AIRFILM
CAMERA SYSTEMS

REPORT AFSP-V2-006

INSTALLATION INSTRUCTIONS
AFSP-V2 UTILITY MOUNT

Airfilm Camera Systems
6245 Aerodrome Way, Hangar No. 2
PO Box 1352
Georgetown, Ca 95634

LOG OF REVISIONS

REVISION	DATE	PAGES EFFECTED	COMMENTS
N/C	01/19/2017	ALL	Original Issue
A	07/18/2017	ALL	Minor Corrections, Revised Payload Specifications, Added PEOVI Installation information, Updated Weight and Balance.
B	05/03/2019	ALL	Minor Corrections to PEOVI Installation Info and Corrected CFR references appendix B

1.0 INTRODUCTION AND DESCRIPTION:

Figure 1. View Showing AFSP-V2 Installation on AS350 Helicopter

The Airfilm AFSP-V2 Utility Bracket Mount allows for the attachment of utility equipment such as cameras, lights, and sensor instruments to be mounted on the Airbus AS350 and AS355 series Helicopters. It can be installed on High or Low Gear aircraft. The AFSP-V2 can be configured in a single beam or dual beam assembly. The single beam configuration can be installed on the right or left-hand side of the aircraft. Applicable models are shown below:

AS350 models B, B1, B2, BA, B3, C, D, and D1
AS355 models E, F, F1, F2, N, and NP

The AFSP-1 mount system consists of a support beam that spans forward to aft. The mount attaches to the forward landing gear cross tube and floor tuning hammer weight attachment points.

After installation, calculate weight and balance for Installed items and check for proper loading of aircraft. A modification to the forward belly panel per Section 2 is required to provide for the A956 T-Bracket Assembly. Antenna, lights, and additional installed equipment may need to be relocated to provide clearance for the camera mount system.

Note - If camera / sensor installations require additional power or system requirements beyond the placarded OEM auxiliary power outlet, additional certification(s) may be required.

2.0 AFSP-V2 UTILITY MOUNT INSTALLATION

Note: Sections 2.1 through 2.5 outline the procedure for modifying the belly panel for the T-Bracket installation. If there is an existing T Bracket installed on the helicopter, skip to section 2.9 for mount installation.

2.1 Confirm that the mount will not interfere with any exterior kits, antennas, and other exterior mounted assemblies.

2.2 Remove the forward belly panel. Use caution for any antennas located on the panel. Disconnect any cabling before removing the panel.

2.3 With the panel removed, temporarily install the T-Bracket (see section 2.7) and place a laser light pointing from the ground directly up at the center of the T-Bracket.

2.4 Without moving the laser light, remove the T-Bracket and re-install the forward belly panel. Using the laser point as a guide, sketch out the cutout according to the figure below.

2.5 Make a cut in the panel. Approximate size of slot is 1.25 x 4.5 with the center of the slot being located on the laser point. Re-install panel and check for adequate clearance. Remove material as needed. Once complete prep repair surfaces by deburring all cut edges and removing any protruding core material.

2.6 Seal cut slot with 2-part epoxy (Aeropoxy P22032 series/E-Z Epoxy or equivalent). Follow manufacturer's instructions for epoxy mix and application. Apply 3 inch 17 fill E glass tape equally to cut edge to seal exposed core material. Prime and paint the exposed area.

2.7 <u>A953-1 Installation (Non-Clamped Connection):</u>

Note: The A953-1 Non-Clamping T-Bracket is to be installed on AS350 Model Helicopters equipped with autopilot.

Hold the A953 T-Bracket up to the hammer weight. Using a 6mm socket, remove one existing metric nut off the hammer weight, and replace with an A700 Special Nut. Repeat process for the remaining nuts (6 per side).

Torque nuts to 72-84 in-lbs (Use caution when using tightening the nuts – note that the bolts are 6mm diameter and proper torque will be achieved quickly). Use 0.032 diameter safety wire to secure all nuts as shown. Repeat bracket installation for the opposite hammer weight (if applicable).

A956 Installation (Clamped Connection):

Remove the AFDP-11 and AFDP-12 T-Bracket Tops from the A956 assembly and locate them on the forward portion of the aircraft hammer weight (shown on Fig. 2). With the bolts in place, place the A735 bracket onto the bottom side of the hammer weight and reassemble the A956.

Torque bolts in accordance with drawing. Repeat bracket installation for the opposite hammer weight (if applicable).

Figure 2. Location of A953-1 and A956 Assembly installation on aircraft hammer weight fitting

Figure 3 Installation of the Non-Clamping A953 T-Bracket with A700 Nuts

Figure 4 Installation of the Clamping A956 T-Bracket (RH Shown)

2.8 Reinstall modified belly panel. Check that clearance holes allow the T-Brackets to extend through the panel.

2.9 Aft Clamp Attachment:

Locate area on the forward cross tube as shown in Figure 3. The attachment area is shown in green, approximately 2 inches outside of the cargo swing attach bracket.

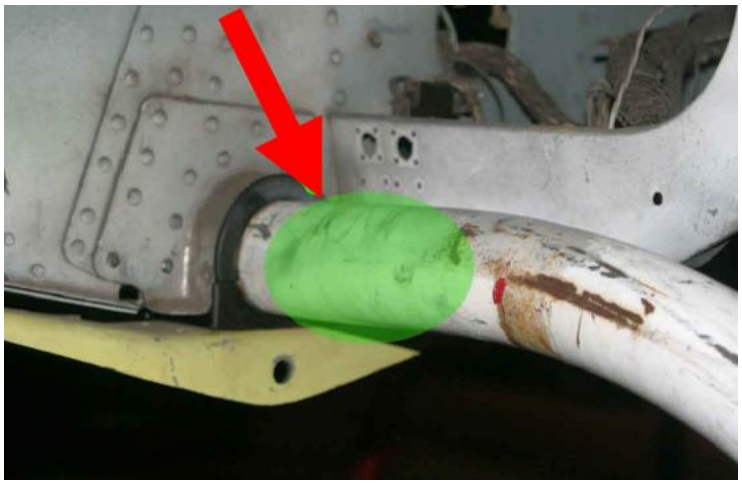


Figure 5. Location of rear clamp installation on forward cross tube

Remove the AN6-25A clamp bolts from the AFSP-V2-1-021 and AFSP-V2-1-023 half clamps and secure the tube clamp onto the forward cross tube with the

supplied rubber to protect the aircraft landing gear. Reinstall the clamp bolts hand-tight. And allow the forward portion of the mount to rest on the floor.

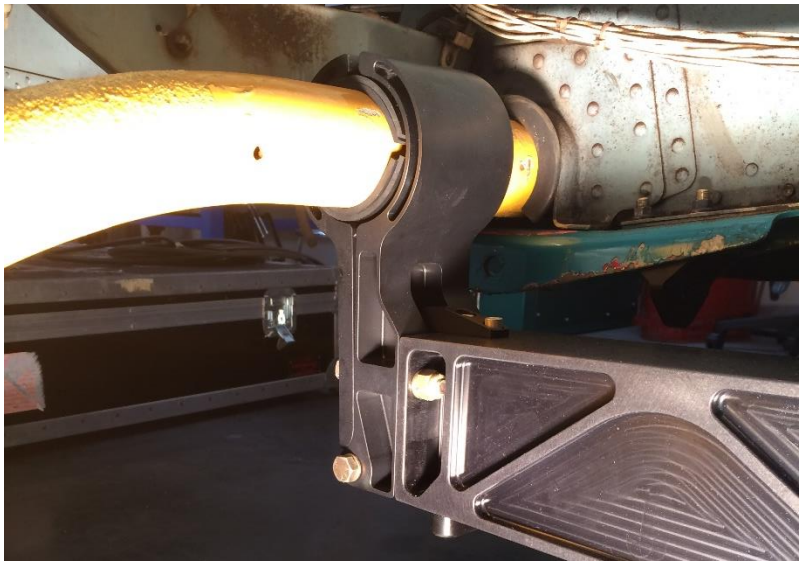


Figure 6 Aft Clamp installation on FWD Cross Tube

2.10 Before raising the forward portion of the mount up to the T Bracket assembly, ensure that the sliding and rotational portions of the attach bracket (AFSP-V2-1-005) are free to move. This will allow the brackets to align when attaching the T-Bracket and mount.

2.11 Raise the forward portion of the mount up to the T Bracket assembly and insert the two (AN6-21A) bolts into the T Bracket lower bolt holes. (Ref Fig. 4)

2.12 Install Forward Arm (Long or Short Configuration) using the three (3) 12 point bolts (MS21250-06046). Torque Bolts to 180-200 in-lbs. (Ref Fig. 7)

Figure 7 Installation of the Forward Arm for Single Pole Configuration

CAUTION

FAILURE TO INSTALL THE 12 POINT BOLTS (MS21250-06046) IN THE CORRECT LOCATION COULD RESULT IN DAMAGE TO THE MOUNT OR LOSS OF PAYLOAD

2.13 If the installation is complete, torque all hardware per FAA AC43.13-1A and check that all hardware is fully secured. If a dual pole configuration is to be installed, leave fasteners hand tight and continue.

2.14 AFSP-V2 Dual Beam Configuration:

Repeat steps 2.1 thru 2.11 for the second beam assembly on opposite side of the aircraft.

2.15 Install the AF200 Connecting Arms (AFSP-V2-4) on the forward end of each single pole using 12 point bolts (MS21250-06046). Torque Bolts to 180-200 in-lbs. Ref Fig 8.

CAUTION

FAILURE TO INSTALL THE 12 POINT BOLTS (MS21250-06046) IN THE CORRECT LOCATION COULD RESULT IN DAMAGE TO THE MOUNT OR LOSS OF PAYLOAD

Figure 8 Installation of the AF200 Connecting Arms for the Dual Pole Configuration

2.16 Install A918 yoke and the AFSP-V2-4 Connecting Arms onto the two beams and fasten all hardware hand-tight. Ref Fig 9.

Figure 9 Installation of the A918 Yoke for the Dual Pole Configuration

2.17 Attach supplied hose to aircraft pitot tube and Pitot tube extension (A919), use supplied aero seal (QS100-M8W) hose clamp. Cut hose to length as required. Tighten hose clamp around hose at both ends to secure. Check that the hose clamp is secure and hose is well retained. Pull Pitot Heat circuit breaker and install placard in clear view of pilot.

Figure 10 Installation of the Pitot Tube Extension (Tube) onto Pitot Tube

The pitot heat must remain **OFF** and/or the circuit breaker pulled with the auxiliary pitot tube installed.

Figure 11 Installation of the Pitot Tube Placard

2.18 Torque all hand-tight hardware per FAA AC43.13-1A and check that all hardware is fully secured, torqued, and safety wired.

2.19 Insure AFSP-V2 Mount does not interfere with existing aircraft equipment.

2.20 Install camera/sensor to AFSP-V2 Mount using Manufacturer's Instructions.

2.21 Route any control wire into aircraft so as not to interfere with the operation of doors or the operation of any flight controls or systems.

2.22 Check entire AFSP-V2 Assembly for flight integrity. System should be secure and not have free play movement.

2.23 <u>Optional A100 - Counterweight Assembly Installation:</u>
Attach the A972 Combo Side Fitting Assembly to the aircraft hardpoint on the right side of the aircraft. The combo fitting will allow for the attachment of both the side mount and the counterweight installations. The left side does not require a combo fitting because the counterweight does not attach to the left side aircraft hard point. Scallop washer to be installed as shown in the figure below.

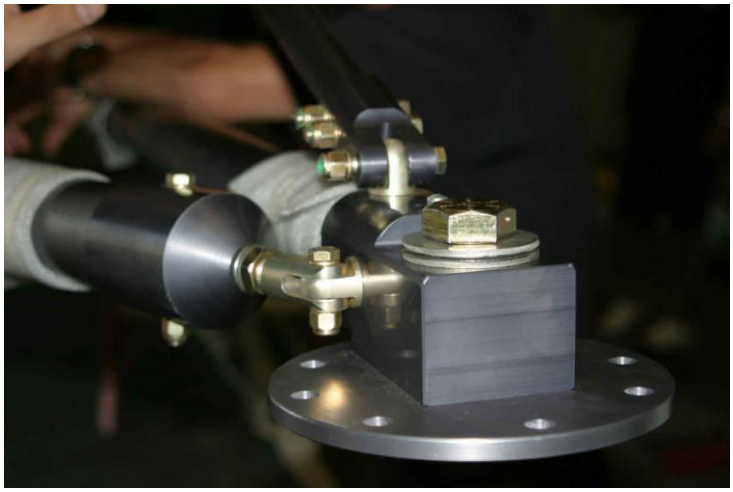
2.24 Attach the Counter Weight Yoke Tension Tube to the A972 Combo Side Fitting. See figure below for clarification.

2.25 Attach the Main Counterweight Support Tube Assembly and the Lower Counterweight Support Tube Assembly to the aircraft's aft cross tube on the LH and RH sides. Attach the assemblies to the cross tubes using the provided tube clamps. Ensure that the aircraft is properly protected by using the supplied (A795) rubber sleeve as shown in the figure below.

Note: Additional rubber strips can be used to protect the landing gear. Do not let the metal clamp come in contact with the landing gear.

2.26 Attach the Counterweight Tension Tube to the Main Counterweight Support Tube Assembly**.** See figure below for clarification.

2.27 Attach the Lower Counterweight Support Tube Assembly to the Main Counterweight Support Tube Assembly



2.28 Attach the Counterweight or Counterweight Box or Sensor to the Counterweight Support Assembly using the 1” diameter bolt supplied. Tighten bolt so taper fit is tight and secure with no free play. Safety wire 1” bolt to the bracket with .032 safety wire.

The standard weight box (A125) can be installed if more counterweight is required. When adding weight to box be sure to check that the weight is secure and has little free movement. Check that the two (2) box lid latches are fully secured and locked.

WARNING: COUNTERWEIGHT APPLIED TO THE A100 COUNTERWEIGHT ASSY IS NOT TO EXCEED 150 LBS

2.29 Optional AF-PSB-ASM and AF-PSB-ADT - PEOVI Camera Assembly Installation:

The AF-PSB-ASM “PEOVI” is a small rugged self-contained camera enclosure which can be (optionally) installed in several locations along the AFSP-V2 mount or on the landing gear cross tubes using the PEOVI Gear Clamp P/N AF-P350. Alternatively, the AF-PSB-ADT “DOVE TAIL” is a small quick release mount which can be installed on several locations of the AFSP-V2 mount, similarly to the AF-PSB-ASM “PEOVI” device.

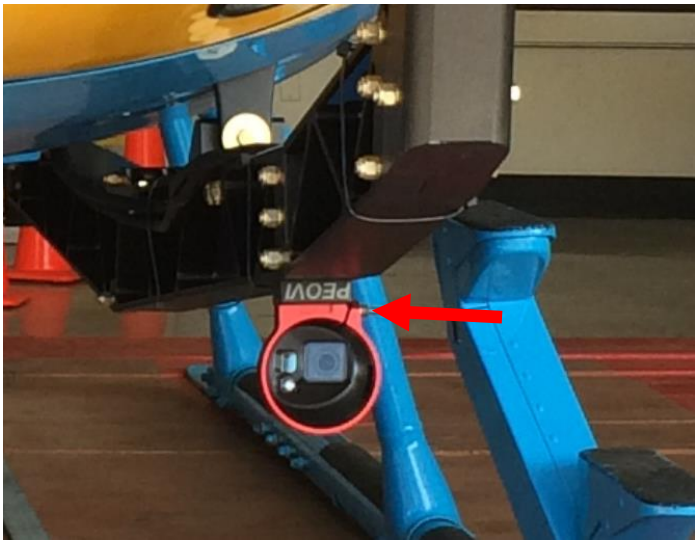


Figure 12 AF-PSB-ASM Installation on AFSP-V2 (FWD Location)

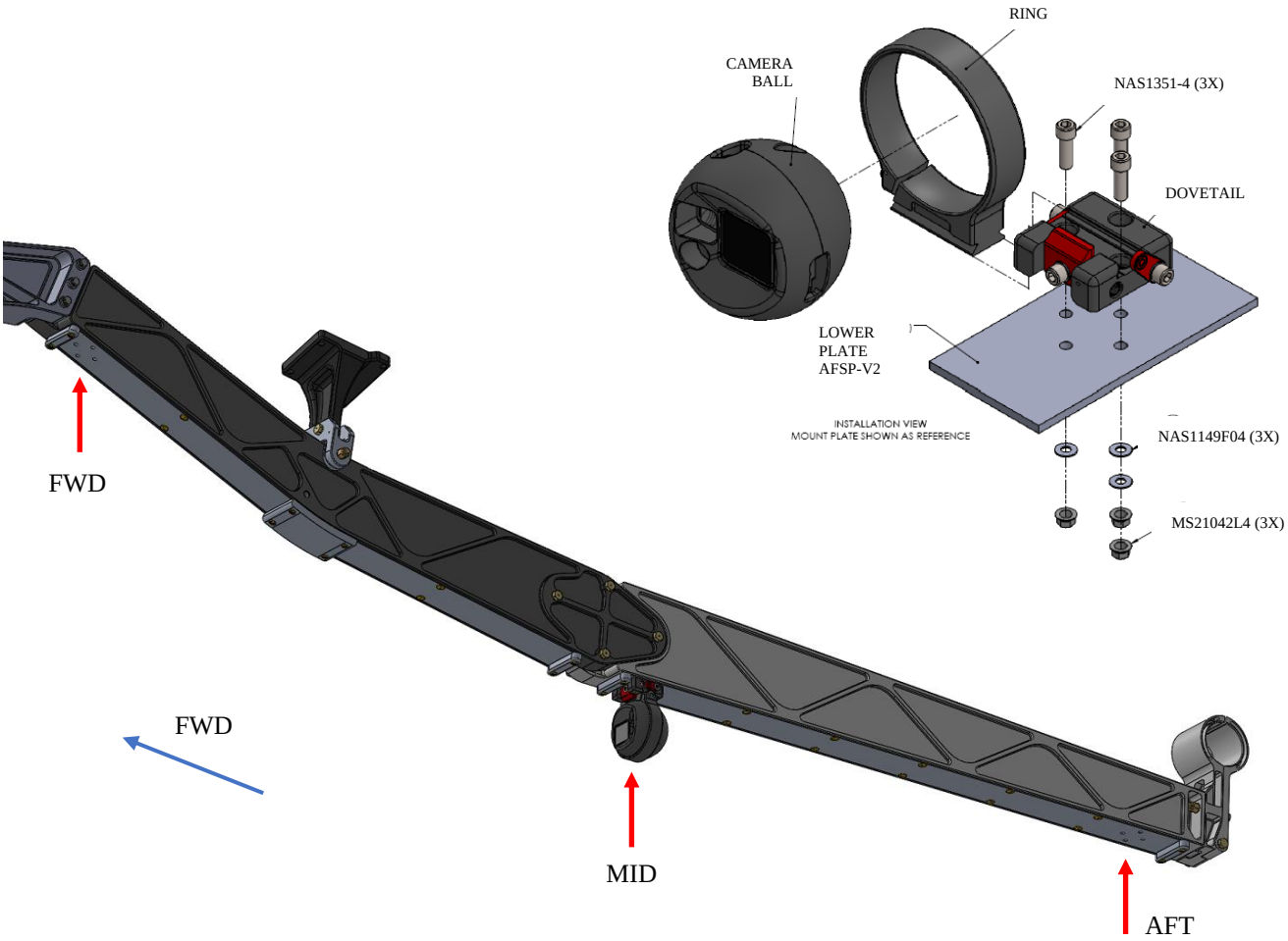


Figure 13 AF-PSB-ASM Optional Installation Locations and Mount Detail for AFSP-V2

a. Remove the AFSP-V2 Lower Plate at the desired PEOVI installation location.
b. Install the PEOVI Dovetail using NAS1351-4 Bolts (3X), NAS1149F04 Washers (3X), and MS21042L4 Locknuts (3X) onto the plate thru existing hole pattern.
c. Reinstall Lower Plate using retained Hardware from Step (a).
d. Assembly the Camera Ball and Ring.
e. Install the Camera Assembly into the Dovetail and secure all locking mechanisms.
f. Torque all hardware per AC 43.13-1B.

NOTES:

1. Typical PEOVI installation weight is 1.6 lbs. Update Aircraft W&B Accordingly
2. PEOVI can be mounted several locations along the AFSP-V2 mount or directly to the aircraft landing gear cross tubes using the PEOVI Gear Clamp P/N AF-P350. Reference PEOVI document AFSP-P1-006 for additional info and instructions on PEOVI.
3. The PEOVI Gear Clamp installation can be used with or without the AFSP-V2 installed. The airspeed limitation of the STC does not apply when PEOVI (only) is installed. All limitations of the FAA Approved RFMS remain applicable.

2.30 Revise weight and balance per Tables 1 and 2 (following page). If needed, install (optional) AF200-2 Counter Weight per Sections 2.28 thru

The following tables present the location of the weight/center of gravity of the mount and payload sensor/camera for adjustment of the aircraft weight and center of gravity with the mount installed.

Table 1. AFSP-V2 Single Pole Weights and Stations

AFSP-V2 (SINGLE POLE) WEIGHT AND STATIONS			
FOR CAMERA / SENSOR SYSTEMS			
AS350 & AS355 ALL SERIES			
	WEIGHT	LONGITUDINAL	LATERAL
ITEM DESCRIPTION	**LBS**	**ARM INCHES**	**ARM INCHES**
NOSE LOCATION PAYLOAD- LONG ARM - *USE CAMERA WEIGHT (175 lb max)**	*	0.1	21.3
NOSE LOCATION PAYLOAD - SHORT ARM - *USE CAMERA WEIGHT (175 lb max)**	*	4.7	21.3
AFSP-V2 - SINGLE POLE BEAM ASSEMBLY (SHORT OR LONG ARM)	44.0	50.9	21.3
FORWARD MOUNT BRACKET (SELECT ONE OF THE FOLLOWING)			
NON CLAMP (PN A953-1 THREE HOLE)	3.0	40.4	21.3
QUICK CLAMP NEW VERSION (PN A956 -1R / 1L NEW THREE HOLE)	5.9	40.4	21.3
QUICK DISCONNECT DEVICE (SELECT ONE OF THE FOLLOWING)			
DT-1-1	2.4	0.1 or 4.7	21.3
QDD-1-1 OR QDD-1H-1	5.0	0.1 or 4.7	21.3
COUNTER WEIGHT LOCATION			
COUNTER WEIGHT BRACKET ASSEMBLY (PN A100)	58.4	234.0	-16.5
COUNTER WEIGHT BOX EMPTY (PN A125)	21.6	260.0	20.0
COUNTER WEIGHTS INSTALLED (150 MAX)		260.0	20.0
TAIL CONE W/ WEIGHT MAX (SEE EUROCOPTER 53.06 SB)	44.0	398.7	0.0

***USE ACTUAL WEIGHT OF INSTALLED EQUIPMENT**
Use proper weight and balance WHEN multiple configurations installed.

Table 2. AFSP-V2 Dual Pole Weights and Stations

AFSP-V2 (DUAL POLE) WEIGHT AND STATIONS FOR CAMERA / SENSOR SYSTEMS AS350 & AS355 ALL SERIES	WEIGHT	LONGITUDINAL	LATERAL
ITEM DESCRIPTION	LBS	ARM INCHES	ARM INCHES
NOSE LOCATION PAYLOAD- LONG ARM - *USE CAMERA WEIGHT (215 LB MAX)**	*	-16.7	0.0
AFSP-V2 (DUAL POLE CONFIG - WITH A918 YOKE)	135.0	27.1	0.0
FORWARD MOUNT BRACKET (SELECT ONE OF THE FOLLOWING)			
NON CLAMP (PN A953-1 THREE HOLE)	6.0	40.4	0.0
QUICK CLAMP NEW VERSION (PN A956 -1R / 1L NEW THREE HOLE)	11.7	40.4	0.0
QUICK DISCONNECT DEVICE (SELECT ONE OF THE FOLLOWING)			
DT-1-1	2.4	-16.7	0.0
QDD-1-1 OR QDD-1H-1	5.0	-16.7	0.0
COUNTER WEIGHT LOCATION			
COUNTER WEIGHT BRACKET ASSEMBLY (PN A100)	58.4	234.0	16.5
COUNTER WEIGHT BOX EMPTY (PN A125)	21.6	260.0	20.0
COUNTER WEIGHTS INSTALLED (150 MAX)		260.0	20.0
TAIL CONE W/ WEIGHT MAX (SEE EUROCOPTER 53.06 SB)	44.0	398.7	0.0

***USE ACTUAL WEIGHT OF INSTALLED EQUIPMENT**

2.31 Torque all hardware per FAA AC43.13-1A and check that all hardware is fully secured.
2.32 Install RFMS AFSP-V2-005 into Rotorcraft Flight Manual.
2.33 Make appropriate log book entry for installation.
2.34 Return to service.

NOTES:

a) The payload package for the Single Beam installation is limited to a maximum allowable frontal area of 2.6 ft^2 and a weight of 175 lbs at any mounting location. The Dual Beam installation is limited to maximum allowable frontal area of 7.1 ft^2 and a weight of 215 lbs.
b) When Airfilm payload Disconnect Devices (QDD-1-1, QDD-1H-1, or DT-1-1) are installed, the payload can be removed and installed by crew.
c) If camera/sensor installations require additional power or system requirements beyond the placarded OEM auxiliary power outlet, additional certification(s) may be required.

Removing the AFSP-V2 system:

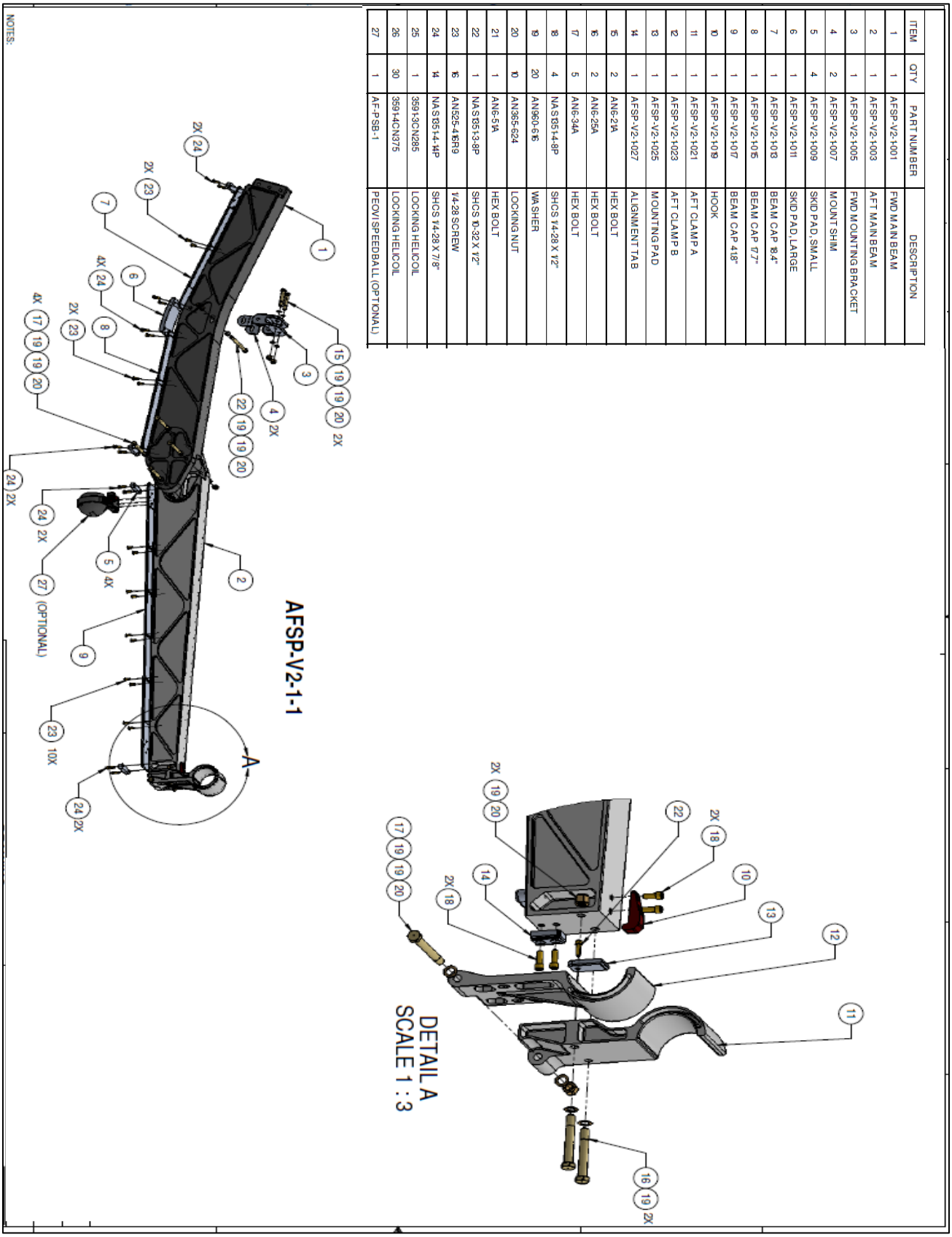
a. Follow instructions in reverse order to remove.
b. Remove entire AFSP-V2 Utility Mount Assembly and associated hardware.
c. Calculate weight and balance
d. Make appropriate log book entry

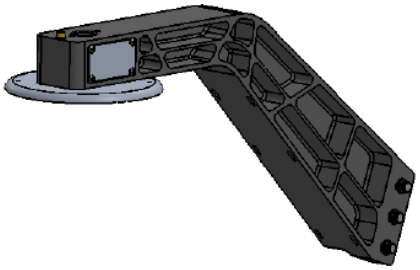
e. Return Aircraft to service

APPENDIX A –
AFSP-V2 Configuration and Assembly Information

PARTS LIST										
ITEM	-1CL	-1CR	-100	-2CL	-2CR	-200	-3C0	-300	PART NUMBER	DESCRIPTION
1	1	1	1	1	1	1	2	2	AFSP-V2-1-1	MAIN ARM
2	1	1	1						AFSP-V2-2-1	LONG ARM
3				1	1	1			AFSP-V2-3-1	SHORT ARM
4							2	2	AFSP-V2-4-1	AF200 CONNECTING ARM
5			1			1		2	A953-1	T-BRACKET ASSY, NON-CLAMPING
6	1			1			1		A956-L	T-BRACKET CLAMP C (LH)
7		1			1		1		A956-R	T-BRACKET CLAMP C (RH)
8							1	1	A918	NM YOKE ASSY
9	-								-1CL	KIT, LH CLAMPING, LONG
10		-							-1CR	KIT, RH CLAMPING, LONG
11			-						-100	KIT, NON CLAMPING, LONG
12				-					-2CL	KIT, LH CLAMPING, SHORT
13					-				-2CR	KIT, RH CLAMPING, SHORT
14						-			-200	KIT, NON CLAMPING, SHORT
15							-		-3C0	KIT, CLAMPING, DUAL
16								-	-300	KIT, NON CLAMPING, DUAL

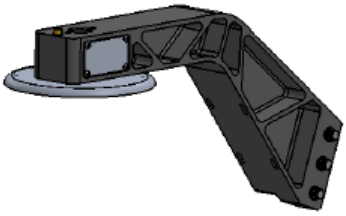
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	AFSP-V2-1001	FWD MAIN BEAM
2	1	AFSP-V2-1003	AFT MAIN BEAM
3	1	AFSP-V2-1005	FWD MOUNTING BRACKET
4	2	AFSP-V2-1007	MOUNT SHIM
5	4	AFSP-V2-1009	SKID PAD, SMALL
6	1	AFSP-V2-1011	SKID PAD, LARGE
7	1	AFSP-V2-1013	BEAM CAP 18.4"
8	1	AFSP-V2-1015	BEAM CAP 17.7"
9	1	AFSP-V2-1017	BEAM CAP 418"
10	1	AFSP-V2-1019	HOOK
11	1	AFSP-V2-1021	AFT CLAMP A
12	1	AFSP-V2-1023	AFT CLAMP B
13	1	AFSP-V2-1025	MOUNTING PAD
14	1	AFSP-V2-1027	ALIGNMENT TAB
15	2	AN6-21A	HEX BOLT
16	2	AN6-25A	HEX BOLT
17	5	AN6-34A	HEX BOLT
18	4	NAS1351-4P	SHCS 1/4-28 X 1/2"
19	20	AN960-616	WASHER
20	10	AN365-624	LOCKING NUT
21	1	AN6-5A	HEX BOLT
22	1	NAS1351-8P	SHCS 10-32 X 1/2"
23	16	AN525-416R9	1/4-28 SCREW
24	14	NAS1351-4P	SHCS 1/4-28 X 7/8"
25	1	359-13CN285	LOCKING HELICOIL
26	30	359-14CN375	LOCKING HELICOIL
27	1	AF-PSB-1	PEO VI SPEEDBALL (OPTIONAL)





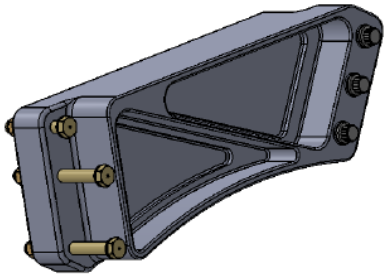
AFSP-V2-2-1

LONG ARM



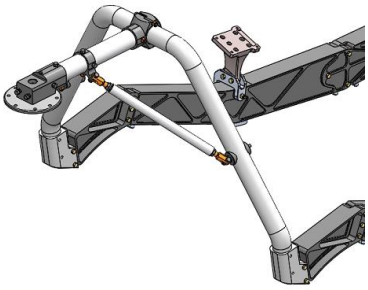
AFSP-V2-3-1

SHORT ARM



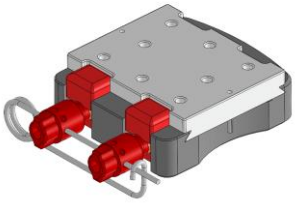
AFSP-V2-4

AF200 CONNECTING ARM



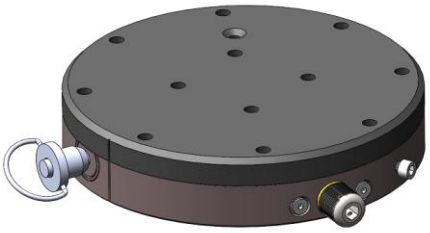
DT-1-1

AF200 YOKE



DT-1-1

DOVE TAIL



QDD-1, QDD-1H, QDD-8

QUICK DISCONECT

AFSP-V2 FORWARD ARMS AND PAYLOAD ATTACHMENT IDENTIFICATION

APPENDIX B –
METHOD OF ADDING ADDITIONAL SENSOR /CAMERA / PAYLOADS

2.1 Overview

This Appendix provides the requirements necessary to qualify sensor / camera / light payloads – IF NEEDED.
It may also be used as a check list for previously approved sensor /cameras / light payloads if desired.

The STC flight testing was conducted and the STC approved with the largest and heaviest payload expected for use with this mount. The specific sensor/cameras/light not listed in the installation manual of equal or lesser than the limit case are accepted with this follow-on test plan.

3.0 Sensor/ Camera/ payload

Make & Model _____

4.0 Test Team

2.2 Pilot(s)

_____ _____
Print Name

2.3 Mechanic and/or Engineer and/or Camera Operator

_____ _____
Print Name

A.1. Test Aircraft Configuration and Location

2.4 Aircraft Model, Registration & Serial Number

_____ _____ _____

Model Registration Number Serial Number

2.5 Test Configurations

Empty weight with appropriate fuel and camera system installed
Takeoff Gross weight with crew

Configuration	Gross Weight	Longitudinal CG	Lateral CG
Empty Wt			
Takeoff Wt			

A.1.1. Test Location

_____

Airport or Test Site

A.2. Test Conditions

Date: _____

Weather: Ceiling _____ Visibility _____ Winds _____

Altimeter _____ Field Elevation _____

Flight Time: Engine Start _____ Shut Down _____ Flt Time _____

A.3. Flight Test

A.3.1. Overview

Applicable regulations demonstrated for compliance are indicated with the following symbol ➔. The testing required for the compliance findings of this installation will be made by as a subject/qualitative evaluation. Although the most critical CG is at the aft limit for most tests this configuration is mounted forward of the mast should not approach the aft limits. This also depends on crew loading. The test team conducts the following tests and evaluations and mark initial the box at the end of each section if the configuration successfully passes the requirements.

A.3.2. FAR § 27.51 Takeoff

A.3.2.1. Applicable Regulation

➔(a) The takeoff data required by Secs. 27.53, 27.55, 27.59, 27.60, 27.61, 27.62, 27.63, and 27.67 must be determined--
(1) At each weight, altitude, and temperature selected by the applicant; and
(2) With the operating engines within approved operating limitations.
➔ (b) Takeoff data must--
(1) Be determined on a smooth, dry, hard surface; and
(2) Be corrected to assume a level takeoff surface.
(c) No takeoff made to determine the data required by this section may require exceptional piloting skill or alertness, or exceptionally favorable conditions.

A.3.2.2. Method of Compliance

The recommended takeoff procedure must be demonstrated to remain clear of the HV "avoid" areas without requiring exceptional piloting skill or exceptionally favorable conditions.

A qualitative evaluation of the ability to safely land at any point along the flight path will be made using judgment and experience with the basic aircraft. No engine failure testing at low altitude will be conducted.

The normal takeoff procedures will be used for the sensor/camera/light payload and mount installation.

A.3.2.3. Findings

Satisfactory _____

A.3.3. FAR § 27.71 Glide Performance

A.3.3.1. Applicable Regulation

➔For each category B helicopter, except multiengine helicopters meeting the requirements of Sec. 27.67(b) and the powerplant installation requirements of category A, the steady angle of glide must be determined in autorotation--
(a) At the forward speed for minimum rate of descent as selected by the applicant;
➔ (b) At the forward speed for best glide angle;
(c) At maximum weight; and
➔ (d) At the rotor speed or speeds selected by the applicant

A.3.3.2. Method of Compliance

(1) Performance capabilities during stabilized autorotative descent are useful pilot tools to assist in the management of a Category B rotorcraft when all engines fail. This information is also useful in determining the suitability of available landing areas along a given route segment.

(2) Two speeds are of particular importance, the speed for minimum rate of descent and the speed for best angle of glide. These speeds along with glide distance information are required as flight manual entries per FAR § 27.1587. The recommended speed for autorotation is usually optimized to assure an effective flare capability and yet be slow enough to allow a controlled, relatively slow touchdown condition. Recommended autorotation speed is ordinarily between the minimum rate of descent and maximum glide angle speeds.

An autorotative descent starting at least 1000 feet above the ground and at the speed published in the RFM, 100% RPM value will be demonstrated. Small turns will be conducted in the descent. The maneuver will be terminated with power at a safe altitude.

The aircraft should be easily controllable and the difference between the mount and camera/sensor/light payload and the clean configuration is the evaluation point.

A.3.3.3. Findings

Satisfactory _____ Altitude Band HP _____ Fuel Gage Reading _____

A.3.4. FAR § 27.143 Controllability and Maneuverability

A.3.4.1. Applicable Regulation

➔(a) The rotorcraft must be safely controllable and maneuverable -
➔ (1) During steady flight; and
➔(2) During any maneuver appropriate to the type, including -
➔ (i) Takeoff;
➔ (ii) Climb;
➔ (iii) Level flight;
➔ (iv) Turning flight;
➔ (v) Glide
➔ (vi) Landing (power on and power off);

➔(b) The margin of cyclic control must allow satisfactory roll and pitch control at VNE with -

(1) Critical weight;
(2) Critical center of gravity;
(3) Critical rotor rpm; and
(4) Power off (except for helicopters demonstrating compliance with paragraph (f) of this section) and power on.

(c) A wind velocity of not less than 17 knots must be established in which the rotorcraft can be operated without loss of control on or near the ground in any maneuver appropriate to the type (such as crosswind takeoffs, sideward flight, and rearward flight), with -

(1) Critical weight;

(2) Critical center of gravity;

(3) Critical rotor rpm; and

(4) Altitude, from standard sea level conditions to the maximum altitude capability of the rotorcraft or 7,000 feet, whichever is less.

(d) The rotorcraft, after failure of one engine in the case of multiengine rotorcraft that meet Transport Category A engine isolation requirements, or complete engine failure in the case of other rotorcraft, must be controllable over the range of speeds and altitudes for which certification is requested when such power failure occurs with maximum continuous power and critical weight. No corrective action time delay for any condition following power failure may be less than -

(1) For the cruise condition, one second, or normal pilot reaction time (whichever is greater); and

(2) For any other condition, normal pilot reaction time.

(e) For helicopters for which a VNE (power off) is established under § 27.1505(c), compliance must be demonstrated with the following requirements with critical weight, critical center of gravity, and critical rotor rpm:

(1) The helicopter must be safely slowed to VNE (power off), without exceptional pilot skill, after the last operating engine is made inoperative at power on VNE.

(2) At a speed of 1.1 VNE (power off), the margin of cyclic control must allow satisfactory roll and pitch control with power off.

A.3.4.2. Method of Compliance

The general requirements for control and for maneuverability are summarized in section (a) of the AC, which is largely self-explanatory.

Section (b) specifies flight at V_{NE} with critical weight, center of gravity (CG), rotor RPM, and power. Adequate cyclic authority must remain at V_{NE} for nose down pitching of the rotorcraft and for adequate roll control.

The helicopter will be flown between 1000 and 3000 feet above ground. The test altitude will be dependent on traffic and terrain and conditions close to sea level pressure are desirable. V_{NE} will be the value stated in the RFM for the test density altitude.

Qualitative measurement techniques (pilot opinion) will be used. The tests will include:

Takeoff
Climbing flight
Forward flight to V_{NE}, not more than the published RFM limit at MCP (maybe less than MCP)
Left & right 30 degree bank turns at V_{NE} and at MCP (maybe less than MCP)
Take-off & Landings (Power **on** only).

The aircraft should be easily controllable and adequate cyclic margins should exist throughout the flight test points. The difference between the mount and sensor / camera / light payload and the clean configuration is the evaluation point.

A.3.4.3. Findings

Satisfactory _____ Cruise Altitude HP _____ Fuel Gage Reading _____

A.3.5. FAR § 27.171 Stability: General

A.3.5.1. Applicable Regulation

➔The rotorcraft must be able to be flown, without undue pilot fatigue or strain, in any normal maneuver for a period of time as long as that expected in normal operation. At least three landings and takeoffs must be made during this demonstration.

A.3.5.2. Method of Compliance

Compliance with the requirements of this section can often be obtained for the VFR condition without any specific or designated flight testing. Demonstrate that the aircraft can be satisfactorily flown throughout the maximum endurance capabilities of the rotorcraft including night and turbulence conditions if those are critical. This test should be conducted with minimum required systems in the aircraft and with minimum flight crew.

Compliance for this requirement will be evaluated throughout the test program.

A.3.5.3. Findings

Satisfactory _____

A.3.6. FAR § 27.251 Vibration

A.3.6.1. Applicable Regulation

➔Each part of the rotorcraft must be free from excessive vibration under each appropriate speed and power condition.

A.3.6.2. Method of Compliance

This flight requirement may be both a qualitative and quantitative flight evaluation. Section 27.571(a) contains the flight load survey requirement that results in accumulation of vibration quantitative data. Section 27.629 generally requires quantitative data to show freedom from flutter for each part of the rotorcraft including control or stabilizing surfaces and rotors.

The aircraft should have a good track & balance for this evaluation. The airspeed should evaluated at 20 kt increments out to the RFM VNE speed. Variations in rotor RPM expected in normal flight should be evaluated. Changes in vibration are best sensed in the cyclic and pedal controls. The stability of the camera/sensor image will be a good indicator.

The pilot will make a subjective evaluation of the difference between the mount and sensor / camera/ light payload and the clean configuration is the evaluation point.

Compliance with this requirement will be evaluated during testing of FAR §27.143 Controllability and Maneuverability.

A.3.6.3. Findings

Satisfactory _____

A.3.7. FAR § 27.773 Pilot Compartment View

A.3.7.1. Applicable Regulation

(a) Nonprecipitation conditions. For nonprecipitation conditions, the following apply:
➔ (1) Each pilot compartment must be arranged to give the pilots a sufficiently extensive, clear, and undistorted view for safe operation.
➔ (2) Each pilot compartment must be free of glare and reflection that could interfere with the pilot's view. If certification for night operation is requested, this must be shown by night flight tests.
(b) Precipitation conditions. For precipitation conditions, the following apply:
(1) Each pilot must have a sufficiently extensive view for safe operation—
(i) In heavy rain at forward speeds up to VH; and
(ii) In the most severe icing condition for which certification is requested.
(2) The pilots must have a window that—
(i) Is openable under the conditions prescribed in subparagraph (1) of this paragraph; and
(ii) Provides the view prescribed in that subparagraph.

A.3.7.2. Method of Compliance

The section outlines requirements for pilot view in fairly general terms. The aircraft was approved with the installed glareshield and instrument panel that meet the rules. Any additional equipment/monitors must be positioned so as not to limit or obstruct the pilot's field of view. There will be some cases where the installation will be temporary and for a unique mission and consideration should be given for these limited cases and time.

If night operations are expected with an operational system, a "dark cockpit" or night evaluation will be necessary to insure the glare/reflection will not interfere with the pilot duties. A limitation to the use at night is an option.

A.3.7.3. Findings

Satisfactory _____

A.3.8. FAR § 27.787 Cargo & Baggage Compartment

A.3.8.1. Applicable Regulation

Cargo and baggage compartments.

(a) Each cargo and baggage compartment must be designed for its placarded maximum weight of contents and for the critical load distributions at the appropriate maximum load factors corresponding to the specified flight and ground load conditions, except the emergency landing conditions of Sec. 27.561.
(b) There must be means to prevent the contents of any compartment from becoming a hazard by shifting under the loads specified in paragraph (a) of this section.
➔ [(c) Under the emergency landing conditions of Sec. 27.561, cargo and baggage compartments must--
(1) Be positioned so that if the contents break loose they are unlikely to cause injury to the occupants or restrict any of the escape facilities provided for use after an emergency landing; or
(2) Have sufficient strength to withstand the conditions specified in Sec. 27.561 including the means of restraint, and their attachments, required for the maximum authorized weight of cargo and baggage at the critical loading distribution.]
(d) If cargo compartment lamps are installed, each lamp must be installed so as to prevent contact between lamp bulb and cargo.

A.3.8.2. Method of Compliance

Amendment 27-31 adds two subparagraphs to § 27.787(c) which clarifies that cargo and baggage compartments should be designed to protect occupants from injury by the compartment contents during emergency landings. This may be done by location or by retention provisions.

The sensor/camera/light controllers and power supply must be located and secured in a position that will not endanger occupants in an emergency landing impact.

Consideration should be given to stowage and egress when filming in hovering flight. In some cases, this might not be possible.

A.3.8.3. Findings

Comment: _____

Satisfactory _____

A.3.9. FAR § 27.1301 Function and Installation.

A.3.9.1. Applicable Regulation

Each item of installed equipment must--

➔ (a) Be of a kind and design appropriate to its intended function
(b) Be labeled as to its identification, function, or operating limitations, or any applicable combination of these factors;
(c) Be installed according to limitations specified for that equipment; and
➔ (d) Function properly when installed.

A.3.9.2. Method of Compliance

For optional equipment, the emphasis on functioning is rather limited compared to that for required equipment. The conditions under which the optional equipment is evaluated should be recorded in the report. The major emphasis for this type of equipment should be to ensure it does not interfere with the operation of systems that are required for safe operation of the rotorcraft, and that the failure modes are acceptable and do not create any hazards.

During flight operations, operate all avionics and electrical systems. Complete the matrix below. The matrix is laid out with the newly installed equipment listed at the top of the page and all aircraft systems listed down the left side of the page. Note any EMI or RFI either TO or FROM the installed equipment. Note any anomalies or EMI/RFI interference to other instruments or indications during all testing phases of flight.

Each item must be checked. Check off each block if no interference is noted. If interference is present during the test, DO NOT CHECK THE BOX and explain in Comments section at end of section. If applicable, note relevant conditions (i.e. frequencies, OBI selection, function modes) under which the interference occurred.

A.3.9.3. Findings

Interference? 5.0	Camera/Sensor/Light	Position Controller
Camera/Sensor/Light		
Position Controller		
VHF Comm 1		
VHF Comm 2		
VHF Comm 3		
VHF NAV 1		
VHF NAV 2		
ADF 1		
XPONDER 1		
Other Radios		
Audio 1		
Audio 2		
Standby Compass		
Engine Inst		
Fuel Gage		
Clock		
Voltmeter		
Ammeter		
Other		

EMI / RFI Comments:

Satisfactory _____

Signatures

General test findings _____

Pilot Signature _____

Mechanic/ Engineer _____

Other Flt Personnel Signature & Function

_____