

T6-200 THERMAL IMAGING SYSTEM



INSTALLATION GUIDE

This document is intended for authorized dealers and installers to review for the purposes of offering greater clarification of the T6-200 Thermal Imaging System and the subsequent installation onto various hull configurations.

THE T6-200 IS EXPORT CONTROLLED AND ITAR RESTRICTED

Due to the nature of the embedded technology contained in this camera assembly it is subject to export control and requires an export license prior to shipment overseas.

TrueView EVS can provide an export license for each overseas shipment.

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T6-200 THERMAL IMAGING CAMERA



The T6-200 Thermal Imager is a cost effective light weight miniature LWIR Infrared camera.

Approvals

Laboratory tested to DO-160/G levels.

Sikorsky Global Helicopters ODA analysis team for documentation & FAA Certification.

Bell 407 – STC No. SR02615NY
Silorsky S76 – STC No. SR03441CH

FAA-PMA approval on complete system.

Approved for field installations.

Approved for single pilot use.

MAXIMUM POWER IN THE SMALLEST PACKAGE

PERFORMANCE

Thermal Imager:	Uncooled VOx Microbolometer
Display Format:	640 x 480 (NTSC)
Frame Rate:	30 Hz (NTSC)
Time to Image:	<3.5 sec (cold start)
Lens:	19mm, Hard Coated
Field of View	32° Horiz x 26° Vert
Sweep Range:	0 - 28° Vert: forward looking

SPECIFICATIONS

Input Power:	200ma @ 14VDC 100ma @ 28VDC
EMI/RFI	Fully Shielded
Lighting Protected	YES
Dimensions:	5.27" Long 2.72" Wide 3.20" Height
Weight:	16.0 ozs (as viewed above)

PHYSICAL PROPERTIES

Turret Housing:	S-2 Glass Composite
Transition Plate:	Glass Impregnated Laminate
Extension Plate:	6061-T6 Aluminum Alloy
Opt Temp Range:	-40°C to +80°C
Temp Shock:	5 degrees / min
Operational Alt:	20,000 feet
Vibration:	4.3g (three axis, 8 hrs ea)
Shock:	200g shock pulse, (11 msec)
Environmental:	IP-67
Core Containment	Nitrogen Purge

FEATURES

Mounting Config:	Transition Plate, Flush Mount Extension Plate, Remodeled For Hull Contours.
Wiring Harness:	Fully Shielded and Assembled User defines video termination
Sweep Control	Trim Switch (console mount)

CAMERA AND TRANSITION PLATE ASSY



Transition Plate Assembly

- 1- Glass impregnated composite structure.
- 2- Nickel coated for EMI/RFI shielding.
- 3- Bonding strap for emissions draining.
- 4- Bonding plates for LSD discharge.
- 5- 4-40 embedded stainless inserts x 8.



Camera Assembly

- 1- S-2 Glass composite turret housing.
- 2- Nickel coated for EMI/RFI shielding.
- 3- Nitrogen purged containment body.
- 3- Gold plated contacts x 4 fused to copper weave embedded into composite shell for lighting strike protection.
- 2- CPC and SMA interface connections.
- 3- Power and signal interfacing module.

CAMERA AND TRANSITION PLATE ASSY

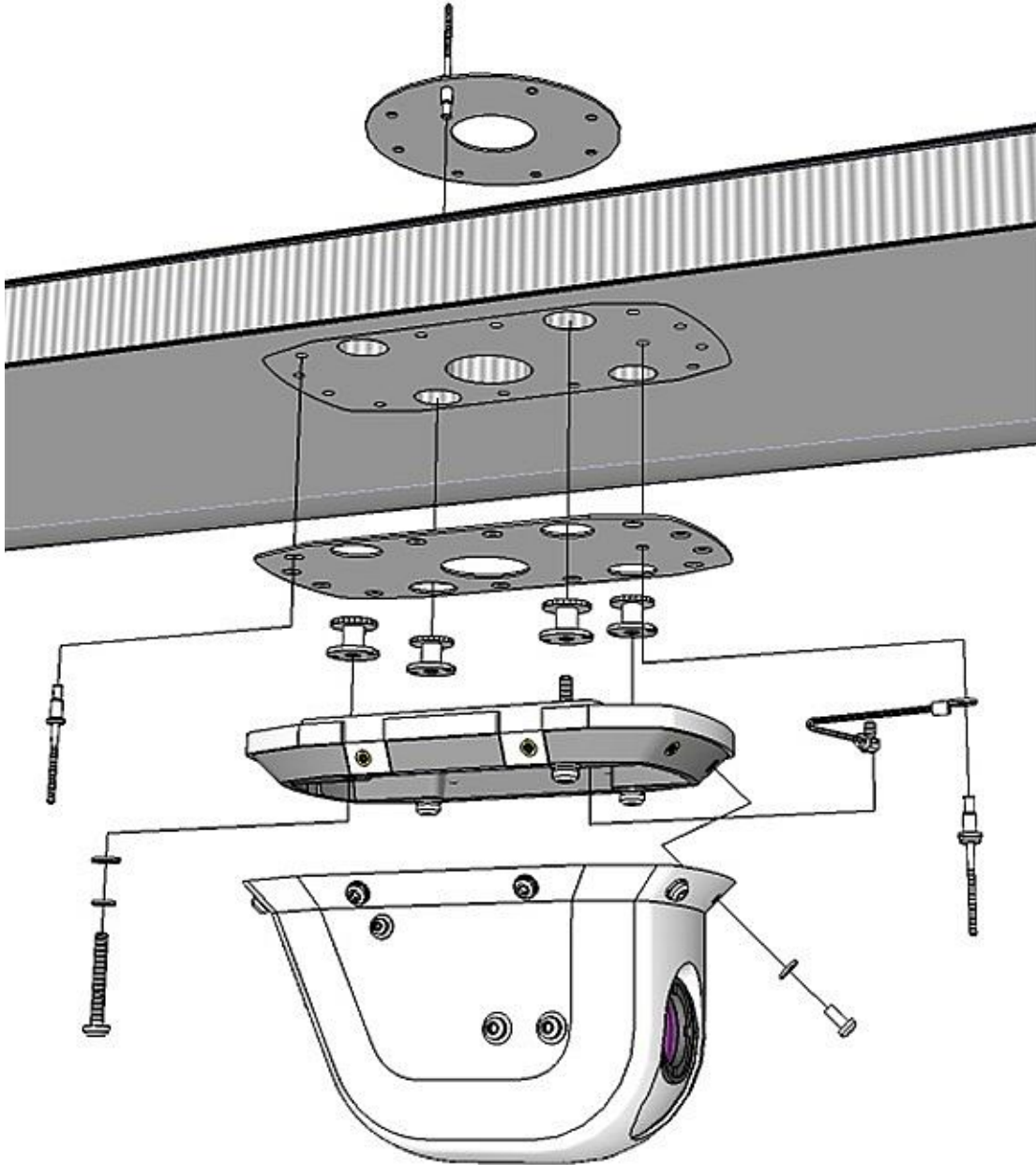


The transition plate assembly is a glass filled composite structure designed to attach to an airframe hull with the proper modifications. It serves as the mounting point for the camera assembly while providing rapid discharged paths for both EMI/RFI emissions and lighting strike protection.



The camera turret housing is a fully composite structure embedded with copper mesh and gold plated contact points. It readily adapts to the transition plate with eight retaining screws. The camera supports FOV aiming from 0° to 28° forward looking with an electric servo by pilot command.

TYPICAL INSTALLATION ONTO HONEYCOMB STRUCTURES

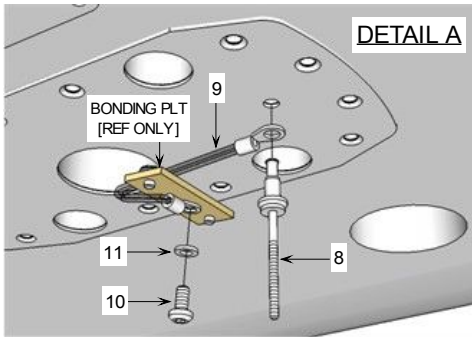


An approved installation into a honeycomb structure is shown here. It requires the modification of the airframe hull with the installation of inner and outer doublers and four 6-32 potting inserts.

INSTALLATION DRAWING NO. T6-60201

NOTES: REF: DWG NO. T6-200-00 FOR SYSTEM P/N.

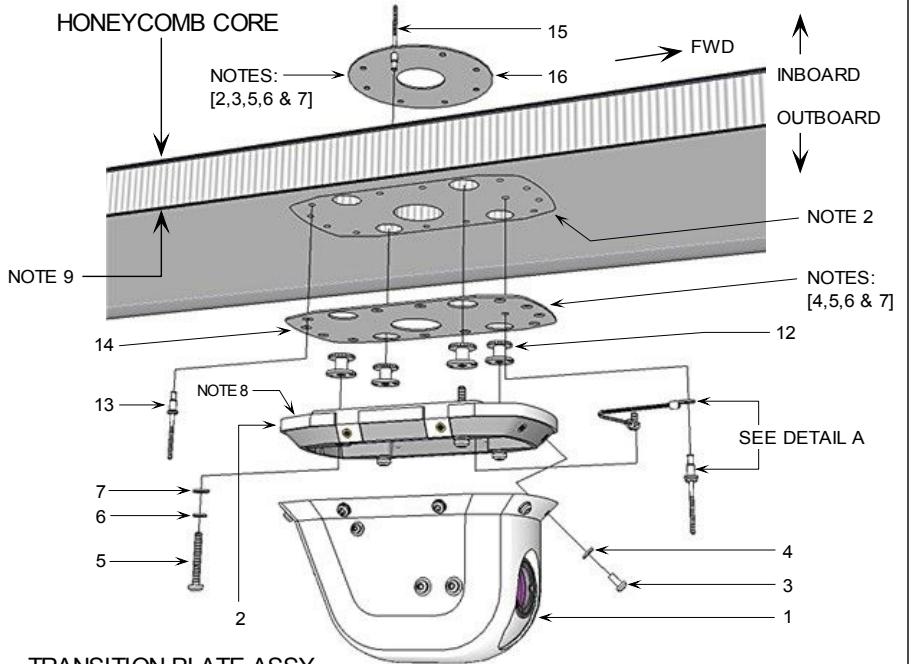
- 1- RECOMMENDED INSTALLATION AS SHOWN.
- 2- SEE APPROPRIATE INSTALL MANUAL FOR LOCATION AND DRILLING PATTERNS.
- 3- INNER DOUBLER DIMENSIONS = 1" I.D. X 3" O.D.
- 4- OUTER DOUBLER DIMENSIONS = T6 FOOTPRINT
- 5- DOUBLER SHALL BE BONDED TO A/F SKIN.
- 6- REMOVE ALL PAINT FROM ALL CONTACT SURFACES PRIOR TO BONDING TO SKIN.
- 7- DOUBLER SHALL BE RIVETED TO A/F SKIN.
- 8- APPLY RTV102 OR 108 SEALANT AROUND ENTIRE MATING SURFACES AFTER INSTALLATION.
- 9- BASED ON A FLAT SURFACE REGION AND A LEVEL REFERENCE POSITION TO HORIZON.



* WASHER I.D. ADJUSTED TO 0.136" (#29)
 ** For skin (grip) thicknesses up to 0.062", increase dash # as req'd.

Item	Description	Part Number	Ref: DWG	Qty
16	INNER DOUBLER	2024-T3, 0.032"T		1
15	RIVET (UNIVERSAL)	CR3213-4-2		8
14	OUTER DOUBLER	2024-T3, 0.040"T		1
13	RIVET (COUNTERSINK)	CR3212-4-2		12
12	POTTING INSERT	NAS1832 SERIES		4
11	LOCKWASHER	T6-260-23 #4 SS		1
10	SCREW	T6-260-22 4-40 x 3/16" SS		1
9	BONDING STRAP	T6-260-16		1
8	RIVET**	T6-260-20 CR3243-4-1**		1
7	WASHER*	T6-210-17* T6-210-17		4
6	LOCKWASHER (#6)	T6-210-16		4
5	SCREW (6-32 X 1)	T6-210-09 T6-210-09		4
4	WASHER	T6-210-14 #4 NYLON		8
3	SCREW	T6-210-13 4-40 x 5/16" SS		8
2	TRANSITION PLATE ASSEMBLY	T6-50212	T6-50212	1
1	CAMERA ASSEMBLY	T6-50205-B	T6-50205	1

 Approved Date 03-06-2011			DWG No: T6-60201 THIRD ANG PROJ: SCALE: NONE Do Not Scale Drawing	REVISIONS		
REV	DESCRIPTION	APR	DATE			
A	INITIAL RELEASE	RAR	03-06-2011			



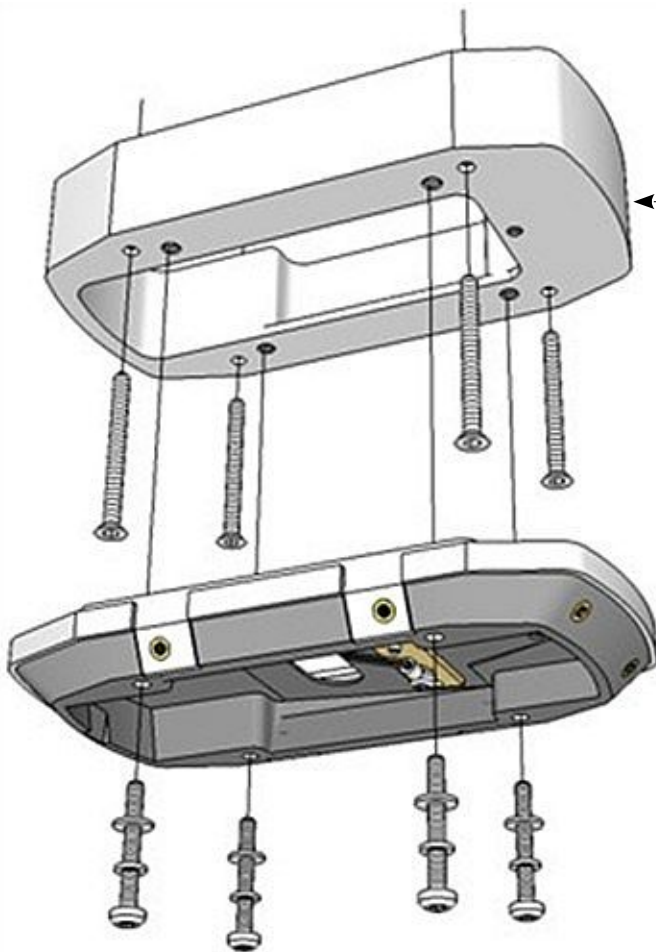
TRANSITION PLATE ASSY
 TYPICAL INSTALLATION

INSTALLATION DRAWING

PROPRIETARY NOTICE: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TrueView EVS LLC AND IS NOT TO BE USED, REPRODUCED OR DISCLOSED IN WHOLE OR IN PART TO ANYONE WITHOUT THE WRITTEN PERMISSION OF TrueView EVS LLC					
UNLESS OTHERWISE SPECIFIED All dimensions are in inches and tolerances are as follows: DECIMALS: XX = +/- .020" .XXX = +/- .010" ANGLES: +/- 1.0°	MATERIAL: NOT SPECIFIED FINISH: NOT SPECIFIED CAD FILE: T6-200-3D TRANSITION_INSTALL MFG PART No. REF DWG No. T6-200-00	APPROVAL DFT: R. RANDAZZO CHK: ENG: APR: CAD CHANGES SHALL BE INCORPORATED BY DESIGN ACTIVITY	DATE 03-06-2011	TrueView EVS www.trueviewevs.com Sackets Harbor N.Y.	TITLE T6-INSTALL_TRANSITION PART No: SEE NOTES DWG No. T6-60201 SCALE: NONE WT: N/A PROJ: SHEET: 1 OF 1

This drawing defines approved procedures for mounting the transition plate assembly onto a honeycomb floor panel and all associated hardware. Once the transition plate is secured, the camera assembly attaches with eight screws and washers.

TYPICAL INSTALLATION ONTO NON-HONEYCOMB STRUCTURES



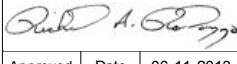

EXTENSION PLATE PART

An extension plate part was designed, analyzed and approved for installation onto airframe hulls where the T6 camera assembly encounters hull contours typical in rib and skin structures.

The extension plate is machined from 6061-T6 aluminum and conformed to receive the transition plate assembly. This plate is produced as a non-remodeled blank with a 1.25" straight flange height as shown in the LH illustration.

Once an approved location has been determined, the extension plate part can be remodeled I.A.W. drawing # T6-210-05 shown on the next page.

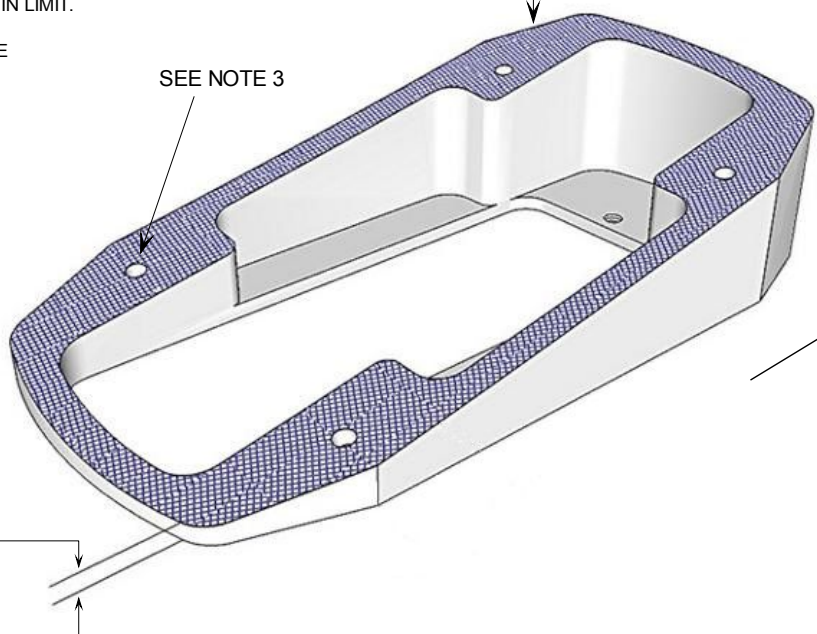
REMODEL DRAWING NO. T6-210-05A [SHEET 3]

<p>EXTENSION PLATE REMODELING LIMITS</p> <p>NOTES:</p> <p>2- MAY BE SHAPED IN ANY DIRECTION AROUND ENTIRE SURFACE PLANE WITH ANY CONTOUR CONFIGURATION WITHOUT VIOLATING MIN LIMIT.</p> <p>3- SEE PM-T6-21005A FOR RETAINING HOLE DRILLING PROCEDURES.</p>		DWG No: T6-210-05A THIRD ANG PROJ: SCALE: 1:1		REVISIONS		
	Approved Date 06-11-2013 Do Not Scale Drawing	REV A	DESCRIPTION INITIAL RELEASE	APR R.A.R.	DATE 06-11-2013	

REMODELED SURFACE (SEE NOTE 2)

SEE NOTE 3

0.10" MIN LIMIT (SEE NOTE 2)



FWD

EXTENSION PLATE
[SERVICE LIMITS]

REMODEL DRAWING

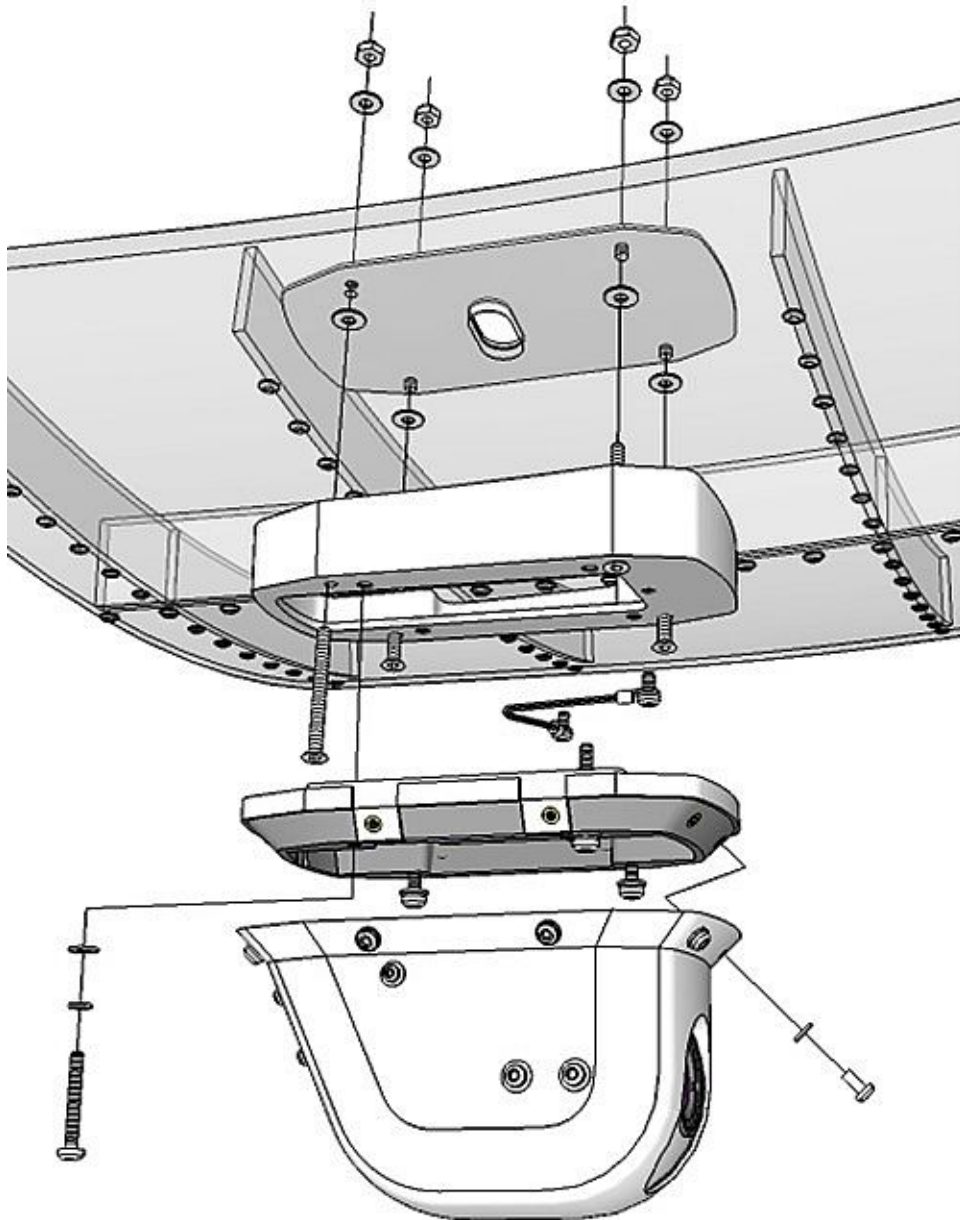
CAD CHANGES SHALL BE INCORPORATED BY DESIGN ACTIVITY

TrueView EVS www.trueviewevs.com Sackets Harbor, N.Y.	PROPRIETARY NOTICE: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF TrueView EVS LLC AND IS NOT TO BE USED, REPRODUCED OR DISCLOSED IN WHOLE OR IN PART TO ANYONE WITHOUT THE WRITTEN PERMISSION OF TrueView EVS LLC	SIZE A	CAGE NO:	DWG NO: T6-210-05A	REV A
DFT: R. RANDAZZO	SCALE = 1:1			SHEET 3 OF 3	

The drawing above defines the service limit of any remodeling procedures performed in order to achieve proper camera assembly orientation. A hull location which supports the extension plate without violating the defined limit is required for an approved installation.

TrueView EVS preforms milling operations and conforms the part for installation.

TYPICAL INSTALLATION ONTO NON-HONEYCOMB STRUCTURES



An typical installation onto a non-honeycomb structure is shown here. It requires remodeling the extension plate part to conform to the hull contour. All approved parts and hardware are provided for this type of installation.

INSTALLATION DRAWING NO. T6-60202

NOTES: REF: DWG NO. T6-200-00 FOR SYSTEM P/N.

- 1- RECOMMENDED INSTALLATION AS SHOWN.
- 2- INNER DOUBLER DIMENSIONS = T6 FOOTPRINT.
- 3- DOUBLER SHALL BE BONDED TO I.B. A/F SKIN.
- 4- REMOVE ALL PAINT FROM ALL CONTACT SURFACES PRIOR TO BONDING TO SKIN.
- 5- SURFACE SHALL BE REMODELED I.A.W. DWG: T6-210-05, SHT 3 [SERVICE LIMITS].
- 6- REMOVE PAINT AROUND EACH THRU-HOLE AS TO ESTABLISH A GROUNDING PATH, INSTALL AT LEAST ONE ITEM (11) ON EACH HOLE.
- 7- AN960PD-6L WASHERS AS REQ'D. ANY COMBINATION TO CONTROL CLEARANCE BETWEEN CLAMP-UP SCREWS TO 0.015" MAX WITH UP TO FOUR WASHERS EACH.
- 8- APPLY RTV102 SEALANT AROUND BOTH PLATE MATING SURFACES AFTER FINAL ASSEMBLY.

DETAIL A
BONDING STRAP ATTACHMENT

*WASHER I.D ADJUSTED TO 0.136" (# 29)

SERVICE LIMITS	
LONGITUDE	8°
LATERAL	15°
SEE NOTE: 1	

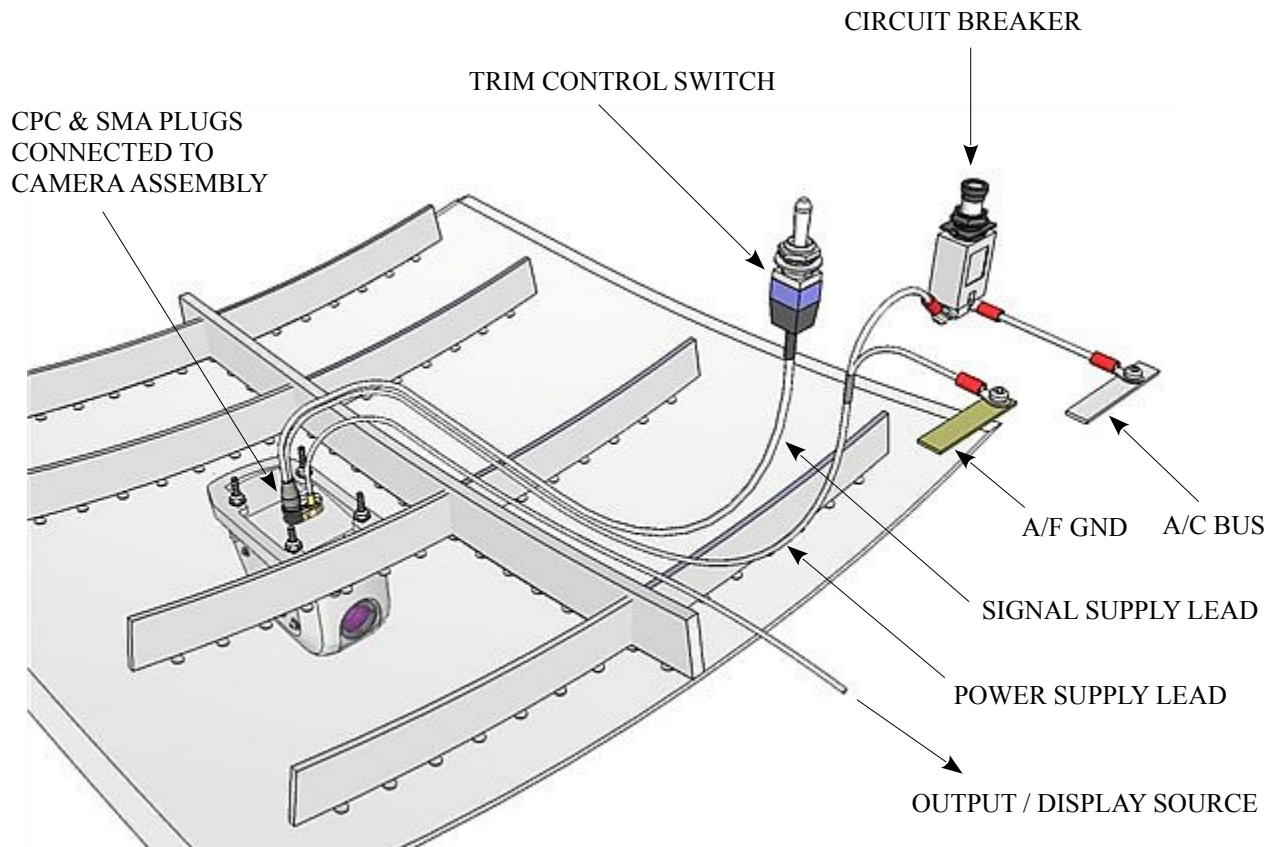
Item	Description	Part Number	Ref: DWG	Qty
16	LOCK WASHER	T6-260-25	# 6, SS	1
15	SCREW	T6-260-24	6-32 x 3/16" SS	1
14	LOCKWASHER	T6-260-23	# 4 SS	1
13	SCREW	T6-260-22	4-40 x 3/16" SS	1
12	BONDING STRAP	T6-260-16	T6-260-16	1
11	WASHER	T6-210-12	AN960PD-6L	4
10	NUT	T6-210-11	AN365-632A	4
9	SCREW	T6-210-10	6-32 X 1.5" SS	4
8	EXTENSION PLATE	T6-210-05	T6-210-05	1
7*	WASHER*	T6-210-17*	T6-210-17	4
6	LOCKWASHER (#6)	T6-210-16	T6-210-16	4
5	SCREW (6-32 X 1")	T6-210-09	T6-210-09	4
4	WASHER	T6-210-14	# 4 NYLON	8
3	SCREW	T6-210-13	4-40 x 5/16" SS	8
2	TRANSITION PLATE ASSEMBLY	T6-50212	T6-50212	1
1	CAMERA ASSEMBLY	T6-50205-A/B	T6-50205	1

This drawing defines approved procedures for mounting a remodeled extension plate and subsequent transition plate and camera assemblies onto a typical rib and skin airframe structure.

NOTE

This drawing is for reference only, each installation varies and requires capturing the support of adjacent stringers or ribs.

AIRFRAME WIRING HARNESS ASSEMBLY



The wiring harness is comprised of CPC and SMA plugs connected to the camera assembly, a console mounted trim control switch and a circuit breaker.

The harness assembly is supplied with approved wiring, components and is factory assembled to the level dictated by each type installation. The CPC plug is factory assembled with the signal and power supply leads connected and terminated at the trim switch and circuit breaker during installation.

The SMA plug is factory assembled and terminated at the display source.

AIRFRAME WIRING HARNESS ASSEMBLY



POWER AND SIGNAL HARNESS

The airframe wiring harness shown here is factory assembled and provides the power and signal inputs to the camera assembly. The harness can be provided in any length required as not to exceed length restrictions.

This harness comes equipped with all the necessary hardware to complete the connection to the circuit breaker, which is also included as part of the system kit.



VIDEO COAX LEAD

The video coax lead is factory assembled at one end to an SMA connector which adapts to the camera assembly. It is provided in any length required to reach the video display where the final connection is completed I.A.W. the displays manufacture.

TOP LEVEL SYSTEM DRAWING NO: T6-200-00

NOTES: PART NUMBER ASSIGNMENTS

- CAMERA P/N: T6-50205-A = 14V INPUT
CAMERA P/N: T6-50205-B = 28V INPUT.
- SYSTEM P/N: T6-200-01-A = TRANSITION PLATE [14V INPUT]
SYSTEM P/N: T6-200-01-B = TRANSITION PLATE [28V INPUT]
- SYSTEM P/N: T6-200-02-A = TRANS & EXTENSION [14V INPUT]
SYSTEM P/N: T6-200-02-B = TRANS & EXTENSION [28V INPUT]
- APPROX 7.0 OZS WITHOUT REMODELING, DWG: T6-210-05, SHT 3

TOP LEVEL SYSTEM DRAWING

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All dimensions are in inches and tolerances are as follows:		NOT SPECIFIED	DFT: R. RANDAZZO	02-20-2011		
DECIMALS: XX = +/- .020" XXX = +/- .010"		FINISH: NOT SPECIFIED	CHK:		TITLE	
ANGLES: +/- .030" +/- .040" +/- .050"		APR:			PART No: T6-200-01/02-A/B	
ANGLES: +/- 1.0°		CAD FILE: T6-200-3D IMAGER	CAD CHANGES SHALL BE INCORPORATED BY DESIGN ACTIVITY		DWG No: T6-200-00	
		MFG PART No: T6-200-01/02-A/B (see notes) TrueView EVS	SCALE: NONE	WT: DWG	PROJ:	SHEET: 1 of 1

Item	Description	TV P/N	Manuf.	Ref: Dw g	Qty
4	A/F WIRING HARNESS	T6-260-00	TVEVS	T6-260-00	1
3	EXTENSION PLATE	T6-210-05		T6-210-05	1
2	TRANSITION PLATE ASSY	T6-50212		T6-50212	1
1	CAMERA ASSEMBLY	T6-50205-A/B		T6-50205	1

This drawing discloses the T6-200 system profile where camera and system part numbers are defined as well as sub component parts. The T6-200 supports both 14 & 28 volt inputs and will only weigh approximately 1.5 lbs as a complete install.

Frame shot as viewed on a Garmin G500H MFD display



The above image shows the synthetic terrain image on the Primary Flight Display (PFD) on the RH panel as runway 18 is on display.

The T6-200 thermal image is displayed on the Multi Function Display (MFD) on the upper LH panel as runway 18 is confirmed while revealing dangerous obstacles.

The helicopter location and proximity is shown on the MFD Map, lower left.

TrueViewEVS.com[®]
thermal imaging technology for the cockpit

For full system support, installation guidance and documentation:

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Sackets Harbor, New York