



skyBeacon™ STC Installation Manual



FAA APPROVED

UAV-1002305-001
Rev G

CHICAGO ACO BRANCH
C & A DIVISION

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Patent uavionix.com/patents

1 Revision History

Revision	Date	Comments
A	9/10/2018	Initial release
B	10/18/2018	Update part number and system limitations
C	11/4/2018	Update transponder limitation to include altitude source
D	3/20/2019	Add software identification and version requirements (ADS-B v1.0.3)
E	6/1/2019	Update ADS-B version to v1.3.1
F	8/12/2019	Update ADS-B version to v1.4.0
G	7/17/2020	Update TCAS II and anti-collision limitations

2 Warnings / Disclaimers

uAvionix is not liable for damages arising from the use or misuse of this product.

This equipment is classified by the United States Department of Commerce's Bureau of Industry and Security (BIS) as Export Control Classification Number (ECCN) 7A994.

These items are controlled by the U.S. Government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

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4 System Information

4.1 Certification

This installation manual provides mechanical and electrical information necessary to install skyBeacon. The content of this manual assumes use by competent and qualified personnel using standard maintenance procedures in accordance with Title 14 of the Code of Federal Regulation and other related accepted procedures.

Those installing this article on an aircraft listed on the Approved Models List shall verify the compatibility of existing STCs with this STC prior to returning the aircraft to service.

4.2 TSO Authorization

Function	TSO/RTCA/SAE	Class/Type
Airborne Navigation Sensor Using the Global Position System (GPS) Augmented by the Satellite Based Augmentation System (SBAS)	TSO-C145d INCOMP RTCA/DO-229D	Beta 1
Universal Access Transmitter (UAT) Automatic Dependent Surveillance-Broadcast (ADS-B) Equipment Operating on Frequency of 978MHz	TSO-C154c RTCA/DO-260B	B1S
Position Light (Red)	TSO-C30c SAE/AS8037	Type I
Anti-Collision Light	TSO-C96a SAE/AS8017D	Class II
Automatic Pressure Altitude Reporting Code-Generating Equipment	TSO-C88b SAE/AS8003	

4.3 System Limitations

Installation

This article meets the minimum performance and quality control standards required by a technical standard order (TSO) and when installed on aircraft approved on the AML can be approved for return to service after installation.

If you are installing this article on or in a specific type or class of aircraft, not listed on the AML you must obtain separate approval for installation.

TCAS II System

skyBeacon does not support installation on aircraft with an active TCAS II system.

SatCom

The skyBeacon GPS has not been demonstrated as compatible with SatCom equipment and should not be installed on SatCom equipped aircraft.

Transponder

A companion altitude-reporting transponder is required to be installed for 14 CFR 91.225 and 91.227 compliance, unless installed on an aircraft excepted from the requirements of 14 CFR 91.215 and 91.225.

The transponder's altitude source must comply with TSO-C10(), TSO-C106() or TSO-C88() and meet the requirements of 14 CFR 91.217.

Transponder antenna

skyBeacon should be installed at least 3 feet from any operating transponder antenna.

Anti-collision Lighting (option)

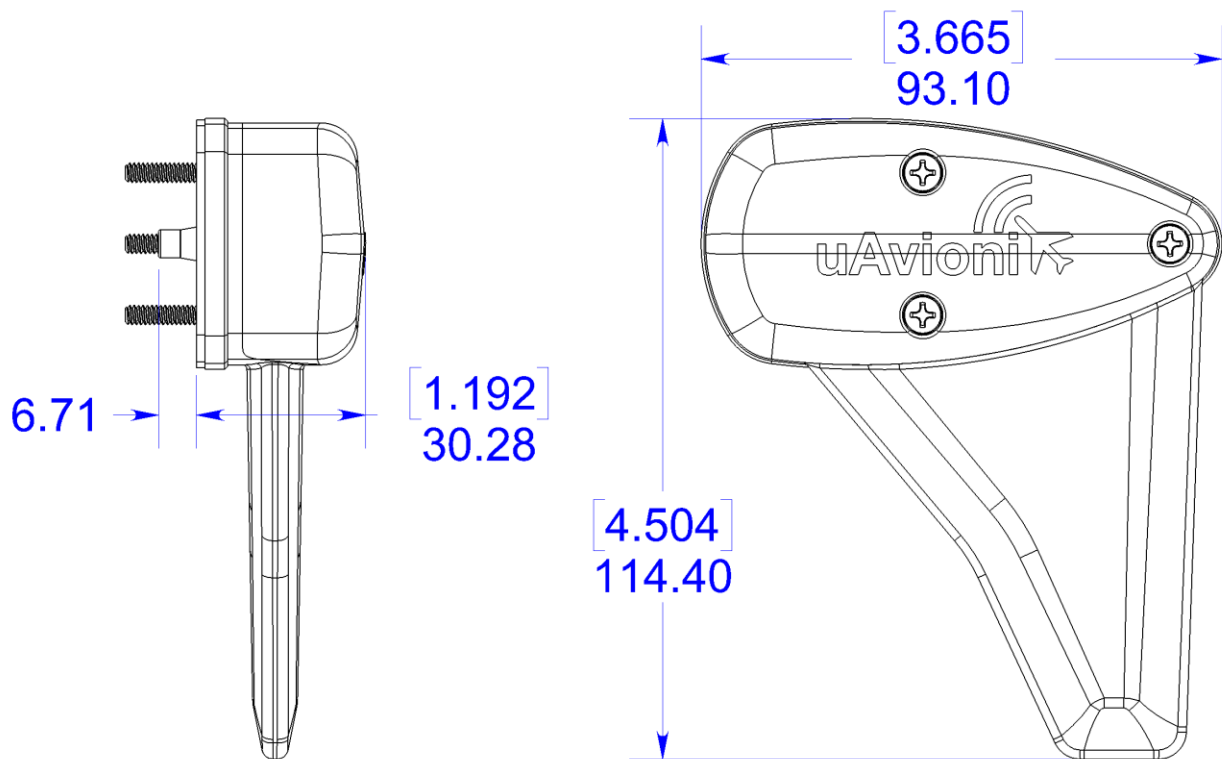
skyBeacon is not approved to replace an existing wingtip anti-collision light without additional FAA approval.

5 System Specifications

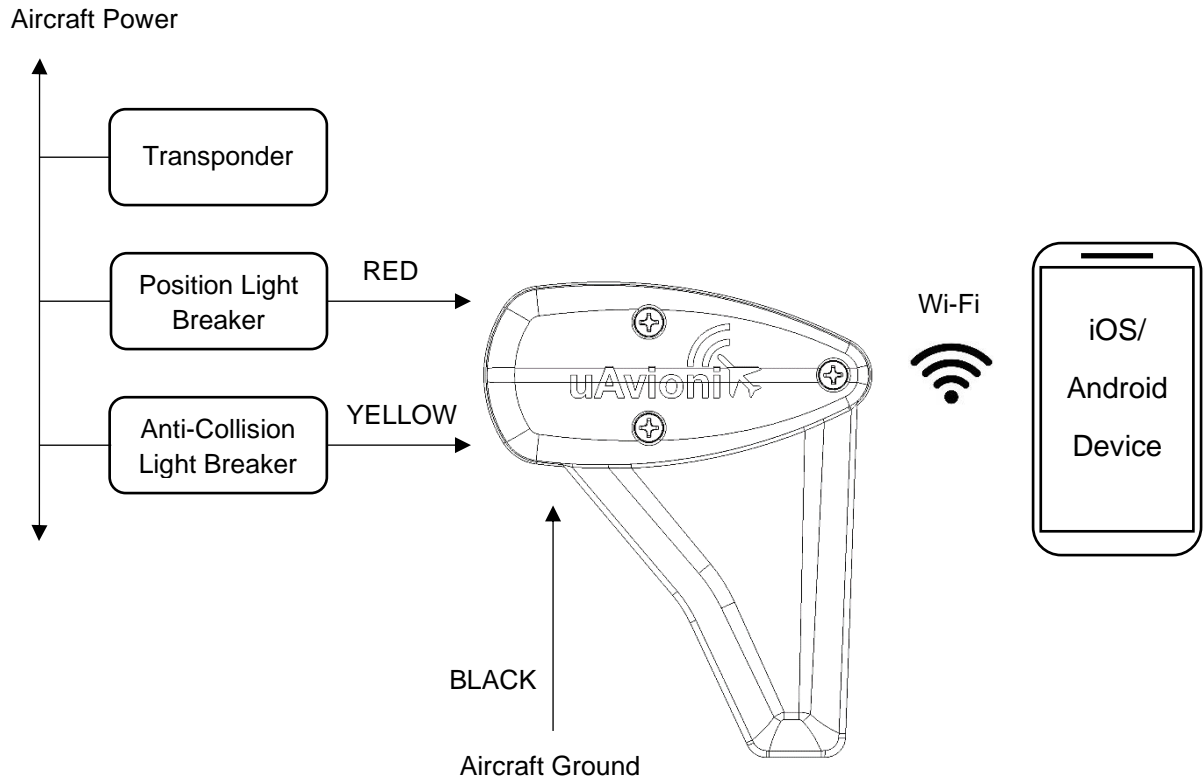
5.1 Physical Specifications

Characteristics	Specifications
Width	3.665 in (93.10 mm)
Height	4.504 in (114.4 mm)
Depth	1.192 in (30.28 mm)
Weight	3.5oz (100 grams)
Operating Temperature Range	-45°C to +70°C
Maximum Pressure Altitude [1]	18,000 ft
Input Voltage Range	9 to 33 VDC
14V Current	0.5A Max
28V Current	0.25A Max

[1] UAT usage is restricted to below 18,000 feet MSL (§91.225).



5.2 System Interfaces



5.3 Anti-collision Specifications

Characteristics	Specifications
Class II (400 candela) horizontal coverage [1]	± 2 degrees from 90 degrees (perpendicular to fuselage)
Class III (100 candela) horizontal coverage [1]	± 30 degrees from 90 degrees (perpendicular to fuselage)

[1] Horizontal coverage specified where 0 degrees is the nose of the aircraft, and 180 degrees is the tail

For additional guidance, see Appendix A.

6 Installation

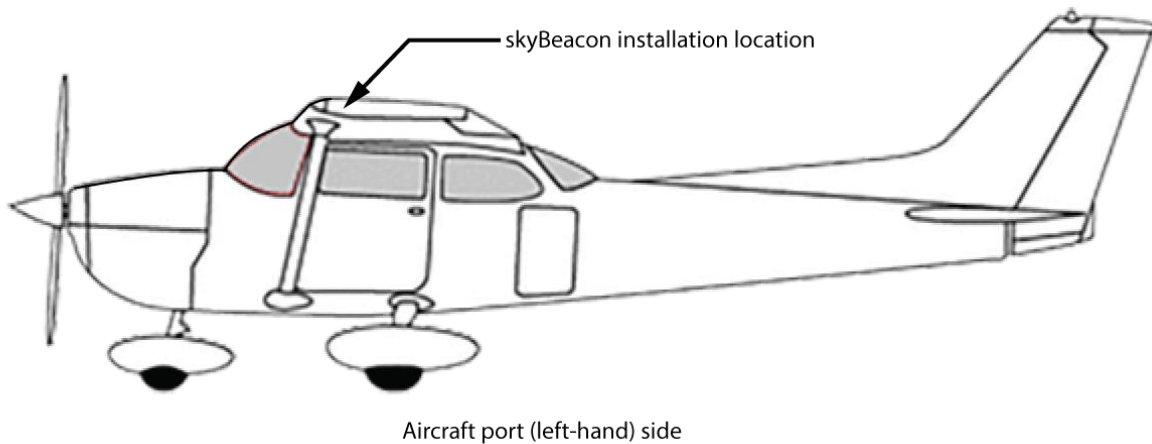
6.1 Unpacking and Inspecting

Carefully unpack the device and make a visual inspection of the unit for evidence of any damage incurred during shipment. If the unit is damaged, notify the shipping company to file a claim for the damage. To justify your claim, save the original shipping container and all packing materials.

6.2 Mounting

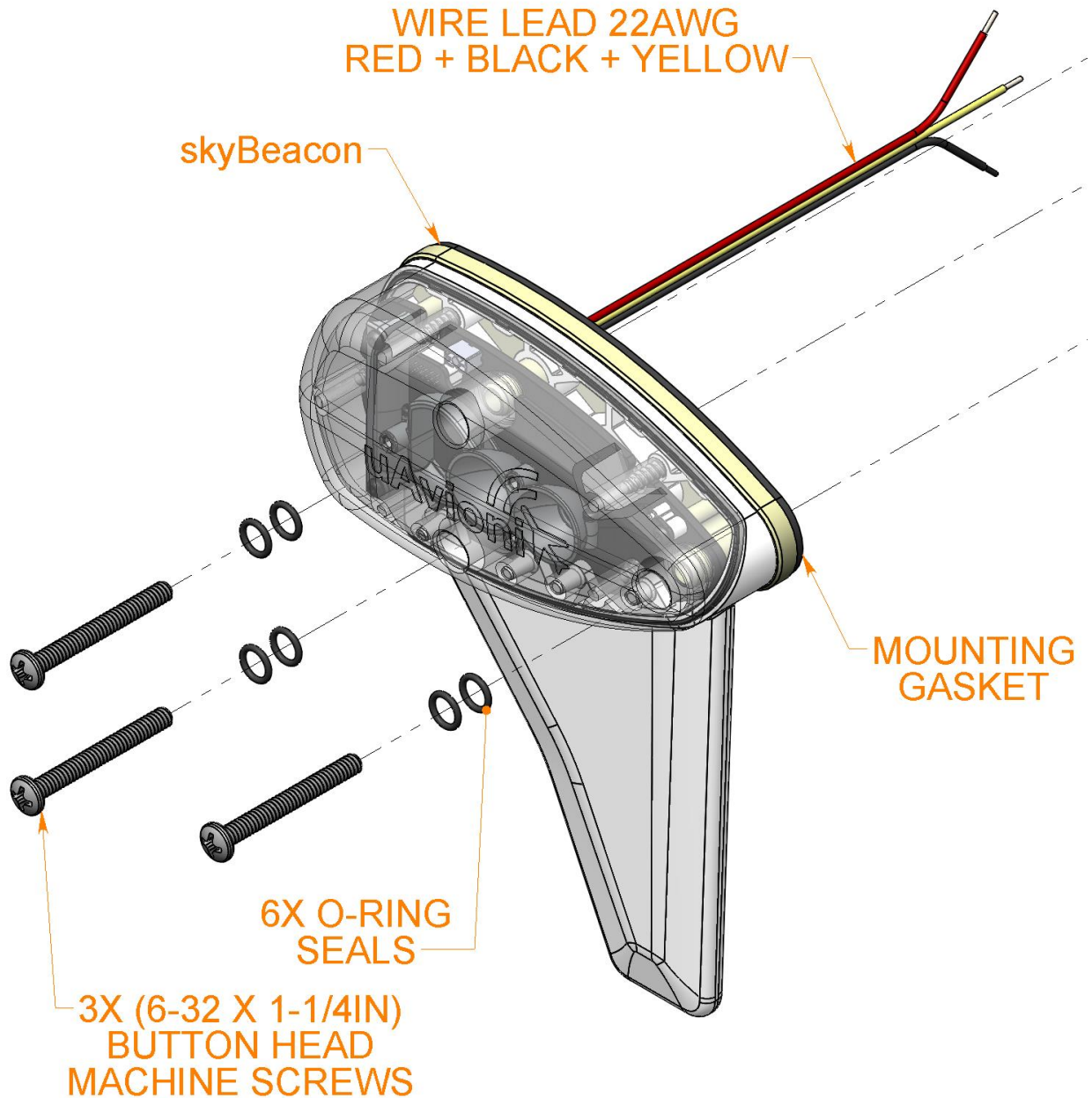
skyBeacon is a wingtip, forward, left position light. The assembly should be mounted as far outboard on the aircraft as practical, parallel to the vertical and horizontal centerlines of the aircraft. Ensure that when mounted, the fin and top of the assembly are free from obstructions.

Note: Installation of the skyBeacon must be in accordance with AC 43-13.2B, Chapter 1

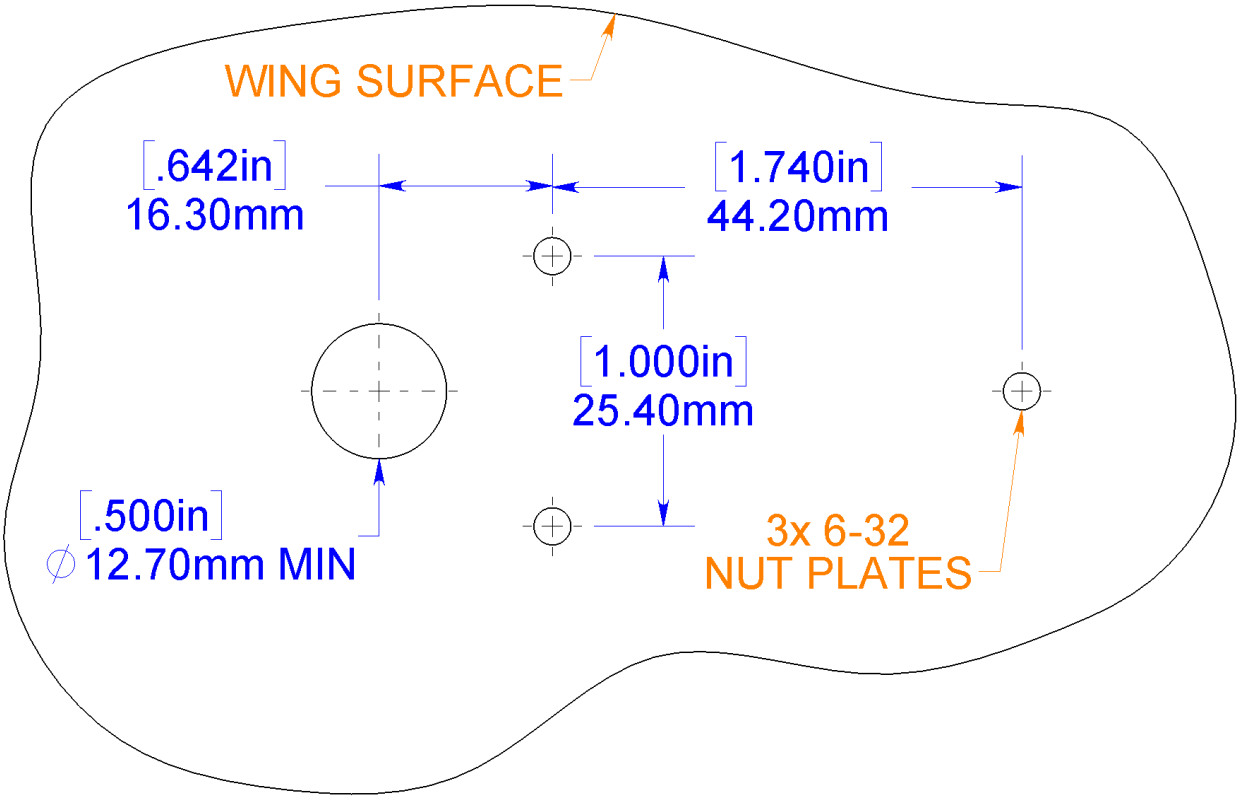


6.3 Unit Installation Overview

skyBeacon is mounted with three 6-32 screws to the existing holes and nut plates in the end of the wing. Two O-rings per screw must be used between the screw and skyBeacon assembly.

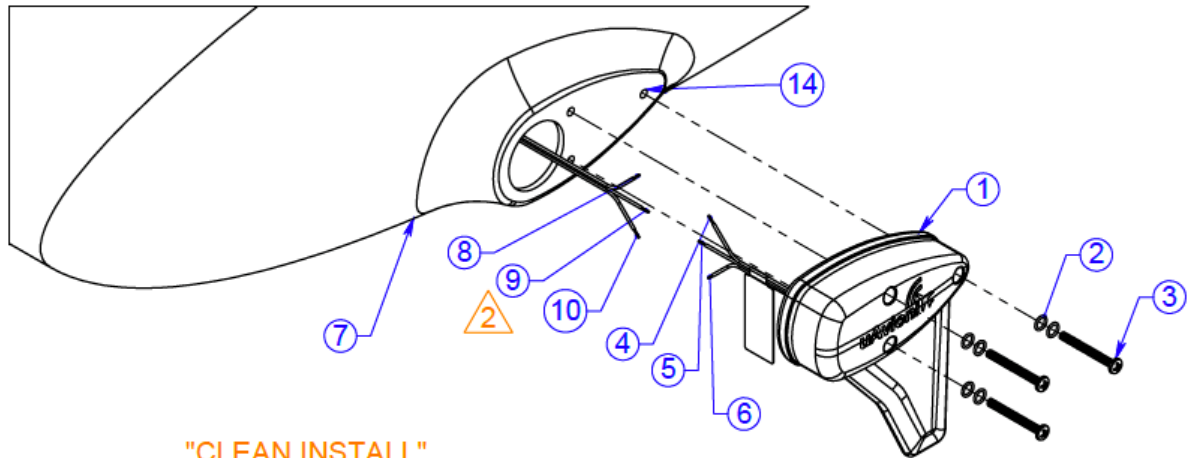


6.4 Mounting Dimensions



6.5 Mounting Procedure on Wingtips

For aircraft where the skyBeacon mounts to the mounting holes as shown in Section 6.4, and the wingtip configuration is as shown in the figure below, install the skyBeacon per the instructions and with hardware noted below.



"CLEAN INSTALL"
REQUIRES NO ADDITIONAL FAIRING/ADAPTERS

Item	Description	Qty	P/N
1	skyBeacon	1	UAV-1001856-002
2	O-ring Seals (1mm x 5mm EPDM)	6	UAV-1002038-001
3	Mounting Screws	3	
	Mounting Screw (6-32 x 1.25")	AR	UAV-1001459-001
	Mounting Screw (6-32 x 1.5")	AR	UAV-1001459-002
	Mounting Screw (6-32 x 1.75")	AR	UAV-1001459-003
4	Nav Light Power (Red) 14/28V	Ref	
5	Strobe Light Power (Yellow) 14/28V	Ref	
6	Aircraft Ground (Black)	Ref	
7	Wingtip	Ref	
8	Aircraft Nav Light Power 14/28V	Ref	
9	Aircraft Strobe Light Power 14/28V	Ref	
10	Aircraft Ground	Ref	
14	Mounting Hole with 6-32 Thread with locking feature	3	
15	Crimp type Wire Splices 18-22 AWG (not shown)	3	UAV-1001487-001
16	skyBeacon ADS-B 1.4.0 Software (not shown)	N/A	UAV-1001759-006

- 1) Remove fasteners retaining the existing position light from wingtip.

Access wiring to disconnect the existing position light. Prepare the wire ends (Items 8, 9, 10) per AC 43-13 for crimp type wire splices.

Note: The replacement of an existing strobe light (anticollision light) or activation of the skyBeacon anticollision light option requires an additional FAA approval (See Section 4.3 System Limitations). Additional guidance can be found in Appendix A.

- 2) Splice wires using (Item 15) environmental splices or equivalent. Cap and stow the skyBeacon yellow wire (Item 5) per AC 43-13, unless the strobe light has been separately FAA approved (see Section 4.3 System Limitations).



WARNING: If the strobe light option has been separately FAA approved, DO NOT connect the skyBeacon yellow wire (Item 5) to a high voltage anti-collision power supply. Only connect the yellow wire directly to 14/28V aircraft power or stow per AC 43-13.

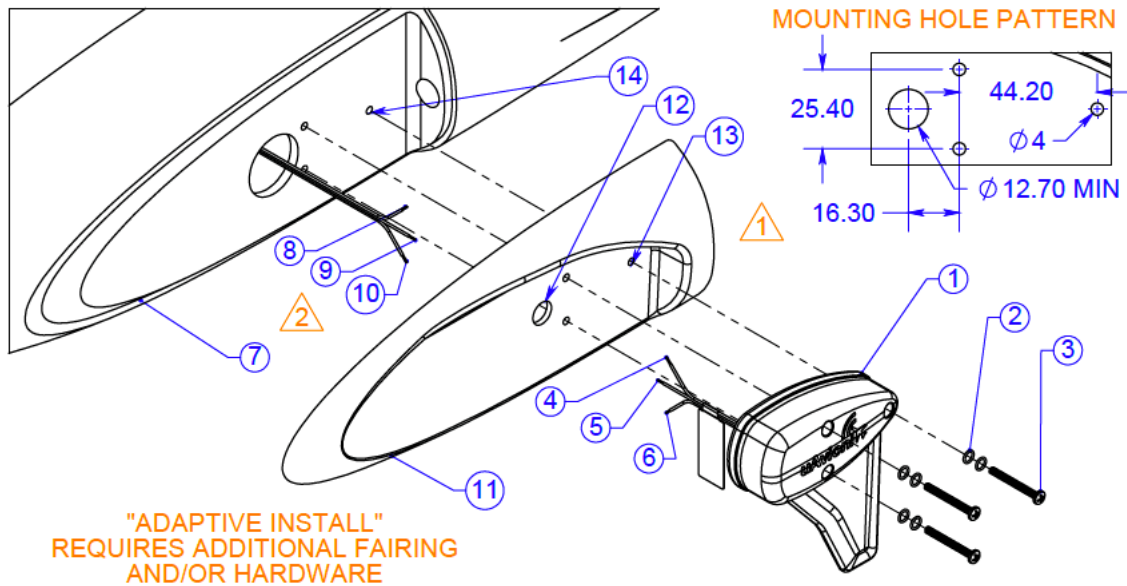
- 3) Attach the skyBeacon (Item 1) to the wing tip as follows:
 - a) Position skyBeacon onto the wingtip and confirm alignment with existing mounting holes (Item 14) as shown in Section 6.4.
 - b) Install 2 O-ring seals (Item 2) onto each screw (Item 3).

Note- the O-ring nearest the head of the screw must be replaced if the screw is tightened and subsequently removed.

- c) Use the appropriate length mounting screws (Item 3) to attach skyBeacon to the wingtip. Tighten screws to 8-10 in-lbs.
- 4) Apply power to the Position light and confirm position light operation.
 - 5) If equipped apply power to strobe light and confirm strobe light operation.
 - 6) Install placard as defined in AFM Supplement document UAV-1002111-001 Section 2.2.
 - 7) Go to Section 6.7 for skyBeacon setup.

6.6 Mounting Procedure on Wingtips with Adaptive Fairing


For aircraft that attach to the mounting holes as shown in Section 6.4 but use a fairing to cover a portion of the position lights, an additional adaptive fairing may be used to improve or refine fit of the installation. If desired, install the skyBeacon utilizing a fairing identified in section 6.6.1 per the instructions and with hardware noted below.



Item	Description	Qty	P/N
1	skyBeacon	1	UAV-1001856-002
2	O-ring Seals (1mm x 5mm EPDM)	6	UAV-1002038-001
3	Mounting Screws	3	
	Mounting Screw (6-32 x 1.25")	AR	UAV-1001459-001
	Mounting Screw (6-32 x 1.5")	AR	UAV-1001459-002
	Mounting Screw (6-32 x 1.75")	AR	UAV-1001459-003
4	Nav Light Power (Red) 14/28V	Ref	
5	Strobe Light Power (Yellow) 14/28V	Ref	
6	Aircraft Ground (Black)	Ref	
7	Wingtip	Ref	
8	Aircraft Nav Light Power 14/28V	Ref	
9	Aircraft Strobe Light Power 14/28V	Ref	
10	Aircraft Ground	Ref	
11	skyBeacon adaptor fairing	1	See Section 6.6.1
12	Hole for wire pass through	Ref	


Item	Description	Qty	P/N
13	Hole for mounting	Ref	
14	Mounting Hole with 6-32 Thread with locking feature	3	
15	Crimp type Wire Splices 18-22 AWG (not shown)	3	UAV-1001487-001
16	skyBeacon ADS-B 1.4.0 Software (not shown)	N/A	UAV-1001759-006

- 1) Remove fasteners retaining the existing fairing and position light from wingtip.
- 2) Access wiring to disconnect the existing position light. Prepare the aircraft wire ends (Items 8, 9, 10) per AC 43-13 for crimp type wire splices.
- 3) Fit the skyBeacon fairing to the wingtip.

 Modify the skyBeacon fairing as needed for best fit to existing wingtip per AC 43-13.

- 4) Locate mounting holes (Item 13) and wire pass through holes (Item 12) to match the wingtip.
- 5) Drill clearance hole for #6 screws through the skyBeacon fairing (Item 11) for the mounting holes and a 0.5-1" hole for the wire pass through.
- 6) Splice wires using (Item 15) environmental splices or equivalent.

Note: The replacement of an existing strobe light (anticollision light) or activation of the skyBeacon anticollision light option requires an additional FAA approval (See Section 4.3 System Limitations). Additional guidance can be found in Appendix A.

 **WARNING:** If the strobe light option has been separately FAA approved, DO NOT connect the skyBeacon yellow wire (Item 5) to a high voltage anti-collision power supply. Only connect the yellow wire directly to 14/28V aircraft power or stow per AC 43-13.

- 7) Attach the skyBeacon (Item 1) to the wing tip as follows

- a) Position skyBeacon and skyBeacon fairing onto the wingtip and confirm alignment with existing mounting holes (Item 14).
- b) Install 2 O-ring seals (Item 2) onto each screw (Item 3).

Note: the O-ring nearest the head of the screw must be replaced if the screw is tightened and subsequently removed.

- c) Use appropriate length mounting screws (Item 3) to attach skyBeacon to the wingtip fairing. Tighten screws to 8-10 in-lbs.
- 8) Apply power to the Position light and confirm position light operation
 - 9) If equipped, apply power to strobe light and confirm strobe light operation
 - 10) Install placard as defined in AFM Supplement document UAV-1002111-001 Section 2.2.
 - 11) Go to Section 6.7 for skyBeacon setup.

6.6.1 Fairing Configuration

The fairing required for each model aircraft is as follows:

Make	Model	P/N
Cessna	150L, 150M, 152, 185E, 180H, 182N	UAV-1002301-001
Cessna	172L, 172M, 172N, 172Q, 172R, 172RG, 182Q, 182R, 182S, 182T, T182T, R182, 180J, 180K, A185K, U206G, TU206F, TU206G, 177B, 177RG	UAV-1002302-001

6.7 skyBeacon System Configuration

6.7.1 Verify Software Version

Before configuring the skyBeacon, verify that the version of software installed on the skyBeacon matches the software version identified in Table 6-1 Software Part Numbers and Versions.

Item / Part	Version	CRC
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ADS-B (skyBeacon PF007 Operating Program Firmware) UAV-1001759-006	1.4.0	0x4957C6B8
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Table 6-1 Software Part Numbers and Versions

If your skyBeacon is marked with UAV-1001856-002 MOD 5, or a greater MOD level, it already contains this software version; proceed to Section 6.7.2 Configure Device. For UAV-1001856-002 MOD 4 and earlier, the current software version must be verified by procedure. To do so, either:

- Use the “skyBeacon Installer Application” on iOS or Android, and navigate to the “Monitor” tab.
- Use the “Beacon Firmware Update Tool” on Windows.

If necessary, reference “Service Bulletin skyBeacon Software Upgrade to ADS-B 1.4.0” UAV-1002756-003 for detailed software update procedures.

6.7.2 Configure Device

Follow instructions provided in the “skyBeacon TSO User and Installation Guide” UAV-1001421-001 Section 10 to configure the system and perform post-installation checks.

6.8 Flight Checks

If the owner desires to further confirm the skyBeacon was installed and configured properly, perform a flight within ADS-B airspace coverage and request a FAA flight test compliance report.

To perform an ADS-B Out flight check requires flying in airspace where ADS-B coverage exists. In some areas in the country, you may need to be at a higher altitude to ensure coverage. Use of a portable ADS-B In with an EFB (or equivalent) can provide the pilot an indication that the airplane is within ADS-B coverage.

If a dedicated flight is desired, perform a take-off, climb, simple maneuvers (standard rate turns around a point for example), descend and land. **Do not perform any aerobatic maneuvers.** Further guidance for flight test procedures can be found in AC 20-165B.

Upon completion of the flight, request an ADS-B Aircraft Operation Compliance Report (ACR) at the Public ADS-B Performance Report Request Internet site:

<https://adsbperformance.faa.gov/PAPRRequest.aspx>

7 Support

For additional questions or support please visit:

<http://www.uavionix.com/support/>

Appendix A Anti-collision Supplementary Guidance

Installation of an anti-collision light requires evaluation of all lighting sources to ensure appropriate coverage. Applicable rule excerpts are provided below as reference for use in obtaining additional FAA approvals.

Current 14 CFR 23.2530 (Amdt. 64) requires that anti-collision lights, “if required by part 91 of this chapter, must have the intensities, flash rate, colors, field of coverage, and other characteristics to provide sufficient time for another aircraft to avoid a collision.” Prior to this update, historical rules required that;

Aircraft originally certificated after March 31, 1957 and before August 11, 1971:

The system must produce a minimum of 100 effective candelas, with decreasing intensities to 30 degrees above and below the horizontal plane. Ref CAR 3-1 / 14 CFR 23.1401.

Aircraft originally certificated after August 10, 1971 and before September 1, 1977:

The system must produce a minimum of 400 effective candelas, with decreasing intensities to 30 degrees above and below the horizontal plane. Ref 14 CFR 23.1401 Amdt. 11.

Aircraft originally certificated after August 31, 1977:

The system must produce a minimum of 400 effective candelas, with decreasing intensities to 75 degrees above and below the horizontal plane. Ref 14 CFR 23.1401 Amdt. 20.