

E1200535-v12

TMS WORK TO DO LIST GOING FORWARD

(all items large and small _rough outline, not in order , or standard format)

6-27-2012

1. D1101130 ASSEMBLY - UPDATE THIS TO SHOW THE PRODUCTION SET CONTAINING THE REMOVABLE END BRACKETS AND CAPTURED SCREWS, AND NUT PLATE, WITH THE ASSOCIATED HARDWARE - NOTE THE FIRST ARTICLE HAS THE ORIGINAL CONFIGURATION THIS SHOULD BE KEPT AS FIRST ARTICLE CONFIG.

Note: we do not need an access hole in the weldment to access the breadboard screw

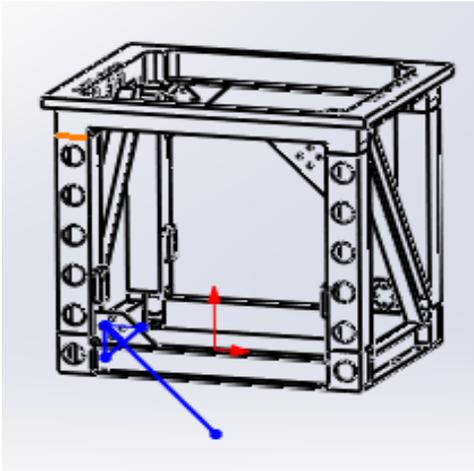
2. D060492 QUAD WELDED FRAME NEEDS TO BE UPDATED IN THE TMS DRAWING AND ASSEMBLIES TO SHOW THE 'UK' STYLE CONSTRUCTION.

THIS CORNER ATTACHMENT FOR THE CHANNEL STIFFENER WELDED IN BRACKET ATTACH POINT (4 PL) RATHER THAN THE NOW SHOWN GUSSET JUST WELDED IN THE CORNER ON THE SURFACE OF THE TUBE.

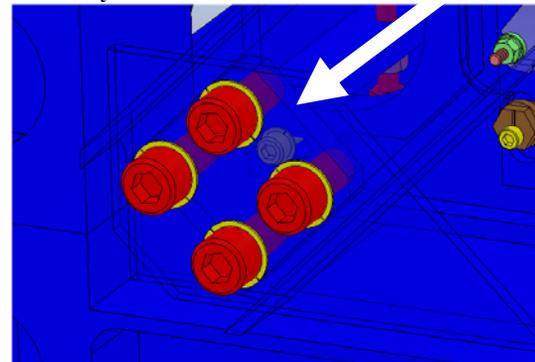
ALSO TO CHECK THE DRAWING FOR THE CHANNEL STIFFENER THAT THE PORT HOLE IS SHOWN FOR THE CONNECTOR CLEARANCE FOR THE BREADBOARD REF. 'UK' PART TD-1084-436

ALSO A NEW TOOL FOR ACCESS TO THE BREAD BOARD CAP SCREW OR THE SCREW IS CHANGED TO A HEX HEAD TO EASE ACCESS.

PICTURES OF THE UK AT CALTECH, AND OUR DRAWING NOTE THE GUSSET



ACCESS TO THIS SCREW (SEE NOTE ABOVE) NOT needed anymore



REF BELOW FOR STIFFENER AND ATTACHMENT GUSSET INFORMATION

Files in Document:

- [D060499-type 3](#) (D060499-type3 aLIGO SUS, QUAD ITM_ETM REM. CROSS MEMBE...pdf, 265.1 kB)
- [Three types of Support Gussets for cross member \(D060499-02\)](#) (D060499-02.PDF, 503.1 kB)

Other Files:

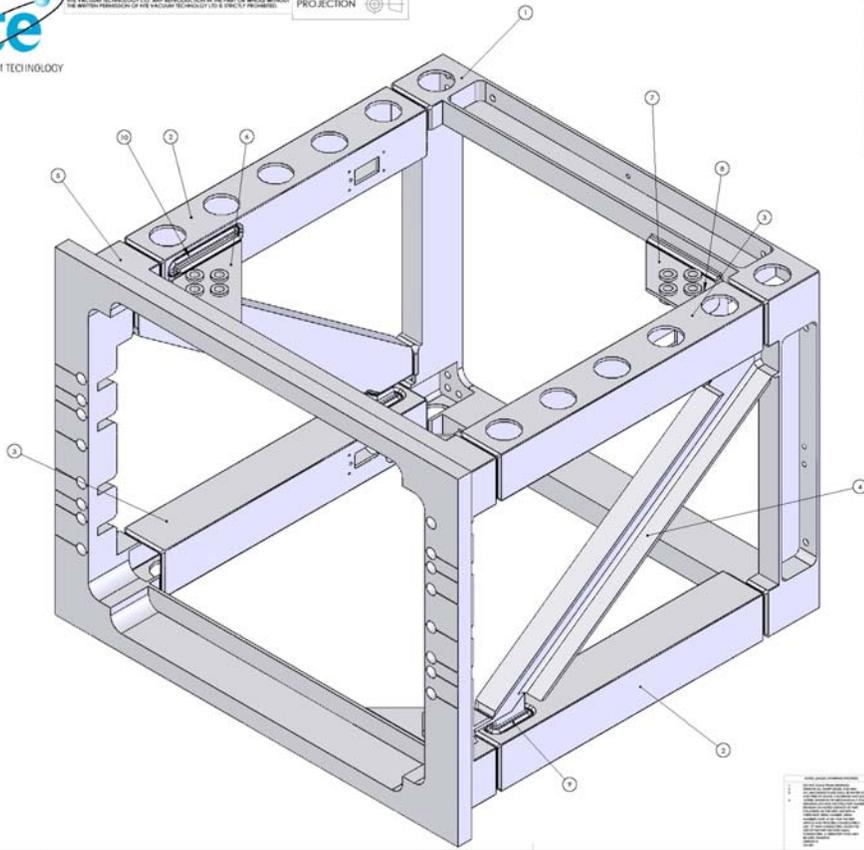
- [D060499-00-K.PDF](#) (498.3 kB)



THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF NTE VACUUM TECHNOLOGY. IT IS TO BE USED FOR THE MANUFACTURE OF THE VACUUM TECHNOLOGY PRODUCTS ONLY. REPRODUCTION OF THIS DRAWING WITHOUT THE WRITTEN PERMISSION OF NTE VACUUM TECHNOLOGY IS STRICTLY PROHIBITED.

PROJECTION

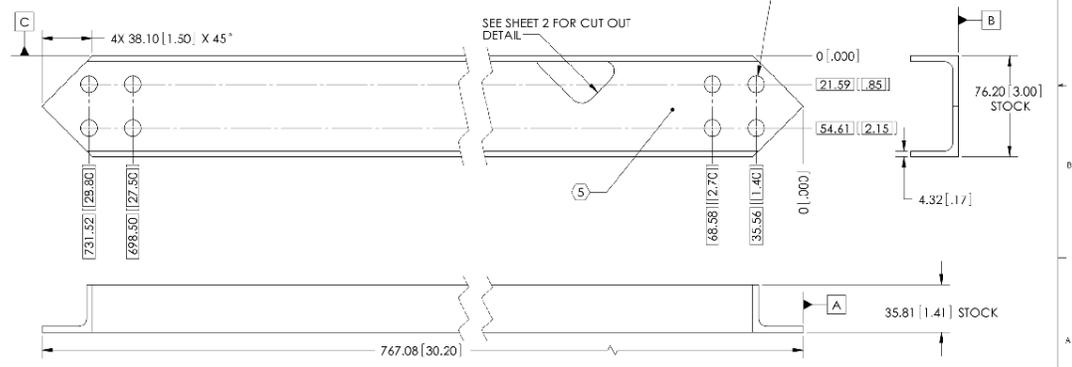
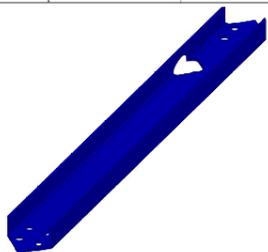
| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------|----------------------------|------|
| 1 | D06049-00-K | BOTTOM RING | 1 |
| 2 | D06049-00-K | VERTICAL BOX HAT | 2 |
| 3 | D06049-00-K | VERTICAL BOX HAT | 2 |
| 4 | D06049-00-K | WELDED TRUS MEMBER HAT | 2 |
| 5 | D06049-00-K | TOP RING | 1 |
| 6 | D06049-00-K | FULL GUSSET | 2 |
| 7 | D06049-00-K | SHORT GUSSET | 2 |
| 8 | D06049-02-S | SHORT GUSSET SUPPORT | 2 |
| 9 | D06049-02-S | WELDED TRUS MEMBER SUPPORT | 4 |
| 10 | D06049-02-S | FULL GUSSET SUPPORT | 2 |



| REV | DATE | BY | CHK | APP | DESCRIPTION |
|-----|-----------|-----|---------|-----|-------------|
| v3 | 12.3.2011 | SAR | E100663 | | |

PARTS LIST: LIGO
 UPPER STRUCTURE ASSEMBLY
 D06049-00-K

- NOTES CONTINUED:
- ALL MACHINING TOLERANCES MUST BE FULLY SYMBIOLIC, FULLY WATER SOLUBLE AND FREE OF SULFUR, SILICONE AND CHLORINE.
 - SCORE, ENGRAVE, OR MECHANICALLY STAMP (NO INKS OR DYES) DRAWING PART NUMBER, REVISION AND VARIANT OR IDENTIFY ARTICULALLY ON MATED SURFACE OF PART. FOLLOWED ON THE NEXT LINE WITH A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS START AT 001 FOR THE FIRST ARTICLE AND PROCEED CONSECUTIVELY. USE MINIMUM 0.12" HIGH CHARACTERS, UNLESS THE SIZE OF THE PART DICTATES SMALLER CHARACTERS. A VIBRATORY TOOL MAY BE USED. EXAMPLE: D06049-00-K, TYPE-KV, SIZE-KXX.
 - APPROXIMATE WEIGHT = 11.52 GROSS
 - ELECTRO POLISH TO REMOVE OXIDE REMOVE .0005 MIN TO .001 MAX PER SIDE. USE OF ABRASIVE REMOVAL TECHNIQUES (INCLUDING SANDING OR SCOURING FOR FINISH) IS NOT ALLOWED. USE OF SCOTCH-BRITE OR SIMILAR PRODUCTS IS FORBIDDEN.
 - ALL PARTS SHALL BE MANUFACTURED IN ACCORDANCE WITH LIGO SPECIFICATION ED900364.
 - ALL MATERIAL IS TO BE VIRGIN MATERIAL (I.E. NOT WELD REPAIRS OR PLUGS) UNLESS APPROVED IN ADVANCE AND IN WRITING BY LIGO. REFER TO LIGO ED900364.
 - NO REPAIRS SHALL BE MADE UNLESS APPROVED IN ADVANCE AND IN WRITING BY LIGO LABORATORY. IN GENERAL WELD REPAIRS AND PRESS FIT INSERT REPAIRS ARE NEVER ACCEPTABLE. THE MATERIAL USED MUST BE VIRGIN MATERIAL. SPECIAL CIRCUMSTANCES CAN BE REVIEWED IF AND WHEN BROUGHT TO THE ATTENTION OF LIGO CONTRACTING OFFICERS REPRESENTATIVE (COR) THROUGH THE MATERIAL REVIEW BOARD (MRB) PROCESS. REFER TO LIGO ED900364.



D06049-00-K.DWG, DRAWING POWERED BY LIGO

| REV | DATE | BY | CHK | APP | DESCRIPTION |
|-----|-----------|-----|---------|-----|-------------|
| v3 | 12.3.2011 | SAR | E100663 | | |

PART NAME: D06049-00-K, UPPER STRUCTURE ASSEMBLY, LIGO

DESIGNED BY: SAR, DATE: 12.3.2011, BY: SAR, CHK: E100663, APP: [Signature]

DRAWN BY: SAR, DATE: 12.3.2011, BY: SAR, CHK: E100663, APP: [Signature]

CHECKED BY: SAR, DATE: 12.3.2011, BY: SAR, CHK: E100663, APP: [Signature]

APPROVAL: SAR, DATE: 12.3.2011, BY: SAR, CHK: E100663, APP: [Signature]

MATERIAL: 6061-T6 AL, FINISH: 63, PART NO: D060492

3. MAKE A ALLEN TOOL FOR THE ADJUSTMENT OF THE SCONDARY MIRROR SCREWS AND THE F1 AND F2 MIRROR ADJUSTORS THRU THE TELESCOPE END PLATE ACCESS HOLE. THIS IS A RIGHT ANGLE BEND ON A SMALL BALL END ALLEN WRENCH. THESE ARE AT CALTECH AND NEED TO BE BENT FOR THE PURPOSE

4. CABLE LAYOUTS FOR THE REMAINING CHAMBERS FOR TMS. NOTE THE NUMBERS ALREADY SELECTED BELOW FOR BSC ASSEMBLIES

TOP ASSEMBLIES:

- Here are the TMS Top Assemblies with their BSC Assemblies (TMS; BSC):
 - D0900411; D0900502 (WBSC5)
 - D0900419; D0900512 (WBSC6)
 - D0902163; D0901150 (WBSC9)
 - D0902168; D0901154 (WBSC10)
 - D0900435; D0900471 (LBSC4)
 - D0900436; D0900506 (LBSC5)

5. REF excel BOM for D1102291 in DCC

6. REF THE 1880 WILL BE: RIGHT / LEFT/ FIRST ARTICLE / PRODUCTION

| ITEM NO. | PART NUMBER | REV | DESCRIPTION | MATERIAL | -01 /QTY | -02 /QTY | -03 /QTY | -04 /QTY | SPARE (EACH CONFIG) | -01 /TOTAL | -02 /TOTAL | -03 /TOTAL | -04 /TOTAL |
|----------|-----------------------------------|-----|--|---------------------|----------|----------|----------|----------|---------------------|------------|------------|------------|------------|
| 11 | D1002460-01 | VI | GLIGO TMS TELESCOPE ASSEMBLY, X-ARM | N/A | 1 | - | 1 | - | - | 1 | - | 1 | - |
| 10 | D1002460-02 | VI | GLIGO TMS TELESCOPE ASSEMBLY, Y-ARM (FA) | N/A | - | - | - | 1 | - | - | - | - | 1 |
| 9 | D1000549-02 | VI | GLIGO UPPER INTERMEDIATE MASS TOP ASSEMBLY, FA (WBSC6) | N/A | - | - | - | 1 | - | - | - | - | 1 |
| 8 | D1101130-01 | VI | GLIGO TMS TELESCOPE SAFETY SUPPORT BEAM ASSEMBLY, RIGHT | N/A | 1 | - | - | 1 | - | 1 | - | - | 1 |
| 7 | D1000549-01 | V8 | GLIGO UPPER INTERMEDIATE MASS TOP ASSEMBLY | N/A | 1 | 1 | 1 | - | - | 1 | 1 | 1 | - |
| 6 | D1100827 | VI | GLIGO TMS VERTICAL SAFETY WIRE ASSEMBLY | N/A | 1 | 1 | 1 | 1 | - | 1 | 1 | 1 | 1 |
| 5 | D1101130-02 | VI | GLIGO TMS TELESCOPE SAFETY SUPPORT BEAM ASSEMBLY, LEFT | N/A | - | 1 | 1 | - | - | - | 1 | 1 | - |
| 4 | U-C COMPONENTS C-2016-NA or equiv | | SCREW, SOCKET HEAD, CAP. 1/4-20 UNC-2A X 1 LONG (PER MS16995-52) | AG-PLATED 800 SS316 | 8 | 8 | 8 | 8 | 3 | 11 | 11 | 11 | 11 |
| 3 | F6861A.600 (McM-Cam) or equiv | | VENTED FLAT WASHER 255 ID., .468 O.D., .032 TH | 18-8 SS316 | 16 | 16 | 16 | 16 | 6 | 22 | 22 | 22 | 22 |
| 2 | D1002460-03 | V8 | GLIGO TMS TELESCOPE ASSEMBLY, Y-ARM | N/A | - | 1 | - | - | - | - | 1 | - | - |
| 1 | D1101163 | VI | GLIGO TMS TELESCOPE SUSPENSION WIRE ASSEMBLY | N/A | 2 | 2 | 2 | 2 | 1 | 3 | 3 | 3 | 3 |

| PARTS LIST | | | | | | | | | |
|------------|--------------------|-----|-----|------|----|-----|--------|-------|------|
| ITEM NO. | DESCRIPTION | QTY | REV | DATE | BY | APP | REASON | SCALE | DATE |
| 1 | ADVANCED GLIGO AOS | 1 | | | | | | | |
| 2 | D0900411 | 1 | | | | | | | |
| 3 | D0900419 | 1 | | | | | | | |
| 4 | D0900435 | 1 | | | | | | | |
| 5 | D0902163 | 1 | | | | | | | |
| 6 | D0902168 | 1 | | | | | | | |

7. SECONDARY MIRROR MOUNT FACE PLATE

8. GENIE REPLACEMENT TOOL FOR ALIGNMENT PHASE

9. ZEMAX RAY TRACE

10. VIEWPORT LOCATION TOOL

11. VIEW PORT FIXTURES

12. CHANGE SAFETY WIRE TO STAINLESS STEEL DUE TO RUST

13. A CAPTIVE SCREW HAS TO BE MADE FOR THE ATTACHMENT OF THE WIRE CLAMP TO THE OPTICAL TABLE

14. look at D1101307_ - - - for updating

15. look at D1101130_ - - - for updating

16. make 4 sets of viewport window location transfer tooling need asap

17. send back to coater two sets of primary and secondary tms mirrors, we need a coating fix for 'fog' and pin holes - - -have talked to L and L about this , they say they can do the work

18. New or revision modified drawings sent to Lisa for DCN's (follow up and check these by looking at sent emails to Lisa)

19. Keita mirror mount to replace siskiyou

20. complete balloon and bom for assembly drawing of the mirror mount tooling in 19 above

21. shipping boxes maybe the gray's in the highbay - Kurt B has done done some work on this

22. June 12 2012 email to Calum re masses to replace the magnets on TMS sus + items to do on TMS

REF. the mass replacements are on the list of suspension parts to make and should be in process now for all the production units.

i believe the FA has to stand 'as is' due to the lack of attachment holes for the mass
i can recheck this to replace the magnets we should request Norna's group to make a few extra of their design and purchase them from SUS

Note: as of 6-12-12 we have not made all the parts yet for TMS:

1. the secondary mirror mount adapter plate, the tool to replace the genit in setup are two items
2. the boxes for shipping or storing an assembled unit (s)
3. new wire for the front safety pendent

- 4. i'm not sure on the glass beam dump internal to tele
- 5. a second set of stabilization tooling Lisa was ordering
- 6. the comparison of used and not used SUS parts to replace
- 7. cables

to replace the magnets we should request Norna's group to make a few extra of their design and purchase them from SUS

23.

issue of correct version to order or put in the ICS re. v4 or v3

Notes and Changes:

This v4 is equivalent to A1 on the NTE drawing. This v4 DCC file contains a welded member used on the original NTE upper structure weldment as well as a drawing for 3 types of connectors to attach this welded member to the upper structure weldment assembly.

Note that D060499-type 3 is equivalent to D060499-v3 in the DCC.

for weldment and side channel stiffener

24.

to follow up on checking the correctness of parts ordered and placed in the design as being the correct parts due to last minute revisions are we current on assemblies and part revisions for all TMS

25.

D1200245

Stephany,
either a relief or a radius is ok, on these 3 boss features,
in each case making the minimum, practical, is desired.

when the vendor chooses which way to go, i would like to enter a redline in the dcc to update the drawing

26. D1200845 / D1200939 NEEDS TO BE COMPLETED

many drawings exist but, this was done in a rush for viewport tooling to the sites asap basis

need to go back to get dcn's / cross referencing between next assembly and proper callouts for purchase parts and new and modified parts look in PDM works for everything. AOS or HAMViewPortTargetTool 'Project folder' ref there is a 'large door tool' and a 'Small door tool' some numbers need deletion because the early tool combined the parts ref.

all parts are common just the number of targets changes from one window to two windows on the small tool

| Options | Number | Description | Revision | Owner | Project |
|---|--|--|----------|----------|-----------------------|
| <input checked="" type="checkbox"/>    | D1200845_aLigo_Ham_ViewPort_Target_Tool_Large_Door.SLDASM | aLigo_Ham_ViewPort_Target_Tool_Assembly | X-004 | kmailand | HAMViewPortTargetTool |
| <input type="checkbox"/>    | aligo viewport target fitting 1.25foot_mcmaste9578T620.SLDPRT | | X-000 | kmailand | AOS |
| <input type="checkbox"/>    | aligo viewport target crossover fitting 1.25_mcmaster9578T220-1.SLDPRT | | X-000 | kmailand | AOS |
| <input type="checkbox"/>    | aligo viewport target mount 1.25 x .12 wall alum tube horiz.SLDPRT | | X-000 | kmailand | AOS |
| <input type="checkbox"/>    | aligo viewport target mount 1.25 x .12 wall alum tube flange.SLDPRT | | X-000 | kmailand | AOS |
| <input type="checkbox"/>    | aligo viewport target post foot.SLDPRT | D1200868 aligo viewport target post foot | X-000 | kmailand | AOS |
| <input type="checkbox"/>    | D1200932 aligo viewport crossover 1 inch to 1.25 inch_9578T210.SLDPRT | D1200932 aligo viewport crossover 1 inch to 1.25 | X-000 | kmailand | HAMViewPortTargetTool |
| <input type="checkbox"/>    | aligo viewport target tube 1inch.SLDPRT | | X-000 | kmailand | AOS |
| <input type="checkbox"/>    | mc master 9578T410.SLDPRT | | X-000 | kmailand | AOS |
| <input type="checkbox"/>    | D1200870 aligo viewport target post foot door spacer.SLDPRT.SLDPRT | D1200870 aligo viewport target post foot door spacer | X-001 | kmailand | HAMViewPortTargetTool |
| <input type="checkbox"/>    | D1200926 aLigo Viewport target tool post screw mcmast no. 92196A540.SLDPRT | D1200926 aLigo Viewport target tool post screw | X-000 | kmailand | HAMViewPortTargetTool |
| <input type="checkbox"/>    | D1200930 aLigo Viewport target post scr washer mcmast no. 90107A013-1.SLDPRT | D1200930 aLigo Viewport target post scr washer | X-000 | kmailand | HAMViewPortTargetTool |
| <input checked="" type="checkbox"/>    | D1200935 aLigo_Ham_ViewPort_Target_Ring_Sub.SLDASM | aLigo_Ham_ViewPort_Target_Ring_Assem | X-002 | kmailand | HAMViewPortTargetTool |
| <input type="checkbox"/>    | D972610_LIGO_HAM_Support_Tube_Weldment.SLDPRT | D972610 LIGO HAM Support Tube Weldment | X-002 | esanchez | obsolete_duplicates |
| <input checked="" type="checkbox"/>    | D1200904 aLigo viewport target ring bracket.SLDPRT | D1200904 aLigo viewport target ring bracket | X-000 | | HAMViewPortTargetTool |
| <input checked="" type="checkbox"/>    | D1200906 aligo viewport target ring shaft.SLDPRT | D1200906 aligo viewport target ring shaft | X-000 | | HAMViewPortTargetTool |
| <input checked="" type="checkbox"/>    | D1200872 aLigo viewport target ring.SLDPRT | D1200872 aligo viewport target ring | X-000 | | HAMViewPortTargetTool |
| <input checked="" type="checkbox"/>    | D1200908 ring bracket screw 90585A226-1.SLDPRT | D1200910 aLigo viewport tool ring bracket screw | X-000 | | HAMViewPortTargetTool |

27. the front support wire needs to be changed to s s wire 304 x .06" diameter see the drawing for this part and bump the material and revision number.

28,

Hi Ken

Thanks for update. Let me know when all assembly drawings with notes of what to do as I want to link them in to the HAM3 and HAM2 chamber level.

Can we discuss cleaning as per Doug / Matt e-mail?

29.

Ken - Great Ken, that sounds good. Good to see drawings on DCC too. ([LIGO-D1200845-v2](#) and [LIGO-D1200939-v1](#)) Is there one for the small door still to be posted?

All - Should these parts to be cleaned to class B or wiped down prior to leaving CIT?

30.

Please come up with a plan like the one you mention below and have approved by customers at site.

Calum

On 6/20/2012 10:48 AM, Ken Mailand wrote:

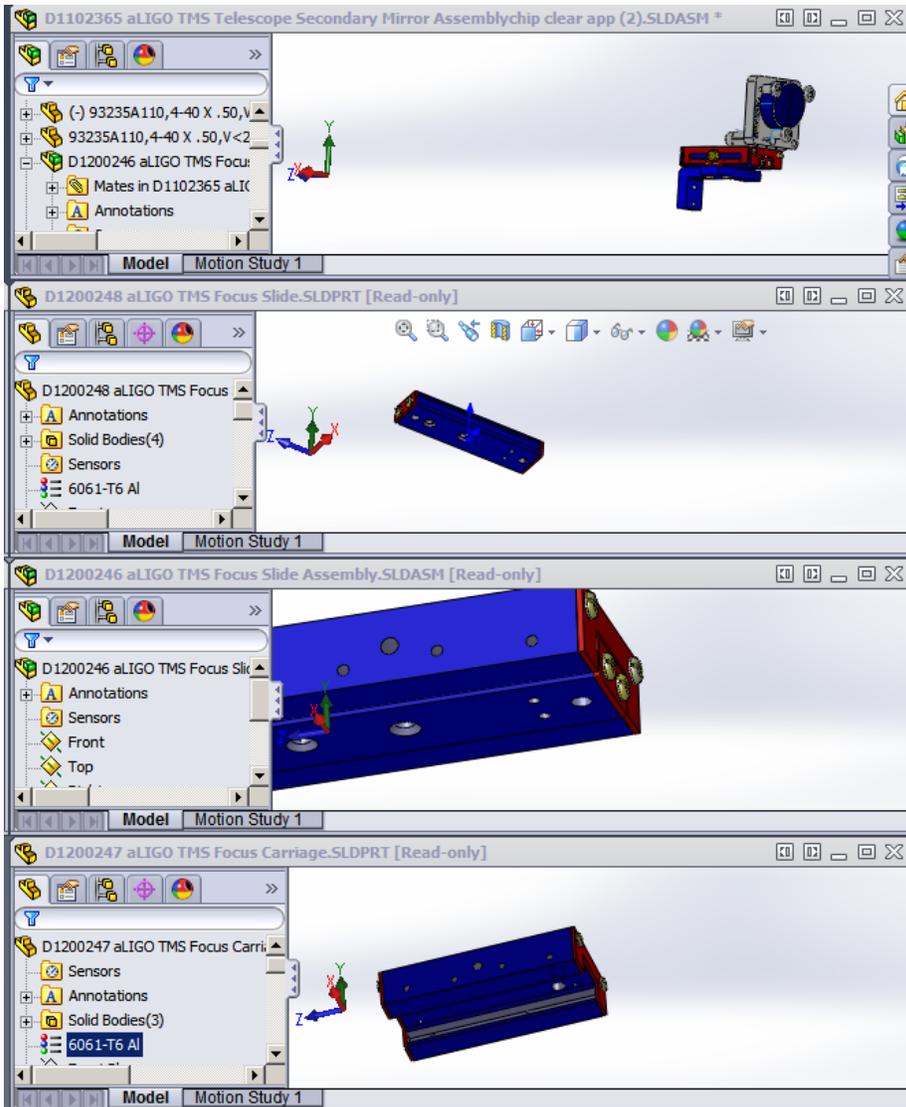
Calum,
after a good initial cleaning to get the mfg. dirt off,
last time we wiped it, with alcohol, while it was attached to the door, before we
attached it to the flanges.

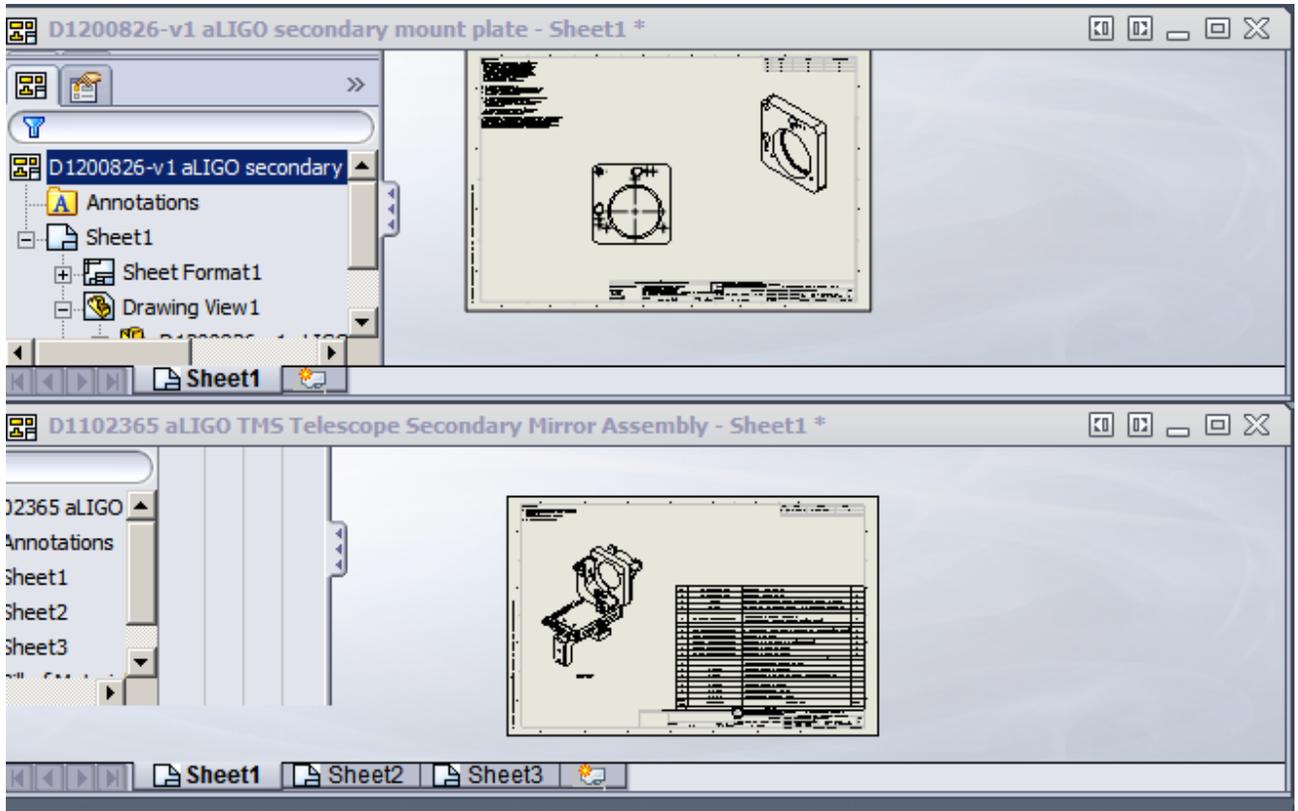
this assembly is really outside, even more than the arm, it never touches anything in vacuum.
except for the tubes, everything is small, can be put in the sonic bath.

ken



31.





32

ORDER QUOTED STRONGER SPRING FOR SECONDARY MIRROR MOUNT

33.

MAKE DRAWING FOR CAPTIVE SCREW FOR THE TMS TELESCOPE WIRE ATTACHMENT BRACKET

34.

COORDINATE THE ACQUISITION OF THE FINE PITCH F1 AND F2 SCREWS FROM ISC

NOTE: ALSO THE 1 INCH MIRROR MOUNTS TO BE USED AS THE SECONDARY MIRROR MOUNT IN THE TMS TELESCOPE

35.

There are measurements done on TMSY at <https://alog.ligo-wa.caltech.edu/aLOG/index.php?callRep=1825>

Are they acceptable?

36. look at email sent to Lisa and Calum approx 5-25- - 6-5, for To Do for TMS

37.

Invar tube update to show turn and not grind od
