



# User's Manual

US v2.0.1

The Vigil is endorsed by:



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Paris Air Show



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# 1 Welcome to the World of the Vigil !

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Thank you for your purchase of today's most sophisticated and modern automatic activation device. It is a revolutionary safety system that requires no maintenance, can be used for multiple types of skydiving, is extremely durable, and is very user friendly.

We sincerely hope that you will never be in a situation that justifies the use of your Vigil. But, if this happened to be the case then you have, thanks to the purchase of this Vigil, demonstrated your judicious foresight.

This manual should accompany you on all your commercial airline flights. It contains explanations that will be useful to the airport security staff.

The most recent manual is available on the Vigil website at <http://www.vigil.aero/manual>.

The Vigil is to be used as a last-resort safety device only. It was never intended and is not be used as a parachute's primary opening system. The procedures written in this manual must be followed to ensure that the Vigil functions properly. Incorrect set up or use can lead to the Vigil functioning improperly. The use a Vigil AAD does not excuse a parachutist from performing proper emergency procedures. A parachutist should adhere to all rules and regulations set by his/her country's skydiving federation.

## 2 Introduction - Your Vigil

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The Vigil was conceived and developed by a team of engineers and parachutists. Its job is to automatically open the reserve container in the event that you are in freefall at an unsafe altitude. The compact, aluminum alloy box is exceptionally strong; its ergonomic design fits well into most any current sport rig.

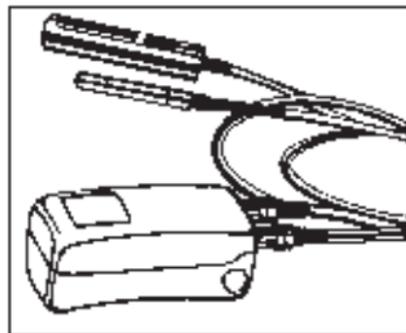
The Vigil can be used for three types of skydiving by the push of just one button. These user programmable modes are: **«Pro»**, **«Student»** or **«Tandem»**.

The unit also works as a data recorder. It memorizes the last jump's freefall time, total time in freefall, and total number of jumps. This data can be viewed directly from the control unit's LCD display or it can be downloaded to a PC through an infrared communications port. A reader and the associated management software are available as an option.

The "2 wire" cable technology was developed especially for the Vigil. It uses Kevlar reinforced cabling that delivers a unique combination of strength and suppleness. The gold plated contacts and the positive locking system guarantee optimal reliability in all circumstances.

The stainless steel control unit has a 26 x 96 point LCD display that allows for a very rich dialogue with the parachutist.

The Vigil's electromagnetic shield protects the Vigil from electromagnetic interferences, like those found in airports and airplanes.



It protects efficiently against electromagnetic waves produced by:

- Radio communications
- Transponders
- Mobile phones
- Radar

➔ *A glossary of unfamiliar terms can be found at the end of this manual.*

## 3 Function

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### 3.1 Principle

The control unit includes an LCD display, a red LED and a yellow LED. The function and the altitude correction modes are displayed directly after starting up the Vigil.

Each time the Vigil is turned on it calibrates itself to the current ground elevation. The altitude correction mode allows you to correct for any difference between the departure and arrival ground levels. The Vigil takes this altitude correction into account to calculate the real activation altitude.

This activation altitude depends on the functioning mode chosen (see § 3.3).  
The red LED briefly flashes three times when the Vigil is reaching and passing the activation altitude.

### 3.2 Installation

The Vigil is completely compatible with most sport rigs on the market today. It can be easily installed in any harness/container system equipped with a place for an AAD.  
All the loops currently available on the market (Spectra CSR style #9512-300, Spectra CSR style #9512-725, Cypres™ Locking Spectra Cord) are usable.

### 3.3 The Functioning Modes

The Vigil has three functioning modes that can be selected by the user: **Pro**, **Student** or **Tandem**. The choice can be made while in the «**SETUP**» mode. (See § 3.4).

#### 3.3.1 *Pro Mode*

The Vigil releases at 270 meters (800 ft.) if the freefall speed is equal or superior to 35 m/sec. (78 mph)

#### 3.3.2 *Student Mode*

The Vigil releases at 330 meters (1000 ft.) if the freefall speed is equal or superior to 20 m/sec. (45 mph)

### 3.3.3 *Tandem Mode*

The Vigil releases at 670 meters (2000 ft.) if the freefall speed is equal or superior to 35 m/sec. (78 mph)

## 3.4 Start Up and Shut Down Procedures

The Vigil must be turned on at ground level (see § 3.4). Never turn the Vigil on while in flight. The procedures listed in this manual eliminate the risk of an undesired start up or shut down.

### 3.4.1 *Start Up – Display*

The Vigil's display is reversible (see § 3.4.6).

In its standard configuration, the Vigil is used with the orange push button situated on the right of the display. The red LED is positioned in the upper, left corner; it dictates the rhythm of the start up procedure. The yellow LED is situated in the bottom, left corner; it confirms the end of the start up procedure.

### 3.4.2 *Starting Up the Vigil*

The Vigil engages and becomes operational after pressing the push button four times. Each time you depress the push button the red LED will immediately flash.

After the first push the «Hello» message is shown, immediately followed by the «Vigil» message.

Press the push button directly after the flash of the red LED.

Press the push button again directly after the second flash of the red LED.

Press the push button again directly after the third flash of the red LED.

The Vigil then starts its control test sequence.

Start up example:

Action	Result
1. Push	<i>Flash and «Hello» followed by «Vigil» appears</i>
2. Push	<i>Flash</i>
3. Push	<i>Flash</i>
4. Push	<i>Start of control tests</i>

➔ *Attention: If there is a great change in atmospheric pressure, it is recommended to restart the Vigil to guarantee optimal precision.*

### 3.4.3 Control Tests

The Vigil goes through several control tests of the electronic circuits, the power pack and the cutter.

The following messages are shown:

- **«Bat OK»**           The power pack is functioning properly
- **«Cut OK»**           The cutter is functioning properly
- **«Ctl OK»**           The electronic circuits are functioning properly

If an error is detected the following messages may be shown:

- **«Ctl Err»**           There is a discrepancy in the electronic circuits
- **«Bat Low»**          Low reading on the power pack. The Vigil is still operational but it is imperative to replace the power pack as soon as possible
- **«Bat Rpl»**          The power pack should be replaced immediately
- **«Cut Err»**          There has been a malfunction with the cutter

The appearance of one of these messages (with the exception of **«Bat Low»**) puts an end to the start up procedure and the Vigil will switch itself off.

If the **«Bat Low»** or **«Bat Rpl»** messages appears, the user can replace the power pack himself (see chapter 6).

If the **«Cut Err»** message appears, the user can replace the cutter himself (see chapter 7).

A new cutter is supplied free of charge in exchange for a completed Life Saving Report. This form is available at <http://www.vigil.aero/saving>.

These first tests are followed by these modes:

**«SETUP»** (see § 3.4.4), **«INFO»** (see § 3.4.5), and **«CONFIG»** (see § 3.4.6)

➔ *The user might not have authorization to replace the power pack or cutter. Some country's regulations require a certified rigger to do such replacements. You must adhere to your country's rules in this situation.*

If the **«Ctl Err»** message appears there may be a failure in the electronic circuits. Send the Vigil back to your distributor for a complete check up.

➔ *In the unlikely event that your Vigil fails to start up, open the unit and disconnect the power pack. Wait one minute, reconnect the power pack, close the box and restart. Once started up, the display will tell you if there is a problem. If need be, swap the component in question, check with us at [info@vigil.aero](mailto:info@vigil.aero), or see your local Vigil dealer.*

#### 3.4.4 **«SETUP»** Mode (Parameters)

At the end of the test sequence it is possible to enter the **«SETUP»** mode. To do this, press the push button as soon as the display shows **«SETUP»** and the red LED flashes.

This mode allows you to correct for any difference between the departure and arrival ground levels, and to define the functioning mode (**Pro**, **Student** or **Tandem** - see § 3.3).

To enter an altitude correction press the push button at the same time as **«Alt Corr»** appears. The arrow facing up corresponds to a positive correction (increase in altitude) and the arrow facing down to a negative correction (decrease in altitude). The correction is made in increments of 50 m. (or 150 ft. when the Vigil is programmed in feet.) Press the push button until the desired correction is achieved.

When the required altitude correction is displayed wait for a few moments until the functioning mode **«Pro»**, **«Student»**, or **«Tandem»** is displayed.

It is possible to modify the functioning mode to **«Pro»**, **«Student»**, or **«Tandem»** by pressing the push button until the desired mode is achieved. When the required functioning mode is displayed, wait for a few moments.

The Vigil will then go to the **«INFO»** (information) mode.

The parameter sequence is described chapter 9, p. 30.

Set up example:

Action	Result
1. Wait	<b>«SETUP»</b> is displayed
2. Push	Configuration of the altitude correction
3. Push	Positive or negative corrections
4. Wait	Display of the functioning modes
5. Push	Select <b>«Pro»</b> , <b>«Student»</b> , or <b>«Tandem»</b> mode

➔ *The altitude correction will remain in the Vigil's memory and will be applied on all jumps that follow. The **«Alt Corr»** setting must only be modified when the elevation of the departure jump site differs from the elevation of the landing jump site.*

### 3.4.5 «INFO» (Information) Mode

This mode allows you to display your Vigil's reference parameters (version and serial number), data from previous jumps, as well as temperature and atmospheric pressure. These parameters are as follows (\*):

Display	Example	Signification
Ver	Ver :4.44	Software version
LCD	LCD :4.44	LCD version
#	#44444	Electronic unit serial number
TJ	TJ :14444	Total Jumps (Total number of jumps)
TFF	TFF :44h 44m44s	Total Free Fall (Total free fall duration in hours, minutes and seconds: hh, mm, ss)
LFF	LFF :144s 444 km/h	Last Free Fall (Duration and maximum speed of the last free fall - displayed in seconds, km/h or mph)
Saves	Saves 14	Number of activations
T	T:+44°C	Temperature in °C or °F depending on the configuration
HPa or Hg	1444hPa	Atmospheric Pressure in hectoPascals or in Hg

(\*) Certain models can be equipped with custom-built or experimental software. The information supplied can be different than on standard units. A badge will make these special models visually identifiable.

Once all the information above has been displayed the Vigil will show **«CONFIG»**; it is then possible to enter into the configuration mode.

#### 3.4.6 **«CONFIG»** (Configuration) Mode

To enter into the configuration mode, press the push button as soon as the display indicates **«CONFIG»** and the red LED flashes. This configuration mode allows you to choose the type of measurement units you wish to display, change the display direction, as well as alter the display's contrast.

Initially, the display indicates **«Meters»** or **«Feet»**, depending on the existing configuration. To change the measurement unit, press the push button.

By pressing the push button you can also choose **«Metric»** or **«U.S.»**.

Press **«View»** to choose to view the display in its normal configuration or flipped 180°.

The contrast can be adjusted by pressing the push button when **«Contrast»** is displayed. The contrast can be adjusted using the up and down arrows.

Once the **«CONFIG»** mode is finished, the Vigil is operational.

Configuration example:

Action	Result
1. Wait	« <b>CONFIG</b> » displayed
2. Push	Push Choose between « <b>Meters</b> » or « <b>Feet</b> »
3. Push	Push Choose between « <b>Metric</b> » or « <b>U.S.</b> »
4. Push	Push Choose between normal or reversed display

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### 3.4.7 Display

The yellow LED flashes five times and the «☺ **ENJOY**» displayed for a few seconds.

If there is no altitude correction, the «**Pro**, **Student** or **Tandem**» mode is displayed.

If an altitude correction was entered, the mode displayed will be, «**P**, **S** or **T**» respectively, followed by a «**+** or «**-**» sign that corresponds to the value of the altitude correction (see § 3.4.4), the measurement value will be shown in feet (**Ft**) or meters (**m**)»

➔ *Check the measurement value (**Ft** or **m**) of the altitude correction carefully.*

### 3.4.8 Shut down

The shut down procedure is similar to the start up procedure. Four quick presses of the push button will shut down the Vigil.

On the first press the «**SysOFF**» message is displayed.

Press the button a second and third time; do this as soon as the red LED flashes.

Press the button a fourth and last time as soon as the red LED flashes. The display will show «**Goodbye**» followed by «**Vigil**» for a few seconds. Finally, the yellow LED lights up and the Vigil shuts down. The Vigil automatically shuts down after 14 hours of activity.

Shut down example:

Action	Result
1. Push	Short flash
2. Push	Short flash
3. Push	Short flash
4. Push	« <b>Goodbye</b> » followed by « <b>Vigil</b> » are displayed and the AAD shuts down.

## 4 Components

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The Vigil is delivered in a custom designed aluminum case. Once your Vigil is installed in its new home (your rig), the case will allow you to safely transport jump accessories like goggles, audible altimeter, altimeters, camera, etc.

The Vigil's the power pack (§ 4.2) and electronic unit are encased (§ 4.3) in an unbreakable, aluminum alloy box (§ 4.1). The Vigil logo makes it easily identifiable.

Two Kevlar reinforced cables ensure the junction between the cutter (§4.4) and the control unit (§4.5).



### 4.1 Box

The Vigil's electromagnetic shield was thoroughly tested to guarantee that it would function as intended when exposed to electromagnetic interference. Such interference can be found in airports and airplanes.

The shield protects against electromagnetic waves produced by:

- Radio communications
- Transponders
- Portable phones
- Radar

The box is equipped with two positive locking connectors, two integrated bronze filters, and a stainless steel closing screw.

The bronze filters ensure protection against the intrusion of pollution, such as dust, and provides a certain amount of resistance to water.

The closing screws allow you to open the box very easily if it is necessary to replace the power pack or the cutter. These operations are described in detail in chapters 6 and 7.

## 4.2 Power Pack

The power pack is composed of one lithium battery, a “Pulses Plus” element and the lower half of the box. The battery was developed especially for Vigil by Sonnenschein-Tadiran. It is submerged in epoxy to ensure total water resistance. It does not suffer from memory effect and is extremely long lasting. The “Pulses Plus” technology supplies the high peak current necessary for the cutter to function.

The power pack works at a temperature range between  $-25^{\circ}\text{C}$  and  $+70^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$  and  $+158^{\circ}\text{F}$ ). Additionally, the Vigil's low consumption components in conjunction with a sophisticated power-supply management program significantly improves the battery's life span. The battery's life span is four years or when the **«Bat Low»** message appears, whichever comes first.

### 4.3 Electronic unit

The entirely automated assembly of surface-mounted components (SMD, Surface Mounted Devices) answers to the strictest standards. The SMD components are associated with electronic and optical production controls in order to provide a high level of quality and reliability; such quality approaches military specifications.

The unit also works as a data recorder. It memorizes parameters described in § 3.4.5 and, notably, the duration of the last freefall jump, the total freefall time, and the total number of jumps. All these results can be viewed directly from the control unit's LCD display or it can be downloaded to a PC using the infrared communications port.

Detailed information is contained in § 3.4.5; information on the communications port is described in chapter 5.

### 4.4 Cutter

Designed especially for the Vigil, the cutter severs the reserve loop by mechanically cutting it with a blade while at the same time melting the loop to ensure its separation. The cutter is completely confined to avoid any possible damage to the parachute.

If the Vigil is activated, a new cutter is supplied free of charge upon presentation of a completed life saving report. This report can also be downloaded from the web site <http://www.vigil.aero/savings>

The user can easily replace the cutter. The different operations are described in chapter 7.

➔ *The user may or may not have authorization to replace the cutter. Some country's regulations require a certified rigger to do such replacements. You must adhere to your country's rules in this situation.*

## **4.5 Control unit**

The control unit is comprised of a reversible display, a red LED that sets the rhythm of the start up procedure, a yellow LED that confirms the end of the start up procedure and an orange push button situated, in the standard configuration, on the right of the display. The red LED also plays the role of infrared transmitter for the communications port (see chapter 5).

The display on the control unit allows for an alphanumerical dialog with the parachutist. (See chapter 3).

## **5 Communications Port**

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The Vigil is equipped with an infrared communications port that allows the user to download the data recorded during the previous jumps. A reader and the associated management software are available as an option. (See your dealer for price information.)

The parameters of the last 16 minutes of freefall are recorded, as well as the total number of jumps and other information described in § 3.4.5.

With the help of this communications port and of the associated software, a rigger can also download a report about tests that were carried out in a decompression chamber.

## 6 Replacing the Power Pack

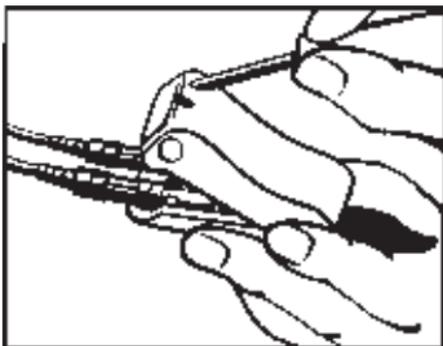
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The replacement of the power pack is an easy and fast operation that can easily be performed by the user. The power pack should be replaced when the following events happens:

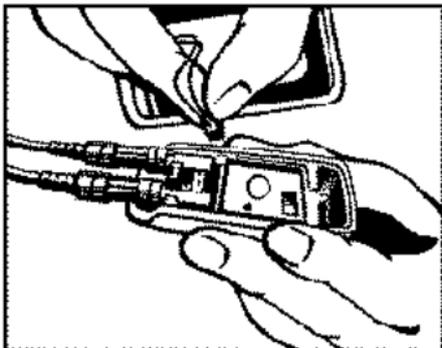
- After 4 years of use
- The «**Bat Low**» or «**Bat Rpl**» warning messages are displayed by the Vigil during the start up control tests.

Replacing the power pack does not require tools.

➔ *The user may or may not have authorization to replace the power pack. Some country's regulations require a certified rigger to do such replacements. You must adhere to your country's rules in this situation.*



Open the box using the supplied Hex key.  
(hexagonal key # 5).



Disconnect the power pack by holding the connector by its small edges. Be careful not to pull on the wires.

Reconnect the new power pack's connector and position the power pack to allow the box to close.

Ensure that the connecting wires of the power pack are correctly positioned and that they will not hinder the box from closing.

Close the box and tighten the screw with the Hex key # 5.

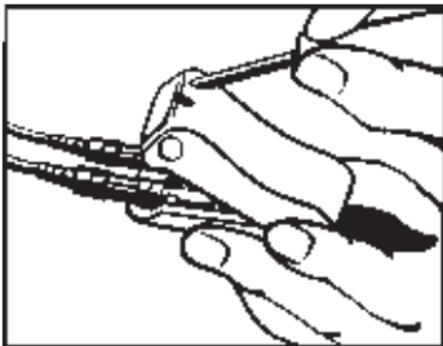
Switch on the **Vigil** to ensure that it is functioning correctly (see § 3.4).

## 7 Replacing the Cutter

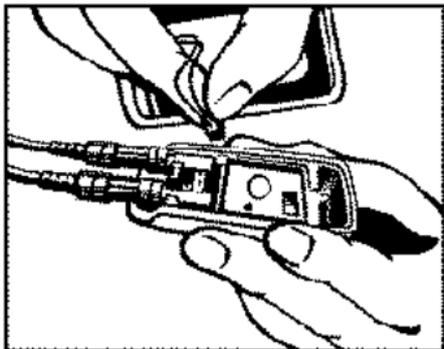
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Replacing the cutter after activation is a simple and fast process that can be performed by the user quite easily.

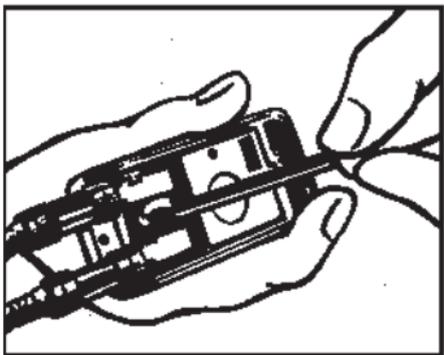
A new cutter will be supplied free of charge upon presentation of a life saving report. This report can also be downloaded from the web site <http://www.vigil.aero/savings>.



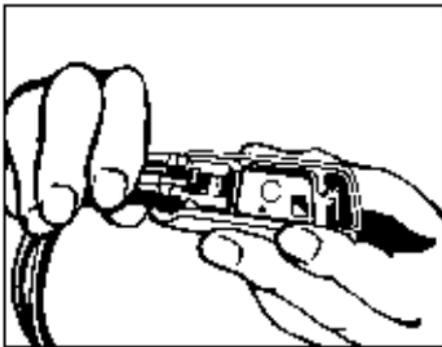
Open the box using the supplied Hex key.  
(hexagonal key # 5).



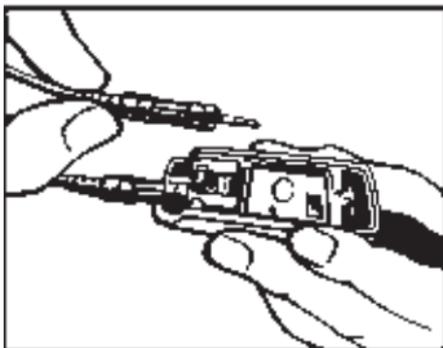
Disconnect the power pack by holding the connector by its small edges. Be careful not to pull on the wires.



Partially unscrew the printed circuit fixing screw with three complete turns only. Do not remove the screw from the printed circuit board. Do not remove the printed circuit board. (\*)



By pushing the two connectors upwards it is possible to lift the printed circuit slightly.



Free the cutter connector and insert the new cutter.  
Check that the connector is correctly positioned and tighten the printed circuit fixing screw.

Reconnect the power pack.

Make sure that the battery's connecting wires are correctly positioned and they do not hinder the box from closing.

Close the box and tighten screw with Hex key # 5.

(\*) Do not remove the printed circuit from its housing; doing so will void the warranty.

## 8 Glossary

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Hex (Key)	Male key for screws with six hollow faces. It is used to open and to close the box when replacing the cutter or power pack.
Electromagnetic shielding	A shield that protects the electronic circuits from electromagnetic waves that may cause the device to malfunction.
Cutter	A cutting system that simultaneously acts by mechanically cutting and melting the loop inside the reserve container.
Infrared (Port)	Transmitter/receiver of infrared signals that allows an exchange of data between the Vigil and a PC.
Kevlar	Carbon fiber used to reinforce the cables. It prevents direct traction on the electrical connections, as well as protects the junction cables of the control unit and the cutter.
LCD	Liquid Crystal Display. The LCD used to visually convey

LED	information from the control unit to the user. This is the same type of display as found on today's mobile phones. Light Emitting Diode. An LED is used during the start up and shut down procedures of the device. An LED can also be found, for example, on a computer keyboard.
SMD	Surface Mount Device. It is an electronic component manufactured to be of reduced size and consumption. Such technology allows the electronic circuit to be very reliable and compact.
Positive locking	A mechanical apparatus that locks the connectors in place to protect them from being accidentally detached.

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## 9 Road Map

