Maintenance and User Instructions

Emergency Vision Assurance System

Model 107TC-XXX

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01	01 Jul 09	Title. TOC 1-4. Chapter 1:4-7. Chapter 2:8-15. Chapter 3:17.	*MHO*
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HIGHLIGHTS of REVISION 04

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1) Updated all footers to current Revision level.
2) Updated List of Effective Pages.
3) Added "®" to EVAS throughout.
4) Revised Revision Procedure.
5) Revised Air and Ground Shipment of EVAS®
6) Revised EVAS® Description
7) Revised Training.
8) Revised Types of Inspection
9) Updated Sample Color Coded Labels.
10) Revised Scope of Blower and Battery Check.
11) Added Loop Fastener Verification.
12) Revised Biennial Service.
13) Revised Rebuild Requirements
14) Revised Explanation of EVAS® Features.

End of highlights.

PREFACE

Goal and Purpose

This document is the Maintenance and User Instructions manual for the Emergency Vision Assurance System (EVAS®) Model 107 TC models, as currently manufactured by VisionSafe Corporation.

The **Goal** of this manual is to provide complete, correct and current instructions to maintenance personnel for the continued airworthiness of EVAS®.

The **Purpose** of this manual is to serve as a reference document to users for the on-going overhaul, maintenance and routine servicing of EVAS®.

Compliance

Awareness and compliance with this manual is necessary. Non-compliance may lead to the warranty being void.

Quality and Continuous Improvement

Care has been used in the preparation and distribution of the manual. However, should any perceived conflict arise between portions of this manual and any professional standard, such conflicts shall be reported and brought to my attention for formal resolution.

Finally, all users should regard this manual as an integral part of a continuous improvement process. Your recommendations for improvement are welcome.

MaryAnn H. Omerod

MaryAnn H. Omerod
Chief Operating Officer
VisionSafe Corporation

CHAPTER 1

INTRODUCTION

CHAPTER 1 INTRODUCTION AND GENERAL

This chapter contains information of an introductory and general nature to inform the reader of the conventions and format used throughout the manual.

1.1 ARRANGEMENT AND FORMAT OF THE MANUAL

Information presented in this manual is DIRECTIVE in nature. Information and work instructions are arranged by Chapter and major / minor subjects within chapters. A decimal system of numbering allows for organization and cross referencing. When the material is revised a vertical change bar will be displayed in the right margin to indicate the revised material.

Each Chapter, Section, and Subsection is designated by title and Arabic numeral. All numbering breakdowns are arranged according to a decimal sequence.

1	Chapter	The first number enumerates the Chapter.
1.**1**	Section	The second number enumerates the Section.
1.1.**1**	Subsection	The third number enumerates the Subsection.
1.1.1.**1**	Subsection	The fourth number enumerates an additional Subsection, etc.
1) then **a**) or •	Series Lettering	Items listed in series under the sections are enumerated as a numeric list then an alphabetic list or as bullets.

This system provides a simple method of referral and cross reference to material in this manual. The symbol "**§**" is used to indicate the prefix "Section" or "Subsection." For example, the notation § 1.1.2.5 is read as subsection 1.1.2.5 (or conversationally, section 1.1.2.5 .). Likewise, §§ 3.2.3 – 3.2.8 (or written as 3.2.3 – 8) is read as "sections 3.2.3 through 3.2.8 ;" or more simply, §§ is the plural form of §.

1.1.1 PAGINATION, REVISION CONTROL AND GENERAL

Pagination

All chapters are numbered sequentially. The chapter number and chapter name are in the middle portion of the footer. The page numbers are in the right portion of the footer. The first page of Chapter 1 is page 1; the following pages are numbered sequentially to the end of the document.

Revision Control

The version or revision control of all pages is indicated in the lower left corner of all pages. For example, "Original, 12 Feb 09" indicates an original page dated 12 Feb 09. If that page is subsequently revised on 24 May 09, for example, the page would be marked "Rev 01, 24 May 09" and the List of Effective Pages would be updated accordingly.

Revision Mark

Material added or revised in the manual will be marked with a vertical bar in the right margin to indicate where the newly added or revised material is located. Minor editorial changes, spelling corrections and text deletions are not normally marked. All revision marks are removed at the next revision.

Validity of Manual Content

Any statements in this manual found to be illegal, incorrect, and/or inapplicable shall not affect the validity of the remaining content.

Titles in the manual shall not govern, limit, modify or affect the scope, meaning or intent of any volume, chapter, section or subsections of this manual.

Grammatical Construction

The content of the manual shall be interpreted using the grammatical rules below.

Tense ..... The present tense also includes the past and future.
Gender ..... The masculine also includes the feminine where appropriate.
Singular and plural ..... The singular also includes the plural.
Mandatory and
permissive ..... "Shall" is mandatory, "may" is permissive.

Printing

The printed version of this manual may be single-sided, two-sided, or in booklet format. When there is no written text for a numbered page, the page shall contain the statement:

(This page intentionally blank.)

When the lower portion of a page is reserved for future use, the page shall contain the statement:

(Remainder of page reserved.)

1.1.2 REVISION PROCEDURE

Revisions are prepared by VSC and distribution to manual holders is done via an email notification.

At any time, manual holders may also download and print out a complete and current Maintenance and User Instructions manual via the VisionSafe website. The manual can be found in the Client Access Portal for TC Units at: www.visionsafe.com

(Remainder of page reserved.)

1.2 APPLICABILITY

This manual applies to EVAS® models 107TC-XXX. The dash XXX suffix is a placeholder for a number suffix used by VisionSafe Corporation to identify four (4) additional characteristics of EVAS®:

- The aircraft model for which EVAS® may be installed and used.
- The particular IVU associated with a particular EVAS®.
- The seat specific location (left seat or right seat).
- The type of attachment bracket or side plate to be used with this appliance in any particular installation.

Each pair of EVAS® (one left seat and one right seat) will have consecutive dash numbers, with the left seat EVAS® being an odd number, and the right seat EVAS® being the left seat number +1.

1.3 ACRONYMS AND DEFINITIONS OF TERMS

§	The symbol "**§**" is used to indicate the prefix Section or Sub-subsection. For example, the notation § 1.1.2.5 is read as Sub-section 1.1.2.5 (or conversationally, section 1.1.2.5 .). Likewise, §§ 3.2.3 – 3.2.8 (or as 3.2.3 – 8) is read as "sections 3.2.3 through 3.2.8 ;" or more simply, §§ is the plural form of §.
AMT	Aircraft Maintenance Technician. An AMT is an FAA (or other equivalent aviation agency) certificated aircraft maintenance technician.
Appliance	Appliance means any instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communications equipment, that is used or intended to be used in operating or controlling an aircraft in flight, is installed in or attached to the aircraft, and is not part of an airframe, engine, or propeller. Avionics equipment is an appliance.
EVAS®	"EVAS®" is an acronym for "Emergency Vision Assurance System."
iaw	Means "in accordance with."
IVU	Inflatable Vision Unit. The inflated portion of EVAS® that allows the pilot to see outside and see the primary instruments.
VSC	VisionSafe Corporation, the manufacturer of EVAS®.

(Remainder of page reserved.)

1.4 UNITS OF MEASURE

The units of measure for EVAS® is the US System of Measurement.

1.5 AIR AND GROUND SHIPMENT OF EVAS®

The EVAS® unit, including the internal battery pack, is not subject to the requirements of Title 49 CFR – 172.101 Hazardous Materials Requirements. However, EVAS® units are subject to Title 49 CFR Part 172.102, Provision 130 which requires compliance with the following three items when transported by aircraft, for a battery whose voltage (electrical potential) exceeds 9 volts:

1) The sender must securely package the EVAS® units. Secure packaging means that the EVAS® unit is cushioned within the shipping package so as to prevent excessive movement.

2) When contained in a device, the device must be packaged in a manner that prevents unintentional activation or must have an independent means of preventing unintentional activation (e.g., packaging restricts access to activation switch, switch caps or locks, recessed switches, trigger locks, temperature sensitive circuit breakers, etc.).

3) An indication of compliance with this special provision must be provided by marking each package with the words "not restricted" or by including the words "not restricted" on a transport document such as an air waybill accompanying the shipment.

1.6 EVAS® DESCRIPTION

"EVAS®" is an acronym for "Emergency Vision Assurance System." EVAS® is a stand-alone, self-contained system that requires no integration into any existing aircraft systems and does not introduce any new wiring into the aircraft.

EVAS® is a self-contained system that includes a battery powered blower which draws smoky air in through a filter, filtering out the visible particles, and out to a flexible air duct, which is connected to an inflatable transparent envelope, called the "Inflatable Vision Unit," (or IVU). The entire EVAS® system is contained in an aluminum container that is approximately the size of a Jeppeson manual and weighs approximately 6 pounds.

The pilot deploys EVAS® by first removing the cover from the EVAS® container. With the EVAS® container open, the pilot inserts his hand into the EVAS® container and removes the IVU from the container and places the entire IVU package onto a strip of Loop Fastener installed on the glare shield. Removal of the IVU package from the container pulls a lanyard, closing the lanyard switch, thereby automatically starting the blower and switching the internal light ON.

As soon as vision assistance is needed, the pilot must hold the IVU in place on the glare shield with one hand and release the IVU for inflation by firmly pulling on the tab of the restraining strap with his other hand. As the IVU inflates, assist inflation by gently unfolding the IVU envelope and positioning the windshield portion and the instrument panel portion for optimum vision. Be sure to assist the instrument portion of the IVU so it inflates between the control wheel and the instruments.

While in use, EVAS® will inflate the IVU with filtered, clear air at a pressure slightly above that of ambient air, thus completely displacing all smoke from the volume of the IVU. As the IVU is transparent, this gives

the pilot a clear vision path to the essential flight instruments and forward along the flight path. The internal IVU light is fixed within the IVU and remains on at all times to provide added illumination of the flight instruments.

1.6.1 FEATURES AND PRINCIPLES OF OPERATION

1) EVAS® displaces all smoke in the vision path, regardless of density.
2) EVAS® provides clear vision of basic instruments and flight path, and lights instruments.
3) EVAS® allows limited use of check lists, approach charts, etc.
4) EVAS® provides continuous operation for several hours. Intermittent operation conserves power and provides satisfactory performance for a more extended period.
5) EVAS® is self-contained and independent of all aircraft systems.

EVAS® is for emergency use only. Unintentional, accidental or emergency deployment of EVAS® (IVU inflated) will require that the unit be returned to VSC for a special inspection (see §2.1.5).

1.6.2 PHOTOGRAPHS OF EVAS®

EVAS®, left and right containers.

EVAS® deployed, left side, in smoke.

(Remainder of page reserved.)

1.7 TRAINING

Training options for EVAS® are described on the "Training" tab of the EVAS® website, www.visionsafe.com. Included on the training page are the EVAS® training video and multiple training options. VSC document 8015, “EVAS® Training Outline," is also available on this page.

End of Chapter 1

CHAPTER 2

CHECKS, SERVICES AND REBUILD REQUIREMENTS

CHAPTER 2 CHECKS, SERVICES AND REBUILD REQUIREMENTS

This chapter provides the checks, services and rebuild requirements for EVAS® Models 107TC-XXX.

There are no field servicing requirements for EVAS®. The battery pack cannot be replaced by the customer.

2.1 TYPES OF INSPECTIONS

There are two prescribed operator checks and three prescribed manufacturer services as listed below:

Checks and Inspections		Performing Agent
1	Position and Location check.	Aircraft owner or operator (or other qualified designee).
2	Blower and Battery check.	Aircraft owner or operator (or other qualified designee).
3	Loop Fastener Verification	Aircraft owner or operator (or other qualified designee).
3	Biennial service.	VisionSafe Corporation (OEM).
4	Special inspection.	VisionSafe Corporation (OEM).
5	120 Month Rebuild.	VisionSafe Corporation (OEM).

2.1.1 POSITION AND LOCATION CHECK

The Position and Location Check of EVAS® is performed by the aircraft owner or operator (or other qualified designee). This check is performed as part of the normal daily and/or preflight check of the aircraft.

2.1.1.1 SCOPE OF POSITION AND LOCATION CHECK

1) No tools or equipment are required to accomplish the check.
2) Visually check EVAS® for general condition, security and proper position in the cockpit. EVAS® is seat position specific and must be installed in the proper position, i.e., the EVAS® marked "Position: Left" shall be installed or otherwise available for use on the left (pilot) side of the cockpit, and likewise the EVAS® marked "Position: Right" shall be installed or otherwise available for use on the right (copilot) side of the cockpit.

Note: To make the proper position of EVAS® in the cockpit more visually apparent, new or serviced EVAS® units have a color-coded label on the cover strap. Red indicates the left (pilot) side position; green indicates the right (copilot) side position. “Outboard” and “Inboard” indicate position for deployment. See sample color coded labels on the following page.

(Remainder of page reserved.)

2.1.1.2 SAMPLE COLOR CODED LABELS

One red or one green label is attached to the cover strap on the top of each EVAS® unit. The color coding is used to make the proper position of EVAS® in the cockpit more visually apparent.

2.1.2 BLOWER AND BATERY CHECK, NOT TO EXCEED NINETY (90) DAYS

The Blower and Battery check of EVAS® is performed by the Aircraft owner or operator (or other qualified designee).

Depress the blower and battery test buttons simultaneously, as detailed below, once per month, or at regular intervals not to exceed ninety (90) days.

2.1.2.1 SCOPE OF BLOWER AND BATTERY CHECK

In addition to those items listed in § 2.1.1.1 , item 2, the Blower and Battery Check includes a combined check as detailed in the procedures that follow.

NOTE

EVAS is shipped with the ON / OFF power switch in the ON position.

1) New EVAS® units are shipped with a small EVAS® test tool (effective 01 July 2009). This tool has two blunt tips used to accomplish the Blower and Battery check. The tool is stored inside the label on the top of each EVAS® unit. Other "tools" that may be used are hex keys, ball point pens or other equivalent tools.

2) Insert a blunt tipped tool into the **"Blower"** test hole and into the **"Battery"** test hole simultaneously. Push to test for approximately one to three seconds. The test instrument(s) need to be perpendicular to unit surface to fully depress the two test buttons. With the two test buttons depressed, the blower motor should be heard if performed in a noise free environment. If the blower motor is heard, the blower motor is serviceable.

3) Confirm which test light illuminates. A **green** "Battery Condition" light in the lower corner of the EVAS® container indicates that the battery condition is "GOOD," i.e., EVAS® is fully serviceable. If instead the **yellow** light is illuminated, the EVAS® unit must be removed and replaced within ten (10) calendar days. Illumination of the **red** "Inop" light, or no light illuminated, indicates an unacceptable battery condition. In this case, EVAS® must be removed from the aircraft immediately. EVAS® units removed from the aircraft for either a yellow or red test light, or no light, must be returned to VSC for a Special Inspection (see §2.1.4).

4) After noting the above conditions the test may be terminated by removing the tools from the test holes. The EVAS® test tool should be stored back into the EVAS® cover label.

5) In the event the blower motor does not run, EVAS® is inoperable. Contact VSC Quality Assurance Department via telephone (1-800-441-9230 or 808-235-0849) or e-mail (qcontrol@visionsafe.com) as soon as practical for further instructions and test procedures.

2.1.3 LOOP FASTENER VERIFICATION, NOT TO EXCEED NINETY (90) DAYS

Verify loop fasteners are secured. Replace or re-attach using locally approved adhesive (reference installation drawing).

2.1.4 BIENNIAL SERVICE

The biennial service is performed every 24 months ±3 months by VSC iaw VSC Service Work Instructions, VS TC-Form 1 Service. The timing of the first Biennial Service is based upon the manufacture date as provided on the documentation accompanying a new EVAS® unit and as engraved on the container of units manufactured after 01 April 06. The first inspection due date is the Base Service Date printed on the EVAS® container. This service includes replacing the EVAS® battery pack; this cannot be accomplished by the customer. The service may also include applicable upgrades by VSC.

EVAS® customers must plan to remove their EVAS® units from the aircraft at a convenient time and ship the EVAS® units to VSC for servicing. After servicing by VSC, the engraved year is covered with a new sticker indicating the next service due date.

The Base Service Date is printed on the EVAS® container. The biennial service may be performed 3 calendar months before and up to 3 calendar months after the Service Due Date printed on the EVAS® container. Regardless of when this service is performed the next servicing date shall be due 24 months after the original service due date.

If the EVAS® unit is in for servicing before or after the 3 calendar month grace period, the Base Service Date will be changed according to the new ship date plus two years. EVAS® units may be subject to additional service fees if received more than three (3) months past the base service date.

2.1.5 SPECIAL INSPECTION

A special inspection is required immediately after:

1) Any use or deployment of EVAS®. This includes any unintentional, accidental or emergency deployment of EVAS® (IVU inflated);

Emergency Deployment

If EVAS is deployed in an emergency, please contact VSC Quality Assurance Department as soon as practical at 1-800-441-9230.

Please complete the Pilot Smoke Event Report (VS QC Form 38) for all emergency deployments. The form is available at the end of this chapter or on the Service page of the VSC website. After completion, send to VSC Quality Assurance Department. The report is requested by VSC for product improvement. All information will be treated as ***Confidential and Proprietary*** data.

2) The integrity of the EVAS® container or contents are compromised. Examples of integrity compromise include a dented container, immersion of EVAS® in any liquid and/or spillage or accumulation, or suspected accumulation, of any liquid or contaminant into the interior of EVAS®; and
3) Any test in which the "Battery Condition" status indicates "Inop.", i.e., illumination of the red test light, or no light.

Special inspections may only be performed by VSC.

2.2 REBUILD REQUIREMENTS

Rebuild of EVAS® is performed every 120 months ±3 months by VSC iaw VS TC-Form 1, Service. The timing of the first rebuild is based upon the manufacture date as provided on the documentation accompanying a new EVAS® unit and as engraved on the container of units manufactured after 01 April 06.

EVAS® customers must plan to remove their EVAS® units from the aircraft at a convenient time and ship the EVAS® units to VSC. The 120 month rebuild includes replacing most major parts, in addition to performing the Biennial Service; this cannot be accomplished by the customer.

(Remainder of page reserved.)

2.3 PILOT SMOKE EVENT REPORT (VS QC FORM 38, REV B)

Please complete this report if an EVAS™ unit is deployed in an emergency situation. The form may be completed by the pilot or other personnel familiar with the incident. Mail to VisionSafe Corporation Quality Assurance, 46-217 Kahuhipa Street, Kaneohe, HI 96744; or fax it to 808-247-6313; or email it to <qcontrol@visionsafe.com>. We appreciate your assistance.

Aircraft Model	Registration	S/N	Date of Incident	From	To

CONDITIONS - Circle all that apply:

Lighting	Flight Conditions	WX Conditions	Phase of Flight w/ Smoke, all that apply	
Dawn	VMC or IMC	Xwind	Parked / Start	Holding
Daylight	Above cloud	Turbulence	Taxi	Approach
Dusk	In cloud	Windshear	Takeoff	Missed Approach
Night	Below cloud	Restricted Vis.	Climb	Landing
	Between layers	Rain Hail Snow	Cruise	Taxi
	No cloud	Fog Haze Smoke	Descent	Shutdown / Parked
		Thunderstorm		
	Single Pilot	None		
	Two Pilot	Other?		

Description of the Smoke Incident What caused the smoke?, How soon was EVAS™ deployed?, Did both pilots deploy?, Was the IVU(s) inflated? When?, How long was the IVU(s) in use (inflated)? Was the aircraft landed using EVAS™?

If necessary, continue on back of sheet.

Training

1) What EVAS™ training have the pilots received?

2) Frequency of EVAS™ training and last training dates?

3) Are you interested in further training?

Additional comments

Your name and title:	
Company name:	
E-mail address and telephone:	

Questions concerning this report can be addressed to VSC Quality Assurance, 808-235-0849 x 22, or via email to <qcontrol@visionsafe.com>. All information is *Confidential and Proprietary*.

Line below is for VSC use only

EVAS s/n:	EVAS s/n:	ITR #:	Servo #:

Page 1 of 1 VS QC Form 38 Rev B 18 Jun 09

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End of Chapter 2

CHAPTER 3

DIMENSIONS AND ACCESS

CHAPTER 3 DIMENSIONS AND ACCESS

3.1 EXPLANATION OF EVAS® FEATURES

"EVAS® is an acronym for "Emergency Vision Assurance System." EVAS® is a stand-alone, self-contained system that requires no integration into any existing aircraft systems and does not introduce any new wiring into the aircraft.

EVAS® includes a battery powered blower which draws smoky air in through a filter, filtering out the visible particles, and out to a flexible air duct, which is connected to an inflatable transparent envelope, called the "Inflatable Vision Unit," (or IVU). The entire EVAS® system is contained in an aluminum container that is approximately the size of a Jeppesen manual and weighs approximately 6 pounds.

The pilot deploys EVAS® by first removing the cover from the EVAS® container. With the EVAS® container open, the pilot inserts his hand into the EVAS® container and removes the IVU from the container and places the entire IVU package on the glare shield. Removal of the IVU package from the container pulls a lanyard, closing the lanyard switch, thereby automatically starting the blower and switching the internal light ON.

As soon as vision assistance is needed, the pilot must hold the IVU in place on the glare shield with one hand and release the IVU for inflation by firmly pulling on the tab of the restraining strap with his other hand. As the IVU inflates, assist inflation by gently unfolding the IVU envelope and positioning the windshield portion and the instrument panel portion for optimum vision. Be sure to assist the instrument portion of the IVU so it inflates between the control wheel and the instruments.

While in use, EVAS® will inflate the IVU with filtered, clear air at a pressure slightly above that of ambient air, thus completely displacing all smoke from the volume of the IVU. As the IVU is transparent, this gives the pilot a clear vision path to the essential flight instruments and forward along the flight path. The internal IVU light is fixed within the IVU and remains on at all times to provide added illumination of the flight instruments.

(See also § 1.5)

3.1.1 FEATURES AND PRINCIPLES OF OPERATION

1) EVAS® displaces all smoke in the vision path, regardless of density.
2) EVAS® provides clear vision of basic instruments and flight path, and lights instruments.
3) EVAS® allows limited use of check lists, approach charts, etc.
4) EVAS® provides continuous operation for several hours. Intermittent operation conserves power and provides satisfactory performance for a more extended period.
5) EVAS® is self-contained and independent of all aircraft systems.

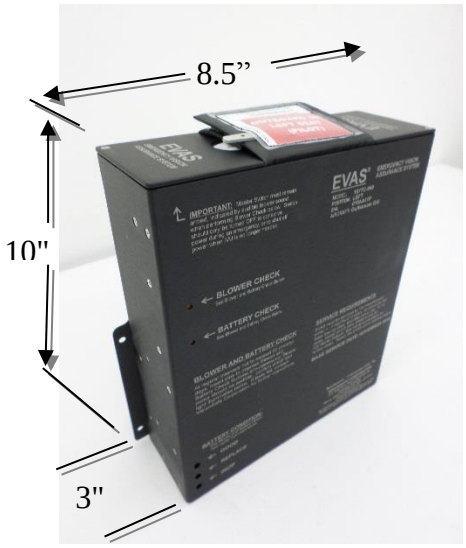
(See also § 1.6.1)

(Remainder of page reserved.)

3.2 DIMENSIONS

Height.....10 inches
Width.....8.5 inches
Depth.....3 inches

See photograph at right.



3.3 SPECIFICATIONS

Center of gravity.....4.375 inches from bottom.

Weight.....6 lbs (nominal).

Materials.....Outer container: aluminum, black anodized.
IVU: Flame retardant rip-stop nylon and Teflon.

Inflation time of IVU.....30 to 60 seconds (nominal).

Blower parameters.....12v DC.
Brushless.
Electronically commutated.
Aluminum die cast housing.
Permanently-lubricated ball bearings.

Maximum operating time.....4 hours (nominal).

Rated operating time.....2.5 hours (nominal).

Internal IVU air pressure.....2.8 inches water pressure.

Filter parameters.....0.1 micron particles – 99% efficiency.
0.3 micron particles – 99.97 % efficiency.

Battery Pack……..+/-13.5V, 3V, 2.8Ah, alkaline.

Explosive atmosphere testing….No explosive events. Satisfactory operation in all respects.

3.4 LOCATION OF ACCESS PANELS

There are no access panels for inspection or servicing of EVAS®.

End of Chapter 3 and End of Manual