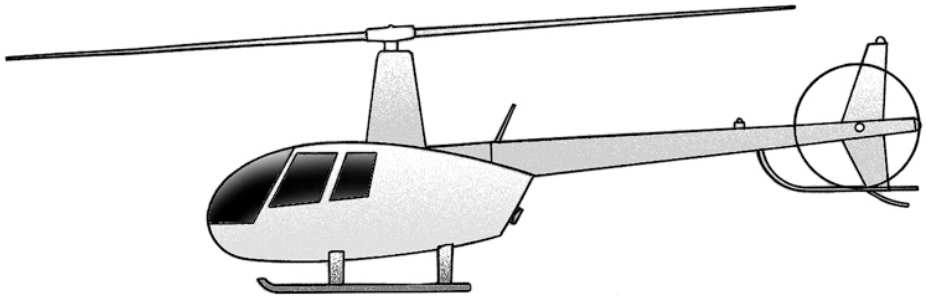
Side Video Gimbal

R44 & Raven II

Installation Manual
Report # R44INST-001
&
Maintenance Manual
Report # ROB-005

Tyler - Side Video Gimbal
For Robinson R44 Series Helicopters

FAA STC # SR0272LA



PLEASE return THIS MANUAL with equipment

Tyler Camera Systems 14218 Aetna Street Van Nuys, Ca 91401 • USA
www.tylermount.com • (818) 989-4420 • Fax (818) 989-0423

MODEL: Robinson R44 REPORT #: R44 INST-001

JOB #: _____ DATE: 8-29-01

SIDE VIDEO GIMBAL (MODEL SVG-R44)

INSTALLATION MANUAL For

ROBINSON R-44 HELICOPTERS

PREPARED BY: C. Tyler

OF PAGES: _____

OF DRAWINGS: _____

CHECKED BY: N. Tyler

APPROVED BY: G. Wood

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REV	PAGE NO.	PAGE DATE	DESCRIPTION	FAA APPROVED
Original	Cover 1-22	29 August 2001	Initial Issue	FAA APPROVED AUG 2 9 LOS ANGELES AIRCRAFT CERTIFICATION OFFICE INITIALS: ..... C Mathies, ANM-120L
A	21-22	16 March 2007	Changed Weight & Balance to include metric value	FAA APPROVED MAR 1 6 2007 LOS ANGELES AIRCRAFT CERTIFICATION OFFICE INITIALS: .....
B	3 4-5 15-20 18-31	28 Nov 2007	Inserted Log of Pages Added list of approved cameras Deleted enclosed RFM Added Test Procedure for unapproved camera/sensor or light Repaginated	FAA APPROVED NOV 2 8 2007 LOS ANGELES AIRCRAFT CERTIFICATION OFFICE INITIALS: .....

List of Approved Cameras & Acceptance Process

The Tyler SVG-R44 mount was certified with the Ultra media II and a self-contained power supply. The following cameras have been installed and flown on the mount at different times and using ships power.

- Wescam 16ss1000
- Poly Tech Kelvin 350IR
- Poly Tech Kelvin 360 Corona
- CineFlex V14

This STC addresses the Structural, Performance & Handling Qualities requirement for the largest configuration (2 sq ft / 1858.06 sq cm & 120 lb / 54.43 kg). Smaller or lighter cameras/sensors are approved without further flight testing. The specific sensor/cameras/light not listed here is accepted with this follow-on test plan found in Appendix A.

For helicopters registered in the U.S. or other countries recognizing FAA certification:

Once the testing is completed by the Integrator/Operator and the flight test conducted by the Pilot/Operator and the FAA (certified) mechanic the sensor /camera / light payload can be added to the accepted list in this manual. The report contained herein must be completed and signed prior to the “return to service” for any sensor/ camera / light payload.

The flight will be conducted as an “Operational Check Flight”. Operational check flights do not require a special airworthiness certificate in the experimental category. The term “operational check flight” (14 CFR § 91.407(b)) includes flight tests performed to check installation and/or operation of an approved STC, amended TC, or any other FAA-approved data after installation and return to service.

Operational check flights are performed under the current airworthiness certificate.

The purpose of this test is to ensure the approved modification and/or alteration functions properly and does not adversely affect aircraft operation.

For helicopters registered in an EU-member state:

The specific sensor/camera/light to be added to the STC has to be introduced by a Minor Change with an EASA accepted certification program.

Once the testing is completed by the Integrator/Operator and the flight test conducted by the Pilot/Operator and EASA Engineer and the Minor Change is approved the

sensor/camera/light, can be added to the accepted list in this manual. The report contained herein must be completed and signed prior to the “return to service” for sensor/camera/light.

The flights have to be conducted with a “Permit to Fly”.

The purpose of this test is to ensure the approved modification and/or alteration functions properly and does not adversely affect aircraft operation.

For all helicopters:

The installation is assumed to have a self-contained power supply or connected to the aircraft through a previously approved electrical connection. If modification to the ship’s system is necessary to support this installation, additional minor modifications with appropriate approval is necessary.

An approved system listed above can be installed by persons other than a certified mechanic/engineer if properly trained. Any mount system may be installed or removed by a Tyler Camera Systems trained technician, pilot or mechanic/engineer, but the installation must be checked and recorded by an mechanic/engineer in accordance with FAR 43.9. The Tyler trained technician may remove and re-install the camera package when ferrying to a job site. The weight and balance for all configurations will be checked before the flight with the mechanic/engineer and pilot before leaving for the job. Any training would be in accordance with EASA/JAR 145 or by an appropriate maintenance/manufacturing organization in accordance with applicable national requirements. The mount is designed to be installed with a minimum amount of alteration to the basic aircraft and a limited number of tools.

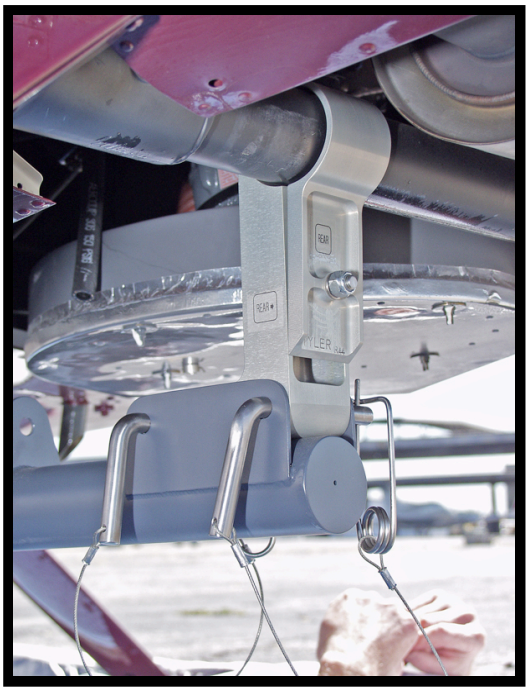
SIDE VIDEO GIMBAL ASSEMBLY INSTRUCTIONS

Install on Left (shown) or Right side of helicopter.

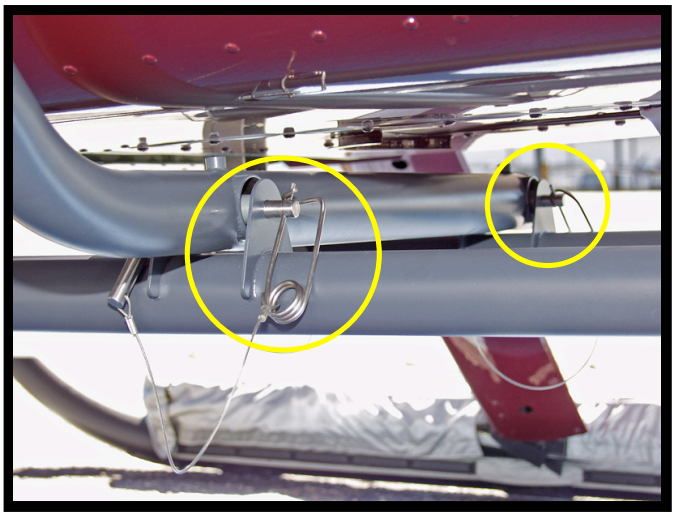
At the forward skid gear remove the forward skid gear cover.

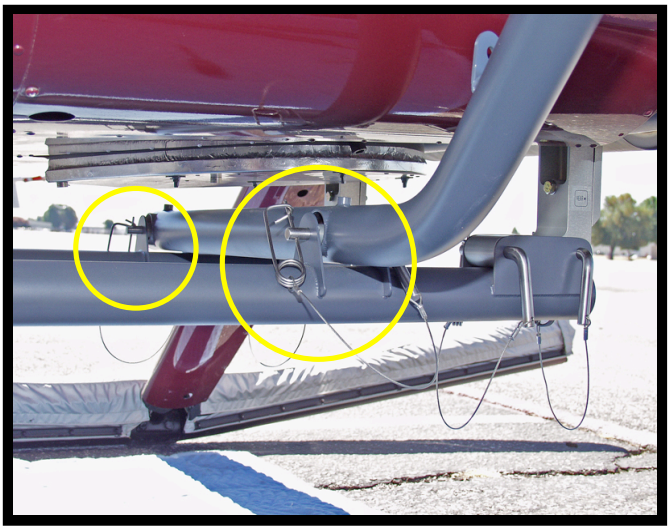
Install both Front and both Rear skid gear clamps. Note: Leave bolts loose so clamps can be shifted into position when attaching the Lateral Support Tubes. IMPORTANT: After all support tubes are attached, tighten all bolts and nuts.

Attach both fore-to-aft Support Tubes to both front Skid Gear Clamps and secure with 7/16” Pins and safety-clips.



Attach both fore-to-aft Support Tubes to both rear Skid Gear Clamps and secure with 7/16” Pins and safety-clips.





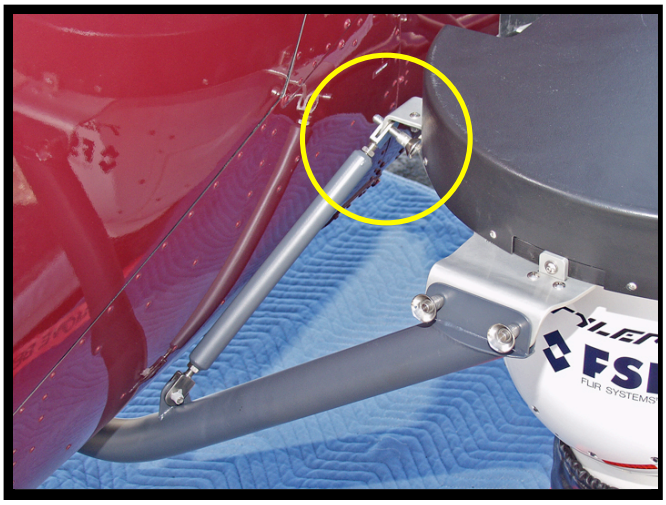
Install both lateral support tubes and secure with 7/16” Pins and safety-clips.

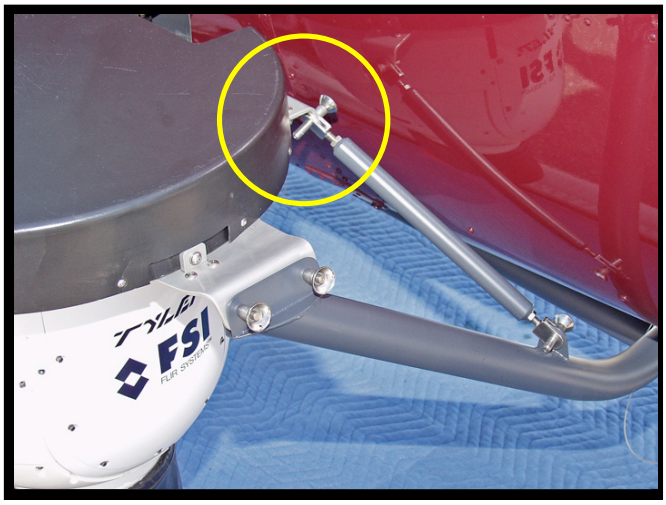
IMPORTANT: Now tighten all skid-gear clamp bolts and nuts.

Note: Lateral Tubes FACE IN toward each other.

Install the two (2) diagonal tie-rods to the Lateral Support Tubes and secure with 3/8” PIP-pins.

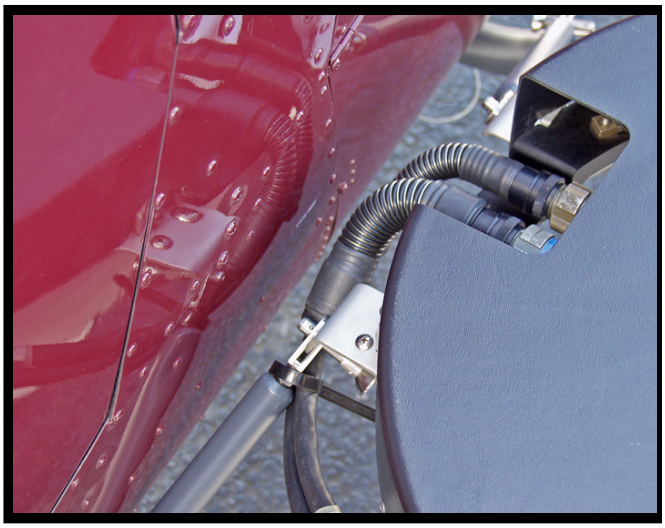
Attach the Video Gimbal (with suspension) to the vertical channels at the ends of the Lateral Support Tubes and secure with four (4) 3/8” PIP-pins.





Connect the two (2) diagonal tie-rods from lateral support tubes to the Video Gimbal Suspension “circled” and secure with 3/8” Pip Pins.

“Arrows” refer to: Pip pins used to fasten Video Gimbal (Last picture, previous page)



Route all power cables from Video Gimbal in to cabin and secure to Lateral Support Tubes (using tape or tie-wraps).

-VIDEO GIMBAL assembly complete-

Fasten the FSI Camera Body Unit to a rear seat cushion with a seat belt.
(Typically on the same side of the Video Gimbal)

Video Gimbal Operator is typically seated in the front left seat,
or may sit in rear (left / right).

United States Of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

Number SR01272LA

This Certificate issued to Tyler Camera Systems
14218 Aetna Street
Van Nuys, California 91401

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 27 *of the* Federal Aviation *Regulations.* (Certification basis is set forth in Type Certificate Data Sheet H11NM)

Original Product Type Certificate Number : H11NM

Make : Robinson Helicopter Company

Model : R44 and R44 II

Description of Type Design Change: Installation of Tyler ROB-001 Universal Mount on Robinson R44 and R44 II helicopters in accordance with FAA approved Tyler Camera Systems Master Drawing List No. TCS R-44-001, Revision B, dated July 5, 2001, or later FAA approved revisions.

Limitations and Conditions: This approval should not be extended to other aircraft of these models on which other previously approved modifications are incorporated unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect on the airworthiness of that aircraft. 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. A copy of this STC must be included in the permanent records of each helicopter modified in accordance with this STC.

FAA approved Rotorcraft Flight Manual Supplement, Tyler Camera Systems Document No. ROB-RFM-001, Revision A, dated December 29, 2004, or later FAA approved revision, is required as part of this installation.

Use of Tyler Installation Manual, Tyler Camera Systems Document No. R-44 INST-001, dated August 29, 2001, or later dated manual, is required for the installation of this STC.

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: March 15, 2001

Date of issuance: May 24, 2002

Date reissued :

Date amended : January 11, 2005

By direction of the Administrator

(*Signature*)
Manager, Airframe Branch
Los Angeles 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.

FAA Form 8110-2(10-68) Page 1 of 2 *This certificate may be transferred in accordance with FAR 21.47.*

INSTRUCTIONS: The transfer endorsement below may be used to notify the appropriate FAA Regional Office of the transfer of this Supplemental Type Certificate.

The FAA will reissue the certificate in the name of the transferee and forward it to him.

TRANSFER ENDORSEMENT

Transfer the ownership of the Supplemental Type Certificate Number_____

to *(Name of transferee)*_____

*(Address of transfer)*_____
(Number and street)

_____
(City, State, and Zip code)

from *(Name of grantor)* *(Print or type)*_____

(Address of grantor) _____
(Number and street)

_____
(City, State, and Zip code)

Extent of Authority (if licensing agreement):_____

_____

_____

_____

Date of Transfer:_____

Signature of grantor *(In ink)*:_____

14218 Aetna St.
Van Nuys, CA. 91401
Installation Manual Report Number R44INSTALL-001

STC Number SR 01272 LA

United States Of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

(Continuation Sheet)

Number SR01272LA

Limitations and Conditions (Continued):

A copy of this Certificate and FAA Approved Model List (AML) No. SR01272LA, dated May 24, 2002, or later FAA Approved revision, must be maintained as part of the permanent records for the modified aircraft. 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.

- END -

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

FAA Form 8110-2(10-68) Page 3 of 3 *This certificate may be transferred in accordance with FAR 21.47.*

14218 Aetna St.
Van Nuys, CA. 91401
Installation Manual Report Number R44INSTALL-001

STC Number SR 01272 LA

WEIGHT & BALANCE DATA AND EQUIPMENT LIST						
Weight x Arm = Moment						
6/23/98		AIRCRAFT MOD	REGISTRATION	AIRCRAFT S/N	PILOT	
SAMPLE SHEET		R 44			N/A	
		LONGITUDINAL			LATERAL	
ITEM:		WEIGHT	ARM	MOMENT	ARM	MOMENT
TYLER UNIVERSAL SIDE MOUNT						
AIRCRAFT EMPTY WEIGHT & C.G.		1448.95	107.6	155907.02	0.6	869.37
R 44 UNIVERSAL SIDE MT. BALL rt (UM2-95#/RS-35#)		0	96.6	0	44.2	0
R 44 UNIVERSAL SIDE BALL left		95	96.6	9177	-42.4	-4028
R 44 UNIVERSAL BALL FRAMEWORK (longit.)	30	30	96.6	2898	-42.4	-1272
R 44 UNIVERSAL BALL FRAMEWORK (longit.)	30	0	96.6	0	44.2	0
R 44 UNIVERSAL BALL FRAMEWORK (lateral)	10	10	0	0	-42.4	-424
R 44 UNIVERSAL BALL FRAMEWORK (lateral)	10	0	0	0	44.2	0
SUBTOTAL:		1583.95	106.0526	167982.02	-2.7972	-4430.63
PILOT (A+) FORWARD RIGHT		170	49.5	8415	12.2	2074
CO-PILOT/OPERATOR (A-) FORWARD LEFT		170	49.5	8415	-10.4	-1768
UNIVERSAL SIDE OPERATOR RIGHT REAR		0	79.5	0	12.2	0
UNIVERSAL SIDE OPERATOR LEFT REAR		0	79.5	0	-12.2	0
POWER CONSOLE RT. SEAT REAR 28#		28	79.5	2226	12.2	341.6
POWER SUPPLY LF. SEAT REAR 55#		55	79.5	4372.5	-12.2	-671
REAR BAGGAGE LBS (50# MAX.)		0	79.5	0	0	0
main FUEL (30.6 usable GAL. MAX.) X 6.0 (FOR. 1) GAL.	30.6	183.6	106	19461.6	-13.5	-2478.6
aux FUEL 18.3 usuable GAL. MAX.) X 6.0 (FOR. 1) GAL.	18.3	109.8	102	11199.6	13	1427.4
R 44 tailboom wt. Bulkhead 4	40#	0	220.5	0	0	0
R 44tailboom wt. Bulkhead 5	40#	0	244.5	0	0	0
EQUIPMENT SUBTOTAL:		716.4		54089.7		-1074.6
TOTAL AIRCRAFT WEIGHT:		**2300.35**	**96.538**	222071.72	**-2.393**	-5505.23
AIRCRAFT MAX GROSS WEIGHT:		**2400**				
NEW USEFUL LOAD:		**99.65**				
AIRCRAFT RIGGED WEIGHT		**2300.35**				
NEW CENTER OF GRAVITY (LONGITUDINAL)		**96.538**				
NEW CENTER OF GRAVITY (LATERAL)		**-2.393**				
		LONGITUDINAL C.G. LIMITS:			LATERAL C.	**-2.393214**
		FOR. & REAR LIMITS			**LATERAL C.G. LIMITS**	
		(92.0-100.2 @ 2200 lb)			**(+ 3.0/ -3.0)**	
		(93.0-98.0 @ 2400 lb)				

14218 Aetna St.
Van Nuys, CA. 91401
Installation Manual Report Number R44INSTALL-001

STC Number SR 01272 LA

WEIGHT & BALANCE DATA AND EQUIPMENT LIST						
Weight x Arm = Moment		AIRCRAFT	REGIS-	AIRCRAFT		
4/16/07		MODEL	TRATION	S/N	PILOT	
SAMPLE SHEET		**R 44**				
weights = kilos & measurements = centimeters						
		LONGITUDINAL			LATERAL	
ITEM:		WEIGHT (kg)	ARM (cm)	MOMENT	ARM (cm)	MOMENT
TYLER UNIVERSAL SIDE MOUNT						
AIRCRAFT EMPTY WEIGHT & C.G.		657.24	2733.04	1796263.21	15.24	10016.338
R 44 UNIVERSAL SIDE MT. BALL rt (UM2-43.09#/RS-15.88#)		0	2540	0	1122.68	0
R 44 UNIVERSAL SIDE BALL left		43.09	2540	109448.6	-1076.96	-46406.21
R 44 UNIVERSAL BALL FRAMEWORK (longit.)	13.61	18.14	2540	46075.6	-1076.96	-19536.05
R 44 UNIVERSAL BALL FRAMEWORK (longit.)	13.61	0	2540	0	1122.68	0
R 44 UNIVERSAL BALL FRAMEWORK (lateral)	4.54	4.54	2540	11531.6	-1122.68	-5096.9672
R 44 UNIVERSAL BALL FRAMEWORK (lateral)	4.54	0	0	0	1122.68	0
SUBTOTAL:		723.01	2699.53	1951787.41	-77.3515	-55925.92
PILOT (A+) FORWARD RIGHT		77.11	49.5	3816.945	309.88	23894.85
CO-PILOT/OPERATOR (A-) FORWARD LEFT		77.11	49.5	3816.945	264.16	20369.38
UNIVERSAL SIDE OPERATOR RIGHT REAR		0	79.5	0	309.88	0
UNIVERSAL SIDE OPERATOR LEFT REAR		0	79.5	0	-309.88	0
POWER CONSOLE RT. SEAT REAR 12.70 (kg)		12.7	79.5	1009.65	309.88	3935.48
POWER SUPPLY LF. SEAT REAR 24.95 (kg)		24.95	79.5	1983.525	-309.88	-7731.51
REAR BAGGAGE LBS (22.68 kilo MAX.)		0	79.5	0	0	0
main FUEL (115.85 usable Ltr. MAX.) X 3.785 (FOR. 1) ltr.	35	132.475	106	14042.35	-342.9	-45425.68
aux FUEL 69.27 usuable ltr. MAX.) X 3.785 (FOR. 1) ltr.	10	37.85	102	3860.7	330.2	12498.07
R 44 tailboom wt. Bulkhead 4	18.14 kg	0	220.5	0	0	0
R 44 tailboom wt. Bulkhead 5	18.14 kg	0	244.5	0	0	0
EQUIPMENT SUBTOTAL:		362.195		28530.115		7540.59
TOTAL AIRCRAFT WEIGHT:		**1085.21**	**1824.83**	1980317.52	**-44.59**	-48385.34
AIRCRAFT MAX GROSS WEIGHT (kg):		**1088.63**				
NEW USEFUL LOAD (kg):		**3.425**				
AIRCRAFT RIGGED WEIGHT (kg):		**1085.21**				
NEW CENTER OF GRAVITY ~ LONGITUDINAL (cm):		**1824.83**				
NEW CENTER OF GRAVITY ~ LATERAL (cm):		**-44.59**				
		LONGITUDINAL C.G. LIMITS:			LATERAL C.G.	**-44.59**
		FOR. & REAR LIMITS			**LATERAL C.G. LIMITS**	
		(2336.80-2545.08 cm @ 997.91 kg)			**(+ 76.20/ -76.20 cm)**	
		(23.62.20-2489.20 cm @ 1088.63 kg)				

Appendix A

Procedure to Add an Unapproved Camera/Sensor

TABLE OF CONTENT

14218 Aetna St.
Van Nuys, CA. 91401

1 Overview

This Appendix provides the requirements necessary to qualify additional sensor / camera / light payloads not listed in the front of this manual. 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.

For helicopters registered in the U.S. or other countries recognizing FAA certification:

Once the testing is completed by the Integrator/Operator and the flight test conducted by the Pilot/Operator and the FAA (certified) mechanic the sensor/camera/light payload can be added to the accepted list in this manual. The report contained herein must be completed and signed prior to the "return to service" for any sensor/camera/light payload.

The flight will be conducted as an "Operational Check Flight". Operational check flights do not require a special airworthiness certificate in the experimental category. The term "operational check flight" (14 CFR § 91.407(b)) includes flight tests performed to check installation and/or operation of an approved STC, amended TC, or any other FAA-approved data after installation and return to service.

Operational check flights are performed under the current airworthiness certificate.

The purpose of this test is to ensure the approved modification and/or alteration functions properly and does not adversely affect aircraft operation.

For helicopters registered in an EU-member state:

The specific sensor/camera/light to be added to the STC has to be introduced by a Minor Change with an EASA accepted certification program.

Once the testing is completed by the Integrator/Operator and the flight test conducted by the Pilot/Operator and EASA Engineer and the Minor Change is approved the sensor/camera/light, can be added to the accepted list in this manual. The report contained herein must be completed and signed prior to the "return to service" for sensor/camera/light.

The flights have to be conducted with a "Permit to Fly".

The purpose of this test is to ensure the approved modification and/or alteration functions properly and does not adversely affect aircraft operation.

For all helicopters:

14218 Aetna St.
Van Nuys, CA. 91401

The installation is assumed to have a self-contained power supply or connected to the aircraft through a previously approved electrical connection. If modification to the ship's system is necessary to support this installation, additional minor modifications with appropriate approval is necessary.

All systems are to be operational and an image viewable by one of the crew displayed in the cockpit/cabin. The pilot is not expected to make this evaluation and should direct his/her attention to flying the aircraft.

Pictures of the installation and location of the power and controller as used in the test will provide additional documentation for the record.

2 Sensor/ Camera/ payload

2.1 Make & Model _____

3 Test Team

3.1 Pilot/s

_____ _____
Print Name

3.2 Mechanic and/or Engineer and/or Camera Operator

_____ _____
Print Name

4 Test Aircraft Configuration and Location

4.1 Aircraft Model, Registration & Serial Number

_____ _____ _____
Model Registration Number Serial Number

4.2 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			

4.3 Test Location

_____
Airport or Test Site

5 Test Conditions

Date: _____

Weather: Ceiling _____ Visibility _____ Winds _____

Altimeter _____ Field Elevation _____

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

6 Flight Test

6.1 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 considered to be 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.

6.2 FAR § 27.51 Takeoff

6.2.1 APPLICABLE REGULATION

➔(a) The takeoff, with takeoff power and rpm, and with the extreme forward center of gravity -

➔(1) May not require exceptional piloting skill or exceptionally favorable conditions; and

(2) Must be made in such a manner that a landing can be made safely at any point along the flight path if an engine fails.

(b) Paragraph (a) of this section must be met throughout the ranges of -

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

(2) Weight, from the maximum weight (at sea level) to each lesser weight selected by the applicant for each altitude covered by paragraph (b)(1) of this section.

6.2.2 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.

6.2.3 FINDINGS

Satisfactory ☐

6.3 FAR § 27.71 Glide Performance

6.3.1 APPLICABLE REGULATION

➔For single engine helicopters and multiengine helicopters that do not meet the Category A engine isolation requirements of Part 29 of this chapter, the minimum rate of descent airspeed and the best angle of glide airspeed must be determined in autorotation at -

(a) Maximum weight; and
(b) Rotor speed(s) selected by the applicant.

6.3.2 METHOD OF COMPLIANCE

(1) Performance capabilities during stabilized autorotative descent are useful tools to assist the pilot 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 best angle of glide performance will be evaluated at a single speed and low power (needles joined) descent. 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 aircraft should be easily controllable and the difference between the mount and camera/sensor/light payload and the clean configuration is the evaluation point.

6.3.3 FINDINGS

Satisfactory ☐ Altitude Band H_P _____ Fuel Gage Reading _____

6.4 FAR § 27.143 Controllability and Maneuverability

6.4.1 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); and
  - (vii) Recovery to power on flight from a balked autorotative approach.

➔(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 (e) 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.

6.4.2 METHOD OF COMPLIANCE

The general requirements for control and for maneuverability are summarized in section (a), 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:

6.4.2.1 Takeoff

6.4.2.2 Climbing flight

6.4.2.3 Forward flight to V_{NE} at MCP (maybe less than MCP)

6.4.2.4 Left & right 30 degree bank turns at V_{NE} and at MCP (maybe less than MCP)

6.4.2.5 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.

6.4.3 FINDINGS

Satisfactory ☐ Cruise Altitude H_P _____ Fuel Gage Reading _____

6.5 FAR § 27.171 Stability: General

6.5.1 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.

6.5.2 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. This test should be conducted with minimum required systems in the aircraft and with minimum flight crew.

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

6.5.3 FINDINGS

Satisfactory ☐

6.6 FAR § 27.251 Vibration

6.6.1 APPLICABLE REGULATION

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

6.6.2 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 V_{NE} 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. The difference between the mount and sensor / camera/ light payload and the clean configuration is the evaluation point.

6.6.3 FINDINGS

Satisfactory ☐

6.7 FAR § 27.773 Pilot Compartment View

6.7.1 APPLICABLE REGULATION

(a) Each pilot compartment must be free from glare and reflections that could interfere with the pilot's view, and designed so that--
➔ (1) Each pilot's view is sufficiently extensive, clear, and undistorted for safe operation; and
(2) Each pilot is protected from the elements so that moderate rain conditions do not unduly impair his view of the flight path in normal flight and while landing.
➔ (b) If certification for night operation is requested, compliance with paragraph (a) of this section must be shown in night flight tests.

6.7.2 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.

Satisfactory ☐

6.8 FAR § 27.787 Cargo & Baggage Compartment

6.8.1 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.

6.8.2 METHOD OF COMPLIANCE

Amendment 27-27 adds two subparagraphs to § 27.787(c) which clarify 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.

6.8.3 FINDINGS

Comment: _____

Satisfactory ☐

6.9 FAR § 27.1301 Function and Installation.

6.9.1 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.

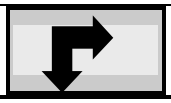
6.9.2 METHOD OF COMPLIANCE

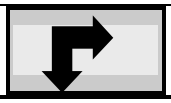
For optional equipment, the emphasis on functioning is rather limited compared to that for required equipment. The conditions under which the optional equipment is evaluated should be recorded in the report. The major emphasis for this type of equipment should be to ensure it does not interfere with 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.

6.9.3 FINDINGS

Interference? 	**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		

Interference?		Camera/Sensor/Light	Position Controller

EMI / RFI Comments:

7 Signatures

General test findings _____

Pilot Signature _____

Mechanic/ Engineer _____

Other Flt Personnel Signature & Function

_____

8 References

1. *14 Code of Federal Regulations, Aeronautics and Space, Chapter I – Federal Aviation Administration, Department of Transportation, Subchapter C – Aircraft, Part 27* (Revised as of 1 January 2000.)
2. *Federal Aviation Administration, Advisory Circular, AC 27-1B Certification of Normal Category Rotorcraft* (ASW-110, September 9, 1999)