

Vigil®

Rigger's Manual

EN Version 2.01



The Vigil is endorsed by:

BUNITED PARACHUTE





























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1) INTRODUCTION

Dear Rigger,

This manual is aimed specially at you, the rigger and is an intended addition to the **Vigil**[®] **I**, **Vigil**[®] **II and VIGIL**[®] 2^+ **User's Manuals** included with our products. Please read all the manuals carefully and make sure to have them available each time you work on a Vigil[®] equipped rig, particularly when the task involves the installation, removal or any handling of the device.

Ensure that you have the latest version of the relevant Vigil[®] User's Manuals.

The latest versions can be downloaded from our website: <u>http://www.vigil.aero</u> as well as additional information such as:

- Vigil[®] Information bulletins: <u>http://www.vigil.aero/information-bulletins</u>
- Vigil[®] Service bulletins: <u>http://www.vigil.aero/service-bulletins</u>
- IR Download Box User's Manual for the downloading of jump data from a Vigil[®] to a PC through the infrared port, using the Box and the appropriate software.
- Closing loop installation using the Vigil[®] washer (see § 3D)

Please visit our website on a regular basis to find the most recent documents and updates.

Let us know your comments and remarks, not only with reference to the manuals, but also share with us your field experience with regards to installation, servicing and use of the Vigil[®]. We also like to point out that we produce the only AAD today on the market of which the recorded jump data can be downloaded by the users without any outside intervention (last 16 minutes of freefall or the last 16 jumps). We value your co-operation and input in our quest for a maximum reliability.

Your Vigil Team



Warranty

A/ $\text{VIGIL}^{\texttt{®}}$ I and $\text{VIGIL}^{\texttt{®}}$ II

There is a <u>2 year warranty</u> for any manufacturing defects, during which we will replace any defective parts, free of charge.

The hologram sticker covering the screw closing the control box is used as a warranty seal. It must remain in place and unaltered (see picture below). The same applies for the silver sticker installed when replacing any part (see § 5C).







*** Keep this Test Certificate card together with the rig documents ***



Vigil[®]I Main Box



<u>Vigil[®] II Main Box</u>





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B/ VIGIL<sup>®</sup> 2^+
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 $\text{VIGIL}^{\texttt{B}}\ \textbf{2}^{\scriptscriptstyle +}$ may not be open by users or riggers.

Battery not to be changed after ten years of use in the factory (see manual).



2) DIFFERENCES BETWEEN VIGIL[®] I, VIGIL[®] II and VIGIL[®] 2⁺

How to recognize a Vigil[®] I from a Vigil[®] II and a Vigil[®] 2^+ :

The primary external differences between the Vigil[®] I, the Vigil[®] II and the Vigil[®] 2^+ are:



and the shape of the display unit; the **oval** one is a feature of Vigil[®] I and the **flat** one - of Vigil[®] II as a shorter LCD for Vigil[®] 2^+ .



However, some Vigil[®] I's have been fitted with a flat display unit with the sapphire window. Therefore, if you want to determine what type of Vigil[®] is installed when the reserve container is closed, you have to proceed with the starting sequence and enter the **"Info"** section.

This section will display the software version of the controller: **"LCD 1.XX"** will appear on a Vigil[®] I and version **"LCD 2.XX"** will be displayed for a flat controller installed on a Vigil[®] II.





In addition, during the start-up sequence, after the welcoming "Hello", the logo Vigil[®] or Vigil[®] II will be briefly displayed, indicating the type of Vigil[®] installed in the system.

A basic, but important difference between Vigil[®] I and Vigil[®] II is that the Vigil II is waterproof according to the IP67 norm (resists a 30 min immersion at a maximum depth of 0.5 m). The Vigil[®] 2^+ is to IP68 or 2 hours at 2 meters depth. It is important to know what type of Vigil[®] you have in the system before making an intentional water jump.

Additional information - The serial number as well as the original gold hologram which is composed of 4 digits also indicate the type of device: 1 letter + 3 numbers (Vigil I & II) or 4 letters (Vigil II as Vigil[®] 2^+)

SN < #8000 = Vigil[®] I (Holograms A to J + 3 numbers) SN > #8000 = Vigil[®] II (Holograms K to Z + 3 numbers) SN > #25.667 = Vigil[®] II (Holograms with 4 letters) SN > #40.000 = Vigil[®] 2⁺ (Holograms with 4 letters)

Vigils[®] I, II and 2^+ are identical in their use and functionality (start-up, modes, etc.).





Grafcet/Road Map (Parameter sequence flow chart)









3) SYSTEM CHECKS ON THE VIGIL[®] BEFORE INSTALLATION

A. <u>New device</u>

Before being packed and shipped, the Vigil[®] has been carefully inspected and tested throughout the entire production process. However, for safety reasons, even if the Vigil[®] is new we advise you to proceed with the following checks before installing the unit:

First of all, start with a visual inspection of the different components - main control box, cutter, controller as well as the cables and connections.

Inspect the cutter(s), starting with connection and the cable, by applying some tension, then verifying the surface of the holes where the closing loop runs through.

This inspection is made by running a piece of loop material through the cutter holes several times back and forth, making sure the loop material comes in contact with all sides of the hole. A smooth loop material, without broken fibers is indicative that the channel is free of burrs that could damage the loop when installed.

Finally, before installing the Vigil[®] into the rig, proceed with a complete start-up sequence checking the "**Setup**", "Info" and "Configuration" sections in order to detect any failure (See § 5). Then shut down the Vigil[®] to proceed with the installation in the reserve container. When the installation is completed, proceed with a new start-up and shutdown sequence.

B. Used device

If the device has already been used, it is obvious that even more care should be taken when proceeding with the above-mentioned inspection.

Important: For a complete inspection, please refer to § 5 below.

It is also necessary to inspect the system in which the Vigil[®] will be installed.

Check the compatibility (type and location) of the installation parts (pocket for the main control unit, cable channels, cutter holder and pocket for the LCD unit) with the Instructions and Service Bulletins issued by the system manufacturer, especially if the installation kit in the rig is a retrofit. Finally, check the condition of the different installation parts.



C. Closing loop

All types of polyamide braid on the market having equivalent characteristics to Spectra CSR style #9512-300 (Dyneema Vigil[®] or Cypres[™] loop material) are compatible for use with the Vigil[®]. One exception: for Parachutes de France containers with double RSL, you must use the double loops supplied by Parachutes de France.

The surface area of the loop that gets in contact with the grommets of the closing flaps should be impregnated with non-acidic silicone.

Setting the length of the loop and use of the washer (oval Vigil[®] washer with single hole)

Before attaching the loop to the washer it is necessary to pre- stretch it. To do this, hold both ends of the loop using a "T" bar or similar and apply a few sharp pulls.

Mark the loop at the desired length referring to the manufacturer's manual (if it has not been done yet, take note of the loop length on the packing card for future reference) and then attach the loop to the washer as per "Vigil[®] Reserve closing loop, washer and silicon instructions" (see below).

Then repeat the stretching operation to tighten the knot.

Install the loop into the container as per the manufacturer's instructions.

If a different type of washer is used, please follow the instructions of the relevant manufacturer.

NOTE: Silicon should be applied to the Vigil[®] reserve closing loop according to the harness and container manufacturer's instructions. If no instructions are available, then a light coating should be applied to the top half of the loop and some to the pull-up cord where it comes in contact with the loop.

D. Use of the washer

Please follow these steps:



Step 1

Inspect the Vigil[®] washer for any sharp spots that could damage the loop. The Vigil[®] washer is made of stainless steel and any questionable areas can easily be smoothened with emery cloth or in nickel coated metal composite.

Step 2

Mark loop to the desired length.

Step 3

Thread loop through washer. Note location of the mark, adjust this location as needed.

Step 4

Thread excess loop around washer and tighten thread as shown.

Step 5

Form a loose double overhand knot.

Step 6

Tightly cinch the first half of the double overhand knot.

Step 7

Tightly cinch the last half.

















Step 8

Form a single overhand knot.



Cinch the single overhand knot tightly against the double overhand knot.





Thread a smooth leverage tool through the end of the loop.



Give the loop about 3 good firm pulls to stretch and set the knots. Note how the mark has

now rotated to correct location.



Adjust this location as needed.





The majority of parachute containers on the market are "AAD -ready" and will have the following components installed:

- A pocket to accept the main unit. Placed in the reserve container, in most cases on the partition wall between the main and reserve sections of the container. Vigil[®] can be installed in any type of pocket as long as the said pocket is accepted by the rig manufacturer.
- Channels to route the cables from the cutter and control units to the main unit.
- An elastic cutter sleeve (two in the case of double cutters) to hold the cutter in the correct position for the reserve closing loop to pass through.
- A windowed pocket to accept the control unit. The window allows viewing of the display and is supple enough to allow operation of the control button for switching on, changing settings or turning the Vigil[®] off.
- A closing loop compatible with the AAD.

The container manufacturers have given careful consideration to the positioning of the AAD components to obtain the best operation of the AAD without compromising the operation of the reserve deployment system and all other functions of the container system.

This is why the Vigil[®] must **always** be installed in accordance with the rig manufacturer's instructions.

The harness and container manufacturer's instructions will provide the necessary information for installing the Vigil[®] into their equipment. However, if you have any questions, do not hesitate to contact us at info@vigil.aero where we will be pleased to assist you.

If the Vigil[®] is to be installed in equipment which is not "*AAD-ready*", we can (upon request) supply a Vigil[®] Installation Kit.

The fitting of the Installation Kit must be carried out by an Advanced/Master Rigger and in accordance with the written instructions provided by the rig manufacturer.



A. The Vigil[®] Installation Kit contents

A. Pocket (16cm x 8 cm; 6.3in x 3.1in)



B. Cutter sleeve (1 or 2)



C. Windowed LCD pocket



B. The Vigil[®] Repack Kit contents

A. 2 closing loops





Do not hesitate to ask for any additional information you would consider necessary.

Once the Vigil[®] is installed in the rig, repeat the start-up and the shut-off sequences before packing the reserve.

All above mentioned Installation Kit components are compatible with any modern container that allows for AAD use. All component sizes are standard.



C. Using the installation kit

In order to proceed with the installation of the different components, it is essential to ensure that you adhere to these conditions:

- The installation is carried out in accordance with the instructions issued by the harness/container manufacturer.
- The positioning of the components of the Vigil® installation kit must not affect, in any way, the operation and function of the reserve deployment system.
- The positioning of the components of the Vigil® installation kit must not affect in any way the structural integrity of the reserve container and/ or of the harness.

In the unlikely event that the manufacturer's instructions, or the instructions in this manual, are not sufficient to install your Vigil[®], <u>DO NOT IMPROVISE</u>! Please feel free to contact us and we will, together with the container manufacturer's advice, look at the possible compatibility and at the best options for the installation of your Vigil[®].

Once the Vigil[®] is installed you can proceed with the packing of the reserve canopy and the closing of the container in accordance with the instructions of the manufacturers.

D. <u>Fitting the Vigil[®]</u>

Follow these steps in order to fit the unit into the container. These instructions apply to both - Vigil[®] I and Vigil[®] II.

1. Pass the control unit cables and cutter cables respectively through the hole in the pocket flap.

2. Feed the cables through the channels; install the control unit in the windowed pocket and the cutter in to the elastic cutter retainer. Position the cutter so the hole for the loop to pass through is perpendicular to the grommet.

3. Position the main unit in the elastic pocket with the cables against the base of the pocket/container. Additional indicator of correct position when fitting Vigil[®] II is the shape of the main unit - the outside of the curve should be situated towards the bottom of the container.





Vigil I

Vigil II

Incorrect

4. Thanks to the flexibility of Vigil[®] cables, the excess cable may be coiled up and stowed under the flap or may be stowed alongside the main unit in the elastic pocket.

Correct



E. Inspection after packing and closing the reserve

When the reserve is closed, proceed with the start-up sequence, in order to make sure that the packing and closing operations have not affected the function of the Vigil[®] (see § 5A).

During the last inspection at the factory and prior to shipping, the Vigil[®] is generally set in "**Pro, meters**" modes ("**Pro, feet**" for North and South America). If you have installed the Vigil[®] in a Tandem or Student system, we advise, if it has not already been done during the initial inspection, to enter into the "Setup" sequence, and configure the parameters to match those locally in use and for the intended use.



5) VIGIL[®]CONTROLS

A. <u>Self tests</u>

The Vigil[®] automatically goes through a complete control sequence each time it is switched on. It verifies that the battery pack, the cutter and the electronic circuits (main functions) are in proper working order.

If no anomaly is detected, the following messages: "Bat OK", "Cut OK" and "Ctrl OK" will be displayed and the start-up procedure will be completed.

If an error is detected, one of the following messages will be displayed:

- **"Bat Low"** : Low batteries, the Vigil[®] is still operational but it is required to replace the battery pack as soon as possible on Vigil I and II.
 - The Vigil[®] 2^+ needs to be sent to the factory to do the battery change.
- **"Bat Rpl"** : The battery pack must be replaced; the Vigil[®] will not switch on.
- "Cut Err" : The cutter resistance is out of tolerance; the Vigil[®] will not switch on.
- "Cut Rpl" : This message will be shown only when an activation has occurred; the Vigil[®] will not switch on.
- **"Ctrl Err"** : A discrepancy in one of the electronic circuits is observed; the Vigil[®] will not switch on.

If one of those messages is displayed (except for "**Bat Low**") it puts an end to the start-up procedure and the Vigil[®] will switch off.

Normally, the replacement of the battery pack or the cutter will cancel this error message and it will then be possible to go through the complete start-up sequence.

In case the "**Ctrl Err**" followed by a figure from 1 to 6 appears, it will be the confirmation of a failure in the electronic circuits. In this case, you need to send the Vigil[®] back to your dealer or to the factory for a complete check-up. Sometimes the Vigil could be started up after a second attempt.

NB: Even if the unit starts up after a second try, never use the Vigil[®] after a **Ctrl Err!**

<u>Remark</u>: When returning a Vigil, a form « Repair & Return Sheet » (see appendices) must be filled out and returned to AAD SA or Vigil America. It will ensure efficient follow up and service.

ADDITIONAL inspections ON AN INSTALLED VIGIL®:

1) Check the compatibility of all parts of the Vigil[®] with the Service Bulletins issued by AAD SA (regarding type and manufacturing date of the cutters) (see our website and also § 5B Cutters).

Then, a closer inspection of the cutter(s), starting with the connections to the cable, by applying some traction, and verifying the surface of the channel where the loop runs through.



- 2) We advise replacing the closing loop at each repack take the opportunity to inspect the old loop for any signs of excessive wear or damage. If in doubt, run a piece of loop material through the hole of the cutter several times, making sure the loop material gets in contact with all sides of the channel. A smooth loop, without broken fibers is the sign that the channel is free of burrs that could damage the loop when installed.
- 3) The condition of the connection points of the cables, mostly at the cable entry point of the control unit (Vigil[®] I) must be carefully checked, as well as the LCD display (see pictures below). In both cases replacement of the control unit is needed. These problems are very rare with the Vigil[®] II control units as the cable connection is a lot stronger and the LCD display is protected with a sapphire, Gorila glass window. For Vigil[®] 2⁺we have an anti-crass finishing on the LCD window.

If you have a start-up problem with a permanent display of the ''HELLO'' message, replacing the control unit will most of the time solve the problem.



In the eventuality of a water landing, we remind you that Vigil[®] I is not waterproof and must be sent back to AAD SA for an inspection and possible reconditioning. On the other hand, Vigil[®] II is waterproof according to IP67 (water immersion at max. 0.5 m depth up to 30 minutes) and Vigil[®] 2⁺is water resistant up to IP68 or 2 m during maximum 2 hours. For complete information regarding this feature, please refer to **Vigil[®] II** or **Vigil[®] 2⁺ User's Manual §** 6.

ACTION REQUIRED IN CASE OF A PROBLEM:

If you are able to repair the Vigil[®] yourself, please follow the procedures carefully described in § 5B, if you can not please contact our After Sales Service (<u>service@vigil.aero</u> or <u>candace@vigil.aero</u> for the US) and complete the "**Repair & Return Sheet**" and send it with the device, to AAD SA or to Vigil America.



B. <u>Replacement of Vigil[®] components</u>

Detailed procedures for the replacement of Vigil[®] I, II and 2^+ components can be found in the corresponding **User's Manuals**. Those procedures must be followed carefully for any part replacement.

(See also the repair and maintenance procedures enclosed)

Hereunder are some additional details with reference to those parts:

Batteries: 1/ The Power pack for Vigil[®] I is made of a Lithium AA cell and one Pulses Plus AA molded together in epoxy. The User's Manual (pp. 25 & 26) indicates a lifespan of minimum 4 years and 700 jumps but, after 8 years of experience, we can estimate the life span at a minimum of **2000 jumps**. Battery packs must be replaced after **10 years** from DOM.



Battery pack for Vigil[®] II contains:

2/ 2 Lithium AA cells to assure the long lasting power supply to drive the electronic system. They have a lifespan of minimum **2.000 jumps** but must be replaced after **10 years** from DOM (See **Vigil**[®] **II User's Manual** pp. 27 to 29).

3/ The battery pack of Vigil[®] 2^+ cannot be replaced by users or by riggers. It must be changed in our factory when battery low or replaced after ten years of use.

- 1 Pulses Plus AA cell to assure the instantaneous power to activate the cutter in less than 2 milliseconds. It has a lifespan of **20 years**.



<u>Cutters</u>: Three different types of cutters have been produced: (Please refer to the Info Bulletin dated 06/05/08) with a jack connector.



Type 1 cutters (with plastic inserts) were installed on the first **Vigil**[®] I (2003 to February 2006) and can be replaced by type 3 at a 40% discount.

Type 2 cutters - first full inox version - were produced from August 2006 (08/06) until March 2007 (03/07). These cutters can all be replaced by type 3 cutters free of charge.

Type 3 cutters - full inox version with stainless steel sleeve (produced since February 2007) are in use today. All **Vigil**[®] **II's** are equipped with type 3 cutters. We remind you that cutters produced in **December 2007** (12/07) must be replaced by cutters with a more recent manufacturing date (see Service Bulletin N°5 dated 10/10/2009, which you can find on our website). Same applies for cutters produced in **October 2007** (10/07; see Service Bulletin PSB-8 dated 20/10/2011, which you can find on our website). Replacement is free of charge.



The cutters for Vigil[®] 2^+ are equipped with a screw connector and can be replaced by users or riggers.



For replacement procedure see Vigil[®] I User's Manual pp. 27 & 28 and Vigil[®] II User's Manual pp. 30 & 31. Refer also to the enclosed Repair and Maintenance Procedures.

Control Unit:



The Vigil[®] I control units were made from a stainless steel oval tube. Those for Vigil[®] II's are made from a flat housing, the upper half made from stainless steel with a scratchproof sapphire or Gorila glass window and the lower half made from blue polycarbonate.

The oval Vigil[®] I control unit can be replaced with another oval Vigil[®] I control unit with software version **1.11** or with a flat unit similar to the Vigil[®] II control unit but with software version **1.13** or **1.20**.



The Vigil[®] II control unit may be replaced only with another Vigil[®] II unit with software **2.06** or above.

We remind you that control units with software version **2.20**, mounted on Vigil[®] II's with serial numbers **23.350 to 24.970**, should be replaced during the next repack cycle (see Information Bulletin dated 07/04/2012, which you can find on our website). Replacement is free of charge.

For replacement procedures see the respective **Vigil**[®] **I User's Manual** pp. 27 & 28 and **Vigil**[®] **II User's Manual** pp. 30 & 31. Also refer to the enclosed Repair and Maintenance Procedures.

For Vigil[®] 2^+ you need to unscrew the plug and then unscrew the connector of the cutter from the main box to be replaced by a new cutter with a screw fixing nut before refitting the clip.



C. Quality control cards (after sales service)

Every replacement part comes with a Quality Control Card (**Vigil**[®] **AAD Service Card**) with a hologram number and a date of manufacture (DOM) for the cutters and the battery packs) or a software reference (for the control units). The card also includes 2 stickers with control holograms (one can be peeled off and applied on the main box as a warranty seal).

When replacing a part, it is mandatory to proceed as follows:

- 1. Fill out the QC Card and hand it to the owner of the Vigil[®] so he/she can keep it with the Test Certificate of the device.
- 2. Place the new sticker on the Vigil[®] I and II main box in the correct place (covering the closing screw of the main box see picture on page 8).
- 3. Forward a copy of the QC Card to AAD SA. It will soon be possible to forward the information online through our website.
- 4. Make sure that the owner keeps the Service Card with the Test Certificate card and the documents of the rig.

This procedure is important for our After Sales Service as it allows us to update our files and to guarantee the replacement part with a 2 year warranty.

For Vigil[®] 2^+ a rigger can only change the cutter or the controller equipped with a screw connector.

The Vigil[®] 2^+ can only be open in the factory or by a Vigil office.



D. Inspecting the Vigil[®] when repacking the reserve

A periodic inspection of the Vigil[®] by the factory is not required. However we do advise you to perform a routine inspection when repacking the reserve.

This will be a visual inspection of the different components of the Vigil[®]. The enclosed Check List will help you with this inspection.

When repack is completed, we recommend running a complete start-up sequence to make sure that no error messages are displayed (See § 5A).

In addition, we recommend that each two year the pressure sensor is checked and compared with a calibrated barometer or calculated by determining the QNH of the location (barometric altitude of a given place at a given time).

Should the reading show a difference of more than +/- 10 hPa from the QNH, please get in touch with AAD SA or with the closest Vigil[®] Service Center.

Control of the pressure gauge reading

The reading of the pressure gauge is displayed in the "Info" section of the start-up process. That reading is given either in hPa (hecto Pascal also called millibar - mb) or in inHg (inch of mercury) depending on the unit system selected during the "Configuration" section (respectively "Metric" or "US") in the start-up process.

Ideally, that reading should be compared with the one measured with a calibrated barometer but such a device is not always available. That is the reason why it will be a lot easier to make an easy calculation based on the QNH value (pressure reduced at sea level for a rather large geographic zone) and the topographic altitude of the place where the inspection is performed.

The instant QNH value can be obtained from the closest Airport tower and the topographic altitude can be found with enough accuracy on Google[®] Earth. To find the actual pressure, all you have to do is subtract 1 hPa for each 8.70 meters of altitude (28.7 feet) as the pressure decrease is almost linear as long as the altitude is below 1.200 meters (3.950 ft) ASL.

<u>Example:</u> Skydive Spa topographic altitude is 480 meters ASL (Above Sea Level). The correction to be applied to the QNH value is then: 480 divided by 8.70 = 55.17 hPa. If the QNH value of the day, obtained from the airfield tower is 1.017 hPa, the actual pressure at the place is: 1.017 hPa - 55.17 hPa = 961.83 hPa.



E. What should be done after an activation?

When an activation has occurred, it is important that we receive the downloaded graph files from the unit (***.vgl** file) for a preliminary analysis (please do not send us image files like *.JPEG, *.bmp or data files like *.xls). Those .vgl files can be sent by e-mail to <u>edwin@vigil.aero</u> or <u>candace@vigil.aero</u>.

All activations will be analyzed and a file containing all the information will be opened. If the activation can be explained from the information received, it will not be necessary to send the unit back to AAD SA. A final report, with the relevant graphs, will be sent to the customer, with the explanation of the reasons of the activation and the further actions involved.

If you do not have access to an IR reader, please contact AAD SA (Belgium) or Vigil America for nearest location. It may be necessary to send the unit back to AAD SA (Brussels, Belgium) or Vigil America (Deland, Florida) to have the data downloaded.

What are the possible reasons for an activation?

Life saving: Can only be approved by AAD Brussels based on the received data, info, graphs, and a completed life saving report. This report, can be filled out either by hand (see .Pdf file downloadable at: <u>http://www.vigil.aero/wp-content/uploads/Life Saving Report.pdf</u>) or on-line (see <u>http://www.vigil.aero/life-saving-report</u>)

If the activation is considered as a true life save by Vigil, the cutter replacement will be free of charge.

Others: Different situations can lead to an activation. Each case will be analyzed and further action will depend on the result of the analysis and reports.

Possible causes for an activation are:

- Low pull.
- Low cutaway.
- Airborne status (see Info bulletin dated May 2009).
- Hook turn (too much speed under canopy).
- Wrong use (wrong mode or altitude correction, unit not switched on at the ground at take-off zone).
- Plane descending too fast.
- Slow low opening of the main canopy.
- Depressurized cabin.
- During ground transport (car, closed bags, etc.) if not switched off.
- Technical problem (failure of an electronic sub-part).
- Possible misfire.





This rigger manual has been produced to answer your questions. If you have any other problems and concerns, please contact us.

AAD nv/sa. Advanced Aerospace Designs

Bld. A. Reyers, 193

B-1030 Brussels - BELGIUM

T: +32 (0)2 732 65 52 - F: +32 (0)2 736 06 27

info@vigil.aero - www.vigil.aero

Vigil America Inc.

1400 Flightline Blvd. Suite C

32724 Deland, FL

UNITED STATES of AMERICA

T: 001 386 736 84 64 - F: 001 386 736 84 68

<u>candace@vigil.aero</u> - <u>www.vigilamerica.com</u>



Appendix A



Vigil