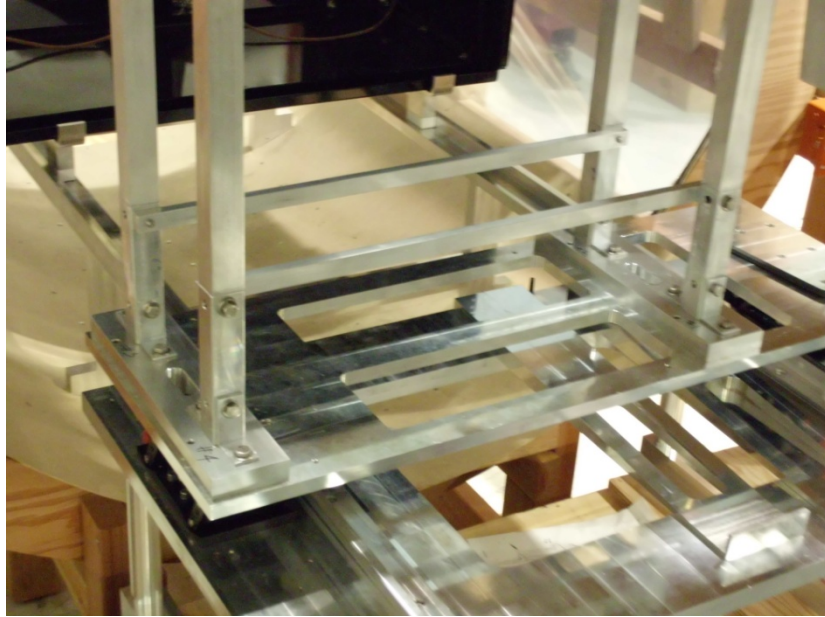
5 – 3/8” washers, **CLASS A**

2 - 5/16” Hex L-Key tool of 3/8-16 SHCS

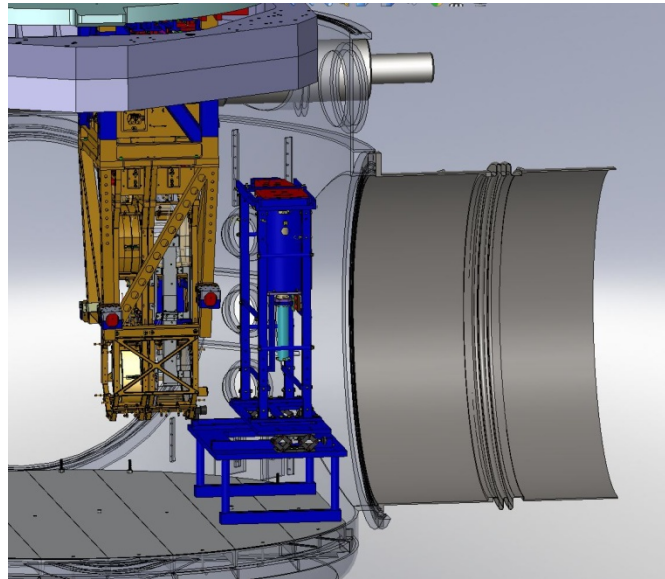
4 - SHCS (3/8-16 x 2 1/2”)

4 – 3/8” washers

6.2.2 **Two people will enter the spool and pass through into the manifold. They will lift and carry the Arm Cavity Baffle Suspension Assembly” (D1200275 OR D1200655), which is secured in the expandable “Installation Stand” (D1101957) in its collapsed and locked configuration, from the manifold, into the spool, and help pass it to another person in the chamber. One person will exit the spool and help the person inside the chamber to carefully place it on top of the “Table, Secondary, Suspension” (D1101962). Total weight is about 120 lbs. There are handles on the Installation Stand for lifting and carrying.**

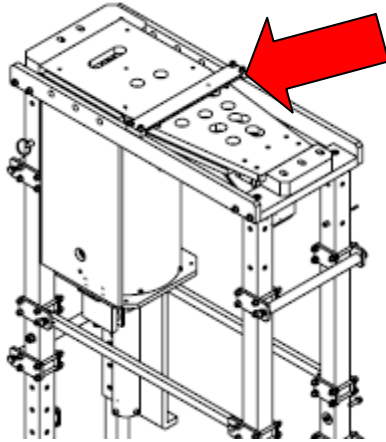


- 6.2.3 **The two people inside the chamber will adjust the Table, Secondary, Suspension” (D1101962) so that it is directly below the Stage 0 position where the ACB suspension will be attached.**

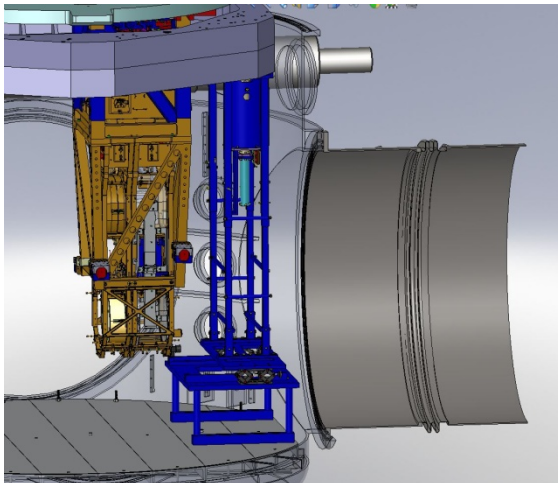


- 6.2.4 **One person (minimum) remains positioned inside the spool during the entire installation**
- 6.2.5 **Two people remain in the chamber, one on each side of the “Suspension Lift Assembly” (D1101953).**
- 6.2.6 **Secure Installation Stand to Secondary Table with the four Table Dog Clamps attached to the Table.**

- 6.2.7 **Loosen Table Dog Clamps that secure the Installation Stand to the Secondary Table. Either slide the Suspension Lift Assembly” (D1101953) on the Teflon mat, and/or loosen the dog clamps and move the Installation Stand to align “ACB\_Stage Zero Narrow\_Guide Block” and “ACB\_Stage Zero Narrow-Dog Clamp, End” [refer to Table 1: Installation Tooling for part numbers] with STAGE-0 attachment location.**
- 6.2.8 **Tighten Table Dog Clamps to secure Installation Stand.**
- 6.2.9 **With Installation Stand secured, remove four SHCS and “Upper Clamp” (D1102062) from top of Installation Stand. Remove parts from vacuum system.**



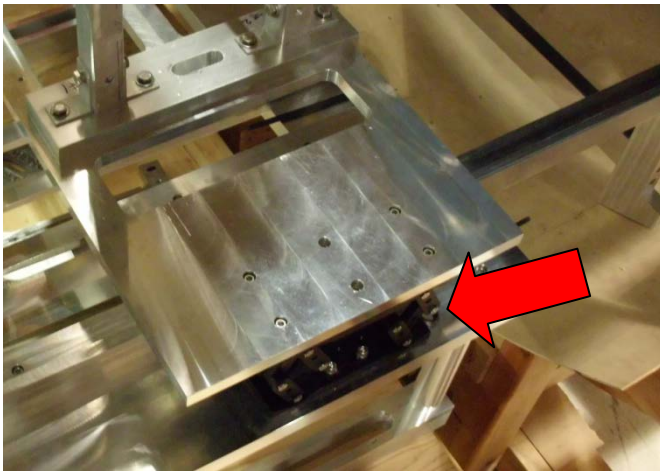
- 6.2.10 **The person positioned in the spool pulls out the four Locking Pins in the Installation Stand legs.**
- 6.2.11 **The two people on each side of the Table grasps the handles on Installation Stand and lifts the Stand until it nearly touch STAGE-0. The person in the spool locks the Stand into position by inserting the four Locking Pins. Some adjustment to the expansion height may be needed to align the holes for locking.**



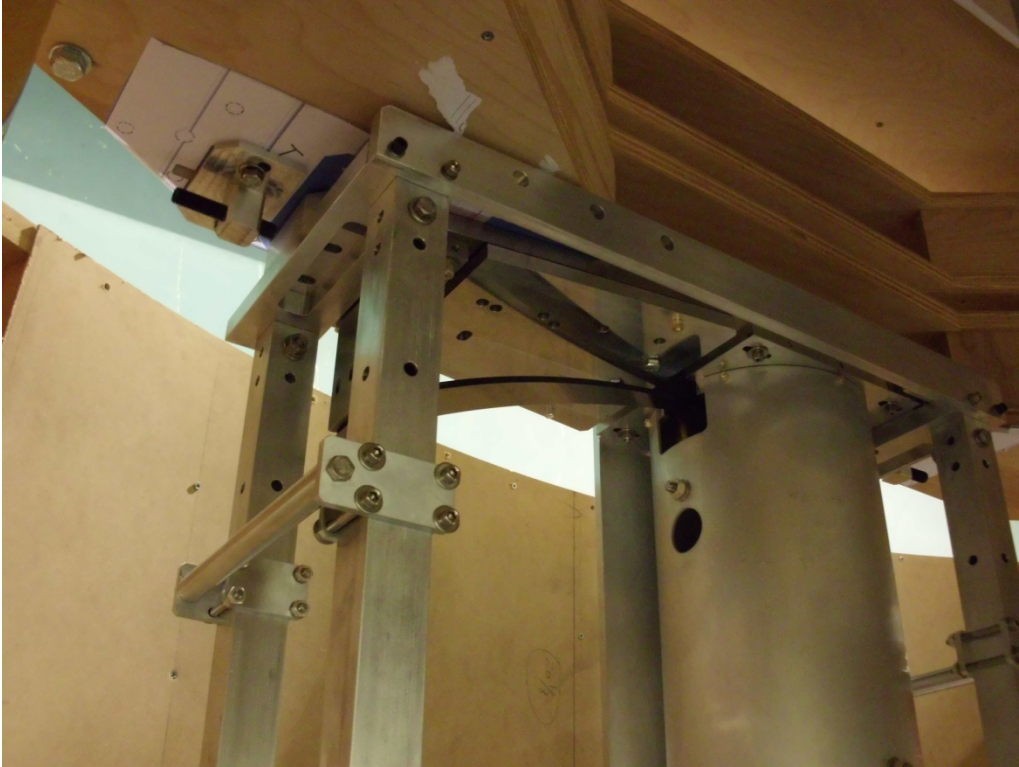




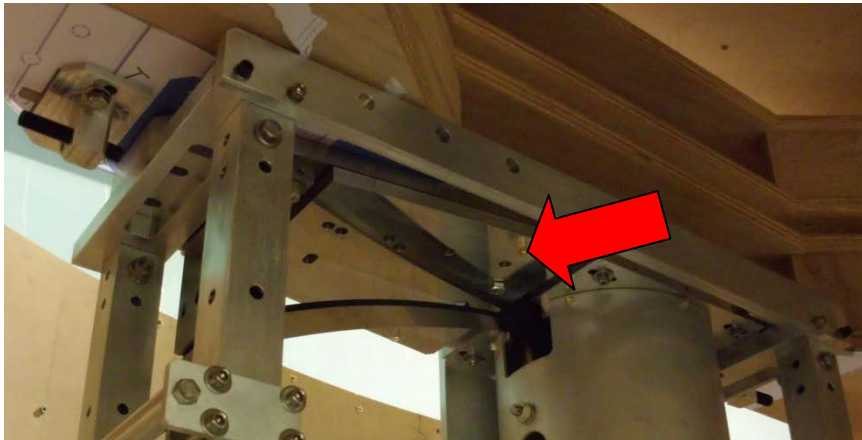
NOTE: There is approximately 8 inches between the **Installation Stand** and the **QUAD**.



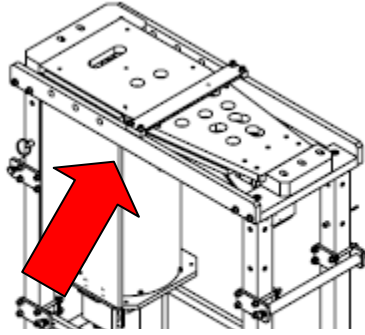
6.2.12 The two people on each side of the Table uniformly raise the Jacks to lift the Installation Stand and align Interface Mounting Plate to STAGE-0 mounting locations. Continue until top of Interface Mounting Plate touches STAGE-0.



- 6.2.13 Attach “ACB\_Stage Zero Narrow\_Guide Block” and “ACB\_Stage Zero Narrow-Dog Clamp, End” [refer to Table 1: Installation Tooling for part numbers] to STAGE-0 with five SHCS (3/8-16 x 2 1/2”) and 3/8” washers.
- 6.2.14 Attach “ACB\_Stage Zero Interface Fixture Mover” (D1101700), which is attached to the “SLC ACB Interface Mounting Plate” (D1001138), to STAGE-0 with four SHCS (3/8-16 x 2 1/2”) and 3/8” washers.



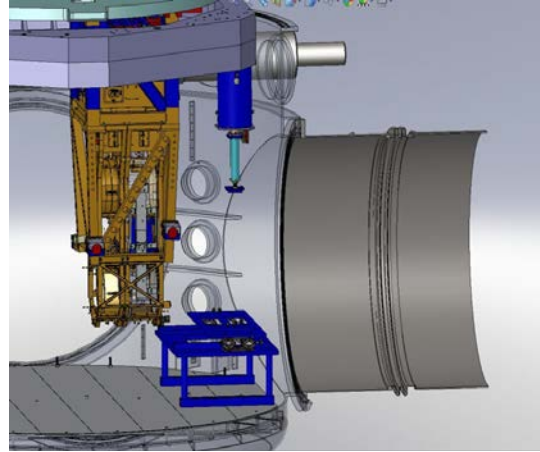
- 6.2.15 Remove four 1/4-20 SHCS and “SIDE BEAM” (D1102026) from Installation Stand on the side closest to the chamber wall. Remove from vacuum system.



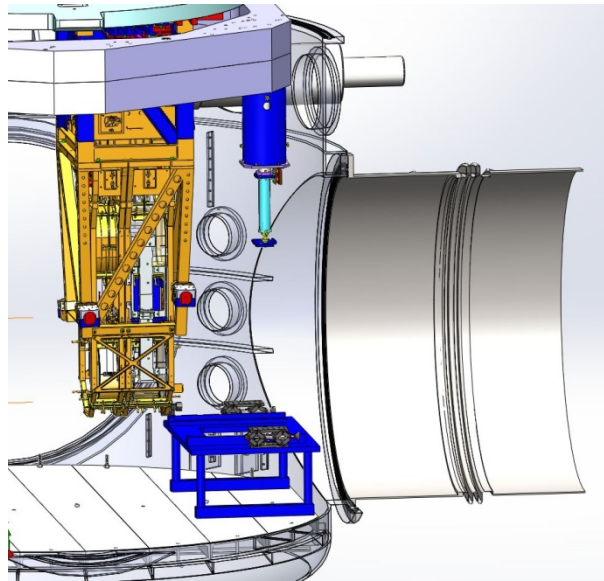
- 6.2.16 The two people on each side of the Table uniformly lower the Jacks to their completely collapsed state which causes the Installation Stand to lower in preparation for removal. Watch the Suspension Assembly for any possible obstruction.
- 6.2.17 While the two people on each side of the Table grasps the handles on Installation Stand, the person positioned in the spool disengages the four Locking Pins in Installation Stand legs.
- 6.2.18 The two people grasping the handles slowly lower the Installation Stand until it returns to the completely collapsed position.
- 6.2.19 The person positioned in the spool then inserts the four Locking Pins into the Installation Stand legs.
- 6.2.20 Loosen the four Table Dog Clamps on the Table securing the Installation Stand, rotate to release Stand and tighten.
- 6.2.21 Carefully remove the empty Installation Stand from the BSC through the chamber door.







**6.2.22 Remove the twelve 1/4-20 SHCS attaching the Secondary Table to the Suspension Lift Assembly. Place SHCS on aluminum foil container in bottom of spool for use in next step. Carefully remove the Secondary Table from vacuum system.**



### 6.3 Arm Cavity Baffle Box Assembly Installation

#### 6.3.1 Items required for Arm Cavity Baffle Box Assembly Installation:

- 2 - Plain Grip Looped T-Handle Hex Key 3/16" Hex
- 2 - “Wedge Lift, Baffle, Suspension Table” (D1101952)
- 8 - 1/4-20 SHCS from Step 5.2.23
- 3/16” Hex L-Key tool of 1/4-20 SHCS
- 1 - “Rail, ACB Assembly” (D1101724)
- 2 - SHCS (1/4-20 x .62”)
- 1 - “Slide, Baffle Carrier Assembly” (D1101958)
- 1 - “Arm Cavity Baffle Box Assembly”

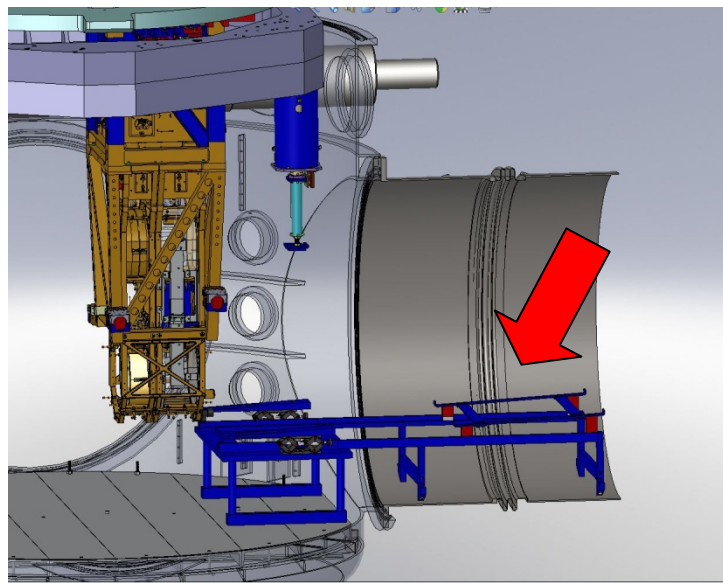
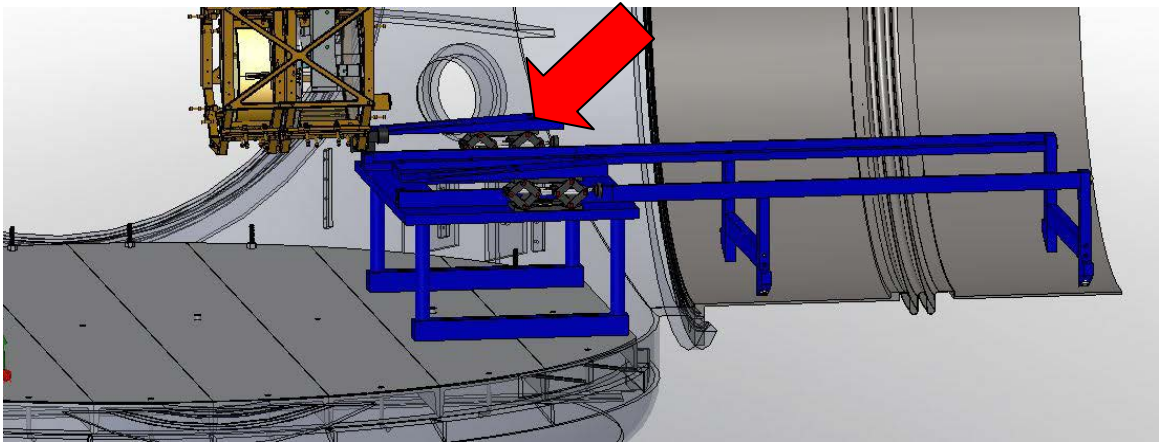
CHAMBER	BOX ASSEMBLY PART NUMBER
BSC1	D1200657
BSC3	D1200314
BSC4/BSC9	D1201036
BSC5/BSC10	D1200654

**Table 2: ARM CAVITY BAFFLE BOX ASSEMBLIES**

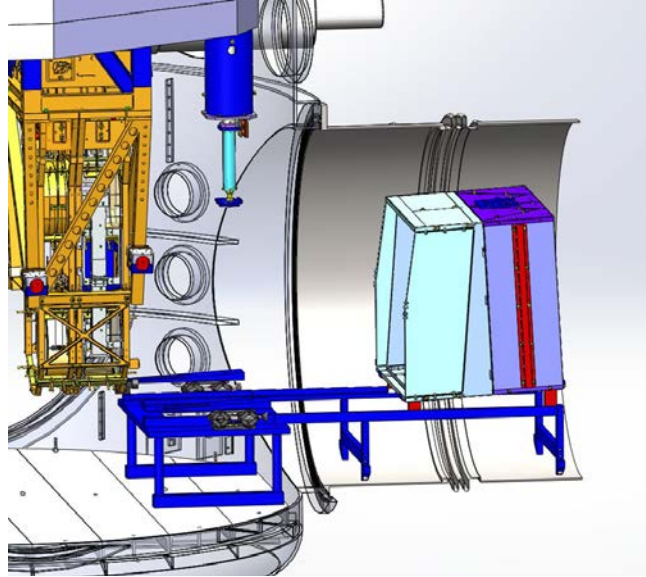
- 1 - Shoulder Screw #10-24 (D1101293)
- 3 - #10 Flat Washers
- 1 - #10 Silver Plated Nut
- 1 – 3/8” Wrench for #10 Shoulder Screw Nut
- 1 - 1/8” Hex L-Key tool for #10 Shoulder Screw
- 4 – SHCS (1/4-20 x 7/8”)

#### 6.3.2 Verify Jacks are in completely collapsed state.

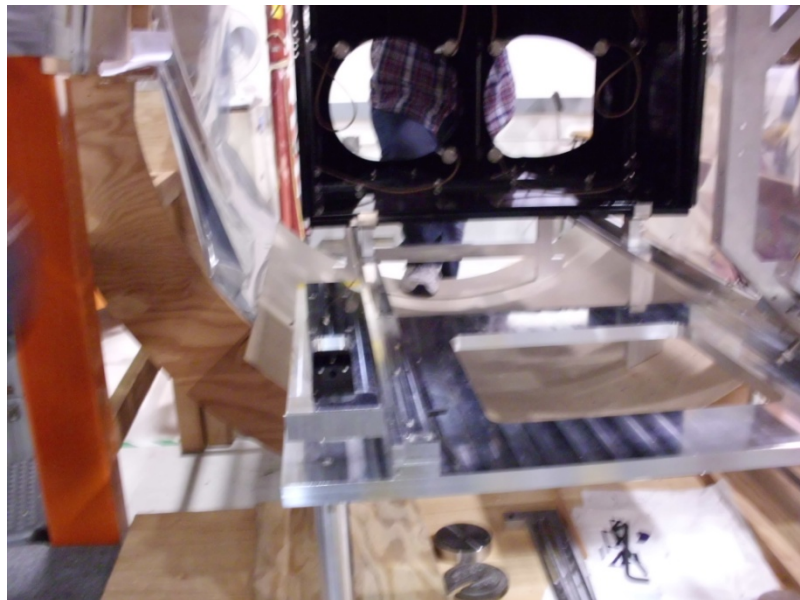
#### 6.3.3 Attach the two “Wedge Lift, Baffle, Suspension Table” (D1101952) stored in manifold to Jacks with eight 1/4-20 SHCS from Step 5.2.23.



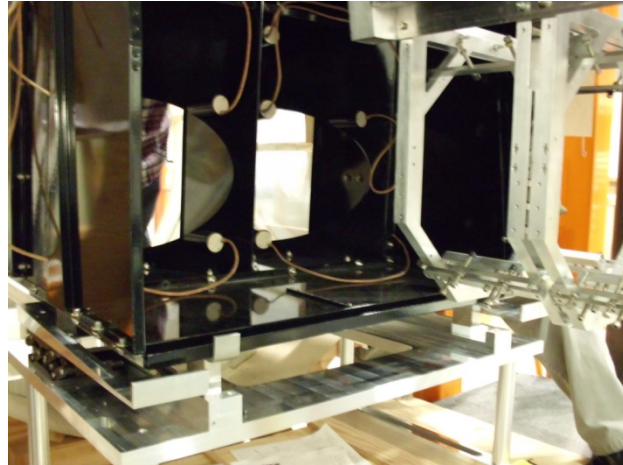
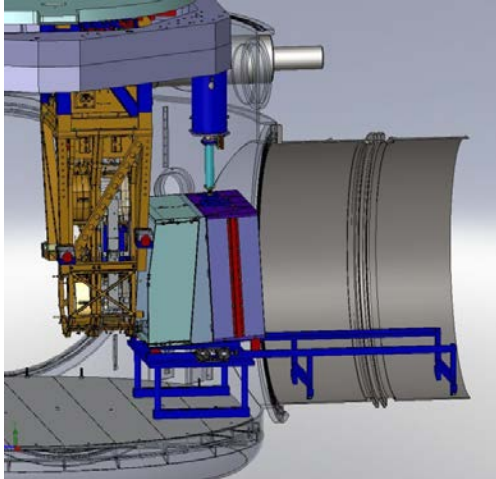
- 6.3.4 Using the “Slide, Baffle Carrier Assembly” (D1101958) and the “sedan chair” rods to lift the “Arm Cavity Baffle Box Assembly” [refer to Table 2: ARM CAVITY BAFFLE BOX ASSEMBLIES for part numbers], which is stored in the manifold, two people will carry it and place the Slide, Baffle Carrier Assembly (supporting the baffle box) into the guides on top of “Rail, ACB Assembly” (D1101724); one person will be positioned in the spool behind the Baffle Box and another in front of the baffle box. The Baffle Box weighs about 160 lbs.



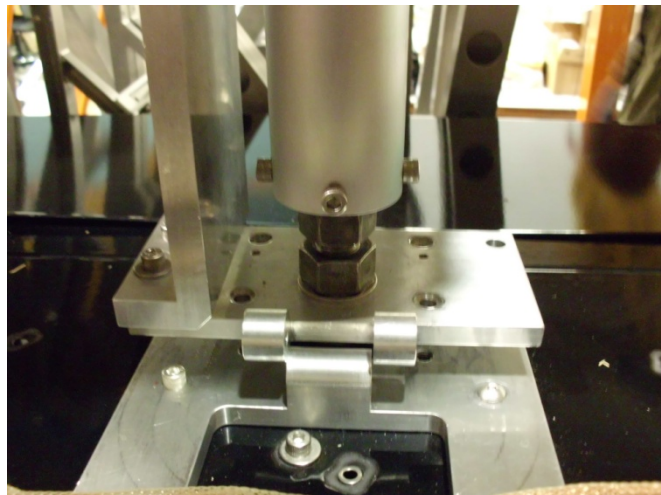
- 6.3.5 The Slide Assembly feet have Teflon pads that allow for an easy slide down the rail. There are blocks attached to the end of the rails to prevent travel past the Table end. Slide the Baffle Box toward the QUAD until it is positioned directly above the Wedge Lift, Baffle, Suspension Table” (D1101952, stopping at the approximate location needed to raise and mate the Baffle Box Assembly with the Suspension Assembly.



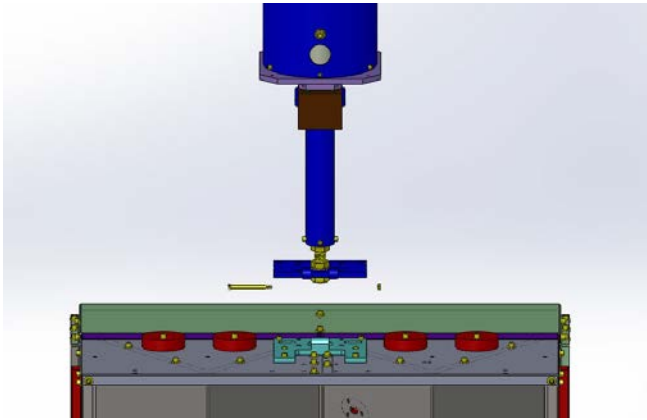




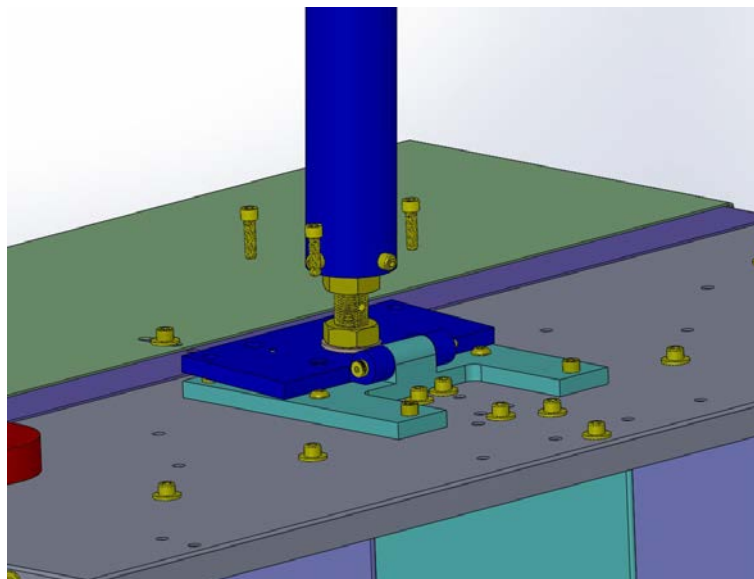
6.3.6 The two people on each side of the Table uniformly raise the Jacks to lift Baffle Box Assembly and align to top hinge plate at bottom of Suspension Assembly. Adjust Baffle Box position as needed for alignment. Continue lifting until hinge plates touch.



6.3.7 **Attach Baffle Box Assembly to Suspension Assembly with one #10-24 Shoulder Screw (D1101293), three #10 Flat Washers, and one #10-24 Silver Plated Nut**

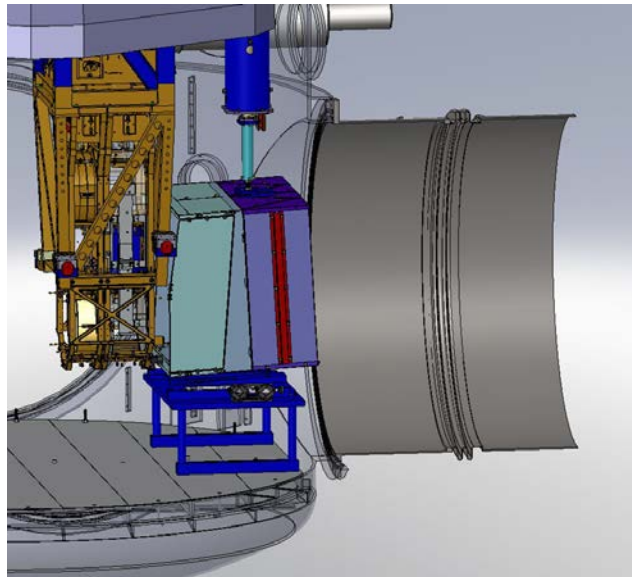


6.3.8 **Attach four captive SHCS in Top Hinge Plate on Suspension Assembly to Bottom Hinge Plate on Baffle Box Assembly.**





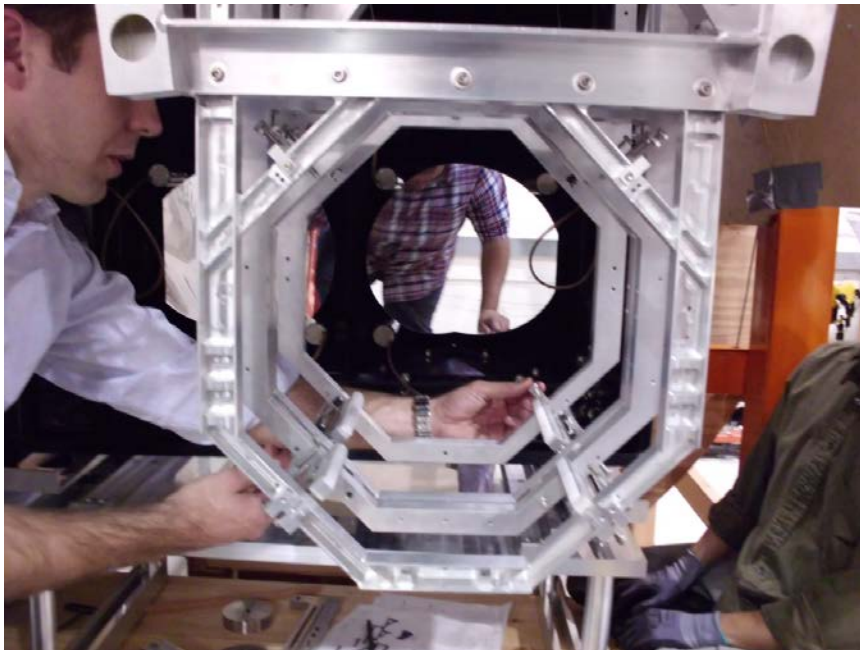
6.3.9 The two people on each side of the Table uniformly lower the Jacks completely.







**6.3.10 Pull Slide Assembly along Rail Assembly to end toward spool, and leave it there until later removing through the manifold tube.**





6.3.11 **Detach Rail Assembly from Table and remove from vacuum system.**

6.3.12 **Remove Table from BSC through chamber door.**

## **6.4 Photodetector Cable Connection**

6.4.1 **Items required for additional assembly to suspend baffle:**

1 - SLC Photodetector Cable Upper Assembly (D1003117-2)

**Tool to attach Cables**

**Cable Ties and Hardware**

6.4.2 **Attach Upper Photodetector Cable (D1003117) to Lower Photodetector Cable (D1003111) attached on top of the Baffle Box.**

6.4.3 **Route cable to feedthrus using cable ties.**

6.4.4 **Mate cable to feedthrus.**

6.4.5 **After the cable has been routed across the Stage 0 and connected to the feed-through at the inside of the BSC, use the continuity check procedure [T1100637](#) to verify continuity to each photodetector from outside the BSC.**

## 6.5 Baffle Alignment

### 6.5.1 Items required for Baffle Alignment:

- 2 - 5/16" Hex L-Key tool of 3/8-16 SHCS
- 2 - 1/4" Hex L-Key tool for Pushers
- 4 - "SLC Interface Mounting Clamps" (D1001700)
- 4 - SHCS (3/8-16 x 2 1/2")
- 4 - 3/8" washers

#### Tool for Bracket SHCS

Allen Tool in hole of "Screw #3/4-10 X 4" (D1001186)

- 2 - Stainless Steel Open-End Wrench for 1-1/8" Nuts

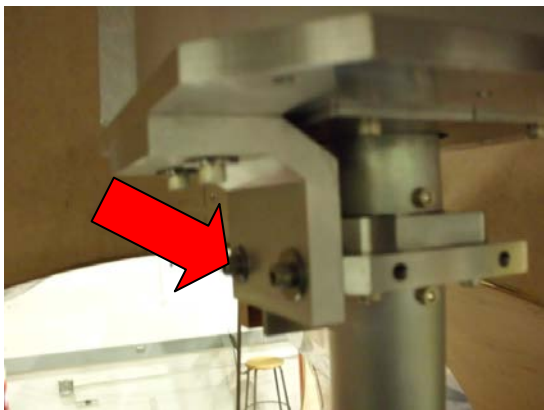
### 6.5.2 Theodolite Setup

IAS group will set up theodolite from open end of manifold aligned with center of COC TM, according to procedure XXX?

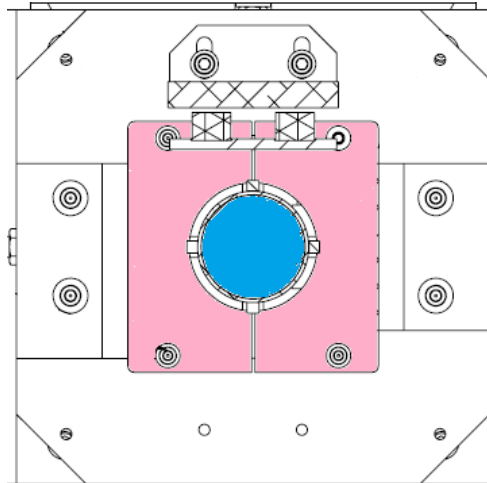
### 6.5.3 Remove the two 1/4-20 SHCS attaching the Interface Fixture Mover to the Interface Mounting Plate. Remove from vacuum system.

### 6.5.4 Loosen the screws in the slot of the Variable Height Bracket (D1102323 OR D1201251) so that the Baffle can move up and down freely.

### 6.5.5 Detach the Transport Locking Bracket at the suspension and park the two screws in the Bracket. Loosen the two screws attached to the 8' Tube. Slide Bracket away from suspension. Tighten screws.



### 6.5.6 Verify balance of baffle. Shift balance weights as needed axially and laterally until the "SLC Baffle Tube Up Assembly" (D1002582) is evenly spaced inside "SLC Earthquake Stop Ring" (D1001120) circumference.



### Lateral Alignment

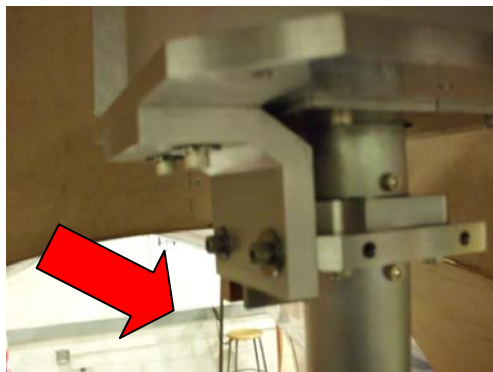
- 6.5.7 Slightly loosen SHCS attaching “ACB\_Stage Zero Interface Fixture Mover” (D1101700), which is attached to the Interface Mounting Plate, to STAGE-0
- 6.5.8 Manually position Suspension Assembly into Guide Block and End Clamp so that it is flush with Guide Block corners.
- 6.5.9 Move the Interface Plate by turning the Threaded Thrust Screws on the STAGE-0 Guide Block and STAGE-0 End Clamp to align the baffle laterally.

**NOTE: DO NOT REMOVE THE LATERAL ALIGNMENT TOOLING UNTIL VERTICAL ALIGNMENT IS COMPLETE, IN CASE WE NEED TO ITERATE!**

- 6.5.10 Tighten the SHCS attaching STAGE-0 Guide Block and STAGE-0 End Clamp to STAGE-0.

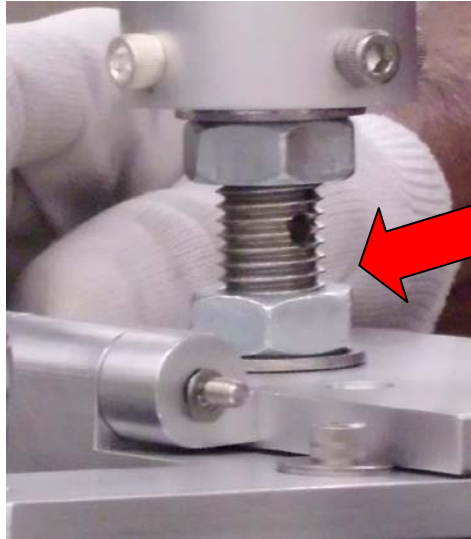
### Vertical Alignment

- 6.5.11 Attach the “Transport, Locking, ACB” (D1101285). **Tighten** the two upper SHCS. **Loosely** attach the two lower SHCS in the slotted holes in order to keep the Up Tube from rotating, but allow vertical movement.



6.5.12 The Variable Height Bracket (D1102323 OR D1201251) should be loosely attached to the suspension with SHCS in slotted holes.

6.5.13 Insert Allen Tool in hole of “Screw #3/4-10 X 4” (D1001186)

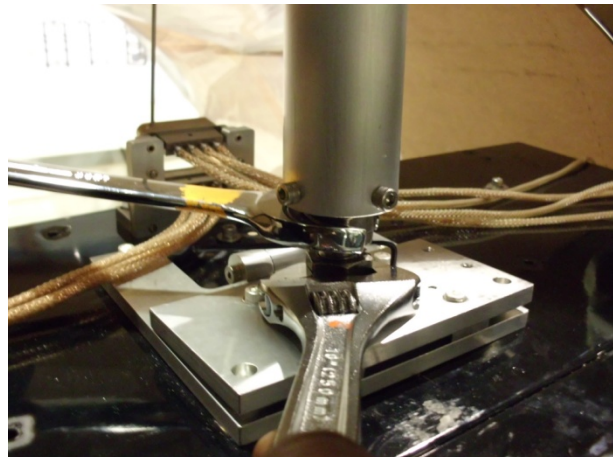


6.5.14 Remove the screws that attach the Anti-Rotation Bracket to the Top Hinge Plate. Set screws aside for later use.

6.5.15 Loosen the screws securing it to the Lower Tube. Slide the assembly up the Lower Tube. Tighten the screws when there is clearance to perform the vertical adjustment.

6.5.16 Loosen both “Nickel Copper Hex Nuts,  $\frac{3}{4}$ ”-10”, D1102316.

6.5.17 Adjust baffle height by turning the #3/4-10 X 4” screw until the lateral edges of the baffle hole are centered with the center of the TM, as determined by the theodolite readings.



- 6.5.18 When correct height is obtained, tighten both “Nickel Copper Hex Nut, 3/4”-10”, D1102316.
- 6.5.19 Remove Allen Tool in hole of “Screw #3/4-10 X 4” D1001186.
- 6.5.20 Loosen the screws securing the Anti-Rotation Bracket to the Lower Tube. Slide the assembly down the Lower Tube and tighten.
- 6.5.21 Attach the Anti-Rotation Bracket to the Top Hinge Plate with screws for Step 5.5.16.
- 6.5.22 Iteration of Alignment Steps
- 1) Remove the “**Transport, Locking, ACB**” (D1101285) so that the ACB hangs freely.
  - 2) Remove the “**Variable Height Bracket**” (D1102323 OR D1201251)
  - 3) Verify alignment.
  - 4) Repeat the lateral alignment starting at Step 5.5.7, and the vertical alignment starting at Step 5.5.12, as needed.
- 6.5.23 Attach the “Transport, Locking, ACB” (D1101285) and tighten all SHCS.
- 6.5.24 Attach the “Variable Height Bracket” (D1102323 OR D1201251) and tighten all SHCS.
- 6.5.25 Verify the “STAGE-0 Guide Block” and “STAGE-0 End Clamp” are securely holding the Interface Mounting Plate.
- 6.5.26 Tighten the five SHCS attaching “STAGE-0 Guide Block” (D1101595) and “STAGE-0 Dog Clamp” (D1101613)
- 6.5.27 Remove the Mover Plate with the four SHCS and washers attaching the Mover Plate to STAGE-0. Set SHCS and washers aside for re-use in next step. Remove the Mover Plate from vacuum system.
- 6.5.28 Attach Interface Mounting Plate to STAGE-0 with four “SLC Interface Mounting Clamps” (D1001700), four CLASS A SHCS (3/8-16 x 2”) and four 3/8” washers.
- 6.5.29 Remove the SHCS attaching “STAGE-0 Guide Block” and “STAGE-0 End Clamp”. Remove from vacuum system.
- 6.5.30 Attach Table Dog Clamps to ends of Interface Plate.

## 7 Baffle Swingback to service QUAD

### 7.1 Baffle Swing-back for ITM Assembly only

#### 7.1.1 Items required for Baffle Alignment:

Tool for ¼-20 SHCS

Variable Height Bracket, 9 Degree (D1201251)

Swingback Wedge Assembly (D1300529)

#### 7.1.2 Verify “Transport, Locking, ACB” (D1101285) is in place. Verify all SHCS are tight.

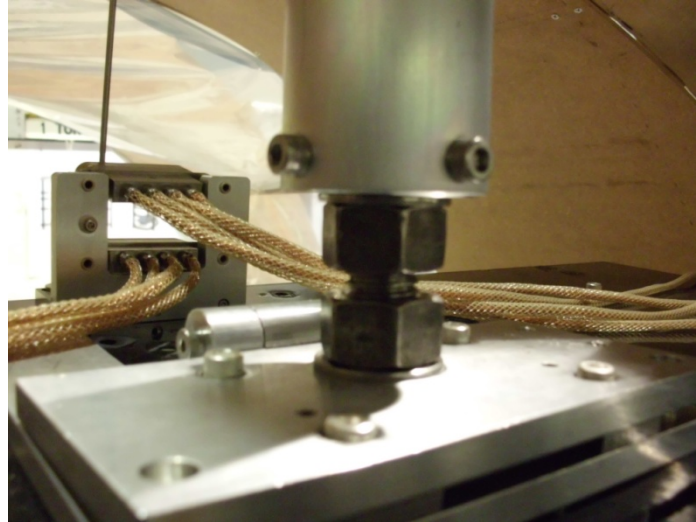


#### 7.1.3 Verify Variable Height Bracket, 9 Degree (D1201251) is in place. Verify all SHCS are tight.

#### 7.1.4 Secure Swingback Wedge Assembly (D1300529) chain around Anti-Rotation Assembly.

#### 7.1.5 While two people on each side of the Table supports the Baffle Box, the other person inside the spool detach the 4 captive screws that attach Upper Hinge Plate to Lower Hinge Plate.





- 7.1.6 **When all four screws have been detached, the two people on each side of the Table slowly swing Baffle Box back toward tube and the other person inside the spool inserts the Swingback Wedge (D1300528) between the Top and Bottom Hinge Plates.**
- 7.1.7 **Attach with the 4 captive screws.**



## 7.2 Baffle Swing-back for ETM Assembly only

### 7.2.1 Items required for Baffle Alignment:

Tool for 1/4-20 SHCS

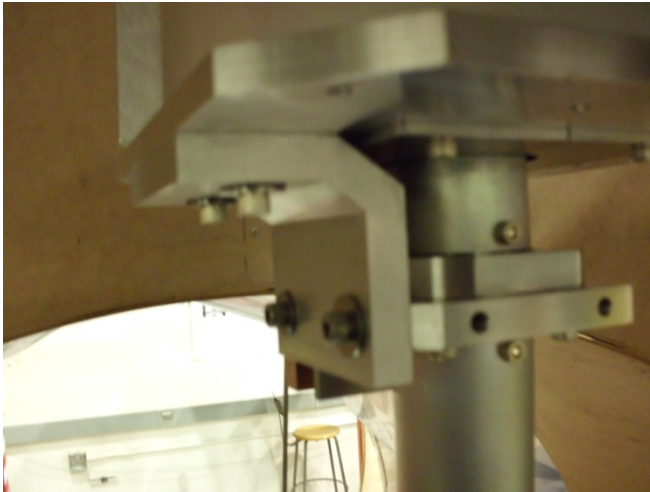
Variable Height Bracket, Flat (D1102323)

Swingback Plate (D1101597) and hardware

Safety Chain Assembly (D1201124)

### 7.2.2 Verify “Plate, Swingback, ACB” (D1101597) is in place.

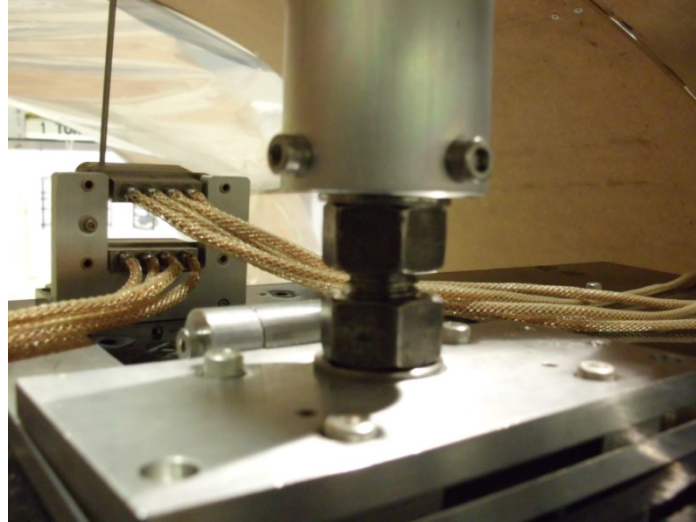
### 7.2.3 Verify “Transport, Locking, ACB” (D1101285) is in place. Verify all SHCS are tight.



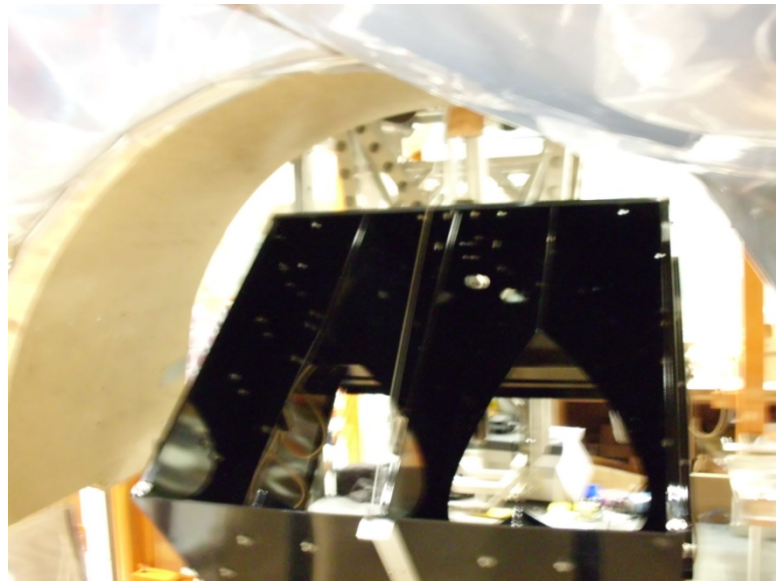
### 7.2.4 Verify “Variable Height Bracket” is in place. Verify all SHCS are tight.

### 7.2.5 Attach chain to eye bolt on Swingback Plate.

### 7.2.6 While two people on each side of the Table supports the Baffle Box, the other person inside the spool detach the 4 captive screws that attach Upper Hinge Plate to Lower Hinge Plate.



**7.2.7** When all four screws have been detached, the two people on each side of the Table slowly swing Baffle Box back toward tube and the other person inside the spool attaches the chain to the center bracket at the bottom of the Baffle Box.





### 7.3 Re-Position Baffle - **ITM Assembly only**

- 7.3.1 While Baffle Box is being held on both sides by the two people positioned on each side of the Table, the other person detaches the 4 captive screws in the Top Hinge Plate from the Swingback Wedge.
- 7.3.2 Remove the Swingback Wedge from between the Top and Bottom Hinge Plates and slowly allow the Baffle Box to rotate back in position.
- 7.3.3 With Baffle Box supported at the bottom by the two people positioned on each side of the Table, the other person inside the spool mates the 4 captive screws in the Upper Hinge Plate to the Lower Hinge Plate.
- 7.3.4 Unhook chain from Swingback Wedge Assembly and remove from vacuum system.
- 7.3.5 Detach “Variable Height Bracket, 9 Degree” (D1201251) and remove from vacuum system.
- 7.3.6 Detach “Transport, Locking, ACB” (D1101285) and remove from vacuum system.
- 7.3.7 Everyone carefully exits chamber.

## **7.4 Re-Position Baffle - ETM Assembly only**

- 7.4.1 **While Baffle Box is being held on both sides by the two people positioned on each side of the Table, the other person inside the spool unhooks the chain from the center bracket at the bottom of the Baffle Box and slowly allows Baffle Box to rotate back in position.**
- 7.4.2 **With Baffle Box supported at the bottom by the two people positioned on each side of the Table, the other person inside the spool mates the 4 captive screws in the Upper Hinge Plate to the Lower Hinge Plate.**
- 7.4.3 **Unhook chain from Swingback Plate and remove from vacuum system.**
- 7.4.4 **Unfasten three screws that attach Swing-back Plate to the Suspension Assembly and remove from vacuum system.**
- 7.4.5 **Detach “Variable Height Bracket, Flat” (D1102323) and remove from vacuum system.**
- 7.4.6 **Detach “Transport, Locking, ACB” (D1101285) and remove from vacuum system.**
- 7.4.7 **Everyone carefully exits chamber.**

## 8 De-Installation of Arm Cavity Baffle

### 8.1 Removal Preparation

#### 8.1.1 Items required for Arm Cavity Baffle Box Assembly Installation:

- 2 - Plain Grip Looped T-Handle Hex Key 3/16" Hex
- 2 - "Wedge Lift, Baffle, Suspension Table" (D1101952)
- 8 - 1/4-20 SHCS from Step 5.2.23
- 3/16" Hex L-Key tool of 1/4-20 SHCS
- 1 - "Rail, ACB Assembly" (D1101724)
- 2 - SHCS (1/4-20 x .62")
- 1 - "Slide, Baffle Carrier Assembly" (D1101958)
- 1 - "Arm Cavity Baffle Box Assembly" [refer to Table 2: ARM CAVITY BAFFLE BOX ASSEMBLIES for part numbers]
- 1 - Shoulder Screw #10-24 (D1101293)
- 3 - #10 Flat Washers
- 1 - #10 Silver Plated Nut
- 1 - 3/8" Wrench for #10 Shoulder Screw Nut
- 1 - 1/8" Hex L-Key tool for #10 Shoulder Screw
- 4 - SHCS (1/4-20 x 7/8")
- Guide Block and End Clamp [refer to Table 1: Installation Tooling for part numbers]

**Transport Locking Bracket**

**Variable Height Bracket**

### 8.2 Photodetector Cable Removal

#### 8.2.1 Items required to remove the photoconductor cable:

- 1 - SLC Photodetector Cable Upper Assembly (D1003117-2)

**Tool to detach Cables**

**Cable Ties and Hardware**

#### 8.2.2 Un-route cables from feedthroughs.

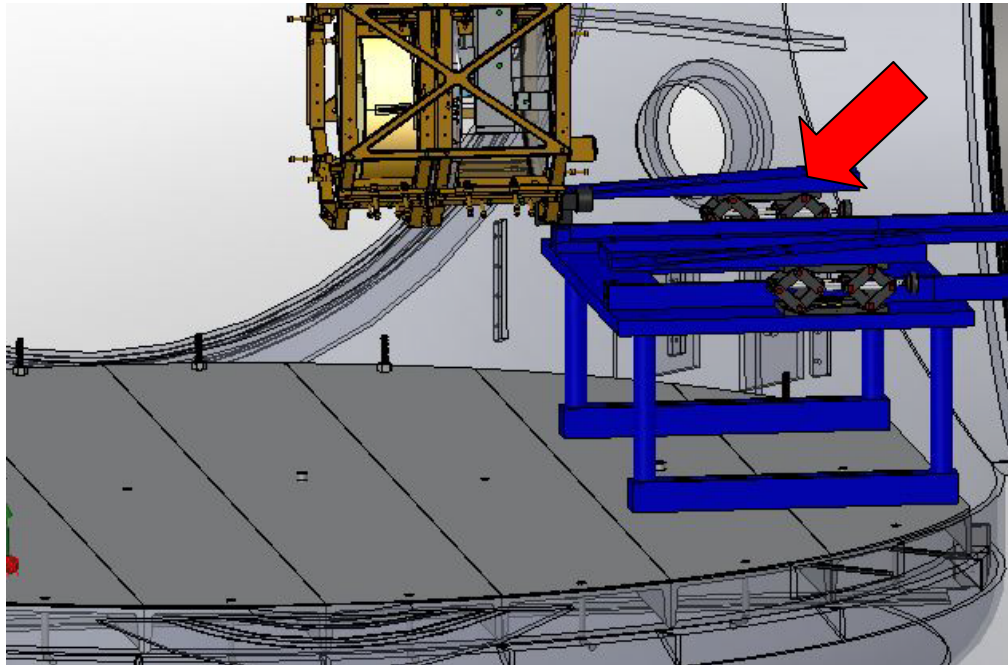
- 8.2.3 Disconnect the cable at the feed-through at the inside of the BSC. De-route the cable across the Stage 0, and disconnect from the D connector at the top of the ACB Box. Preserve the cable for future use.



### 8.3 Arm Cavity Baffle Box Removal

8.3.1 Position Lift Table under Baffle Box.

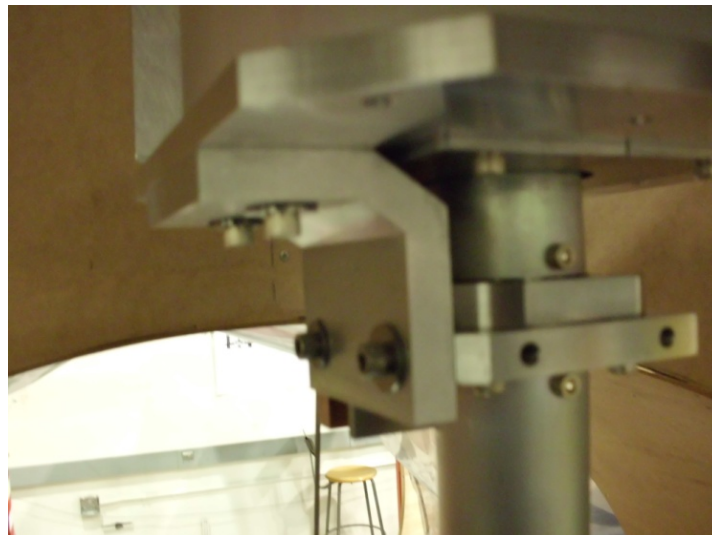
8.3.2 Attach the two “Wedge Lift, Baffle, Suspension Table” (D1101952) to Jacks with eight 1/4-20 SHCS from Step 5.2.23.



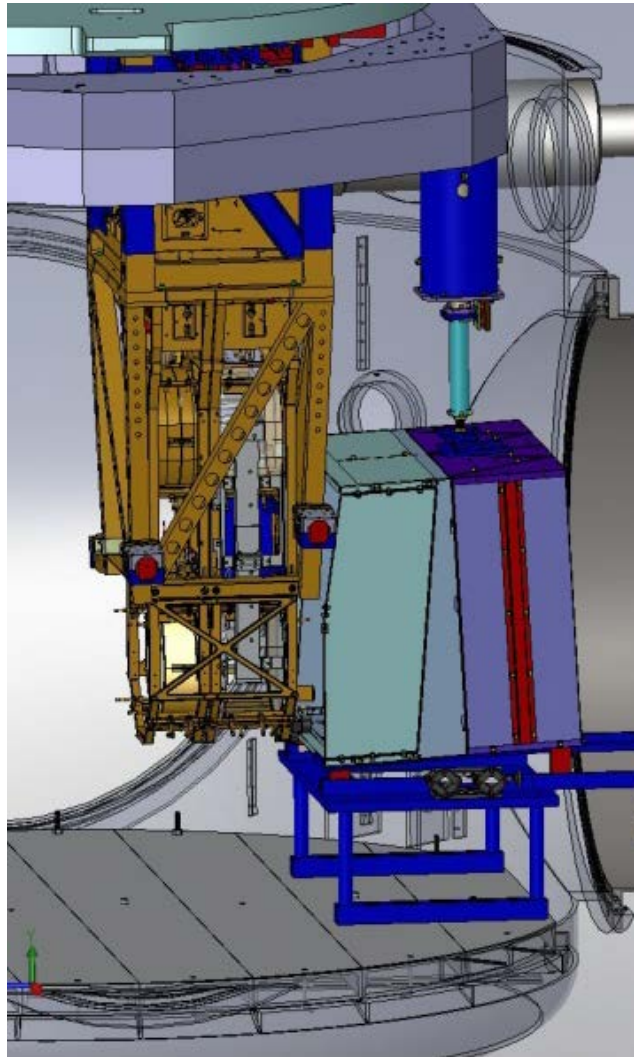
8.3.3 Verify Jacks are in completely collapsed state.

8.3.4 Position Slider underneath the Baffle Box.

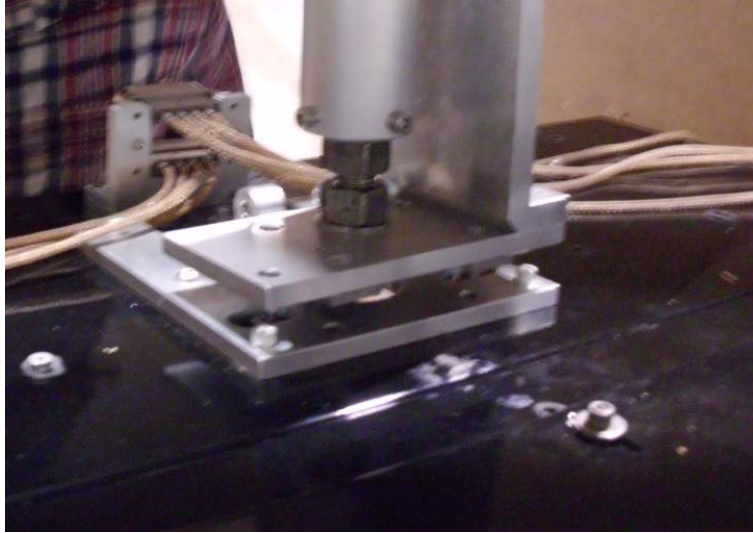
8.3.5 Verify that short Transport Locking Bracket is in place. Verify all SHCS are tight.



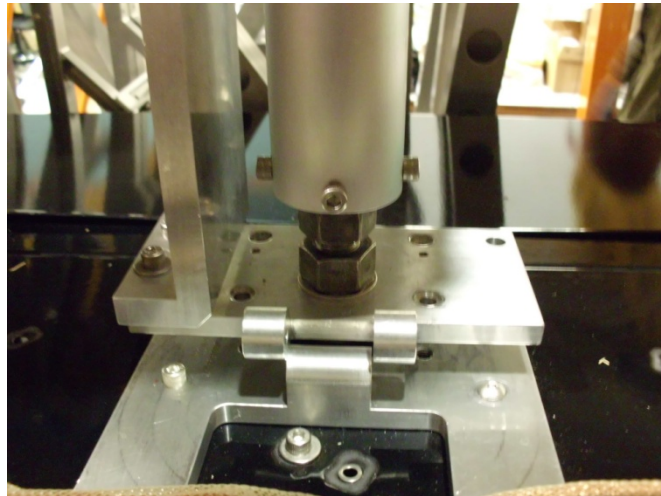
- 8.3.6 Verify that long “Variable Height Bracket” is in place. Verify all SHCS are tight.
- 8.3.7 Raise the lifting table with the jacks until the table touches the bottom of the Baffle Box and partially supports it.



- 8.3.8 Detach the four captive screws that attach the Top Hinge Plate on Suspension Assembly to Bottom Hinge Plate on Baffle Box Assembly.



- 8.3.9 **Remove the Shoulder Screw, #10 Flat Washers, and #10-24 Silver Plated Nut that attach the Baffle Box Assembly to the Suspension Assembly.**



- 8.3.10 **The two people on each side of the Table uniformly lower the Jacks to lower the Baffle Box Assembly until the Baffle Box is free from the Suspension Assembly.**
- 8.3.11 **Four people must assist with moving Baffle Box Assembly. The Baffle Box weighs about 160 lbs. Carefully lift the Baffle Box and set aside.**

## 8.4 Suspension Assembly Removal

8.4.1 **Items required for Suspension Assembly removal: Use the Lifting Table (D1002192) that was used for installation of the Baffle Box with the two Wedge Lifts attached to Jacks from Step 3.2.2**

8.4.2 **Remove the Wedge Lifts from Jacks, set screws aside for future use.**

8.4.3 **Verify Jacks are in completely collapsed state.**

8.4.4 **Verify Dog Clamps are mounted on Secondary Table.**

8.4.5 **Attach Secondary Table to Lift Assembly with screws from Step 3.3.3.**

**NOTE: Two people must remain beside the Suspension Lift Assembly.**

8.4.6 **Secure Installation Stand to Secondary Table with the four Table Dog Clamps attached to the Table.**

8.4.7 **Verify Installation Stand has the correct Guide Block and End Clamp as listed in Table 1: Installation Tooling.**

8.4.8 **Loosen Table Dog Clamps that secure the Installation Stand and align to suspended Suspension Assembly**

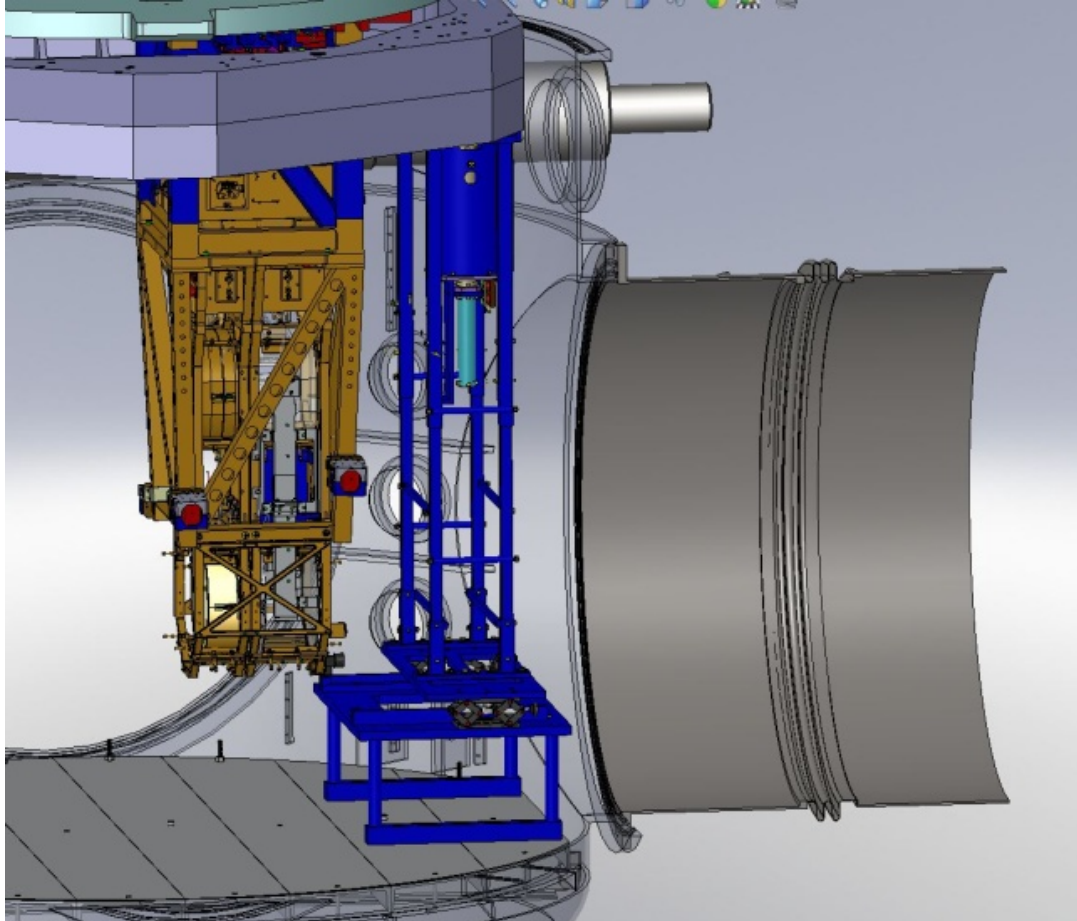
8.4.9 **Tighten Table Dog Clamps to secure Installation Stand**

8.4.10 **Verify Upper Clamp from top of Installation Stand and Side Beams are removed.**

8.4.11 **Two people on each side of the Table uniformly raise the Jacks and lift the table to the lowest position. Two people grab the lifting bars on each side of the Installation Stand and a 3rd person removes the locking pins that secure the telescoping legs. Raise the installation stand to the nearest telescoping leg locking hole that brings the installation stand closest to the Stage 0 mounting surface with the Suspension Assembly nested inside. Insert the locking pins and secure the telescoping legs.**

8.4.12 **The two people on each side of the Table uniformly raise the Jacks to lift the Installation Stand and align Interface Mounting Plate to STAGE-0 mounting locations. Continue until top of Interface Mounting Plate touches STAGE-0 to lift the Installation Stand and align Interface Mounting Plate to STAGE-0 mounting locations. Continue until top of Interface Mounting Plate touches STAGE-0**

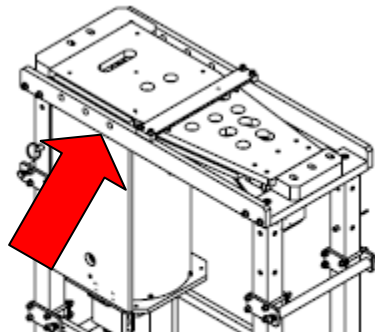




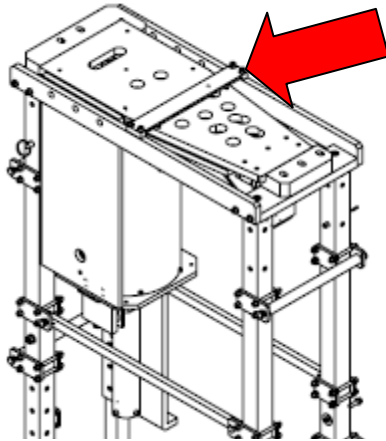
8.4.13 Slowly turn the Jacks and raise the lifting table upwards until the Installation Stand touches the Suspension Assembly.

NOTE: The Guide Block and End Clamp must be present in the Stand.

8.4.14 Remove Dog Clamps and attach the Side Beams to the Installation Stand on each side, one at a time. Remove parts and set aside.



- 8.4.15 Two people on each side of the Table uniformly lower the Jacks to completely collapsed state which causes the Installation Stand to lower in preparation for removal.
- 8.4.16 Then the two people on each side of the Table completely lower (collapse) the telescoping Installation Stand with the Suspension Assembly inside.
- 8.4.17 Attach the Upper Clamp to top of Installation Stand.



- 8.4.18 Loosen the four Table Dog Clamps on the Secondary Table securing the Installation Stand; rotate to release Stand.
- 8.4.19 Carefully remove Installation Stand with attached Suspension Assembly from Secondary Table and place in secure location.