VueStar™ Manual

find
your
way

VueStar™
The Aerial Survey Navigation Solution

NavCom Technology, Inc.
20780 Madrona Avenue
Torrance, CA 90503
USA
Tel: +1 310.381.2000
Fax: +1 310.381.2001
sales@navcomtech.com
www.navcomtech.com

NAVCOM
A John Deere Company

Table of Contents

Tables & Figures

Notices

VueStar**™** Manual

P/N 96-310017-3001

Revision B   July 2006

Copyright

© 2006 by NavCom Technology, Inc.

All rights reserved. No part of this work or the computer programs described herein may be reproduced or stored or transmitted by any means, without the written permission of the copyright holders. Translation in any language is prohibited without the permission of the copyright holders.

Trademarks

The 'find your way', 'NavCom Globe' and NAVCOM TECHNOLOGY logos are trademarks of NavCom Technology, Inc. *StarFire*™ and VueStar™ are a registered trademark of Deere & Company. All other product and brand names are trademarks or registered trademarks of their respective holders.

FCC Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
> (1) this device may not cause harmful interference, and
> (2) this device must accept any interference received, including interference that may cause undesired operation.

User Notice

Limited Warranty

NavCom Technology, Inc., warrants that its products will be free from defects in workmanship at the time of delivery. Under this limited warranty parts found to be defective or defects in workmanship will be repaired or replaced at the discretion of NavCom Technology, Inc., at no cost to the Buyer, provided that the Buyer returns the defective product to NavCom Technology, Inc. in the original supplied packaging and pays all transportation charges, duties, and taxes associated with the return of the product. Parts replaced during the warranty period do not extend the period of the basic limited warranty.

This provision does not extend to any NavCom Technology, Inc. products, which have been subjected to misuse, accident or improper installation, maintenance or application, nor does it extend to products repaired or altered outside the NavCom Technology, Inc. production facility unless authorized in writing by NavCom Technology, Inc.

THIS PROVISION IS EXPRESSLY ACCEPTED BY THE BUYER IN LIEU OF ANY OR ALL OTHER AGREEMENTS, STATEMENTS OR REPRESENTATIONS, EXPRESSED OR IMPLIED, IN FACT OR IN LAW, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND OF ALL DUTIES OR LIABILITIES OF NAVCOM TECHNOLOGY, INC. TO THE BUYER ARISING OUT OF THE USE OF THE GOODS, AND NO AGREEMENT OR UNDERSTANDING VARYING OR EXTENDING THE SAME WILL BE BINDING UPON NAVCOM TECHNOLOGY, INC. UNLESS IN WRITING, SIGNED BY A DULY-AUTHORIZED OFFICER OF NAVCOM TECHNOLOGY, INC.

This limited warranty period is one (1) year from date of purchase.
Technical Data Declaration (Jan 1997)

USG FAR

The Contractor, NavCom Technology, Inc., hereby declares that, to the best of its knowledge and belief, the technical data delivered herewith under Government contract (and subcontracts, if appropriate) are complete, accurate, and comply with the requirements of the contract concerning such technical data.

Global Positioning System

Selective availability (*S/A* code) was disabled on 2nd May 2000 at 04:05 *UTC*. The United States government has stated that present *GPS* users do so at their own risk. The US Government may at any time end or change operation of these satellites without warning.

The U.S. Department of Commerce Limits
Requirements state that all exportable *GPS* products contain performance limitations so that they cannot be used to threaten the security of the United States. Access to satellite measurements and navigation results will be limited from display and recordable output when predetermined values of velocity and *altitude* are exceeded. These threshold values are far in excess of the normal and expected operational parameters of the NCT-2100 *GPS* Sensor.

Use of this Document

This Manual is intended for use by someone familiar with the concepts of *GPS* and satellite surveying equipment.

Note indicates additional information to make better use of the product.

Indicates a caution, care, and/or safety situation.

Overview

VueStar™ is the only complete global aerial survey navigation system. VueStar™ delivers precision navigation by combining NavCom's leading edge, dual frequency GPS receiver with NavCom's StarFire™ Network, a Global Satellite Based Augmentation System (GSBAS). The VueStar™ system, equipped with a single FAA certified tri-band antenna that receives both GPS and StarFire™ signals, provides decimeter navigation in real-time without the need for local base stations.

The VueStar™ aerial survey package is the only system of its kind providing a reliable, cost-effective solution for aerial surveyors. Maximizing the advantages of the global StarFire Network, the system eliminates the range limitations of terrestrial communication links as well as the dependency on postprocessing with ground based reference stations. Not only does VueStar™ provide surveyors with the ability to return customer surveys in days rather than weeks, but it also frees ground based survey crews to work on other projects.

The VueStar™ package comes complete with NavCom's SF-2050M dual frequency receiver, all necessary cabling, a combined GPS/StarFire™ FAA certified aircraft antenna, StarPac™ Utility Software, a one-year global StarFire™ license, as well as detailed installation manuals and user guides. An optional event latch interface can be purchased, which will allow greater connectivity between the VueStar™ receiver and Photogrammetry cameras.

Purpose of This Document

The setup and operation of the VueStar™ System is described in the SF-2050 User Guide and the StarPac™ User Guide. This VueStar™ Manual lists steps and information regarding the installation of the Airborne Antenna as well as connectivity and set-up of the optional Event Latch Interface along with all equipment described in this manual.

VueStar™ Case Contents

Item	NavCom Part Number	Description
	P/N Determined by options ordered.	**SF-2050M GPS Receiver** • 64 MB Internal Memory (1 Hz Data Rate) • 1-PPS Output • Event Input • 25 Hz Fast Position Update Rate • 25 Hz Raw Data Update Rate • WAAS/EGNOS Capability • 1yr Global StarFire™ License (P/N 90-310003-3010) • StarPac™ Utility Software (P/N 97-310061-3001) • SF-2050M Manual (P/N 96-310002-3001) **Software Options** • RTK
	94-310059-3006	• 2x 6 U.S. ft Serial Cables
	82-001002-3001	• AN2008T Aircraft Antenna
	94-310058-3012	• 12 U.S. ft. Antenna Cable
	82-020002.5001	• Universal AC/DC Power Adapter (12V, 2A)
	94-310060-3010	• 10 U. S. ft Unterminated Power Cable
	92-310062-3003	• Event Marker Cable
	94-310050-3003	• 3 U.S. ft. 1-PPS Cable
	96-310006-3001	• Software and Documentation CD
	96-310017-3001	• VueStar™ Manual
	92-310334-2001	• **OPTIONAL** Event Latch Box

Aircraft Antenna

This section of the VueStar™ Manual is dedicated to the specifications for mounting the Airborne Antenna to the fuselage of an airplane. Included within are measurements and spacing of hardware based off of production designs, it is recommended to verify these measurements against the shipped product before undertaking installation. All work should be performed by someone experienced with aviation mechanics.

Included Materials

The Airborne Antenna includes the following items:

- 1 FAA Certified Airborne Antenna
- 4 Phillips Flat Head Mounting Screws
- 1 FCC Airworthiness Approval Certificate

Since aircraft and applications differ, nuts and washers have not been included. In order to continue with installation, these items will need to be purchased/obtained independently and in accordance to your unique situation.

Antenna Specifications and Mounting Guidelines

Optimum performance of the receiver is with a front end gain of 32—36 dB at the engine connector, which the standard 12ft antenna cable shipped with the VueStar™ package delivers. However, other cables can be used, as long as all the cables and connectors between the antenna and the RF front end of the receiver experience no more than 3—7 dB of loss. Anything above or below 32—36 dB could result in degraded receiver performance. It should, however, be understood that the receiver has an overall operating dynamic gain range of 26—40dB, but operation on the extreme high and low ends of this dynamic range are not recommended.

Make sure the chosen location provides the antenna with a clear and unobstructed view of the entire sky. Any obstructions to this view will degrade position accuracy.

Mounting Requirements

Mounting the Airborne Antenna requires 5 holes; 4 for the mounting screws, and 1 for the TNC connector which protrudes from beneath the antenna body. Reference the antenna spec sheet in Figure 1 to determine the required size and relative spacing of the holes. Orientation of the antenna is not as important as making sure that the antenna is flush against the body of the vehicle and tightly held in place. (Figure 2)

When creating the hole for the TNC connector, be sure that it is smaller than the width of the o-ring that surrounds the connection. This will allow the o-ring to create an effective seal and establish a secure connection point, free of air flow around the TNC connection.

The measurements in Figure 1 are based off of production designs and may have a small degree of variance compared to shipped antennas. It is strongly recommended to use the antenna that will be mounted as a guide before creating any holes in the aircraft skin.
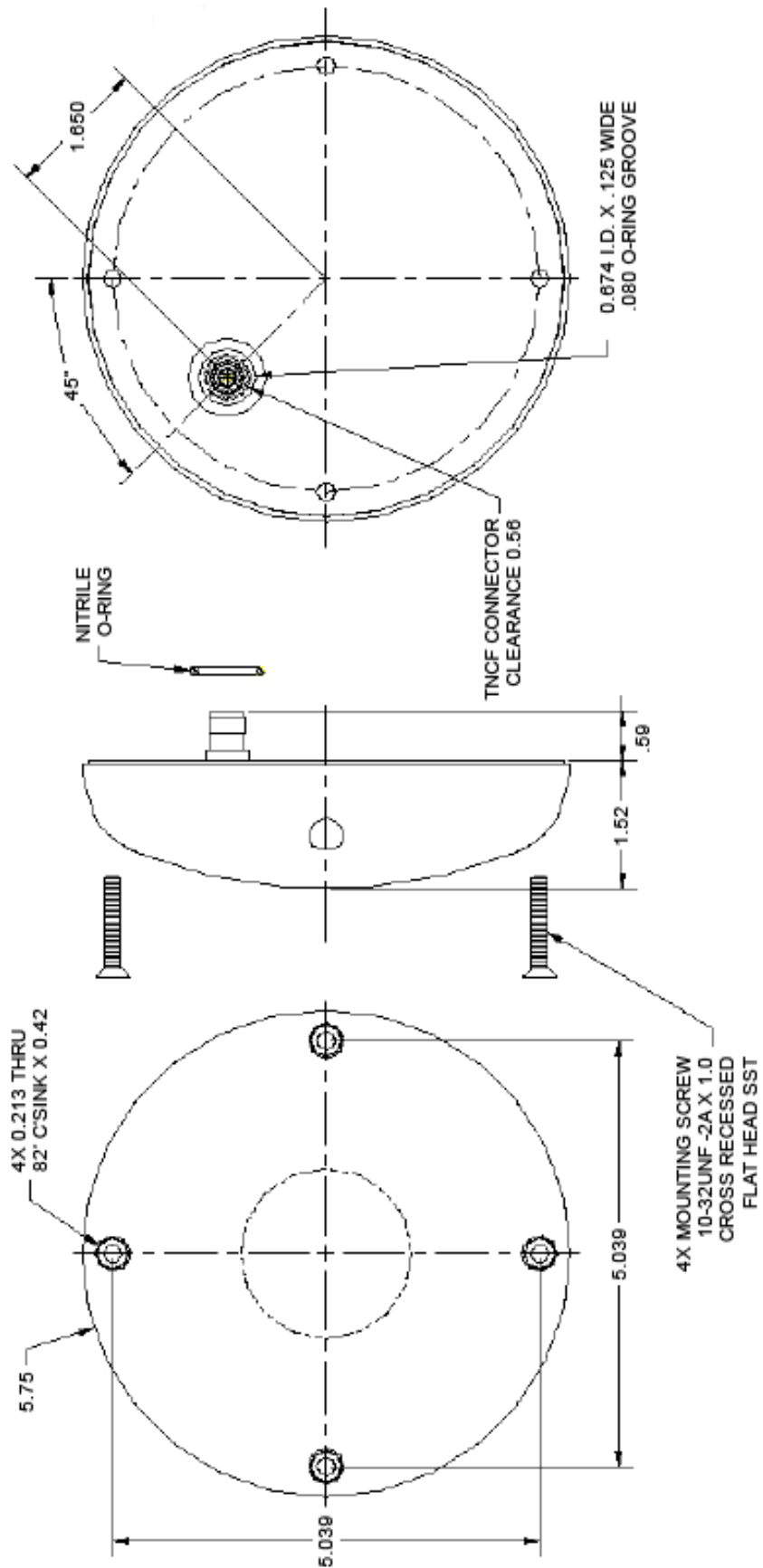
Figure 1: Antenna Measurement Specifications

The location of the antenna holes in the aircraft need to allow enough room on the inside of the skin for the nuts to be threaded onto the mounting screws, as well as have enough space for the antenna cable to connect to the TNC connector without putting pressure or tension on the TNC connector, antenna cable, or connection. (Figure 3)

Once the desired location on the plane body is chosen and the measurements are correctly made, consult the aircraft technical manual or a qualified aircraft technician about the proper tools and steps needed in order to create the needed mounting and connector holes. Make sure to choose a location that is not near crucial systems and that can withstand the strain of installation as well as the weight of the antenna.

Figure 2: Antenna Mounted to fuselage

Figure 3: Antenna Cable Entering Cabin

Event Latch Interface

This section is dedicated to installation and information about the optional Event Latch Interface. The Event Latch Interface is designed to allow VueStar™ to have greater compatibility with more aerial cameras and survey sensors. The Event Latch interface eliminates the requirement of 3-6V DC with 50 Ohm load input impedance, and since it is powered by the receiver, it only requires a simple setup.

✎   *This section covers the specifications and installation of the Event Latch Interface, and includes limited information about setting up a receiver to capture events. For further information on receiver setup please consult the SF2050 Manual.*

Event Latch Interface Specifications

The Event Latch Interface was designed to allow greater connectivity between the VueStar™ receiver and Photogrammetry cameras. The Event Latch Interface (ELI) conditions and amplifies event pulse output from cameras and other survey sensors so that the pulse can be successfully integrated with the GPS receiver.

The ELI will support triggered rates of up to one pulse per second, provided that the pulse width is 10 microseconds or longer. The trigger source can be a simple off push button switch, or an electronic switch such as an open/collect/ open drain device. Since the ELI is powered by the idle CAN bus on the receiver the leakage current of the switch should be less then 1uA. If the trigger source is a real electronic signal, then the pulse should have input voltage logic high 4—5.5V and logic low 0—0.4V with a minimum 4mA sink current. The ELI will add a 12 microsecond delay to the time of an event.

📝   *The event latch is configured to trigger on the falling edge of the pulse. However, use of the Event Latch Interface will condition the pulse appropriately, so the SF-2050M is able to accept either rising or falling edge configurations (active high or active low).*

Event Latch Interface Installation

Installation of the Event Latch Interface is very simple. Connect the LEMO connector to the EVT MKR/ CAN connector located at the back panel of the SF-2050M GPS Receiver. Input into the ELI is through a female BNC connector, where the center pin is the signal and the outer shell is the ground. (Figure 4)
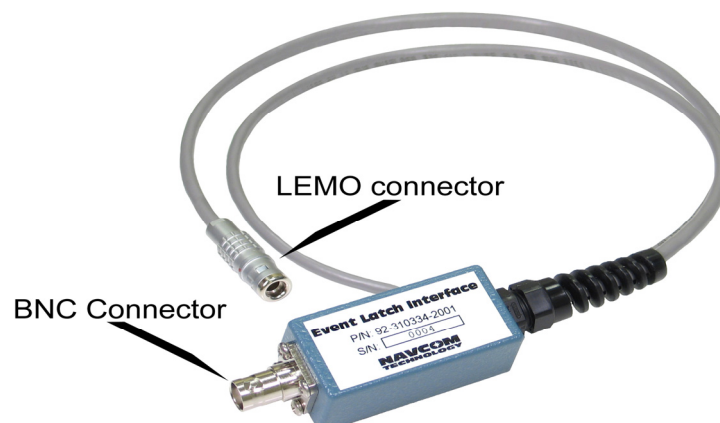

Figure 4: Event Latch Interface Connectors