US Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved OMB No. 2120-0020 2/28/2011 | Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft	Nationality and Registration Mark: N539MY	Serial No.: 18282238	
	Make: Cessna	Model: 182T	Series:
2. Owner	Name *(As shown on registration certificate)*: NG Research	Address *(As shown on registration certificate)*: Address PO Box 655; City Bristow; State VA; Zip 20136-0655; Country USA	

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
☐	☑	AIRFRAME	———	*(As described in Item 1 above)*	———
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type / Manufacturer		

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency		
Name Philip Glasgow	✓	U. S. Certificated Mechanic	☐ Manufacturer
Address 2533 Dallas Creek Court	☐	Foreign Certificated Mechanic	C. Certificate No.
City Fort Collins State Co	☐	Certificated Repair Station	
Zip 80528 Country USA	☐	Certificated Maintenance Organization	A&P 3292572 IA

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B	Signature/Date of Authorized Individual
☐	Philip Glasgow 10/16/13

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☑ Approved ☐ Rejected

BY								
	☐	FAA Flt. Standards Inspector	☐	Manufacturer	☐	Maintenance Organization	☐	Persons Approved by Canadian Department of Transport
	☐	FAA Designee	☐	Repair Station	✓	Inspection Authorization		Other *(Specify)*

Certificate or Designation No.	Signature/Date of Authorized Individual
A&P 3292572 IA	Philip Glasgow 10/16/13

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished
(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N539MY	10/16/13
Nationality and Registration Mark	Date

Installed Gomolzig Flugzeug-und Maschinebau GmbH Muffler IAW STC SA01096W1.

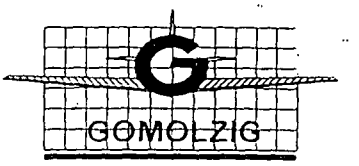
Updated weight & balance records.

----------END----------

☑ Additional Sheets Are Attached

Gomolzig Flugzeug-
und Maschinenbau GmbH
Eisenwerkstr.: 9
58332 Schwelm

EASA.21J.274



Installation Instruction

for
Cessna 182S and T

Modification 2024354

Equipped with Gomolzig Silencer Kit C182-606580

Edition: 01.07.2011

The content of this Version dated 01.04.2010 is issued under the privilege of DO EASA.21J.274.

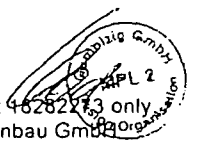
Installation Permission

Based on the conditions stated in the EASA STC the installation of this modification is hereby permitted by the approval holder GOMOLZIG Flugzeug- und Maschinenbau GmbH for the following aircraft only:

Model: Cessna 182T
Registration:
Serial No.:

Date: 2011-08-22

Signature/Stamp:



This Document is issued to A/C Serial-No.: 18282273 only

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Weight and Balance	01.07.2011	5
Instruction for Continued Airworthiness	01.07.2011	6
Assembly Drawing C182(T)-606580.00	01.07.2011	Attachm. 1

Data Package

- Form One
- Installation Instruction II_2024354_rev0_20110701
- Installation Drawing C182(T)-606580.00
- Supplement to Pilot's Operating Handbook and FAA Approved Aircraft Flight Manual
- SPOH_2024354_rev0_20110701
- STC EMZ SA1062/ STC SA01096WI
- Minor Change Approval Change Note CN_2024354_rev0_20110701

Introduction:

The aircraft can be modified i.a.w. this installation instruction. The installation can be performed by an approved maintenance organisation. The installer has to verify, that no other modification is incorporated, which together with the intended modification will effect the airworthiness of the aircraft.

The Gomolzig Low Noise Silencer System C182-606550 was initially approved by the German LBA STC EMZ SA1062, which later on was grandfathered through EASA and validated by FAA under STC SA01096WI.

With modification 2024354 the silencer was removed from the left side and installed to the right side. This modification was approved by a Minor Change Approval of the EASA approved Design Organisation Gomolzig Flugzeug- und Maschinenbau GmbH based on their privileges. Consequently this installation instruction is part of the above mentioned approval.

According to the "Agreement between United States of America and the European Community on cooperation in the regulation of civil aviation safety" a Minor Change Approval of an appropriate approved EASA Design Organisation is considered approved by the FAA.

Installation Instruction:

This system consists of LH and RH exhaust tubing leading the exhaust gas to a main muffler. This muffler has a shroud assy. The exhaust gas is lead via an elbow and a swivel ball joint to an additional silencer that is installed in the RH cowling area. Perform the installation i.a.w. the following instruction and corresponding Installation Drawing C182(T)-606580.00

1) Remove the upper and lower cowling parts, remove the complete original exhaust system from the cylinder outlet ports in accordance with the Maintenance Manual.
2) Mount the LH (Item 4, 5, 6) and RH (Item 7, 8, 9) exhaust tubing, but don't tighten the screws in order to align the system. Use the required Lycoming Blow-Proof-Gaskets and self locking stop nuts for the exhaust-tubing / engine connection. Mount the muffler (Item 1) together with the pre-mounted heating shroud (Item 31). Tighten the self locking nuts corresponding to the Maintenance Manual, tighten the clamps in a way, that moving of the muffler is still possible.
3) Mount the triad bracket (Item 16) corresponding to the installation drawing on the right hand side of the engine with the standard parts (items 34-38) to the oil sump.
4) Mount the silencer (Item 2) and connect the swivel-ball joint to the mufflers outlet with standard parts (Item 12, 18, 19, 20, 21). Tighten the swivel-ball joint screw and

springs in a way, that rotating the silencer by hand is possible. Secure the castle nuts (Item 20) with cotter pins (Item 21).

5) Connect the silencer (Item 2) to the triad bracket with the standard parts (Items 17, 28, 29, 32, 33, 34 and 35). Screw and secure the clamp (Item 14) with the safety wire (Item 15).
6) Secure the tail pipe with the original attaching parts.
7) Mount the cooling air hose (Item 23) to the silencers (Item 2) cooling shroud inlet and fix it with the clamp (Item 24)
8) Mount the Y-Tube (Item 22) to the original cabin heat Inlet hose (Item 26). Secure with clamps (Item 24).
9) Mount the other end of the cooling air hose (Item 23) to the Y-Tube (Item 22) and secure with clamp (Item 24).
10) Mount the cabin heat inlet tube (Item 26) to the LH flange of the shroud and fix it with the original clamp (Item 30).
11) Mount the cabin heat outlet tube (Item 27) to the RH flange of the shroud (Item 31) and fix it with the original clamp (Item 25).
12) Check all parts concerning proper and tight fitting. Tighten all pre-tightened connections and secure all parts with the designated standard parts.
13) Mount the complete cowling corresponding to the Maintenance Manual. Check the cowl-flaps function.
14) Conduct an engine ground run by an authorised person.
15) Correct the Weight and Balance Sheet with the data given on the following page
16) Insert Supplement to the Pilot's Operating Handbook and FAA Approved Aircraft Flight Manual
17) Add Instruction of Continued Airworthiness to the Maintenance Documentation
18) Release aircraft to service.

Weight and Balance

Change due to the installation of Gomolzig Silencer Kit C182-606580

Reference line is the front of the firewall:

Removing the original exhaust system:

The weight of the removed exhaust system (including side tubing):	**9,6 kg or**	**15**	**lbs**
	45,0 cm or	**17,7**	**inch**
Centre of gravity of the removed parts: in front of the firewall			
Resulting in a moment of:	9,6 kg x 45 cm =	**432**	**kgcm**
or	27,7 lbs x 17,7 inch =	**490,3**	**lbsinch**

Installation of silencer kit C182T-606580:

The weight of the new muffler with side tubing is:	**7 kg or**	**15,4**	**lbs**
	75 cm or	**29,53**	**inch**
The centre of gravity is in front of the firewall			
It has a moments of:	7 kg x 75 cm =	**525**	**kgcm**
or	15,4 lbs x 29,53 inch=	**454,8**	**lbsinch**

The weight of the additional silencer is:	**6,5 kg or**	**14,3**	**lbs**
	41,5 cm or	**16,33**	**inch**
The centre of gravity is in front of the firewall			
It has a moment of:	6,5 kg x 41,5 cm =	**269,8**	**kgcm**
or	14,3 lbs x 16,33 inch=	**230,2**	**lbsinch**

The kits complete weight is:	**13,5 kg or**	**29,7**	**lbs**
The kits complete moment is:	**794,8 kgcm or**	**685**	**lbsinch**

Corrective data due to the installation of the Gomolzig Silencer Kit C182-606580			
added weight	**+ 3,9 kg**	**or**	**10,4 lbs**
added moment	**- 362,8 kgcm**	**or**	**- 194,7 lbsinch**

This Document is issued to A/C Serial-No.: 18282273 only.

Instruction for Continued Airworthiness

During the maintenance checks of this aircraft the following checks have to be conducted at the silencer kit C182T-606580 :

			100 h	200h	500h
1.1	Muffler:				
	(a)	Inner pipes		O	
	(b)	Muffler	O		
	(c)	Swivel ball joint	O		
	(d)	Cracking inside the side covers	O		
1.2	Silencer:				
	(a)	Inner tubing		O	
	(b)	Steel wool			O
	(c)	Attachment / Mounting	O		

2. Work instruction referring 1.1:

(a): remove each side tubing part and light the mufflers inner tubes with a light
- check for deformation or cracks and for well passage of exhaust gas.

(b): remove the shroud and check the mufflers wall for deformation and cracks. Conduct an exhaust system leak-test (e.g. with the help of a blowing hoover)
- Leaks have to be welded with filler rod 1.4551 or equivalent.

(c): The swivel-ball connection attachments have to be rotatable by hand
- if necessary adjust the springs. Lubricate contact surfaces with appropriate high temperature grease.

(d): Visual check: Cracks are not allowed.

3. Work instruction referring 1.2:

(a): Light inner tubing with the help of a light and check for deformation or cracking.

(b): Remove the back side by unfastening the four screws. Check the area between casing and tubing, which needs to be completely filled out by steel wool.

(c): The attachment parts have to be without any cracks, the triad bracket has to be without damage. The silencer has to be flexible inside the shock mount attachment, any movement restrictions due to the shock mount rubber parts are prohibited.

4. For ordering spare parts or in case of detecting any failure or defects contact:

Gomolzig Flugzeug- und Maschinenbau GmbH,
Eisenwerkstr. 9, D-58332 Schwelm,
Germany
Phone: +49 (0)2336 490 330
Fax: +49 (0)2336 490 339

E-MAIL: INFO@GOMOLZIG.DE

This Document is issued to A/C Serial-No.: 18282273 only

Gomolzig Flugzeug-
und Maschinenbau GmbH
Eisenwerkstr.: 9
58332 Schwelm
EASA.21J.274

Pilot's Operating Handbook and FAA Approved Airplane Flight Manual

Supplement for Cessna 182S and T

Modification 2024354

Equipped with Gomolzig Silencer Kit C182-606580

Edition: 01.07.2011

This Flight Manual Supplement is EASA approved under approval number EMZ SA 1062 and FAA STC SA01096WI. The content of this Version dated 01.07.2011 is issued under the privilege of DO EASA.21J.274.

Installation Permission

Based on the conditions stated in the EASA STC the installation of this modification is hereby permitted by the approval holder GOMOLZIG Flugzeug- und Maschinenbau GmbH for the following aircraft only:

Model: Cessna 182T
Registration:
Serial No.:

Date: 2011-08-22
Signature/Stamp:

This Document is issued to A/C Serial-No.: 18282273 only.

Log of Revisions / Amendments

Revision	Reason of Revision	Page Number	Date	Approved under
0	EASA First Edition	All	26.05.1998	EMZ SA 1062
0	FAA First Edition	All	03.07.2002	SA01096WI
1	Extension to model 182T	All	31.01.2003	SA01096W
1	Version 2024354	All	01.07.2011	DO EASA.21J.274

Table of valid pages:

SECTION 1: GENERAL

Introduction:

This Supplement to the Pilot's Operating Handbook and FAA Approved Aircraft Flight Manual refers to the operation of the aircraft with the Gomolzig Low Noise Silencer Kit C182-606580.

The Gomolzig Low Noise Silencer System C182-606550 was initially approved by the German LBA STC EMZ SA1062, which later on was grandfathered through EASA and validated by FAA under STC SA01096WI.

With modification 2024354 the silencer was removed from the left side and installed to the right side. This modification was approved by a Minor Change Approval of the EASA approved Design Organisation Gomolzig Flugzeug- und Maschinenbau GmbH based on their privileges. Consequently this supplement is part of the above mentioned approval.

According to the "Agreement between United States of America and the European Community on cooperation in the regulation of civil aviation safety" a Minor Change Approval of an appropriate approved EASA Design Organisation are considered approved by the FAA.

This supplement to the Flight Manual (POH supplement) only contains information that contributes to safe operation. The supplement must be followed, if the aircraft is equipped with the equipment listed in chapter 6. It extends the original flight manual (POH) by adding or replacing specific information and procedures only in the areas expressly mentioned below.

For limitations, procedures and performance information not contained in this supplement please refer to the original Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

SECTION 2: LIMITATIONS

This section remains unchanged

SECTION 3: EMERGENCY PROCEDURES

This section remains unchanged

SECTION 4: NORMAL PROCEDURES

This section remains unchanged

SECTION 5: PERFORMANCE

This section remains unchanged

SECTION 6: MASS AND BALANCE / EQUIPMENT LIST

According to the data given in the Installation Instruction II_2024354_rev0_20110701 the Weight and Balance Sheet of each specific aircraft can be corrected.

SECTION 7: AIRPLANE AND SYSTEMS DESCRIPTION

This Supplement to the Pilot's Operating Handbook and FAA Approved Aircraft Flight Manual refers to the operation of the aircraft with the Gomolzig Low Noise Silencer Kit C182-606580.

This system consists of LH and RH exhaust tubing leading the exhaust gas to a main muffler. This muffler has a shroud assy. The exhaust gas is lead via an elbow and a swivel ball joint to an additional silencer that is installed in the RH cowling area.

For procedures and information not contained in this part of this supplement, please refer to the original Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

United States of America

Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

IMPORT

Number SA01096WI

This certificate issued to: Gomolzig Flugzeug-und Maschinenbau GmbH
Loher Strasse 1/ Gebaude 38
D-58332 Schwelm, Germany

certifies that the change in the type design for the following product with the limitations and conditions therefore as specified hereon meets the airworthiness requirements of Part 23 of the Federal Aviation *Regulations.* Luftfahrt-Bundesamt (LBA) originally certificated this modification under German LBA EMZ (STC) No. SA 0672. The FAA validated this modification under U.S. Supplement Type Certificate No. SA01095WI. Effective September 28, 2003, the European Aviation Safety Agency (EASA) began oversight of this modification on behalf of Luftfahrt-Bundesamt.

Original Product - Type Certificate Number: 3A13

Make: Cessna

Model: 182S, 182T

Description of Type Design Change: Installation of Gomolzig C182R-606550 engine exhaust system silencer. Data Required: (1) Gomolzig Flugzeug-und Maschinenbau GmbH Installation Instructions, dated October 1, 2001, stamped FAA Approved July 3, 2002, or later FAA approved revisions; and (2) Gomolzig Flugzeug-und Maschinenbau GmbH Pilot's Operating Handbook and FAA Approved Airplane Flight Manual Supplement dated July 3, 2002, or later FAA approved revisions.

Limitations and Conditions: Compatibility of this design change with previously approved modifications must be determined by the installer. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

This STC is not to be transferred since its issuance was in accordance with 14 CFR 21.29 and is based upon a validation of the German LBA EMZ No. SA 0672.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: December 17, 2001

Date reissued: March 20, 2007

Date of issuance: July 3, 2002

Date amended:

By direction of the Administrator

Original signed by Eual Conditt

(*Signature*)

Eual M. Conditt, Jr.
Associate ACO Manager, Airframe & Services
Wichita Aircraft Certification Office

(*Title*)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

GOMOLZIG Flugzeug- und Maschinenbau GmbH EASA.21J.274	EK11 – Anlage 1	GOMOLZIG ENTWICKLUNGEN

CHANGE NOTE

project definition [Engineering] :	
CHANGE NOTE – No. :	CN_2024354_rev0_20110701.DOC
check list to change note :	CLCN_2024354_rev0_20110701.doc
Project Title :	CESSNA 182 EXHAUST SYSTEM RH OUTLET
affected (S)TC :	EMZ SA 1062
affected type/make :	Cessna
affected model(s) :	182S/T with STC SA 1062
affected S/Ns :	all
available documents :	Flughandbuch, Maintenance Manual, Parts Katalog

project description (add attachment, when appropriate) :
Variant of exhaust system C182-606550

The exhaust system is already approved with STC LBA EMZ SA 1062 and FAA STC SA01096WI. Without changing of any feature the muffler outlet of the new variant was moved to the righthand side on customer's request. P/N of the modified system is changed to C182-606580. P/N of the lefthand side outlet system remains C182-606550.

Project Leader	name : Bernd Ahlert
	signature : Ahlert
	date : 01.07.2011

Classification and start of Certification Project [Office of Airworthiness] :	
project in capability list :	yes
applied Certification Basis :	FAR 23 Amdt 23-1 through 23-45
Certification Programme :	CP_2024354_rev0_20110701
Master Document List :	MDCL_2024354_rev0_20110701

Change	[ ]	Major	[X]	Minor	[ ] ATC	[ ]	significant
Repair	[ ]	Major	[ ]	Minor	[X] STC	[X]	not significant
Unrepaired Damage	[ ]	Major	[ ]	Minor	[ ] ASTC		

Office of Airworthiness	name : Achim Kocks
	signature : Kocks
	date : 01.07.2011

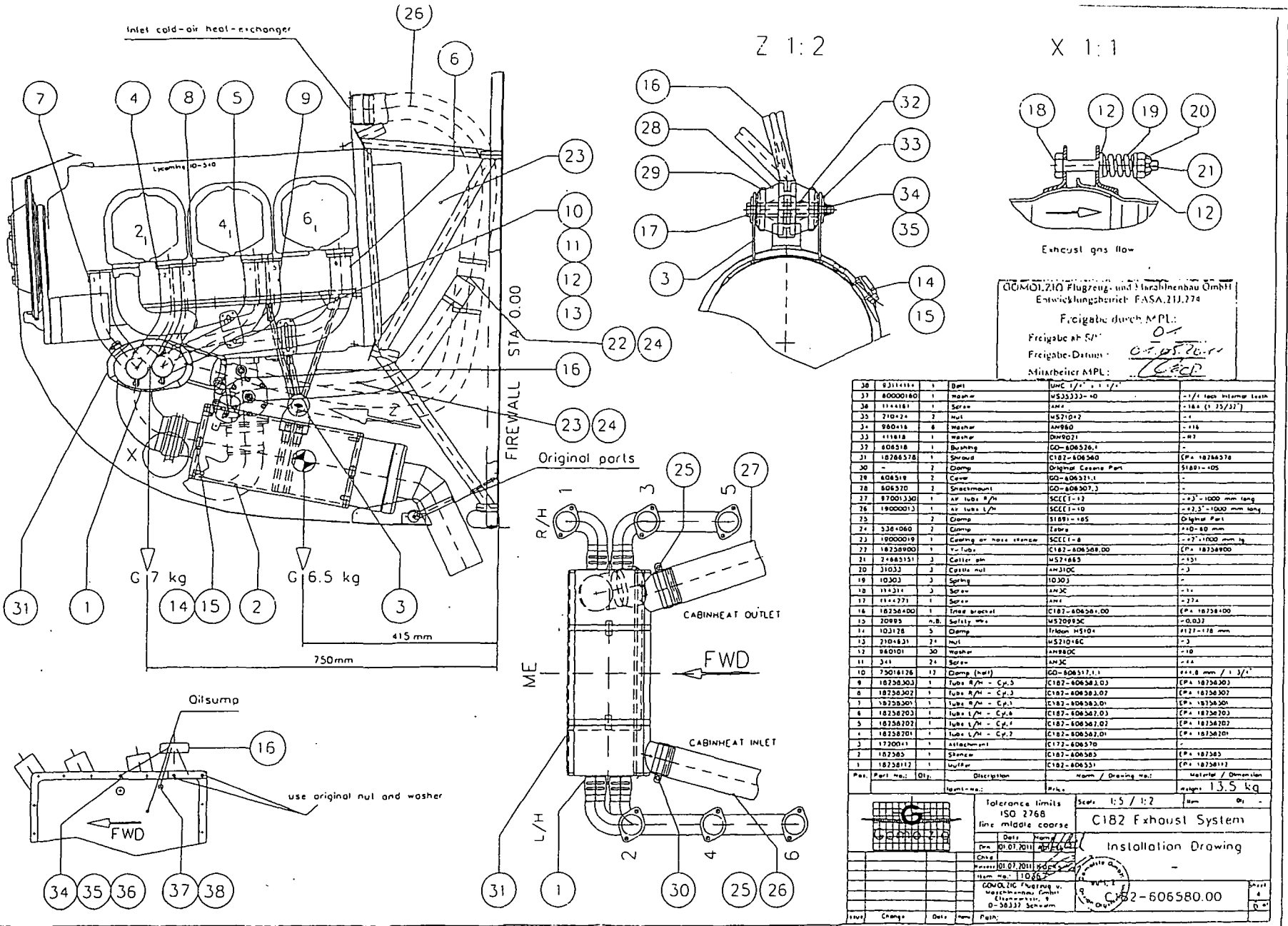
Concizio GmbH MPL 2 Design Organisation

Approval [Office of Airworthiness] / EASA	Finalisation [Office of Airworthiness] :
Minor Change/Repair approved under authority of the design organisation EASA.21J.274 with regard to the valid procedures of the corresponding design organisation exposition. Minor Change/Repair approved under authority of EASA Implementation of this modification is valid after the date shown below. This modification complies with the applicable Certification Specifications as listed in the Certification Programme mentioned above.	EASA-Project No. : Implementation of this Major Change/Repair is only valid after issuance of an corresponding EASA approval!

Approval: Office of Airworthiness / EASA	CR finished :	
name : Achim Kocks	date :	
signature : Kocks	DoC signed :	
date : 04.07.2011	date :	

Concizio GmbH MPL 2 Design Organisation

Countersigned Project Leader	name : Bernd Ahlert
	signature : Ahlert
	date : 18.7.2011



GOMOLZIG Flugzeug- und Stahlbau GmbH
Entwicklungsbereich EASA.21J.274
Freigabe durch MPL:
Freigabe-Nr.: 01
Freigabe-Datum: 07.05.2012
Mitarbeiter MPL: Gö

Pos.	Part no.:	Qty.	Description	Norm / Drawing no.:	Material / Dimension
			Item-no.:	Price:	Weight: 13.5 kg
38	93114166	1	Bolt	UNC 1/4" x 1 1/2"	
37	800001680	1	Washer	WS33333-40	-1/4 Inch Internal Teeth
36	1144181	1	Screw	AN4	-16A (1 35/32")
35	210424	2	Nut	MS21042	-4
34	960416	6	Washer	AN960	-416
33	411618	1	Washer	DIN9021	-A2
32	806518	1	Bushing	GO-806526.1	-
31	18786578	1	Shroud	C182-806560	EPA 18786578
30	-	2	Clamp	Original Cessna Part	S1891-105
29	806519	2	Cover	GO-806521.1	-
28	806520	2	Shockmount	GO-806507.3	-
27	870013330	1	Air tube R/H	SCEET-12	-42"-1000 mm long
26	19000013	1	Air tube L/H	SCEET-10	-42.5"-1000 mm long
25		2	Clamp	S1891-105	Original Part
24	330-060	2	Clamp	Zebra	40-60 mm
23	19000019	1	Cooling air hose stence	SCEET-8	-42"-1000 mm lg
22	18758900	1	Y-tube	C182-806568.00	EPA 18758900
21	24885151	3	Cotter pin	MS24665	-151
20	31033	3	Castle nut	AN310C	-3
19	10303	3	Spring	10303	-
18	114314	3	Screw	AN3C	-3A
17	114271	1	Screw	AN4	-27A
16	18756400	1	Tube bracket	C182-806561.00	EPA 18756400
15	20995	n.B.	Safety wire	MS20995C	-0.032
14	103128	5	Clamp	Tridon MS10-	#127-178 mm
13	210831	7*	Nut	MS210-8C	-3
12	960101	30	Washer	AN960C	-10
11	341	2*	Screw	AN3C	-4A
10	75018126	12	Clamp (half)	GO-806517.1	###.8 mm / 1 3/4"
9	18758303	1	Tube R/H - Cyl.5	C182-806583.03	EPA 18758303
8	18758302	1	Tube R/H - Cyl.3	C182-806583.02	EPA 18758302
7	18758301	1	Tube R/H - Cyl.1	C182-806583.01	EPA 18758301
6	18758703	1	Tube L/H - Cyl.6	C182-806567.03	EPA 18758703
5	18758702	1	Tube L/H - Cyl.4	C182-806567.02	EPA 18758702
4	18758701	1	Tube L/H - Cyl.2	C182-806567.01	EPA 18758701
3	1720041	1	Attachment	C172-606570	-
2	187585	1	Stence	C182-806585	EPA 187585
1	18758112	1	Muffler	C182-806551	EPA 18758112

Tolerance limits ISO 2768 fine middle coarse
Scale: 1:5 / 1:2
C182 Exhaust System
Installation Drawing
Drn. 01.07.2011
Chkd
Issued 01.07.2011
Item no.: 10.867
GOMOLZIG Flugzeug u. Maschinenbau GmbH Eisenweg str. 9 D-38337 Schwanm
C182-606580.00
Sheet 1 of 1

Issue	Change	Date	Name	Path:

US Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved OMB No. 2120-0020 2/28/2011 | Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See Title 14 CFR §43.9, Part 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. §44701). Failure to report can result in a civil penalty for each such violation. (49 U.S.C. §46301(a))

1. Aircraft	Nationality and Registration Mark: N539MY	Serial No.: 18282238	
	Make: Cessna	Model: 182T	Series:
2. Owner	Name *(As shown on registration certificate)*: NG Research	Address *(As shown on registration certificate)*: Address PO Box655; City Bristow; State VA; Zip 20136-0655; Country USA	

3. For FAA Use Only

The technical data identified herein has been found to comply with the applicable airworthiness requirements and is hereby approved for use only on the above described aircraft, subject to conformity inspection by a person authorized in CFR title 14, Part 43, section 43.7.
Approving Inspector: Julie Summa **Date:** 10/21/2013
Denver FSDO, NM-03

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
☐	☑	AIRFRAME	—	*(As described in Item 1 above)*	—
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type / Manufacturer		

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency			
Name Philip Glasgow	✓	U. S. Certificated Mechanic		Manufacturer
Address 2533 Dallas Creek Court		Foreign Certificated Mechanic	C. Certificate No.	
City Fort Collins State Co		Certificated Repair Station		
Zip 80528 Country USA		Certificated Maintenance Organization	A&P 3292572 IA	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B	Signature/Date of Authorized Individual
☐	Philip Glasgow 11/5/13

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☑ Approved ☐ Rejected

BY								
	☐	FAA Flt. Standards Inspector	☐	Manufacturer	☐	Maintenance Organization	☐	Persons Approved by Canadian Department of Transport
	☐	FAA Designee	☐	Repair Station	✓	Inspection Authorization		Other *(Specify)*

Certificate or Designation No.	Signature/Date of Authorized Individual
A&P 3292572 IA	Philip Glasgow 11/5/13

FAA Form 337 (10-06)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished
(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N539MY	11/5/13
Nationality and Registration Mark	Date

Installed Equipment.

Installed Paravion Technology C182-100 Infrared Camera provisions IAW STC SA00294DE.

Ref Paravion Engineering Report ER-C182ELP-2 Rev N/C.

-Installed a Paravion Technology Augmented Reality System (ARS) IAW Paravion C182 Electrical-Rev A & ARS 214. The ARS is powered from the Avionics Buss and is protected using a 15 AMP Klixon C/B switch P/N 7270-1-15 labeled "ARS". The ARS is interfaced to FLIR Camera system IAW the above mentioned Paravion C182 Electrical-Rev A Dwgs. The ARS ECU is mounted in the baggage compartment at station 130".
-The ARS is secured to the rear baggage compartment shelf using two quick disconnect controller mount rails. Ref attached Paravion Technology Inc drawing ARS 4130 sheet 3 for fabrication of controller rails. Attached the controller mount rails to two existing structures in the aircraft using 4X Screws P/N MS27019-1-10 , 7 X washers P/N NAS1149F0332P & 3 X nuts P/N MS21042-L3.
-Fabricated a new cover plate for the ARS. Ref Paravion Technology Dwg # ARS 4130 sheet 2. Attached fabricated cover with 8 X Screws P/N MS35206-231. Instructions for continued airworthiness for the augmented Reality System are contained in Paravion Document PR-ARS-120M. Ref 8110-3 dated 3/30/11 and Paravion report ARS-4004-901 for structural mounting

-Mounted the Inertial Navigation Unit (IMU) on top of the fabricated cover plate and secured with 4 X IR-620 spacers, 4 X MS35207-265 screws & 4 X MS21042L3 nuts. The IMU is powered from the above ARS ECU and is protected using a 2 amp internal fuse to the ARS ECU. Mounted the GPS antenna P/N 42G01215A-XT-1 to the topside of the aircraft at station 79.0 using manufacturer provided screws, 4X MS21044C3 nuts & 4 X NAS1149C0332R washers.
-Mounted the INS RS232 control box to the fabricated cover plate using a plate with is attached to the above mentioned cover plate using 4 X MS35206-226 screws. Ref Paravion Technology Dwg 4130 Sheet 4 item -12 for full fabrication details. Attached the INS RS232 control box to the above mentioned plate using 4 X MS35206-226 screws.
-Mounted Janteq Downlink Control ECU to the floor aft of the FLIR at station 105.00 mounted to existing structure using 4 X MS27039-1-10 screws. Attached 4 X MS21059 L4 nut plates to the existing structure using 2 X MS20426AD3-4 rivets each. Installed the Janteq Down link IAW manufacturers Dwgs 1011139 and user manual BHDTX-S-TWINTX-HP-AB. System is protected using a Klixon C/B switch P/N 7270-1-3 and is labeled "Down Link" Mounted two antennas on the bottom of the aircraft. Mounted the first antenna at station 145.0" on the bottom of the aircraft to the R/H side of the aircraft center line. Fabricated a doubler from 6061 T6 aluminium 4" X 5". Attached the antenna to the aircraft using 4 X P/N MS51987-48 screws, 4 X P/N AN960C8 washers & 4 X P/N MS21042-L08 nuts. Mounted the second antenna to the bottom of the aircraft at station 125.0" to the L/H side of the center line. Fabricated a doubler from 6061 T6 aluminium 4" X 5". Attached the antenna to the aircraft using 4 X P/N MS51987-48 screws, 4 X AN960C8 P/N washers & 4 X P/N P/N MS21042-L08 screws. Mounted the control head to the center console using 4 X P/N MS35206-215 screws, 4 X MS21042L04 nuts & 4 X AN960JD3 Washers. Ref Structural analysis dwg ER-ARS-214-2, ER-IR2300-2 & Paravion dwg ARS 232.

-Installed 2 X Video Accessory Corporation Video Distribution Amplifiers P/N 11-524-104 Ref Paravion Technology Inc Dwg # C182 ARS-1000 item -14 for fabrication details of the supporting bracket. Attached the Video Distribution Amplifiers support brackets to the shelf using 2 X MS27039-0807 screws, 2 X MS21042-L08 nuts & 4 X NAS1149FN832P washers. Attached the distribution Amplifiers to the brackets using 4 X MS24693S27 screws. Power is supplied from the avionics buss and the amplifiers are protected using a 1 Amp Klixon C/B P/N 7277-2-1 C/B Labeled"Video Dstrb"

☑ Additional Sheets Are Attached

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished
(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N539MY	11/5/13
Nationality and Registration Mark	Date

Installed 2 X Video Accessory Corporation Video switches P/N 17-511-112. Power is supplied from the avionics buss and is protected using a 1 Amp Klixon C/B P/N 727721-1. Controlling the 2 X Video switches by installing 2 X Rotary switches one labeled "Downlink Video & ARS or FLIR". The second switch is labeled "MFD Video & PRI or SEC" They are collectively labeled "Video switching". These switches are located in the upper center overhead panel. Fabricated a switch panel is secured to the overhead interior panel using 4 X 632 clip nuts & 4 X MS35206-228 screws. Located the FLIR control switch, Laser Interlock control switch & the FLIR Anti Ice switch to the above mentioned overhead panel. Ref Paravion dwg C182ARS-1000 for fabrication details.

The monitor is mounted to the instrument panel on the R/H side using 3X MS24693-363 screws. Attached 3X MS21049-L3 nut plates to the instrument panel using 6 X MS21426-3-4 counter sunk rivets. The primary display is provided power from the avionics buss and is protected using a 3 Amp C/B P/N 7277-2-3. And is label "Monitor Power".

Fabricated a center console and installed in the aircraft. Ref Paravion Technology drawing C182IRC-1000 for details and ref attached conformity reports for material used. Ref Paravion Technology Drawing ARS182-1000 sheet 3 & 4 for fabrication details of the attaching brackets for the above mentioned console. Attached the brackets to the floor using MS20426AD3-3.5 Rivets X 24.

Installed 2 X Aux Foot switches on the floor at station location 20.00". Fabricated foot switch holder form the same material as mentioned above for the center console and installed a 2 X switches P/N M8805/55-001 X 2. Attached the Foot switch housing Using 2 x MS35206-228 screws and 2 X AN960JD6L washers. to the floor using 3 X Nut plates P/N MS21075L06 & 1 X MS21069L06 nut plate. Attached the nut plates to the floor using 8 X MS20426AD3-3.5 Rivets.

Mounted an existing Motorola radio on the above mentioned center console on the aft end using a doubler fabricated from 6061 T6 aluminum 2" X 4" .063". Used 1 X AN3-3A bolt and 1 X NAS1149F0332P washers to attach to the console.

Wire gauge selection was done in accordance with AC43-13-1B Chapter 11, Aircraft Electrical System, section 5 (wiring rating) paragraphs 11-66, 11-67 section 6 (Aircraft Electrical Wire section) paragraphs 11-76, 11-77.

An electrical load does not exceed limitations of AC43-13-1b Chapter 11, paragraphs 424 (Electrical load limits), 425 (generator) and 428 (determination of electrical load).

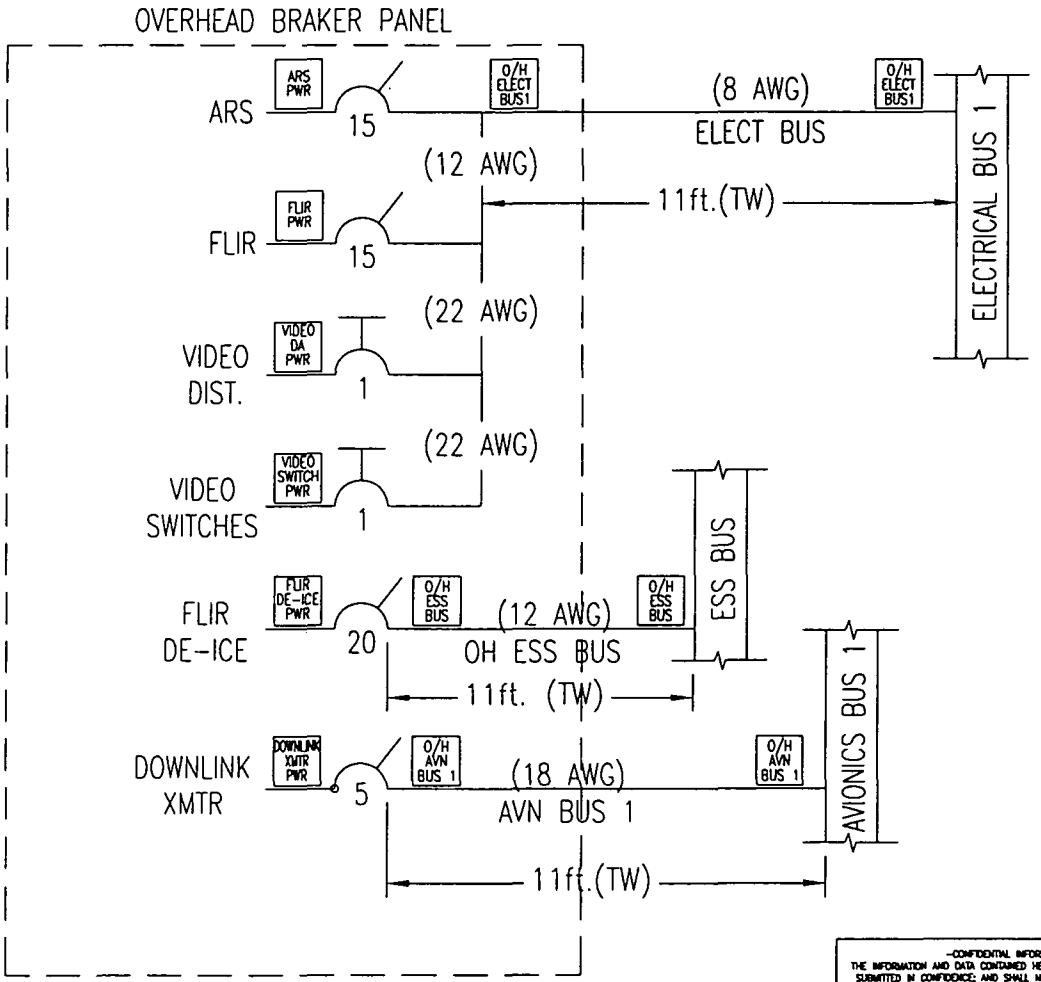
The Instructions for Continued Airworthiness (ICA) contained in the Flight Standards Handbook Bulletin for Airworthiness (HBAW-8900.1) are not applicable as these components are not field repairable and are "Remove and Replace" items only.

Aircraft weight & balance and equipment list amended as required.

---------- Nothing follows ----------

☑ Additional Sheets Are Attached

SHEET	REV	DATE	DESCRIPTION	BY	APR	CHK
3,10,11	A	04/26/2012	REMOVED NANOFLASH, ADDED USB3, ADDED "VIDEO" TO SWITCH LABELS	REB		
3,5,7,8,10,11,16	B	06/13/2012	UPDATED WIRE LENGTHS	REB	REB	LS
2,9,11,12,	C	09/26/2012	UPDATED PER MARK-UP	REB		
1,3,9	D	04/02/2013	REMOVED DWNLK CONTROL POWER, REWIRE SHT 3	DGW		



WIRE LEGEND

TW = TOTAL WIRE LENGTH

SS = TOTAL SNAKE SKIN LENGTH

TS = TOTAL SHEILD LENGTH

PROTO

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Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

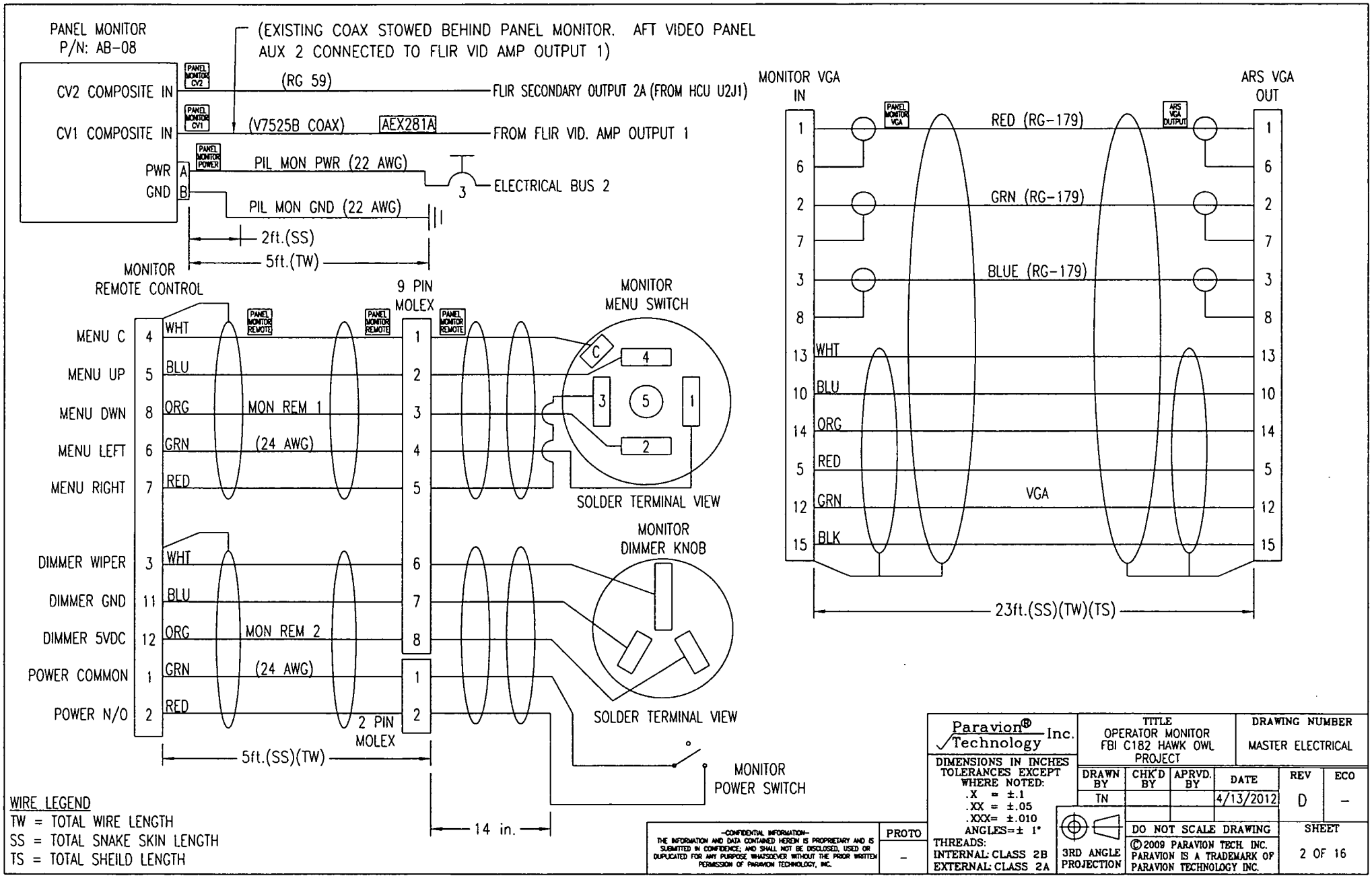
3RD ANGLE PROJECTION

TITLE: POWER BUS
FBI C182 HAWK OWL PROJECT

DRAWING NUMBER: MASTER ELECTRICAL

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	-

DO NOT SCALE DRAWING



WIRE LEGEND
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PROTO
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.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

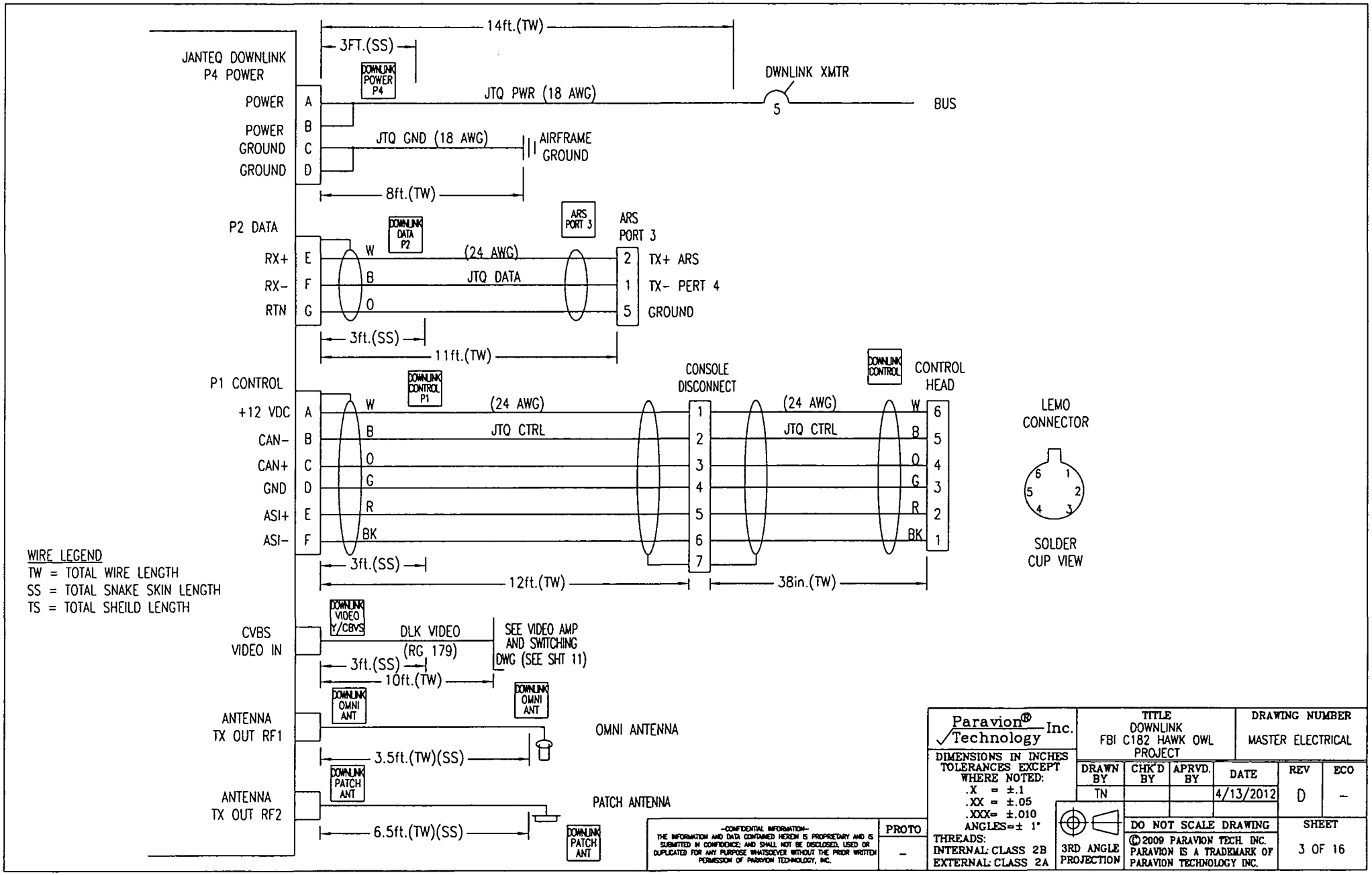
TITLE
OPERATOR MONITOR
FBI C182 HAWK OWL PROJECT

DRAWING NUMBER
MASTER ELECTRICAL

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	–

DO NOT SCALE DRAWING

SHEET
2 OF 16



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.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

TITLE
DOWNLINK
FBI C182 HAWK OWL PROJECT

DRAWING NUMBER
MASTER ELECTRICAL

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	-

DO NOT SCALE DRAWING

SHEET 3 OF 16

PROTO
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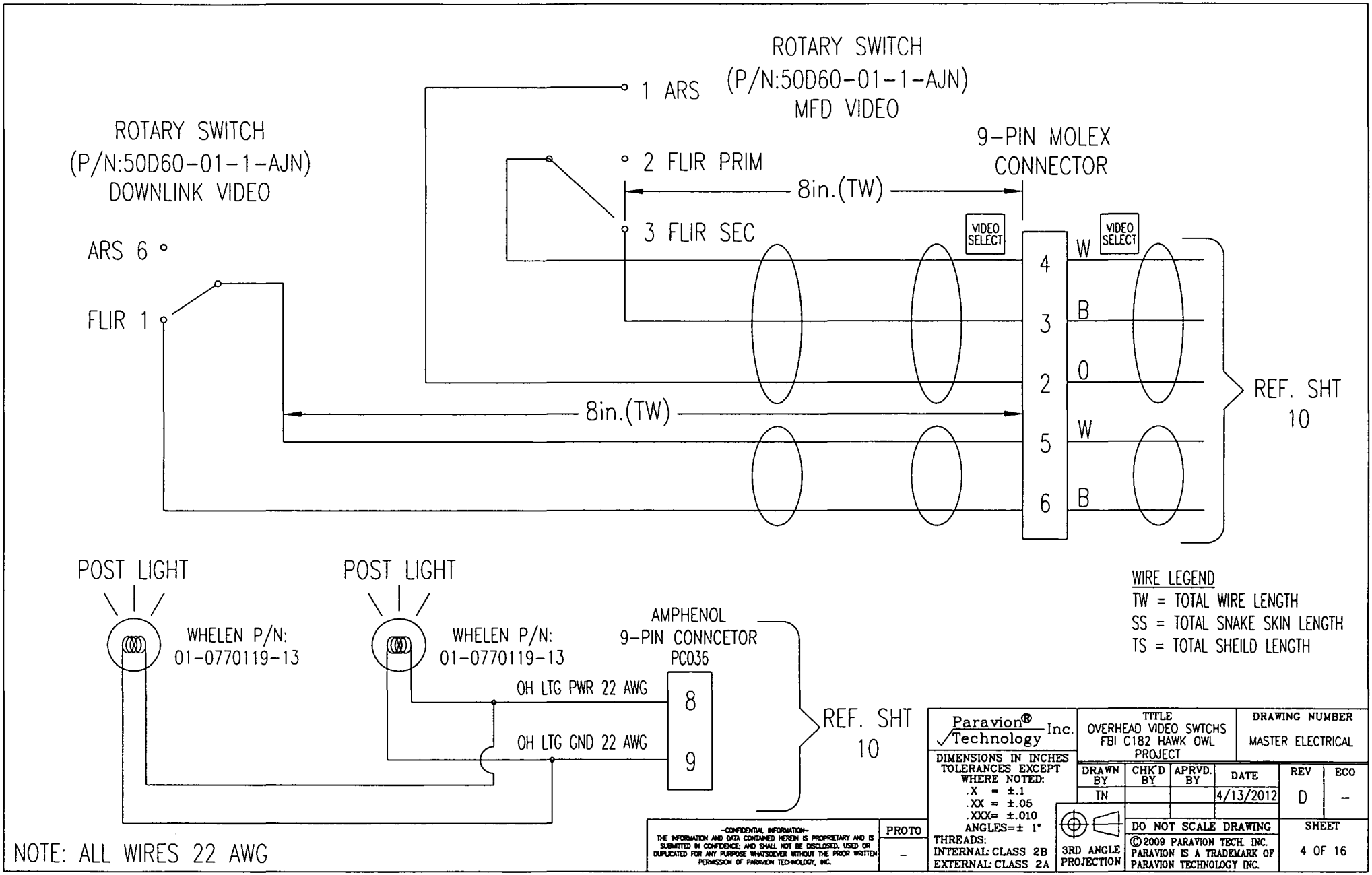

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.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

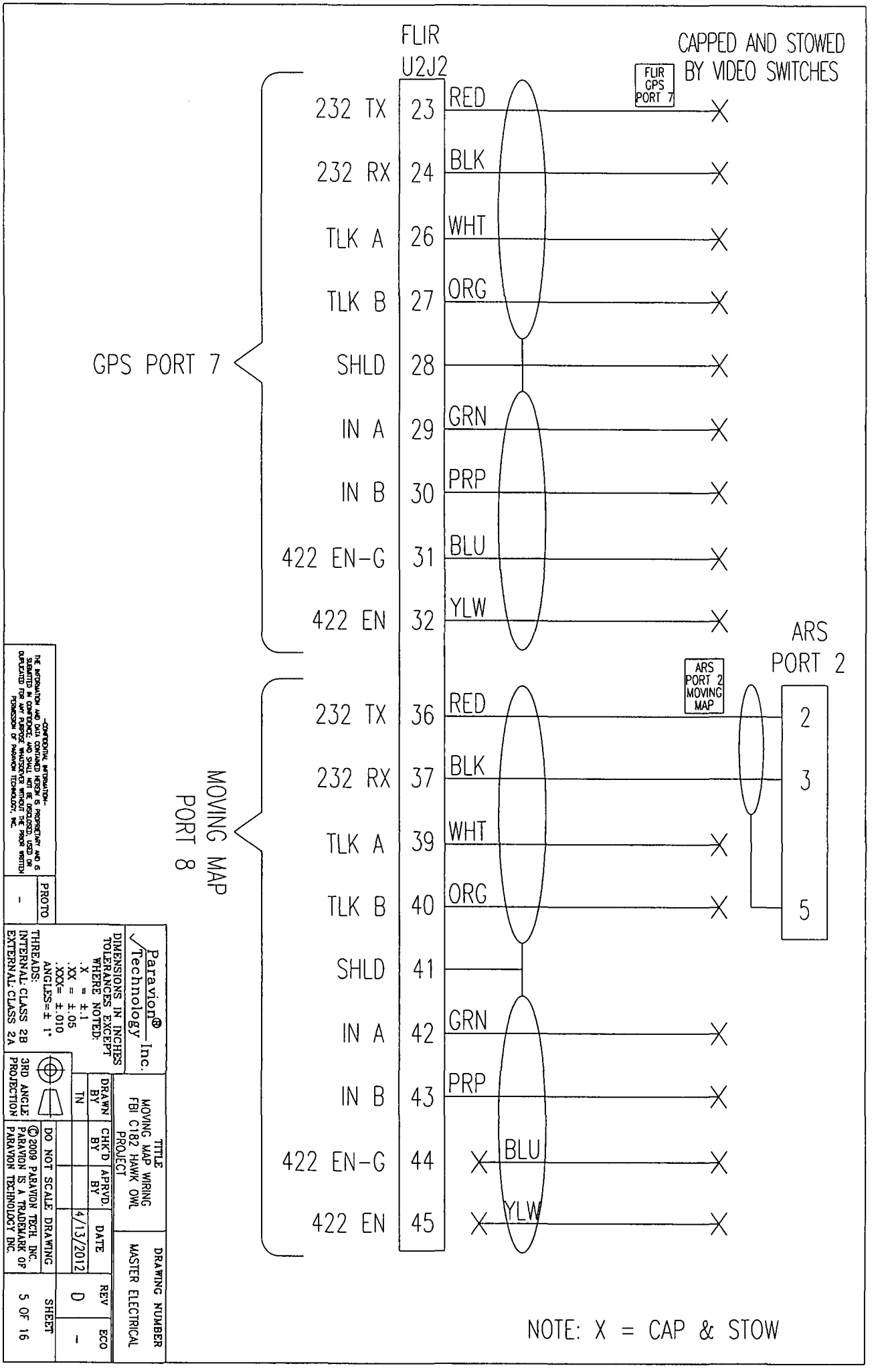
TITLE
OVERHEAD VIDEO SWTCHS
FBI C182 HAWK OWL
PROJECT

DRAWING NUMBER
MASTER ELECTRICAL

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	–

DO NOT SCALE DRAWING

SHEET
4 OF 16



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.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

DRAWN BY	CHK'D BY	APRVD. BY	DATE
TN			4/13/2012

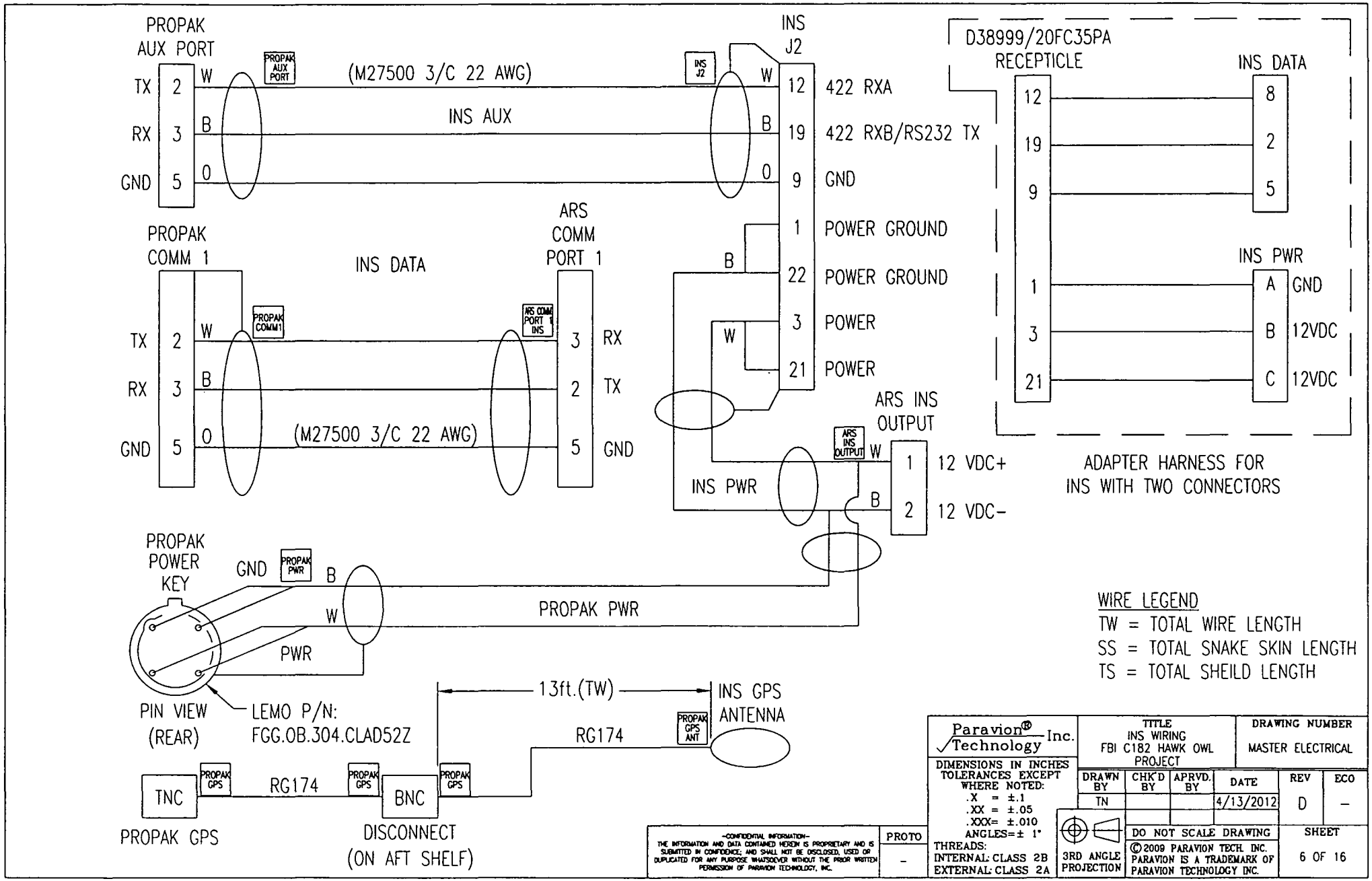
DO NOT SCALE DRAWING

TITLE
MOVING MAP WIRING
FBI C182 HAWK OWL
PROJECT

DRAWING NUMBER
MASTER ELECTRICAL

REV	ECO
D	-

SHEET
5 OF 16


PROPAK AUX PORT
TX 2 W
RX 3 B
GND 5 0
PROPAK AUX PORT
(M27500 3/C 22 AWG)
INS AUX
INS J2
INS J2
W 12 422 RXA
B 19 422 RXB/RS232 TX
0 9 GND
1 POWER GROUND
B
22 POWER GROUND
W
3 POWER
21 POWER
D38999/20FC35PA RECEPTICLE
12
19
9
1
3
21
INS DATA
8
2
5
INS PWR
A GND
B 12VDC
C 12VDC
ADAPTER HARNESS FOR INS WITH TWO CONNECTORS
PROPAK COMM 1
TX 2 W
RX 3 B
GND 5 0
PROPAK COMM1
INS DATA
(M27500 3/C 22 AWG)
ARS COMM PORT 1
ARS COMM PORT 1 INS
3 RX
2 TX
5 GND
ARS INS OUTPUT
ARS INS OUTPUT
W 1 12 VDC+
B 2 12 VDC-
INS PWR
PROPAK POWER KEY
GND
PROPAK PWR
B
W
PROPAK PWR
PWR
PIN VIEW (REAR)
LEMO P/N: FGG.0B.304.CLAD52Z
13ft.(TW)
INS GPS ANTENNA
PROPAK GPS ANT
RG174
TNC
PROPAK GPS
RG174
BNC
PROPAK GPS
PROPAK GPS
PROPAK GPS
DISCONNECT (ON AFT SHELF)
WIRE LEGEND
TW = TOTAL WIRE LENGTH
SS = TOTAL SNAKE SKIN LENGTH
TS = TOTAL SHEILD LENGTH
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.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A
3RD ANGLE PROJECTION
TITLE
INS WIRING
FBI C182 HAWK OWL
PROJECT
DRAWING NUMBER
MASTER ELECTRICAL
DRAWN BY
CHK'D BY
APRVD. BY
DATE
REV
ECO
TN
4/13/2012
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SHEET
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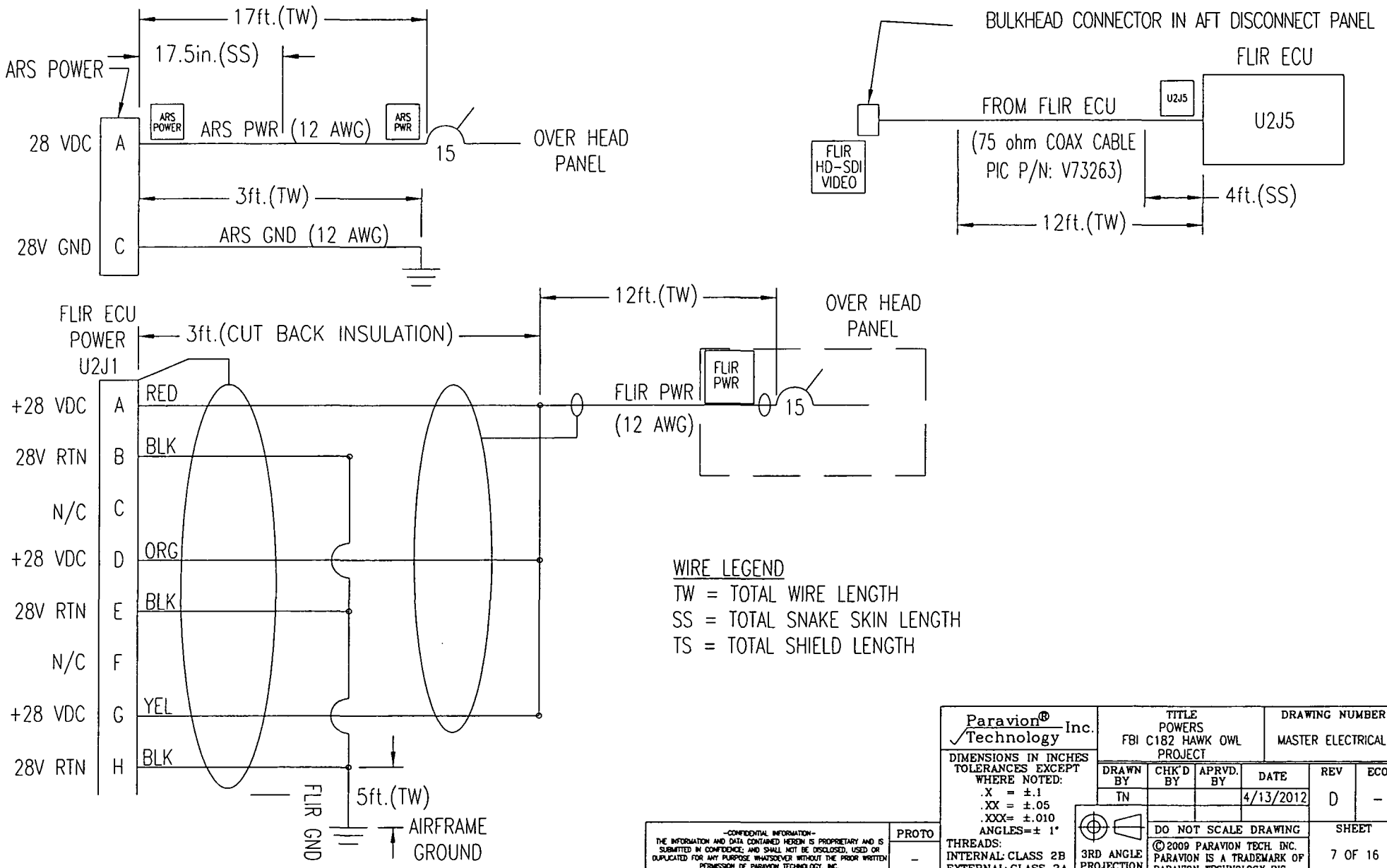

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Technology

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.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

TITLE
POWERS
FBI C182 HAWK OWL
PROJECT

DRAWING NUMBER
MASTER ELECTRICAL

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	–

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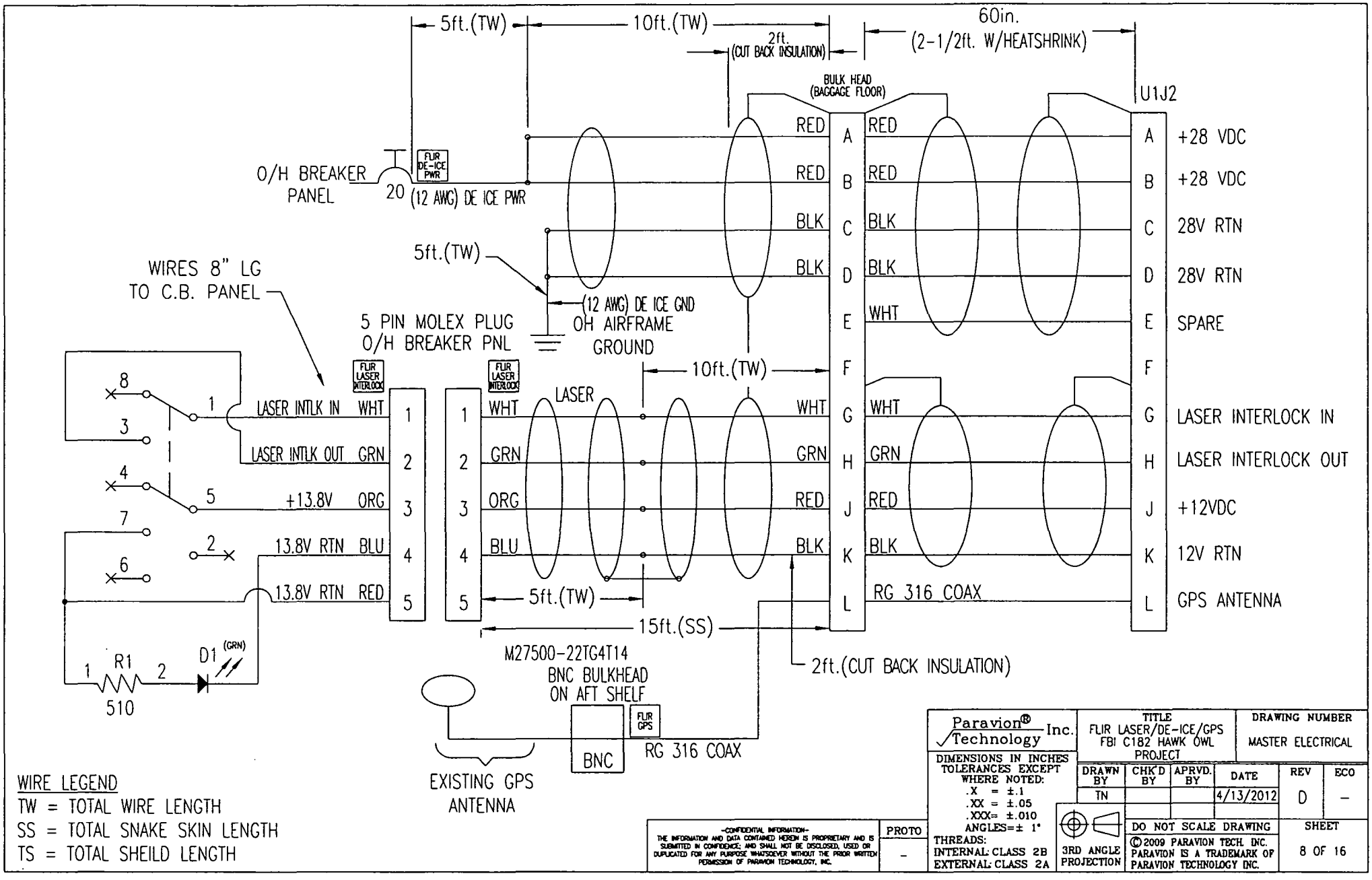
SHEET
7 OF 16



WIRE LEGEND
TW = TOTAL WIRE LENGTH
SS = TOTAL SNAKE SKIN LENGTH
TS = TOTAL SHEILD LENGTH

PROTO
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DIMENSIONS IN INCHES
TOLERANCES EXCEPT
WHERE NOTED:
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.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

TITLE
FLIR LASER/DE-ICE/GPS
FBI C182 HAWK OWL
PROJECT

DRAWING NUMBER
MASTER ELECTRICAL

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	-

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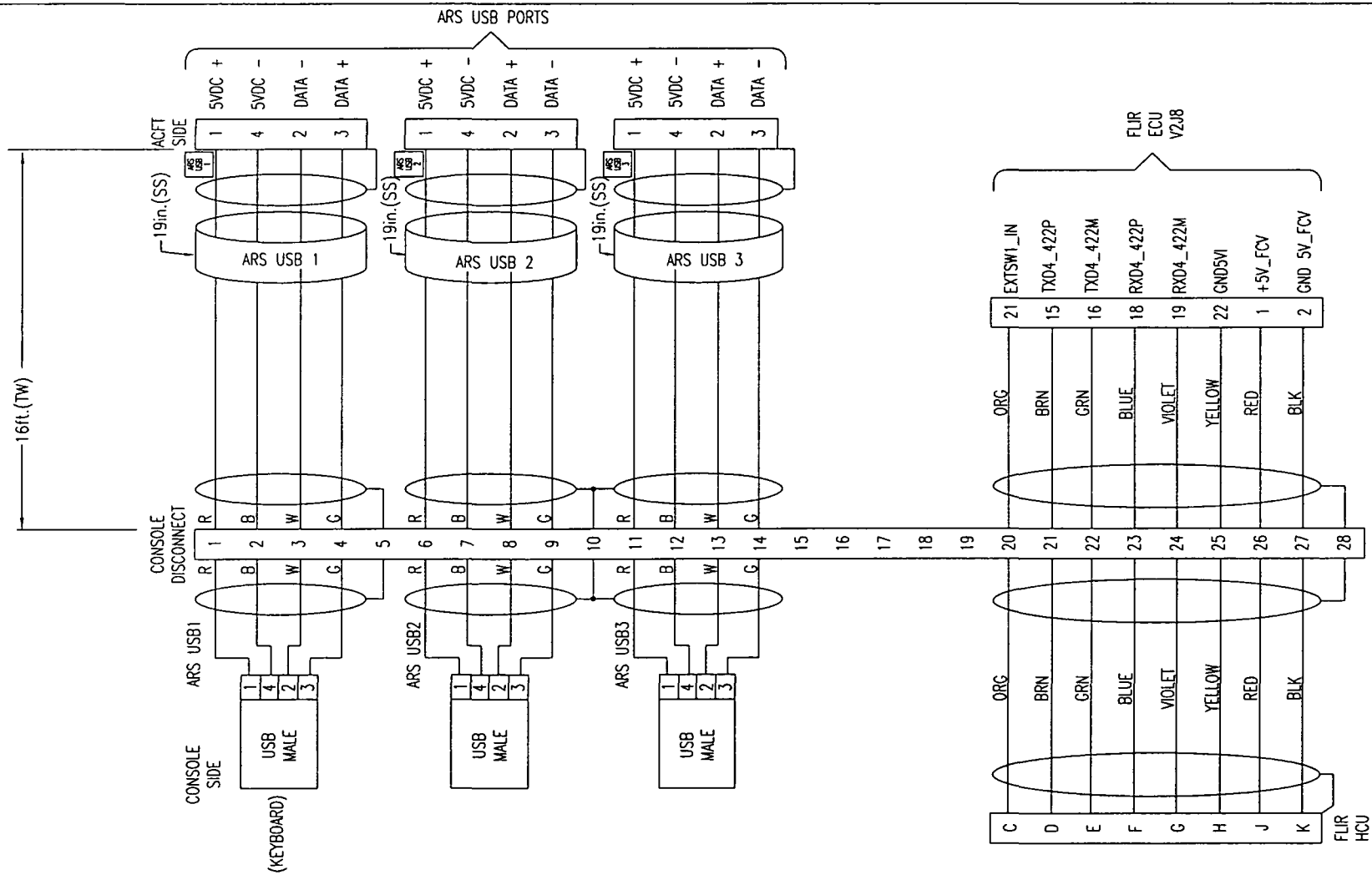
SHEET
8 OF 16



Paravision® Technology Inc.	TITLE: OVERHEAD VIDEO SWTCHS FBI C182 HAWK OWL PROJECT					DRAWING NUMBER: MASTER ELECTRICAL	
DIMENSIONS IN INCHES TOLERANCES EXCEPT WHERE NOTED: .X = ±.1 .XX = ±.05 .XXX= ±.010 ANGLES=± 1° THREADS: INTERNAL: CLASS 2B EXTERNAL: CLASS 2A	DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO	
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3RD ANGLE PROJECTION	DO NOT SCALE DRAWING				SHEET		
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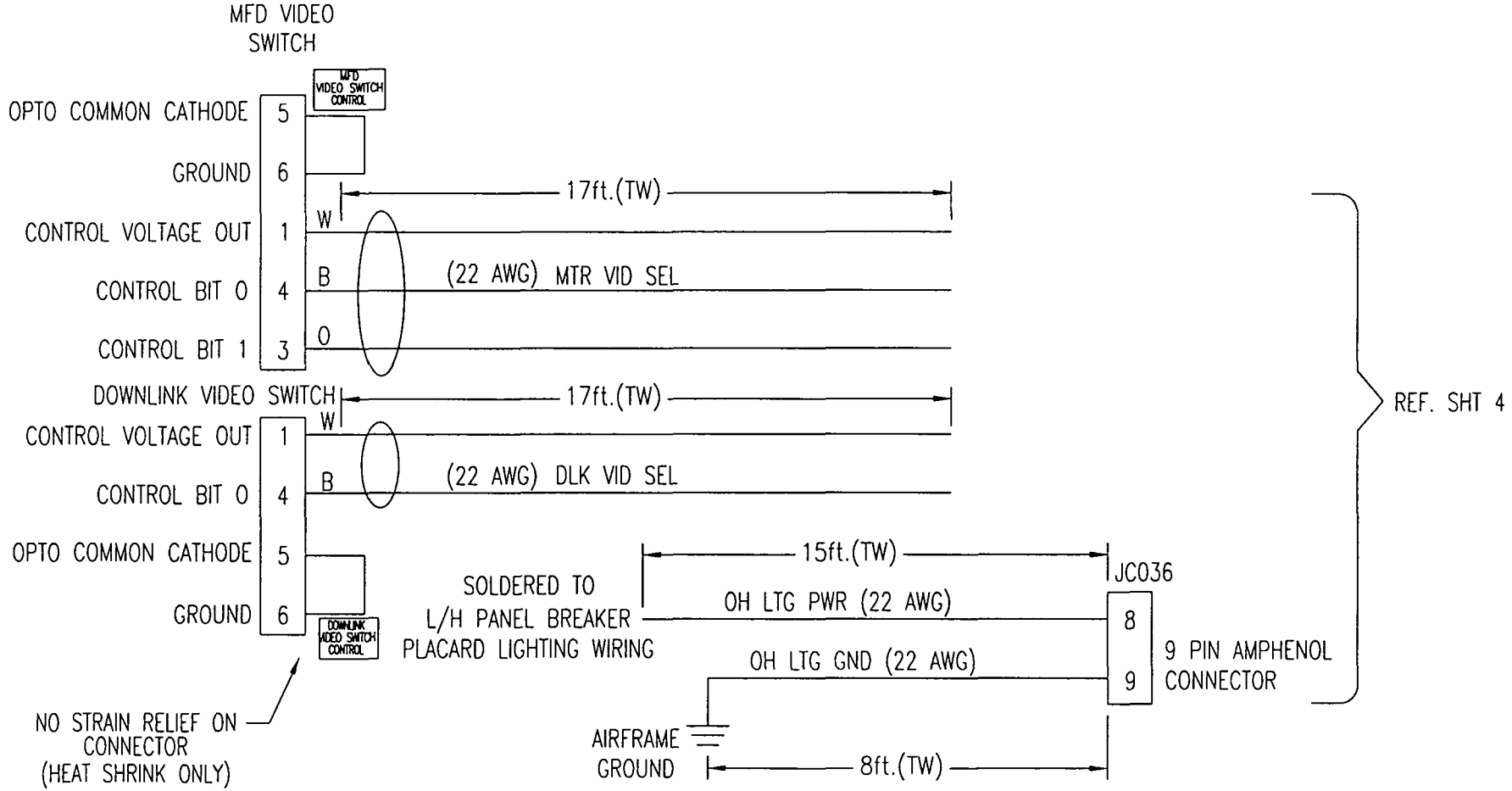

Paravion® Technology Inc.	TITLE: VIDEO DISTRIBUTION FBI C182 HAWK OWL PROJECT				DRAWING NUMBER: MASTER ELECTRICAL		
DIMENSIONS IN INCHES TOLERANCES EXCEPT WHERE NOTED: .X = ±.1 .XX = ±.05 .XXX= ±.010 ANGLES=± 1° THREADS: INTERNAL: CLASS 2B EXTERNAL: CLASS 2A	DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO	
	TN			4/13/2012	D	–	
3RD ANGLE PROJECTION	DO NOT SCALE DRAWING				SHEET		
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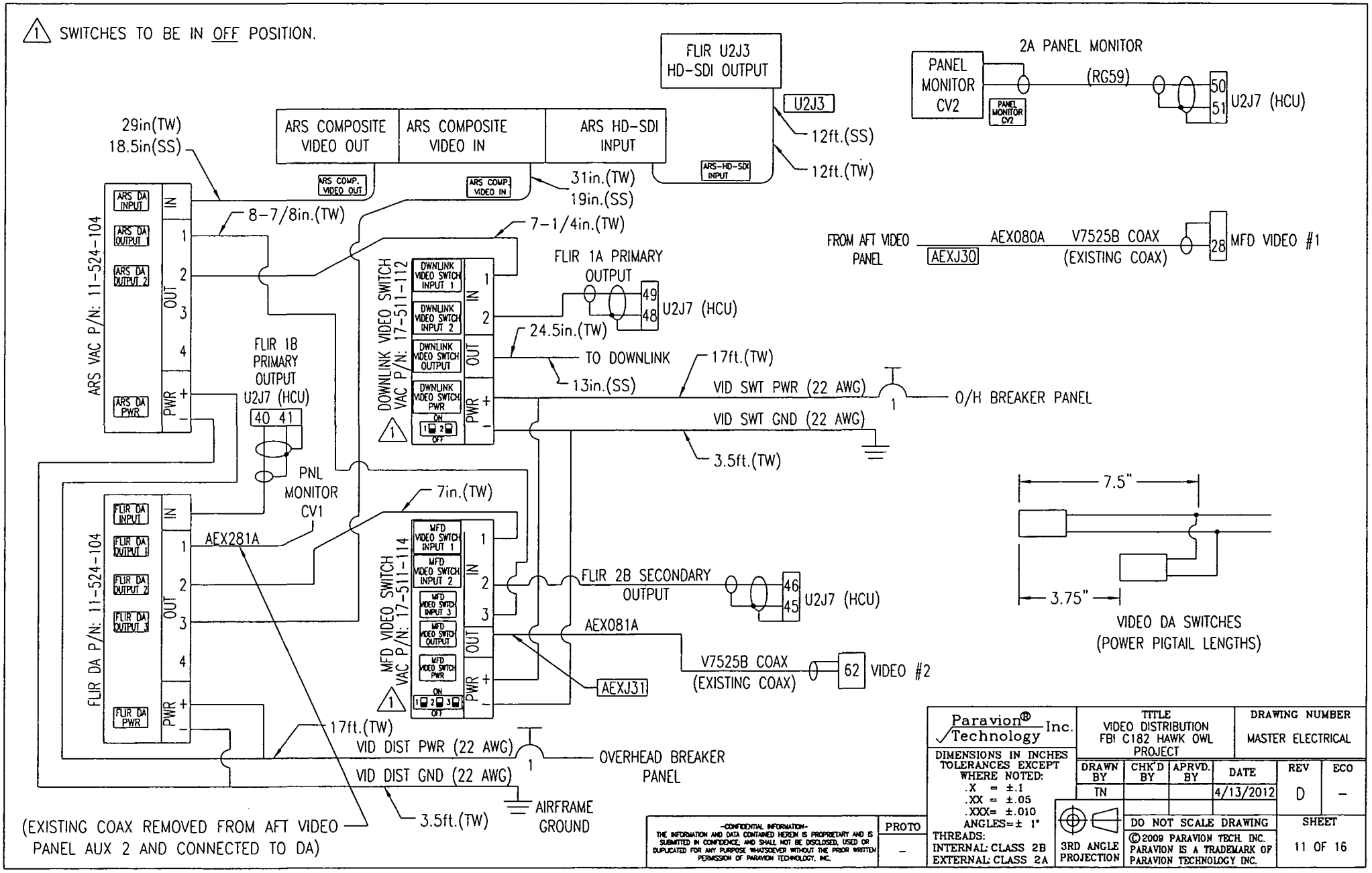

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DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
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.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

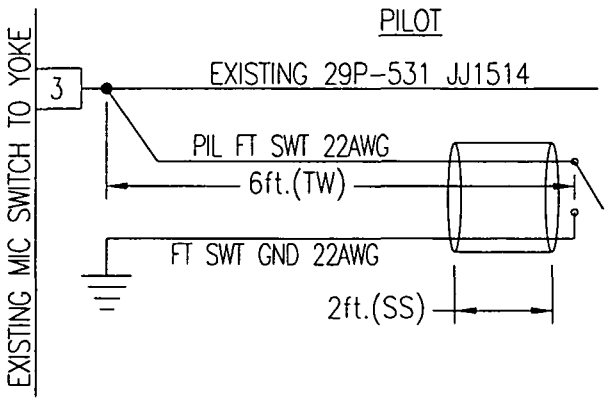
TITLE: VIDEO DISTRIBUTION FBI C182 HAWK OWL PROJECT

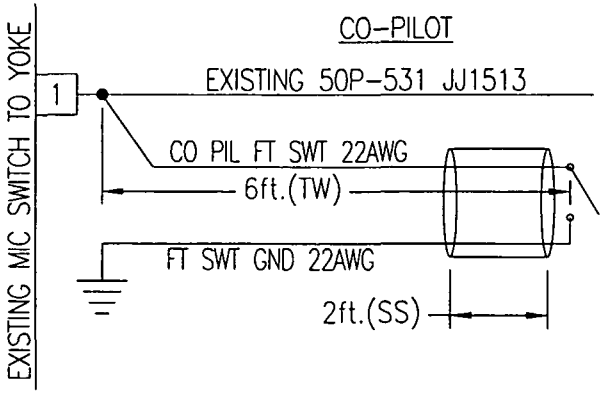
DRAWING NUMBER: MASTER ELECTRICAL

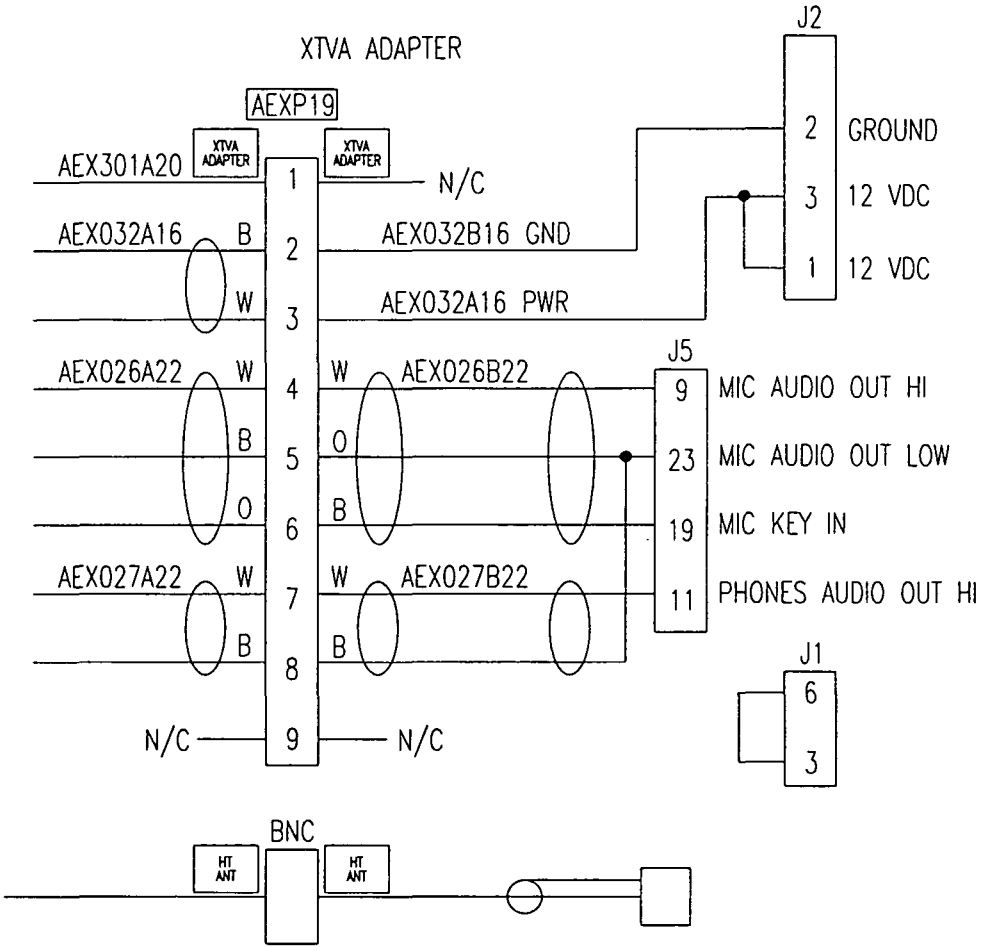
DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	–

DO NOT SCALE DRAWING

SHEET 11 OF 16



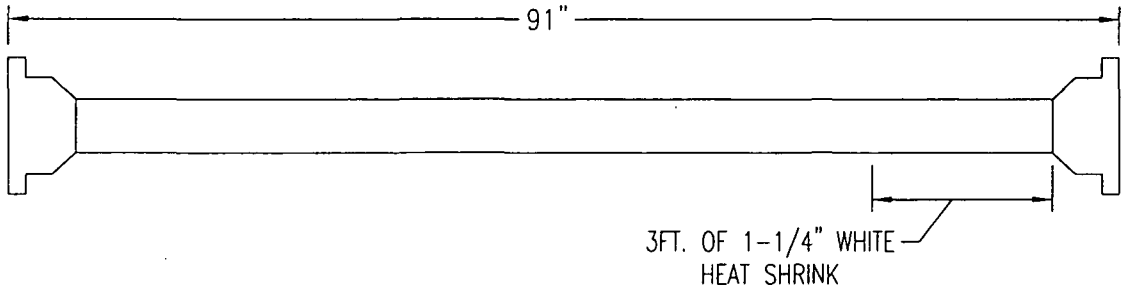


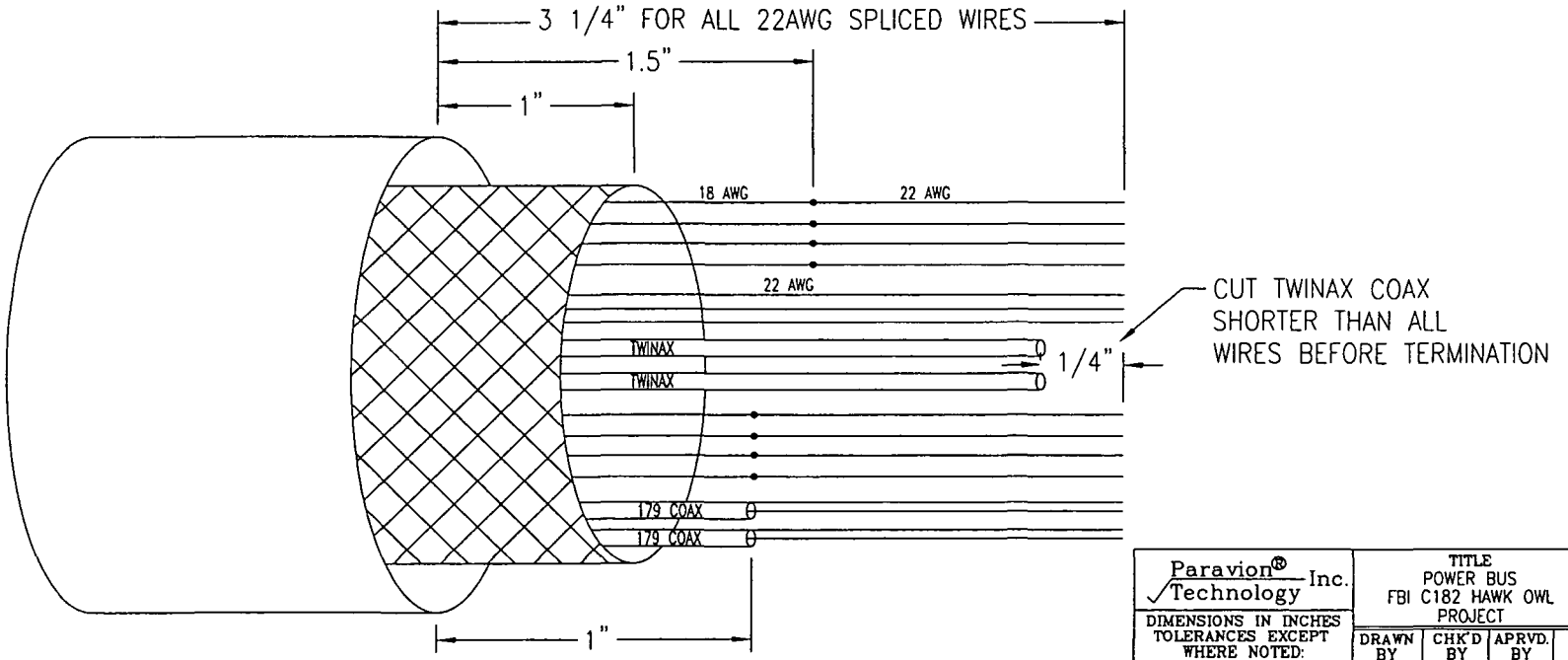


Paravion® Technology Inc.	TITLE: XTVA ADAPTER/FOOT SWITCH FBI C182 HAWK OWL PROJECT				DRAWING NUMBER: MASTER ELECTRICAL		
DIMENSIONS IN INCHES TOLERANCES EXCEPT WHERE NOTED: .X = ±.1 .XX = ±.05 .XXX= ±.010 ANGLES=± 1° THREADS: INTERNAL: CLASS 2B EXTERNAL: CLASS 2A	DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO	
	TN			4/13/2012	D	–	
3RD ANGLE PROJECTION	DO NOT SCALE DRAWING				SHEET: 12 OF 16		

PROTO: –

MAIN IMAGER FLIR GIMBAL CABLE





NOTES:

1. TWINAX SOCKET COME WITH CRIMP INSTRUCTIONS.
2. ALL OTHER SCOKETS ARE: M39029/56-348 (USE CRIMPER M22520/2-01 (BLUE CRIMPER) DIE K40).

PROTO: -

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

TITLE: POWER BUS
FBI C182 HAWK OWL
PROJECT

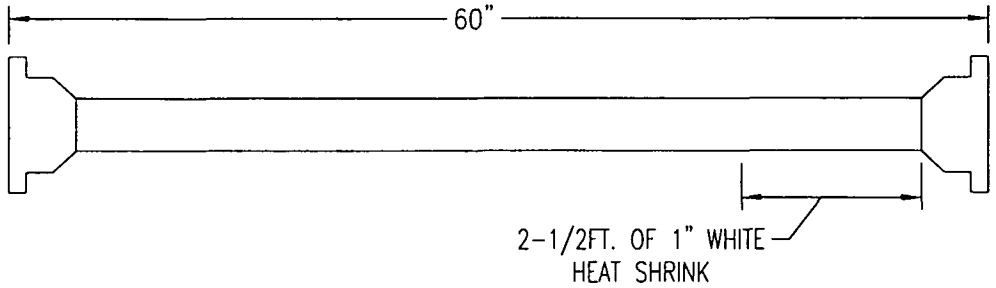
DRAWING NUMBER: MASTER ELECTRICAL

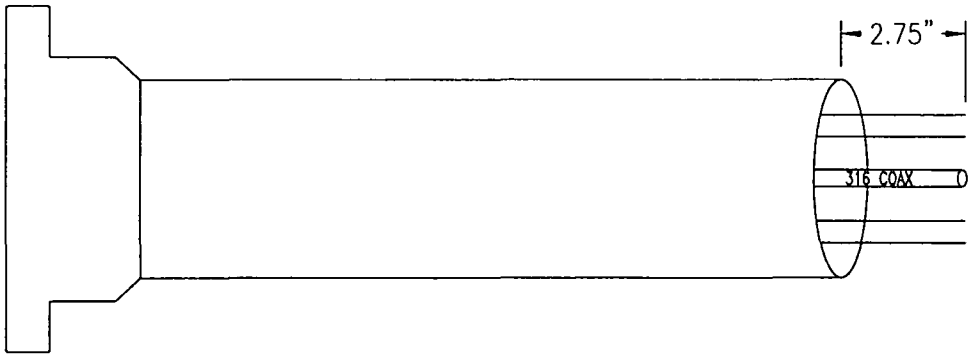
DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	-

DO NOT SCALE DRAWING

SHEET: 13 OF 16

GIMBAL SIDE OF LASER/GPS/DE-ICE CABLE





NOTES:

1. COAX SOCKET COMES WITH CRIMP INSTRUCTIONS.
2. ALL OTHER SCOKETS ARE: M39029/56-352 (USE CRIMPER M22520/1-01 DIE M22520/1-01).

PROTO: -

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

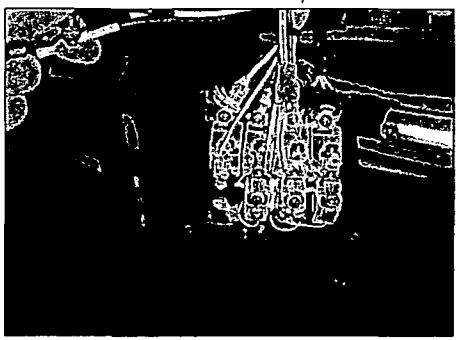
TITLE: POWER BUS
FBI C182 HAWK OWL PROJECT

DRAWING NUMBER: MASTER ELECTRICAL

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	-

DO NOT SCALE DRAWING

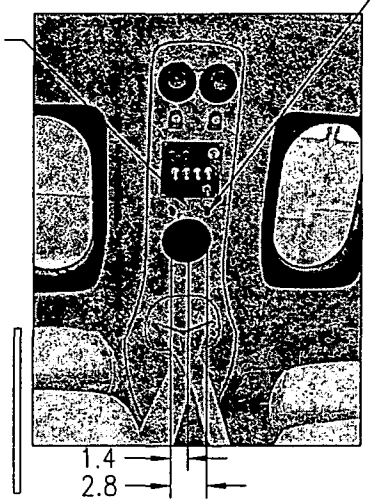
10" OF WIRE SLACK FROM O/H OPENING TO BREAKER PANEL



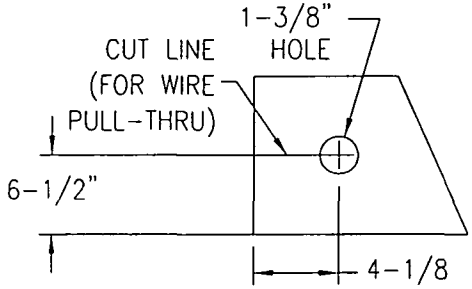
O/H VIDEO SWITCH BREAKER

#8 NUTPLATE

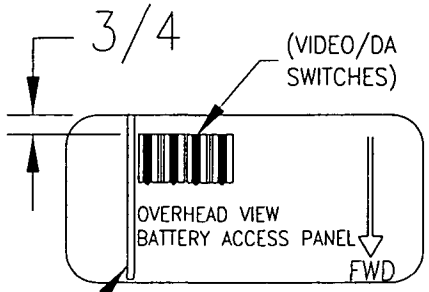
2X POST LIGHTS (CLEARANCE HOLES FOR POST LIGHTS BEHIND PANEL ARE ø.625)



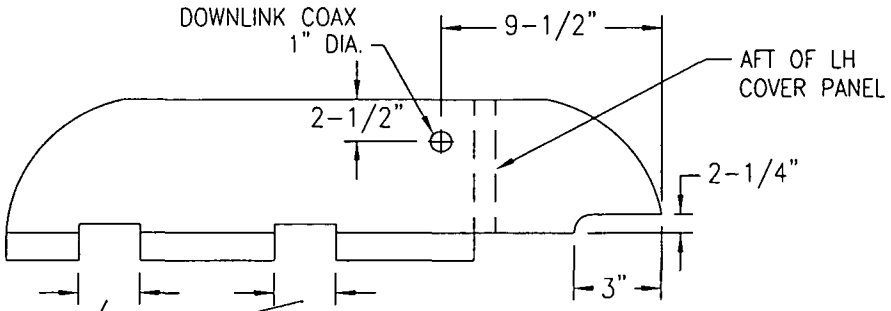
O/H VIDEO SWITCH BREAKER



LH COVER PANEL
(FOR AFT CIRCUIT BREAKERS)



EXISTING AFT BREAKER PANEL SUPPORT

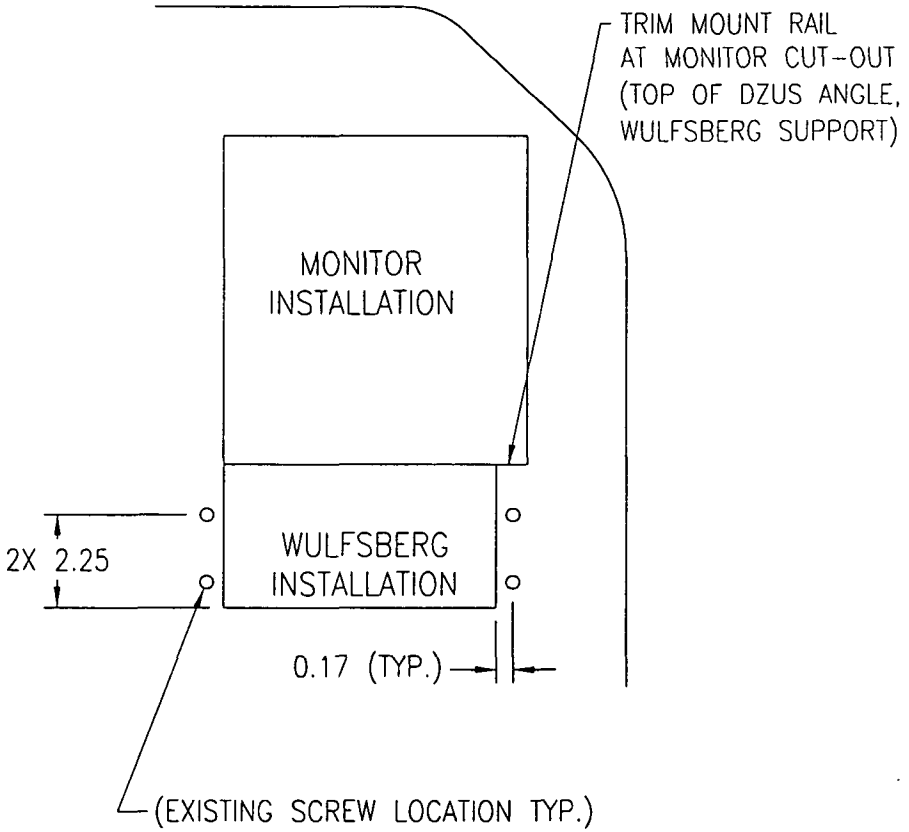


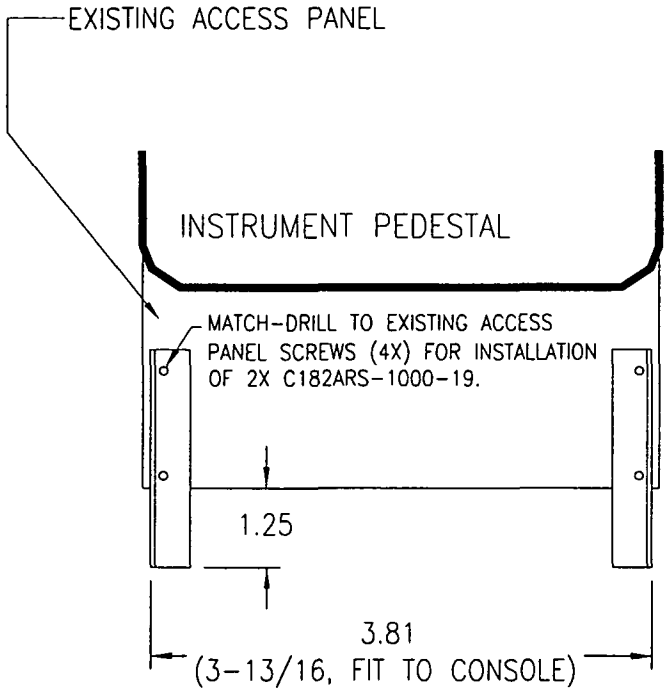
AFT SHELF CLOSE-OUT PANEL (BEHIND ARS)

Paravion® Technology Inc.	TITLE: POWER BUS FBI C182 HAWK OWL PROJECT					DRAWING NUMBER: MASTER ELECTRICAL	
DIMENSIONS IN INCHES TOLERANCES EXCEPT WHERE NOTED: .X = ±.1 .XX = ±.05 .XXX= ±.010 ANGLES=± 1° THREADS: INTERNAL: CLASS 2B EXTERNAL: CLASS 2A	DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
	TN			4/13/2012	D	-
3RD ANGLE PROJECTION	DO NOT SCALE DRAWING				SHEET	
	© 2009 PARAVION TECH. INC. PARAVION IS A TRADEMARK OF PARAVION TECHNOLOGY INC.				15 OF 16	

PROTO: -

INSTRUMENT PANEL, RIGHT SIDE





CONSOLE INSTALLATION

PROTO: –

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

TITLE: RECORDER
FBI C182 HAWK OWL PROJECT

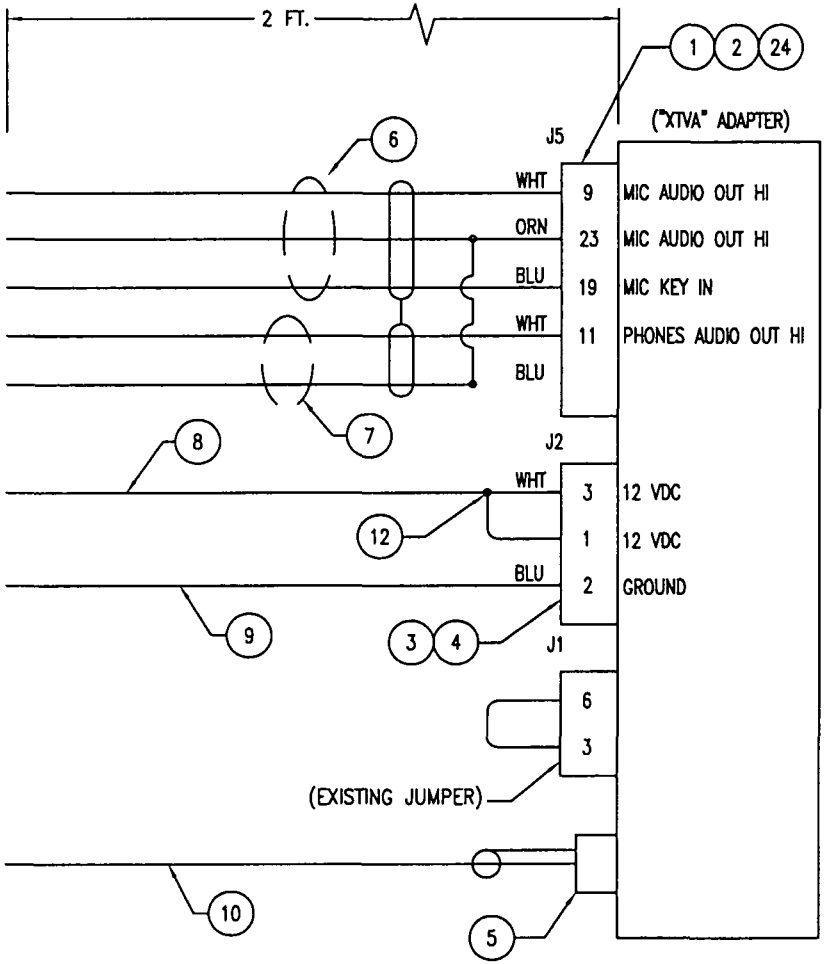
DRAWING NUMBER: MASTER ELECTRICAL

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			4/13/2012	D	–

DO NOT SCALE DRAWING

SHEET: 16 OF 16

SHEET	REV	DATE	DESCRIPTION	BY	APR	CHK
1,2	A	05/11/2012	REMOVE NANO FLASH, REVISE USB CONFIGURATION	REB	REB	LS



WIRE LABEL LEGEND	
ITEM	WIRE LABEL
7	AEX027B22
8	AEX0032PWR16
9	AEX0032GND16
6	AEX025B22
10	AEX026B22

QTY	ITEM	PART NUMBER	DESCRIPTION
38"	26	22TG1T14	WIRE
10ft.	25	M22759/16-20	WIRE, AWG 20
2	24	5205980-1	FASTENER KIT
1	23	190712	MALE BNC CONNECTOR
15"	22	V73263	CABLE
1	21	110249	90° BNC CONNECTOR
4	20	M39029/63-368	CONTACT
1	19	205203-8	D-SUB CONNECTOR 9-PIN
1	18	ES50264-2F	CONNECTOR
1	17	P1011-036	FEMALE USB CABLE
1	16	17-200161 (REF.)	FEMALE BAYONET USB
1	15	PAN-AM-AS-BK	CONNECTOR
38"	14	USB2422	USB WIRE
1	13	206039-1	PLUG
1	12	M83519/1-2	SOLDER SLEEVE
1	11	206070-1	CLAMP
24"	10	RG-400	CABLE, COAX 50 OHM
24"	9	M22759/16-16-9	WIRE, AWG 16
24"	8	M22759/16-16-9	WIRE, AWG 16
24"	7	M27500-22TG2T14	WIRE
62"	6	M27500-22TG3T14	WIRE
1	5	81-115N-1000	CONNECTOR
3	4	45750-1212	CONTACT
1	3	39-01-2040	MOLEX PLUG
32	2	M39029/64-369	MALE CONTACT
1	1	5205208-1	25 PIN MALE SUB-D CONNECTOR

NOTE:

1. LABEL WIRES AS INDICATED.

PROTO: -

Paravion® Technology Inc.

TITLE: C182 CONSOLE WIRING SCHEMATIC

DRAWING NUMBER: C182IRC-3000

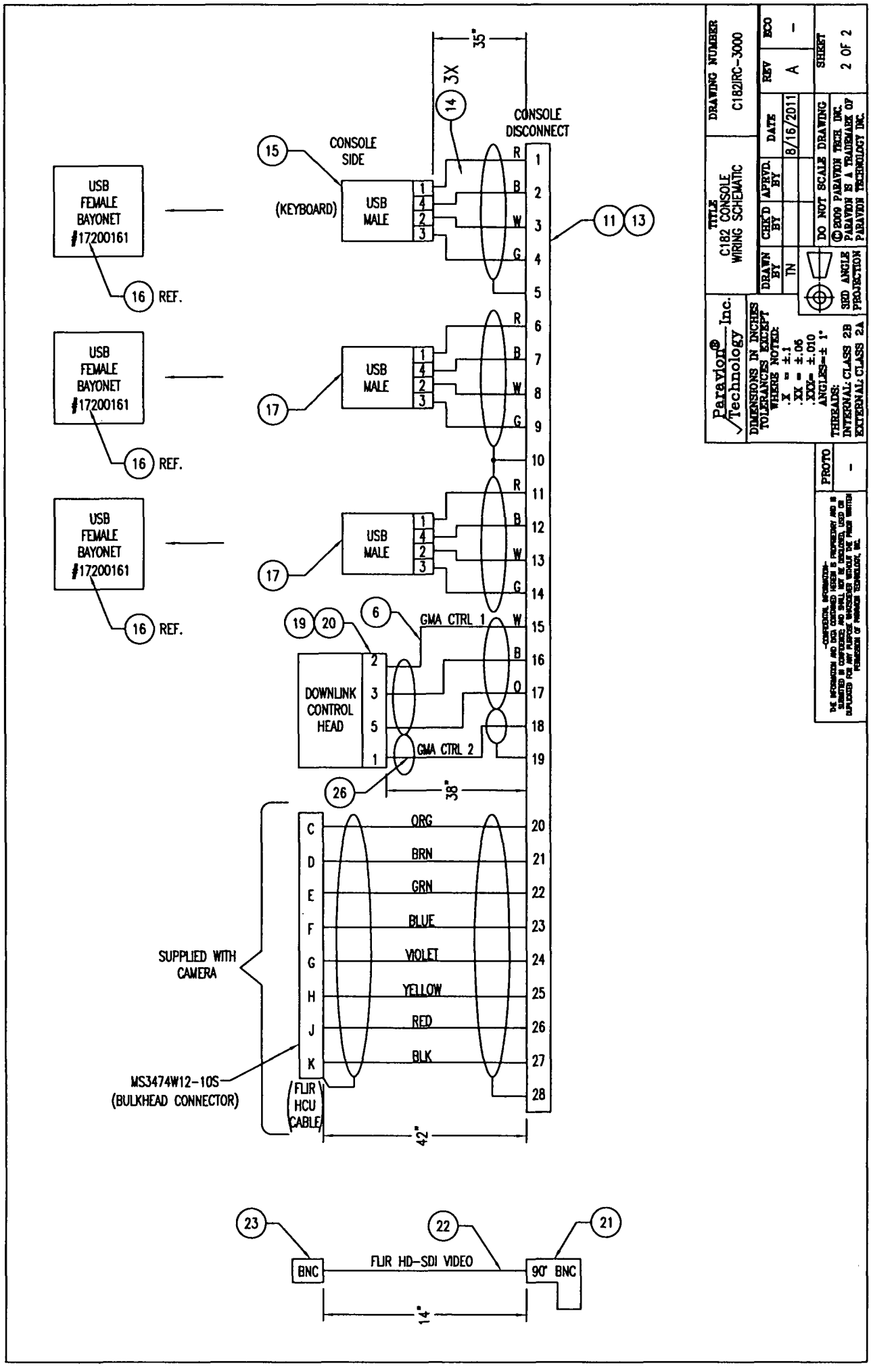
DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.06
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			8/16/2011	A	-

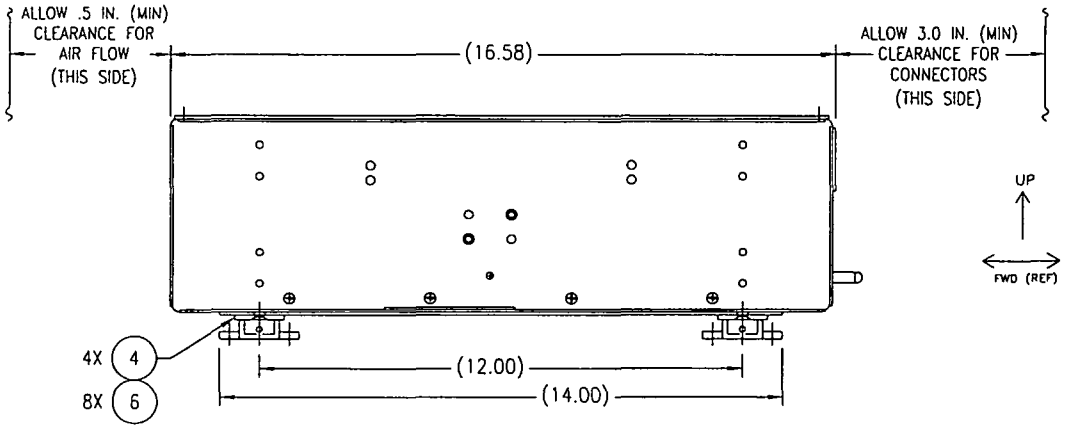
3RD ANGLE PROJECTION

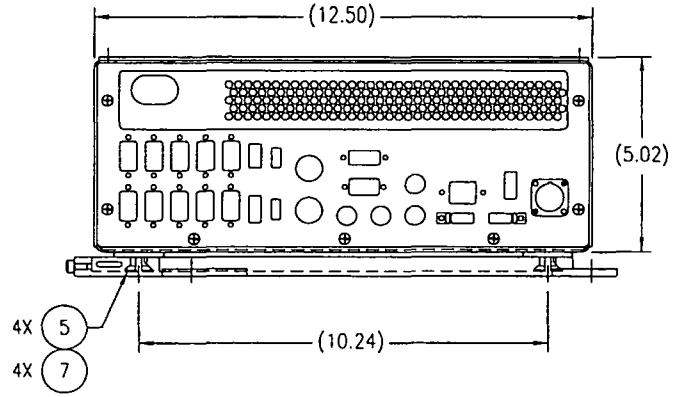
DO NOT SCALE DRAWING

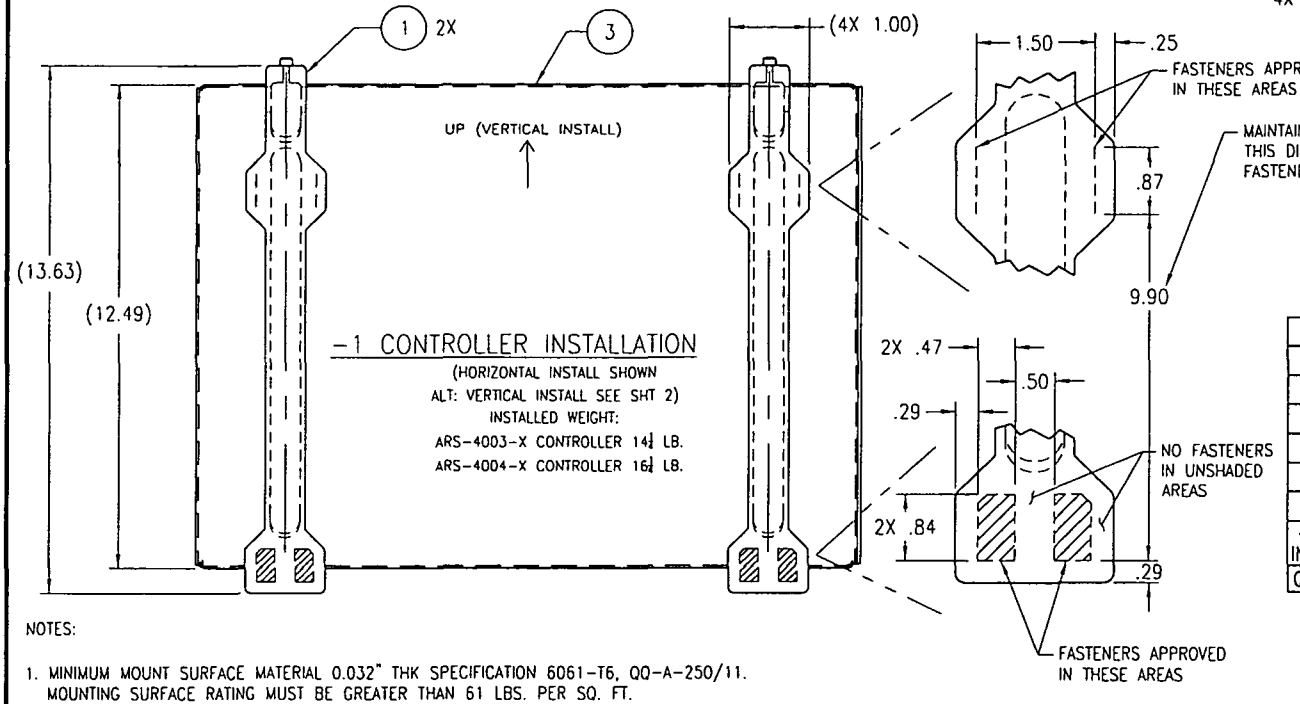
SHEET: 1 OF 2



SHEET	REV	DATE	DESCRIPTION	BY	APR	CHK
1,2	A	5/24/11	REVISED -1 INSTALL: ADDED -2 INSTALL	TN	REB	LS
1,2	B	7/28/2011	ADDED WEIGHTS, -1/ -2 INSTN; ARS4003/4004	REB	REB	LS







-2 INST QTY	-1 INST QTY	ITEM	PART NUMBER	DESCRIPTION
4	4	7	MS24693-69	SCREW
8	8	6	MS24693-50	SCREW
4	4	5	ARS-4130-14	FOOT
4	4	4	ARS-4130-13	PLATE
1	1	3	ARS-400(X)-(X)	CONTROLLER ASSEMBLY (REF.)
2	-	2	ARS-4130-2	CONTROLLER MOUNT ASSEMBLY
-	2	1	ARS-4130-1	CONTROLLER MOUNT ASSEMBLY

NOTES:

1. MINIMUM MOUNT SURFACE MATERIAL 0.032" THK SPECIFICATION 6061-T6, QQ-A-250/11. MOUNTING SURFACE RATING MUST BE GREATER THAN 61 LBS. PER SQ. FT.
2. USE A MINIMUM OF (4) #8 MS35206 OR EQUIVALENT STRENGTH FASTENERS OF APPROPRIATE LENGTH PER RAIL (ARS-4130-X) IN THE LARGEST RECTANGULAR PATTERN POSSIBLE.

PROTO: -

Paravion® Technology Inc.

TITLE: CONTROLLER INSTALLATION

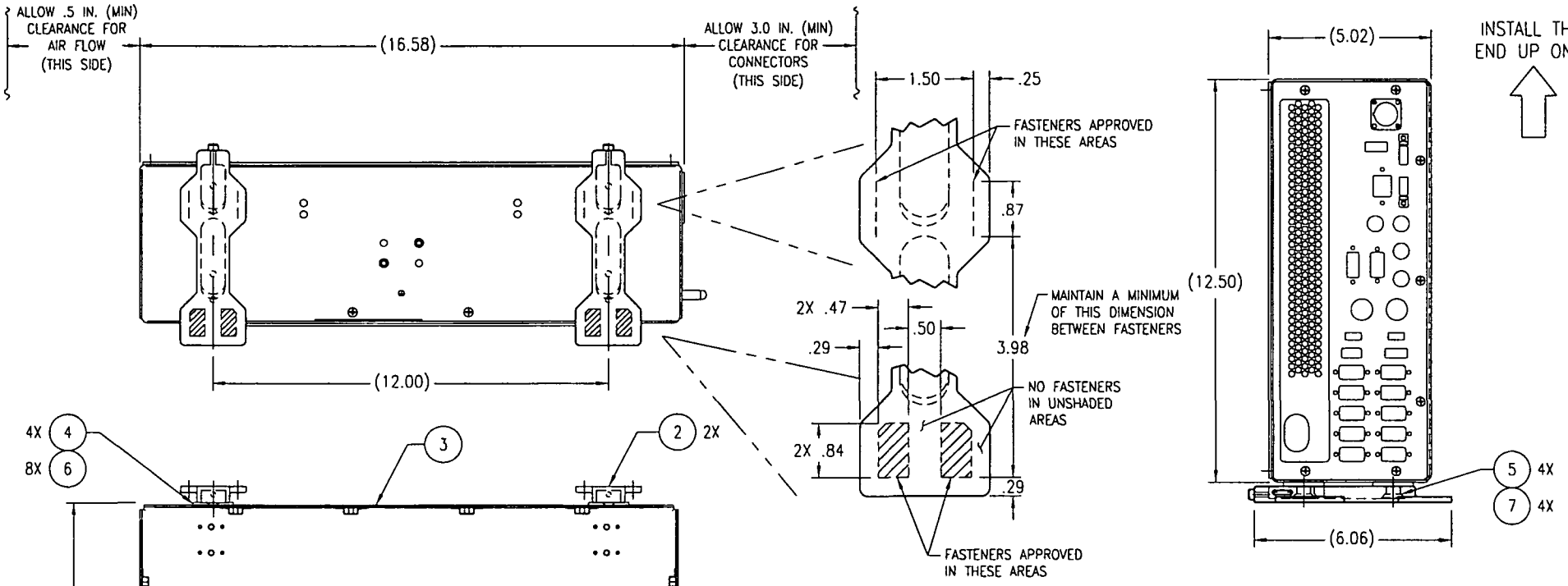
DRAWING NUMBER: ARS-214

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	5/23/11	B	-

3RD ANGLE PROJECTION

DO NOT SCALE DRAWING



-2 CONTROLLER INSTALLATION

(VERTICAL INSTALL SHOWN)
INSTALLED WEIGHT:
ARS-4003-X CONTROLLER 14 LB.
ARS-4004-X CONTROLLER 16 LB.

PROTO
–

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

TITLE: CONTROLLER INSTALLATION

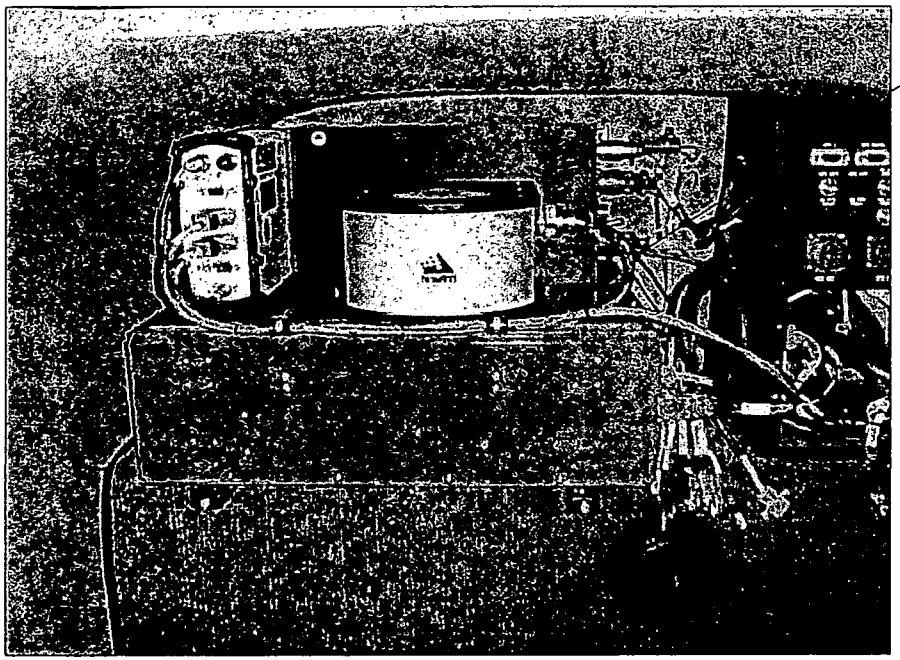
DRAWING NUMBER: ARS-214

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	5/23/11	B	–

DO NOT SCALE DRAWING

SHEET 2 OF 2

SHEET	REV	DATE	DESCRIPTION	BY	APR	CHK
1	A	9/8/2011	ADDED -2 ASSY.	TN		



-2 ASSEMBLY
(PICTURE FOR REFERENCE ONLY
SEE SHT 2 FOR DETAILS)

-2 ASSY QTY	-1 ASSY QTY	ITEM	PART NUMBER	DESCRIPTION
10	–	20	MS3367-4-0	4" WIRE TIE
1	–	19	ARS-3610-3	CABLE ASSEMBLY
1	–	18	ARS-3610-2	CABLE ASSEMBLY
1	–	17	ARS-3610-1	CABLE ASSEMBLY
3	–	16	NAS1149DN632J	WASHER
3	–	15	25004	3/8 NYLON CLAMP
8	8	14	MS35206-231	SCREW
6	6	13	MS35206-226	SCREW
4	4	12	MS21042L3	NUT
4	4	11	NAS1149D0332J	WASHER
4	4	10	MS35207-265	SCREW
2	2	9	M4 X 8mm C.S. PH	SCREW ZINC PLATED OR S.S. (COMMERCIAL)
4	4	8	MS27039-08-05	SCREW
–	–	7	NOT USED	
4	4	6	IR-620-2	SPACER
1	1	5	ARS-4130-12	PLATE
1	1	4	ARS-4130-10	PLATE
1	1	3	MCHPTCBOS3N21	DOWNLINK BOX (COBHAM GMS PROD.) (CUSTOMER SUPPLIED)
1	1	2	HG1700-H58	IMU- LASER RING GYRO UNIT
1	1	1	PROPAK-V3-RT2I	GPS INTERFACE

NOTES:

1. APPLY LOCTITE 640 (P/N:64031) THREAD LOCKING COMPOUND.

PROTO: –

Paravion® Technology Inc.

TITLE: IMU, GPS, & DOWNLINK ASSEMBLY ARS CONTROLLER

DRAWING NUMBER: ARS-232

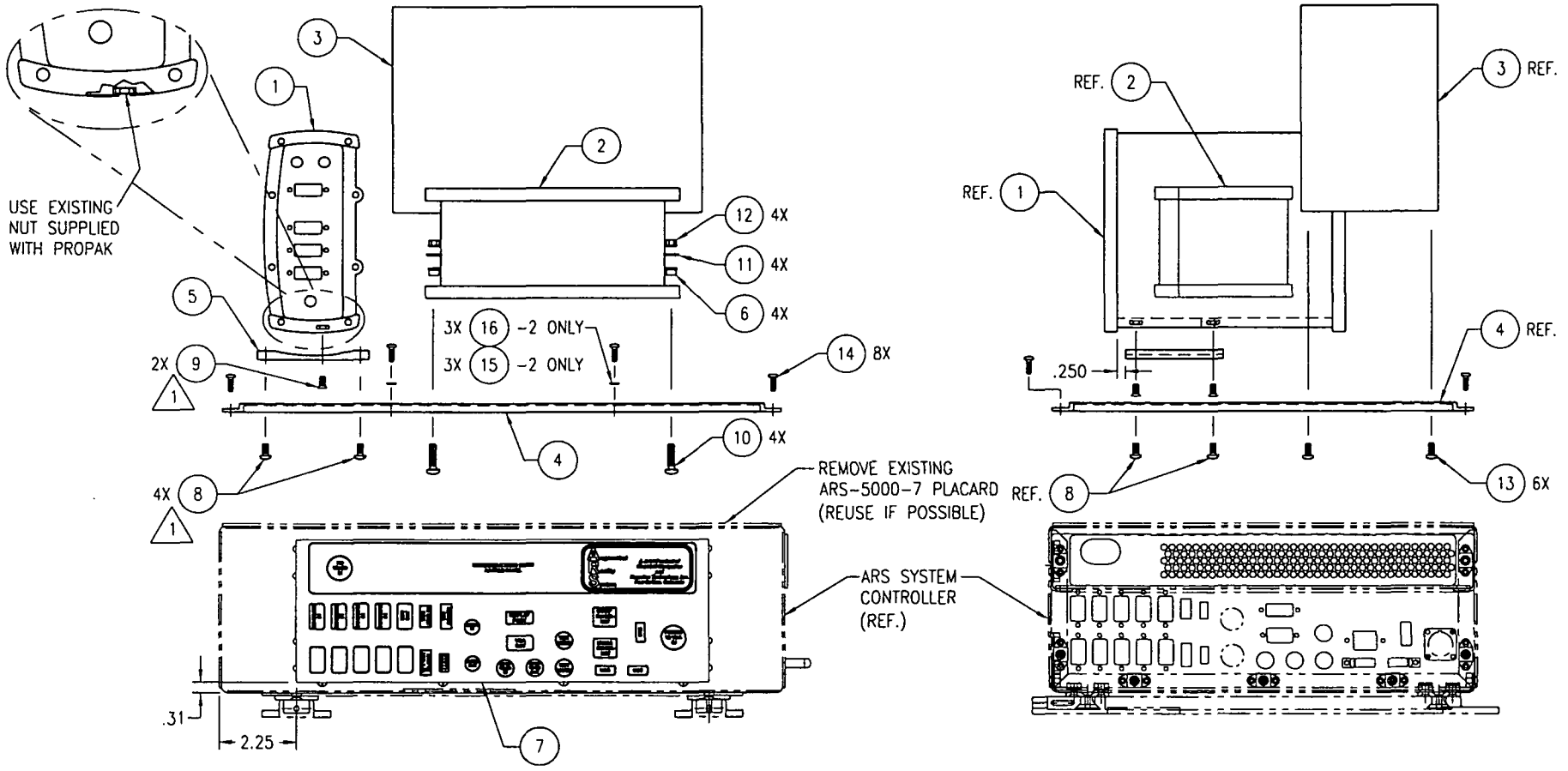
DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN			3/15/11	A	–

3RD ANGLE PROJECTION

DO NOT SCALE DRAWING

SHEET: 1 OF 2



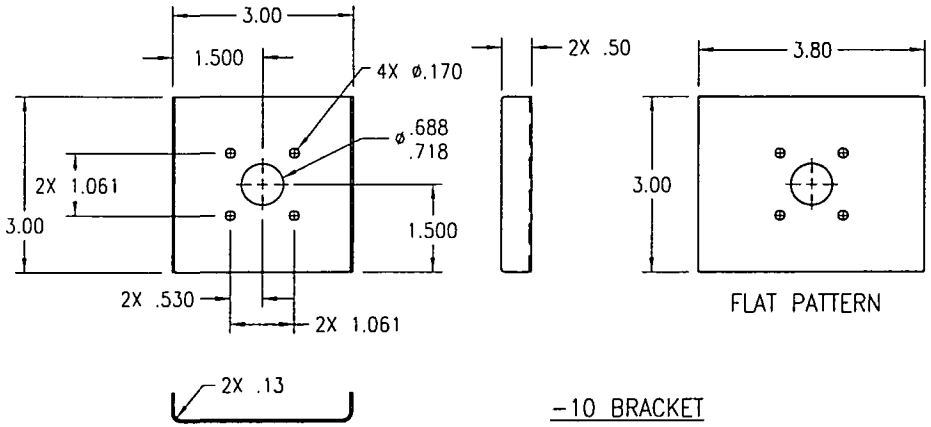
-1 ASSEMBLY

(-2 ADDS CABLE ASSEMBLIES)

Paravion® Technology Inc.	TITLE: INS, GPS, & DOWNLINK ASSEMBLY ARS CONTROLLER			DRAWING NUMBER: ARS-232		
DIMENSIONS IN INCHES TOLERANCES EXCEPT WHERE NOTED: .X = ±.1 .XX = ±.05 .XXX= ±.010 ANGLES=± 1° THREADS: INTERNAL: CLASS 2B EXTERNAL: CLASS 2A	DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
	TN			3/15/11	A	–
3RD ANGLE PROJECTION	DO NOT SCALE DRAWING				SHEET	
					2 OF 2	

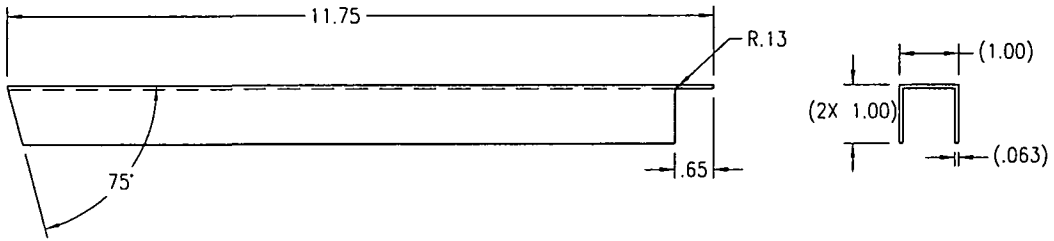
PROTO: –

SHEET	REV	DATE	DESCRIPTION	BY	APR	CHK
	A	7/27/2011	UPDATE TO CURRENT CONFIG; MATERIALS, FIN.	TN		
7,12	B	8/16/2011	ADDED PART -30 & SHT 12; REMOVED ø.159 HOLE FROM -24	TN		
1,2	C	9/9/2011	ADDED BLACK POWDER COAT FINISH TO -10,-11,-12,-13,-14	TN		



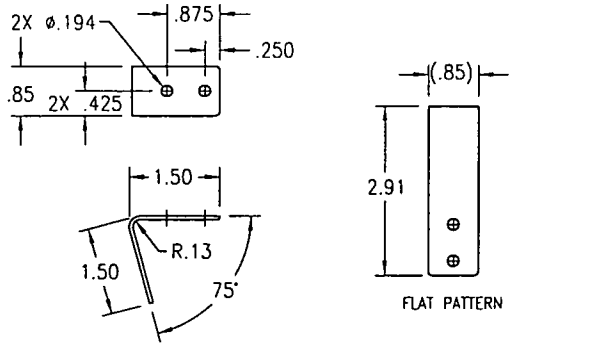
-10 BRACKET

MAT'L: .04" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303 OR
EPOXY POLAMIDE PRIMER PER MIL-P-23377
(BUILD 1)
(DOWNLINK OMNI ANTENNA MOUNT)



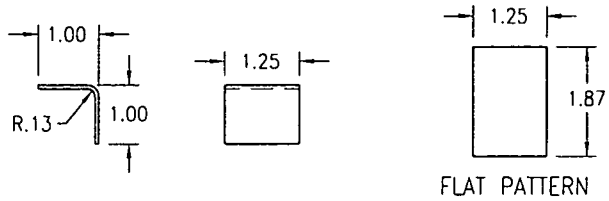
-11 CHANNEL

MAT'L: 1" X 1" X .063" THK 6063-T52 ALUMINUM EXTRUSION
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303 OR
EPOXY POLAMIDE PRIMER PER MIL-P-23377
(BUILD 1)
(SHELF SUPPORT MATES WITH 12)



-12 BRACKET

MAT'L: .063" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303 OF
EPOXY POLAMIDE PRIMER PER MIL-P-23377
(BUILD 1)
(SHELF SUPPORT MATES WITH 11)



-13 BRACKET

MAT'L: .063" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303 OR
EPOXY POLAMIDE PRIMER PER MIL-P-23377
(BUILD 1)
(LOWER SHELF SUPPORT MATES WITH 14)

NOTES:

1. BREAK ALL SHARP EDGES.
2. ALL UNSPECIFIED RADII TO BE .13 MIN. O.N.O.

PROTO: -

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

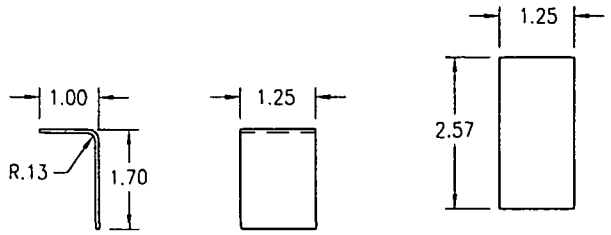
TITLE
MOUNT PARTS
FBI HAWK OWL
PROJECT

DRAWING NUMBER
C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	-

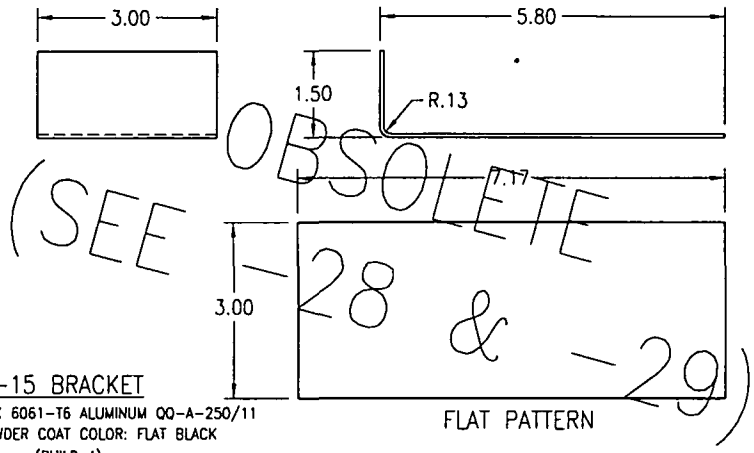
DO NOT SCALE DRAWING

SHEET
1 OF 13



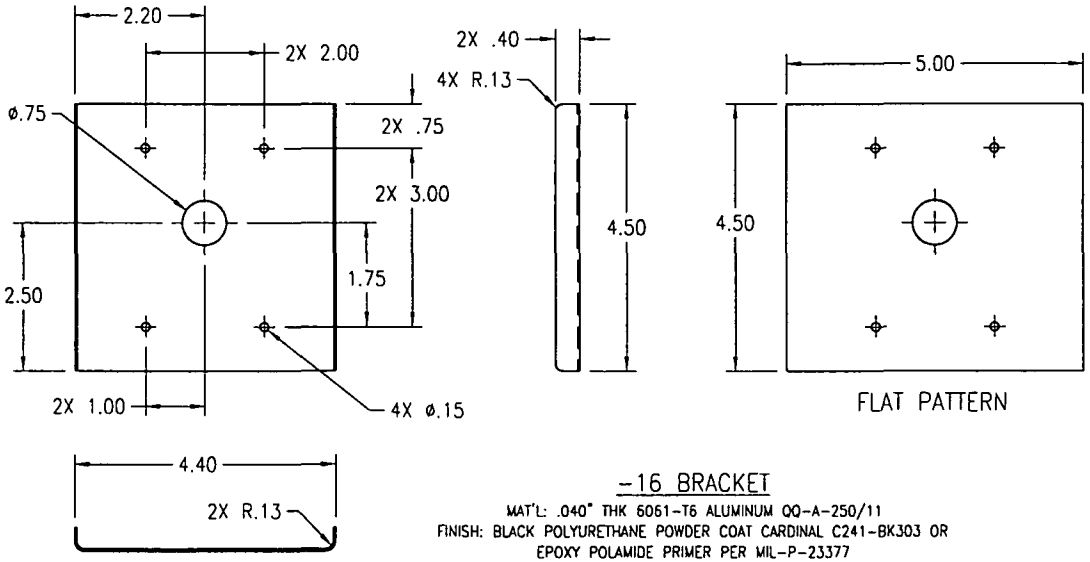
-14 BRACKET

MAT'L: .063" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303 OR
EPOXY POLAMIDE PRIMER PER MIL-P-23377
(BUILD 1)
(LOWER SHELF SUPPORT MATES WITH 13)



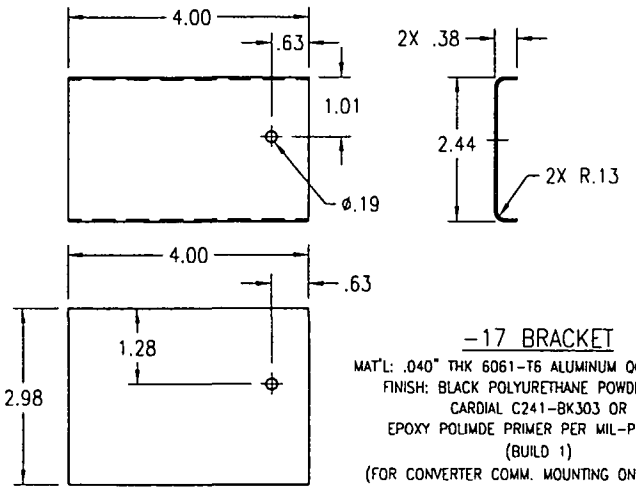
-15 BRACKET

MAT'L: .063" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: POWDER COAT COLOR: FLAT BLACK
(BUILD 4)
(MOUNTS VIDEO SWITCHES)



-16 BRACKET

MAT'L: .040" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303 OR
EPOXY POLAMIDE PRIMER PER MIL-P-23377
(BUILD 1)
(FOR DOWNLINK ANTENNA MOUNTING)



-17 BRACKET

MAT'L: .040" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT
CARDIAL C241-BK303 OR
EPOXY POLIMDE PRIMER PER MIL-P-23377
(BUILD 1)
(FOR CONVERTER COMM. MOUNTING ON CONSOLE)

PROTO
-

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

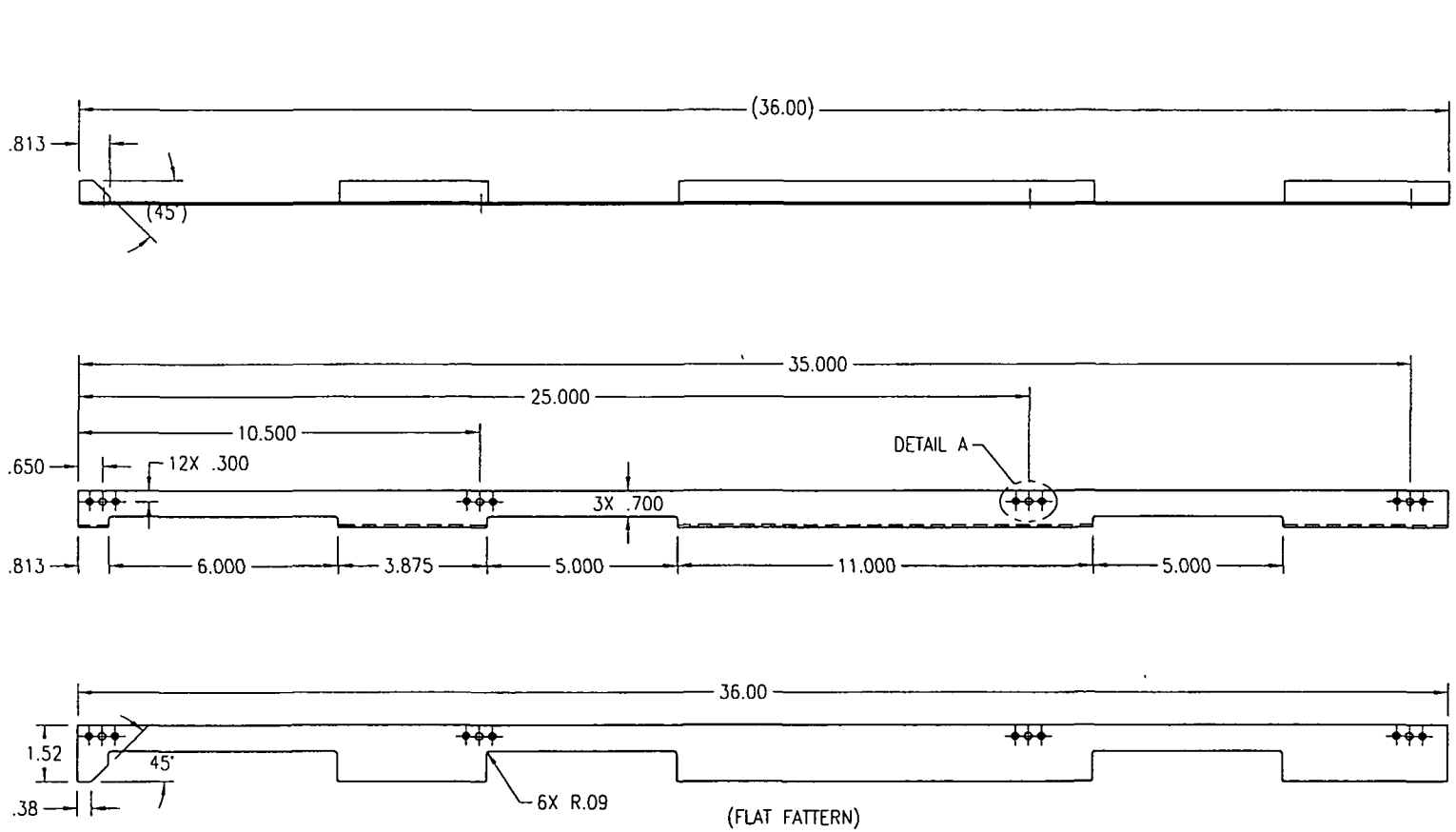
TITLE
MOUNT PARTS
FBI HAWK OWL
PROJECT

DRAWING NUMBER
C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	-

DO NOT SCALE DRAWING

SHEET
2 OF 13



-18R R/H BRACKET

MAT'L: .060" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303
(MOUNTS CONSOLE TO FLOOR)

PROTO: -

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

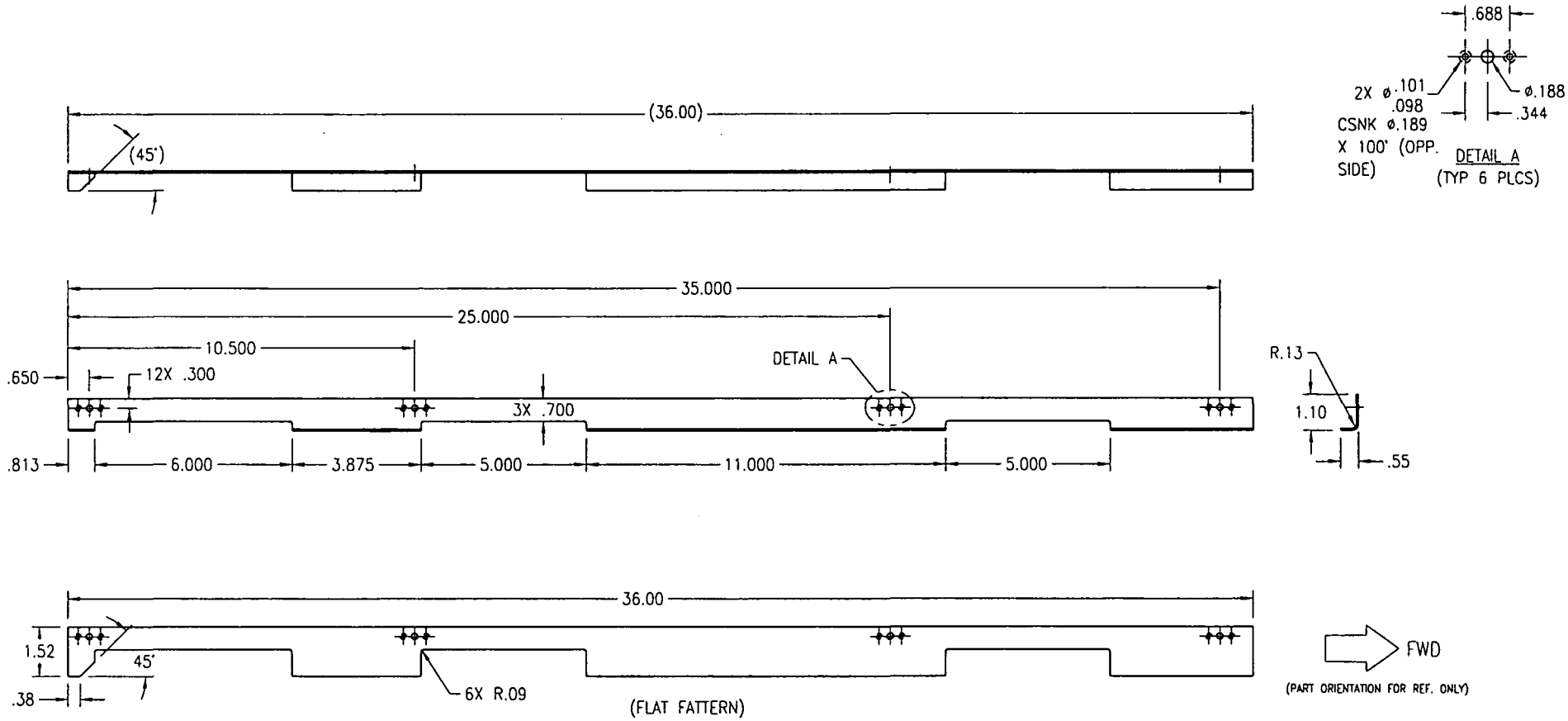
3RD ANGLE PROJECTION

TITLE: MOUNT PARTS FBI HAWK OWL PROJECT

DRAWING NUMBER: C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	-

DO NOT SCALE DRAWING



-18L L/H BRACKET

MAT'L: .060" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303
(MOUNTS CONSOLE TO FLOOR)

PROTO: –

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

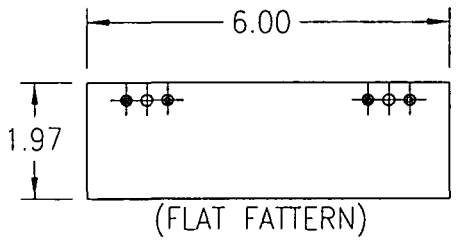
3RD ANGLE PROJECTION

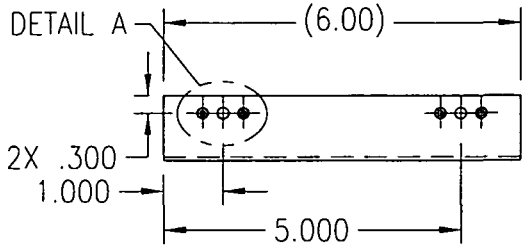
TITLE: MOUNT PARTS FBI HAWK OWL PROJECT

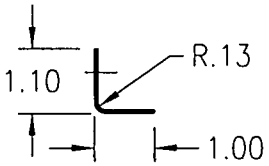
DRAWING NUMBER: C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	–

DO NOT SCALE DRAWING

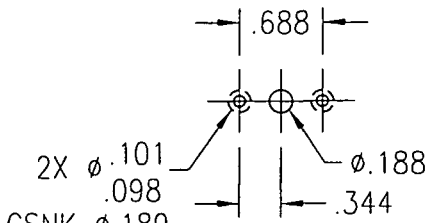






-19 BRACKET

MAT'L: .063" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303
(BUILD 2 PER AIRCRAFT)
(MOUNTS CONSOLE TO FLOOR)



DETAIL A
(SCALE 2/1)

PROTO
-

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

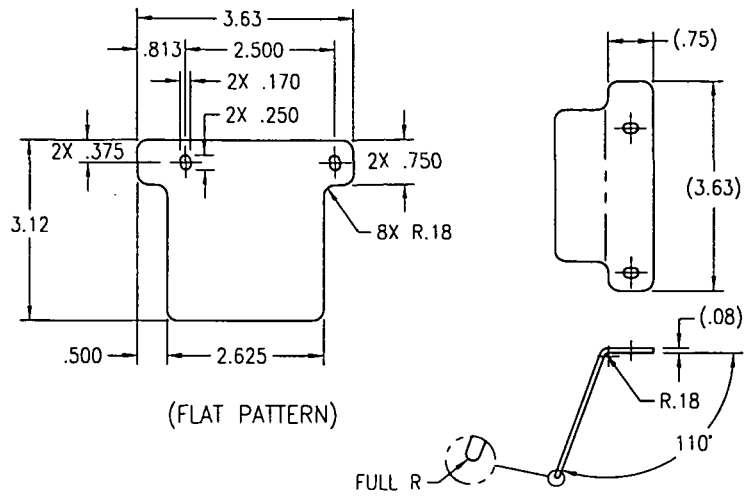
TITLE
MOUNT PARTS
FBI HAWK OWL
PROJECT

DRAWING NUMBER
C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	-

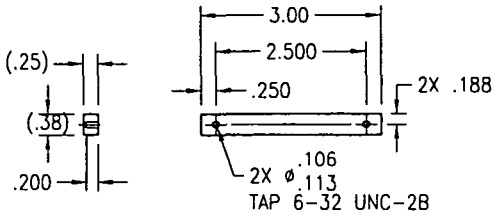
DO NOT SCALE DRAWING

SHEET
5 OF 13



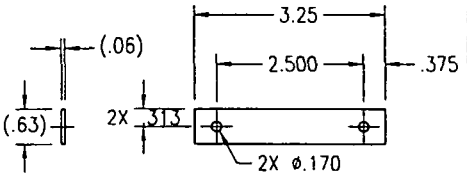
-20 BRACKET

SUGGESTED MAT'L: .08" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303
(BUILD 1)



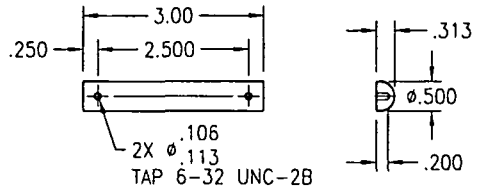
-22 BAR

SUGGESTED MAT'L: .38" X .25" SQ 6061-T6 ALUMINUM QQ-A-200/8
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303
(BUILD 1)



-23 DOUBLER

SUGGESTED MAT'L: .05" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303
(BUILD 1)



-21 BAR

SUGGESTED MAT'L: ø.50" 6061-T6 ALUMINUM QQ-A-200/8
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303
(BUILD 1)

PROTO
-

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

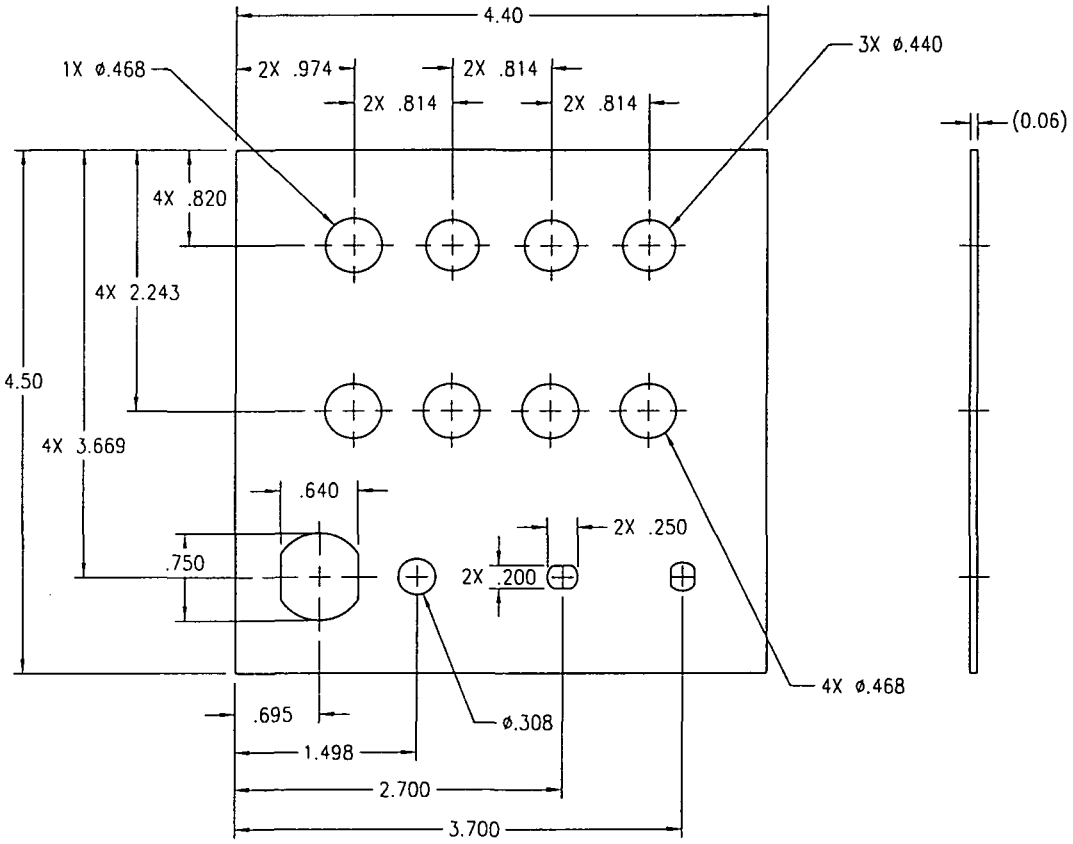
TITLE
MOUNT PARTS
FBI HAWK OWL
PROJECT

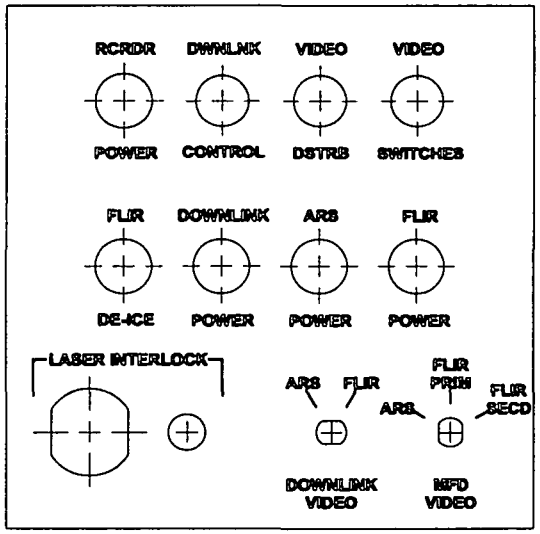
DRAWING NUMBER
C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	-

DO NOT SCALE DRAWING

SHEET
6 OF 13





ENGRAVED PANEL

-24 C.B. PANEL

SUGGESTED MAT'L: .06" THK 6061-T6 ALUMINUM QQ-A-250/11

FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303

(BUILD 1)

PROTO

-

Paravion® Technology Inc.

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TOLERANCES EXCEPT WHERE NOTED:
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.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

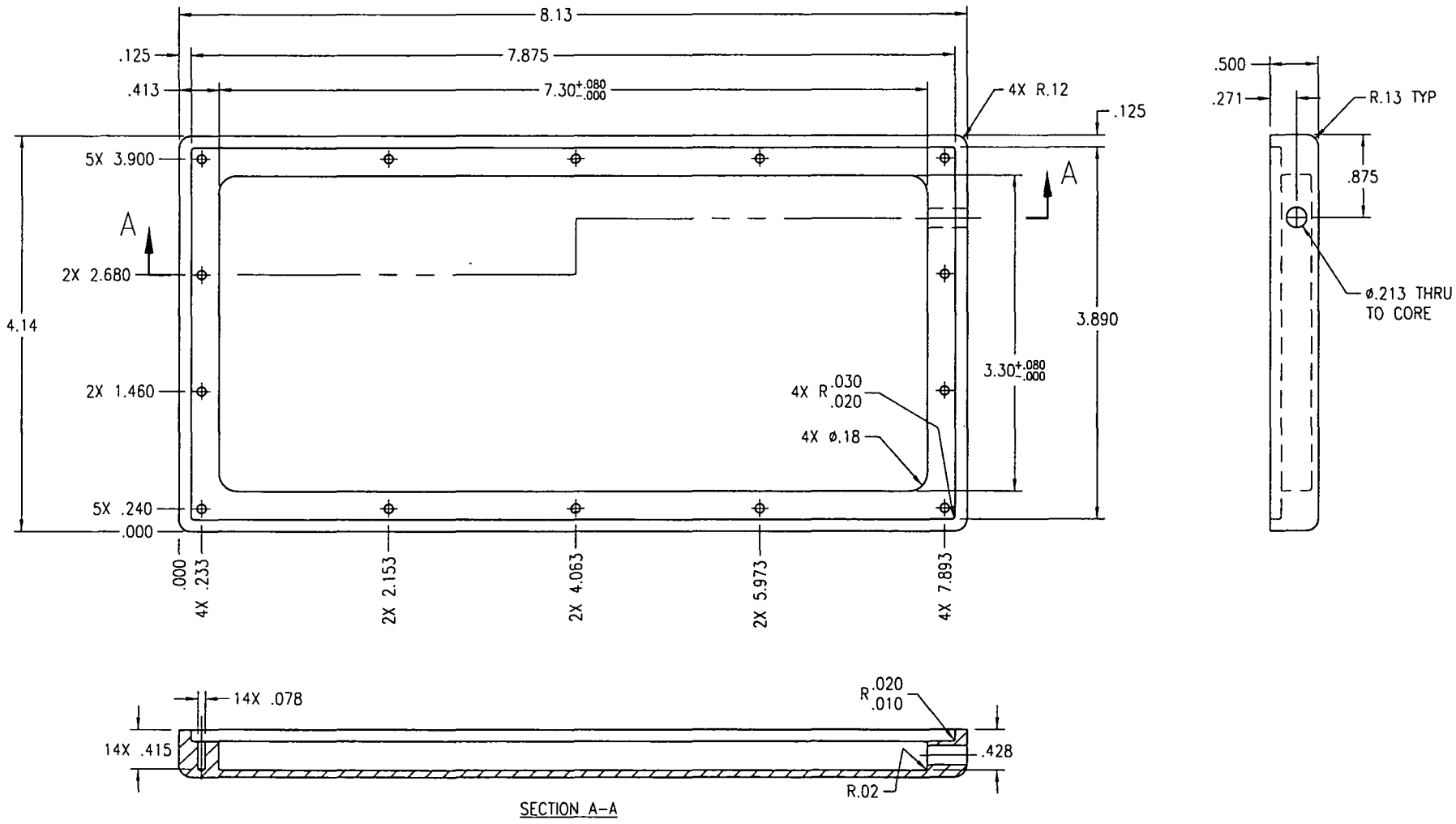
TITLE
MOUNT PARTS
FBI HAWK OWL
PROJECT

DRAWING NUMBER
C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	

DO NOT SCALE DRAWING

SHEET
7 OF 13



SECTION A-A

-25 BASE PLATE

MAT'L: 8-1/8" X 4-1/4" X 1/2" THK PVC SHEET PLASTIC

COLOR: GREY

PROTO: –

Paravion® Technology Inc.

DIMENSIONS IN INCHES
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.X = ±.1
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.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

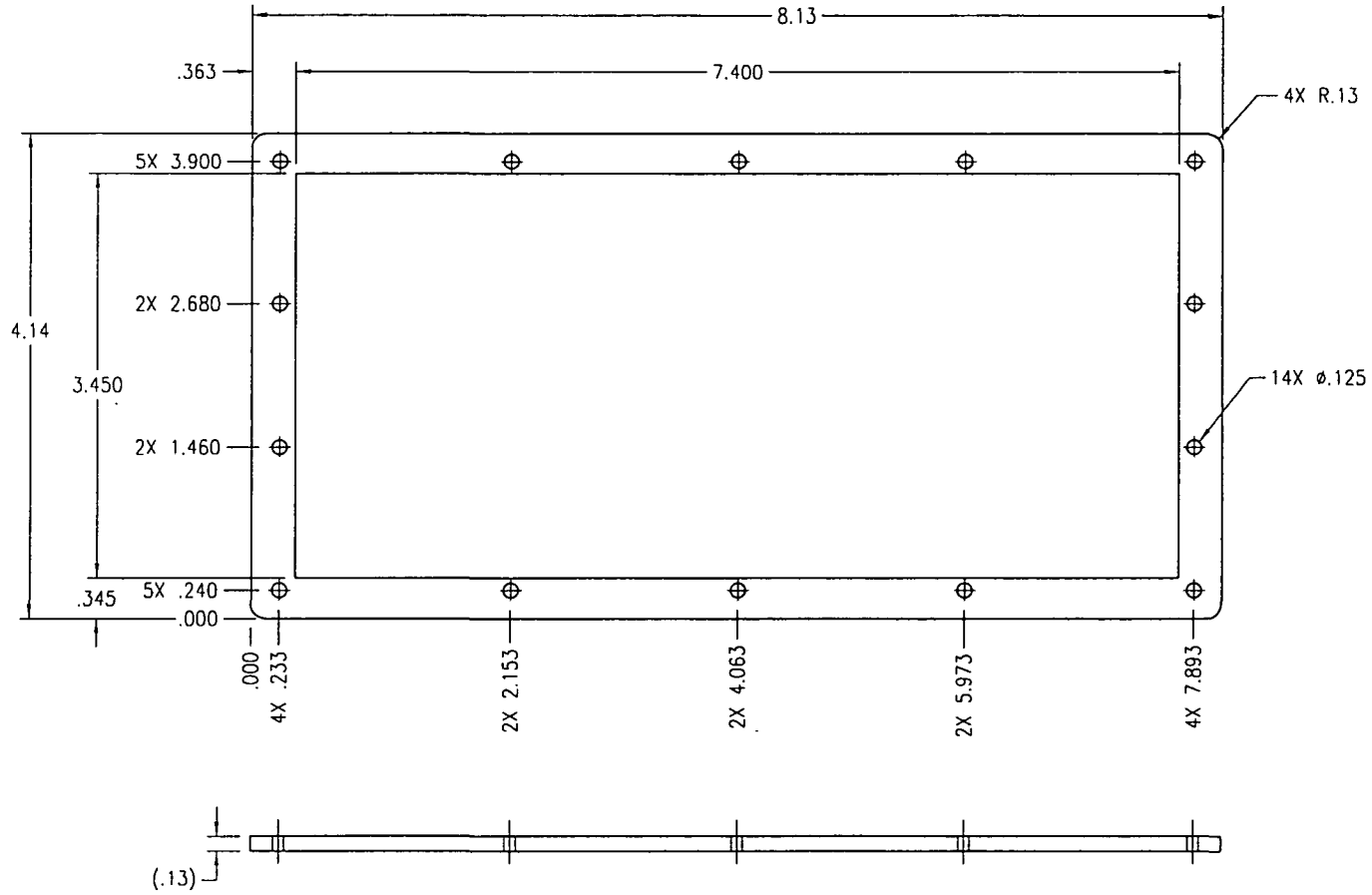
TITLE: MOUNT PARTS FBI HAWK OWL PROJECT

DRAWING NUMBER: C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	6/9/11	C	–

DO NOT SCALE DRAWING

SHEET: 8 OF 13



-26 TRIM

MAT'L: 8-1/8" X 4-1/4" X 1/8" THK POLYCARBON PLASTIC
COLOR: BLACK
(SHEFFIELD PLASTICS MACROLON GP)

PROTO: -

Paravion® Technology Inc.

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TOLERANCES EXCEPT WHERE NOTED:
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.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

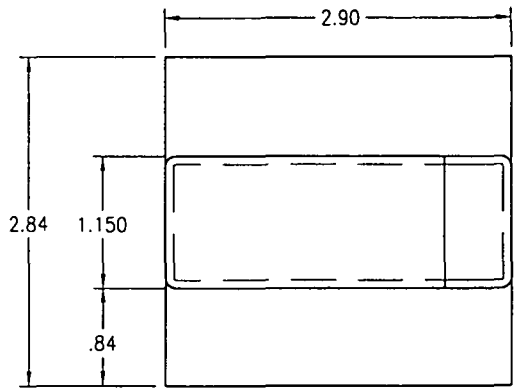
3RD ANGLE PROJECTION

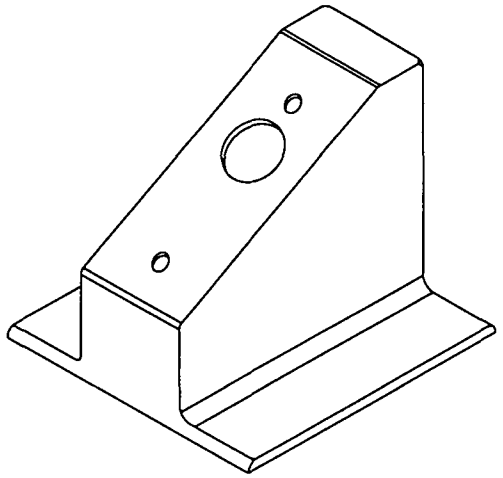
TITLE: MOUNT PARTS FBI HAWK OWL PROJECT

DRAWING NUMBER: C182ARS-1000

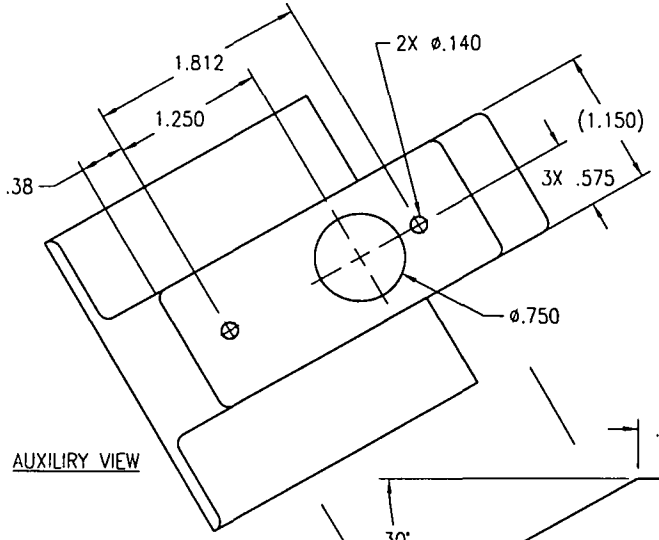
DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	6/9/11	C	-

DO NOT SCALE DRAWING

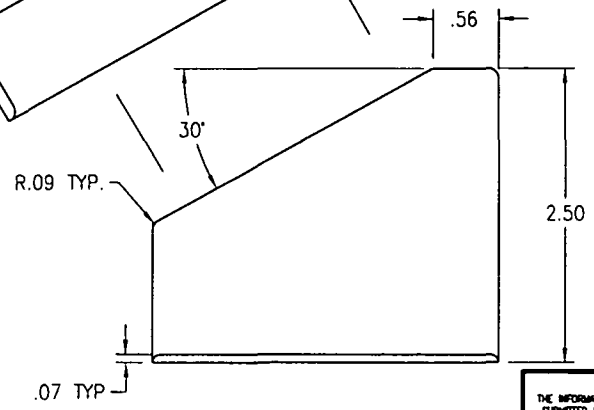




ISO VIEW
(FOR REFERENCE ONLY)



AUXILIRY VIEW



-27 SWITCH HOUSING

MAT'L: .070" THK LEXAN COLOR: CLEAR

FINISH: FLAT BLACK ENAMEL (PAINT INTERIOR SURFACE ONLY)

PROTO: -

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

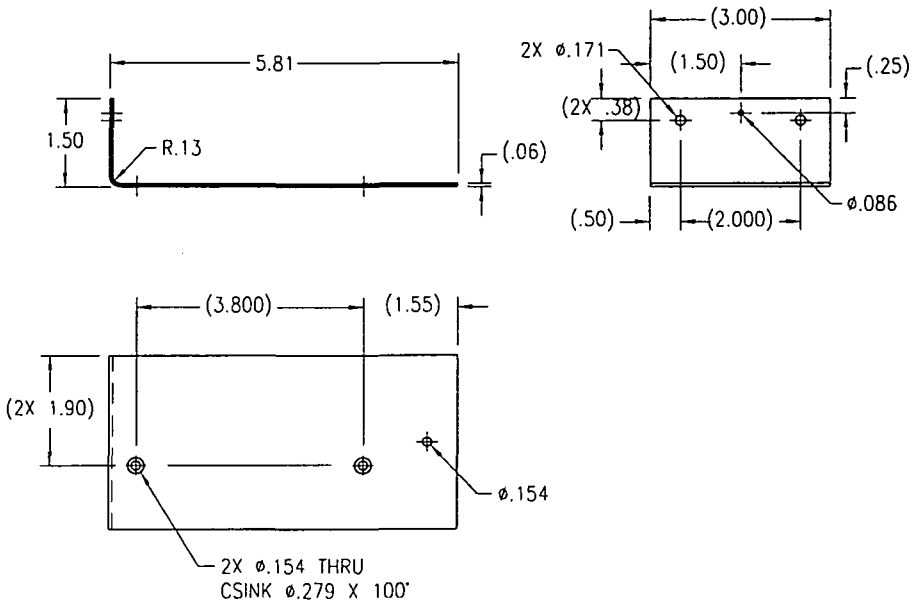
3RD ANGLE PROJECTION

TITLE: MOUNT PARTS FBI HAWK OWL PROJECT

DRAWING NUMBER: C182ARS-1000

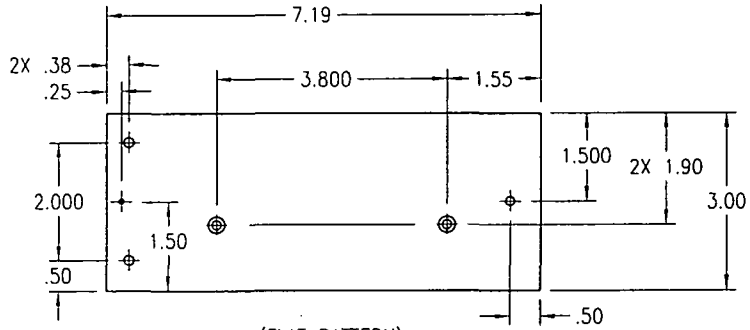
DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	6/9/11	C	-

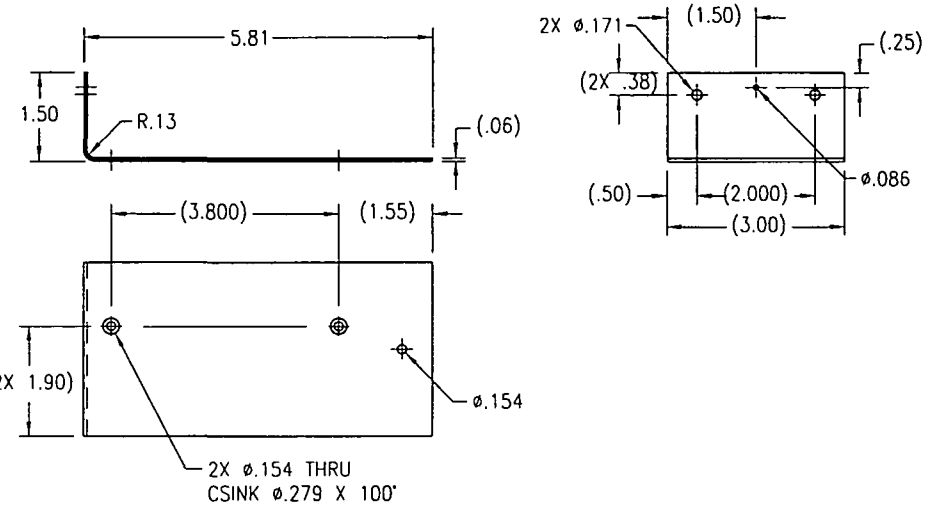
DO NOT SCALE DRAWING



-28 L/H BRACKET

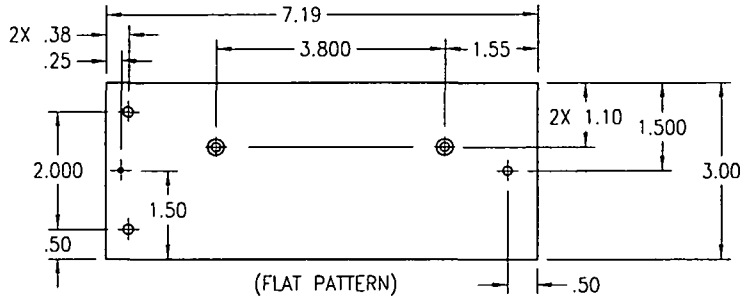
MAT'L: .060" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303
(BUILD 1 PER AIRCRAFT)
(MOUNTS VIDEO GAIN MODULE)





-29 R/H BRACKET

MAT'L: .060" THK 6061-T6 ALUMINUM QQ-A-250/11
FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303
(BUILD 1 PER AIRCRAFT)
(MOUNTS VIDEO GAIN MODULE)



PROTO
–

Paravion® Inc.
Technology

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

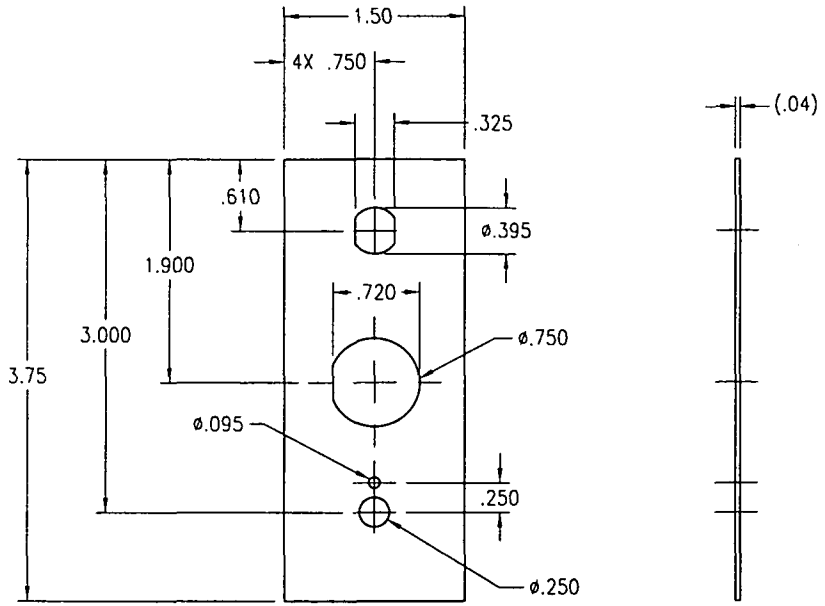
TITLE
MOUNT PARTS
FBI HAWK OWL
PROJECT

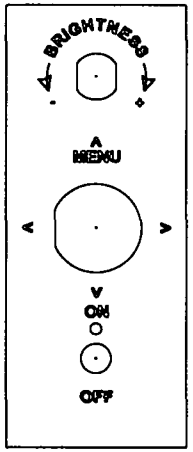
DRAWING NUMBER
C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	–

DO NOT SCALE DRAWING

SHEET
11 OF 13





COMPLETED PART

-30 PLACARD

SUGGESTED MAT'L: .04" THK 6061-T6 ALUMINUM QQ-A-250/11

FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303

(BUILD 1)

PROTO: -

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
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.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

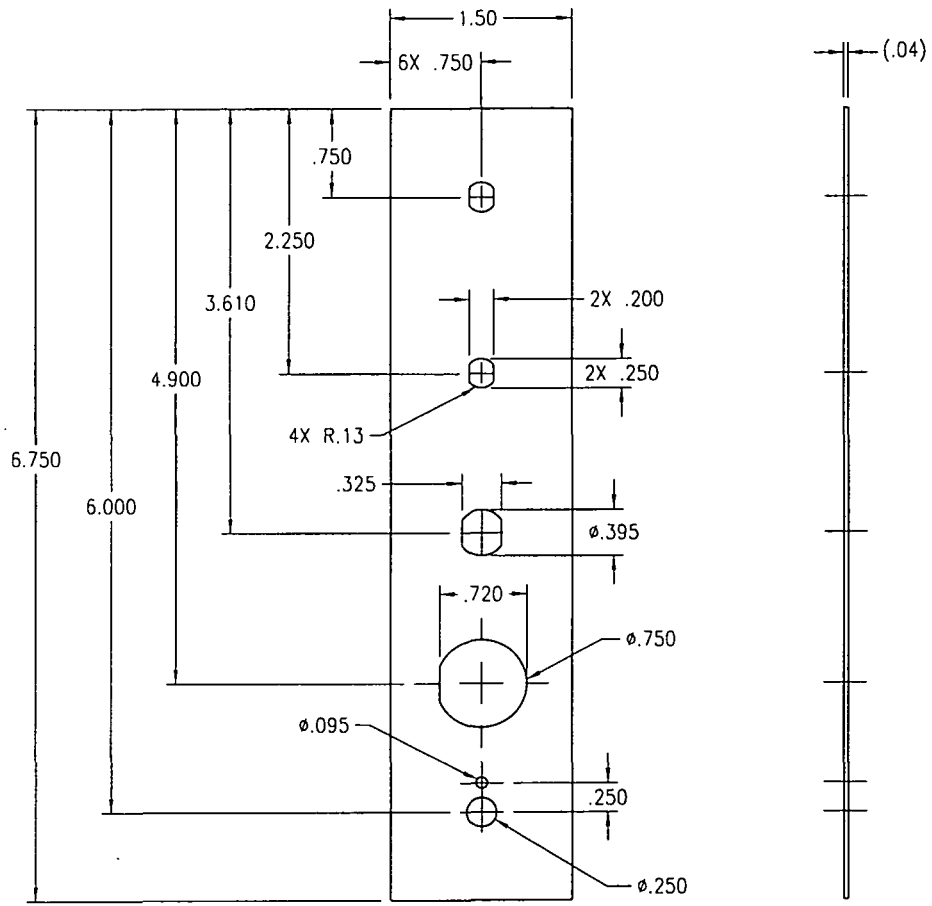
3RD ANGLE PROJECTION

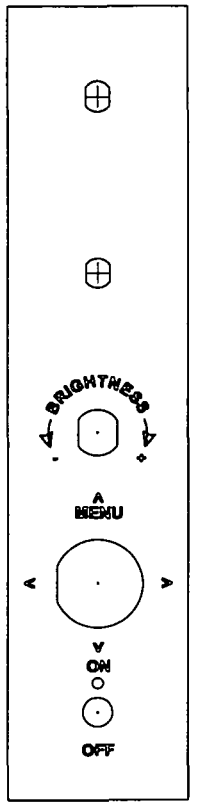
TITLE: MOUNT PARTS FBI HAWK OWL PROJECT

DRAWING NUMBER: C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	

DO NOT SCALE DRAWING





COMPLETED PART

-31 PLACARD

(APPLICABLE TO: C206 STATIONAIRE ONLY)

SUGGESTED MAT'L: .04" THK 6061-T6 ALUMINUM QQ-A-250/11

FINISH: BLACK POLYURETHANE POWDER COAT CARDINAL C241-BK303

(BUILD 1)

PROTO
-

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

TITLE: MOUNT PARTS FBI HAWK OWL PROJECT

DRAWING NUMBER: C182ARS-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	TN	REB	1/17/11	C	

DO NOT SCALE DRAWING

SHEET: 13 OF 13

SHEET	REV	ECO	DATE	DESCRIPTION	BY	APR	CHK
1,2,5	A	–	5/11/2012	ADDED -51, -52, UPDATE BOM	DW	REB	LS
1,2,4	B	–	07/16/2012	ITEM 41 NOW OPT., IF EXISTING CUT-OUT UPDATED PHOTOGRAPHS	REB	REB	LS

-1 ASSY QTY	ITEM	PART NUMBER	DESCRIPTION
(B) 1	42	C182IRC-1000-52	USB COVER OPT. (IF EXISTING CUT-OUT)
1	41	C182IRC-1000-51	COVER PLATE
2	40	MS24693S26	SCREW
2	39	MS21042L06	NUT
8	38	MS20426AD3-3	RIVET
4	37	MS21071L04	NUTPLATE
1	36	C182ARS-1000-33	PLATE
6	35	MS3367-4-0	CABLE TIE; GENERAL USE AS NEEDED
7	34	MS3367-1-0	CABLE TIE; GENERAL USE AS NEEDED
(2) 6	33	CTM2B	CABLE TIE MOUNT
–	32	NOT USED	
14	31	4 X 1/2 PHPN SMS	STAINLESS STEEL SCREW
1	30	SL-75-OEM-USB	KEYBOARD ASSY
5	29	CPX076	FEMALE CONTACT
1	28	CPX075-1	HEADER CONNECTOR
1	27	17-200121 (REF.)	USB CABLE (PROVIDED W/KEYBOARD)
2	26	MS21042L08	NUT
2	25	S-5030-12	SPRING
4	24	NAS1149DN832J	WASHER
2	23	MS27039-08-15	SCREW
6	22	NAS1149FN632P	WASHER
4	21	MS35206-226	SCREW
3	20	17-200161	RECEPTICLE
1	19	NAS1149F0332P	WASHER
1	17	AN3-5A	BOLT
–	16	MS21042L04	NUT (B) (2 EA. IF ITEM 42 INSTALLED)
2	15	MS35206-217	SCREW
4	14	MS35206-216	SCREW (B) (6 EA. IF ITEM 42 INSTALLED)
1	12	C182IRC-3000-1	CONSOLE WIRING
1	11	DOWNLINK RCU-V	GMS UNIT (CUSTOMER SUPPLIED)
1	9	MOTOROLA XTVA	CONVERTER COMM. UNIT (CUSTOMER SUPPLIED)
1	8	C182ARS-1000-26	TRIM
1	7	C182ARS-1000-25	BASE PLATE
1	6	C182ARS-1000-23	DOUBLER
1	5	C182ARS-1000-17	BRACKET
1	4	C182ARS-1000-20	BRACKET
1	3	C182ARS-1000-22	BAR
1	2	C182ARS-1000-21	BAR
1	1	C182IRC-1000-50	CONSOLE
-1 ASSY QTY	ITEM	PART NUMBER	DESCRIPTION

Paravion® Technology Inc.

TITLE: C182 CONSOLE

DRAWING NUMBER: C182IRC-1000

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

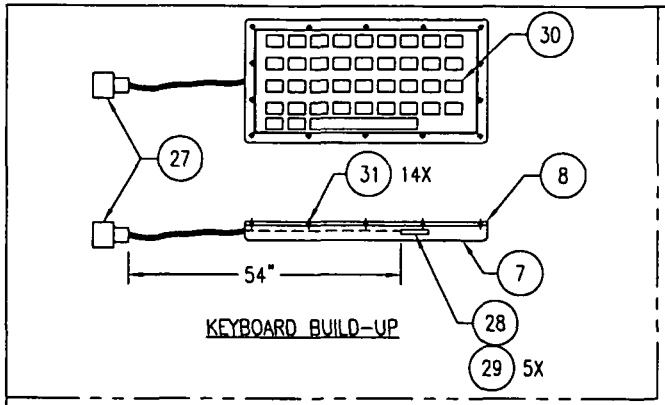
DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	8/15/2011	B	

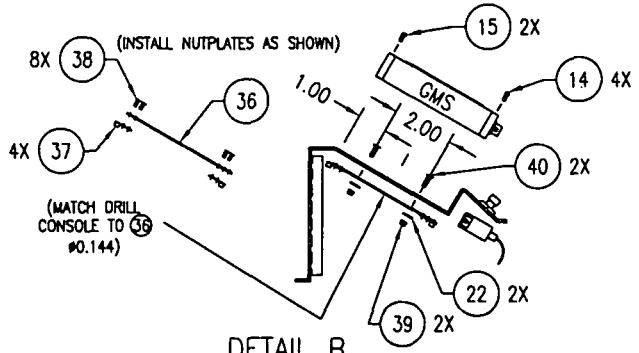
3RD ANGLE PROJECTION

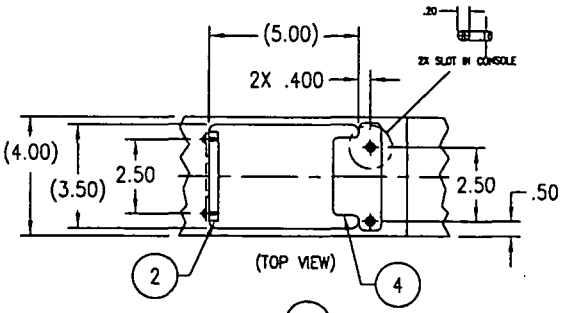
DO NOT SCALE DRAWING

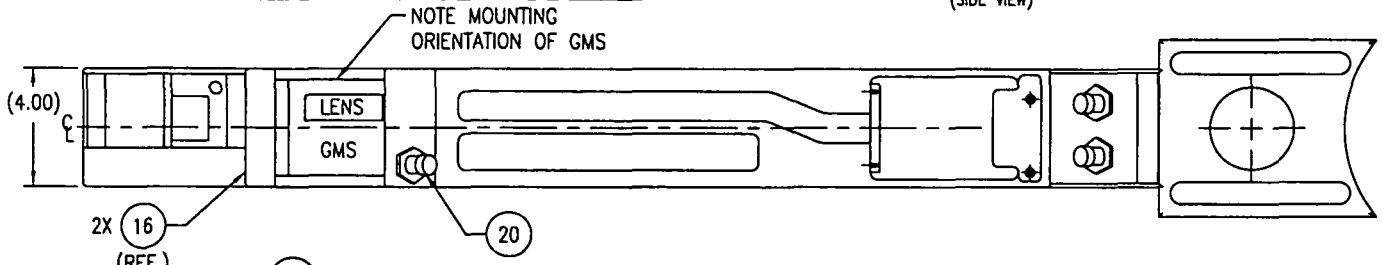
SHEET 1 OF 5

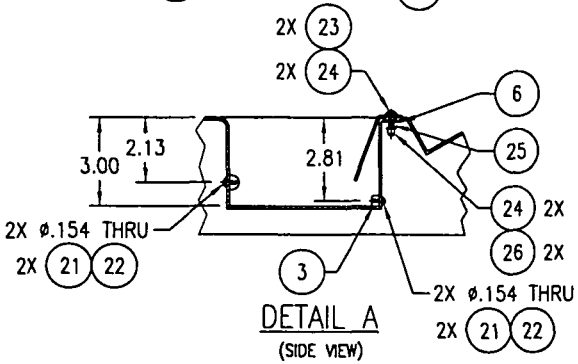
PROTO –

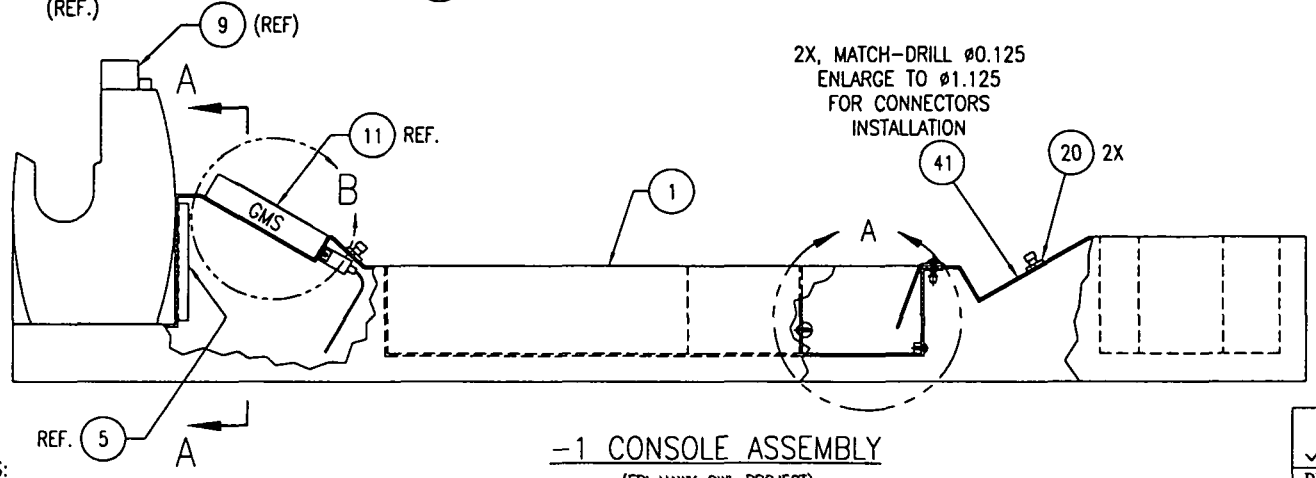


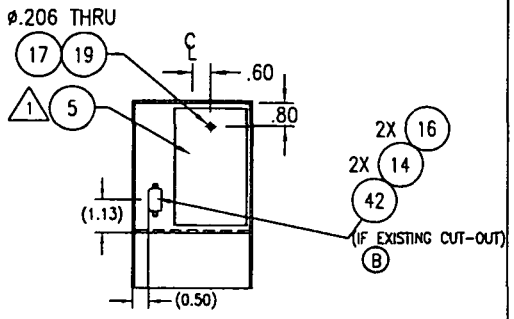












-1 CONSOLE ASSEMBLY

(FBI HAWK OWL PROJECT)

NOTES:

1. CEMENT INTO POSITION SHOWN USING: OATEY ABS CEMENT #30902, BLACK.
2. FOR CTM2B MOUNTS REMOVE FOAM TAPE AND APPLY CYANOACRYLATE TO ATTACH MOUNTS.
3. USE TEMPLATES FOR HOLES AND CUTOUTS.

PROTO -

Paravion® Technology Inc.

TITLE: C182 CONSOLE

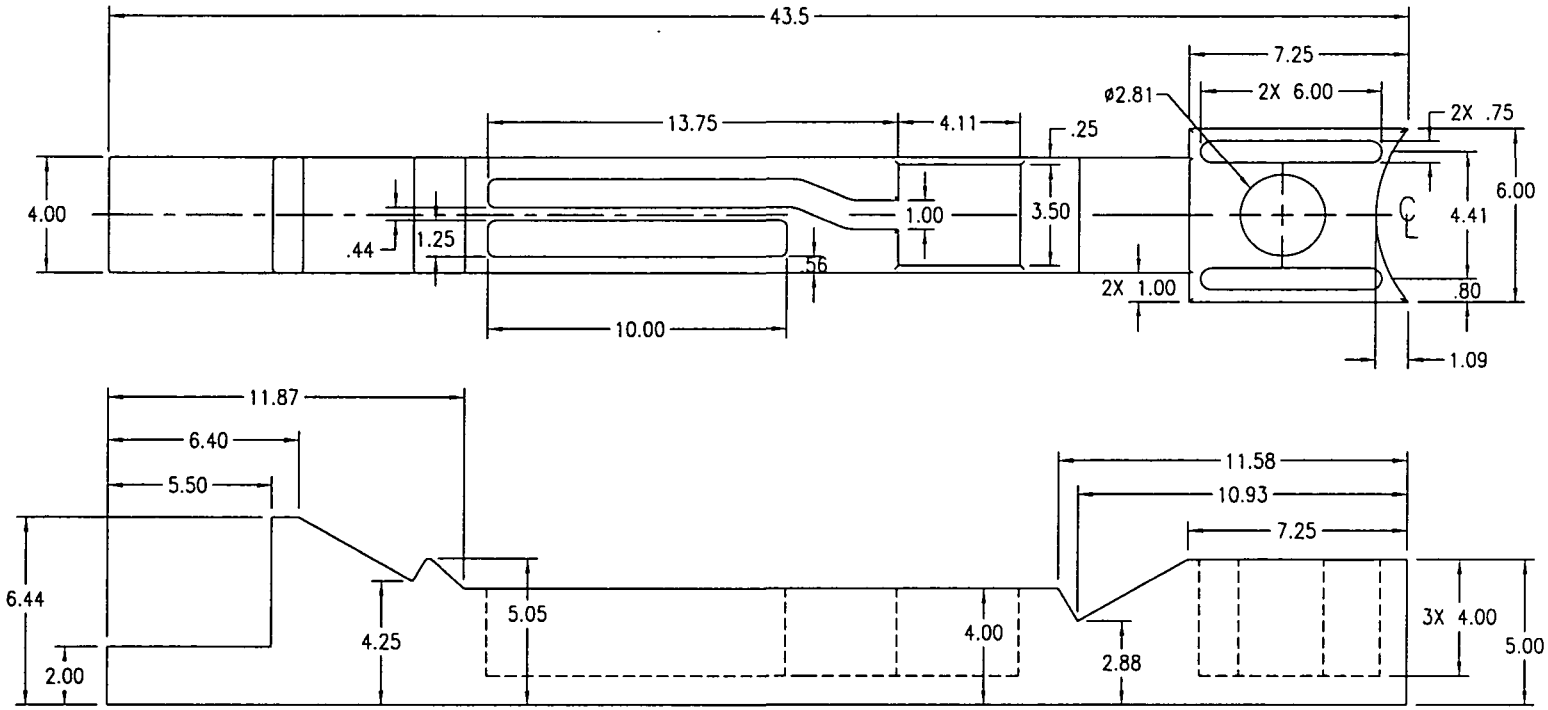
DRAWING NUMBER: C182IRC-1000

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	8/15/2011	B	

3RD ANGLE PROJECTION

DO NOT SCALE DRAWING



VENDOR PART NUMBER:
C182IRC-1000-50V

-50 CONSOLE

NOTES:

1. MAT'L USED: .100/.080 BLACK KYDEX PLASTIC.
   (GRADES 100, T, 200, 6200, 6565 ACCEPTABLE)
2. VENDOR: PLASTIC CREATIONS LTD.
   4640 IRONTON ST.
   DENVER, CO. 80239

PROTO

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Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

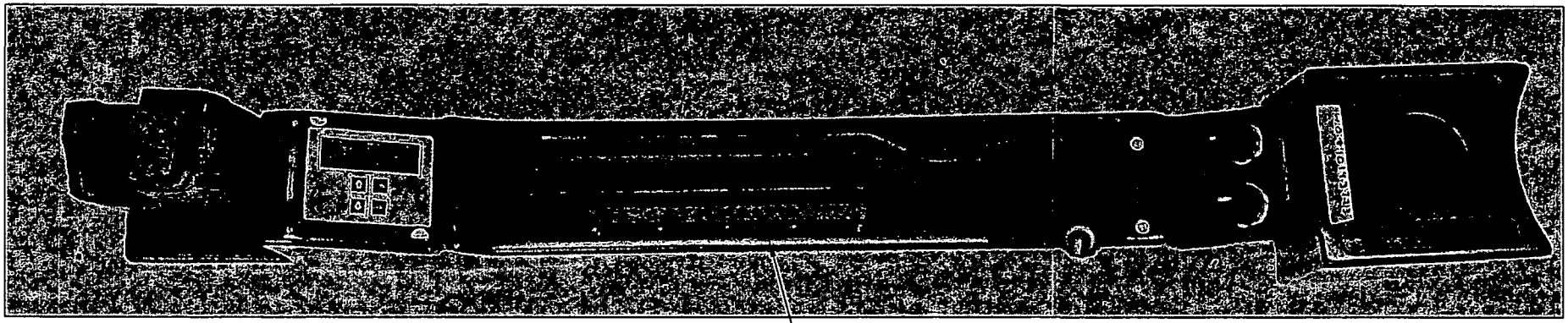
TITLE: C182 CONSOLE

DRAWING NUMBER: C182IRC-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	8/15/2011	A	

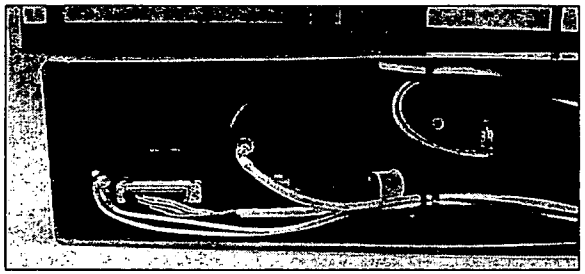
DO NOT SCALE DRAWING

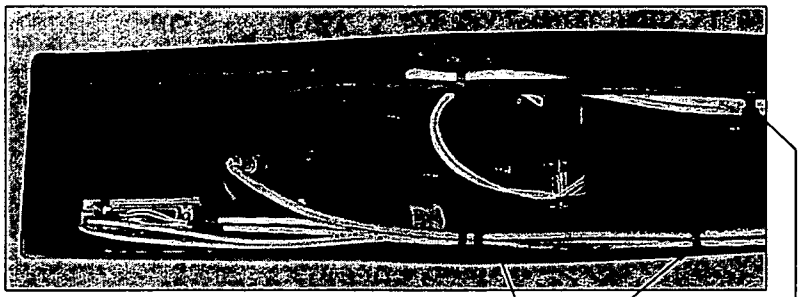
SHEET 3 OF 5



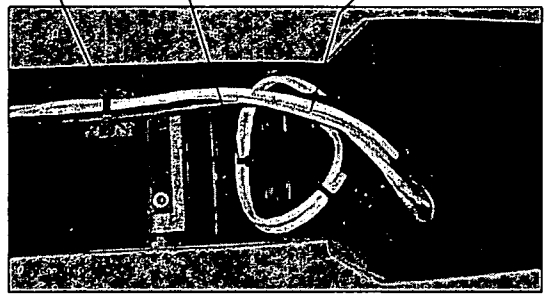
KEYBOARD (REF.)

-1 CONSOLE ASSEMBLY





33 34
2



12

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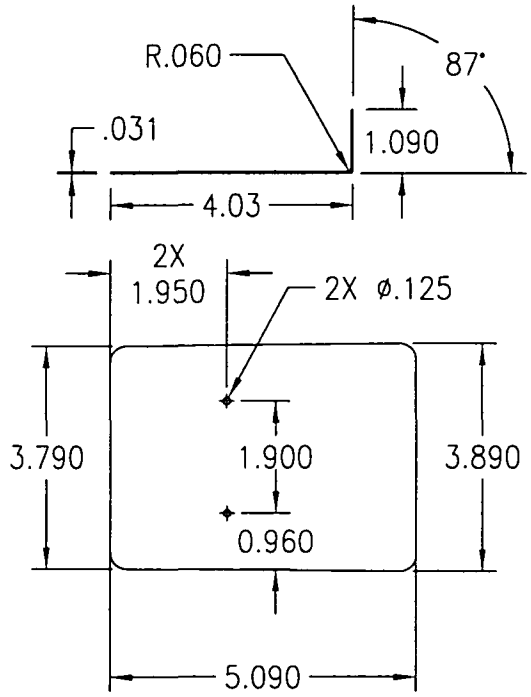
2

Paravion® Technology Inc.	TITLE: C182 CONSOLE				DRAWING NUMBER: C182IRC-1000	
DIMENSIONS IN INCHES TOLERANCES EXCEPT WHERE NOTED: .X = ±.1 .XX = ±.05 .XXX= ±.010 ANGLES=± 1° THREADS: INTERNAL: CLASS 2B EXTERNAL: CLASS 2A	DRAWN BY: TN	CHK'D BY: LS	APRVD. BY: REB	DATE: 8/15/2011	REV: B	ECO:
	3RD ANGLE PROJECTION	DO NOT SCALE DRAWING			SHEET: 4 OF 5	

PROTO: -

BREAK ALL SHARP EDGES



FLAT PATTERN

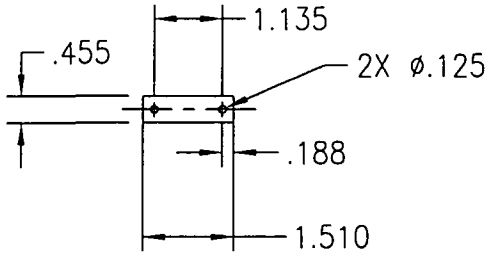
-51 COVER PLATE

MATERIAL: 6061-T6

STOCK: 0.025" SHEET QQ-A-250/11

FINISH: BLACK POLYURETHANE POWDER COAT

CARDINAL C241-BK303



-52 USB COVER

MAT'L: 6061-T6

STOCK: 0.025" SHEET QQ-A-250/11

FINISH: BLACK POLYURETHANE POWDER COAT

CARDINAL C241-BK303

PROTO

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Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

TITLE	DRAWING NUMBER
C182 CONSOLE	C182IRC-1000

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	8/15/2011	A	

DO NOT SCALE DRAWING

SHEET 5 OF 5

DOCUMENT NO. ER-ARS-214-2; INSTALLATION STRUCTURAL ANALYSIS

6 October 2011, Robert E. Bristol — Paravion Technology, Inc.

Reference Installation Drawing ARS-214-1 Rev. B dated 07-28-2011,
ARS4004-1 Controller Unit Rev. A, ARS232-2 IMU/GPS/Downlink Assy Rev. A

Calculations show that Margins-of-Safety are large reference strength of screws and components of mounting fixture. Minimum Mount Shelf 0.010 thickness, based only on ultimate strength (no rigidity needs addressed).

Actual installation mounted to shelf (2024-T3, 0.032 sheet), ARS-4130-1 brackets supported on aluminum angles (3/4"-x-3/4"-x-0.095") installed using (4 ea.)MS27039-0808, (8 ea.) NAS1149FN832P, (4 ea.) MS21042L08 exceeding requirements of this analysis.

Minimum Margin-of-Safety (35%) is based on bending in Roll-Pin Retention Slot at Ultimate 18g Sideward inertial acceleration.

INPUT: **Unit Weights**

ARS-4004-1 $Wt_1 := 16.25$ lb. $Ht_1 := 5.10$ in.

IMU Assy, ARS-232-2 $Wt_2 := 22$ lb. $Ht_2 := 6.00$ in.

Hardware $Wt_3 := 0.88$ lb.

Fasteners

MS24693 (#8-32) $n := 2$ per corner $\phi 8 := 0.16$

These screws attach ARS4130-13 plates to ARS4004-1 assy

Tensile Strength, $TS8 := 840$ lb. MINIMUM

Minimum C'Sink Diameter: $\Phi 8 := 0.285$

MS24693 (#10-32) $N := 1$ per corner $\phi 10 := 0.19$

These screws attach ARS4130-14 feet to ARS4130-13 plates

Tensile Strength, $TS10 := 1200$ lb. MINIMUM

Minimum C'Sink Diameter: $\Phi 10 := 0.333$

Materials Ref. ARS-4130-13 Mount Plate, 6061-T6 Thickness := 0.125 in.

Fsu := 20000 psi

(Fsu Conservative, app'l to all ARS-4130 components)

Ref. CFR14, FAR23, 23.561(b)(3)(ii), Amendment 23-48;
Worst-Case Ultimate inertial loading, gLoad := 18 g's

CALCULATIONS:

$$Wt_0 := \sum_{i=1}^{3} Wt_i$$

$$CG := \frac{Wt_1 \cdot \frac{Ht_1}{2} + Wt_2 \cdot \left(Ht_1 + \frac{Ht_2}{2}\right)}{Wt_0} = 5.6$$

$$Moment := gLoad \cdot Wt_0 \cdot CG = 3953 \text{ in-lb}$$

Set $k := 1..4$ $x_1 := 0.225$ $x_2 := 1.025$ $x_3 := 10.470$ $x_4 := 11.270$

Fastener Tension:

$$Tension8 := \frac{Moment \cdot x_4}{\sum_k (x_k)^2} + \frac{Wt_0 \cdot gLoad}{4 \cdot n} = 275$$ lb./screw (#8-32 rated 840 lb.)

Margin-of-Safety, $MS8 := \frac{TS8}{1.15(Tension8)} - 1 = 165 \cdot \%$ Including ref. to 23.625(a)(2) Fitting Factors, Amdt 23-7

Set $j := 1..2$ $\chi_1 := 0.625$ $\chi_2 := 10.870$

Fastener Tension:

$$Tension10 := \frac{Moment \cdot \chi_2}{2 \cdot \left[\sum_j (\chi_j)^2\right]} + \frac{Wt_0 \cdot gLoad}{4 \cdot n} = 269$$ lb./screw (#10-32 rated 1200 lb.)

COMBINED LOADING

Margin-of-Safety, $MS10 := \frac{TS10}{1.15(Tension10)} - 1 = 287 \cdot \%$ Including ref. to 23.625(a)(2) Fitting Factors, Amdt 23-7

Foot Shear Area: $SA := \frac{0.533 + 0.710}{2} \cdot 0.089 + 0.710 \cdot 0.030 = 0.078$ sq. in. (Shear Area of "foot")

Shear Stress in foot: $FSS := \frac{Tension10}{SA} = 3515$ psi, $Fsu = 20000$ psi

Margin-of-Safety, $MSS := \frac{Fsu}{1.15(FSS)} - 1 = 395 \cdot \%$ Including ref. to 23.625(a)(2) Fitting Factors, Amdt 23-7

Fastener Shear:

$$Shear8 := \frac{Wt_0 \cdot gLoad}{4 \cdot n} = 88$$

$$Shear10 := \frac{Wt_0 \cdot gLoad}{4 \cdot N} = 176$$

Because screw shear load is much much less than 1/2 of screw tensile strength and tension load is much much less than screw tensile strength, caluclation of allowable shear using calculated tension load (Ref. Bruhn Chapt. D1) is unnecessary.

"TEAR-OUT", -13 PLATE

$$\text{ShearStress8} := \frac{\text{Tension8}}{\pi \cdot \Phi 8 \cdot (\text{Thickness})} = 2461 \text{ psi}, \quad \text{Margin} = \frac{\text{Fsu}}{1.15 \cdot \text{ShearStress8}} - 1 = 607 \cdot \%$$

$$\text{ShearStress10} := \frac{\text{Tension10}}{\pi \cdot \Phi 10 \cdot (\text{Thickness})} = 2059 \text{psi}, \quad \text{Margin} = \frac{\text{Fsu}}{1.15 \cdot \text{ShearStress10}} - 1 = 745 \cdot \%$$

ROLL-PIN INSTALLATION:

(Considedred in Worst-Case, as though at greatest distance from hinge point)

Ref. MS16562-32 Roll Pin, rated 2100 lb. Double Shear; $\text{DS} := \frac{\text{Moment}}{(2) \cdot (11.29)} = 175$ lb.

Where 11.29 = Moment Arm of Roll Pin, Opposite foot contribution neglected.

"Beam" Dimensions: $\text{Width} := 0.125$ $\text{Height} := 0.112$ Minimum

Shear Stress in "Beam": $\text{SSB} := \frac{\text{DS}}{2 \cdot (\text{Width}) \cdot (\text{Height})} = 6253$ psi

$$\text{ShearMargin} := \frac{\text{Fsu}}{1.15 \cdot (\text{SSB})} - 1 = 178 \cdot \%$$

Ref. Installation Drawing ARS-214, Roll-Pin load is imposed at 0.075 inch from end of slot. Bending Stress is calculated as though DS/2 is imposed at 0.1 inch from "square" slot end.

Second Moment-of-Area, $\text{I} := \frac{\text{Width} \cdot \text{Height}^3}{12} = 14.63 \times 10^{-6}$ in.^4

Slot Length, $\text{Ln} := 0.613$ Load Appl'n, $a := 0.10$ $b := \text{Ln} - a$

$$\text{Load} := \frac{\text{DS}}{2} \qquad \text{ch} := \frac{\text{Height}}{2}$$

Ref. Mach. Hdbk Strength of Materials: Max. Bending Stress = $\text{BS} := \frac{\text{Load} \cdot a \cdot b^2 \cdot \text{ch}}{\text{I} \cdot (\text{Ln})^2} = 23461$

Where $\text{Fty} := 35000$ psi $\quad \text{BendingMargin} := \frac{\text{Fty}}{1.15 \cdot \text{BS}} - 1 = 30 \cdot \%$

IMU, TOP PLATE INSTALLATION: $\text{Wt}_2 = 22$ lb. $\quad \text{gLoad} = 18$

Installed using 8 ea. MS24693 (#8-32) screws: $\frac{\text{Wt}_2}{8} \cdot \text{gLoad} = 50$ lb. Tension/Shear per Screw

(Ref. 840 lb. Tension Strength)

REFERENCE AIRCRAFT INSTALLATION:

Fastener Tension $xa_1 := 0.340$ $xa_2 := 9.908$ **Worst-Case Fastener Locations**

$$TensionShelf := \frac{Moment \cdot xa_2}{4 \cdot \left[\sum_j \left(xa_j\right)^2\right]} + \frac{Wt_0 \cdot gLoad}{8} = 188 \text{ lb./screw (\#8-32 rated 840 lb. min.)}$$

COMBINED LOADING

Assumed 4 ea. #8 screws fastening Mount Fixtures to Shelf

Actual Installation included 2 ea.#10, 2 ea. #8

Note that MS21042L08 nuts are rated 1670 lb. axial load.

Minimum Mount Shelf Thickness, based on equivalent Shear Area, material, is calculated as follows:

$$Shelf := \frac{TensionShelf}{(\pi \cdot 0.375) \cdot Fsu} = 0.008 \text{ inch}$$ **Based on NAS1149, #8 Washer, 0.375" OD)**

$$ShearShelf := \frac{Wt_0 \cdot gLoad}{8 \cdot (\phi 8) \cdot Shelf} = 69082 \text{ psi}$$

$Fbru := 67000$ psi,
ref. MMPDS, 6061-T6, 0.010 sheet,
e/D = 1.5

The above "Minimum Shelf Panel Thickness DOES NOT consider shelf rigidity need. Calculation of minimum shelf panel ref. shear pull-through agrees approximately with calculation ref. bearing strength.

Regulatory requirements are satisfied when ARS 4004 and IMU combined assembly is mounted to a shelf greater than 0.010 inch thick, manufactured from 6061-T6 or stronger material, using 8 ea. MS24694, #8-32 or equivalent strength screws.

ENGINEERING REPORT ER-IR2300-2;
STRUCTURAL ANALYSIS OF EQUIPMENT SHELF IR-2300-1 ASSEMBLY

Prepared by Robert E. Bristol, 7 October 2011

The following calculations verify very large structural Margin of Safety reference requirements of CFR14, Part 23, 23.561 (b)(3), 23.625, reference FLIR TALON Control Electronics Unit installation on IR-2300-1 Equipment Shelf installed to C182IR-1012-1 Support Assembly.

SUMMARY: The calculations show greatest calculated bolt tension, reference 18g Forward inertial loading, to be 85 lb. imposed on #8-32 screw rated to 840 lb. and 15 lb. imposed on #6-32 screw rated 725 lb.

REF. IR-2300-1; With Talon CEU installed

LOAD LOCATION VECTORS DEFINITION

$$X_0 := \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$$ **[Bolt Pattern Center, IR-2100-1 Mount Plate (IR-2000-1 "Buttons")]**

$$X_1 := \begin{pmatrix} -0.28 \\ 0.00 \\ 3.10 \end{pmatrix}$$ **[Center-of-Gravity, Talon CEU P/N23364-200] REF. MFR'S DATA**

$$X_2 := \begin{pmatrix} -4.05 \\ 0 \\ 0 \end{pmatrix}$$ **[Bolt Pattern Center, Talon CEU "Clamp Mount"] REF. DWG. IR-2300-1**

$$X_3 := \begin{pmatrix} 5.65 \\ 0 \\ 0 \end{pmatrix}$$ **[Bolt Pattern Center, Talon CEU "Pin Mount"] REF. DWG. IR-2300-1**

CEU Weight := 13 lb.; **[Weight of P/N23364-200 CEU] REF. MFR'S DATA**

(1) CEU Inertial Loads

up := 1 forward := 2 side := 3 **[REF.]**

Ref. 14CFR, Part 23, Section 23.561(e), (b3):

Ultimate Load Factors: $n_{up} := 3.0$ $n_{forward} := 18.0$ $n_{side} := 4.5$

LOAD MAGNITUDE VECTORS DEFINITION

$$PV_1 := \begin{pmatrix} 0 \\ 0 \\ -n_{up} \cdot Weight \end{pmatrix} = \begin{pmatrix} 0.00 \\ 0.00 \\ -39.00 \end{pmatrix}$$

REF. UPWARD INERTIAL LOAD IN RELATION TO AIRPLANE

$$PV_2 := \begin{pmatrix} 0 \\ -n_{forward} \cdot Weight \\ -Weight \end{pmatrix} = \begin{pmatrix} 0.00 \\ -234.00 \\ -13.00 \end{pmatrix}$$

REF. FORWARD INERTIAL LOAD IN RELATION TO AIRPLANE

$$PV_3 := \begin{pmatrix} n_{side} \cdot Weight \\ 0 \\ -Weight \end{pmatrix} = \begin{pmatrix} 58.50 \\ 0.00 \\ -13.00 \end{pmatrix}$$

REF. SIDEWARD INERTIAL LOAD IN RELATION TO AIRPLANE

Set

$i := 1..4$ $\quad x_1 := 2.015 \quad y_1 := 2.150 \quad x_3 := -2.015 \quad y_3 := 2.150$

$\quad x_2 := 2.015 \quad y_2 := -2.150 \quad x_4 := -2.015 \quad y_4 := -2.150$

[Bolt Pattern , IR-2100-1 Mount Plate (IR-2000-1 "Buttons")]

$$\begin{pmatrix} MX_{1,1} \\ MY_{1,1} \\ MZ_{1,1} \end{pmatrix} := X_1 \times PV_1 = \begin{pmatrix} 0.00 \\ -10.92 \\ 0.00 \end{pmatrix}$$ lb.-in.; **[Moment on Mt. Plate Bolt Pattern due to up g-load]**

$n_{up} = 3.00$

$$\begin{pmatrix} MX_{1,2} \\ MY_{1,2} \\ MZ_{1,2} \end{pmatrix} := X_1 \times PV_2 = \begin{pmatrix} 725.40 \\ -3.64 \\ 65.52 \end{pmatrix}$$ lb.-in.; **[Moment on Bolt Pattern due to fwd g-load]**

$n_{forward} = 18.00$

$$\begin{pmatrix} MX_{1,3} \\ MY_{1,3} \\ MZ_{1,3} \end{pmatrix} := X_1 \times PV_3 = \begin{pmatrix} 0.00 \\ 177.71 \\ 0.00 \end{pmatrix}$$ lb.-in.; **[Moment on Bolt Pattern due to side g-load]**

$n_{side} = 4.50$

Based on upward inertial load, ref. Bruhn Chapter D1

$$TX_{1,i} := \frac{x_i \cdot MY_{1,1}}{\sum_i (x_i)^2} \qquad TY_{1,i} := \frac{y_i \cdot MX_{1,1}}{\sum_i (y_i)^2} \qquad BT_{1,i} := \left(TX_{1,i} + TY_{1,i}\right) + \frac{n_{up} \cdot Weight}{4}$$

[Ultimate Bolt Tension, IR-2000-1 Button Installation, Upward Inertial Load]

$TX_{1,i}$ =	$TY_{1,i}$ =	$BT_{1,i}$ =
-1.35	0.00	8
-1.35	0.00	8
1.35	0.00	11
1.35	0.00	11

$n_{up} = 3.00$ $\quad Weight = 13.00$

$\sum_i BT_{1,i} - n_{up} \cdot Weight = 0.00$

Must equal zero

$BTmax := \max(BT) = 11$ lb. **[MS24693 (#8-32) rated to 840 lb. Tension ref. MS24693]**

[MS21042L08 rated to 1670 lb. Tension ref. MS21042]

$$MS_1 := \frac{840}{1.15 \cdot BTmax} - 1 = 6478 \cdot \%$$ **Ref. FAR23.625 Fitting Factor**

[Extremely High]

Where: $\Phi A := 0.285$ Minimum Head Dia., MS24693 (#8-32) Ref. Specification MS24693

$Th_0 := 0.080$ Material Thickness, Ref. Drawing IR-2300-1

$Ashear := \pi \cdot \Phi A \cdot Th_0 = 0.072$

$n_{up} = 3.00$ $Fsu := 27000$ psi; 6061-T6 Sheet, Ref. MMPDS, 3.2.6.0(b1)

$$\sigma shear := \frac{BTmax}{Ashear} = 155.03 \qquad MS_2 := \frac{Fsu \cdot Ashear}{1.15 \cdot BTmax} - 1 = 15044 \cdot \%$$ **[Ref. Tear-Thru]**

Based on Forward inertial load, ref. Bruhn Chapter D1

$$TX_{2,i} := \frac{x_i \cdot MY_{1,2}}{\sum_i (x_i)^2} \qquad TY_{2,i} := \frac{y_i \cdot MX_{1,2}}{\sum_i (y_i)^2} \qquad BLT_{2,i} := \left(TX_{2,i} + TY_{2,i}\right)$$

[Ultimate Bolt Tension, IR-2000-1 Button Installation, Forward Inertial Load]

$x_i =$	$y_i =$	$TX_{2,i} =$	$TY_{2,i} =$	$BLT_{2,i} =$
2.02	2.15	-0.45	84.35	84
2.02	-2.15	-0.45	-84.35	-85
-2.02	2.15	0.45	84.35	85
-2.02	-2.15	0.45	-84.35	-84

$$\frac{\sum_i BLT_{2,i}}{n_2} = 0.00$$ **Must equal zero**

$BltTmax := \max(BLT) = 85$ lb. **[MS24693 (#8-32) rated to 840 lb. Tension ref. MS24693]**

[MS21042L08 rated to 1670 lb. Tension ref. MS21042]

$$MS_3 := \frac{840}{1.15 \cdot BltTmax} - 1 = 761 \cdot \%$$ **Ref. FAR23.625 Fitting Factor**

[High]

Where: $\Phi B := 0.16$ Dia., MS24693 (#8-32) Ref. Specification MS24693

$Th_0 = 0.080$ Material Thickness, Ref. Drawing IR-2300-1

Bearing Load = $BL := n_{forward} \cdot \frac{Weight}{4} = 58.50$ lb./screw

Bearing Area = $BA := \Phi B \cdot \left(Th_0\right) = 0.013$ sq. in. per screw

$\sigma bearing := \frac{BL}{BA} = 4570$ psi $\quad n_{forward} = 18.00$

[Ultimate Bearing Stress, Forward Inertial Load]

Fbru := 88000 psi, Ref. MMPDS, 3.6.2.0(b1)

$MS_4 := \frac{Fbru}{1.15 \cdot \sigma bearing} - 1 = 1574 \cdot \%$ **Ref. FAR23.625 Fitting Factor**

[Extremely High]

$\begin{pmatrix} MX_{1,3} \\ MY_{1,3} \\ MZ_{1,3} \end{pmatrix} := X_1 \times PV_3 = \begin{pmatrix} 0.00 \\ 177.71 \\ 0.00 \end{pmatrix}$ lb.-in.; **[Moment on Bolt Pattern due to Side g-load]**

$n_{side} = 4.50$

$TX_{3,i} := \frac{x_i \cdot MY_{1,3}}{\sum_i (x_i)^2} \quad TY_{3,i} := \frac{y_i \cdot MX_{1,3}}{\sum_i (y_i)^2} \quad BOLT_{3,i} := (TX_{3,i} + TY_{3,i})$

x_i =	y_i =	$TX_{3,i}$ =	$TY_{3,i}$ =	$BOLT_{3,i}$ =
2.02	2.15	22.05	0.00	22
2.02	-2.15	22.05	0.00	22
-2.02	2.15	-22.05	0.00	-22
-2.02	-2.15	-22.05	0.00	-22

$\frac{\sum_i BOLT_{3,i}}{n_2} = 0.00$ **Must equal zero**

BoltTmax := max(BOLT) = 22 lb. **[MS24693 (#8-32) rated to 840 lb. Tension ref. MS24693]**

[MS21042L08 rated to 1670 lb. Tension ref. MS21042]

$MS_5 := \frac{840}{1.15 \cdot BoltTmax} - 1 = 3213 \cdot \%$ **Ref. FAR23.625 Fitting Factor**

[Extremely High]

ΦA = 0.285 Minimum Head Dia. $Th_0 = 0.080$ Material Thickness Ashear = 0.072

Fsu := 27000 psi; 6061-T6 Sheet, Ref. MMPDS, 3.2.6.0(b1)

$MS_6 := \frac{Fsu \cdot Ashear}{1.15 \cdot 1.5 \cdot BoltTmax} - 1 = 4985 \cdot \%$ **Ref. FAR23.625 Fitting Factor**

[Extremely High]

The above completes analysis of attachment tof the shelf to C182IR-1012-1 Support Assy.

Ref. (8 ea.) MS24693S51 (#8-32) screws, rated 840/2 = 420 lb. shear) to attach the Mount Pin Blocks to the IR-2300-1 plate, (4 ea.) MS24693Sbased on 18.0 Forward inertial loading (13 lb. at 3.10 inches above the shelf).

Ref. Figure 1, $Mx := (3.10)\cdot(n_2 \cdot Weight) = 725$ in.-lb., where: $n_2 = 18.00$

$Weight = 13.00$

$Y_1 := 1.79 \qquad Y_2 := 2.24 \qquad Y_3 := 7.58 \qquad Y_4 := 8.28$

$$VT_i := \frac{Y_i \cdot Mx}{\sum_i (Y_i)^2}$$

i =	Y_i =	VT_i =
1	1.79	10
2	2.24	12
3	7.58	41
4	8.28	45

= Up Load on each ECU Tie-Down Point Due to Forward Inertia Load, 18g Ultimate

By Inspection Max Load = $ML := VT_4 = 45$ lb.

Ref. Fig. 1, $Tmax := \frac{1}{2}\cdot\frac{\left[0.81\cdot(1.19\cdot VT_4)\right]}{\left(0.31^2 + 0.81^2\right)}\cdot 1.15 = 33$ lb. **Ref. FAR23.625 Fitting Factor**

Ref. MS24693S51 (#8-32); rated 840 lb.

By Inspection Secondary Load = $M2 := VT_3 = 41$ lb.

Ref. Fig. 1, $T2max := \frac{\left[0.68\cdot(0.24\cdot VT_3)\right]}{\left(0.25^2 + 0.68^2\right)}\cdot 1.15 = 15$ lb. **Ref. FAR23.625 Fitting Factor**

Ref. MS24693S27 (#6-32); rated 725 lb.

These calculations show that Margins-of-Safety reference FLIR TALON ECU installation on IR-2300-1equipment shelf assembly, FAR requirements 23.561, 23.625 are extremely large.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

STATEMENT OF COMPLIANCE WITH FEDERAL AVIATION REGULATIONS

DATE: March 30 2011

AIRCRAFT OR AIRCRAFT COMPONENT IDENTIFICATION

MAKE	MODEL NO.	TYPE *(Airplane, Radio, Helicopter, etc.)*	NAME OF APPLICANT
Cessna Aircraft	182T	Airplane	Paravion Technology, Inc.

LIST OF DATA

IDENTIFICATION	TITLE
Report: ARS-4004-901 Date: March 29, 2011	Structural Substantiation Equipment Installation Notes: 1. Structural aspects only of the above data are approved herein. This approval is only for engineering design data. 2. This approval is valid only for Cessna Aircraft Model: 182T S/N: 18282177 and is issued in support of the alteration of the aircraft. 3. Except as noted, all applicable requirements are to amendment levels established in TCDS 3A13, Revision 69.

PURPOSE OF DATA
In support of avionics equipment installation:

APPLICABLE REQUIREMENTS (List specific sections)

FAR 23.301, 23.303, 23.305, 23.307, 23.341, 23.561, 23.601, 23.603, 23.605, 23.613

CERTIFICATION - Under authority vested by direction of the Administrator and in accordance with conditions and limitations of appointment under Part 183 of the Federal Aviation Regulations, data listed above and on attached sheets numbered ___ None ___ have been examined in accordance with established procedures and found to comply with applicable requirements of the Federal Aviation Regulations.

I ~~(We)~~ Therefore ☐ Recommend approval of these data
☒ Approve these data

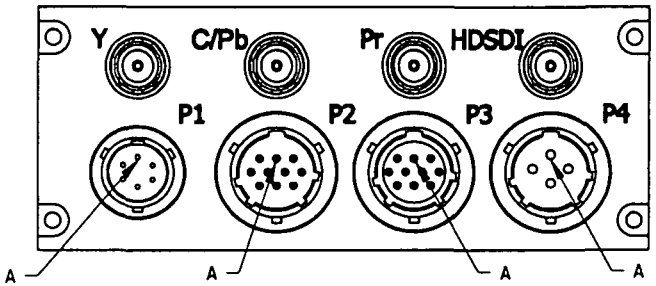
SIGNATURE(S) OF DESIGNATED ENGINEERING REPRESENTATIVE(S)	DESIGNATION NUMBER(S)	CLASSIFICATION(S)
Venkat Ramachandran Venkat Ramachandran	DERT-635514-NM	Structures

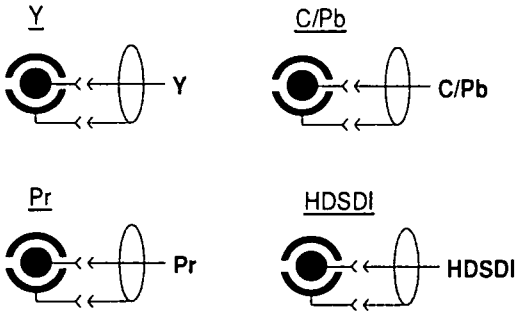
FAA FORM 8110-3 (11-70) SUPERSEDES PREVIOUS EDITION (Computer Generated)

File No. OM110330-093

NOTES:
VOLTAGE RANGE: 11 - 30 VOLTS
POWER CONSUMPTION: 72 VA
TROLL INTERFACE: CONNECTOR P2 PINS H, J & K
FOR REFERENCE USE ONLY

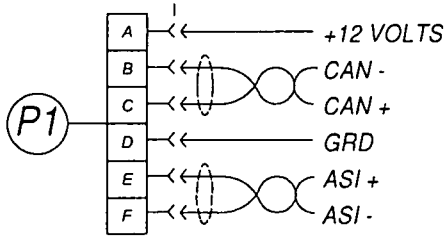
REVISION HISTORY			
REV	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	3/16/2011	O REYES





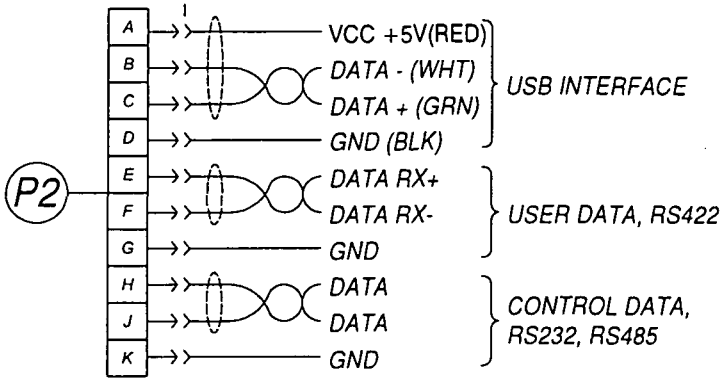
HAND HELD CONTROLLER

PT02E-10-6S (TX Chassis) — PT06E10-6P(SR) (Free Plug)



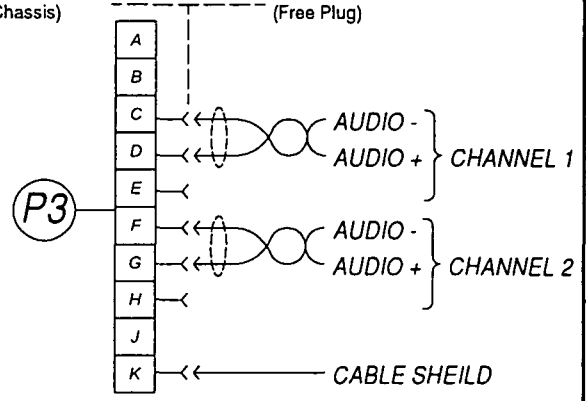
DATA INTERFACE

PT02E-12-10S (TX Chassis) — PT06E12-10P(SR) (Free Plug)



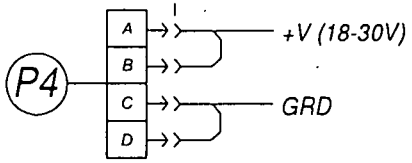
AUDIO INTERFACE

PT02E-12-10S (TX Chassis) — PT06E12-10P(SR) (Free Plug)



POWER INTERCONNECT

PT02E-12-4P (TX Chassis) — PT06E12-4S(SR) (Free Plug)



TOLERANCE INFO:
ALL DIMENSIONS ARE IN INCHES.
DECIMAL .XX ±.01, .XXX±.0025, ANGULAR ± .3°
HOLE SIZE +.003, -.002, CONCENTRICITY ±.001,
FLATNESS ±.0025, SURFACE FINISH 63 OR BETTER

CONFIDENTIAL INFO:
THIS DOCUMENT AND INFORMATION IT CONTAINS IS CONFIDENTIAL AND THE SOLE PROPERTY OF JANTEQ INC. AND MAY NOT BE REPRODUCED OR DISTRIBUTED WITHOUT THE WRITTEN CONSENT OF JANTEQ INC.

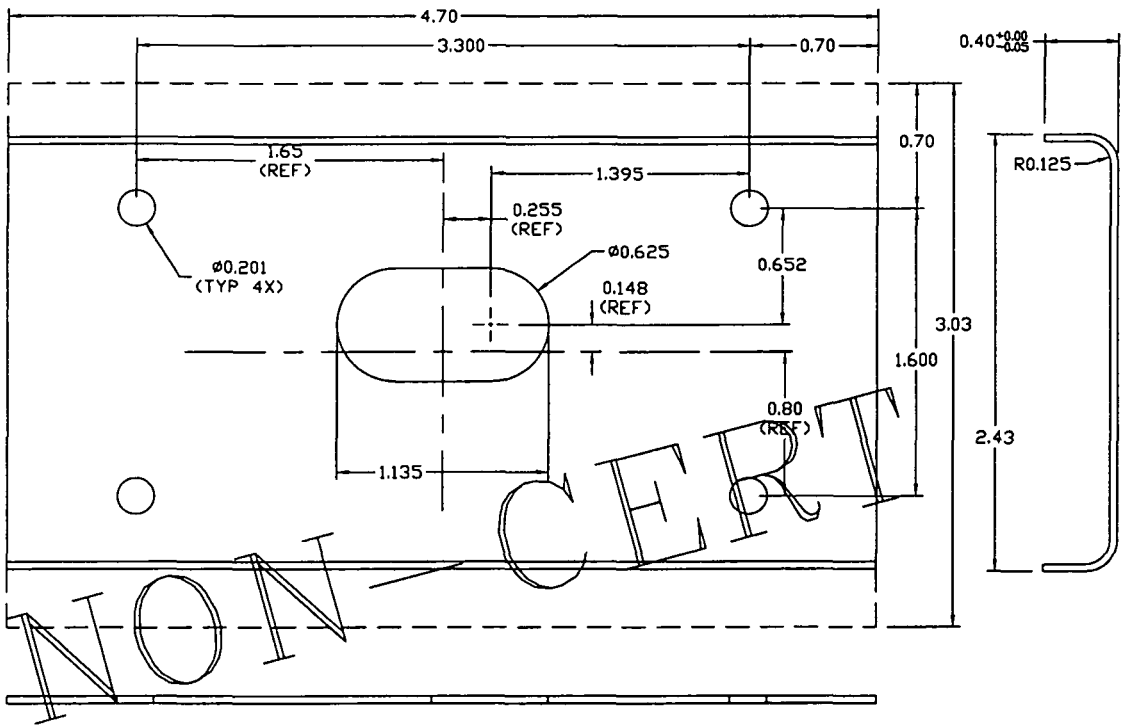
PART NO: 1011139
REV: A
DESIGNER: J PORTER
ENGINEER: O REYES
SHEET: 1 OF 1
DATE: 3/16/2011

AVIATION Tx WIRING INTERFACE

JANTEQ CORPORATION
9272 JERONIMO RD.
IRVINE, CA. 92618
PH: (949) 215-2603
FAX: (949) 215-2604

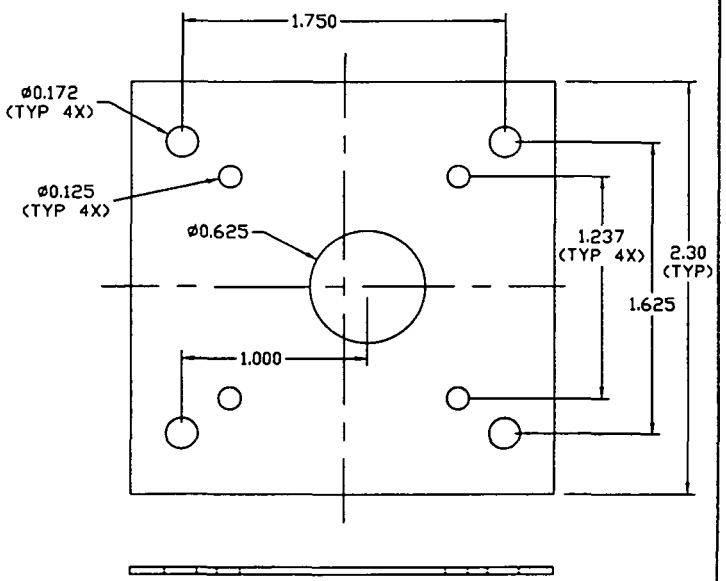
FINISH: ANODIZE PER MIL-A-8625 TYPE II, CLASS 2, COLOR OPTIONAL (OR EQUIV.)
ALT: BLACK POLYURETHANE POWDER COAT CARDINAL #T006-BK05 (OR EQUIV.)
ALT: EPOXY PRIMER PER MIL-P-23377E TYPE I, CLASS 1 (OR EQUIV.)

SHEET	REV	ECO	DATE	DESCRIPTION	BY	APR	CHK
1	A		12/04/2008	ADDED ø0.625, 4X ø0.172, HOLES	BNS	REB	LS
1			12/14/2009	ADDED -2 NON-CERTIFICATED.	BNS	REB	LS
1			03/05/2010	ADDED WTS., REF DIMS 1.65 & 0.80 NON-CERTIFICATED.	BNS	REB	LS
1			06/03/2011	ADD FLANGE BENDS, SLOTTED HOLE -2 NON-CERT.	REB		



-2 DOUBLER

MAT'L: 6061-T6 QQ-A-250/11 AMS 4027
STOCK: 0.040 SHEET
EST. WEIGHT = 0.05 LBS



-1 DOUBLER

MAT'L: 6061-T6 QQ-A-250/11 AMS 4027
STOCK: 0.040 SHEET
EST. WEIGHT = 0.02 LBS

BREAK ALL SHARP EDGES

PROTO

N/C

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ± .1
.XX = ± .05
.XXX = ± .010
ANGLES = ± 1°
THREADS:
INTERNAL=CLASS 2B
EXTERNAL=CLASS 2A

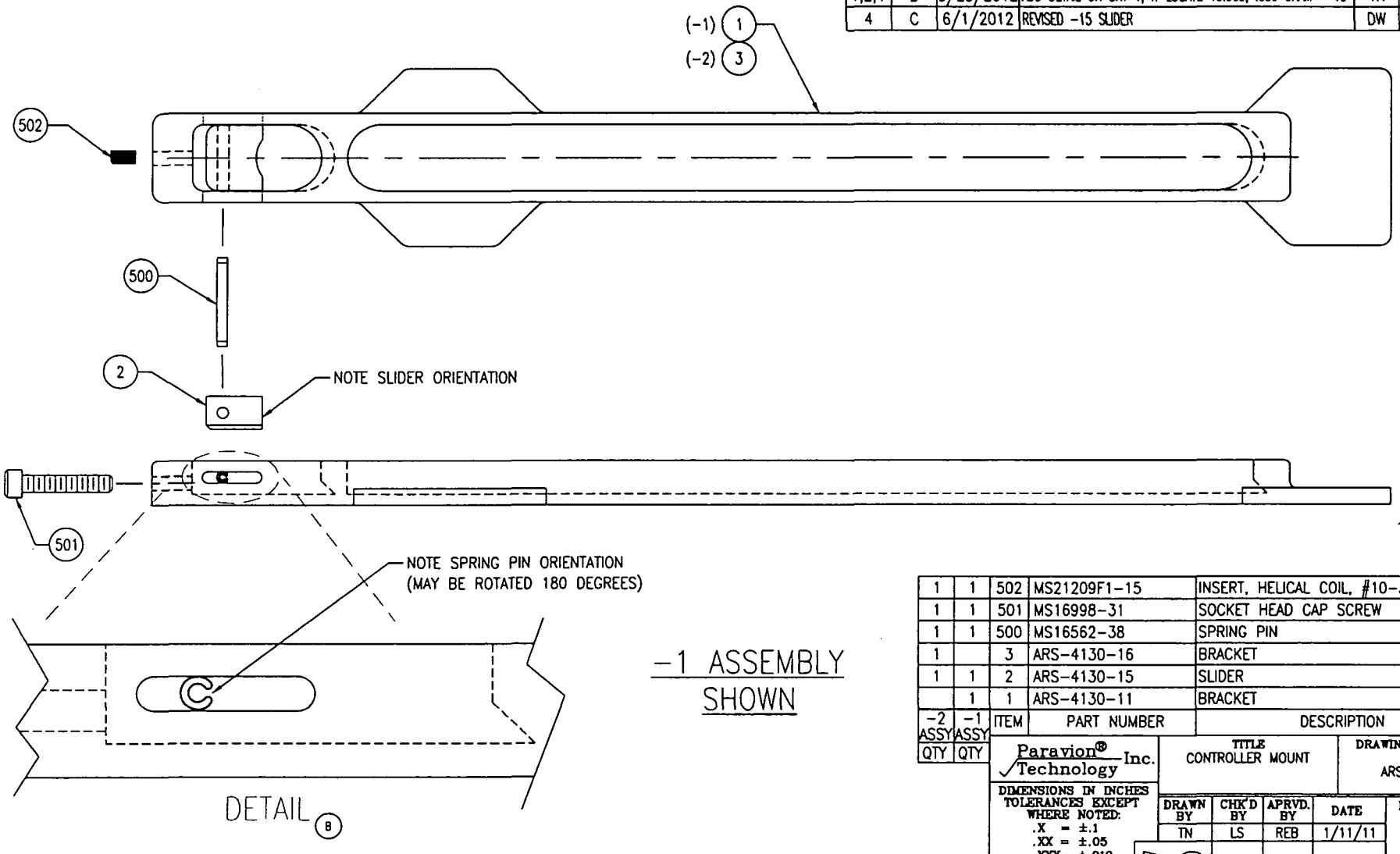
TITLE	DRAWING NO.
DOUBLER	ARS-4100

DRAWN BY	APRVD. BY	CHK'D BY	DATE	REV	ECO
BNS	REB	LS	12/21/2007	A	

DO NOT SCALE DRAWING

SHEET 1 OF 1

SHEET	REV	DATE	DESCRIPTION	BY	APR	CHK
1,3,4	A	3/11/11	ADD -16 BRACKET: REVISED PARTS PER PROTOTYPE	REB	REB	LS
1,2,4	B	3/23/2012	ADD DETAIL ON SHT 1; X-LOCATE 13.963, .050 CHAM -15	TN	REB	LS
4	C	6/1/2012	REVISED -15 SLIDER	DW		



-1 ASSEMBLY SHOWN

-2 ASSY QTY	-1 ASSY QTY	ITEM	PART NUMBER	DESCRIPTION
1	1	502	MS21209F1-15	INSERT, HELICAL COIL, #10-32
1	1	501	MS16998-31	SOCKET HEAD CAP SCREW
1	1	500	MS16562-38	SPRING PIN
1		3	ARS-4130-16	BRACKET
1	1	2	ARS-4130-15	SLIDER
	1	1	ARS-4130-11	BRACKET

Paravion® Technology Inc.

TITLE: CONTROLLER MOUNT

DRAWING NUMBER: ARS-4130

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

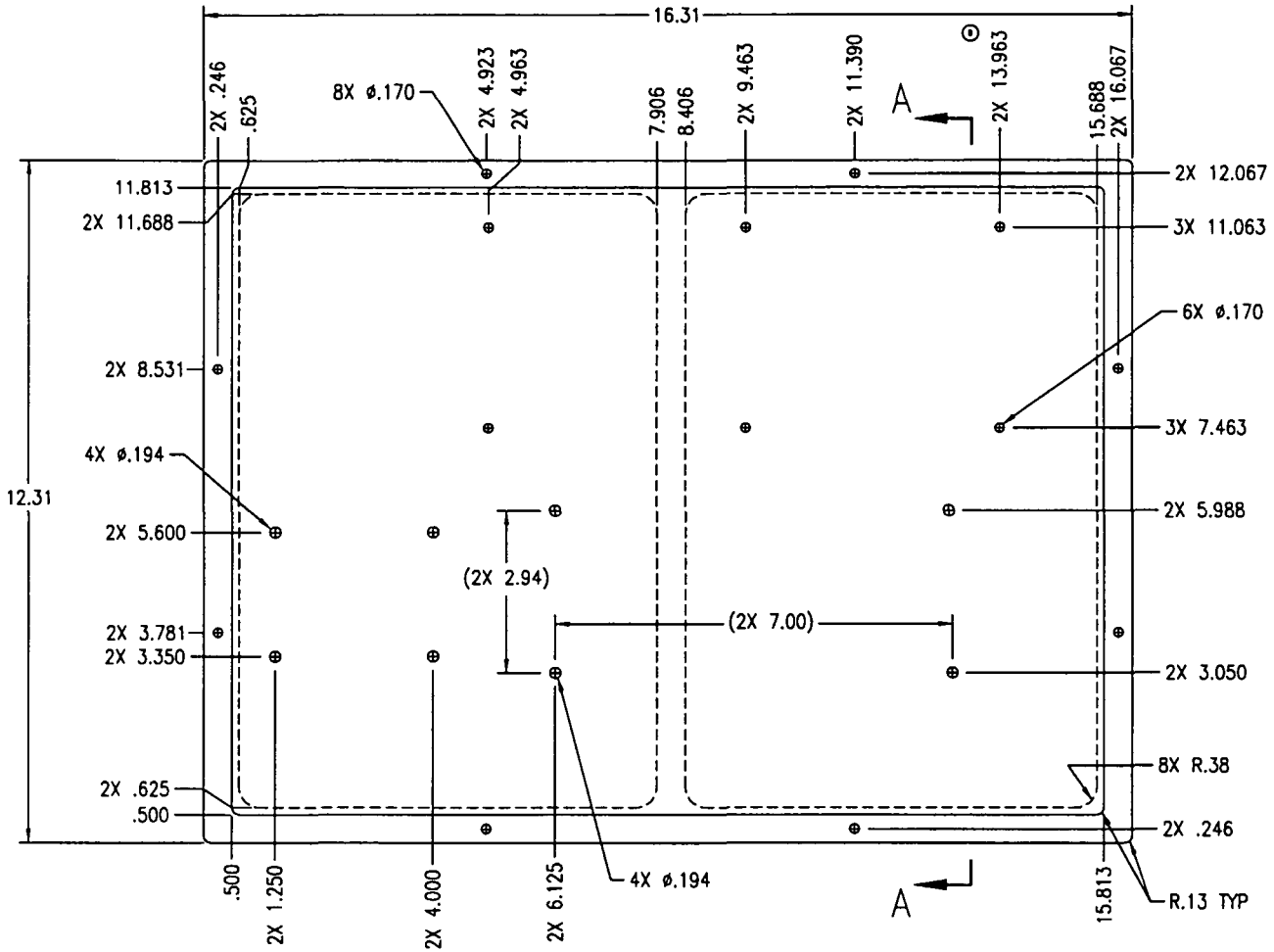
DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	1/11/11	C	

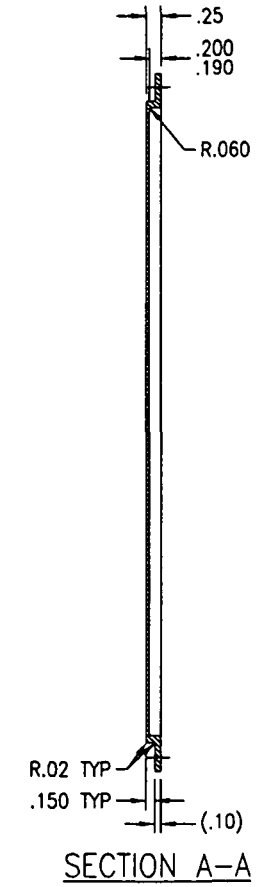
3RD ANGLE PROJECTION

DO NOT SCALE DRAWING

SHEET 1 OF 5

PROTO





SECTION A-A

-10 PLATE

REC. MAT'L: .25 THK 6061-T6 ALUMINUM PLATE, QQ-A-200/11
FINISH: POWDER COAT COLOR: RED (CARDINAL T009-RD03)

NOTES:

1. BREAK ALL SHARP EDGES.
2. ALL INTERNAL AND EXTERNAL RADII TO BE .02-.03 UNLESS OTHERWISE SPECIFIED.

PROTO

Paravion® Technology Inc.

TITLE: CONTROLLER MOUNT

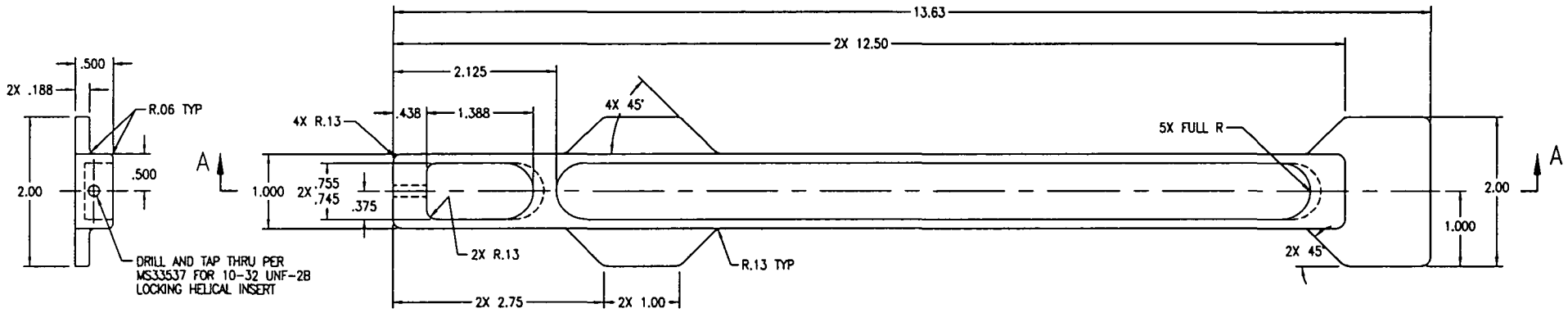
DRAWING NUMBER: ARS-4130

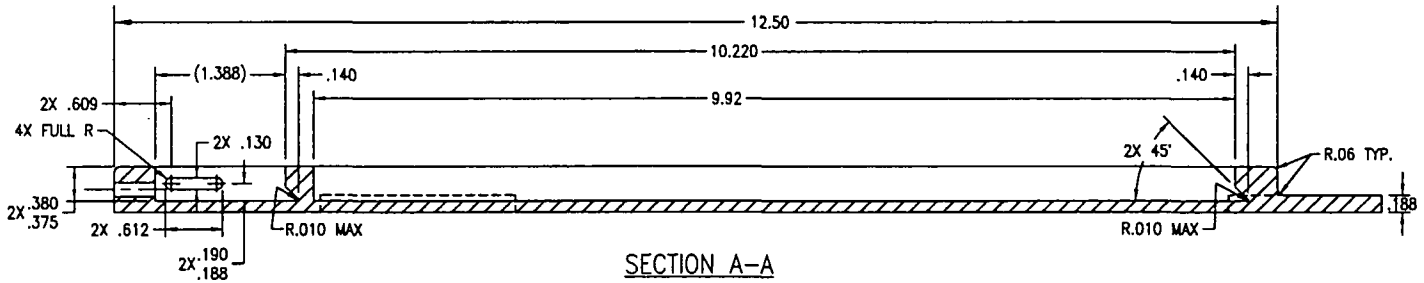
DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	1/11/11	C	

3RD ANGLE PROJECTION

DO NOT SCALE DRAWING





SECTION A-A

-11 BRACKET

REC. MAT'L: 2.00" X .50" THK 6061-T6 ALUMINUM BAR, QQ-A-200/8
FINISH: ANODIZE PER MIL-A-8625 TYPE II, CLASS 2, COLOR: BLACK

PROTO

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

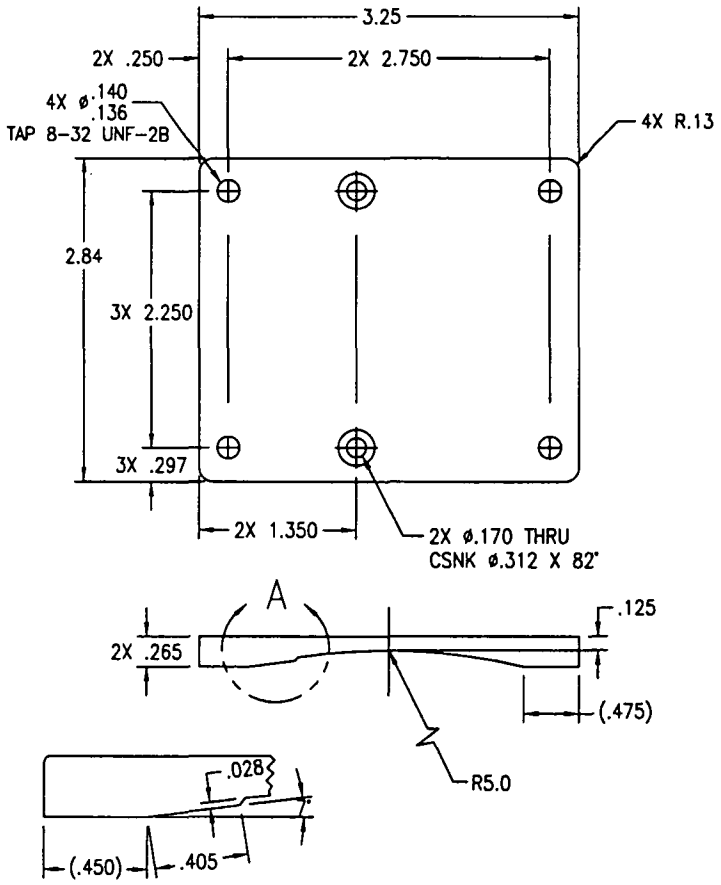
TITLE: CONTROLLER MOUNT

DRAWING NUMBER: ARS-4130

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	1/11/11	C	

DO NOT SCALE DRAWING

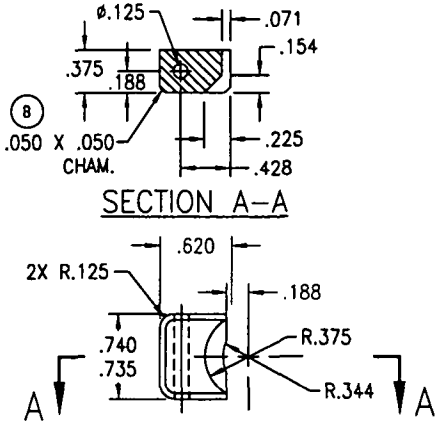
SHEET 3 OF 5



DETAIL A
(SCALE 2/1)

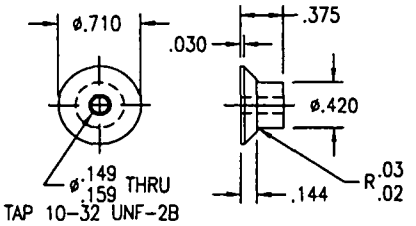
-12 PLATE

REC. MAT'L: 3.0" X .38" THK 6061-T6 ALUMINUM BAR, QQ-A-200/8 ASTM B221
FINISH: POWDER COAT COLOR: BLACK (CARDINAL T006-BK05)



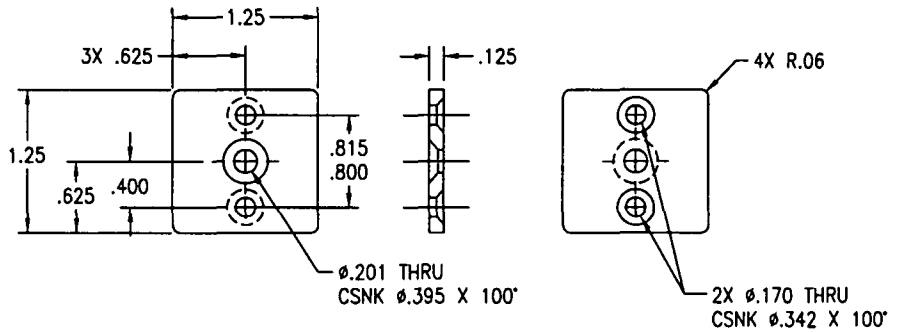
-15 SLIDER

REC. MAT'L: .75" X .38" THK 6061-T6 ALUMINUM BAR QQ-A-200/8 ASTM 221
FINISH: ANODIZE PER MIL-A-8625 TYPE II, CLASS 2, COLOR: BLACK



-14 FOOT

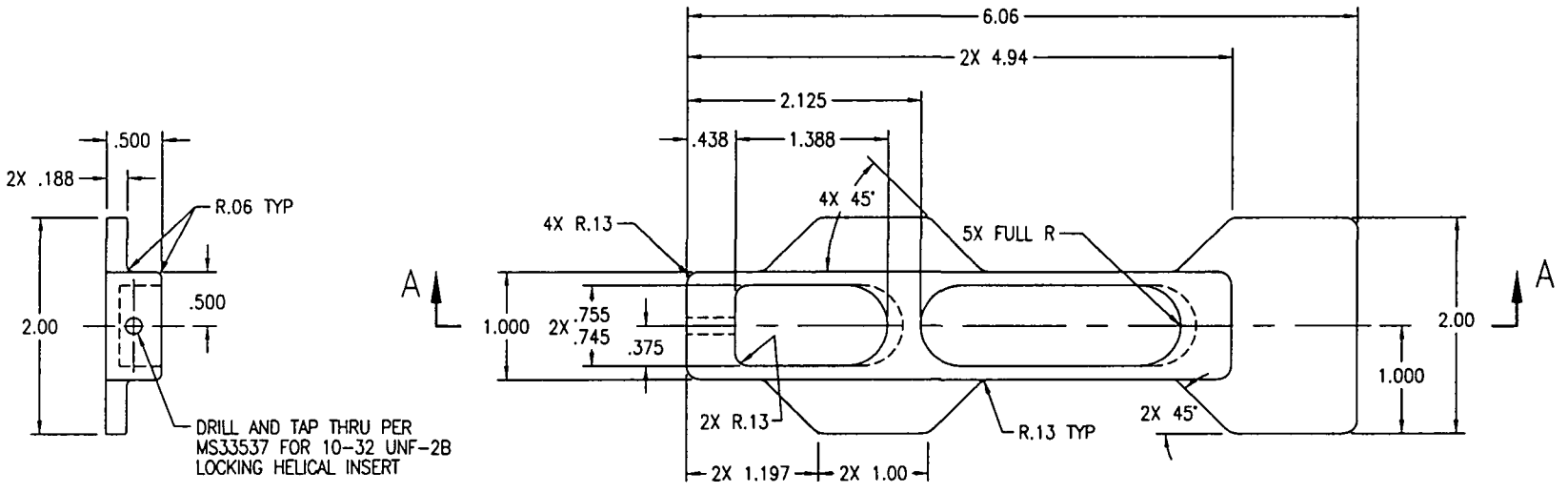
REC. MAT'L: ø.75" 6061-T6
ALUMINUM RND, QQ-A-200/8 ASTM 221
FINISH: ANODIZE PER MIL-A-8625 TYPE II,
CLASS 2, COLOR: BLACK

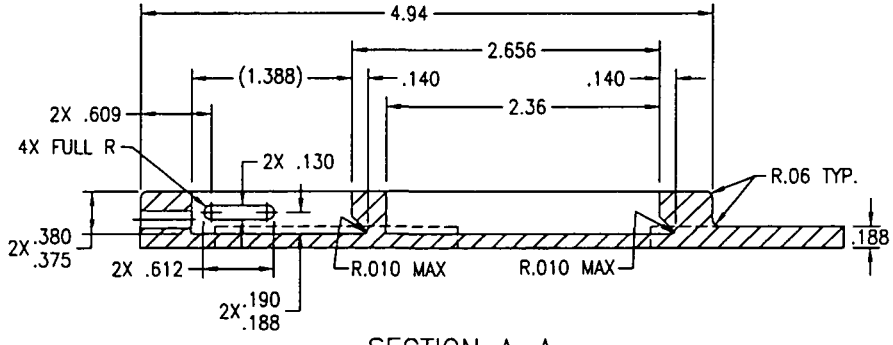


-13 MOUNT PLATE

REC. MAT'L: .125" THK 6061-T6 ALUMINUM SHEET, QQ-A-250/11 ASTM 209
FINISH: ANODIZE PER MIL-A-8625 TYPE II, CLASS 2, COLOR: BLACK

Paravion® Technology Inc.	TITLE: CONTROLLER MOUNT				DRAWING NUMBER: ARS-4130	
DIMENSIONS IN INCHES TOLERANCES EXCEPT WHERE NOTED: .X = ±.1, .XX = ±.05, .XXX = ±.010, ANGLES = ± 1°, THREADS: INTERNAL: CLASS 2B EXTERNAL: CLASS 2A	DRAWN BY: TN	CHK'D BY: LS	APRVD. BY: REB	DATE: 1/11/11	REV: C	ECO:
-CONFIDENTIAL INFORMATION- THE INFORMATION AND DATA CONTAINED HEREIN IS PROPRIETARY AND IS SUBMITTED IN CONFIDENCE AND SHALL NOT BE DISCLOSED, USED OR DUPLICATED FOR ANY PURPOSE WHATSOEVER WITHOUT THE PRIOR WRITTEN PERMISSION OF PARAVION TECHNOLOGY, INC.	PROTO	3RD ANGLE PROJECTION	DO NOT SCALE DRAWING		SHEET: 4 OF 5	





SECTION A-A

-16 BRACKET

REC. MAT'L: 2.00" X .50" THK 6061-T6 ALUMINUM BAR, QQ-A-200/8
FINISH: ANODIZE PER MIL-A-8625 TYPE II, CLASS 2, COLOR: BLACK

PROTO

Paravion® Technology Inc.

DIMENSIONS IN INCHES
TOLERANCES EXCEPT WHERE NOTED:
.X = ±.1
.XX = ±.05
.XXX= ±.010
ANGLES=± 1°
THREADS:
INTERNAL: CLASS 2B
EXTERNAL: CLASS 2A

3RD ANGLE PROJECTION

TITLE: CONTROLLER MOUNT

DRAWING NUMBER: ARS-4130

DRAWN BY	CHK'D BY	APRVD. BY	DATE	REV	ECO
TN	LS	REB	1/11/11	C	

DO NOT SCALE DRAWING

SHEET: 5 OF 5

United States of America

Department of Transportation Federal Aviation Administration

Supplemental Type Certificate

Number SA00294DE

This certificate, issued to Paravion Technology, Inc.
2001 Airway Avenue
Fort Collins, CO 80524

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3 *of the* Civil Air *Regulations.*

Original Product—Type Certificate Number: 3A13

Make: Cessna

Model: R182, 182R, 182T, T182T, 182Q, & 182S

Description of the Type Design Change:

Installation of an external Infrared Imaging System in accordance with Paravion Technology Master Drawing List Report No. DL-C182IR-100, Revision N/C, dated March 19, 1997, or later FAA approved revision.

Limitations and Conditions:

1. Compatibility of this design change with previously approved modifications must be determined by installer.
2. A copy of this certificate and Flight Manual Supplement must be maintained as part of the permanent records for the modified aircraft.
3. FAA approved Aircraft Flight Manual Supplement, PR-C182IR-100M, Revision 0, dated June 6, 1997, or later FAA approved revision is required.
4. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: January 10, 1997

Date reissued:

Date of issuance: June 10, 1997

Date amended: 2/18/98; 4/8/04; February 17, 2009

By direction of the Administrator

Melissa Sandow *(Signature)* Program Manager
Northwest Mountain Region
Denver Aircraft Certification Office
(Title)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

FAA Form 8110-2(10-68)

PARAVION TECHNOLOGY, INC.
2001 AIRWAY AVENUE
FT. COLLINS, COLORADO 80524

ER-C182ELP-2

Rev. N/C

Structural Substantiation Engineering Report for FLIR TALON Installation on Cessna Model 182 Aircraft

Robert E. Bristol Oct. 12, 2011

Prepared by: Date:
Robert E. Bristol

Lawrence J. Stark 10-12-2011

Reviewed by: Date:
Larry Stark

Revision History

Revision	Date	Detail of Changes	By
N/C	10-12-2011	Original REB	REB

Acronyms

AC	Advisory Circular
A/C	Aircraft
ACO	Aircraft Certification Office
CFR	Code of Federal Regulations
CP	Certification Plan
DER	Designated Engineering Representative
FAA	Federal Aviation Administration
KEAS	Knots Equivalent Airspeed
KIAS	Knots Indicated Airspeed
STC	Supplemental Type Certificate
TBD	To Be Determined
TC	Type Certificate
TCDS	Type Certification Data Sheet

Based on model R182

V_A	Design Maneuvering Speed = 112 knots (Ref. TCDS 3A13)
V_c	Design Cruising Speed = 160 knots (Ref. Cessna Literature)
V_{NE}	Never Exceed Speed = 182 knots (Ref. TCDS 3A13)
V_D	Dive Speed; 230 knots Ref. CFR14, 23.335

References

Document No.	Document Title
TCDS 3A13 Revision 69, April 20, 2009	Type Certification Data Sheet for Cessna Model 182
AC 23-19A	Airframe Guide for Certification of Part 23 Airplanes
Ref. 1	MMPDS-03, "Metallic Materials and Elements for Flight Vehicle Structures", U.S. Government Printing Office, Washington, D.C.
Ref. 2	Fluid Dynamic Drag, Hoerner, S.F.
Ref. 3	NACA-TN 2960 "Drag of Circular Cylinders for Wide Range of Reynolds Numbers and Mach Numbers"
	"Airframe Stress Analysis and Sizing", 2nd Edition, Michael C. Y. Niu, Hong Kong Conmilit Press, Ltd.
	"Analysis and Design of Flight Vehicle Structures", E. F. Bruhn, Jacobs Publishing, Inc.
	"Stress Concentration Factors", R.E. Peterson, John Wiley & Sons, 1974
	"Introduction to Flight", J. D. Anderson, McGraw-Hill Book Company

1.0 Introduction

1.1 Purpose and Scope

This report presents structural substantiation for the C182ELP-100 External Loads Provision Installation as installed to support FLIR Talon imaging unit installation. This report shows compliance to 14 CFR 23.301(a)(b)(c), 23.303, 23.305, 23.307(a), 23.321, 23.333, 23.335(a)(b), 23.337(a)(b), 23.341, 23.441(a), 23.443(a)(c), 23.471, 23.473(a)(d)(e)(g), 23.479, 23.481(a)(b), 23.483, 23.485,23.493, 23.613, 23.619 and 23.625(a). All regulations are as set forth in Amendment 61 to CFR14, Part 23.

Representative External Loads Provision Installation, with reference load installed, is shown in Figure 1.

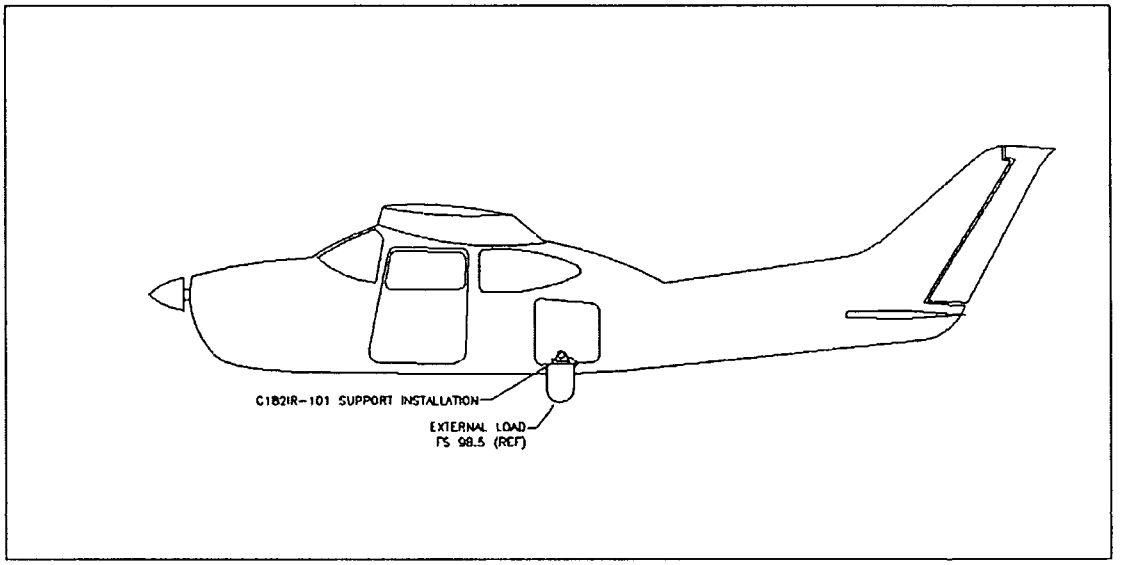


Figure 1 - External Loads Provision Installation

The External Loads Provision is mounted to the floor of the Cargo compartment of Cessna 182 aircraft, and extends through a hole cut through the Cargo compartment door. This mount accepts a second mount bracket, which is designed to accept a mount plate to which the external load is attached. This report documents loading (load weight, shape, and mount plate configuration) applicable to use with FLIR TALON system installed.

1.2 Compliance Summary

The design and analysis of the modification shows that the installation meets all applicable structural requirements identified below. The minimum margin-of-safety for each installation is shown in Table 1. Analysis begins at the FLIR TALON imager unit installation and proceeds installation of the Support Assembly (C182IR-1012) to the Cargo Compartment floor.

. Margin-of-safety greater than 500% is reported as HIGH.

Minimum Margin of Safety Summary

Section	Description	Mode of Failure	Margin
Attached Calculations	SX5-606-1 Support Plate (1/4-inch 6061-T6)	Shear-Thru	High
	SX5-606-1 Support Plate, Load Attaching Bolt	Tension	411%
	IR-4301- 10 Adapter Plate (Outer Bolt Circle)	Attaching Bolt Tension	High
	IR-4301- 10 Adapter Plate (Outer Bolt Circle)	Attaching Bolt Tear-Thru	High
Attached Calculations	IR-1040 Support Assy (Mount Bracket)		
	Channel Rivets Installation	**Shear**	132%
	Bracket Installation, AN525-10 Screws	**Shear**	High
	Torsional Stress	**Shear**	491%
	Bending	**Tension**	High
	Rotation Lock	**Static Friction**	98%
Attached Calculations	IR-1060-1 Bolt (1/4-28, 303 Stainless)	Tension, assuming 50-70 in-lb Wrench Torque	6%
Attached Calculations	C182IR-1012 Support Assy Instn		
	Tube Torsional Stress	Shear	High
	Attaching Screws, IR-1032, NAS1303	Shear	77%
	Cargo Floor Screws MS35207-264, Tension	Tension	259%

Regulatory compliance for this change isbased on the following:

14 CFR; Part 23 including Amendments 23-1 through 23-61.

Table 1 – Compliance Summary

14 CFR	Title	Amdt.	Compliance Statement
	Subpart C - Structure		
	GENERAL		
23.301 (a)(b)(c)	Loads.	23-48	The installation is analyzed for limit loads as calculated in this document. Appropriate Factor of Safety and Fitting Factor are included as part of this analysis
23.303	Factor of safety.	23-0	All limit loads are multiplied times a 1.5 factor of safety.
23.305	Strength and deformation.	23-45	Analysis shows that the modified structure is able to support limit loads without detrimental or permanent deformation.
23.307 (a)	Proof of structure.	23-0	Analysis using reliable methods shows that strength and deformation requirements for 23.305 are met for all load cases in 23.301.
	FLIGHT LOADS		
23.321	General.	23-45	Flight load factors for critical altitudes and weights for the flight envelope defined in the POH are used in the analysis. Compressibility effects are not significant.
23.333	Flight envelope.	23-34	Installation of Talon System does not alter the flight characteristics of the OEM aircraft. A flight envelope for use in applied loads on ELP is generated in a conservative manner.
23.335(a)(b) (c)(d)	Design airspeeds.	23-48	The installation of Talon System does not alter the design airspeeds of the aircraft. A flight envelope for use in applied loads is generated in a conservative manner.
23.337(a)(b)	Limit maneuvering load factors.	23-48	Limit maneuver load factors as prescribed in the regulation for normal category aircraft are used in the analysis with FLIR Talon System installed.

23.341(c)	Gust load factors.	23-48	Limit gust load factors as calculated per 23.341(c) are used in the analysis with FLIR Talon System installed.
	VERTICAL SURFACES		
23.441(a)	Maneuvering loads.	23-48	Maneuvering loads based on vertical surface area with FLIR Talon System installed are used in the analysis.
23.443(a)(c)	Gust loads.	23-48	Gust loads based on vertical surface area with FLIR Talon System installed are used in the analysis.
	GROUND LOADS		
23.471	General.	23-0	Installation does not alter the ground loads of the OEM aircraft. A conservative estimate of loads for use in applied loads is used in the analysis.
23.473(a)(d)(e)(g)	Ground load conditions and assumptions.	23-48	Installation does not alter the ground loads of the OEM aircraft. A conservative estimate of loads for use in applied loads is used in the analysis..
23.479	Level landing conditions.	23-45	Installation does not alter the ground loads of the OEM aircraft. A conservative estimate of loads for use in applied loads is used in the analysis.
23.481(a)(b)	Tail down landing conditions.	23-0	Installation does not alter the ground loads of the OEM aircraft. A conservative estimate of loads for use in applied loads is used in the analysis..
23.483	One-wheel landing conditions.	23-0	Installation does not alter the ground loads of the OEM aircraft. A conservative estimate of loads for use in applied loads is used in the analysis..
23.485	Side load conditions.	23-45	Installation does not alter the ground loads of the OEM aircraft. A conservative estimate of loads for use in applied loads is used in the analysis.
23.493	Braked roll conditions.	23-0	Installation does not alter the ground loads of the OEM aircraft. A conservative estimate of loads for use in applied loads is used in the analysis.

	Subpart D – Design and Construction		
23.601	GENERAL	23-0	N/A
23.613	Material strength properties and design values.	23-45	Statistically based material strength properties from MMPDS are used in the analysis. 'A' basis values are used for single member structural elements and 'B' basis values are used for redundant structure.
23.619	Special factors.	23-45	Standard analysis and aerospace grade materials are used for the design so no special factors of safety are required to address uncertainty, deterioration or appreciable variability.
23.625 (a)	Fitting factors.	23-7	A fitting factor of 1.15 was applied to each fitting substantiated by analysis. No additional fitting factor is required for continuous joints with multiple fasteners and section properties typical of the member being spliced.

Analysis is based on ultimate maneuvering load factor, gust load factor requirements, and ground loading requirements. It is shown that external load installation within loading limits will not have detrimental or permanent deformation during flight operations within certificated aircraft limitations.

FLIGHT ENVELOPE

	(knots) V_p =	n_p =
"Maneuvering"	112	3.93
"Cruise"	160	5.62
"Dive"	230	4.32
"Maneuvering"	112	-1.57
"Cruise"	160	-3.62
"Dive"	230	-2.32
"Landing"	49	2.05

Vel_p =

RESULTS SUMMARY:

Margins-of-Safety:

Cd = 0.85

MS_1 = 1054% **(HIGH) Mount Plate Shear Thru**
MS_{11} = 5857% **Tear-Thru, IR4301 Skirt**

MS_2 = 411% **Mount Plate Screws, Tension**
MS_{21} = 1317% **AN3, IR-4301 Skirt**

MS_3 = 132% **Rivet Shear, Channels Instn**

MS_4 = 557% **(HIGH) Screw Shear, Bracket Instn[AN525]**

MS_5 = 491% **Torsional Stress, Inner Spt Tube**

MS_8 = 507% **(HIGH)Bending Stress, Inner Spt Tube**

MS_6 = 857% **(HIGH) Torsional Stress, Outer Support Tube**

$MS_7 = 98\%$ **Based on Friction Lock at Tapered Collar, IR-1060-1 Bolt at 50-70 in.-lb. Wrench Torque(40000 psi Tension)**

$MS_{71} = 9\%$ **Based on Shear(MS27039-1-11) Anti-Rotation Lock Screw Only**

$MS_{90} = 139\%$ **Cargo Compartment Mount Bracket Screws, Shear, Based on MS27039, #10-32**

$MS_{92} = 488\%$ **MS35207-264 Cargo Compartment Mount Bracket Screws, Tension**

$MS_{10} = 6\%$ **Tension Stress, IR-1060-1 Bolt at 50-70 in.-lb. wrench torque.**

NOTE: Worst-Case Tension Loading imposed on the (10)CR3214-4 Rivets fastening the inboard end of the C182IR-1022 Support to the Cargo Floor is 27 lb. (3 lb. per rivet). These rivets are rated to 250 lb. tension each rivet.

Worst-Case Tension Loading imposed on the (4) #10 screws at the outboard end is 165 lb. (42 lb. per screw). These screws are rated to 1200 lb. tension.

2.0 External Loads

2.1 Model Information

This document is applicable to:

Cessna model 182; 182Q, 182R, 182S, 182T, T182T, R182*

Type Certificate (TC) Holder:

Cessna Aircraft Company

P. O. Box 7704

Wichita, Kansas 67277

Type Certification Data Sheet (TCDS):

3A13 Revision 69, April 20, 2009

Basic Aircraft Information from TCDS– Model 182:

Lycoming 0-540., 235 Horsepower at 2400 rpm (R182)

Maneuver speed. V_A = 112 KIAS (R182)

Never Exceed Speed, V_{NE} = 182 KIAS (R182)

Maximum Takeoff Weight = 3,100 Lbs.

Maximum Landing Weight = 2,950 Lbs.

Basic Aircraft Information for Cessna website:

Maximum Useful load = 1,030 Lbs.

Wing Span = 36 Ft.

Standard Empty Weight = 2,095 Lbs.

Wing Area = 174 sq. ft.

Wing Loading = 3100 Lb./174 sq. ft. = 17.816 Lbs/sq ft

Stall Speed = 49 KCAS

- R182 is shown as worst-case

2.2 Load Axis System

The loads axis system is a "right-handed" system defined in the aircraft (A/C) coordinate system as follows:

X: (+) LH Outboard normal to the A/C centerline of the fuselage

Y: (+) Aft along A/C centerline of the fuselage

Z: (+) Up normal to A/C centerline along the fuselage

Acceleration loads are provided as accelerations in "G" and are aircraft accelerations. For example;

Nz = 5.0 means aircraft is accelerated 5 g's vertically upward

In evaluating an item of mass, inertial load on the part is calculated as:

Fz = -5.0g x (Wt of part)

whereby a positive acceleration imparts a negative direction inertial force.

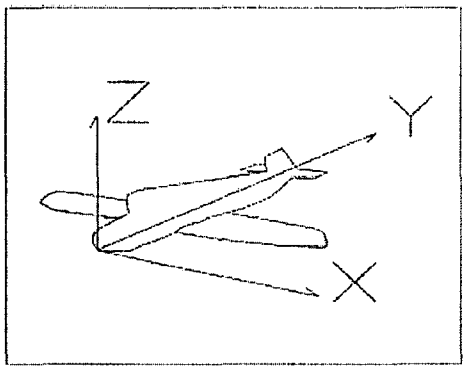


FIGURE 2, LOAD AXIS SYSTEM

2.3 Design Airspeeds

The flight envelope is per 23.333 and TCDS information:

Design Maneuvering Speed, V_A = 112 KIAS

Minimum design cruising speed calculated per 14 CFR 23.335(a):

Where: W = 3100 S = 174 V h = 182 KIAS (V_{NE}, R182)

Ref. 23.335(a)(1) $Vc := 33 \cdot \sqrt{\frac{W}{S}} = 139$ KEAS

MINIMUM; **Vc = 159 KEAS, Ref. Cessna Literature**

Ref. 23.335(a)(2)

$\frac{W}{S} = 17.82$ <20 (multiplier 33 is required.)

Ref. 23.335(a)(3) V_C need not be greater than $0.9*V_H = 0.9*182 = 164$ KEAS, Sea Level

Therefore **Vc** is set to **164 KIAS = 277 ft./sec. for this analysis**

Dive speed is calculated from 23.335(b):

Ref. 23.335(b)(2)(i) $V_D = 1.4*V_c = 230$ KEAS

Ref. 23.335(b)(3)

$\frac{W}{S} = 17.82$ <20 (multiplier 1.4 is required)

Therefore V_D is set to 230 KEAS = 388 ft./sec. **for this analysis**

2.4 Limit Maneuvering Load Factors

The maximum limit load factors at maneuvering speed Vc per 14 CFR 23.337 for normal category aircraft are used:

Ref. 23.337(a)(1)

$n := 2.1 + \frac{24000}{GW + 10000} = 3.93$ Positive, need not be greater than 3.8

Ref. 23.337(b)(1) n = 0.4*3.93 = 1.57 Negative, **for this analysis**

Pitch, yaw and rolling accelerations due to abrupt maneuvers are relatively small for this installation due to proximity or the installation to the aircraft center of gravity. Therefore the principle loads due to maneuver are as defined by 23.337.

2.5 Limit Gust Load Factors

Maximum limit gust load factors are calculated per the method in 14 CFR 23.341. A conservative airplane normal force coefficient is assumed:

$a := 2\cdot\pi = 6.28$ /radian (Note: $a\cdot\frac{\pi}{180} = 0.11$ /degree)

$g := 32.2$ feet per second per second

$\rho := 0.00238$ lb-sec^2/ft^4 (slug/ft^3)

Where: MFW = 2095 + 180 = 2275 lb. (Std Empty Weight + 1 Crew)

$$\mu g := 2\cdot\frac{\left(\frac{MFW}{S}\right)}{\rho\cdot Ch\cdot a\cdot g} = 11.24 \qquad Kg := \frac{0.88\,\mu g}{5.3+\mu g} = 0.60$$

Using

$Vc := 164$ knots

$$NpositiveCruise := 1 + \frac{Kg\cdot Udec\cdot Vc\cdot a}{498\cdot\left(\frac{MFW}{S}\right)} = 5.73 \qquad NnegativeCruise := 1 - \frac{Kg\cdot Udec\cdot Vc\cdot a}{498\cdot\left(\frac{MFW}{S}\right)} = -3.73$$

Using

$Vd := 230$ knots

$$NpositiveDive := 1 + \frac{Kg\cdot Uded\cdot Vd\cdot a}{498\cdot\left(\frac{MFW}{S}\right)} = 4.32 \qquad NnegativeDive := 1 - \frac{Kg\cdot Uded\cdot Vd\cdot a}{498\cdot\left(\frac{MFW}{S}\right)} = -2.32$$

2.6 Limit Ground Load Factors

The descent velocity in feet per second per 23.473(d) is;

$Vg = 4.4\left(\frac{W}{S}\right)^{1/4}$ = 9.0 ft./sec. where W = 3100 lb., S = 174 sq. ft.

Need not exceed 10 ft./sec., may not be less than 7 ft./sec.

The landing gear static gear deflection is measured at 2.50 inches at MTOW. This indicates that the landing gear spring rate is:

$$K = \frac{2950}{2.5} = 1{,}180\ lb.per\ inch$$

The landing gear is modeled as a simple spring mass system as shown in Figure 2 – Landing Gear System.

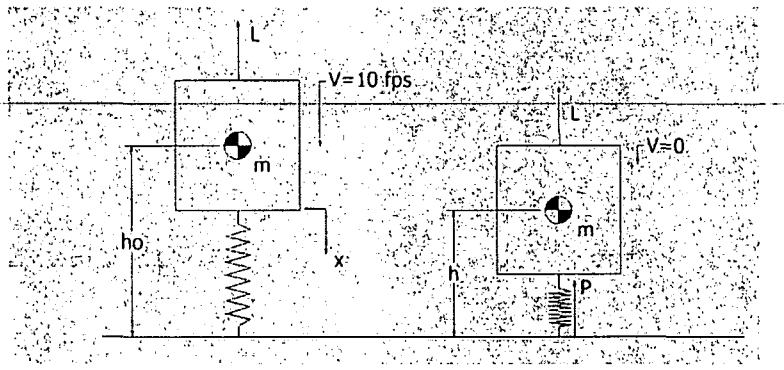


Figure 3 – Landing Gear System

The diagram above represents the airplane and landing gear at the point of initial contact with the ground where the downward velocity is 9 ft/s and the spring force is zero. Maximum acceleration occurs at the bottom of the stroke when downward velocity is zero and the spring compression and therefore resulting force and acceleration are maximum. Maximum spring compression is conservatively found by assuming the work done by the airplane is converted to spring energy. Such that;

U = ΔKE + FX = ΔSE ; Work done by the aircraft = Spring Energy increase.

$\Delta KE = \frac{1}{2}\frac{GW}{g}(v^2)$ Where v = vertical velocity at contact, reduced to 0 at maximum compression, GW = aircraft gross weight at touchdown, g = acceleration of gravity.

$FX = \frac{GW}{3}Y1$ Where wing lift equal to 2/3 of airplane weight (GW) is assumed per 23.477(e).

$\Delta SE = \frac{1}{2}KY1^2$ Where K = Spring Constant (=GW/Yo), Yo = Static Gear Deflection at aircraft weight GW, and Y1 = maximum gear deflection during landing (vertical velocity = 0)

Using the above equations, the following quadratic equation can be written:

$$Y1^2 - 2\left(\frac{Yo}{3}\right)Y1 - \left(\frac{Yo}{g}v^2\right) = 0$$

Therefore; $Y1 = \left(\frac{Yo}{3}\right) + \sqrt{\left(\frac{Yo}{3}\right)^2 + \left(\frac{Yo}{g}v^2\right)}$

Solving for the Vertical Force on the aircraft at maximum gear deflection Y1,

$$F1 = \frac{GW}{g}Y1 + \frac{2}{3}GW$$

And: $\frac{d^2}{dx^2}y = {}^{F1}\!/_{\frac{GW}{g}} = \left[\frac{Y1}{Yo} + \frac{2}{3}\right]g$

= Maximum vertical acceleration in units of g.

Where: Yo = 2.50 inches (= 0.21 ft Static Deflection) and v = 9 ft/sec., maximum vertical aircraft acceleration (inertia load factor) is calculated to be 2.1 g.

2.7 Limit Longitudinal Airloads

Limit drag load is calculated by the following equation:

$$F_Y = \frac{1}{2}\rho V^2 S C_d = \frac{1}{2}(0.00238)(v)^2(S)(Cd)$$

Where: v = airspeed in ft/sec, S = Load frontal area in sq. ft (0.83),

Cd = 0.85

2.8 Limit Lateral Maneuver and Gust Airloads

External loads can also have an exposed vertical surface which results in a side or lateral load.

These calculations are based on flat area as above (side area projection of Talon installation is equivalent to frontal projection. Drag coefficient used for sideward flow is 0.85. Forces can be resolved into a normal force or lateral load on the external load by the using the cross-flow principle in Ref 2.

$$F_N = qSC_N$$

Where the q, the dynamic pressure is;

$$q = \frac{1}{2}\rho V^2$$

The normal force coefficient for a body inclined to the flow at an angle of attack is given by.

$$C_N = C_{D\,basic}(\sin^2\alpha)$$

$$Fx = qSC_d(sin^2\beta)$$

Lateral maneuver load at speeds up to V_A is calculated per 23.441 using:

Static freestream sideslip angle equal to 15 degrees per 23.441(a)(3).

Overswing angle 1.5 times static per 23.441(a)(2).

Assuming sidewash factor equal to 2.0 to account for local flow around the fuselage side due to sideslip maneuver.

$\beta_{max} = 15 \times 1.5 \times 2.0 = 45\ deg.$

Lateral gust load at speeds up to V_C is calculated per 23.443 using:

U_{de} = 50 ft./sec. at VC per 23.333(c

V_C = 164 knots = 277 ft/sec.

Equivalent sideslip angle:

$$\beta = tan^{-1}\left(\frac{Ude}{Vc}\right) = tan^{-1}\left(\frac{50}{277}\right) = 10.2\ deg.$$

Assuming a sidewash factor equal to 2.0 to account for local flow around the fuselage side due to side gust:

$\beta_{max} = \beta(2.0) = 10.2(2.0) = 20.4\ deg.$

Lateral gust loads at speeds up to V_D are conservatively included by using the gust velocity per 23.333(c) of 25 fps.

$V_D = 371\ fps$ Vd = 230 knots = 388 ft./sec.

Equivalent sideslip angle:

$$\beta = tan^{-1}\left(\frac{Ude}{Vd}\right) = tan^{-1}\left(\frac{50}{388}\right) = 3.7\ deg.$$

$$\beta_{max} = \beta(2.0) = 3.7(2.0) = 7.4\ deg.$$

Therefore the limit lateral load for maneuver and gust conditions is as shown below, in Table 3:

Table 2 - Limit Loading for Maneuver and Gust Conditions

Condition	V (fps)	β_{MAX} (deg)	q (psf)	S (ft^2)	C_D	F_X (Lbs)	F_Y(Lbs)
Maneuver (V_A)	189	45	42.5	0.83	0.85	15	30
Gust (V_C)	270	20.4	86.8	0.83	0.85	8	61
Gust (V_D)	388	7.4	179	0.83	0.85	2	126
Landing (V_S)	83	45	8.14	0.83	0.85	3	6

2.9 Limit Inertia Loading

The Turret Weight used in this analysis is 35 lbs. The Support Assembly weight used is 5 lb. The Electronic Control Unit weight is 13 lb.

Resulting applied vertical load is computed based on the maximum N_z load factors found in sections 2.4, 2.5 and 2.6., by the following equation:

$$F_Z = -N_Z \cdot (35)$$

2.10 Net Applied External Loads

The air loads and inertia loads for a component of maximum area and weight combined for each corner of the V-n diagram are shown in Table 3.

Table 3 – Net Limit Loads at Centroid of External Load

Case - Condition	F_X (lbs)	F_Y (lbs)	F_Z (lbs)
1 - $V_{A\text{-positive}}$	15	30	-138
2 - $V_{C\text{-positive}}$	8	61	-197
3 - $V_{D\text{-positive}}$	2	126	-151
4 - $V_{A\text{-negative}}$	15	30	+55
5 - $V_{C\text{-negative}}$	8	61	+127
6 - $V_{D\text{-negative}}$	2	126	+81
7 – $V_{S\text{-Landing}}$	3	6	-72

These loads are applied at the center of area for the external load (~7.9 inches below the Support Mount Plate for the Talon installation).

Applied direct loads and Moments at evaluation locations are defined in the Calculations (MathCad Format) attached to this report. Annotations are contained in the calculations listing to define the purpose of calculations. These calculations are therefore not repeated in the body of this report.

Table 4 – Net Limit Loads at Mount Plate Surface Center

Case - Condition	N_Z	Direct Loads			Torsional Moment		
		P_X (lbs)	P_Y (lbs)	P_Z (lbs)	M_X (in-lbs)	M_Y (in-lbs)	M_Z (in-lbs)
1 - $V_{A\text{-positive}}$	+3.93	15	30	-138	227	-114	0
2 - $V_{C\text{-positive}}$	+5.62	8	61	-197	463	-59	0
3 - $V_{D\text{-positive}}$	+4.32	2	126	-151	957	-16	0
4 - $V_{A\text{-negative}}$	-1.57	15	30	+55	227	-114	0
5 - $V_{C\text{-negative}}$	-3.62	8	61	+127	463	-59	0
6 - $V_{D\text{-negative}}$	-2.32	2	126	+81	957	-16	0
7- $V_{S\text{-Landing}}$	+2.05	3	6	-72	43	-22	0

These loads are representative of the FLIR Talon installation, 35 lb. Turret, 0.83 square feet projected area and 0.85 Drag Coefficient.

3.0 Allowables

3.1 Materials

All materials used in the design are specified by industry material specification with statistically based material strength properties included in the MMPDS (Ref. 1). For the analysis 'A' basis values are used for single member structural elements and 'B' basis values maybe used for redundant structure. Aerospace grade materials with proven methods of corrosion protection are used for the design so no special factors of safety are required to address uncertainty, deterioration or appreciable variability. The environmental temperatures in the area of the design are well within the allowable range for the aluminum structure used. Therefore, no correction is required to account of the effects of temperature.

Applicable material allowables from MMPDS for the materials used in the design are summarized in Table 5.

Table 5 – Material Allowables

Material	Type	Specification	F_{tu} (ksi)	F_{cy} (ksi)	F_{su} (ksi)	F_{bru} (ksi) e/D= 2	E (msi)	MMPDS
6061-T6	Sheet 0.010-0.249	AMS- QQ-A-250/11	42	35	27	88	9.9	3.6.2.0(b_1)
6061-T62 & T6511	Plate; 0.25-2.0 in.	AMS- QQ-A-250/11	42	36	27	88	9.9	3.6.2.0(b_2)
6061-T6, & T62	Tube and Pipe 0.025 - 0.50 Wall Thick	AMS- WW-T-700/6	42	34	27	88	9.9	3.6.2.0(c_1)

Mechanical properties for the minimum strength direction are used unless otherwise noted. Bearing allowables are based on 2.0 e/D.

3.2 Fasteners

All fasteners used in the design are specified by military or industry specification with statistically based material strength properties included in the MMPDS or the fastener specification. The fasteners are aerospace grade which are well proven in this type of application. No special factors of safety are required to address uncertainty, deterioration or appreciable variability. The environmental temperatures in the area of the design are well within the allowable range for fasteners used and no correction is required to account of the effects of temperature.

Fastener allowables from MMPDS or the fastener specification are summarized in Table 6.

Table 6 – Fastener Allowables

Fastener	Type	Nominal Diameter (in)	Tension (lbs)	Single Shear (lbs)	Ref
MS27039-1-11	Screw	0.190	2500	2125	Specification MS27039
MS35207-264	Screw	0.190	1200	600 (1/2 Tension)	Specification MS35207
AN4-10A	Bolt, Steel	0.250	4080	3680	Specification AN3 – AN20
AN3-10A	Bolt, Steel	0.190	2210	2125	Specification AN3 – AN20
AN525-10	Screw, Washer Head	0.190	4780	2125	MMPDS, AN525 EngrsEdge.com Tensile Thrd Area
MS20426AD4 MS20470AD4	Rivet	0.125	N/A	319	26000 psi Mil-R-5674F

4.0 STRESS ANALYSIS

4.1 SX5-606-3 Support Plate

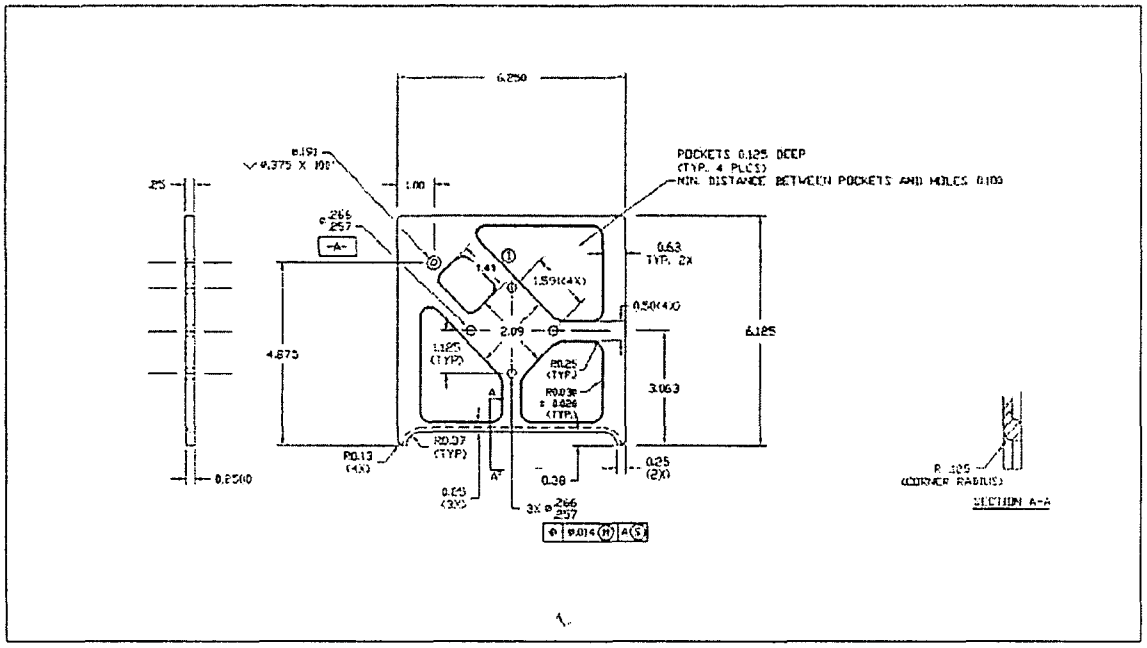


Figure 4 – SX5-606-1 Support Plate

Plate Material: 6061-T6 aluminum alloy

Fsu = 27 ksi (A)
28 ksi (B)

Ftu = 42 ksi (A)
43 ksi (B)
Ref. MMPDS, 3.6.2.0(b_1)

4.2 IR-1040 Mount Bracket

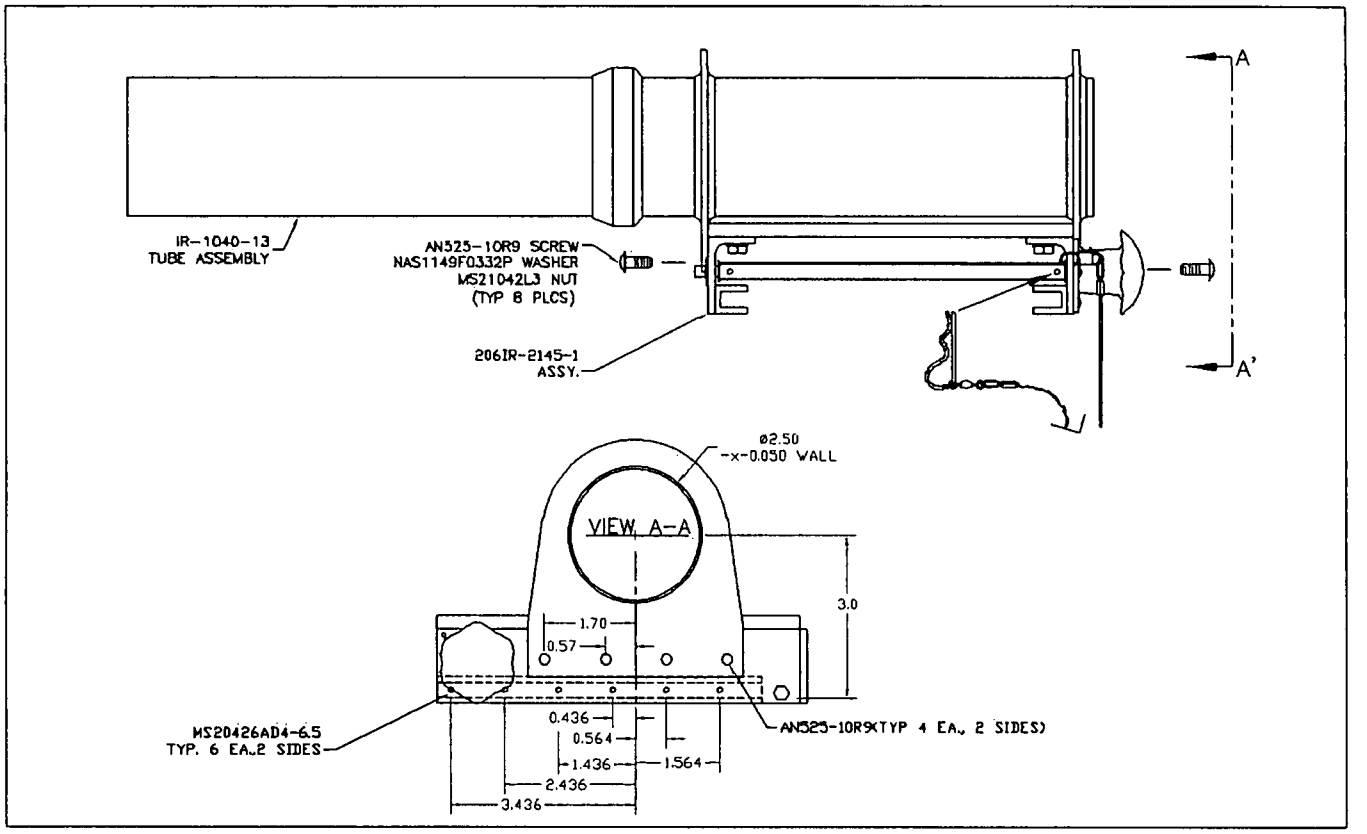


Figure 5 – Load Support Fixture (IR-1040-(X)

Note: SX5-606-1 (For FLIR Talon installation) is approximately centered in the channels shown above.

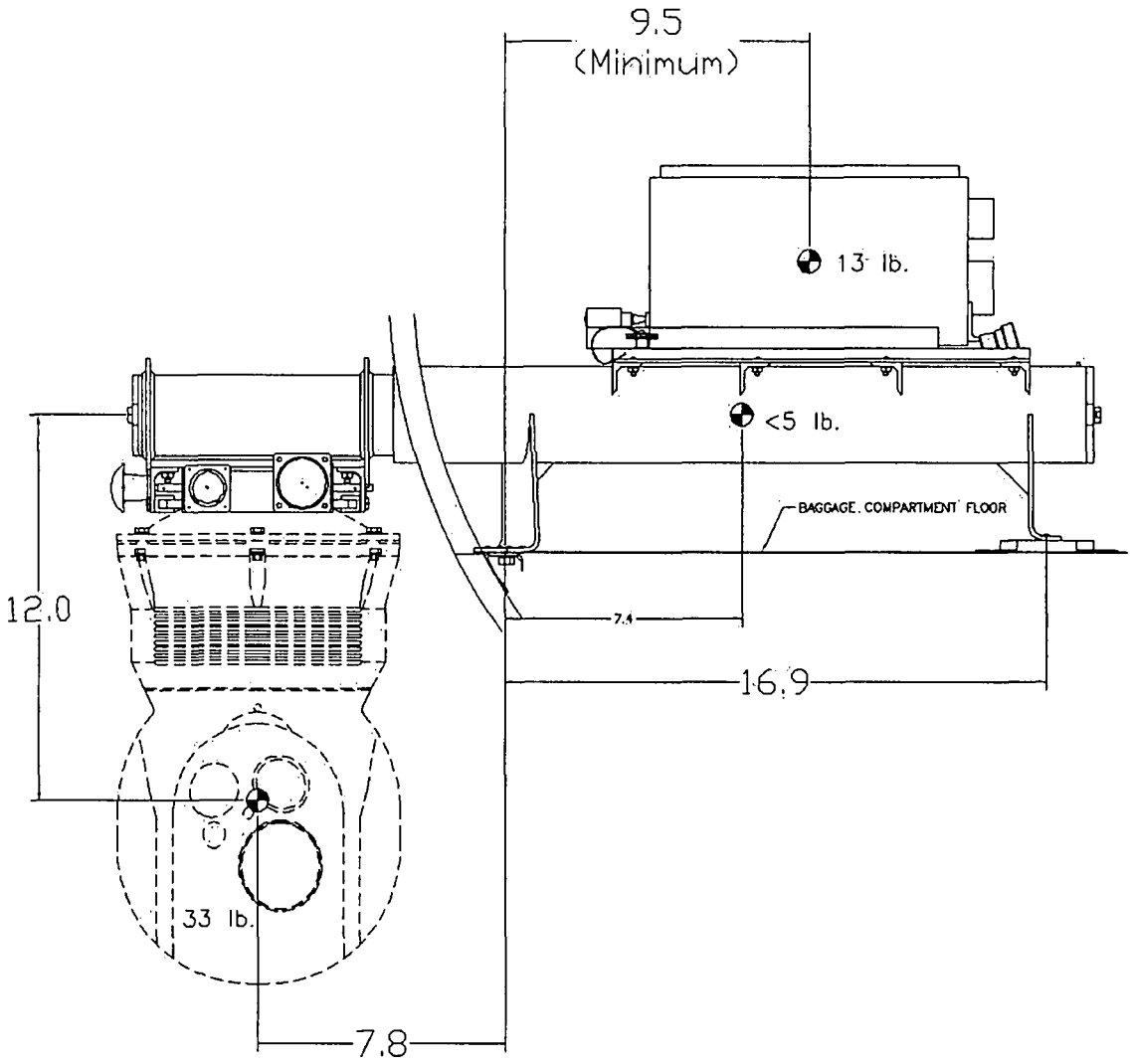


Figure 6 – Representative Load Support Installation:
IR-431-1 Assembly (Gimbal attached to IR-4301-10 and SX5-606-1),
IR-1040-(X), C182IR-1012-1

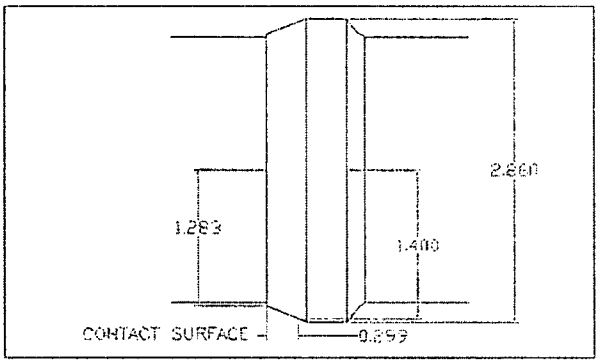


FIGURE 7, Guide Collar Detail

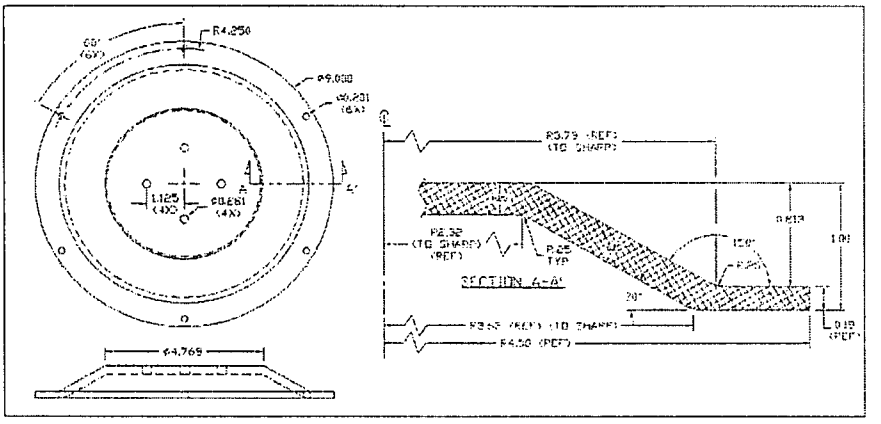


FIGURE 8, IR-4301-10 Plate

Plate Material: 6061-T6 aluminum alloy

Fsu = 27 ksi (A)
28 ksi (B)

Ftu = 42 ksi (A)
43 ksi (B)
Ref. MMPDS, 3.6.2.0(b_1)

Paravion Technology, Inc.
Fort Collins, CO

Report No. ARS-4004-901

Structural Substantiation
Equipment Installation

March 29, 2011

This report substantiates the installation of three pieces of equipment on the baggage compartment (FS 124 to FS134) shelf of a Cessna 182 aircraft. Figure 1 shows the equipment installation of the rails and the installation of the equipment on the rails.

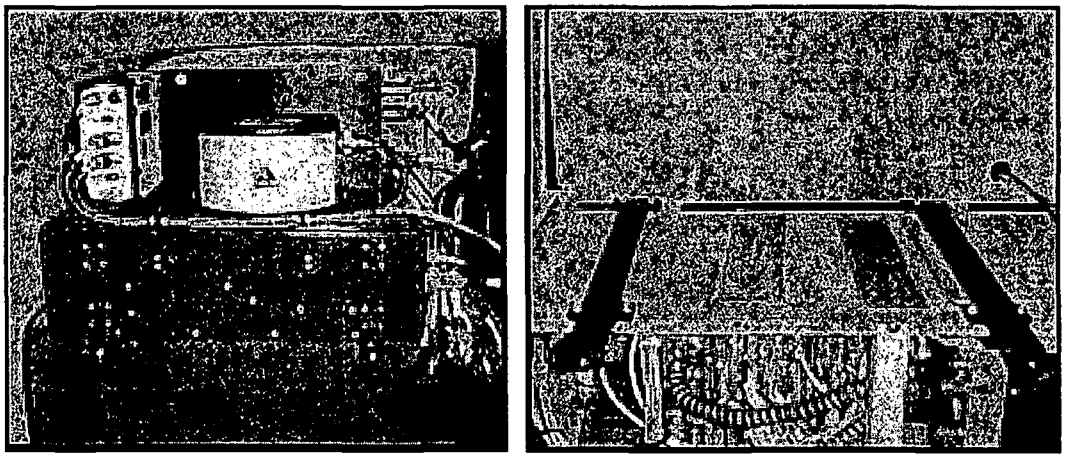


Figure 1 – Equipment Installation

Each rail is installed with two screws to the forward end of the shelf and two screws to the aft angle of the baggage shelf. The IMU is attached to the rails using four feet as shown in Figure 2. The feet are locked in place using locking blocks and roll pins.

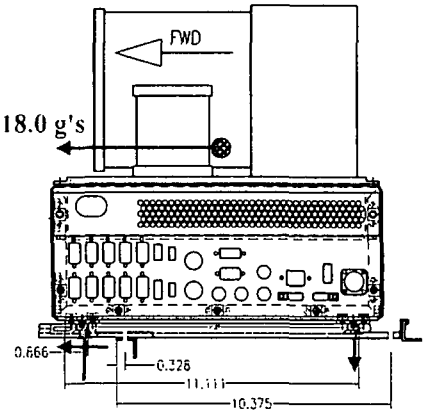


Figure 2 - Equipment Installation - Side View

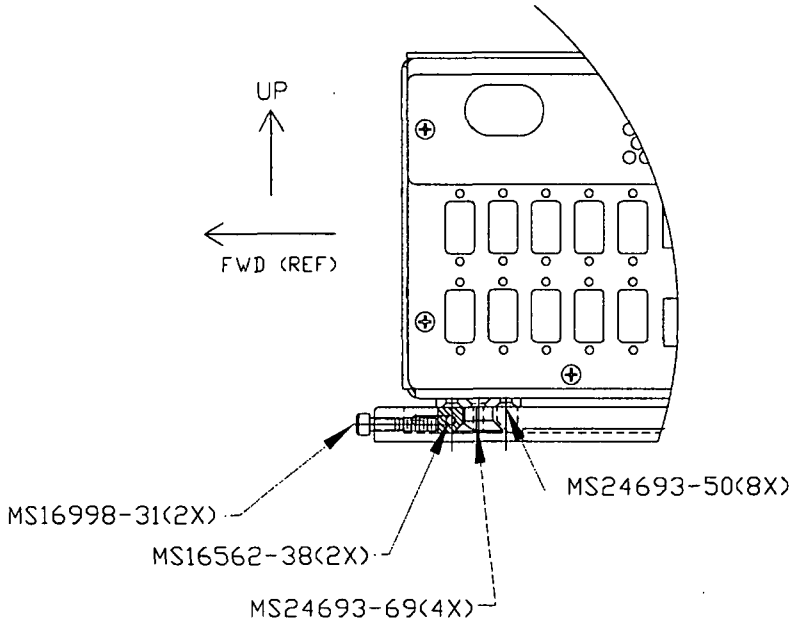


Figure 3 - Equipment Installation - DETAIL

The baggage area is placarded for 80 lbs per Cessna Pilot Operating Handbook (POH). Therefore, the vertical load is not a concern for the shelf.

The most critical condition will be the emergency forward 18.0 g's per FAR 23.561.

Max. Weight of equipment = 37.0 lbs.

Max. C.G. of equipment above shelf = 8.0 inches

Horizontal Reaction R_H = 18.0 x 37.0 = 666 lbs.

This load is reacted primarily by two MS16998-31 screws in compression. The secondary load path is two MS16562-38 pins. We can conservatively assume that only the weaker of the two load path transfers load.

Single shear rating of each roll pin = 1050 lbs.

M.S. = (2*1050/666) - 1 = + HIGH

Vertical Reaction R_V = (18.0 x 37.0 x 8.0")/(10.25") = 520 lbs.

This load is reacted by the foot in two rails.

Shear area of foot = 0.07 in2

Shear stress in foot fs = 520/2/0.07 = 3715 psi.

The foot is made using 6061-T6 aluminum, Fsu = 27000 psi.

M.S. = (27000/3715) - 1 = + HIGH

Load is transferred to baggage shelf using screws that attach the rails to shelf.

Tensile load on screws = (18.0 x 37.0 x 8.0")/(4*10.0") = 133 lbs.

Tensile Strength of MS35206 #8-32 screws (Ftu = 60 ksi) = 730 lbs.

M.S. = (730/133) - 1 = + HIGH

Based on positive strength margins of the installation, the equipment installation is adequate to meet the strength requirements of the aircraft.

PARAVION TECHNOLOGY, INC.
2001 AIRWAY AVENUE
FT. COLLINS, COLORADO 80524

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS AUGMENTED REALTIY SYSTEM INSTALLATION

This document is applicable to systems certificated under the following Supplemental Type Certificates:
SR00682DE

The above certification documents include approval for Augmented Reality System (ARS) installation to the following aircraft:

Bell 206A/B
Bell 206L, L-1, L-3, L-4
Bell 407

Paravion® Technology Inc.

RECORD OF REVISIONS

REVISION NO.	ISSUE DATE	DATE INSERTED	BY
0	Not Distributed		
1			

REVISION CONTROL PROCEDURE

Revisions to this document are mailed to owner of record. Before inserting a change, ensure this manual is correct. Check the existing List of Effective Pages in this manual to ensure that all prior revisions are inserted. **Do not insert this revision if prior revisions are not inserted.**

LIST OF EFFECTIVE PAGES

PAGE NO.	REVISION	DATE
COVER	1	04/08/08
A	1	04/08/08
i	1	04/08/08
ii	1	04/08/08
1	1	04/08/08
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11	1	04/08/08
12	1	04/08/08
A-1	1	04/08/08
A-2	1	04/08/08
B-1	1	04/08/08

Paravion® Technology Inc.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ADDITIONAL REFERENCE

AC43.13-2B Acceptable Methods, Techniques and Practices – Aircraft Alterations

AIRWORTHINESS LIMITATIONS

The Airworthiness Limitations Section is FAA approved and specifies inspections and other maintenance required under §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

No airworthiness limitation associated with this type design change.

This system has no life-limited components.

REVISION	DATE	APPROVED
0	03/20/08	
1	04/08/08	

Paravion® Technology Inc.

1.0 SYSTEM DESCRIPTION

The Paravion Technology, Inc./Churchill Navigation **Augmented Reality System** (ARS) is an accessory to certain infrared and visible light imaging system installations installed under separate certification, to add display of parcel and address overlay information to the monitor screen. The Augmented Reality System is operated by the assigned observer in accordance with imaging system certification instructions.

This accessory to the previously certificated imaging system is designed as an aid to surveillance operations, requires no pilot action, and is non-essential to safety-of-flight.

The ARS uses GPS input, to determine imaging system location and viewpoint. Touch screen commands are used to enable its various options (See Users Handbook). It is designed to consume less than 4.5 amp (28VDC), and to be powered through the imaging system circuit breaker.

1.1 The ARS installation includes the following major components:

A. Controller Assembly, 6 lbs. (2.7 kg)
B. Serial Bypass Switch, 1.2 lbs. (0.5 kg)
C. Inertial Measurement Unit, 5 lbs. (2.2 kg)
D. GPS Antenna, 0.3 lbs. (0.1 kg)
E. Cables Installation, est. 3 lbs. (~1.4 kg estimate)
F. Monitor Mount Installation (Ref.), 1.7 lbs. (0.8 kg)
G. Monitor Assembly (Ref. DBM-100-5T), 5.3 lbs (2.4 kg)

TABLE I

WEIGHT & BALANCE DATA					
ITEM	WEIGHT (lbs)	LONGITUDINAL		LATERAL	
		F.S. (in)	MOMENT (in-lbs)	B.L. (in)	MOMENT (in-lbs)
ARS-4000 Controller Assembly	6.0				
ARS-3500 Serial Bypass Switch	1.2				
ARS-3600 IMU ASSEMBLY	5.5				
GPS Antenna	0.3				
Cables Installation	3				
Monitor Installation	7				

Note: This table is to be completed upon system installation.

Component Weight & Balance data completed **Date:**
Aircraft:
By:

2.0 INSPECTION AND MAINTENANCE

It is the objective of this inspection and maintenance procedure to ensure that component installations are secure and that the electrical system is airworthy. Table II, TROUBLE SHOOTING GUIDE, refers to the most likely problems that may be encountered, and outlines the appropriate corrective actions. Appendix B, Inspection Checklist should be referenced during periodic Airworthiness inspections. All loose and/or replaced fasteners should be tightened per the torque requirements outlined in Appendix A.

3.0 COMPONENT REMOVAL AND REPLACEMENT

The major components of the ARS (Controller Unit and Inertial Measurement Unit) are mounted in the baggage area of the aircraft, in accordance with certificated installation data. The monitor is mounted for operation by observer in accordance with certificated installation data. The GPS antenna is mounted to the aircraft exterior in accordance with approved data.

Electrical power for the Augmented Reality System is obtained from the power supply installed to provide power to the imaging system to which the system has been added. Data transmission wiring is routed to the monitor and imaging system according to aircraft requirements in accordance with certificated ARS installation data.

Assure that imaging system power supply is switched to OFF and that electrical wires are disconnected and capped before removing any component of the system.

Component removal/re-installation order does not affect system performance after completion of the work.

NOTE: When mounting components are removed and replaced, follow torque recommendations given in Appendix A for fastener installation. Remove installed wire caps and re-install wiring. Refer to AC43.13-2B guidelines for installation of GPS antenna and other alterations as needed.

4.0 COMPONENT SERVICE PROCEDURE

If troubleshooting results in the finding of faults in the system components the Augmented Reality System must be disabled before the faulty unit is removed. Aircraft Weight and Balance should be adjusted accordingly, reference Table I of this document. The faulty component must be returned to Paravion Technology, Inc. for repair or replacement.

5.0 SYSTEM TESTING/TROUBLESHOOTING PROCEDURES

TABLE II
TROUBLE SHOOTING GUIDE

PROBLEM	ADDITIONAL SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
No video.	Cooling fans do not run	No power to ARS	Ensure that the aircraft is providing power to the ARS.
	Cooling fans may or may not run	ARS internal breakers	Ensure that the 3 circuit breakers mounted to the ARS unit are not tripped. If tripped, reset. If circuit breaker fails to reset, remove ARS unit from aircraft and send to Paravion for service.
	Cooling fans run, no beeping sound as unit powers on, no lights on IMU	12V power supply breaker blown	Reset breaker. If problem persists, remove ARS Controller unit and IMU from aircraft and send to Paravion for service.
	Cooling fans running	Monitor off	Ensure monitor is ON
		Proper video input not selected	Press "Source" on the monitor until video is shown (usually with the on-screen designation "PC" or "VGA")
		Video wiring	Inspect video wiring from ARS to monitor.
Video shows ARS controls, but no camera video.		Camera off or camera in standby	Turn camera ON and wait for initialization to complete. Ensure camera is operational.
		Video wiring	Inspect video wiring from camera to ARS.
Video indicates "NO CAMERA"		Camera off or camera in standby	Turn camera ON and wait for initialization to complete. Ensure camera is operational.
		Serial connection from camera is bad	Inspect wiring between camera serial port output and ARS.
		ARS Controller Unit internal component or wiring faulty, possible software fault.	Remove unit from aircraft and return to Paravion for service. Field repair of the ARS Controller Unit should not be attempted.

PROBLEM	ADDITIONAL SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
Camera does not turn on or hand controller is unresponsive.	Hand controller backlight is off.	No power to camera	Ensure camera has aircraft power.
		Hand controller wiring bad	Inspect wiring between hand controller and camera. If plugging the hand controller directly in to the camera solves the problem, then inspect aircraft-side wiring and replace as necessary. System will be usable in this state, but geo-pointing functions (if available) will not work.
	Hand controller backlight is on. Serial Bypass Switch (ARS-3100-1) has no LEDs lit.	Serial Bypass Switch does not have power.	Inspect wiring between Serial Bypass Switch and camera. Ensure power is available on the bypass switch (pin 1=ground, pin 2=+5v DC +/- 10%). As a temporary solution, the hand controller may be plugged directly in to the camera, or a plug shorting pins 3 and 9 may be used in place of the serial bypass switch, but geo-pointing functions (if available) will not work.
		Serial Bypass Switch has failed	Disconnect the serial bypass switch and manually short pins 3 and 9 on the cable harness. *Do not touch pin 2 (+5v power).* If the camera can be turned on, then replace the serial bypass switch. As a temporary solution, the hand controller may be plugged directly in to the camera, or a plug shorting pins 3 and 9 may be used in place of the serial bypass switch, but geo-pointing functions (if available) will not work.
	Hand controller backlight is on. Serial bypass switch has one LED lit.	Wiring bad	Inspect wiring between hand controller, serial bypass switch, and camera. If plugging the hand controller directly in to the camera solves the problem, then inspect aircraft-side wiring and replace as necessary. The system will be usable in this state, but geo-pointing functions (if available) will not work.
		Serial bypass switch has failed	Disconnect the serial bypass switch and manually short pins 3 and 9 on the cable harness. *Do not touch pin 2 (+5v power).* If the camera can be turned on, then replace the serial bypass switch. As a temporary solution, the hand controller may be plugged directly in to the camera, or a plug shorting pins 3 and 9 may be used in place of the serial bypass switch, but geo-pointing functions (if available) will not work.

PROBLEM	ADDITIONAL SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
Video indicates "INVALID IMU"		IMU not initialized	The aircraft must move at least 10 knots before the IMU initializes.
		No GPS signal	Ensure that the GPS antenna has an unobstructed view of the sky. The IMU will not work inside a hanger.
		GPS antenna is connected improperly	Ensure that the antenna is connected to IMU connector marked "Primary" and not the one marked "Secondary".
		GPS antenna and/or cable is faulty	With the aircraft outside and the ARS powered ON for at least 5 minutes, verify that the GPS light on the IMU is red or orange. No light indicates that the antenna, antenna cable, or IMU is bad and should be replaced.
Video indicates "NO IMU"		No signal from IMU	Ensure that the data cable (marked "Ethernet" on the IMU) is securely connected.
		IMU has no power.	If the IMU "Power" LED is not on, then verify wiring. Power cable should have 9-15 volts.
		IMU Failure	If the power cable has 9-15 volts and the IMU "Power" LED remains off, then replace the IMU. Contact Paravion Technology, Inc. for system recalibration instructions.
Touch screen not responsive		Wiring bad	Inspect wiring between touch screen and ARS.
Touch screen inaccurate	Fingers operate incorrect button, or finger must be in the wrong place to operate button	Touch screen needs recalibration	Contact Paravion Technology, Inc. for touch screen calibration instructions.
Road/Video alignment poor		Camera mount and/or IMU have been moved with respect to airframe since last calibration.	Contact Paravion Technology, Inc. for system calibration instructions.

IMU (ARS-3600-1): LED Definitions:

LED	Color	Condition
SdNav	Off	IMU Booting
	Red Flash	Running, but not yet operational. GPS has not yet output a valid time.
	Red	Running, but not yet operational. GPS has a valid time, but has not initialized. Waiting for the vehicle to travel > 5 m/s.
	Orange	Operational, but data is not yet real-time. This condition should not last more than 10 seconds.
	Green	Operational.
GPS	Off	GPS does not have a valid position.
	Red Flash	Operational check (startup only)
	Red	GPS has a standard position solution (SPS). This is the default state.
	Orange	GPS has a differential solution (SBAS). This is normally not used.
Power	Off	No power to the system.
	Green	System is powered; 5v internal voltage is active.
	Orange	System is powered; Outputting data to serial port. This is normally not used.

Paravion® Technology Inc.

FIGURES

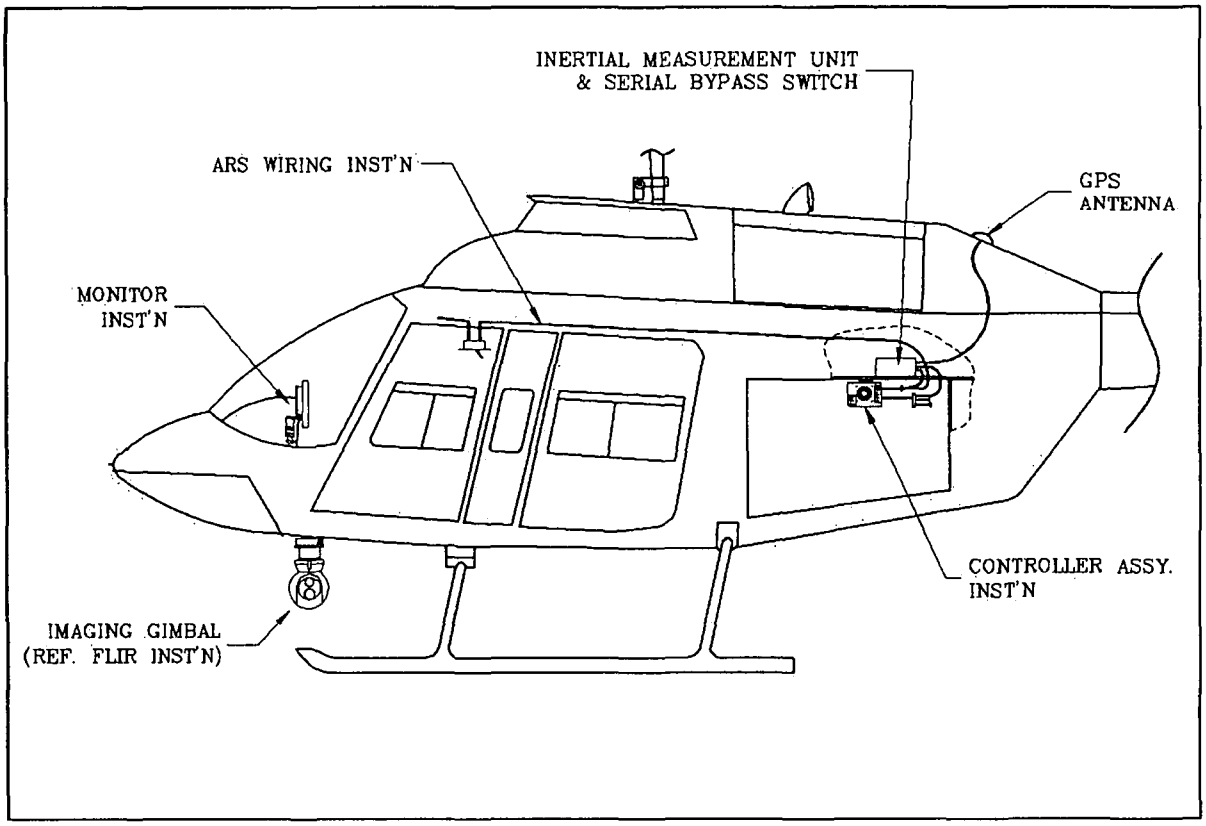

FIGURE 0: Suggested Installation, Bell 407 shown

1. TOUCH SCREEN MONITOR REQ'D. ⑦ & ⑧ (REF. EA.)
2. WIRES LABELED/(COLORED) AS SHOWN

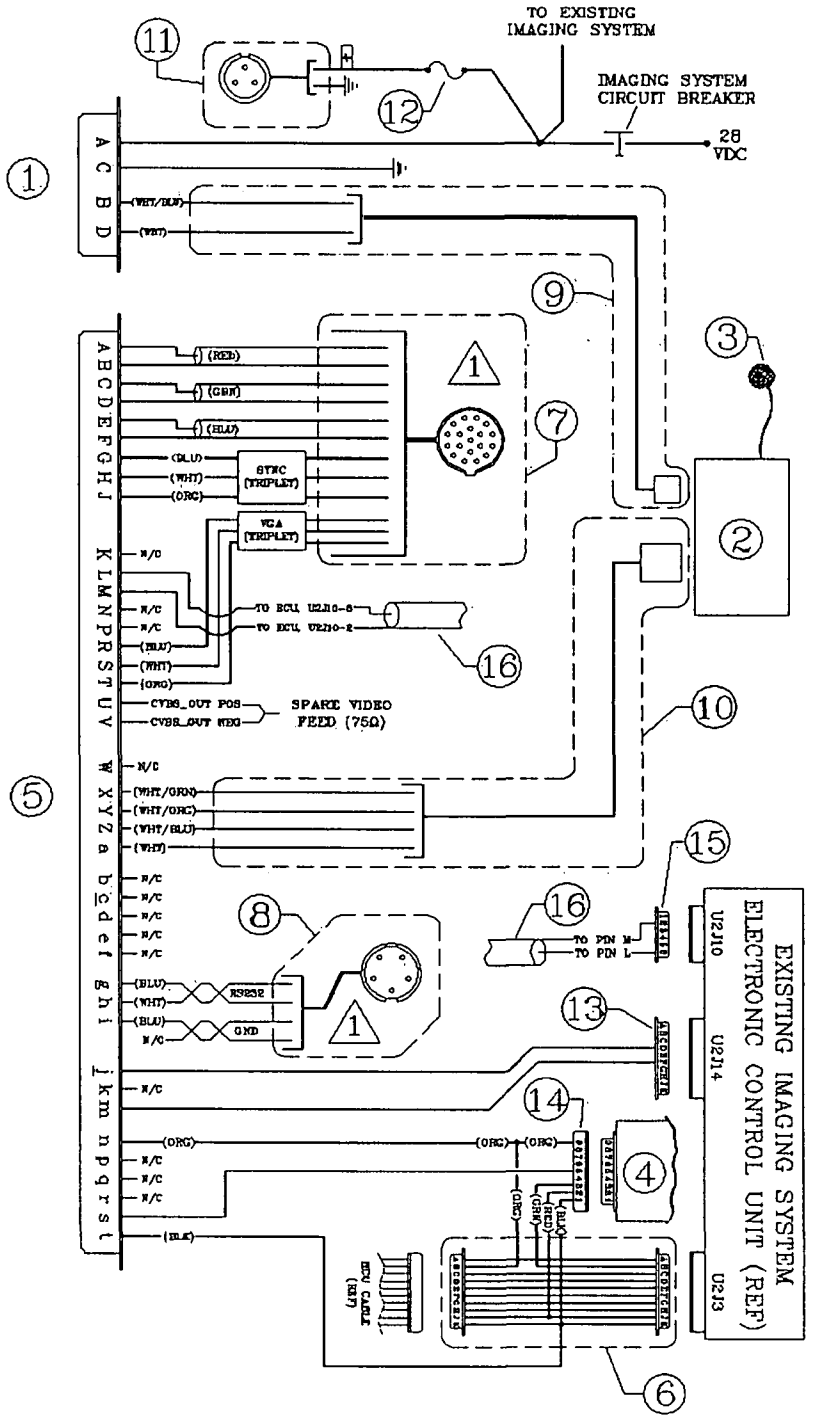

FIGURE 1: Aircraft-Side Wire Harness
FLIR U8000/U8500 SERIES IMAGING SYSTEM

Paravion® Technology Inc.

COMPONENTS, FIGURE 1

ITEM NO	PN	DESCRIPTION	QTY	TYP
0*		Existing Imaging System Circuit Breaker	REF.	
1	ACC02E16-9S-003	CONNECTOR (Blkd Receptacle)	1	EA.
2	ARS-3600-1	INERTIAL MEASUREMENT UNIT	1	EA.
3	ES54100-2	ANTENNA, GPS	1	EA.
4	ARS-3500-1	SERIAL BYPASS SWITCH	1	EA.
5	MS27474E20F41S	CONNECTOR (Blkd Receptacle)	1	EA.
	M85049/41-12A	BACKSHELL		
6	ARS-3100-1	CABLE, PASS-THRU	1	EA.
7	ARS-3011-1	VIDEO CABLE ASSY	1	EA.
8	ARS-3011-2	TOUCHSCREEN CABLE ASSY	1	EA.
9	ARS-3010-1	POWER CABLE ASSY, IMU	1	EA.
10	ARS-3010-2	SIGNAL CABLE ASSY, IMU	1	EA.
11	ES56221-1	MONITOR POWER CABLE	1	EA.
12	ES58110-1	FUSE HOLDER	1	EA.
	AGC-3	FUSE, 3 AMP	1	EA.
13	MS27467T15B18P	CONNECTOR	1	EA.
	M85049/49-2-14W	BACKSHELL	1	EA.
14	AIM-97095	CONNECTOR (Or equiv. DE-9 Female)	1	EA.
15	MS27467T9B35P	CONNECTOR	1	EA.
	MS27506-B-9-2	BACKSHELL (Alt: MS27506-F-9-2)	1	EA.
16	V75268	75 OHM COAXIAL CABLE (Or equiv.)	15	FT.
ATTACHING HARDWARE,				
-	ARS-3600-2	HAT SECTION ASSEMBLY	2	EA.
-	MS20470AD4-X	RIVET (Length may vary)	16	EA.
-	MS35206-08XX	SCREW	4	EA.
-	NAS1149CN616R	WASHER	4	EA.
-	MS27039-08XX	SCREW (Length may vary)	4	EA.
-	MS21042L08	SELF LOCKING NUT	4	EA.
-	MS35206-XXX (#4-40)	SCREW (Length may vary)	4	EA.

WIRING SPECIFICATION:

Circuit Breaker rating must be 20A or lower

System electrical power and ground, Connector 1 Pins A and C, are M22759/16-14 or equivalent.

All other (data transmission) wires are M22759/16-22 or equivalent

NOTE: The Inertial Measurement Unit, Serial Bypass Switch, & GPS Antenna are supplied as Line Replaceable Units, assembled and calibrated at the factory. Field maintenance of these units should not be attempted.

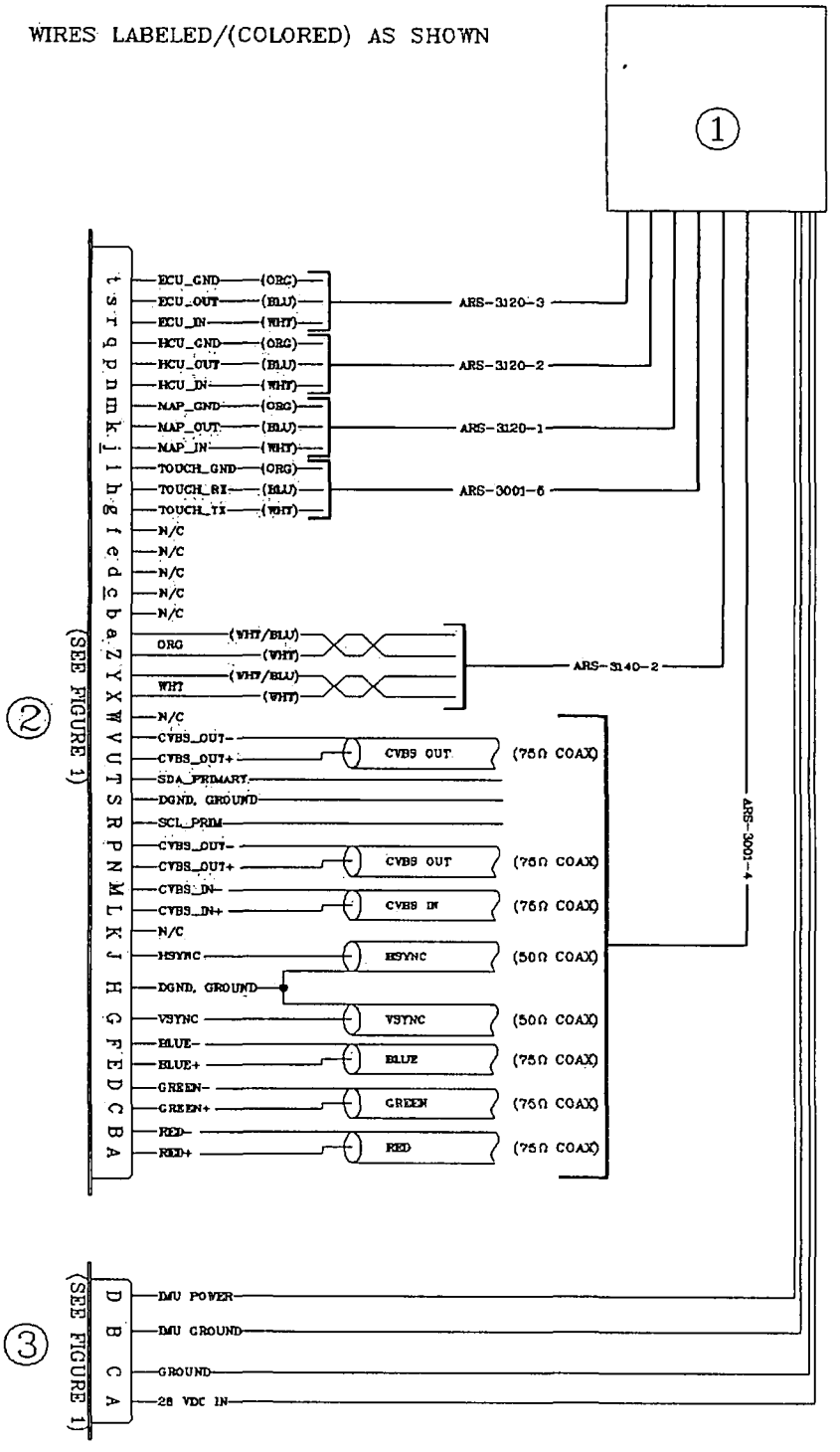

FIGURE 2: Augmented Reality System Controller Installation

Paravion® Technology Inc.

COMPONENTS, FIGURE 2

ITEM NO	PN	DESCRIPTION	QTY	TYP
1	ARS-4000-1	CONTROLLER ASSEMBLY	1	EA.
2	MS27484E20F41PN	CONNECTOR	1	EA.
3	ACC02E16-9S-003	CONNECTOR	1	EA.
ATTACHING HARDWARE,				
-	MS27039-08XX	SCREW (Length may vary)	4	EA.
-	MS35333-106	LOCK WASHER	4	EA.

NOTE: The Controller Assembly is supplied as a Line Replaceable Unit, assembled and calibrated at the factory. Field maintenance of the unit must not be attempted.

APPENDIX A

STANDARD TORQUE VALUE CHART

Appendix A

RECOMMENDED TORQUE VALUES (inch-pounds) (Reference AC 43.13-1B, Change 1, Dated 9/8/98)				
CAUTION THE FOLLOWING TORQUE VALUES ARE DERIVED FROM OIL FREE CADMIUM PLATED THREADS.				
	TORQUE LIMITS RECOMMENDED FOR INSTALLATION (BOLTS LOADED PRIMARILY IN SHEAR)		MAXIMUM ALLOWABLE TIGHTENING TORQUE LIMITS	
Thread Size	Tension type nuts: MS20365, MS21042, MS17825, AN310 (40,000 psi in bolts)	Shear type nuts: MS20364, MS21245, MS17826, AN320 (24,000 psi in bolts)	Nuts: MS20365, MS21042, MS17825, AN310 (90,000 psi in bolts)	Nuts: MS20364, MS21245, MS17826, AN320 (54,000 psi in bolts)
FINE THREAD SERIES				
8-36	12-15	7-9	20	12
10-32	20-25	12-15	40	25
1/4-28	50-70	30-40	100	60
5/15-24	100-140	60-85	225	140
3/8-24	160-190	95-110	390	240
7/16-20	450-500	270-300	840	500
1/2-20	480-690	290-410	1100	660
9/16-18	800-1000	480-600	1600	960
5/8-18	1100-1300	600-780	2400	1400
3/4-16	2300-2500	1300-1500	5000	3000
7/8-14	2500-3000	1500-1800	7000	4200
1-14	3700-5500	2200-3300*	10,000	6000
1-1/8-12	5000-7000	3000-4200*	15,000	9000
1-1/4-12	9000-11000	5400-6600*	25000	15000
COARSE THREAD SERIES				
8-32	12-15	7-9	20	12
10-24	20-25	12-15	35	21
1/4-20	40-50	25-30	75	45
5/16-18	80-90	48-55	160	100
3/8-16	160-185	95-100	275	170
7/16-14	235-255	140-155	475	280
1/2-13	400-480	240-290	880	520
9/16-12	500-700	300-240	1100	650
5/8-11	700-900	420-540	1500	900
3/4-10	1150-1600	700-950	2500	1500
7/8-9	2200-3000	1300-1800	4600	2700
The above torque values may be used for all cadmium-plated steel nuts of the fine or coarse thread series which have approximately equal number of threads and equal face bearing areas. * Estimated corresponding values.				
This table includes standard nut and bolt combinations, currently used in aviation maintenance. For further identification of hardware, see AC 43.13-1B, Chapter 7.				

APPENDIX B

ANNUAL/300 HR. INSPECTION CHECKLIST

INSPECTION (Infrared Camera System)	COMMENTS	INITIALS
1. Check for mount fasteners security (GPS antenna and other exterior installations, interior installations). Inspect equipment and adjacent aircraft structure for condition.		
2. Torque all fasteners in accordance with Appendix A.		
3. Inspect electrical cabling for security and insulation damage. Evaluate cable routing to avoid heat and movement.		
4 Inspect Controller Assembly and surrounding area for airflow obstruction. Clean heat radiation surfaces as needed. Verify cooling fans operation.		

U.S Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved OMB No. 2120-0020 11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each such violation (Section 901 Federal Aviation Act 1958)

1. Aircraft

Nationality and Registration Mark	Serial No.		
USA N539MY	18282238		
Make	**Model**	**Series**	
CESSNA	182T	SKYLANE	

2. Owner

Name *(As shown on registration certificate)*	Address *(As shown on registration certificate)*
CESSNA AIRCRAFT COMPANY	Address ATTN: DEPT 093 3 CESSNA BLVD City WICHITA State KANSAS Zip 67215-1400 Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
☐	☒	AIRFRAME	———	*(As described in Item 1 above)*	———
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type Manufacturer		

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency			
Name YINGLING AVIATION	☐	U.S. Certificated Mechanic	☐	Manufacturer
Address 2010 AIRPORT ROAD	☐	Foreign Certificated Mechanic	C. Certificate No.	
City WICHITA State KS	☒	Certificated Repair Station	YN8R621Y RADIO CLASS 1,2,3	
Zip 67277 Country USA	☐	Certificated Maintenance Organization		

D. I certify that the repair and/or alteration made to the unit(s) identified in Item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B ☐	Signature/Date of Authorized Individual
	[signature] 8/19/10

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in Item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED

BY								
	FAA Flt Standards Inspector		Manufacturer		Maintenance Organization		Person Approved by Canadian Department of Transport
	FAA Designee	X	Repair Station		Inspection Authorization		Other *(Specify)*

Certificate or Designation No.	Signature/Date of Authorized Individual
YN8R621Y	[signature] 8/19/10

FAA Form 337 (10-06)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. **Description of Work Accomplished**

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

USA N539MY — Nationality and Registration Mark

8/19/10 — Date

CESSNA 182T –18282238– N539MY

Provisions: Installed antenna doublers under the fuselage for future install of a Directional Finder Antenna.
2 ea provisions at FSS 31.5
2 ea provisions at FSS 44.0

Cut 1 ea opening provision for DF antenna coax. Located on pilot side under the fuselage at FSS 48.0. Fabricated and installed cover plate.

Reference:
AC 43.13-1B
AC 43.13-2B Chap. 3

The above installation meets the requirements for static loading in accordance with A.C.43.13-2B Chapter 1 par. 106 through 114. No changes were noted to the compass system. Further details are on file at C.R.S. # YN8R621Y under W.O. # AVI 10082.

>>>>>>>>>>>>>>>END<<<<<<<<<<<<<<<<

☐ Additional Sheets Are Attached

U.S Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved OMB No. 2120-0020 11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each such violation (Section 901 Federal Aviation Act 1958)

1. Aircraft

Nationality and Registration Mark	Serial No.	
USA N539MY	18282238	
Make	**Model**	**Series**
CESSNA	182T	SKYLANE

2. Owner

Name *(As shown on registration certificate)*	Address *(As shown on registration certificate)*
CESSNA AIRCRAFT COMPANY	Address ATTN: DEPT 093 3 CESSNA BLVD City WICHITA State KANSAS Zip 67215-1400 Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
☐	☒	AIRFRAME	———	*(As described in Item 1 above)*	———
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type Manufacturer		

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency		C. Certificate No.
Name YINGLING AVIATION Address 2010 AIRPORT ROAD City WICHITA State KS Zip 67277 Country USA	☐ U.S. Certificated Mechanic	☐ Manufacturer	
	☐ Foreign Certificated Mechanic		
	☒ Certificated Repair Station		YN8R621Y RADIO CLASS 1,2,3
	☐ Certificated Maintenance Organization		

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B	Signature/Date of Authorized Individual
☐	Leslie Ines Jr 8/19/10

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED

BY								
	☐	FAA Flt Standards Inspector	☐	Manufacturer	☐	Maintenance Organization	☐	Person Approved by Canadian Department of Transport
	☐	FAA Designee	X	Repair Station	☐	Inspection Authorization		Other *(Specify)*

Certificate or Designation No.	Signature/Date of Authorized Individual
YN8R621Y	LTC Shelton 8/19/10

FAA Form 337 (10-06)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

USA N539MY	8/19/10
Nationality and Registration Mark	Date

Cessna 182T–18282238– N539MY

INSTALLED SYSTEMS:

- Installed Yingling Aviation Installation of Cabin Skylights IAW STC SA01569WI.

CONTINUED AIRWORTHINESS INSTRUCTIONS:

- Reference Yingling Aviation Document No. 5640-F182-06 Rev. A, for Instructions for Continued Airworthiness Installation of Skylights in the Cessna 182T.

WEIGHT & BALANCE and EQUIPMENT LIST: Revised Aircraft Weight & Balance and Equipment List. See Aircraft Weight & Balance records for details.

The above installation meets the requirements for static loading in accordance with A.C.43.13-2B Chapter 1 par. 106 through 114. No changes were noted to the compass system. Further details are on file at C.R.S. # YN8R621Y under W.O. # AVI 10082.

>>>>>>>>>>>>>>>END<<<<<<<<<<<<<<<

☐ Additional Sheets Are Attached

U.S Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved OMB No. 2120-0020 11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each such violation (Section 901 Federal Aviation Act 1958)

1. Aircraft

Nationality and Registration Mark	Serial No.	
USA N539MY	18282238	
Make	**Model**	**Series**
CESSNA	182T	SKYLANE

2. Owner

Name *(As shown on registration certificate)*	Address *(As shown on registration certificate)*
CESSNA AIRCRAFT COMPANY	Address ATTN: DEPT 093 3 CESSNA BLVD City WICHITA State KANSAS Zip 67215-1400 Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
☐	☒	AIRFRAME	—	*(As described in Item 1 above)*	—
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type Manufacturer		

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency			
Name YINGLING AVIATION	☐	U.S. Certificated Mechanic	☐	Manufacturer
Address 2010 AIRPORT ROAD	☐	ForeignCertificated Mechanic	C. Certificate No.	
City WICHITA State KS	☒	Certificated Repair Station	YN8R621Y RADIO CLASS 1,2,3	
Zip 67277 Country USA	☐	Certificated Maintenance Organization		

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B ☐	Signature/Date of Authorized Individual
	Leozito Ines Jr 8/19/10

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED

BY								
	☐	FAA Flt Standards Inspector	☐	Manufacturer	☐	Maintenance Organization	☐	Person Approved by Canadian Department of Transport
	☐	FAA Designee	X	Repair Station	☐	Inspection Authorization	Other *(Specify)*	

Certificate or Designation No.	Signature/Date of Authorized Individual
YN8R621Y	8/19/10

FAA Form 337 (10-06)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

USA N539MY	8/19/10
Nationality and Registration Mark	Date

Cessna 182T– 18282238– N539MY

Installation Description: The following equipment was installed IAW Mfr's Installation Manual P/N 150-049106 Rev F and the AC 43.13-2B. Using the existing mission radio interface system. System is powered from Mission Buss (Electrical Buss 3) thru a 5 Amp pull type circuit breaker.

Installed Equipment:
Wulfsberg P-2000VHF Digital/Analog Tactical FM Radio:

- Wulfsberg FM Transceiver P-2000VHF P/N 400-049200-11-011-2135-2135, 3.0 lbs @ arm 14.0
- Comant VHF FM (bent whip) Antenna P/N CI292-3, .5 lbs @ arm 60.7
- Comant VHF FM (bent whip) Antenna P/N CI292-3, .5 lbs @ arm 143.0

OPERATIONAL GROUND CHECKS: Post installation ground functional and interference tests were performed IAW Wulfsberg Installation Drawing 150-049106 Rev F or later.

EMI testing performed IAW YINGLING AVIATION EMI Test Doc. 23507-F206-10 Rev IR or Later on 8/19/10 and found to be satisfactory.

CONTINUED AIRWORTHINESS INSTRUCTIONS:

- **Inspections**-During annual, 100 hour, or alternate type inspections as required, inspect the Wulfsberg P-2000 FM Radio, including all components in the system, for damage and general condition to ensure their continued satisfactory operation. Replace parts that are damaged and defective with identical parts.
- **Removal and replacement**-Reference the Wulfsberg Installation Manual P/N 150-049106 Rev F Section 5 for return to service after repairs.

WEIGHT & BALANCE and EQUIPMENT LIST: Revised Aircraft Weight & Balance and Equipment List. See Aircraft Weight and Balance records for details.

Operators Manual: Wulfsberg Flexcom 2000 (P-2000/C2000/RT2000) Manual No. 150-049105 Rev D or Later

The above installation meets the requirements for static loading in accordance with A.C.43.13-2B Chapter 1 par. 106 through 114. Electrical load Calculation was performed IAW AC43.13-1B Chap 11 Para 36 and found to be less than 80% of electrical system capacity. No changes were noted to the compass system. Further details are on file at C.R.S. # YN8R621Y under W.O. # AVI 10082.

>>>>>>>>>>>>>>>END<<<<<<<<<<<<<<<

☐ Additional Sheets Are Attached

U.S Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved OMB No. 2120-0020 11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each such violation (Section 901 Federal Aviation Act 1958)

1. Aircraft

Nationality and Registration Mark	Serial No.		
USA N539MY	18282238		
Make	**Model**	**Series**	
CESSNA	182T	SKYLANE	

2. Owner

Name *(As shown on registration certificate)*	Address *(As shown on registration certificate)*
CESSNA AIRCRAFT COMPANY	Address ATTN: DEPT 093 3 CESSNA BLVD City WICHITA State KANSAS Zip 67215-1400 Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
☐	☒	AIRFRAME	———	*(As described in Item 1 above)*	———
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type Manufacturer		

6. Conformity Statement

A. Agency's Name and Address	B. Kind of Agency			
Name YINGLING AVIATION	☐	U.S. Certificated Mechanic	☐	Manufacturer
Address 2010 AIRPORT ROAD	☐	Foreign Certificated Mechanic	C. Certificate No.	
City WICHITA State KS	☒	Certificated Repair Station	YN8R621Y RADIO CLASS 1,2,3	
Zip 67277 Country USA	☐	Certificated Maintenance Organization		

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B ☐

Signature/Date of Authorized Individual: [signature] 8/19/10

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED

BY								
	FAA Flt Standards Inspector		Manufacturer		Maintenance Organization		Person Approved by Canadian Department of Transport
	FAA Designee	X	Repair Station		Inspection Authorization		Other *(Specify)*

Certificate or Designation No. YN8R621Y

Signature/Date of Authorized Individual: [signature] 8/19/10

FAA Form 337 (10-06)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

USA N539MY	8/19/10
Nationality and Registration Mark	Date

Cessna 182T–18282238– N539MY

INSTALLED SYSTEMS: Installed Precise Flight Pulselite Control unit IAW STC SA4005NM.

OPERATIONAL GROUND CHECKS: Required ground tests were performed and the equipment was found to operate normally IAW Precise Flight Installation Manual PPRI-2000 Doc # 015PMAN0001 Rev. O dated May 16, 2007.

CONTINUED AIRWORTHINESS INSTRUCTIONS: Reference Document No. 000PMAN0002 Rev. D (7/07) for Instructions for Continued Airworthiness.

AFMS: FAA Approved Flight Manual Supplement Doc. No. 000PMAN0001Rev. A (7/24/03) was inserted into the Aircraft Flight Manual.

WEIGHT & BALANCE and EQUIPMENT LIST: Revised Aircraft Weight & Balance and Equipment List. See Aircraft Weight & Balance records for details.

The above installation meets the requirements for static loading in accordance with A.C.43.13-2B Chapter 1 par. 106 through 114. No changes were noted to the compass system. Further details are on file at C.R.S. # YN8R621Y under W.O. # AVI.10082.

>>>>>>>>>>>>>>>END<<<<<<<<<<<<<<<

☐ Additional Sheets Are Attached

U.S Department of Transportation
Federal Aviation Administration

MAJOR REPAIR AND ALTERATION
(Airframe, Powerplant, Propeller, or Appliance)

Form Approved OMB No. 2120-0020 11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed $1,000 for each such violation (Section 901 Federal Aviation Act 1958)

1. Aircraft

Nationality and Registration Mark	Serial No.	
USA N539MY	18282238	
Make	**Model**	**Series**
CESSNA	182T	SKYLANE

2. Owner

Name *(As shown on registration certificate)*: CESSNA AIRCRAFT COMPANY

Address *(As shown on registration certificate)*
Address ATTN: DEPT 093 3 CESSNA BLVD
City WICHITA State KANSAS
Zip 67215-1400 Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
☐	☒	AIRFRAME	———	*(As described in Item 1 above)*	———
☐	☐	POWERPLANT			
☐	☐	PROPELLER			
☐	☐	APPLIANCE	Type / Manufacturer		

6. Conformity Statement

A. Agency's Name and Address
Name YINGLING AVIATION
Address 2010 AIRPORT ROAD
City WICHITA State KS
Zip 67277 Country USA

B. Kind of Agency

☐	U.S. Certificated Mechanic	☐	Manufacturer
☐	Foreign Certificated Mechanic	C. Certificate No.	
☒	Certificated Repair Station	YN8R621Y RADIO CLASS 1,2,3	
☐	Certificated Maintenance Organization		

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B ☐

Signature/Date of Authorized Individual: [signature] 8/19/10

7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is ☒ APPROVED ☐ REJECTED

BY								
	FAA Flt Standards Inspector		Manufacturer		Maintenance Organization		Person Approved by Canadian Department of Transport
	FAA Designee	X	Repair Station		Inspection Authorization		Other *(Specify)*

Certificate or Designation No. YN8R621Y

Signature/Date of Authorized Individual: [signature] 8/19/10

FAA Form 337 (10-06)

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

USA N539MY	8/19/10
Nationality and Registration Mark	Date

CESSNA 182T –18282238– N539MY

INSTALLED SYSTEMS: The following avionics equipment was installed IAW Yingling Aviation STC Number SA01552WI. Amendment date November 12, 2009.

Garmin GMA 1347 Audio Panel, 2 ea NAT (A711) Expansion Panels, NAT Audio Control System (A740), NAT Universal Audio Radio Interface, 3 ea Sandia Card Enclosures (SRU-1), 3 ea Sandia Relay Cards (SR-54), KGS Model RG28 DC to DC Converter, GPS Antenna CI-420-230, Marker Beacon Antenna Splitter CI509, and 2 ea Comant VHF/FM CI-292-3 Antennas.

OPERATIONAL GROUND CHECKS: Required ground tests were performed and all equipment was found to operate properly.

CONTINUED AIRWORTHINESS INSTRUCTIONS: Reference Yingling Aviation Document ICA 23507-F206-04 Rev C for Instructions for Continued Airworthiness.

WEIGHT & BALANCE and EQUIPMENT LIST: Revised Aircraft Weight & Balance and Equipment List. See Aircraft Weight & Balance records for details.

AFMS: FAA Approved Flight Manual Supplement Doc. No. AFMS Document 23507-F206-08, Rev. A, dated November 12, 2009 inserted in the Airplane Flight Manual.

The above installation meets the requirements for static loading in accordance with A.C.43.13-2B Chapter 1 par. 106 through 114. No changes were noted to the compass system. Further details are on file at C.R.S. # YN8R621Y under W.O. # AVI 10082.

>>>>>>>>>>>>>>END<<<<<<<<<<<<<<<

☐ Additional Sheets Are Attached

FAA FORM 8130-6, APPLICATION FOR U.S. AIRWORTHINESS CERTIFICATE

Form Approved O.M.B. No. 2120-0018
12/31/2010

U.S. Department of Transportation
Federal Aviation Administration

APPLICATION FOR U. S. AIRWORTHINESS CERTIFICATE

INSTRUCTIONS - Print or type. Do not write in shaded areas; these are for FAA use only. Submit original only to an authorized FAA Representative. If additional space is required, use attachment. For special flight permits complete Sections II, VI and VII as applicable.

I. AIRCRAFT DESCRIPTION

1. REGISTRATION MARK	2. AIRCRAFT BUILDER'S NAME (Make)	3. AIRCRAFT MODEL DESIGNATION	4. YR MFR	FAA CODING
N539MY	Cessna Aircraft Company	182T	2010	
5. AIRCRAFT SERIAL NO.	**6. ENGINE BUILDER'S NAME (Make)**	**7. ENGINE MODEL DESIGNATION**		
18282238	Lycoming Engines	IO-540-AB1A5		
8. NUMBER OF ENGINES	**9. PROPELLER BUILDER'S NAME (Make)**	**10. PROPELLER MODEL DESIGNATION**	**11.AIRCRAFT IS (Check if applicable)**	
One	McCauley Propeller Systems	B3D36C431/80VSA-1	IMPORT	

APPLICATION IS HEREBY MADE FOR: (Check applicable items)

A 1 x STANDARD AIRWORTHINESS CERTIFICATE (Indicate category) — x NORMAL | UTILITY | ACROBATIC | TRANSPORT | COMMUTER | BALLOON | OTHER

B SPECIAL AIRWORTHINESS CERTIFICATE (Check appropriate items)

II. CERTIFICATION REQUESTED

7		PRIMARY									
9		LIGHT-SPORT (Indicate Class)		AIRPLANE		POWER-PARACHUTE		WEIGHT-SHIFT CONTROL		GLIDER	LIGHTER THAN AIR
2		LIMITED									
5		PROVISIONAL (Indicate class)	1		Class I						
			2		Class II						
3		RESTRICTED (Indicate operation(s) to be conducted)	1		AGRICULTURE AND PEST CONTROL	2		AERIAL SURVEY	3		AERIAL ADVERTISING
			4		FOREST (Wildlife conservation)	5		PATROLLING	6		WEATHER CONTROL
			0		OTHER (Specify)						
4		EXPERIMENTAL (Indicate operation(s) to be conducted)	1		RESEARCH AND DEVELOPMENT	2		AMATEUR BUILT	3		EXHIBITION
			4		AIR RACING	5		CREW TRAINING	6		MARKET SURVEY
			0		TO SHOW COMPLIANCE WITH THE CFR	7		OPERATING (Primary Category) KIT BUILT AIRCRAFT			
			8		OPERATING LIGHT-SPORT	8A		Existing Aircraft without an airworthiness certificate & do not meet § 103.1			
						8B		Operating Light-Sport Kit-Built			
						8C		Operating light-sport previously issued special light-sport category airworthiness certificate under § 21.90			
8		SPECIAL FLIGHT PERMIT (Indicate operation (s) to be conducted, then complete Section VI or VII as applicable on reverse side)	1		FERRY FLIGHT FOR REPAIRS. ALTERATIONS, MAINTENANCE, OR STORAGE						
			2		EVACUATE FROM AREA OF IMPENDING DANGER						
			3		OPERATION IN EXCESS OF MAXIMUM CERTIFICATED TAKE-OFF WEIGHT						
			4		DELIVERING OR EXPORTING	5		PRODUCTION FLIGHT TESTING			
			6		CUSTOMER DEMONSTRATION FLIGHTS						

C 6 MULTIPLE AIRWORTHINESS CERTIFICATE (check ABOVE: "Restricted Operation" and "Standard" or "Limited" as applicable)

III. OWNER'S CERTIFICATION

A. REGISTERED OWNER (As shown on certificate of aircraft registration) — IF DEALER, CHECK HERE: x

NAME	ADDRESS
Cessna Aircraft Company	14115 Russ Meyer Blvd., PO Box 1996, Independence, KS 67301

B. AIRCRAFT CERTIFICATION BASIS (Check applicable blocks and complete items as indicated)

X	AIRCRAFT SPECIFICATION OR TYPE CERTIFICATE DATA SHEET (Give No. and Revision No.) 3A13 – Revision 69	X	AIRWORTHINESS DIRECTIVES (Check if all applicable AD's are complied with and give the number of the last AD SUPPLEMENT available in the biweekly series as of the date of application) 08-10
	AIRCRAFT LISTING (Give page number(s)) N/A		SUPPLEMENTAL TYPE CERTIFICATE (List number of each STC incorporated) N/A

C. AIRCRAFT OPERATION AND MAINTENANCE RECORDS

X	CHECK IF RECORDS IN COMPLIANCE WITH 14 CFR section 91.417	TOTAL AIRFRAME HOURS 2.2	3	EXPERIMENTAL ONLY (Enter hours flown since last certificate issued or renewed)

D. CERTIFICATION -I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 et seq. and applicable Federal Aviation Regulations, and that the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested.

DATE OF APPLICATION	NAME AND TITLE (Print or type)	Signature
Jul 22, 2010	David W. LaPierre Director Quality, Independence	

IV. INSPECTION AGENCY VERIFICATION

A. THE AIRCRAFT DESCRIBED ABOVE HAS BEEN INSPECTED AND FOUND AIRWORTHY BY (Complete the section only if 14 CFR part 21.183(d) applies).

2	14 CFR PART 121 CERTIFICATE HOLDER (Give Certificate No.)	3	CERTIFICATED MECHANIC (Give Certificate No.)	6	CERTIFICATED REPAIR STATION (Give Certificate No.)
5	AIRCRAFT MANUFACTURER (Give name or firm)				

DATE	TITLE	SIGNATURE

V. FAA REPRESENTATIVE CERTIFICATION

(Check ALL applicable block items A and B)

A. I find that the aircraft described in Section I or VII meets requirements for — x THE CERTIFICATE REQUESTED | 4 AMENDMENT OR MODIFICATION OF CURRENT AIRWORTHINESS CERTIFICATE

B. Inspection for a special flight permit under Section VII was conducted by: — FAA INSPECTOR | FAA DESIGNEE | CERTIFICATE HOLDER UNDER | 14 CFR part 65 | 14 CFR part 121 or 135 | 14 CFR part 145

DATE	MIDO/FSDO		DESIGNEE'S SIGNATURE AND NO.		FAA INSPECTOR'S SIGNATURE
Jul 22, 2010	CE-43	4	Robert R. Evans ODA-100129-CE	1	Reviewed by SR

FAA Form 8130-6 (01-09) Previous Edition Dated 5/01 May be Used Until Depleted, Except for Light-Sport Aircraft

NSN: 0052-00-024-7006

8-5-10

VI PRODUCTION FLIGHT TESTING

A MANUFACTURER

NAME | ADDRESS

B. PRODUCTION BASIS *(Check applicable item)*

- ☐ PRODUCTION CERTIFICATE *(Give production certificate number)*
- ☐ TYPE CERTIFICATE ONLY
- ☐ APPROVED PRODUCTION INSPECTION SYSTEM

C. GIVE QUANTITY OF CERTIFICATES REQUIRED FOR OPERATING NEEDS

DATE OF APPLICATION | NAME AND TITLE (Print or type) | SIGNATURE

VII. SPECIAL FLIGHT PERMIT PURPOSES OTHER THAN PRODUCTION FLIGHT TEST

A. DESCRIPTION OF AIRCRAFT

REGISTERED OWNER | ADDRESS

BUILDER *(Make)* | MODEL

SERIAL NUMBER | REGISTRATION MARK

B. DESCRIPTION OF FLIGHT — CUSTOMER DEMONSTRATION FLIGHTS ☐ *(Check if applicable)*

FROM | TO

VIA | DEPARTURE DATE | DURATION

c. CREW REQUIRED TO OPERATE THE AIRCRAFT AND ITS EQUIPMENT

☐ PILOT ☐ CO-PILOT ☐ FLIGHT ENGINEER ☐ OTHER *(Specify)*

D. THE AIRCRAFT DOES NOT MEET THE APPLICABLE AIRWORTHINESS REQUIREMENTS AS FOLLOWS:

E. THE FOLLOWING RESTRICTIONS ARE CONSIDERED NECESSARY FOR SAFE OPERATION: (Use attachment if necessary)

F- CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above; that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 et seq. and applicable Federal Aviation Regulations; and that the aircraft has been inspected and is safe for the flight described.

DATE | NAME AND TITLE *(Print or type)* | SIGNATURE

VIII AIRWORTHINESS DOCUMENTATION(FAA/DESIGNEE use only)

X	A. Operating Limitations and Markings in Compliance with 14 CFR section 91.9, as Applicable		G- Statement of Conformity, FAA Form 8130-9 *(Attach when required)*
	B. Current Operating Limitations Attached		H. Foreign Airworthiness Certification for Import Aircraft *(Attach when required)*
	C. Data, Drawings, Photographs, etc. *(Attach when required)*		I. Previous Airworthiness Certificate issued in Accordance with 14 CFR Section _____ CAR _____ (Original attached)
X	D. Current Weight and Balance Information Available in Aircraft		
	E. Major Repair and Alteration, FAA Form 337 *(Attach when required)*	X	J. Current Airworthiness Certificate Issued in Accordance with 14 CFR Section **21.183 (a)**
X	F. This inspection Recorded in Aircraft Records		K. Light-Sport Aircraft Statement of Compliance, FAA Form 8130-15 (Attach when required).

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION

STANDARD AIRWORTHINESS CERTIFICATE

1 NATIONALITY AND REGISTRATION MARKS	2 MANUFACTURER AND MODEL	3 AIRCRAFT SERIAL NUMBER	4 CATEGORY
N539MY	Cessna Aircraft Company 182T	18282238	Normal

5 AUTHORITY AND BASIS FOR ISSUANCE

This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein.

Exceptions:

None

DUPLICATE

6 TERMS AND CONDITIONS

Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States.

DATE OF ISSUANCE	FAA REPRESENTATIVE	DESIGNATION NUMBER
Jul 22, 2010	Robert R. Evans	ODA-100129-CE

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding $1,000 or imprisonment not exceeding 3 years or both.
THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.

FAA Form 8100-2 (3-08)