



US Department
of Transportation
Federal Aviation
Administration

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

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

Electronic Tracking Number

For FAA Use Only

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

1. Aircraft	Nationality and Registration Mark N87567	Serial No. 129		
	Make Republic	Model RC3	Series	
2. Owner	Name (As shown on registration certificate) Ostronik, KC		Address (As shown on registration certificate)	
			Address P.O. Box 371101	
			City Key Largo	State FL
			Zip 33037	Country USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial No.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in Item 1 above)	_____
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

6. Conformity Statement

A. Agency's Name and Address		B. Kind of Agency	
Name Poules, Alexander		<input checked="" type="checkbox"/> U. S. Certificated Mechanic	Manufacturer
Address 200 Woody Hill Road		<input type="checkbox"/> Foreign Certificated Mechanic	C. Certificate No.
City Hope Valley	State RI	<input type="checkbox"/> Certificated Repair Station	37365627
Zip 02832	Country USA	<input type="checkbox"/> Certificated Maintenance Organization	

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

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual 10-08-2014
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7. Approval for Return to Service

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

BY	FAA Flt. Standards Inspector	Manufacturer	Maintenance Organization	Persons Approved by Canadian Department of Transport
	FAA Designee	Repair Station	<input checked="" type="checkbox"/> Inspection Authorization	Other (Specify)

Certificate or Designation No. 37365627	Signature/Date of Authorized Individual 10-08-2014
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NOTICE

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

8. Description of Work Accomplished

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

N87567

Nationality and Registration Mark

10-08-2014

Date

One time major alteration to install Angle of Attack system.
See attached FAA Form 8110-3 dated
21 September 2014 for details. END.

☒ Additional Sheets Are Attached

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION STATEMENT OF COMPLIANCE WITH AIRWORTHINESS STANDARDS			1. DATE September 21, 2014	
AIRCRAFT OR AIRCRAFT COMPONENT IDENTIFICATION				
2. MAKE Sky Enterprises, Inc	3. MODEL NO. RC-3	4. TYPE (Airplane, Engine, Propeller etc.) Airplane	5. NAME OF APPLICANT KC Ostronic	
LIST OF DATA				
6. IDENTIFICATION SEEBEEALT-AOA, Rev IR, Dated April 24, 2014		7. TITLE Alteration to Install Angle of Attack system on Republic RC-3 Serial Number 129 Notes: What the DER is approving: This approval is for engineering design data only. It indicates the data listed above demonstrates compliance only with the regulations specified by paragraph and subparagraph listed below as "Applicable Requirements." This form does not constitute FAA approval of all the engineering data necessary for substantiation of compliance to necessary requirements for the entire alteration/repair. What the DER cannot approve: The approval of Instructions for continued airworthiness is retained by the FAA. However, the need for ICA has been reviewed by the DER and it appears that there are no special requirements. Rules excluded: None Rules cited by Applicant and Not DER findings: Compliance with additional regulations not listed here may be required. ***END***		
8. PURPOSE OF DATA To provide approval of engineering data in support of a major alteration to RC-3 Seebee S/N 129, N87567, for the addition of a supplemental Angle of Attack (AOA) system installation.				
9. APPLICABLE REQUIREMENTS (List specific sections) 14 CFR §§ 23.601 [23-0], 23.603 [23-23], 23.611 [23-48], 23.1301 [23-62], 23.1309 (a) (2) [Amdt.23-61], 23.1311 (a) (1) (2) [23-62], 23.1321 [23-49], 23.1322 [23-43], 23.1331 (a) (b) [23-61], 23.1351 [Amdt.23-49], 23.1365 (a) (d) (e) [23-49], 23.1541 [Amdt.23-21]				
10. CERTIFICATION - Under authority vested by direction of the Administrator and in accordance with conditions and limitations of appointment under 14 CFR Part 183, data listed above and on attached sheets numbered <u>N/A</u> have been examined in accordance with established procedures and found to comply with applicable requirements of the Airworthiness Standards listed. <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Recommend approval of these data I (We) Therefore <input checked="" type="checkbox"/> Approve these data </div> </div>				
11. SIGNATURE(S) OF DESIGNATED ENGINEERING REPRESENTATIVE(S) <div style="display: flex; align-items: center; justify-content: center;"> <div>Robert Ray</div> </div>		12. DESIGNATION NUMBERS(S) DERT-405146-CE	13. CLASSIFICATION(S) Systems and Equipment, Mechanical, Chart C1 Part 23 C1, C2, C4, C7 Systems and Equipment, Electrical, Chart C2 Part 23 A1, A2, A4, A5	

KC Ostronik Owner
SKY ENTERPRISES, INC. (REPUBLIC)
MODEL: RC-3
SERIAL NUMBER: 129
FAA REGISTRATION: N87657



DERS Group Svc LLC

Alteration to install Angle of Attack system on Republic RC- 3 Serial Number 129

DOCUMENT NO.: SEABEEALT-AOA

REVISION: IR

April 24, 2014



Zero
Lift



Best
Glide



Best
Approach



High
Angle
Warning

KC Ostronik owner of the aircraft proposes an one-time alteration to Seabee RC-3 aircraft for installation of a Angle Of Attack (AOA) system which provides pilot with a full range angle of attack indication.

The designs and data shown and described in this document contain certain features which have been developed by owner of the aircraft KC Ostronik and shall not be disclosed outside the immediate recipient, or be duplicated, used or disclosed in whole or in part for any purpose other than that for which it is submitted. All use, sales, and reproduction rights are the property of KC Ostronik and the disclosure herein does not imply transfer or relinquishment of these rights.

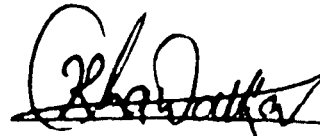
RC-3 Alteration to Install an Angle of Attack System

RECORD OF REVISIONS / SIGNATURES

REVISION	DATE	PURPOSE	APPROVAL BY
Original	04/24/2014	Initial Release	JMG



Applicant Project Manager
Tracy Ourhaan
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RC-3 Alteration to Install an Angle of Attack System

4

1 INTRODUCTION

1.1 General:

This Compliance Summary Report document provides the description for a one-time alteration to a Republic RC-3 Seabee aircraft. This document includes alteration description, purpose, proposed certification basis, compliance finding, safety assessment and compliance demonstration.

1.2 Scope

The Republic RC-3 Seabee aircraft is an amphibious aircraft powered with a 6 cylinder horizontally opposed 215 hp. 6A8-215-B9F engine. Mr. KC Ostronik, owner of the aircraft, proposes this one time alteration for the installation of an Angle Of Attack (AOA) System supplied by Proprietary Software System, Inc. The installed AOA system will provide AOA information and warning to the aircraft pilot when the AOA is at high angles. The system will give reliable warnings at high angles from zero lift. This information is in addition to the airspeed and AOA system is not used as primary instrument.

The proposed alteration has been previously FAA approved with FORM 337 dated 25 October 2002 for Republic RC-3 S/N 56. Please refer to the APPENDIX A for the copy of approved FORM 337 and approved corresponding technical data. The applicant has chosen to follow same approved data for this alteration.

Mr. KC Ostronik has contracted DERS Group Svc LLC. (DERS Group) located at 144 Grays Creek Drive, Savannah, Georgia 31410, to act as its agent and manage this certification project and provide the FAA with all necessary documentation in support of this alteration.

This is a one time alteration is only applicable to the below specified aircraft serial number:

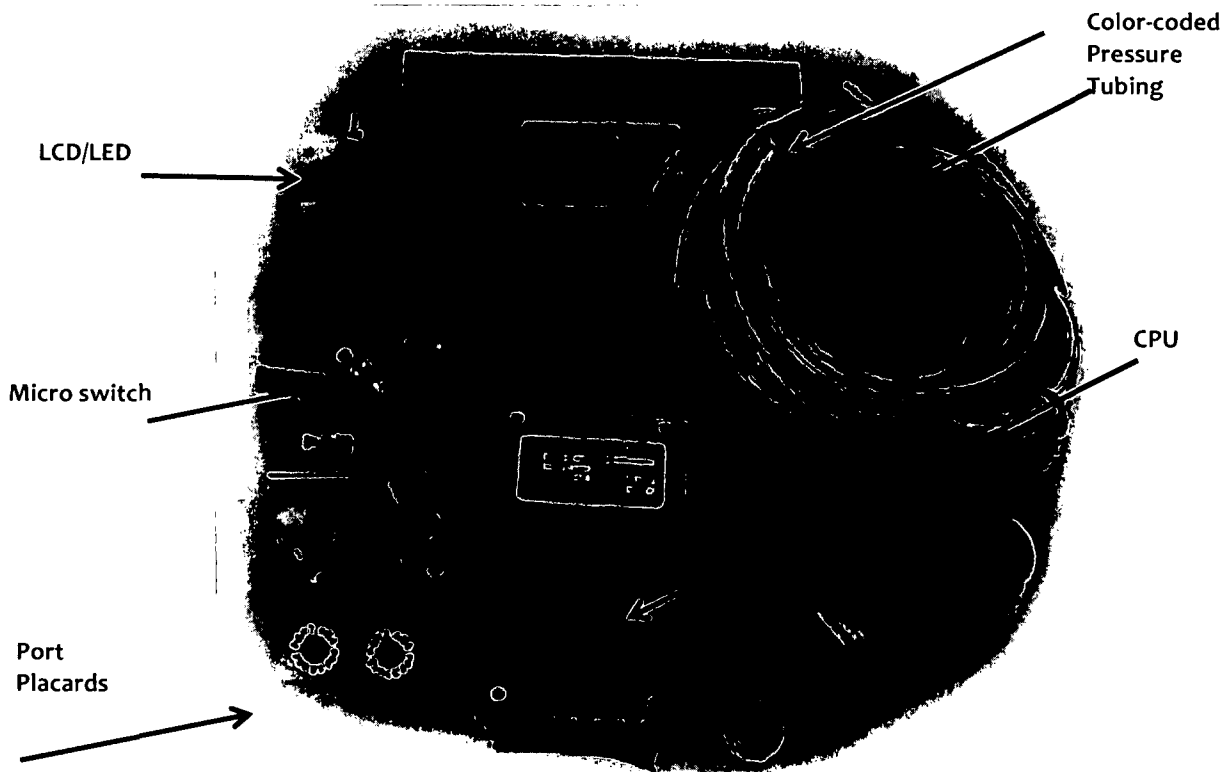
1.2.1 Table 1 – Applicability

AIRCRAFT MAKE	AIRCRAFT MODEL	AIRCRAFT S/N
Sky Enterprises, Inc.	RC -3 Seabee	129

2 DESIGN REPORT:

2.1 System Components

The AOA system supplied by Proprietary Software System Inc. consists of a Central Processing Unit (CPU), Liquid Crystal Display (LCD) or Light Emitter Diode (LED) display, flap microswitch, wiring harness, pressure tubings, placards as shown below.



The AOA CPU is enclosed in an aluminum tray. The 25 pin Dsub is for wiring to the display, the power supply, the push to test (PTT), dimmer and flap position switch. The four barbs will be connected to 1/8" OD color-coded pressure tubes. There is no battery in the CPU since the memory chip does not require a battery to remember data.

The Proprietary Software System Inc. supplies a three-color light emitting diode (LED) or a four-color liquid crystal display (LCD). For aircraft equipped with flaps, slats, and/or retractable gear, the AOA system needs to know whether the aircraft is in the landing or the cruise configuration, which is accomplished by using micro-switches.

The proposed alteration for AOA system installation has been previously FAA approved for the same model aircraft i.e. RC-3 but for S/N 56. The alteration for the RC-3 S/N 56 had been approved with FAA FORM 337 dated October 25, 2002.

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Please Refer to APPENDIX A for the copies for the approved FORM 337 and corresponding technical data. The approved technical data includes, installation instructions, continued airworthiness instructions and architecture.

The applicant has decided to follow RC-3 S/N 56 approved technical data in exact similar way for the proposed alteration without any deviation.

3 INSTALLATION INSTRUCTIONS

The installation has been made in accordance with the instructions provided by the manufacturer.

The installation instructions provided below follows the previously approved for RC-3 S/N 56 instructions. They are reiterated below to make them more readable.

- (1) The CPU is mounted on an existing bracket at station 17, weight = 0.9 lb.
- (2) LCD mounted on top of instrument panel, station 39, weight = +0.125 lb. Placard "Never For Primary Use".
- (3) Electrical power supplied through a 1-amp circuit breaker marked AOA.
- (4) Pressure ports located at 13.5" from leading edge of the cord (21.4%) and 20.75 in from wing end and labeled.
- (5) Flap micro-switch mounted on bracket attached to existing aileron cable guide blocks next to right flap hydraulic cylinder. Micro-switch is actuated by movement of the cylinder and does not interfere with the movement of cylinder.

Below image shows installation instruction from RC-3 S/N 56 approved technical data.

5. Installation

CPU is mounted on an existing bracket at station 17, wt. = .9 lb

LCD mounted on top of instrument panel, station 39, wt. + .125 lb. Placarded "Never for Primary Use"

Electrical power supplied through a 1 amp circuit breaker marked AOA.

Pressure ports located at 13.5" from leading edge of cord (21.4%) and 20.75 in from wing end and labled.

Flap microswitch mounted on a bracket attached to existing aileron cable guide blocks next to right flap hydraulic cylinder. Microswitch is actuated by movement of the cylinder and does not interfere with movement of the cylinder.

The Following are the additional instructions provided on the drawing which are reiterated below,

- (1) Keep the upper and lower pressure ports within 4" of each other span wise
- (2) Call for optimum wing span location
- (3) Keep the upper and lower pressure ports at same % of chord
- (4) Avoid locating ports near round head rivets
- (5) Clean all mating surfaces prior to installation
- (6) Use sealant between pressure blocks and wing
- (7) Pressure ports drilled with #60 bit (0.040 dia.) after block placement

RC-3 Alteration to Install an Angle of Attack System

- (8) Pressure test all system prior to flight
- (9) Use acceptable methods techniques and practices in accordance with DOT FAA circular AC43B-1A.

Below image shows installation instruction from RC-3 S/N 56 approved technical data drawing.

Keep the upper and lower pressure ports within 4" of each other span wise call for optimum wing span location

Keep the upper and lower pressure ports at the same % cord

Avoid locating the ports near round head rivets

Clean all mating surfaces prior to installation

Use sealant between pressure blocks and wing

Pressure ports drilled with #60 bit (.040 dia.) after block placement

Pressure test all systems for leaks prior to flight

Use acceptable methods, techniques and practices in accordance with DOT FAA circular AC 43.13-1A

4 REGULATORY

4.1 Original Certification Basis

The Original Aircraft Type Certification Basis are listed under:

- CAR 03 effective 13 November 1945, A-769 Rev. 15 - TCDS Sky Enterprises, Inc.

4.2 Determination of Significance

This alteration to the aircraft is considered to be 'Major Alteration', as it is not listed in the aircraft, engine, or propeller specifications. It is decided to use the regulations at current amendment levels for compliance demonstration; hence a further classification of alteration as significant or Non-significant has not been performed.

4.3 Proposed Certification Basis

Part 23 regulations at current amendment levels as dated on 24 April 2014.

4.4 Compliance Checklist

Below are the rules governing the compliance applicable to this alteration.

1.1.1 Table – Compliance Checklist

14 CFR	AMDT.	DESCRIPTION
23.601	23-0	General
23.603	23-23	Materials and workmanship
23.611	23-48	Accessibility [provisions.]
23.1301	23-62	Function and installation
23.1309 (a)(2)	23-61	Equipment, systems, and installations
23.1311 (a)(1)(2)	23-62	Electronic display instrument systems
23.1321	23-49	Arrangement and visibility
23.1322	23-43	Warning, caution, and advisory lights
23.1331 (a)(b)	23-61	Instruments using a power source
23.1351	23-49	General
23.1365 (a)(d)(e)	23-49	Electric cables and equipment
23.1541	23-21	General

4.5 Compliance Demonstration

This section demonstrates the compliance with the each of applicable rule.

4.5.1 Sec. 23.601 DESIGN AND CONSTRUCTION: General.

The suitability of each questionable design detail and part having an important bearing on safety in operations must be established by tests.

Amdt. Orig., Eff. 02/01/65

4.5.1.1 Evidence

The suitability of installation of Angle of Attack system installation on RC-3 aircraft has been demonstrated by previously installed similar system on same model aircraft i.e. RC-3 S/N 56. There has been no evidence of any operational unsafe events due to this system installation. *Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.601.*

4.5.2 Sec. 23.603 DESIGN AND CONSTRUCTION: Materials and workmanship.

- [(a) The suitability and durability of materials used for parts, the failure of which could adversely affect safety, must--
- (1) Be established by experience or tests;
 - (2) Meet approved specifications that ensure their having the strength and other properties assumed in the design data; [and
 - (3) Take into account the effects of environmental conditions, such as temperature and humidity, expected in service.]
- (b) Workmanship must be of a high standard.

Amdt. 23-23, Eff. 12/01/78

4.5.2.1 Evidence

The suitability of installation of Angle of Attack system installation on RC-3 aircraft has been demonstrated by previously installed similar system on same model aircraft i.e. RC-3 S/N 56. There has been no evidence of any operational unsafe events due to this system installation. *Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.603.*

4.5.3 Sec. 23.611 DESIGN AND CONSTRUCTION: Accessibility [provisions.]

[For each part that requires maintenance, inspection, or other servicing, appropriate means must be incorporated into the aircraft design to allow such servicing to be accomplished.]

Amdt. 23-48, Eff. 03/11/96

4.5.3.1 Evidence

The installation of a CPU on existing bracket at Station 17 and an LCD on top of the instrument panel ensures easy access for maintenance, inspection or servicing. *Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.611.*

4.5.4 Sec. 23.1301 EQUIPMENT: Function and installation.

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; and
- (c) Be installed according to limitations specified for that equipment.

Amdt. 23-62, Eff. 01/31/12

4.5.4.1 Evidence

The installation instructions ensure appropriate labeling of different instruments of the system. Also, the installation of similar Angle of Attack system on same model aircraft i.e. RC-3 S/N 56 demonstrated that the system does its intended function, without any safety concern. *Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1301.*

4.5.5 Sec. 23.1309(a)(2) EQUIPMENT: [Equipment, systems, and installations.]

The requirements of this section, except as identified in paragraphs (a) through (d), are applicable, in addition to specific design requirements of part 23, to any equipment or system as installed in the airplane. This section is a regulation of general requirements and does not supersede any requirements contained in another section of part 23.

(a) The airplane equipment and systems must be designed and installed so that:

- (1) Those required for type certification or by operating rules perform as intended under the airplane operating and environmental conditions, including the indirect effects of lightning strikes.
- (2) Any equipment and system does not adversely affect the safety of the airplane or its occupants, or the proper functioning of those covered by paragraph (a)(1) of this section.

Amdt. 23-62, Eff. 01/31/12

4.5.5.1 Evidence

The Angle of Attack system can be considered as system, which does not have adverse effect on the aircraft. Non of the AOA system instrument interfere with any other instrument/system of the aircraft, hence does not affect proper functioning of any other system. *Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1309(a)(2).*

4.5.6 Sec. 23.1311 (a)(1)(2) EQUIPMENT: Electronic display instrument systems

(a) Electronic display indicators, including those with features that make isolation and independence between powerplant instrument systems impractical, must:

- (1) Meet the arrangement and visibility requirements of Sec. 23.1321.
- (2) Be easily legible under all lighting conditions encountered in the cockpit, including direct sunlight, considering the expected electronic display brightness level at the end of an electronic display indicator's useful life. Specific limitations on display system useful life must be contained in the Instructions for Continued Airworthiness required by Sec. 23.1529.
- (3) Not inhibit the primary display of attitude, airspeed, altitude, or powerplant parameters needed by any pilot to set power within established limitations, in any normal mode of operation.
- (4) Not inhibit the primary display of engine parameters needed by any pilot to properly set or monitor powerplant limitations during the engine starting mode of operation.
- (5) For certification for Instrument Flight Rules (IFR) operations, have an independent magnetic direction indicator and either an independent secondary mechanical altimeter, airspeed indicator, and attitude instrument or an electronic display parameters for the altitude, airspeed, and attitude that are independent from the airplane's primary electrical power system. These secondary instruments may be installed in panel positions that are displaced from the primary positions specified by Sec. 23.1321(d), but must be located where they meet the pilot's visibility requirements of Sec. 23.1321(a).
- (6) Incorporate sensory cues that provide a quick glance sense of rate and, where appropriate, trend information to the parameter being displayed to the pilot.
- (7) Incorporate equivalent visual displays of the instrument markings required by Sec. Sec. 23.1541 through 23.1553, or visual displays that alert the pilot to abnormal operational values or approaches to established limitation values, for each parameter required to be displayed by this part.

(b) The electronic display indicators, including their systems and installations, and considering other airplane systems,

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must be designed so that one display of information essential for continued safe flight and landing will be available within one second to the crew by a single pilot action or by automatic means for continued safe operation, after any single failure or probable combination of failures.

(c) As used in this section, "instrument" includes devices that are physically contained in one unit, and devices that are composed of two or more physically separate units or components connected together (such as a remote indicating gyroscopic direction indicator that includes a magnetic sensing element, a gyroscopic unit, an amplifier, and an indicator connected together). As used in this section, "primary" display refers to the display of a parameter that is located in the instrument panel such that the pilot looks at it first when wanting to view that parameter.

Amdt. 23-62, Eff. 01/31/12

4.5.6.1 Evidence

The LCD used for the angle of attack display has fifty-two light bar segments and are individually controlled by the microprocessor (direct drive) providing the maximum contrast possible, which ensures readable under all conditions in the cockpit. *Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1511 (a)(1)(2).*

4.5.7 Sec. 23.1321 EQUIPMENT: Arrangement and visibility

(a) Each flight, navigation, and powerplant instrument for use by any required pilot during takeoff, initial climb, final approach, and landing must be located so that any pilot seated at the controls can monitor the airplane's flight path and these instruments with minimum head and eye movement. The powerplant instruments for these flight conditions are those needed to set power within powerplant limitations.

(b) For each multiengine airplane, identical powerplant instruments must be located so as to prevent confusion as to which engine each instrument relates.

(c) Instrument panel vibration may not damage, or impair the accuracy of, any instrument.

[(d) For each airplane, the flight instruments required by Sec. 23.1303, and, as applicable, by the operating rules of this chapter, must be grouped on the instrument panel and centered as nearly as practicable about the vertical plane of each required pilot's forward vision. In addition:]

- (1) The instrument that most effectively indicates the attitude must be on the panel in the top center position;
- (2) The instrument that most effectively indicates airspeed must be adjacent to and directly to the left of the instrument in the top center position;
- (3) The instrument that most effectively indicates altitude must be adjacent to and directly to the right of the instrument in the top center position; and
- (4) The instrument that most effectively indicates direction of flight, other than the magnetic direction indicator required by Sec. 23.1303(c), must be adjacent to and directly below the instrument in the top center position; and
- (5) Electronic display indicators may be used for compliance with paragraphs (d)(1) through (d)(4) of this section when such displays comply with requirements in Sec. 23.1311.

(e) If a visual indicator is provided to indicate malfunction of an instrument, it must be effective under all probable cockpit lighting conditions.

Amdt. 23-49, Eff. 03/11/96

4.5.7.1 Evidence

The LCD used for the angle of attack display is firmly mounted on the instrument panel, which ensures that pilot can monitor the LCD and does not cause any vibration. *Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1321.*

4.5.8 Sec. 23.1322 EQUIPMENT: Warning, caution, and advisory lights

If warning, caution, or advisory lights are installed in the cockpit, they must, unless otherwise approved by the Administrator, be--

- (a) Red, for warning lights (lights indicating a hazard which may require immediate corrective action);
- (b) Amber, for caution lights (lights indicating the possible need for future corrective action);
- (c) Green, for safe operation lights; and
- (d) Any other color, including white, for lights not described in paragraphs (a) through (c) of this section, provided the color differs sufficiently from the colors prescribed in paragraphs (a) through (c) of this section to avoid possible confusion.
- [(e) Effective under all probable cockpit lighting conditions.]

Amdt. 23-43, Eff. 05/10/93

4.5.8.1 Evidence

The LCD is a four-color display, which includes of red, blue, green and green and displayed according to the AOA values. Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1322.

4.5.9 Sec. 23.1331 (a)(b) EQUIPMENT: Instruments using a power source

For each instrument that uses a power source, the following apply:

- (a) Each instrument must have an integral visual power annunciator or separate power indicator to indicate when power is not adequate to sustain proper instrument performance. If a separate indicator is used, it must be located so that the pilot using the instruments can monitor the indicator with minimum head and eye movement. The power must be sensed at or near the point where it enters the instrument. For electric and vacuum/pressure instruments, the power is considered to be adequate when the voltage or the vacuum/pressure, respectively, is within approved limits.
- (b) The installation and power supply systems must be designed so that--
 - (1) The failure of one instrument will not interfere with the proper supply of energy to the remaining instrument; and
 - (2) The failure of the energy supply from one source will not interfere with the proper supply of energy from any other source.
- (c) For certification for Instrument Flight Rules (IFR) operations and for the heading, altitude, airspeed, and attitude, there must be at least:
 - (1) Two independent sources of power (not driven by the same engine on multiengine airplanes), and a manual or an automatic means to select each power source; or
 - (2) A separate display of parameters for heading, altitude, airspeed, and attitude that has a power source independent from the airplane's primary electrical power system.

Amdt. 23-62, Eff. 01/31/12

4.5.9.1 Evidence

Whenever there will not be any audio or visual display on AOA LCD instrument, it can be considered as faulty power supply or wiring harness. Also, the failure of any of the AOA system instrument does not interfere proper power supply of any of the other system or its components. This is demonstrated by previously installed similar Angle of Attack system on same model aircraft i.e. RC-3 S/N 56. Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1331(a)(b).

4.5.10 Sec. 23.1351 EQUIPMENT: General

- (a) Electrical system capacity. Each electrical system must be adequate for the intended use. In addition--
- (1) Electric power sources, their transmission cables, and their associated control and protective devices, must be able to furnish the required power at the proper voltage to each load circuit essential for safe operation; and
 - (2) Compliance with paragraph (a)(1) of this section must be shown as follows--
 - (i) For normal, utility, and acrobatic category airplanes, by an electrical load analysis or by electrical measurements that account for the electrical loads applied to the electrical system in probable combinations and for probable durations; and
 - (ii) For commuter category airplanes, by an electrical load analysis that accounts for the electrical loads applied to the electrical system in probable combinations and for probable durations.
- (b) Function. For each electrical system, the following apply:
- (1) Each system, when installed, must be--
 - (i) Free from hazards in itself, in its method of operation, and in its effects on other parts of the airplane;
 - (ii) Protected from fuel, oil, water, other detrimental substances, and mechanical damage; and
 - (iii) So designed that the risk of electrical shock to crew, passengers, and ground personnel is reduced to a minimum.
 - [(2) Electric power sources must function properly when connected in combination or independently.
 - (3) No failure or malfunction of any electric power source may impair the ability of any remaining source to supply load circuits essential for safe operation.
 - (4) In addition, for commuter category airplanes, the following apply:
 - (i) Each system must be designed so that essential load circuits can be supplied in the event of reasonably probable faults or open circuits including faults in heavy current carrying cables;
 - (ii) A means must be accessible in flight to the flight crewmembers for the individual and collective disconnection of the electrical power sources from the system;
 - (iii) The system must be designed so that voltage and frequency, if applicable, at the terminals of all essential load equipment can be maintained within the limits for which the equipment is designed during any probable operating conditions;
 - (iv) If two independent sources of electrical power for particular equipment or systems are required, their electrical energy supply must be ensured by means such as duplicate electrical equipment, throwover switching, or multichannel or loop circuits separately routed; and
 - (v) For the purpose of complying with paragraph (b)(5) of this section, the distribution system includes the distribution busses, their associated feeders, and each control and protective device.
- (c) Generating system. There must be at least one generator/alternator if the electrical system supplies power to load circuits essential for safe operation. In addition--
- (1) Each generator/alternator must be able to deliver its continuous rated power, or such power as is limited by its regulation system.
 - (2) Generator/alternator voltage control equipment must be able to dependably regulate the generator/alternator output within rated limits;
 - [(3) Automatic means must be provided to prevent damage to any generator/alternator and adverse effects on the airplane electrical system due to reverse current. A means must also be provided to disconnect each generator/alternator from the battery and other generators/alternators.]
 - (4) There must be a means to give immediate warning to the flight crew of a failure of any generator/alternator.
 - (5) Each generator/alternator must have an overvoltage control designed and installed to prevent damage to the electrical system, or to equipment supplied by the electrical system that could result if that generator/alternator were to develop an overvoltage condition.
- (d) Instruments. A means must exist to indicate to appropriate flight crewmembers the electric power system quantities essential for safe operation.
- (1) For normal, utility, and acrobatic category airplanes with direct current systems, an ammeter that can be switched into each generator feeder may be used and, if only one generator exists, the ammeter may be in the battery feeder.

(2) For commuter category airplanes, the essential electric power system quantities include the voltage and current supplied by each generator.

(e) Fire resistance. Electrical equipment must be so designed and installed that in the event of a fire in the engine compartment, during which the surface of the firewall adjacent to the fire is heated to 2,000° F for 5 minutes or to a lesser temperature substantiated by the applicant, the equipment essential to continued safe operation and located behind the firewall will function satisfactorily and will not create an additional fire hazard.

(f) External power. If provisions are made for connecting external power to the airplane, and that external power can be electrically connected to equipment other than that used for engine starting, means must be provided to ensure that no external power supply having a reverse polarity, or a reverse phase sequence, can supply power to the airplane's electrical system.

(g) It must be shown by analysis, tests, or both, that the airplane can be operated safely in VFR conditions, for a period of not less than five minutes, with the normal electrical power (electrical power sources excluding the battery and any other standby electrical sources) inoperative, with critical type fuel (from the standpoint of flameout and restart capability), and with the airplane initially at the maximum certificated altitude. Parts of the electrical system may remain on if--

(1) A single malfunction, including a wire bundle or junction box fire, cannot result in loss of the part turned off and the part turned on; and

(2) The parts turned on are electrically and mechanically isolated from the parts turned off.

Amdt. 23-49, Eff. 03/11/96

4.5.10.1 Evidence

The AOA CPU works on 12 to 24 volts and 0.5 amps maximum and power for the backlighting of the LCD comes from AOA CPU. The electric load of 0.5 amps is considered to be negligible on the existing aircraft electrical system and can consider that this additional load does not exceed alternator maximum output. This is demonstrated by previously installed similar Angle of Attack system on same model aircraft i.e. RC-3 S/N 56. *Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1351.*

4.5.11 Sec. 23.1365 (a) (d) (e) EQUIPMENT: Electric cables and equipment.

(a) Each electric connecting cable must be of adequate capacity.

[(b) Any equipment that is associated with any electrical cable installation and that would overheat in the event of circuit overload or fault must be flame resistant. That equipment and the electrical cables must not emit dangerous quantities of toxic fumes.]

(c) Main power cables (including generator cables) in the fuselage must be designed to allow a reasonable degree of deformation and stretching without failure and must--

(1) Be separated from flammable fluid lines; or

(2) Be shrouded by means of electrically insulated flexible conduit, or equivalent, which is in addition to the normal cable insulation.

[(d) Means of identification must be provided for electrical cables, terminals, and connectors.

(e) Electrical cables must be installed such that the risk of mechanical damage and/or damage caused by fluids vapors, or sources of heat, is minimized.

(f) Where a cable cannot be protected by a circuit protection device or other overload protection, it must not cause a fire hazard under fault conditions.]

Amdt. 23-49, Eff. 03/11/96

4.5.11.1 Evidence

The electrical wires/cables used for installation are industry standard MIL specification wires such as 22AWG M2259 and are of adequate capacity, and the instruments connections are properly identified and are shown in the drawing.

RC-3 Alteration to Install an Angle of Attack System

Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1365 (a) (d) (e).

4.5.12 Sec. 23.1541 Operating Limitations and Information: General

- (a) The airplane must contain--
 - (1) The markings and placards specified in Secs. 23.1545 through 23.1567; and
 - (2) Any additional information, instrument markings, and placards required for the safe operation if it has unusual design, operating, or handling characteristics.
- (b) Each marking and placard prescribed in paragraph (a) of this section--
 - (1) Must be displayed in a conspicuous place; and
 - (2) May not be easily erased, disfigured, or obscured.
- [(c) For airplanes which are to be certificated in more than one category--
 - (1) The applicant must select one category upon which the placards and markings are to be based; and
 - (2) The placards and marking information for all categories in which the airplane is to be certificated must be furnished in the Airplane Flight Manual.
- (d) [Deleted.]

Amdt. 23-21, Eff. 03/01/78

4.5.12.1 Evidence

The installation of the system has been done in accordance with instructions provide by manufacturer, which clearly identifies the placards which are required. Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1541.

4.6 Instructions for Continued Airworthiness (ICA)

- | | |
|-----------------------------------|---------|
| (1) Wing pressure port | Clear |
| (2) Air/Water separator | Drained |
| (3) Angle of Attack | Checked |
| (4) Wiring condition and security | Ok |
| (5) Pressure tubing and condition | Ok |

Each 24 months a pitot/static check is required by FAR 91.411 and compliance with applicable bulletins from manufacturer.

5 SAFETY ASSESSMENT

5.1 Introduction

This section provides a qualitative safety assessment related to the installation of Angle of Attack (AOA) system and investigates in reference to failure conditions, their classification, probability and their effects, and overall system safety level.

5.2 System Description

The system considered under this safety assessment is newly installed Angle of Attack (AOA) system. The purpose of this system installation is to provide angle of attack information and warning when angle of attack is at high angles to the aircraft pilot and when the airfoil is operating at the optimum AOA for an approach and operating at some other performance related AOA such as the maximum endurance or best glide angle. The AOA system instrument is not used as primary instrument and airspeed indicator always takes priority. There have been no changes to the existing aircraft system for the installation of this system.

5.3 Functional hazard assessment (FHA)

This section provides a systematic, comprehensive examination of the Angle of Attack (AOA) system functions to identify potential minor, major, hazardous, and catastrophic failure conditions that may arise as a result of a malfunction or a failure to function.

The severity is a quantitative measure of the worst possible degree of personal injury, property damage, or system damage, which can result from a failure mode. The possible severity categories defined in FAA Advisory Circular AC 25.1309-1E are provided in Table 2.

5.3.1 Table 2 Severity Classification

Severity Class	Severity Description
Catastrophic	Failure condition, which prevents continued safe flight and landing, and for which no effective action is realistically possible.
Hazardous	Failure condition which causes a large reduction in safety margins or functional capacity, very high increase in workload or physical stress for the crew or discomfort to occupants.
Major	Failure condition, which causes a significant reduction in safety margins or functional capabilities and a significant increase in crew workload or in, conditions impairing crew efficiency or discomfort to occupants.
Minor	Failure condition which does not significantly reduce aircraft safety and/or involve crew actions that are well within their capabilities. Minor failure conditions may include for example, a slight reduction in safety margins or functional capabilities, a slight increase in crew workload, such as a routine flight plan change or some inconvenience to occupants.
No Safety Effect	Failure conditions that would have no effect on safety (that is, failure conditions that would not affect the operational capability of the airplane or increase crew workload).

Below are the failure conditions that have been identified as being related to the alteration:

RC-3 Alteration to Install an Angle of Attack System

5.4 Safety Assessment

5.4.1 Table 3 Failure Causes

Failure Condition Hazard Description	Failure Condition Cause	Classification Of Failure Condition	Occurrence
Loss of the AOA system	<ul style="list-style-type: none"> Loss of LCD Loss of electricity Malfunction of any of the AOA system instrument 	No Safety Effect	Extremely Improbable

5.4.2 Table 4 Failure Effects

Failure Condition Hazard Description	Effect
Loss of the AOA system	The angle of attack information will not be available to the aircraft pilot.

5.5 Conclusion – Criticality Determination

The installed AOA system instrument is not the primary instrument for the aircraft. This system displays angle of attack, which provides supplementary information to the airspeed, and hence airspeed always takes priority. The failure of AOA system does not interfere with any other existing aircraft system and does not have any safety effect i.e. AOA system failure would not affect the operational capability of the airplane or increase crew workload. Hence this alteration does not have any adverse effect on the previously established safety level. *Therefore, it is concluded that the Angle of Attack system installation on RC-3 S/N 129 is in compliance with § 23.1309.*

5.6 Airworthiness Directive Search Report

SEARCH PARAMETER

SYSTEM SUPPLIER

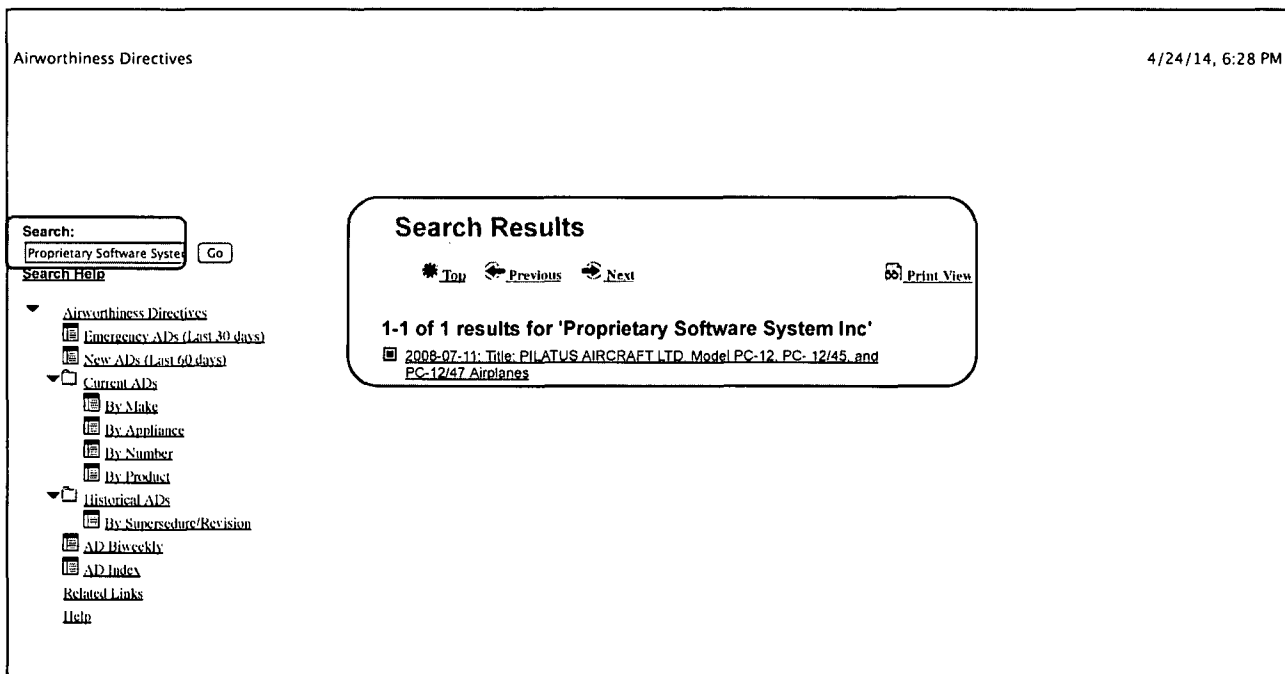
Proprietary Software System Inc

Search http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAD.nsf/MainFrame?OpenFrameSet

SEARCH RESULTS A search of AOA system supplier returned 1 AD.

Search results are listed on the following pages (attached). Only important pages of each of the ADs are shown.

AD Query Completed April 24, 2013 by Jayant R Ghawalkar, Certification Engineer, DERS Group Svc LLC.



5.6.1 AD Summary

The search dated on 24 April 2014 for the 'Proprietary Software System Inc' identified 1 AD as shown in the image. After careful study of the AD 2008-07-11 it has been found that this AD is applicable to Pilatus PC-12, PC-12/45, and PC-12/47 airplanes and not related to Angle of Attack system. Therefore, this AD is considered to be not applicable hence, no further action is required for above AD.

5.7 Service Difficulties Summary Report

The Aircraft Make for the RC-3 aircraft is Sky Enterprises, Inc., as per the TCDS A-769 shown below.

SEARCH SITE: <http://av-info.faa.gov/SDRX/Query.aspx>

SDR Query Completed April 24, 2013 by Jayant R Ghawalkar, Certification Engineer, DERS Group Svc LLC.

RC-3 Alteration to Install an Angle of Attack System

FEDERAL AVIATION AGENCY	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> A-769 Revision 15 STOL (REPUBLIC) RC-3 November 20, 1992 </div>	
<u>AIRCRAFT SPECIFICATION NO. A-769</u>	
Type Certificate Holder	<div style="border: 1px solid black; padding: 2px;">Sky Enterprises, Inc.</div> Tacoma Narrows Airport 1302 26th Avenue NW Gig Harbor, Washington
<u>1 - Model RC-3 4 PCAMM (Normal Category), 2 PCAMM (Utility Category), Approved October 15, 1947</u> (See NOTES 4, 5 and 6 for flying boat versions).	
Engine	Franklin 6A8-215-B8F
Fuel	80 min. octane aviation gasoline
Engine limits	For all operations, 2500 rpm (215 hp)

For the above search site, 'Sky Enterprise, Inc.' is not listed on the FAA website, as the aircraft make, shown below.

[Run Query](#) [Clear Query Criteria](#) [Return to the Main Menu](#)

Query Criteria (Note: Recently submitted SDR's are not available until submission.)

Operator Control # _____

Operator Designator _____

Difficulty Date: From _____ To _____ (mm/dd/yyyy)

JASC (ATA) Code _____

Aircraft Make SKYLARK _____

Engine Make _____

Propeller Make _____

Part Name _____

Part Number _____

Problem Description _____

Aircraft Manufacturer Lookup

Search Text:

sky

SKRISKY - SIKORSKY AIRCRAFT
SKYLEA - SKYLEADER JIHLAVAN/SIMVISION CZ
SKYLARK - SKYLARK AIRCRAFT CORP

Select

Cancel

(Searching this field will alter query time.)

These fields allow the use of the % symbol to indicate a wildcard search. Below are some examples:

- Exact Match -- "craft mod" will only match the exact text "craft mod"
- Single Wildcard Match -- "craft mod%" would match "craft model" but not "aircraft model"
- Multiple Wildcard Match -- "%craft mod%" or "air%mod%" would match any text containing that phrase such as "aircraft model"

So, it was unable to identify any Service Difficulties Summary Report for RC-3.

6 ALTERATION SUMMARY

6.1 General:


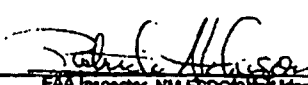
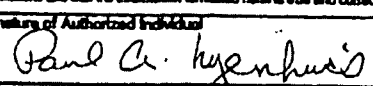
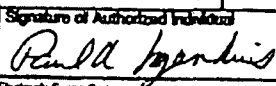
The document explains the alteration installation of Angle Of Attack system installation (supplied by Proprietary Software System Inc.) for RC-3 s/n 129 aircraft. The purpose of the alteration is to provide the aircraft pilot with angle of attack information, but not as primary instrument. This alteration does not interfere any of the aircraft existing system and does not affect continued safe operation of the aircraft once properly modified.

6.2 Conclusion:

A detailed explanation has been provided about the change, change classification, installation instruction, compliance findings, and compliance demonstration. Care has been taken to consider if any off the previously issued FAA AD notes or SDR are applicable to this alteration. *A safety assessment demonstrates that this altered aircraft demonstrates the same level of safety as the aircraft prior to alteration. This document addresses each of the applicable rules and demonstrates successful compliance.*

RC-3 Alteration to Install an Angle of Attack System

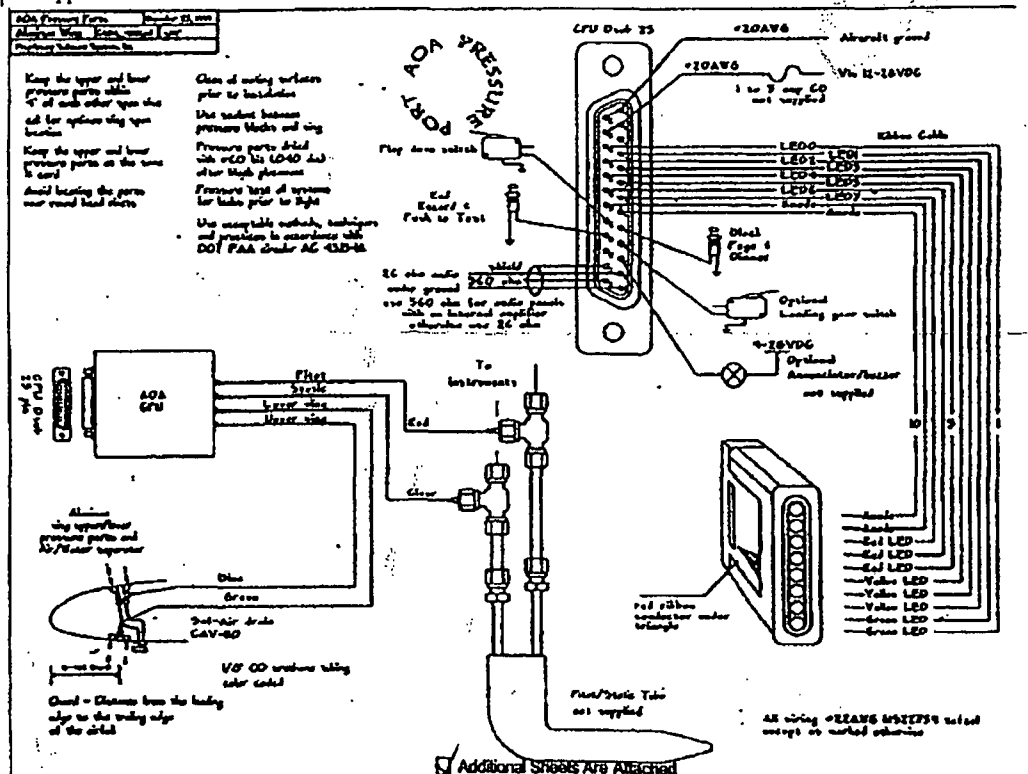
APPENDIX A: FAA APPROVED DATA – RC-3 S/N 56

 MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)		Form Approved OMB No. 2120-0020 For FAA Use Only Office Identification	
INSTRUCTIONS: Fill or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act of 1958).			
1. Aircraft	Make Republic Serial No. 56	Model RC-3 Nationality and Registration Mark N87504	
2. Owner	Name (As shown on registration certificate) Duke, G. Roger	Address (As shown on registration certificate) P.O. Box 1129 Langley, WA 98260-1129	
The data/alteration identified herein complies with applicable airworthiness requirements and is approved for FAA Use Only only for the above described aircraft subject to conformity inspection by a person authorized in FAR 43.7			
DATE 10/21/02  FAA Inspector, NIA-PSC006 Unit Identification			
Unit	Make	Model	Serial No.
AIRFRAME	(As described in Item 1 above)		
POWERPLANT			
PROPELLER			
APPLIANCE	Type		
	Manufacturer		
5. Type			
A. Agency's Name and Address Paul A. Nyeckus Aviation Inspection & Repair, Inc. 18928 - 59th. Drive NE Ardenmore, WA 98223		B. Kind of Agency <input checked="" type="checkbox"/> U.S. Certified Mechanic <input type="checkbox"/> Foreign Certified Mechanic <input type="checkbox"/> Certified Repair Station <input type="checkbox"/> Manufacturer	C. Certificate No. A&P 1595544
D. I certify that the repair and/or alteration made to the unit(s) identified in Item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.			
Date 10/16/02		Signature of Authorized Individual 	
7. Approval for Return To Service Pursuant to the authority given persons specified below, the unit identified in Item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> REJECTED			
BY	FAA FE Standards Inspector FAA Designee	Manufacturer Repair Station	Inspection Authorization Person Approved by Transport Canada Airworthiness Group
Date of Approval or Rejection 02/25/2002		Certificate or Designation No. 1595544	Signature of Authorized Individual 

NOTICE

B. Description of Work Accomplished

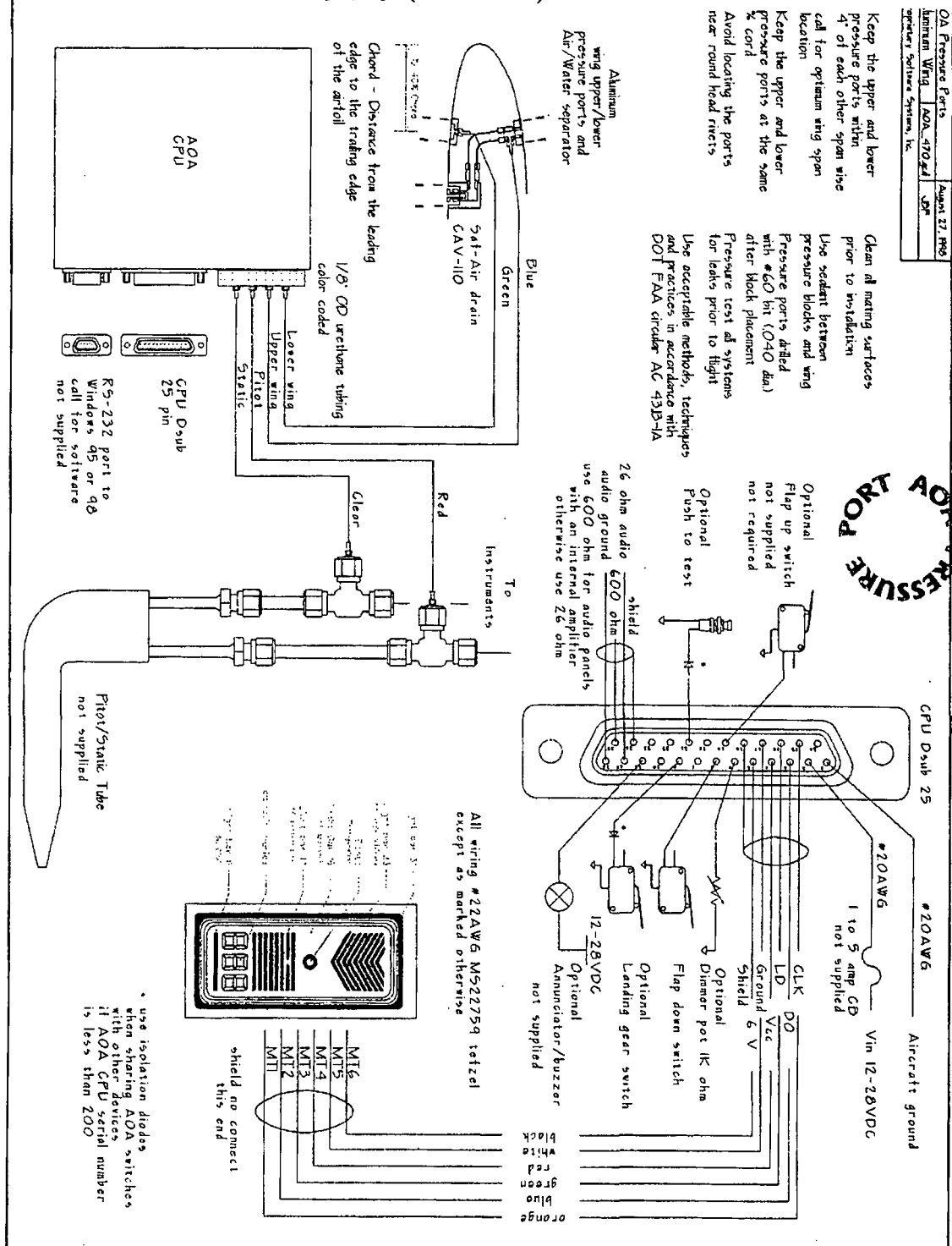
1. Installed Angle of Attack system with cockpit display instrument. Kit provided by Proprietary Software System, Inc. 950 Iris Circle, Excelsior MN 55331. Part # Sport 0008V3, Serial # 333
2. Installation was made in accordance with instructions provided by the manufacturer January 1, 2000.
3. All mounting of equipment meets the criteria of AC 43.13-2A Chapter 1 Par 2, d.
4. The electrical part of the system was installed IAW AC 43.13-1B Chapter 11, Section 3, 11-30, 11-32, 11-32, and 11-33, Chapter 12 section 1
5. Installation
CPU is mounted on an existing bracket at station 17, wt. = .9 lb
LCD mounted on top of instrument panel, station 39, wt. + .125 lb. Placarded "Never for Primary Use"
Electrical power supplied through a 1 amp circuit breaker marked AOA.
Pressure ports located at 13.5" from leading edge of cord (21.4%) and 20.75 in from wing end and lable.
Flap microswitch mounted on a bracket attached to existing aileron cable guide blocks next to right flap hydraulic cylinder. Microswitch is actuated by movement of the cylinder and does not interfere with movement of the cylinder.
6. Continued airworthiness 1. Pressure ports, Clear. 2. Air/Water separator, Drained. 3. Angle of Attack, Checked. 4. Wiring condition and security, OK. 5. Pressure tubing condition and security, OK.
6. Each 24 months a Pitot/ Static leak check will be performed on the AOA system that will coincide with the aircraft's instrument pitot/static check as required by FAR 91.411 and compliance with applicable bulletins from the manufacturer.



AFB Electronics Forms System

RC-3 Alteration to Install an Angle of Attack System

APPENDIX A: FAA APPROVED DATA – RC-3 S/N 56 (CONTINUED)



RC-3 Alteration to Install an Angle of Attack System

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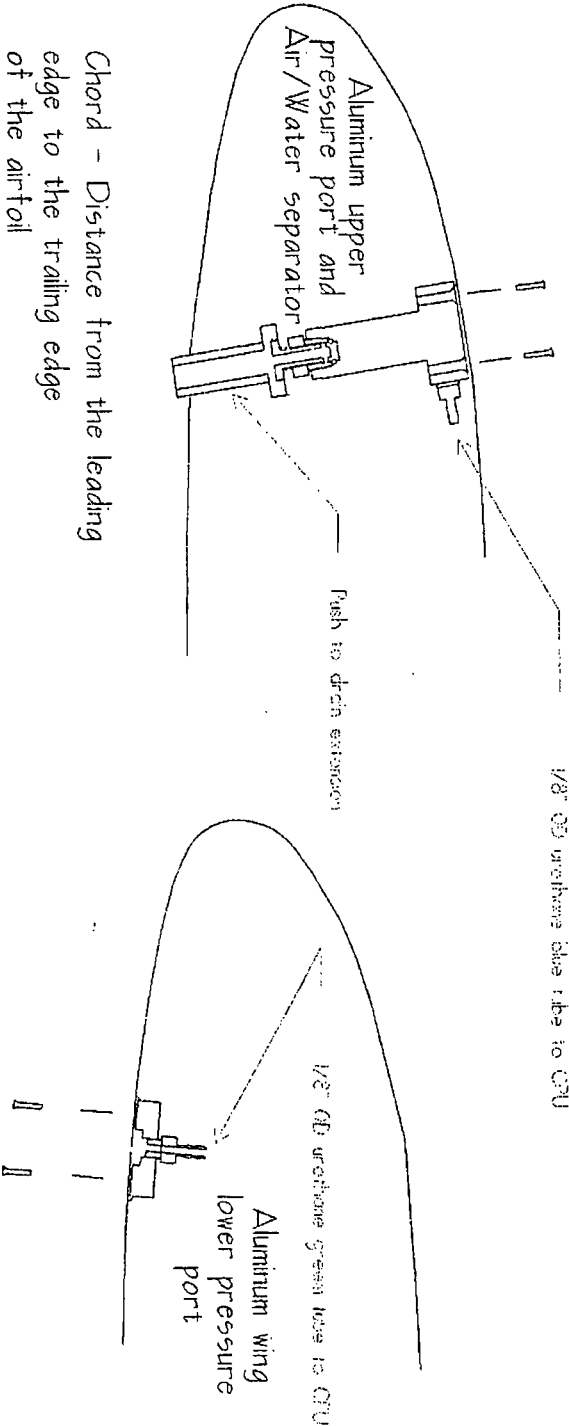
APPENDIX A: FAA APPROVED DATA – RC-3 S/N 56 (CONTINUED)

AOA Pressure Ports	May 1, 1999
Aluminum Wing	AOA_460b.gcd
Proprietary Software Systems, Inc.	JBF

Keep the upper and lower pressure ports within 4" of each other span wise
8 - 48 inches from wing tip is optimum span location
Keep the upper and lower pressure ports at the same % cord
Avoid locating the ports near round head rivets

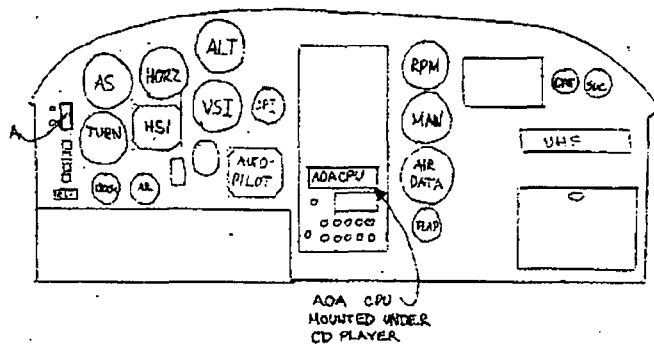
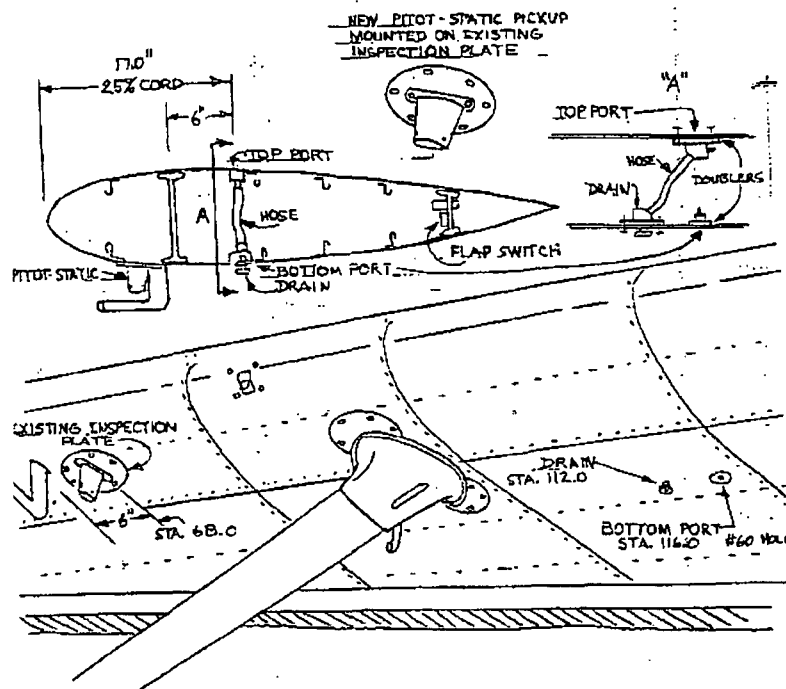
Clean all mating surfaces prior to installation
Use sealant between pressure blocks and wing
Pressure ports drilled with #60 bit (.040 dia.) after block placement
Pressure test all systems for leaks prior to flight
Use acceptable methods, techniques and practices in accordance with DOT FAA circular AC 43J3-1A

AOA PRESSURE PORT



RC-3 Alteration to Install an Angle of Attack System

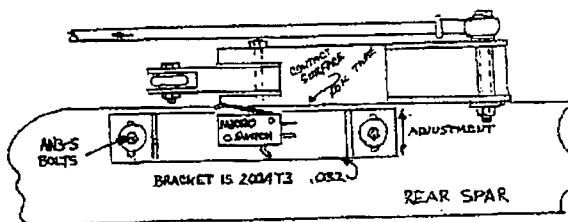
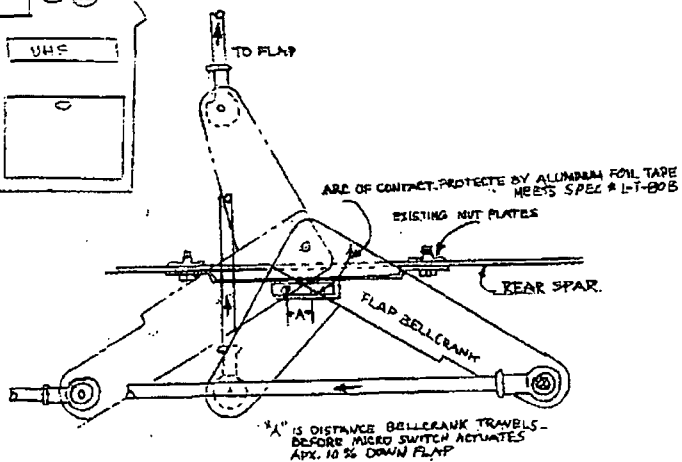
APPENDIX A: FAA APPROVED DATA – RC-3 S/N 56 (CONTINUED)



The pressure ports must be placarded with

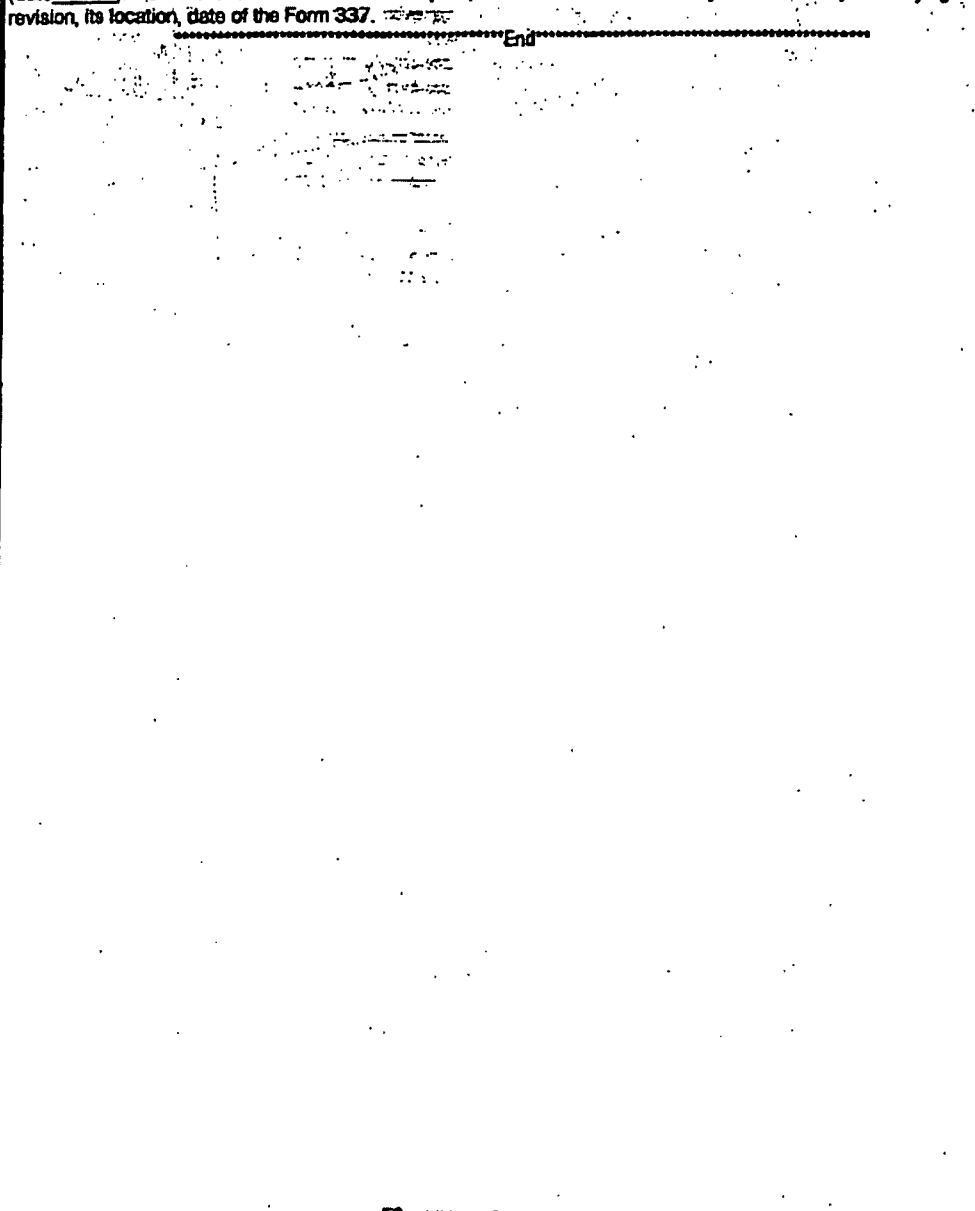


and the area around the ports must never be power washed.



RC-3 Alteration to Install an Angle of Attack System

APPENDIX A: FAA APPROVED DATA – RC-3 S/N 56 (CONTINUED)

NOTICE	
Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.	
B. Description of Work Accomplished <i>(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)</i>	
major alteration have been accepted by the FAA, superseding the instructions for Continued Airworthiness (date ____). Once the revision has been accepted, a maintenance record entry will be made, identifying the revision, its location, date of the Form 337.	
.....End.....	
<div style="text-align: center;">  </div>	
<input checked="" type="checkbox"/> Additional Sheets Are A:	

: 3 GPO: 1959-0-663-171