



truFYX

User and Installation Guide



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1 Revision History

Revision	Date	Comments
A	2/13/2019	Initial release
B	10/26/2019	



2 Warnings / Disclaimers

All device operational procedures must be learned on the ground.

uAvionix is not liable for damages arising from the use or misuse of this product.

This equipment is classified by the United States Department of Commerce's Bureau of Industry and Security (BIS) as Export Control Classification Number (ECCN) 7A994.

These items are controlled by the U.S. Government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

3 Limited Warranty

uAvionix products are warranted to be free from defects in material and workmanship for one year from purchase. For the duration of the warranty period, uAvionix, at its sole option, will repair or replace any product which fails under normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost.

Restrictions: This warranty does not apply to cosmetic damage, consumable parts, damage caused by accident, abuse, misuse, fire or flood, theft, damage caused by unauthorized servicing, or product that has been modified or altered.

Disclaimer of Warranty: IN NO EVENT, SHALL UAVIONIX BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

Warranty Service: Warranty repair service shall be provided directly by uAvionix. Proof of purchase for the product from uAvionix or authorized reseller is required to obtain and better expedite warranty service.

Please email or call uAvionix support with a description of the problem you are experiencing. Also, please provide the model, serial number, shipping address and a daytime contact number.

You will be promptly contacted with further troubleshooting steps or return instructions. It is recommended to use a shipping method with tracking and insurance.

4 Contents

1	Revision History.....	3
2	Warnings / Disclaimers.....	4
3	Limited Warranty.....	5
5	TSO and System Information.....	8
5.1	Certification.....	8
5.2	TSO Authorization.....	8
5.3	Applicable P/Ns	8
5.4	System Functions	8
5.5	TSO Deviations and Incomplete.....	9
5.6	Environmental Qualification Form	10
5.7	Continued Airworthiness	11
5.8	System Limitations.....	11
6	System Specifications.....	11
6.1	truFYX Specifications.....	12
6.1.1	Physical Specifications	12
6.1.2	GPS/SBAS Specification	12
6.2	System Interfaces	13
6.2.1	Electrical.....	14
6.2.2	Serial Data Interfaces.....	14
7	Equipment Installation	14
7.1	Part Numbers.....	14
7.2	Unpacking and Inspecting.....	14
7.3	Mounting.....	15
7.4	Wiring Diagram	15
8	Post Installation Checks.....	16
8.1	Checklist	21
9	System Configuration	22

9.1	Navigation Output	22
9.1.1	NMEA.....	22
9.1.2	MAVLink.....	23
10	Maintenance	24
11	Support.....	24

5 TSO and System Information

5.1 Certification

This installation manual provides mechanical and electrical information necessary to install truFYX. It is not equivalent to an approved airframe-specific maintenance manual, installation design drawing, or installation data package. The content of this manual assumes use by competent and qualified personnel using standard maintenance procedures in accordance with Title 14 of the Code of Federal Regulation and other related accepted procedures. The conditions and tests required for approval of this article are minimum performance standards. Those installing this article either on or within a specific type or class of aircraft must determine that the aircraft installation conditions are within the standards which include any accepted integrated functions not specified by the standards. TSO articles, articles approved with 14 CFR Part 21.8(d), and any accepted integrated function(s) not specified in the standard must have separate approval for installation in an aircraft. The article may be installed only according to 14 CFR Part 43 or the applicable airworthiness requirements. This is an incomplete system intended to provide the functions identified in, and when installed according to this installation manual.

5.2 TSO Authorization

Function	TSO/RTCA	Class
Airborne Navigation Sensor Using the Global Position System (GPS) Augmented by the Satellite Based Augmentation System (SBAS)	TSO-C145e INCOMP RTCA/DO-229D	Beta 1

5.3 Applicable P/Ns

Description	P/Ns
skyBeacon GNSS Operating Program Firmware	UAV-1001760-001

5.4 System Functions

UAV-1002631-001 Rev B

ECCN 7A994



System Function	DO-178C DAL	DO-254 DAL
GPS/SBAS	C	C

5.5 TSO Deviations and Incomplete

TSO	Deviation
C145e	uAvionix was granted a deviation from TSO-C145e Paragraph 3.e.(1) and Paragraph 6.g to use DO-178C instead of DO-178B.
C145e	uAvionix was granted a deviation from TSO-C145e Paragraph 3.d to use RTCA/DO-160G in place of RTCA/DO-160E.
C145e	uAvionix was granted a deviation from RTCA/DO-229D section 2.1.1.10 to use a GPS antenna that meets uAvionix minimum performance specifications instead of DO-301 qualified antennas.

TSO-C145e Class Beta 1 functionality is incomplete. truFYX does not implement FD prediction.

5.6 Environmental Qualification Form

Conditions	DO-160G Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Category B2
Low temperature ground survival	4.5.1	-55°C
Low Temperature Short-Time Operating	4.5.1	-45°C
Low Temperature Operating	4.5.2	-45°C
High Temperature Operating	4.5.4	+70°C
High Temperature Short-Time Operating	4.5.3	+70°C
High Temperature Ground Survival	4.5.3	+85°C
Loss of Cooling	4.5.5	Cooling air not required (+55°C operating without cooling)
Altitude	4.6.1	60,000 feet
Decompression	4.6.2	Equipment identified as Category B2 – no test
Overpressure	4.6.3	Equipment identified as Category B2 – no test
Temperature Variation	5.0	Equipment tested to Category B
Humidity	6.0	Equipment tested to Category A
Operation Shock and Crash Safety	7.0	Equipment tested to Category X – no test
Vibration	8.0	Aircraft zone 2: type 5 Category S level M
Explosion	9.0	Equipment identified as Category X – no test
Waterproofness	10.0	Equipment identified as Category S
Fluids Susceptibility	11.0	Equipment identified as Category X – no test
Sand and Dust	12.0	Equipment identified as Category X – no test
Fungus	13.0	Equipment identified as Category X – no test
Salt Spray	14.0	Equipment identified as Category X – no test
Magnetic Field	15.0	Equipment identified as Category Z
Power Input	16.0	Equipment identified as Category BX
Voltage Spike	17.0	Equipment identified as Category B
AF Conducted Susceptibility	18.0	Equipment identified as Category B
Induced Signal Susceptibility	19.0	Equipment identified as Category AC
RF Susceptibility	20.0	Equipment identified as Category TT
RF Emissions	21.0	Equipment identified as Category H
Lightening Induced Transient Susceptibility	22.0	Equipment identified as Category A2G2L2 with no loss of function
Lightening Direct Effects	23.0	Equipment identified as Category X – no test
Icing	24.0	Equipment identified as Category X – no test
Electrostatic Discharge	25.0	Equipment identified as Category X – no test
Fire, Flammability	26.0	Equipment identified as Category X – no test

5.7 Continued Airworthiness

Maintenance of the truFYX is "on condition" only. For regulatory periodic functional checks, refer to the approved aircraft maintenance manuals or manual supplements. The aircraft must be returned to service in a means acceptable to the appropriate aviation authority.

5.8 System Limitations

This article meets the minimum performance and quality control standards required by a technical standard order (TSO). If you are installing this article on or in a specific type or class of aircraft, you must obtain separate approval for installation.

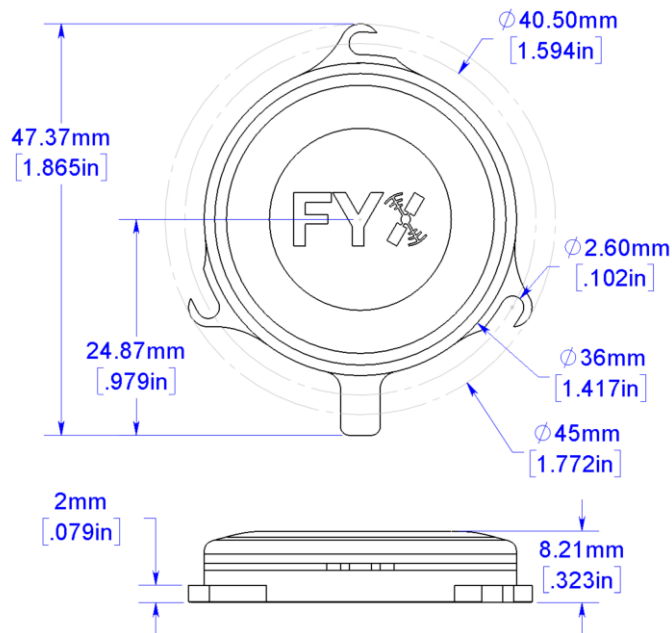
6 System Specifications

truFYX is a wing-tip mounted, TSO-145e Class Beta 1 [INCOMPLETE] certified WAAS GPS position source. It can be used as a primary position source for domestic en route, terminal, approach (LNAV) and departure navigation. It provides integrity in the absence of SBAS signal through the use of Fault Detection and Exclusion (FDE).

6.1 truFYX Specifications

6.1.1 Physical Specifications

Characteristics	Specifications
Width	1.771 in (45 mm)
Height	1.865 in (47.37 mm)
Depth	0.323 in (8.21 mm)
Weight	1.4 oz (40 grams)
Operating Temperature Range	-45°C to +70°C
Maximum Pressure Altitude	60,000 ft
Input Voltage Range	5.5 to 31 VDC
14V Current	25mA Max



6.1.2 GPS/SBAS Specification

Characteristics	Specifications
Number of Channels	15 (12 GPS and 3 GPS/SBAS)
Frequency	1575.42 MHz L1, C/A code
Sensitivity	
Tracking	-166 dBm
Reacquisition	-160 dBm
Cold Start	-148 dBm

UAV-1002631-001 Rev B

ECCN 7A994

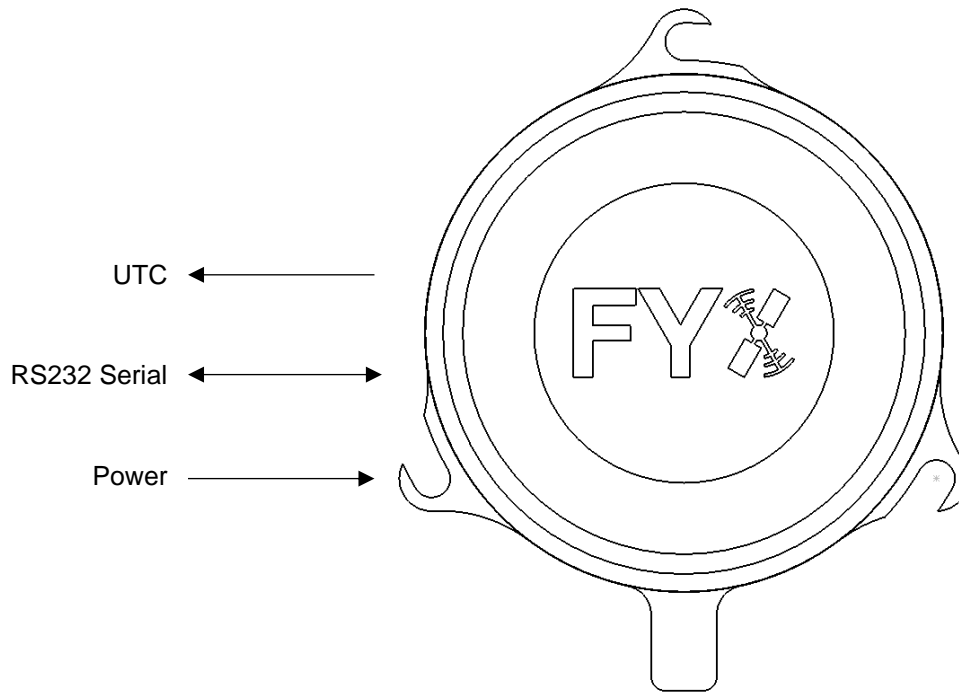


Page 12 | 24

Hot Start	-160 dBm
Horizontal position accuracy	5 m RMS with SBAS
Velocity accuracy	0.1 m/s
Heading accuracy	0.3 degrees
TTFF (Time to First Fix)	58 seconds typical with current almanac and position
Reacquisition	1 second typical
Position update interval	0.2 second (5 Hz)
Time Mark	±30 nSec of UTC
Datum	WGS-84

6.2 System Interfaces

truFYX has a 5-wire power and data interface.



6.2.1 Electrical

Color	Signal
BLACK	Aircraft Ground
RED	Aircraft Power
GRAY	RS232 TX
ORANGE	NMEA RS232 RX
WHITE (optional)	PPS TimePulse

6.2.2 Serial Data Interfaces

	Speed	Protocol
POSITION	115200 bps	MAVLink
	115200 bps	NMEA 0183 + RAIM
CONTROL and CONFIGURATION	115200 bps	uAvionix pingGNSS NMEA

Note:

Details of the uAvionix pingGNSS NMEA packets can be found in UAV-1002084-001 uAvionix pingGNSS NMEA Data Interface Specification.

7 Equipment Installation

This section describes the installation of truFYX on the aircraft, including mounting, wiring, and connections.

7.1 Part Numbers

Part	Part Number
truFYX	UAV-1002196-001
truFYX User and Installation Manual	UAV-1002631-001

7.2 Unpacking and Inspecting

UAV-1002631-001 Rev B

ECCN 7A994



Carefully unpack the device and make a visual inspection of the unit for evidence of any damage incurred during shipment. If the unit is damaged, notify the shipping company to file a claim for the damage. To justify your claim, save the original shipping container and all packing materials.

7.3 Mounting

truFYX is designed to be mounted on the wing of the airplane. The assembly should be mounted as far outboard on the aircraft as practical, parallel to the vertical and horizontal centerlines of the aircraft.

The following installation procedure should be followed, taking care to allow adequate space for installation of cables and connectors.

- Select a position in the aircraft wing.
- Avoid sharp bends and placing the cables too near to the aircraft control cables.
- Secure the transponder to the aircraft via the three (3) mounting screws. It should be mounted on a flat surface.

7.4 Wiring Diagram

Interfaces

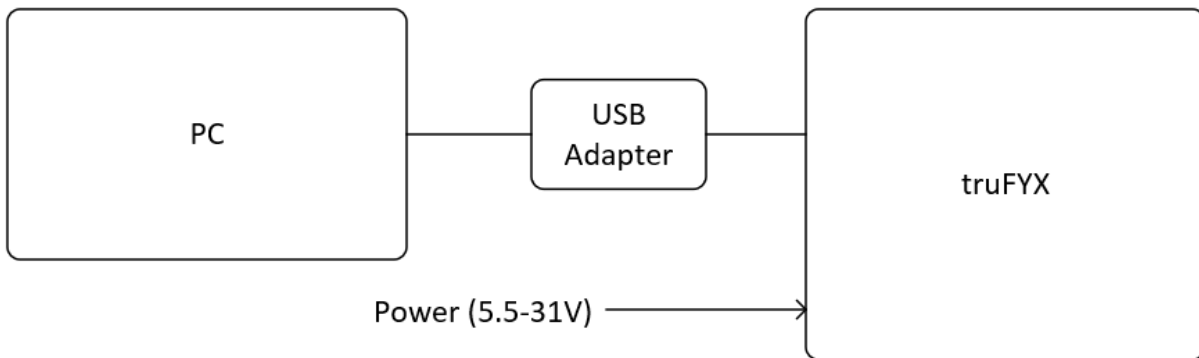
Pin	Type	Physical	Rate
Black	Ground		
Red	Aircraft Power	9-30.3V	
Grey	COM TX	RS-232 Out	115200bps
Orange	COM RX	RS-232 In	115200bps
White	PPS TimePulse	RS-232 Level	

8 Post Installation Checks

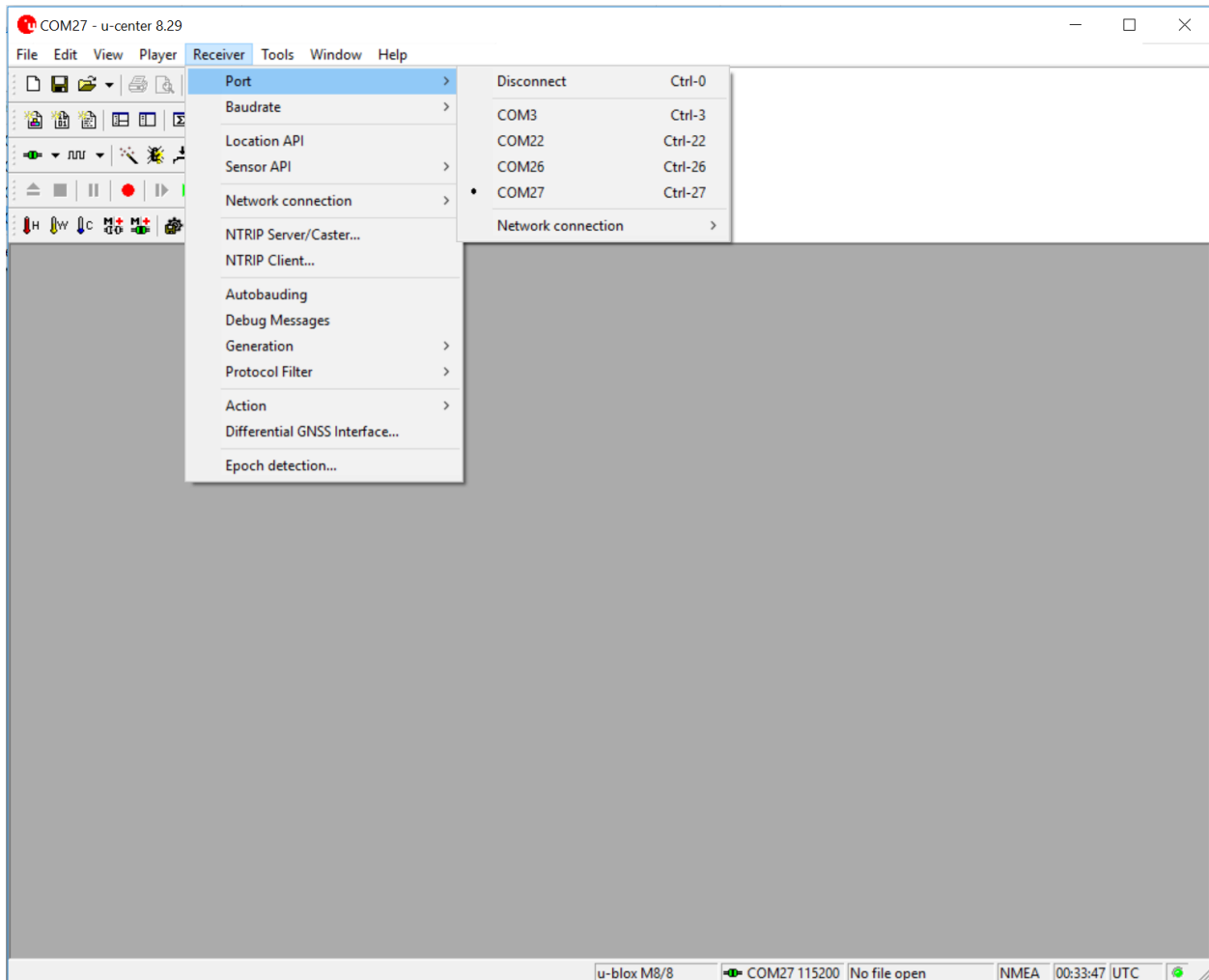
Connect truFYX to a PC as shown in Figure 8-1.

Download and install running uCenter GNSS Evaluation software for Windows (<https://www.u-blox.com/en/product/u-center>).

Figure 8-1 Post Installation Configuration Diagram

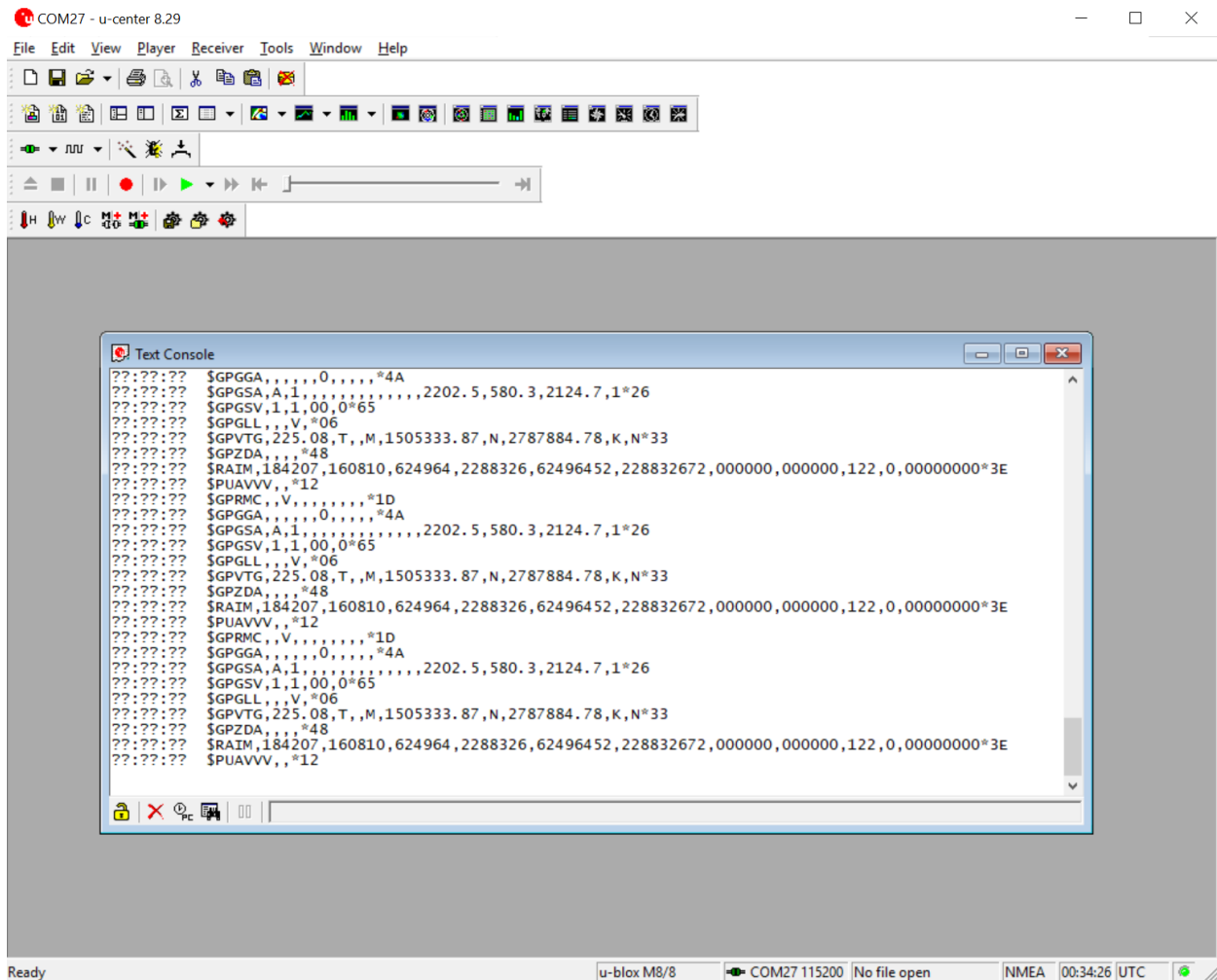


Launch uCenter and connect to the receiver on the COM port which matches the serial port assigned to the USB adapter. Set the Baudrate to 115200 bps.

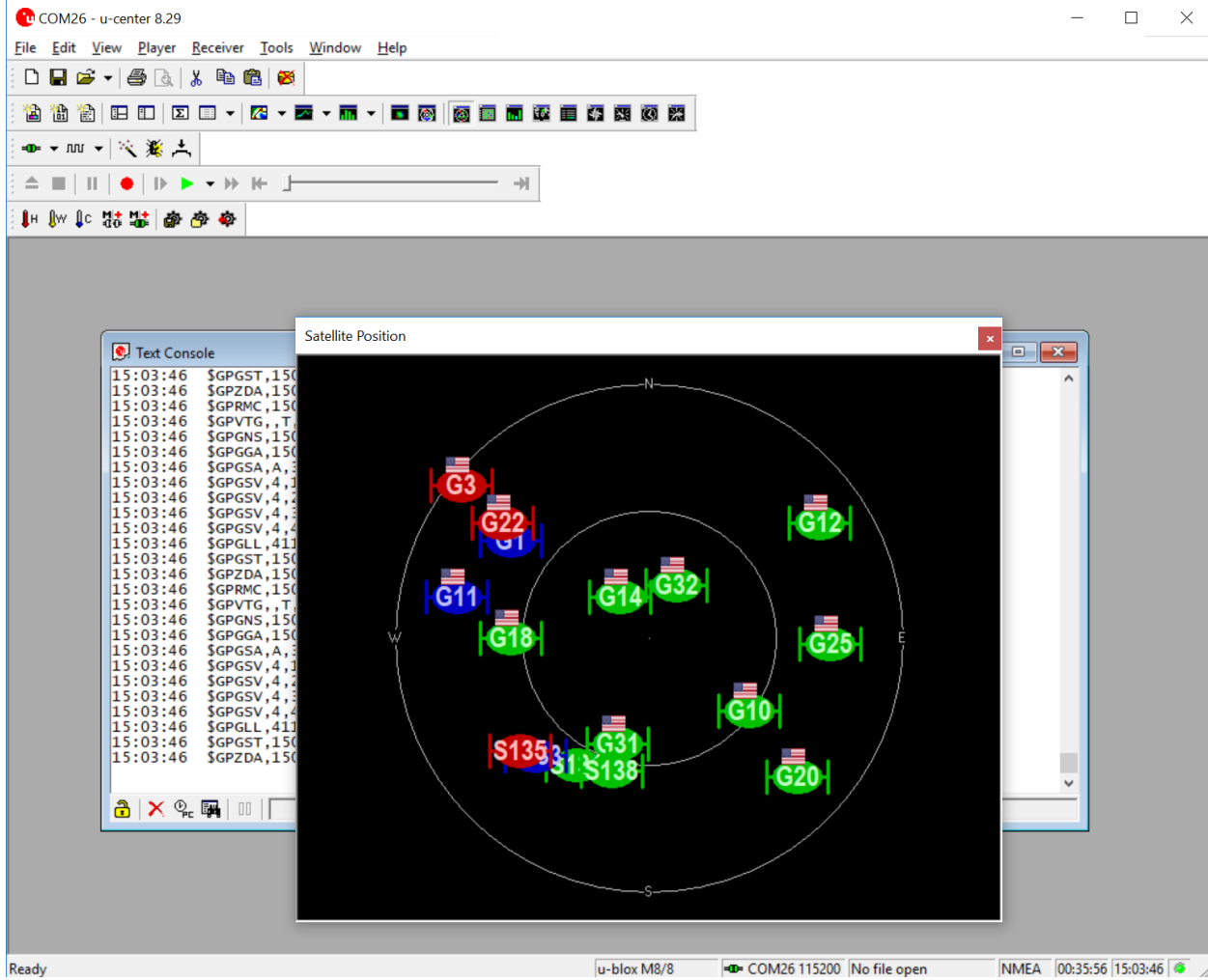


Apply power from a minimum of a 11V, 1A power source and confirm that the Green LED begins blinking after power-up.

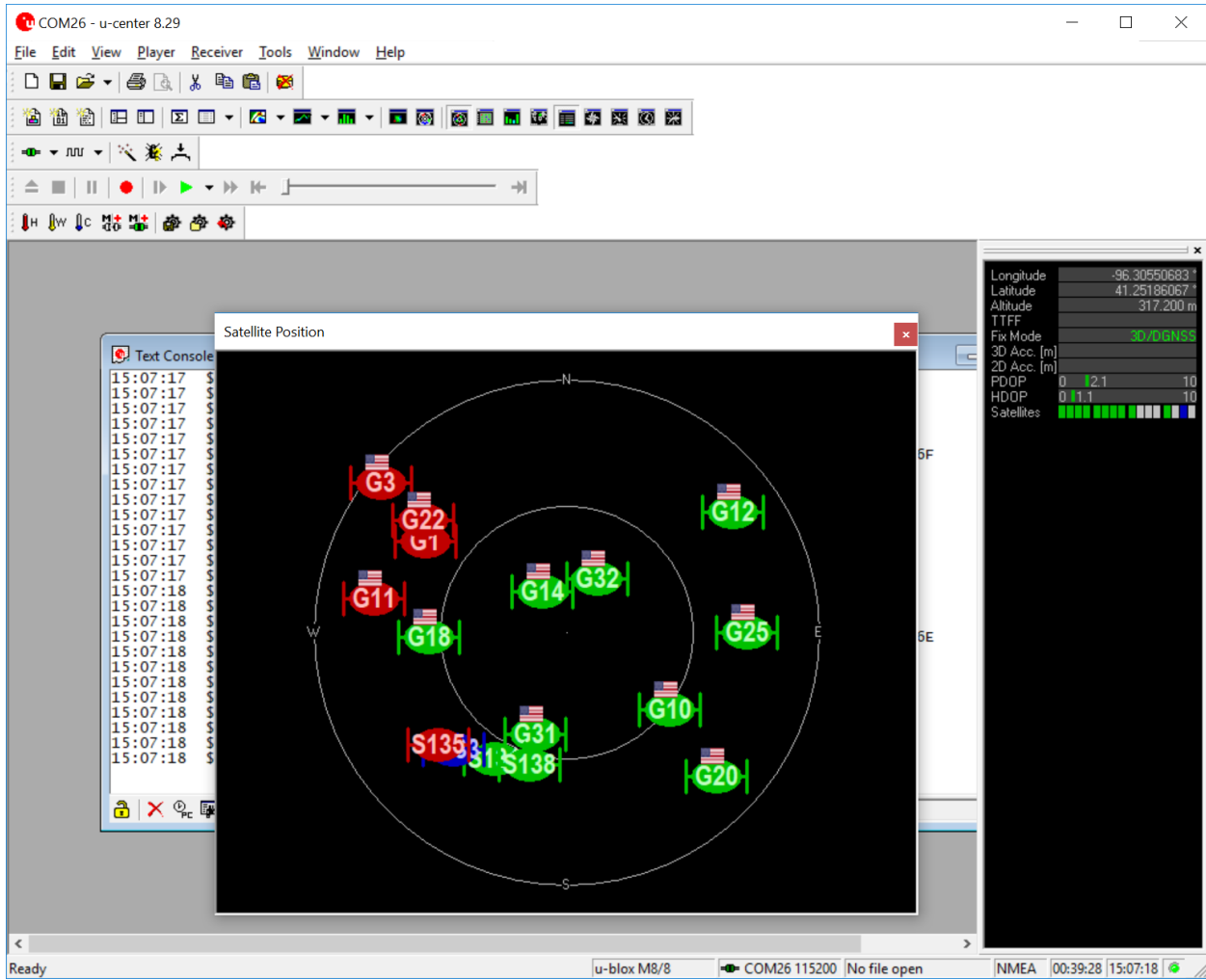
Open the 'Text Console' on uCenter and verify that NMEA packets are being received.



Open the 'Satellite Position' docking window and confirm that satellites are being acquired and used in the position solution.



Open the 'Data' docking window and confirm the GPS fix and position.



8.1 Checklist

STEP	CHECK
Launch the PC uCenter application	
Set Port to the USB or serial port connected to the truFYX	
Set the App Baud to 115200bps	
Apply power from a minimum of a 11V, 1A power source	
Confirm that the Green LED comes on after power-up	
Open the 'Text Console' in uCenter	
Ensure NMEA packets are being received	
Open the 'Satellite Position' docking window in uCenter	
Ensure that satellites are being acquired	
Open the 'Data' docking window in uCenter	
Confirm GPS position and fix.	

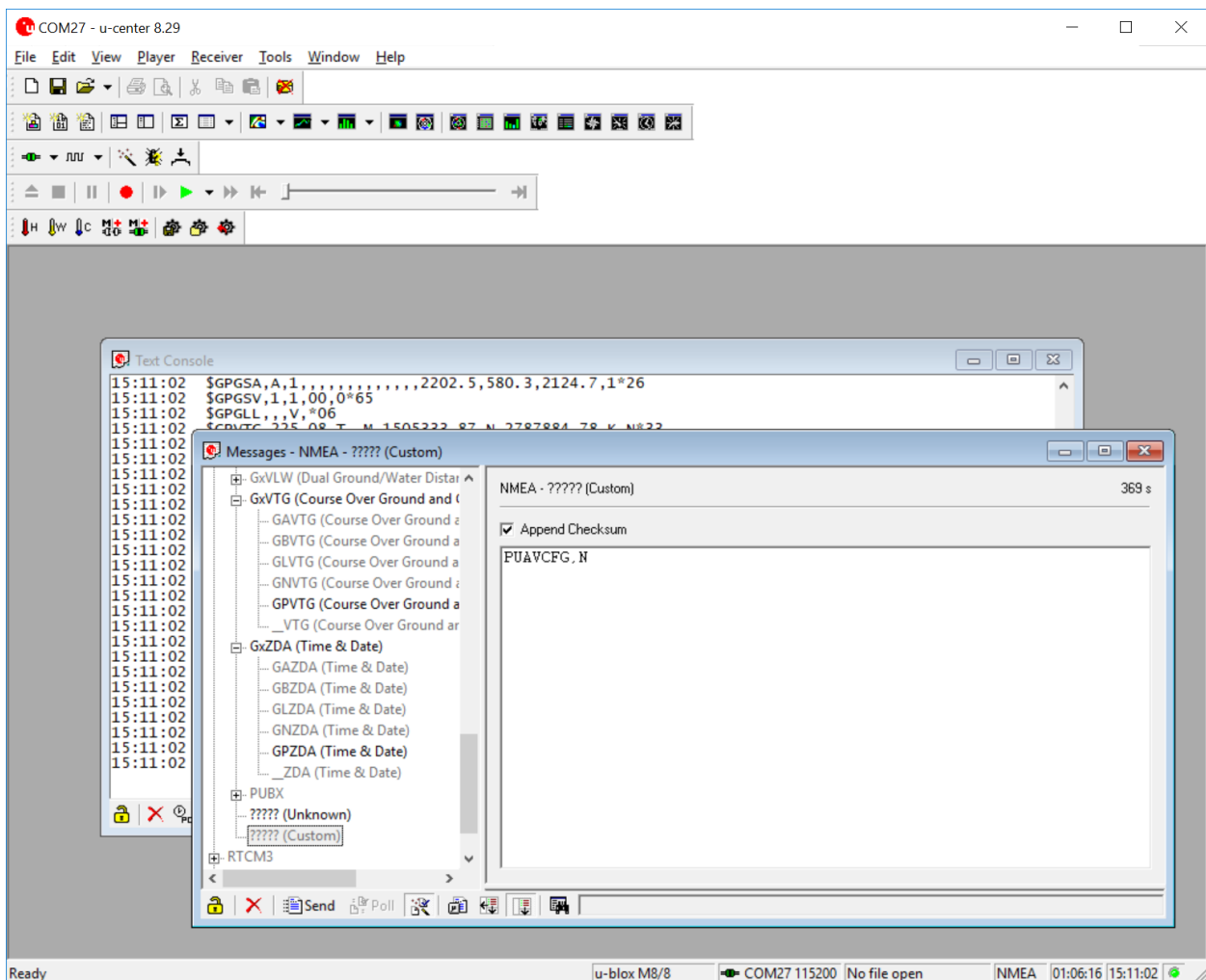
9 System Configuration

9.1 Navigation Output

truFYX can be configured to transmit uAvionix pingGNSS NMEA or MAVLink messages from its RS232 port. Connect truFYX to a PC as shown in Figure 8-1. Launch uCenter and connect to the receiver on the COM port which matches the serial port assigned to the USB adapter. Set the Baudrate to 115200 bps. Open the 'Messages' view to configure the navigation output protocol via the 'PUAVCFG'.

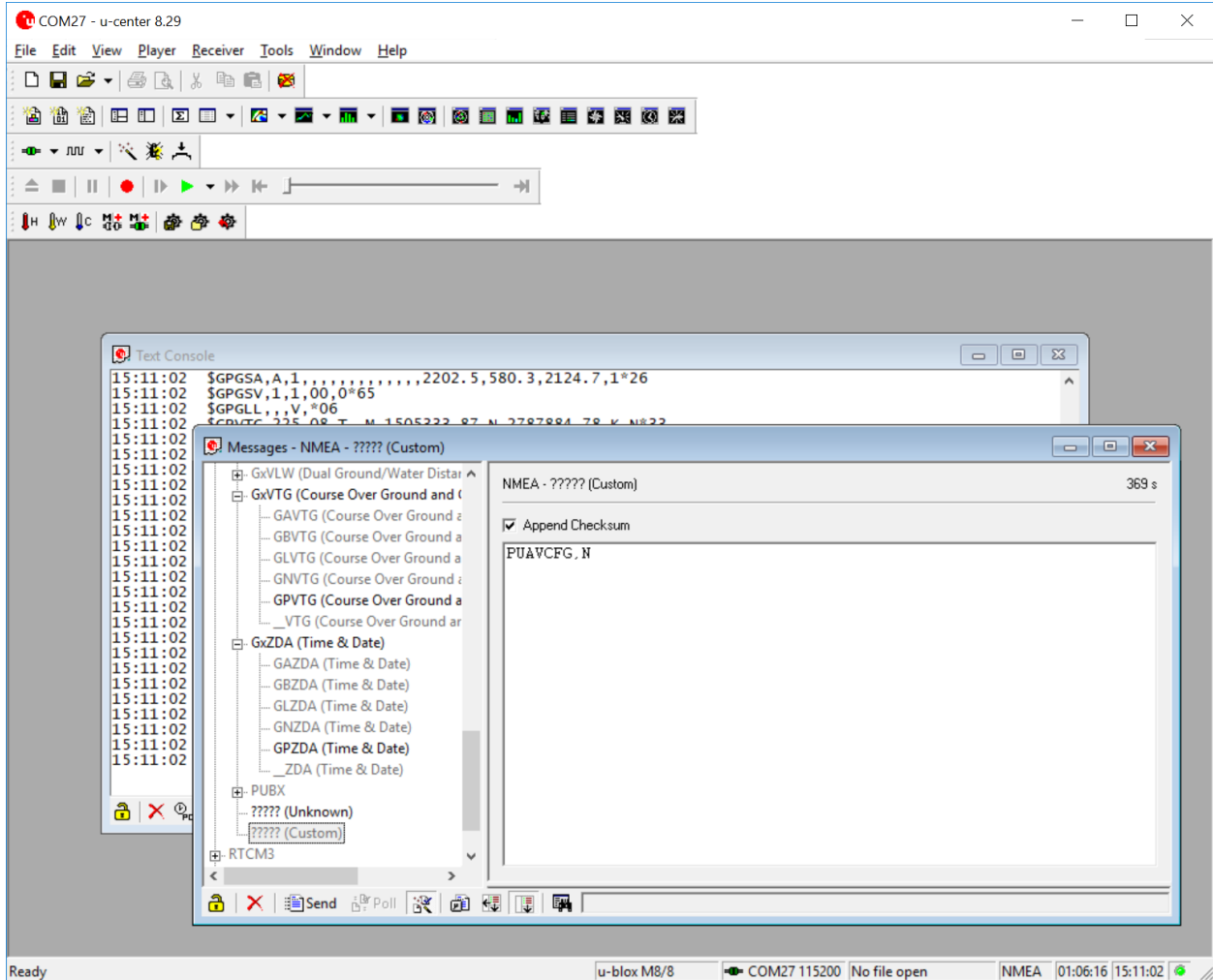
9.1.1 NMEA

To configure truFYX to transmit NMEA message, issue the command 'PUAVCFG,N' with option "Append Checksum" as a "PUBX Custom" command.



9.1.2 MAVLink

To configure truFYX to transmit NMEA message, issue the command 'PUAVCFG,N' with option "Append Checksum" as a "PUBX Custom" command.



10 Maintenance

truFYX is not a user serviceable product. All service must be performed either by uAvionix or an authorized uAvionix repair center.

11 Support

For additional questions or support please visit:

<https://www.uavionix.com/support/>