

Moving Terrain

Installation Manual MT-VisionAir X ETSO PN MTUP/00-3.60-3

Revision 0



Note on this manual

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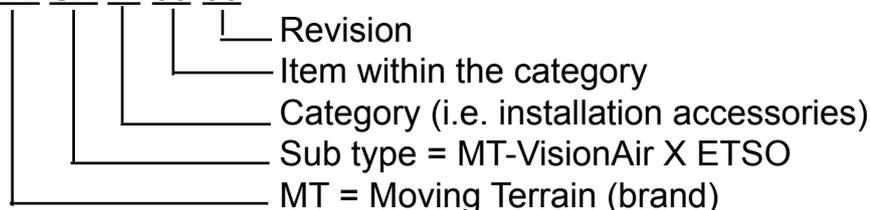
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General Safety Precautions



CAUTION:

- The two central connectors (50-pin MDR) of the MT-VisionAir X ETSO are connected identically; **strictly avoid** using both at the same time! This could cause severe damage of the device.



Always connect
ONLY ONE of
these connectors.

- Never disconnect the conducting connector during operation. This could cause severe damage of the device.
- Never store the device into the transport case when equipped with battery packs. This could cause overheating.
- Always take care to allow sufficient ventilation of the device when mounted. Otherwise overheating could occur.

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1. General information for Operating a MT-VisionAir X ETSO

MT-VisionAir X ETSO was designed to be installed and operated as a panel mounted device, but can easily be removed for flight planning. MT-VisionAir X ETSO is equally suited as a hand-held device.



Fig. 1.1: MT-VisionAir X ETSO Panel mount installation in Piper JetProp

The Easy mount is permanently installed in the panel. The MT-VisionAir X ETSO slides into the Easy mount, but can easily be removed for flight planning, updates of the navigation data or charts, etc.

Installation of the the MT-VisionAir X ETSO has virtually no influence on the weight and balance calculation.

Following installation, an EMI test has to be performed in the aircraft. Prior to the first flight it is mandatory to turn on the system and check cockpit instruments for deviations from normal performance.

2. Introduction of MT-VisionAir X ETSO

2.1 Views of device

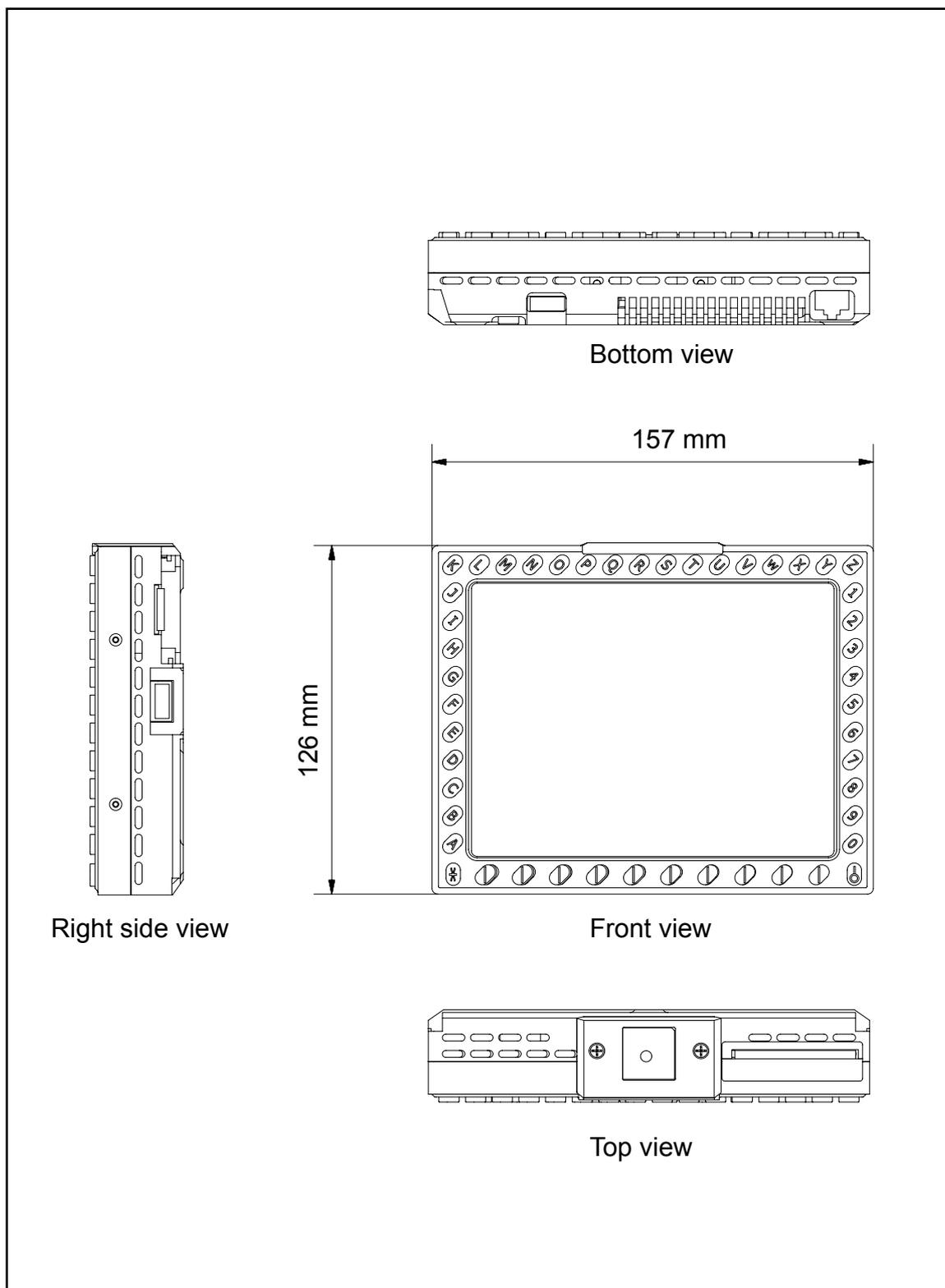
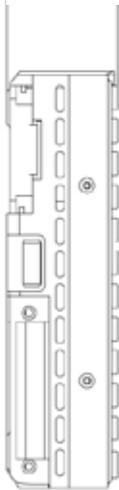
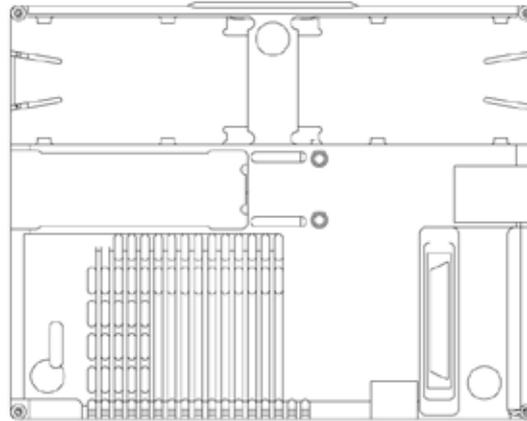


Fig. 2: Views of MT-VisionAir X ETSO (1)

33.1 mm



Left side view



Rear view

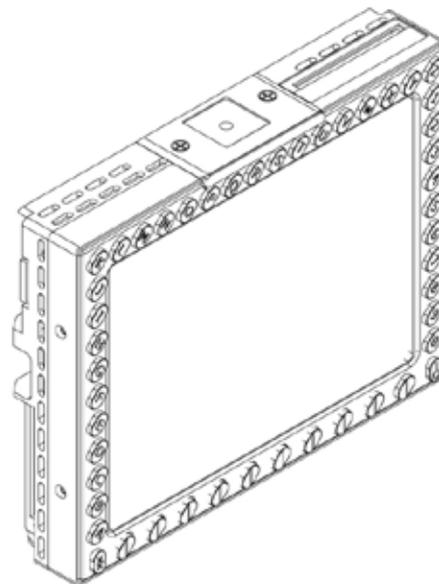
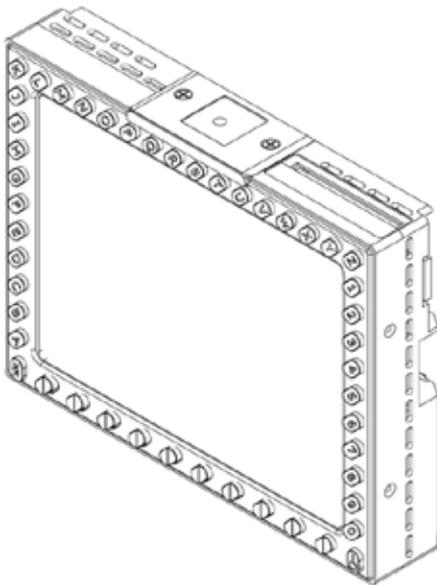
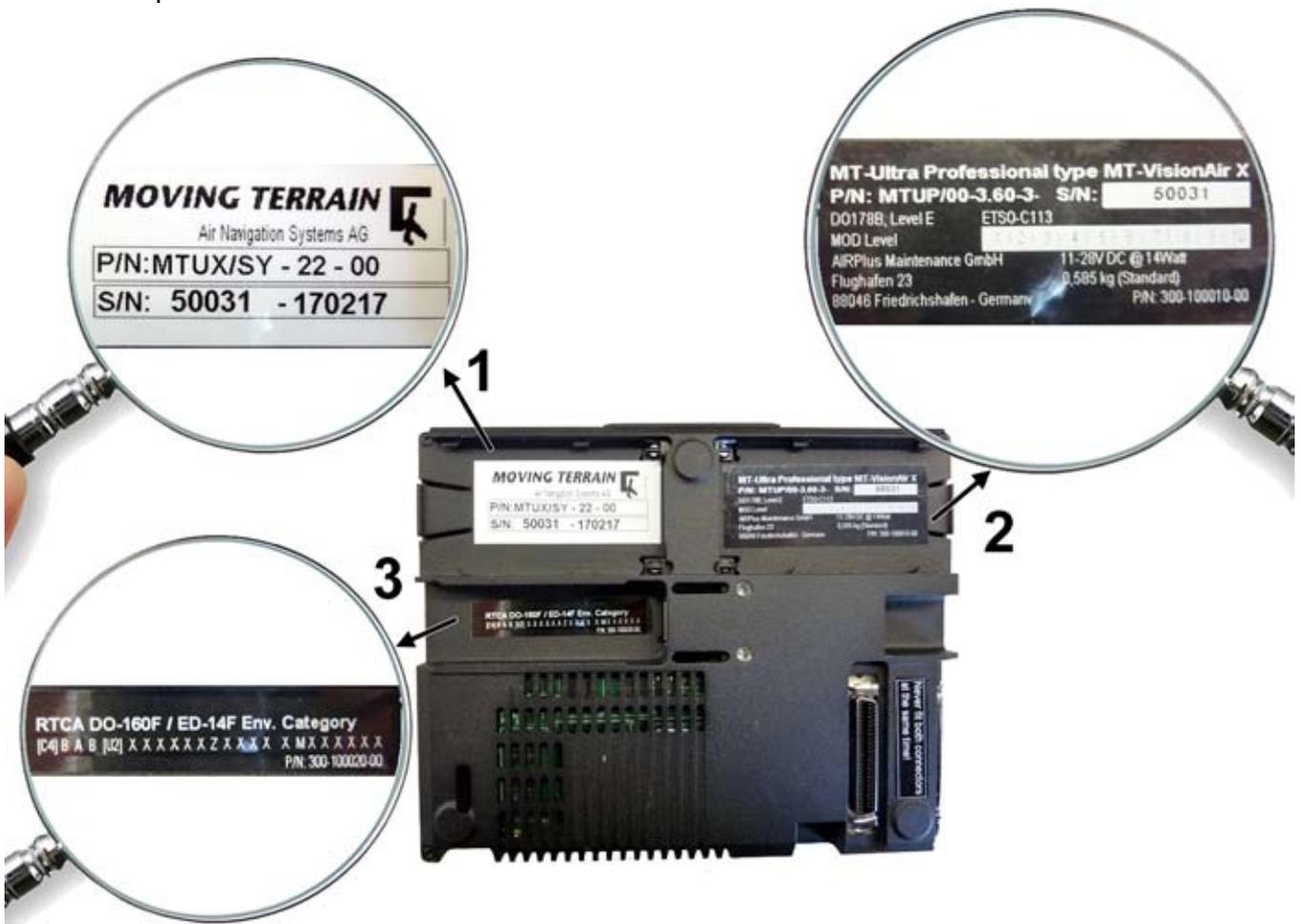


Fig. 2: Views of MT-VisionAir X ETSO (2)

2.2 Label Definition & Serial Number

MT-VisionAir X ETSO units are marked with adhesive labels as shown:



1. **MT Identification label** -> example (not part of the ETSO approval)

P/N: MTUX/SY-22-00

S/N: 50031 - 170217

2. **ETSO Part label**

P/N: MTUP/00-3.60-3

S/N: 50031 (example)

(label P/N 300-100010-00)

Serial numbering system

S/N: XXXXX

3. **Environmental Category Label**

RTCA DO-160F / ED-14F Env. Category

[C4] B A B [U2] X X X X X X Z X X X X X M X X X X X X X

(label P/N 300-100020-00)

2.3 Warning Sign for Cockpit

This warning sign is included with every MT-VisionAir X ETSO device and must be displayed in a clearly visible position in the cockpit next to the MT-VisionAir X.

(label P/N MTUP/99-04)

The warning sign dimension is 100mm x 10mm.



3. Installation of MT-VisionAir X ETSO

3.1 Installation of Easy mount in the cockpit panel

For installation of the MT-VisionAir X ETSO an Easy mount is used. Choose the installation location according to requirement of application or preferences:

- in the cockpit panel
- in other locations, e.g. the yoke.

3.1.1 Choosing the best location

- The MT-VisionAir X ETSO should be easily visible during flight.
- Choose the optimum readability angle.
- Refer to the following figures showing the dimensions of the Easy mount (without and with MT-VisionAir X ETSO) before specifying the location of the panel cutout.

3.1.2 Easy mount sketch

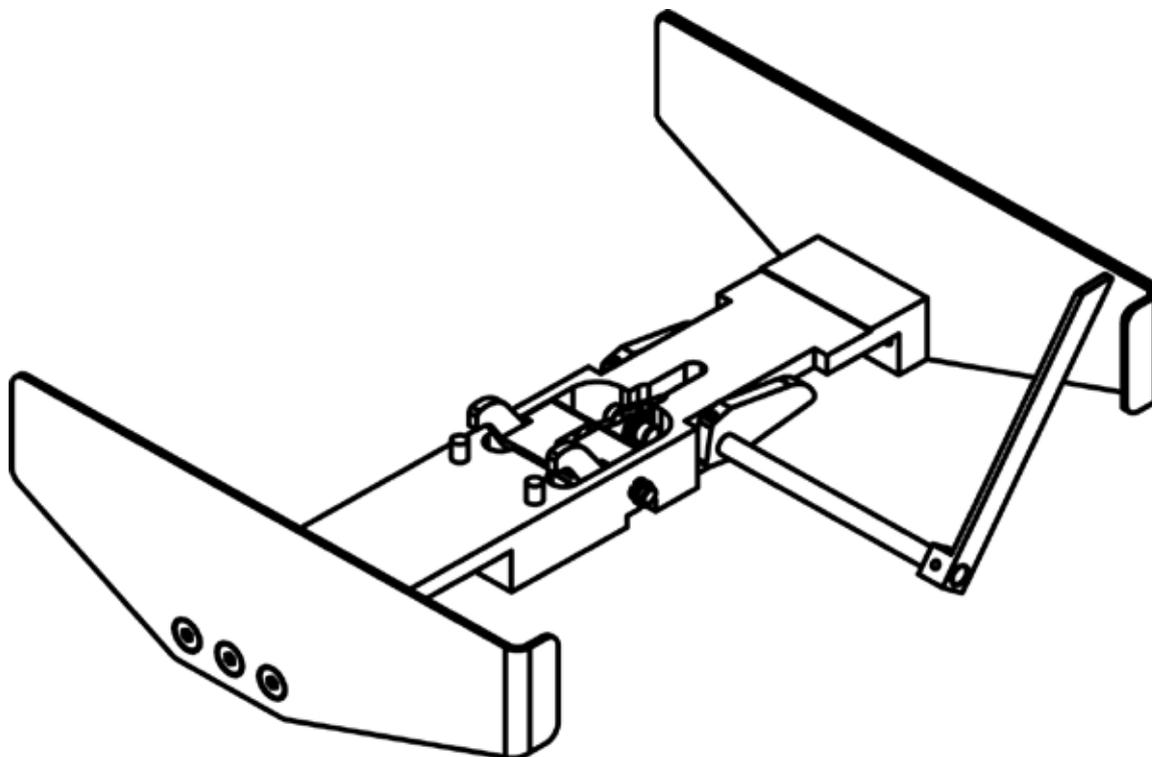


Fig. 3.1.2: Easy mount sketch

3.1.3 Panel cutout

The Easy mount must be firmly attached to the cockpit panel with screws.

Please use countersunk screws or rivets for installation in the instrument panel (or onto the angled rail) as space of 158 mm including any protruding screwheads must remain available for the device.

Panel cutout dimensions:

Width: 157.5 mm minimum (with latches in the rack), 160.5 mm optimum

Height: 128 mm

Depth: 46 mm

(all dimensions incl. 0.5 mm tolerance)

1. Installation for panel clearance of 160.5 mm

Mounting flush with cockpit panel or tilted mounting due to improved readability angle (e.g. for mounting at co-pilots side).

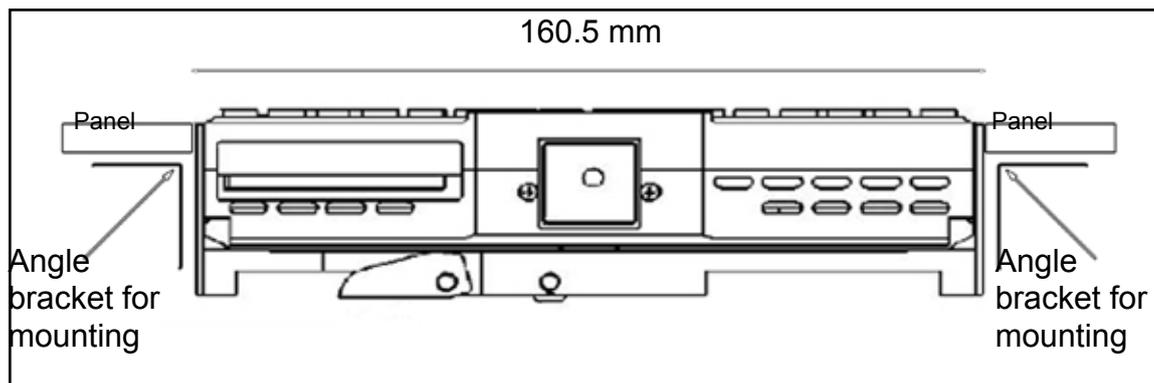


Fig. 3.1.3 (1): Panel clearance 160.5 mm

2. Installation for panel clearance of 158 mm

Mounting at the rear side of the panel: to flush the unit with the panel relocate the screws in the side mounting brackets.

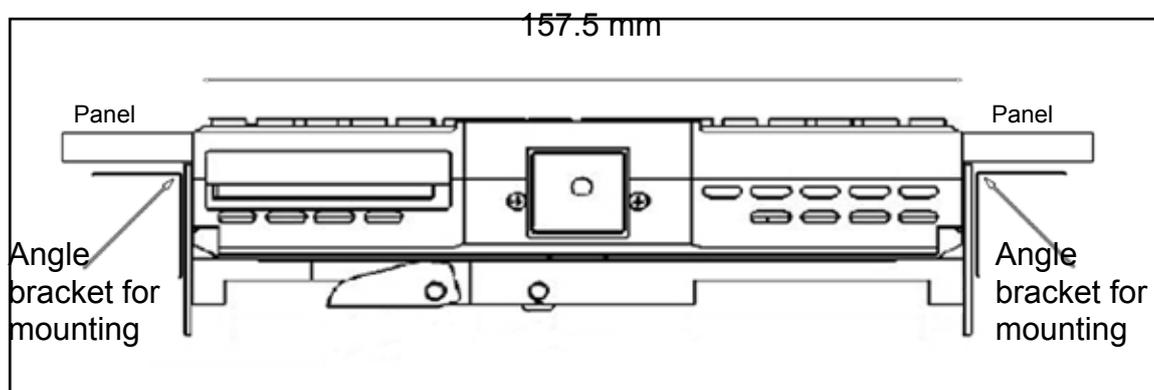


Fig. 3.1.3.(2): Panel clearance 158 mm

3.2.4 Dimensions of Easy mount

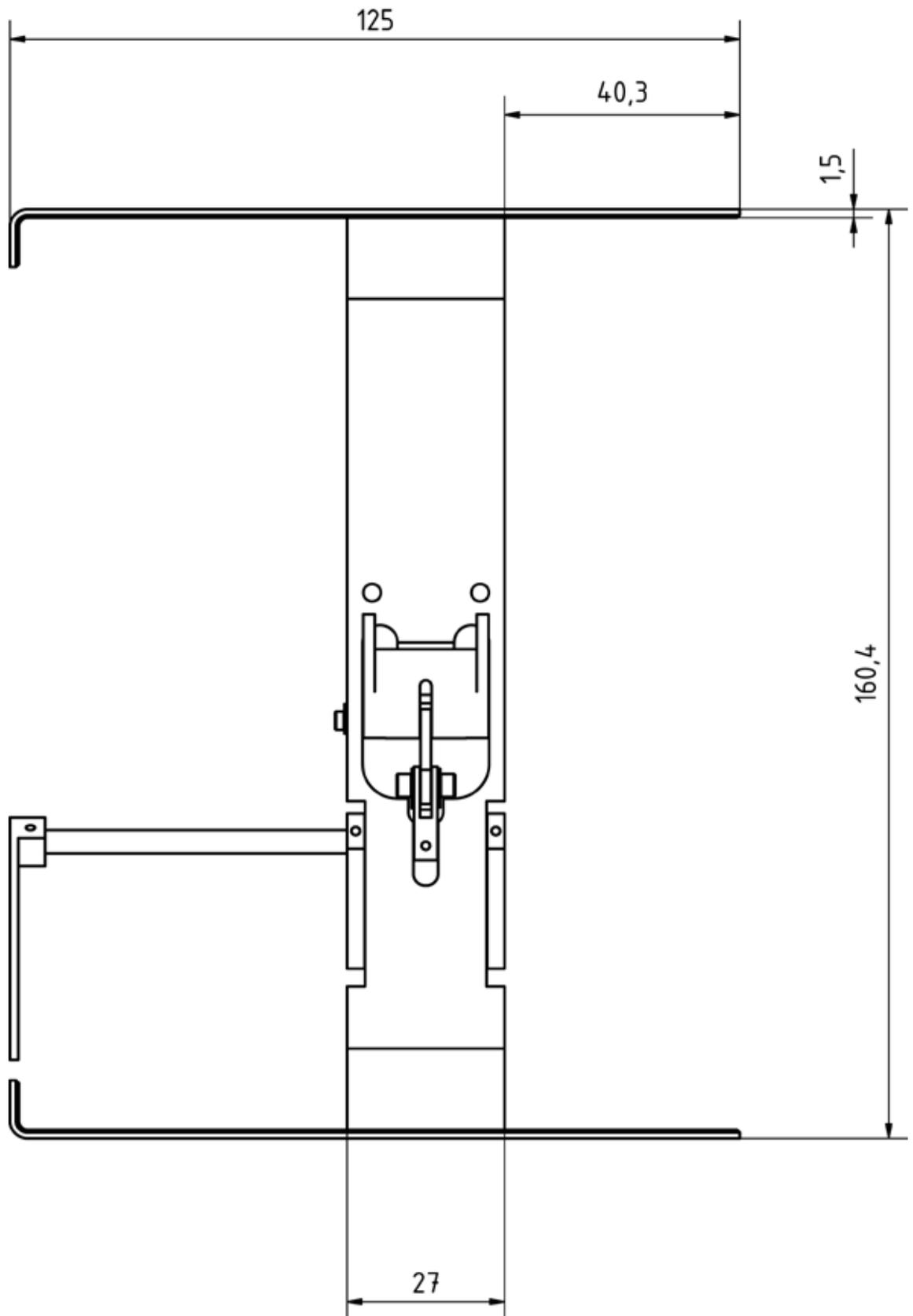


Fig. 3.1.4 (1): Front view of Easy mount / dimensions in mm

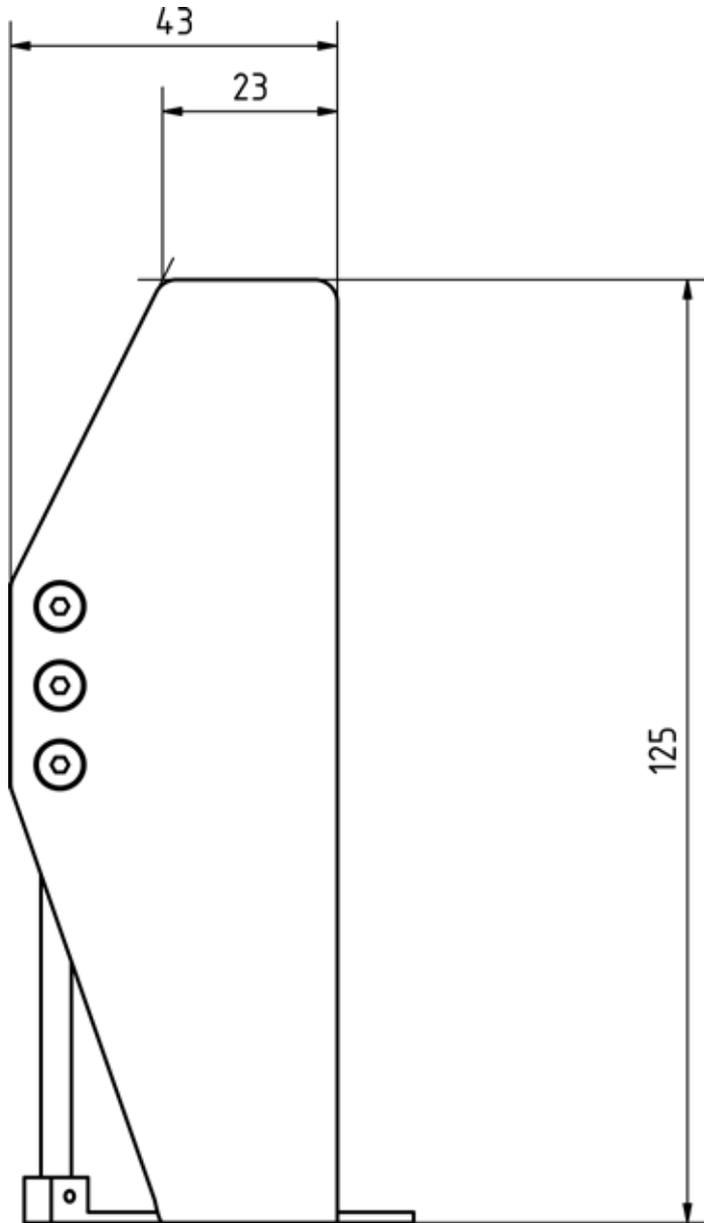


Fig. 3.1.4 (2): Side view of Easy mount / dimensions in mm

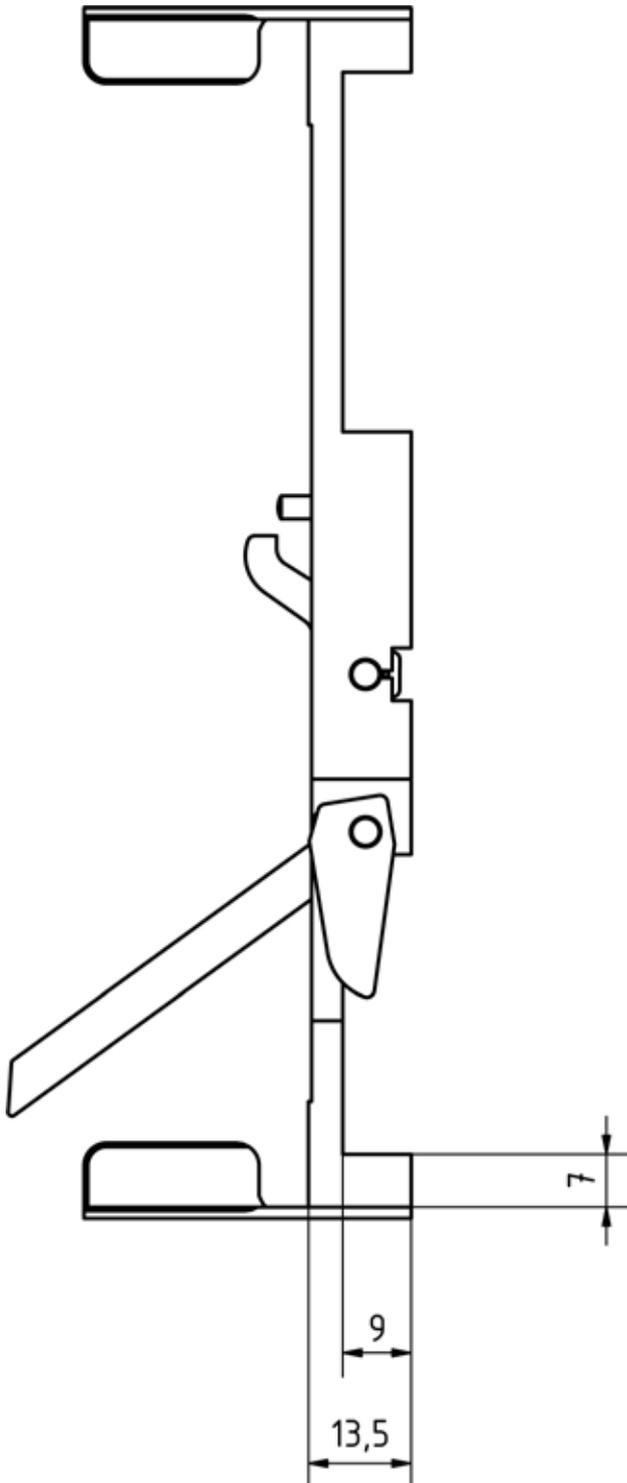


Fig. 3.1.4. (3): Top view of Easy mount / dimensions in mm

3.1.5 Dimensions of MT-VisionAir X ETSO with Easy mount

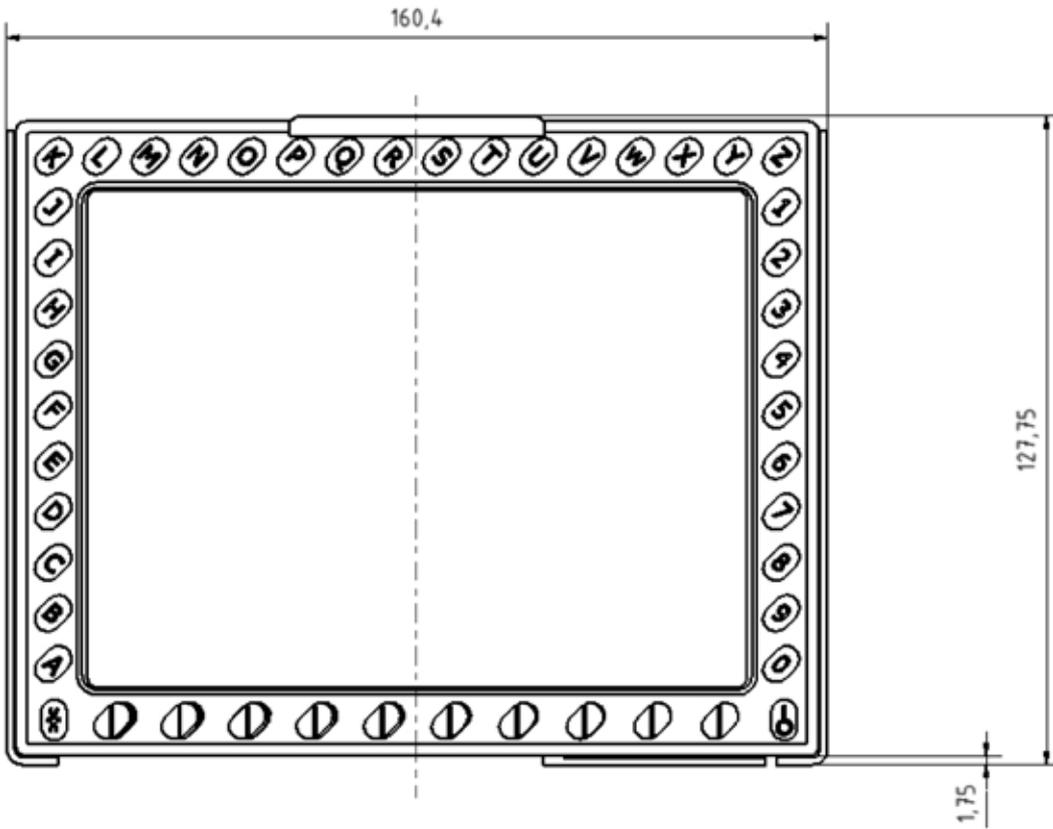


Fig. 3.1.5 (1): Front view of MT-VisionAir X ETSO **with Easy moun** / dimensions in mm
t

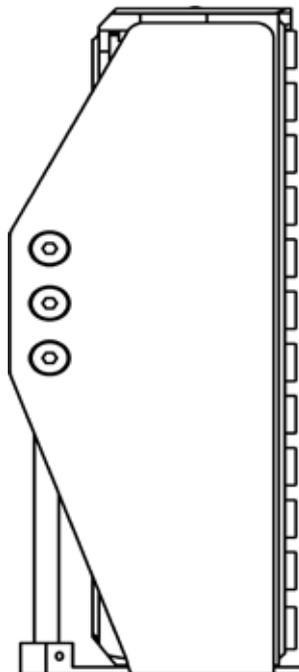


Fig. 3.1.5. (2): Side view of MT-VisionAir X ETSO **with Easy mount**

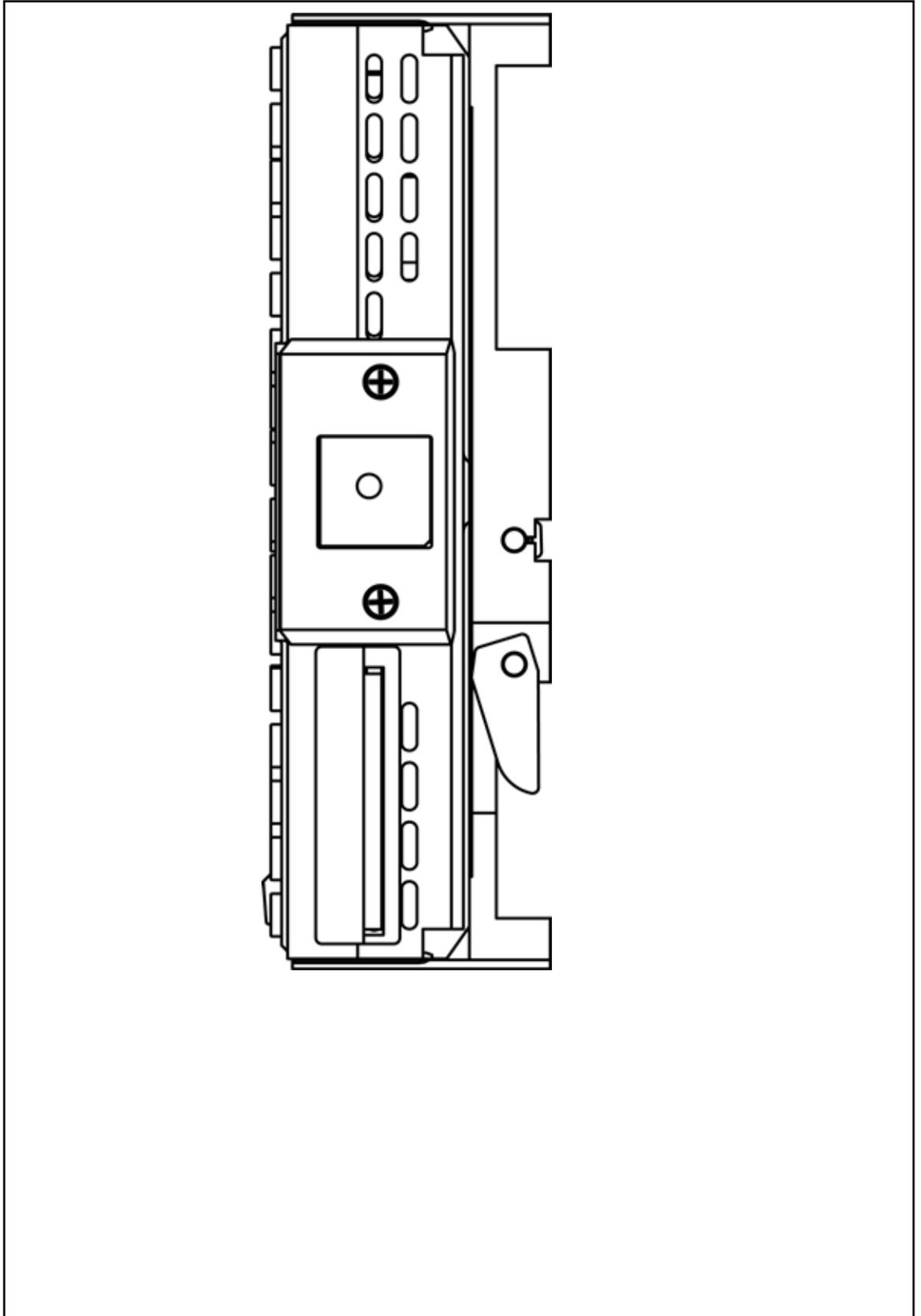


Fig. 3.1.4. (3): Top view of MT-VisionAir X ETSO with Easy mount

3.1.6 Remarks regarding installation

The device can be adversely affected if it is allowed to vibrate against fixed parts of the aircraft - see the symbolic sketch below.

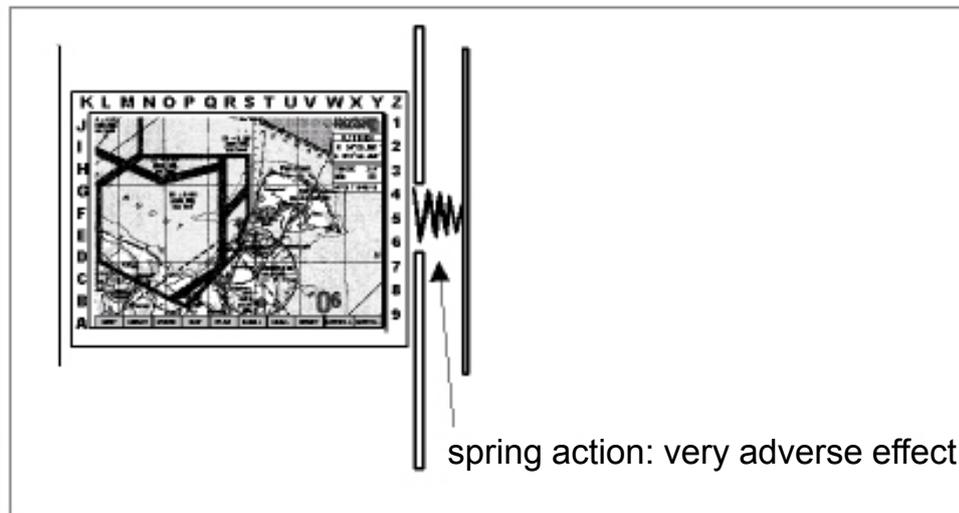


Fig. 3.1.6: Observe to avoid adverse effects

The locking mechanism of the Easy mount must be easy to operate.

Leave a loop of the cable and bundle the cables so that the device can be easily removed again.

3.1.7 View of an installation in a cockpit



Fig. 3.1.7: Installation in a cockpit EC 120

3.1.8 Removal and Insertion of the Device

Removal is required for several reasons:

- Changing/charging of battery packs
- Flight preparation can be performed outside of the cockpit.
- Updates via USB device .

The manufacturer recommends that pilots make themselves familiar with the removal and insertion of the device together with the facility providing installation service and to pay attention to the correct installation method of the Easy mount.

Please refer to the video instruction on the website of Moving Terrain (www.moving-terrain.de) for a demonstration of how to insert and to remove the MT-VisionAir X ETSO into/from the Easy mount.

3.2 Installation of the Easy mount in other locations

For installation of the Easy mount in other locations (e.g. the yoke) special mounting devices of other manufacturers may be suitable or required.

Please contact the customer's service at Moving Terrain for detailed information.

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4. Installation of GPS

MT-VisionAir X ETSO is by default equipped with a Fast Integral GPS (with integrated antenna).

For the configuration of the correct GPS in the software refer to chapter “Connections”.

4.1 Installation of Fast Integral GPS

4.1.1 Recommended installation location of the Fast Integral GPS

The manufacturer recommends installation of the Fast Integral GPS on the glare shield.

- A windshield heater usually attenuates the incoming signal to such an extent that placing the antenna under it does not make sense.
- A segment of the sky as large as possible must be visible for the antenna (integrated in the GPS!). The cable length is limited to 20 m.
- Because of the high peaks of the digital signal a well shielded cable is recommended to prevent interference with other units.
- For the installation a ground plate (min 20x20 cm) made of conducting material is recommended. Provide ground connection to aircraft structure. On this ground plate the antenna is mounted **with upward vision**. Conducting material (e.g. galvanized sheet metal) improves the reception.

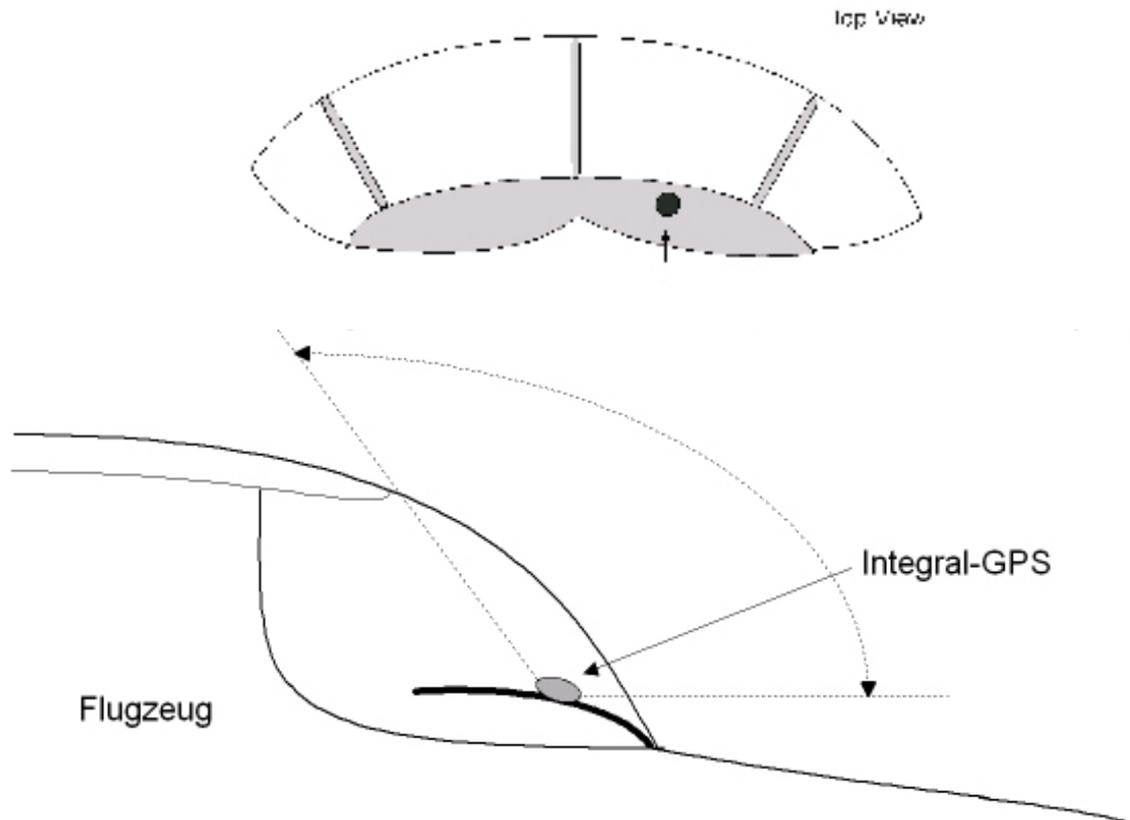


Fig. 4.1.1: Installation of the Fast Integral GPS on the glare shield

NOTES

For a glare shield made of plastics, installation beneath the glare shield is also possible. In this case observe to install the Fast Integral GPS top side up.

The Fast Integral GPS can also be mounted on the outside of the aircraft. In general a temperature limit of $-20\text{ }^{\circ}\text{C}$ must be observed.

4.1.2 View of Fast Integral GPS



Fig. 4.1.2 (1): Top view of Fast Integral GPS



Fig. 4.1.2.(2): Side view of Fast Integral GPS
- screws can be used, but we recommend fastening with velcro

4.1.3 External dimensions of Fast Integral GPS

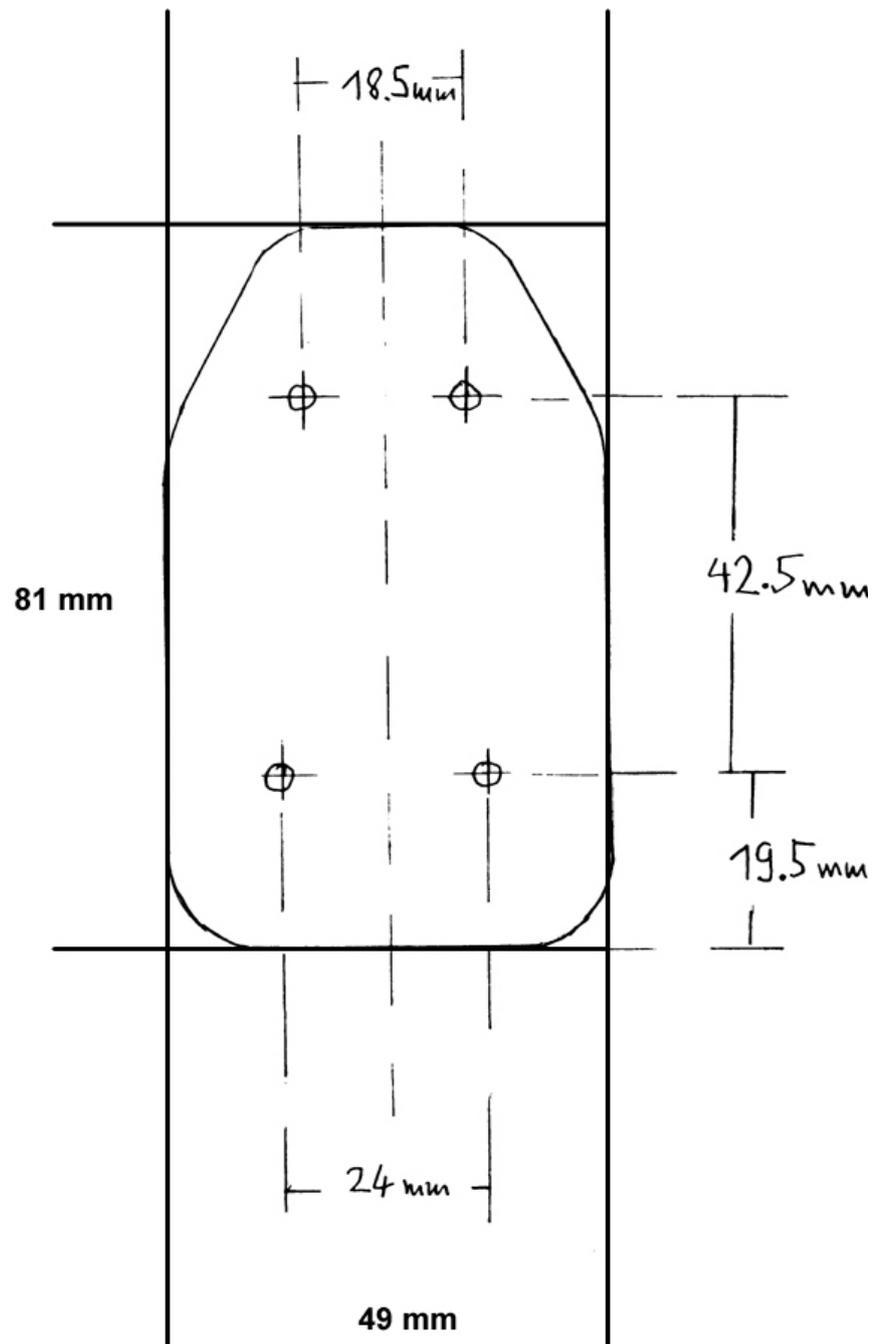


Fig. 4.1.3: Dimensions of Fast Integral GPS

4.1.4 Remarks regarding installation

The manufacturer recommends a velcro strap to fix the Fast Integral GPS to the desired location. This facilitates a change of location.

Alternatively mounting screws can be used:

- Use 4 mounting screws 16x2.2 mm (tapping screw, DIN 7981 or the like).
- It's absolutely necessary to remove the short screws in the mounting holes before the 4 mounting screws can be used.

4.3 Restrictions for Location of Fast Integral GPS and Iridium antenna

NOTE

In order to avoid interference **any** Iridium / satellite antenna must be located at least 1.30 m away from the Fast Integral GPS.

This applies for any type of Iridium antenna, as well as ITAS modules with integrated antenna situation.

Refer to chapter “MT Satellite Radar and MT BLITZPLAN” for details.

5. Connections

5.1 Power supply

The manufacturer recommends attaching MT-VisionAir X ETSO devices to a power supply whose fuse is directly connected to the aircraft battery and does not include any other substantial power loads.

Recommended: Ground Clearance Switch
Hot Bus

Not recommended: General Avionics Bus

Only under these conditions is the pilot able to perform his preflight work with MT-VisionAir X ETSO without draining the battery.

For the aircraft side required fuses and power consumption:

| | |
|------------------------------|--|
| Aircraft side required fuses | Operating voltage 12 V -> min. 5 A, slow Operating voltage 24 V -> min. 2 A, slow |
|------------------------------|--|

Shielded wires are to be used for cabling and the shield must be connected to aircraft ground to avoid interference of other avionics units.

NOTE

The power supply coming from the central connector is not switched by the unit, i.e. a Fast Integral GPS connected to the central connector draws 50 to 70 mA even when the unit is switched off. If no master switch is used this can drain the aircraft battery in a couple of weeks, therefore always connect the unit with a master switch.

5.2 Power supply via battery pack

Batteries are provided as a 2 piece for MT-VisionAir X ETSO. A charger is supplied.

The batteries are intended for mobile use or in emergency cases.

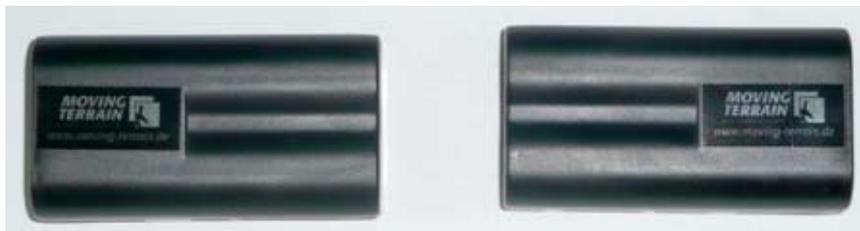


Fig. 5.2 (1): View of battery packs for left/right slot (figure shows slim packs for example)



Fig. 5.2.(2): Loading station = charger

NOTE

Batteries are not charged while installed on the MT-VisionAir X, charging is only possible with the loading station. Mind taking the loading station with you when using batteries.

5.3 General connection of MT-VisionAir X ETSO

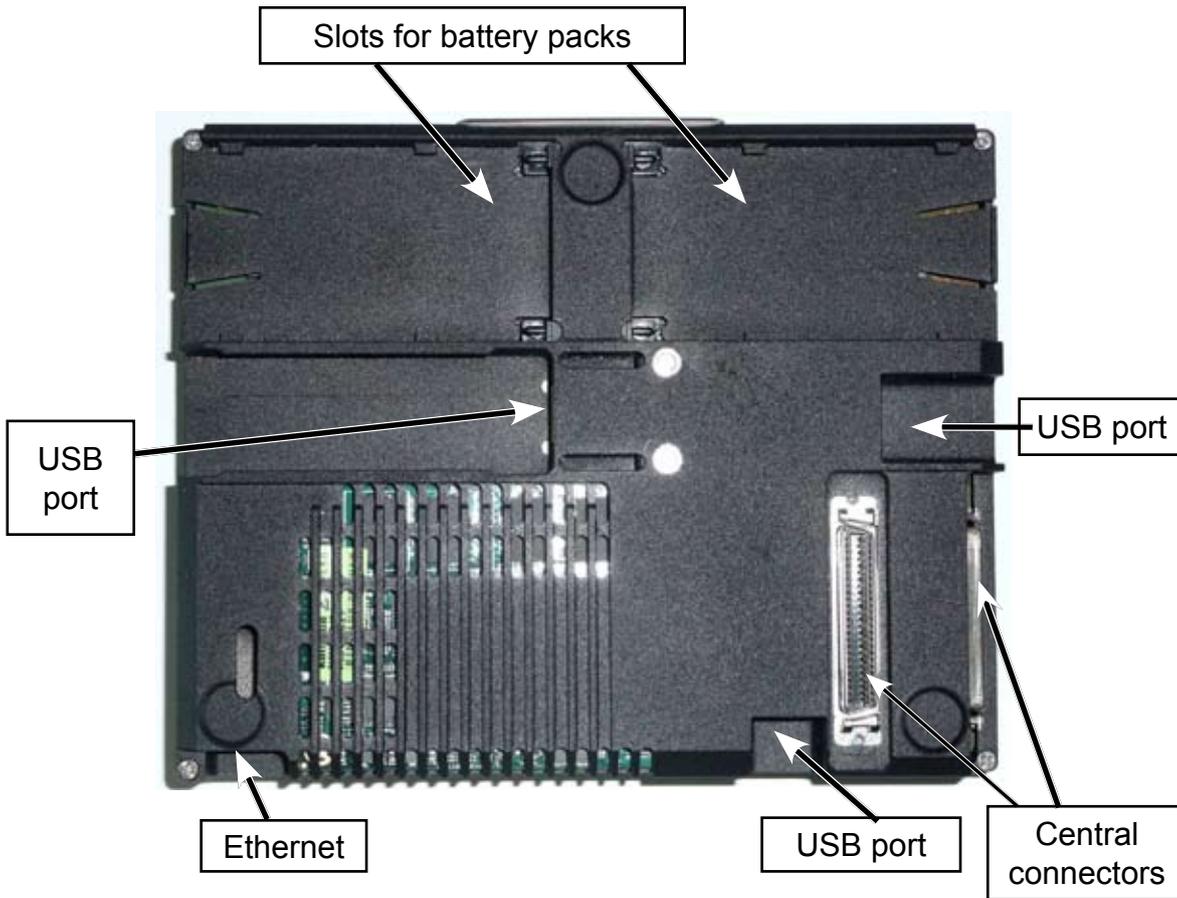


Fig. 5.3 (1): General connection of MT-VisionAir X ETSO (rear view)

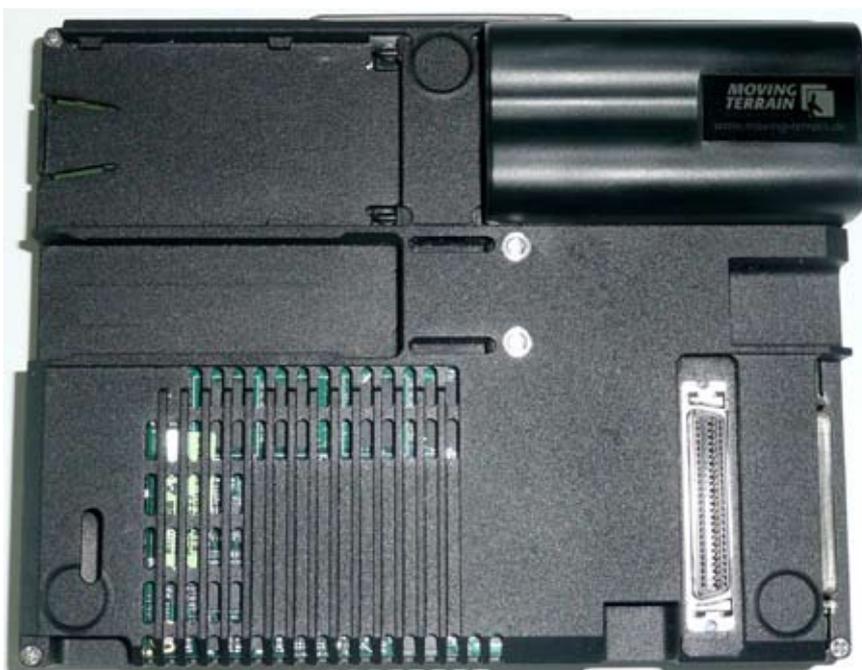


Fig. 5.3 (2): Rear view of MT-VisionAir X ETSO connectors (equipped with 1 battery)

5.4 Central connector (50-pin MDR)

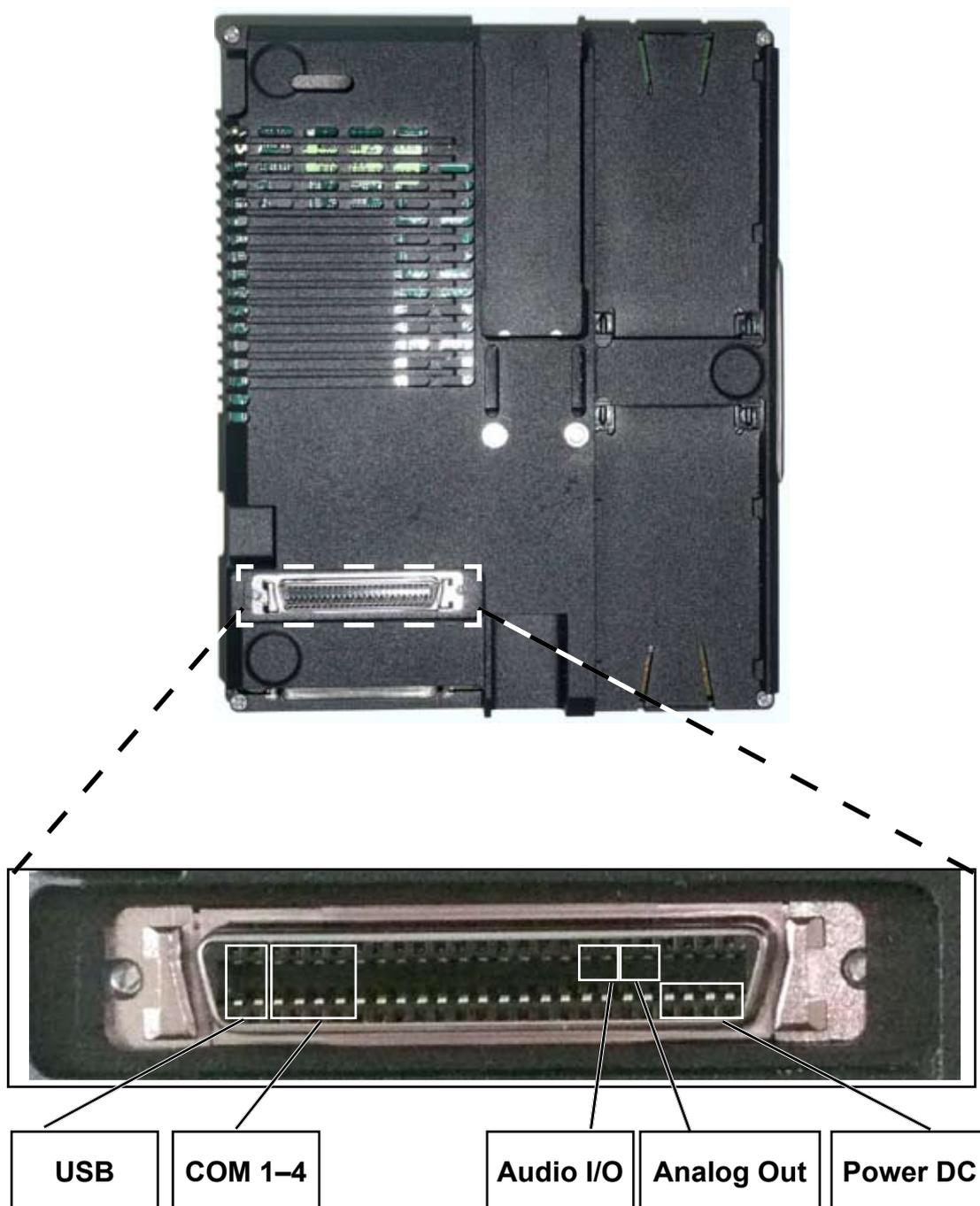


Fig. 5.4 (1): MT-VisionAir X ETSO central connector (50-pin MDR) / view on unit



CAUTION:

The two central connectors (50-pin MDR) are connected identically; **strictly avoid** using both at the same time! This could cause severe damage of the device.

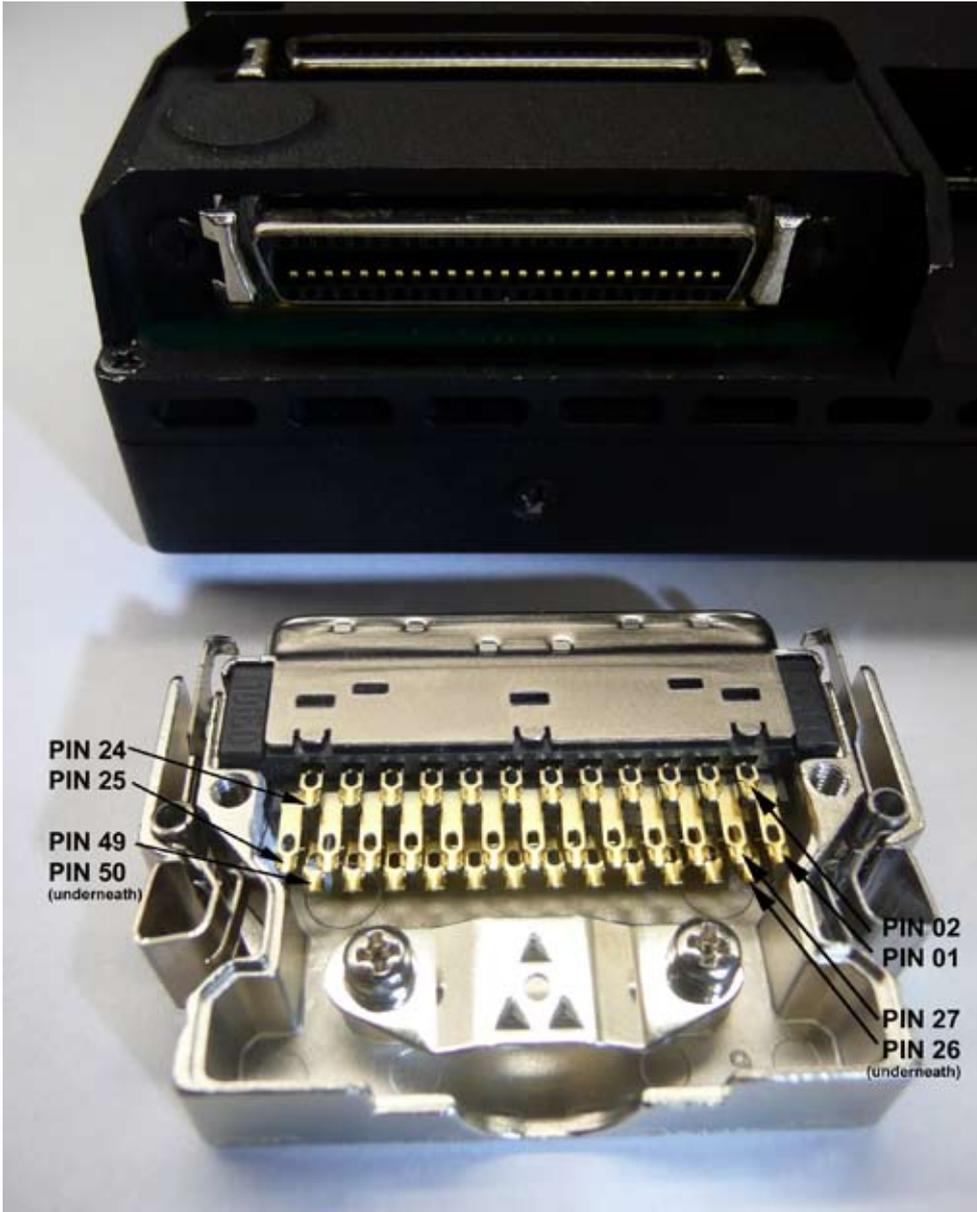


Fig. 5.4 (2): Detailed view of connector solder layout

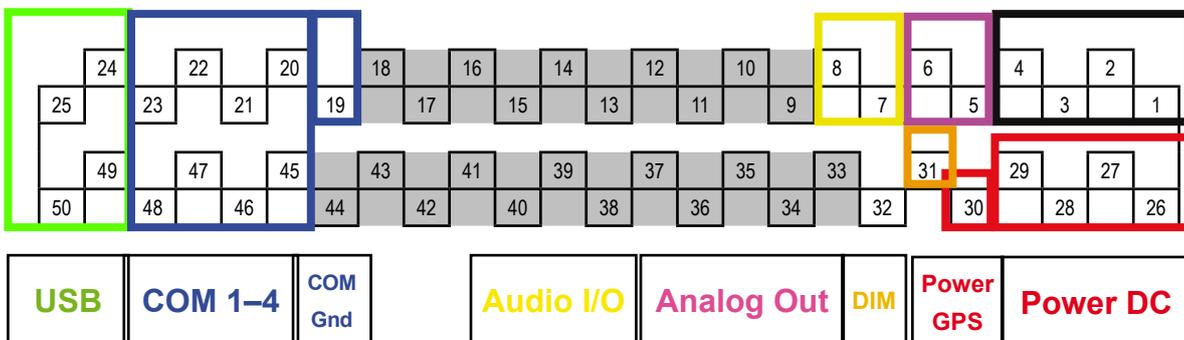


Table 5.4: Pin layout - solder side view

Power Gnd

NOTE Do not connect the pins highlighted in grey: 9 to 18 and 33 to 44.

5.5 Pin layout of the central connector (50-pin MDR)

| Standard Pin Assignment | | | | |
|-------------------------|-----------------------|-------------------------|------------------|-------------------|
| Signal | Central connector pin | Pin at Common Connector | Common Connector | Common Wire Color |
| Power DC 12–36 V | 26 | 2 | 2 pin socket | red |
| Power DC 12–36 V | 27 | 2 | | red |
| Power DC 12–36 V | 28 | 2 | | red |
| Power DC 12–36 V | 29 | 2 | | red |
| PWR GND | 1 | 1 | | blue/black |
| PWR GND | 2 | 1 | | blue/black |
| PWR GND | 3 | 1 | | blue/black |
| PWR GND | 4 | 1 | | blue/black |
| DC Power out | 30 | 3 | 4 pin socket | red |
| COM 1 RxD | 45 | 2 | 9 pin Sub-D | * |
| COM 1 TxD | 46 | 3 | | * |
| COM 2 RxD | 47 | 2 | 9 pin Sub-D | * |
| COM 2 TxD | 48 | 3 | | * |
| COM 3 RxD | 20 | 2 | 9 pin Sub-D | * |
| COM 3 TxD | 21 | 3 | | * |
| COM 4 RxD | 22 | 2 | 9 pin Sub-D | * |
| COM 4 TxD | 23 | 3 | | * |
| GND COM 1–4 | 19 | 5 | 9 pin Sub-D | * |
| USB +5V | 24 | 1 | | red |
| USB data – | 25 | 2 | USB | white |
| USB data + | 50 | 3 | | green |
| USB GND | 49 | 4 | | black |
| Audio out | 7 | | | |
| Audio in | 8 | | | |
| Audio GND | 4 | | | |
| DIM analog in | 31 | | | |
| Analog out 1 | 5 | | | |
| Analog out 2 | 6 | | | |
| Analog GND | 4 | | | |

Table 5.5: Pin layout of central connector (continued on next page)

* the colors for COM test cables are not standardized - can not be specified.

| Standard Pin Assignment | Optional Pin Assignment | | | |
|---|-------------------------|-------------------------|------------------|-------------------|
| Description | Signal Optional | Pin at Common Connector | Common Connector | Common Wire Color |
| | | | | |
| | | | | |
| | | | | |
| necessarily use all pins connected for power GND (pin 51&52 if available to plug housing also connect to GND) | | | | |
| | | | | |
| Voltage from the board or battery 500 mA max. for Fast Integral GPS | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| Line level | | | | |
| Line level | | | | |
| | | | | |
| 0–28 V DC for backlight dimming in respect to GND | | | | |
| | | | | |
| | | | | |
| GND for Analog output 1 & 2 | | | | |

5.6 The central plug cable assembly for MT-VisionAir X ETSO

5.6.1. Recommended tools and materials

- Temperature-controlled soldering iron (soldering max.2mm width (better: 1.5 mm) set to about 350 °C
- Solder with integrated solder flux, 0.5 mm (no lead-free solder)
- Stripper with fixed cable diameters
- Tweezers
- Hot air gun
- Shrink on tubing various sizes (2mm diameter)
- Kapton tape
- Range of reasonable diameter cable sleeves
- Various sizes small Phillips screwdriver
- Scalpel or penknife
- Cutters (for example: Knipex)
- A small vice with alligator clip.
- Sufficient light in the workplace, torch

5.6.2. The strain relief

A cable sleeve with a diameter fitting to the complete cable bunch ensures a proper strain relief. This sleeve protects single cables from slipping out of the complete cable bunch and also from the sharp edges of the strain relief clamp. The strain relief should be fixed with the screws as firm as possible so that they can't be loosened by vibration.

The position of the cables in the strain relief should be in a way that the outer shells of all cables are clamped into the cable clamp and that the individual strands are distributed loosely in the connector housing. There should be no mechanical stress between the solder and the cable network. This should be determined prior to stripping the individual strands quite accurately. The external connector pins need longer wires because they are further from the strain relief as the inner pins.

NOTE | Pulling the cable into the cable sleeve is easier if you use silicone spray

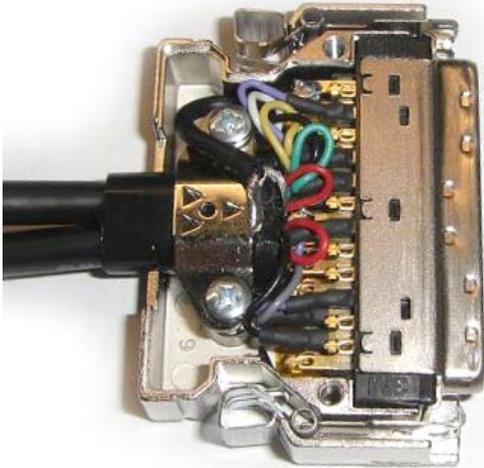


Fig. 5.6.2 (1): Strain relief in metallized connector housing

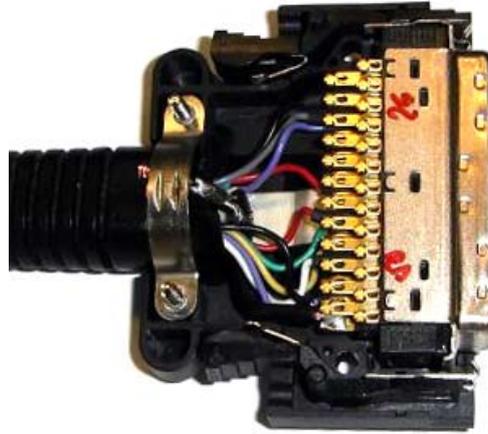


Fig. 5.6.2 (2): Strain relief in non-metallized connector housing

5.6.3. Strip the cable and solder to the connector pins

When stripping the cables make sure that no single strand is accidentally cut and taken off with the isolation. This reduces the diameter and weakens the strand mechanically. A stripper with fixed diameters is recommended. The correct diameter should be determined with a non essential part of the cable. The stripped cable should be as long as necessary and as short as possible.

To support the solder joints it is recommended to use a shrink tubing for each connection. This not only increases the mechanical stability of the critical transition strand / tinned strand, but prevents short circuits between connector pins. After soldering all wires the shrinkable tubing is slipped over the solder buckets. Hold the connector in a way that they don't slip back and shrink them only shortly with the hot air gun (max. 2 seconds).

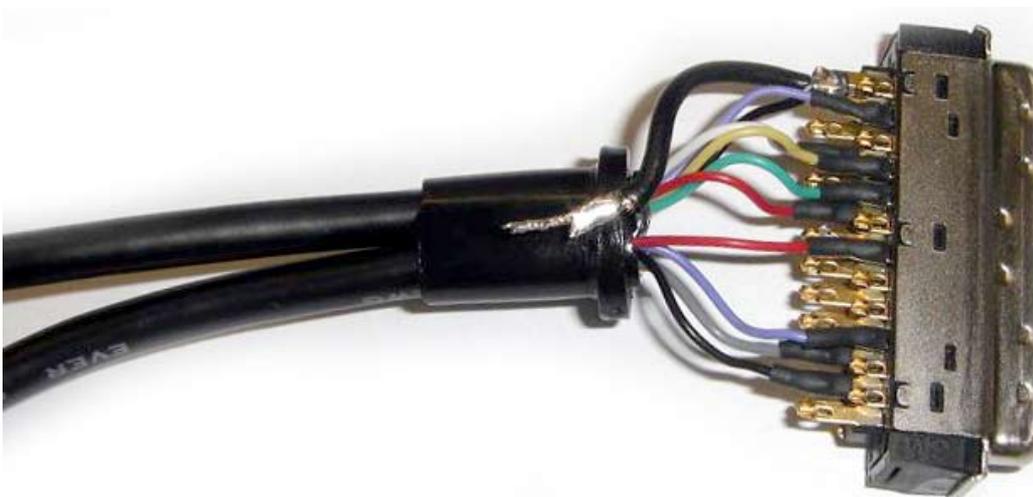


Fig. 5.6.3: Single Cables soldered to connector pins

5.6.4. The grounding

The correct grounding of all attached peripheral devices should be considered in addition to the strain relief as the second important condition for the proper operation of the units. They cause not only total failures, but mostly sporadic disorders. This may not be reproduced without further ado and can cause an infinitely time-consuming search.

All peripheral grounds are radially merged within the central connector and placed on the reference ground, the power supply ground (ground of the aircraft). This ground is the point of reference for all signals, which are either single ended (GPS or USB) or double-ended as the serial interface which is connected to ground via peripheral device itself.

Different ground potentials of the devices can cause interference in the best case – due to strong transients in the worst case permanent damage to the units.

In addition to individual ground strands (mostly signal grounds, part of cables) the electric shieldings have to be grounded to the aircraft mass due to the most stable oscillation-free potential.



Fig. 5.6.4 (1) Soldering ground strand to unit ground

For metallized connector housings the shielding is placed above the cable sleeve and on the strain relief. Make sure that the shielding cannot get into contact with unused connector pins, which can be current-carrying from the unit. Isolation of the connector pins using a so-called special “Kapton” tape is recommended. The frame of the connecting plug board itself is connected to ground in the metallized housing. So the optimum connection to the frame is given. This guarantees optimal shielding and protection against external interferences.

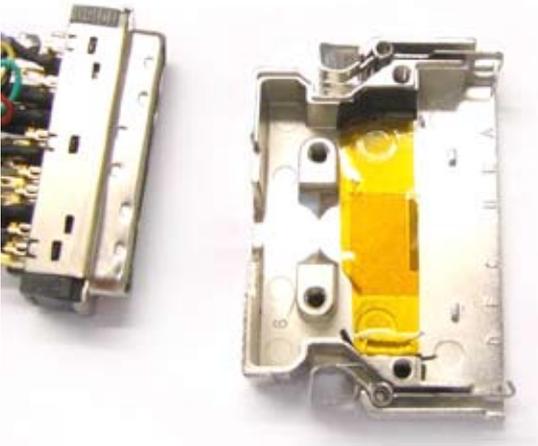


Fig. 5.6.4 (2) Kapton tape in the base

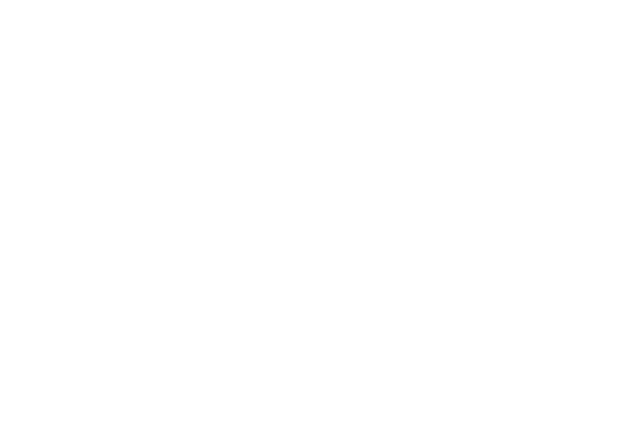


Fig. 5.6.4 (3) Kapton tape in the lid

Within the not metallized connector housing (due to mechanical reasons) the shielding as well as the frame of the connector itself must be grounded. This must be done with additional (in cross section wider) strands. They have to be soldered directly to the device ground (GND pin = power supply (ie negative) in the plug and to the shielding / the frame.



Fig. 5.6.4 (4): Soldered shieldings and connector to device ground

5.7 Standard/test connection with MDR50 central connector

5.7.1 Standard/test cabling when system is delivered w/o COM / USB connections

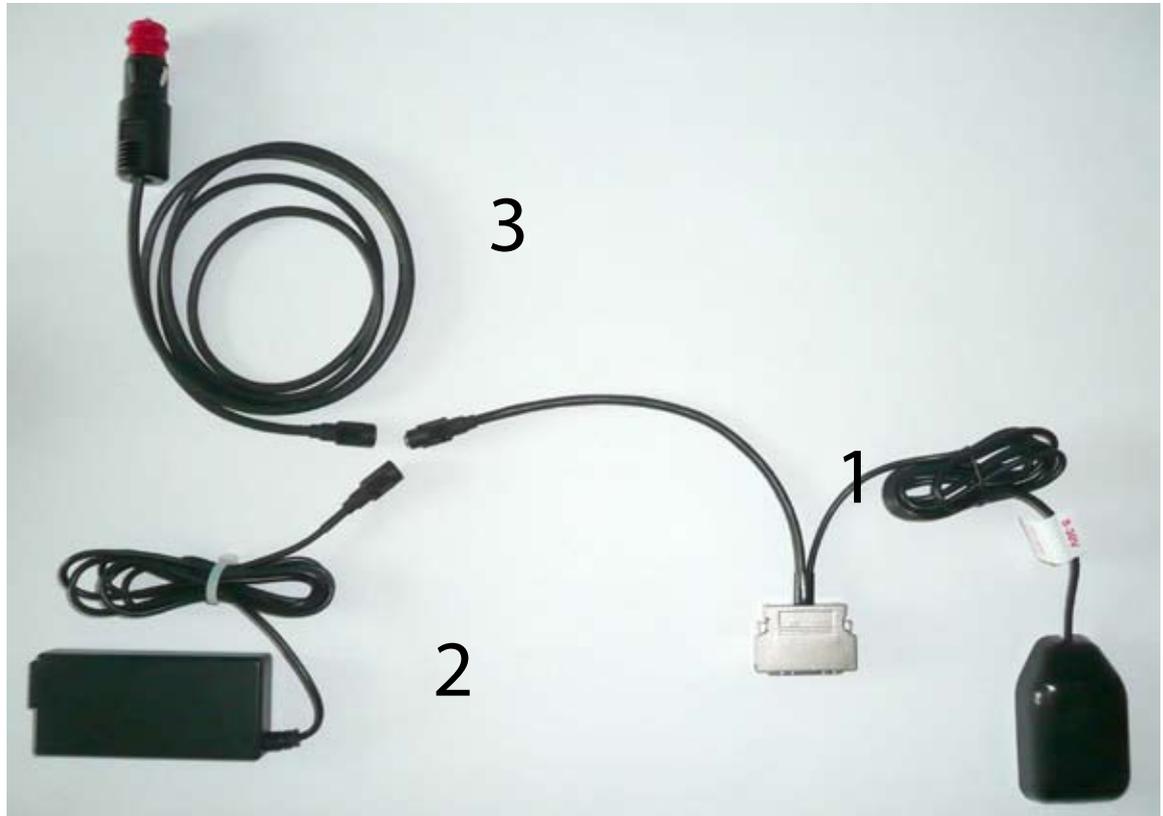


Fig. 5.7.1: Central connector plug

| No. in fig. | Description |
|-------------|---|
| 1 | Fast Integral GPS with central connector (to MT-VisionAir X ETSO) |
| 2 | 220 V power supply with clutch for direct connection to Fast Integral GPS, e.g. for trial connection before installation of the Fast Integral GPS on the aircraft or for mobile use/flight preparation. |
| 3 | Connection cable to on-board power supply/Fast Integral GPS installed on aircraft. |

Table 5.7.1: Connections of Fast Integral GPS

5.7.2 Connection of further COM / USB devices to central connector

If further connections are desired the manufacturer provides a test cabling. For final installation it is recommended to merge the shielded wires.

5.7.3 Optional 220 V power supply with central connector

Optionally a second 220 V power supply equipped with a central connector is available.

This might be convenient for mobile use of MT-VisionAir X ETSO in different locations, e.g. for flight preparation without GPS.

NOTE | In this case **strictly avoid** using both central connectors of the MT-VisionAir X ETSO at the same time.

5.8 MT-VisionAir X ETSO starts automatically as soon as power is connected

Once the MT-VisionAir X ETSO is powered via central connector it will automatically start.

5.9 Adjust the brightness of the screen

Use the **star button** down left to adjust the brightness. 5 squares (cyan) indicate the dimming level. Repeated pressing of the star button will be stepwise dim down to the lowest level and further pressing will set the brightness back to the the highest level.

5.8 Connecting GPS to the system

5.8.1 Fast Integral GPS

Fast Integral GPS connects to the 50-pin MDR central connector on COM2 according to following table:

| Function | Central Connector Pin | Fast Integral GPS Wire |
|----------------------|-----------------------|------------------------|
| RXD | 47 | Green |
| TXD | 48 | White |
| VCC = +12 to 36 V DC | 30 | Red |
| GND | 19 | Black |

Table 5.8.1: Connecting the Fast Integral GPS to central connector (50-pin MDR)

NOTE | For installation of the Fast Integral GPS in the proper location, refer to section “4.1 Installation of Fast Integral GPS” of this installation manual.

5.8.2 Connecting another type of GPS

Any GPS must be connected to COM 2.

| Function | Central Connector Pin | |
|----------|-----------------------|--|
| RXD | 47 | |
| TXD | 48 | |
| GND | 19 | |

Table 5.8.2: Connecting another type of GPS to central connector (50-pin MDR)

NOTE | For crossfill use of GARMIN 430/530 refer to chap. 6.

5.8.3 Configuration of the correct GPS in the software

GPS must be configured by pressing the following keys in the main menu:
<AUX> → <SETUP> → <GPS>

Select the correct GPS in the list of the available GPS receiver types:

| AVAILABLE GPS RECEIVER TYPES | | |
|------------------------------|-------------------|---|
| Extern | FAST INTEGRAL GPS | (9600 , NMEA) |
| | TRIMBLE | (9600 , AVIATION) |
| | KING KLN90 | (9600 , AVIATION) |
| | GARMIN 430/530 | (9600 , AVIATION) |
| | UNIVERSAL FMS | (9600 , AVIATION) |
| | FLARM | (38400 , NMEA) (ONLY FOR COMBINED TCAS DISPLAY) |
| | | |

Table 5.8.3: GPS drivers in software

6. Crossfill options

6.1 Crossfill from Garmin 430 / 530

6.1.1 System description

The VisionAir X accepts route information (in Aviation protocol) from an external GPS connected via serial port, for example a Garmin 430.

6.1.2 Prerequisites

- XFILL must be ordered and enabled
- The external GPS / equipment must send data in Aviation protocol, including the loaded route.

6.1.3 Configurations and usage

Further configuration may be needed by editing the „mtpro.ini“ configuration file. The procedure is as follows:

- Connect an USB keyboard
- Press SHIFT + 1 to call the configuration text editor

- Edit the desired parameters
- When finished press CTRL + X, then ,Y' to confirm and save the changes (,N' will discard all changes)
- Restart the system for the changes to take effect.

There are 2 possible configurations:

6.1.3.1 Configuration 1: Single GPS used both for Crossfill-IN and position data

Route data = Crossfill IN
+ GPS position

COM 2

Fig. 6.1.3.1 Single GPS for Crossfill-IN and position data

The MT-VisionAir X ETSO must be configured with one of these GPS types: Trimble, KLN90, Garmin 430/530 or Universal FMS

Only „Crossfill IN“ is possible, no „Crossfill OUT“.

No further setup is necessary in mtpro.ini.

Usage

- 1) Program a route in the Garmin 430
- 2) On the VisionAir X press navRTE - ROUTES - X-FILL
- 3) The latest route data received from the Garmin 430 will be copied into the MT-VisionAir X ETSO.

6.1.3.2 Configuration 2: Separate GPS devices used for Crossfill-IN and position data



Fig. 6.1.3.2 2 separate GPS for Crossfill-IN and position data

The position data is received by Fast-integral GPS connected to COM2.

Garmin 430 (or other Aviation protocol GPS) feeds route data into COM3. Position data sent into COM3 is discarded.

The following settings have to be entered in configuration file mtpro.ini:

```
[XFILL]
Port = 3
```

Usage

- 1) Program a route in the Garmin 430
- 2) On the MT-VisionAir X ETSO press navRTE - ROUTES - X-FILL
- 3) The latest route data received from the Garmin 430 will be copied into the MT VisionAir X

6.1.4. Limitations

- Whenever an Aviation/TNL GPS is selected as position input (-> AUX -> SETUP -> GPS) the COM3 port is freed and the system will NOT listen for flight plan data over it. It is NOT supported to have two GPS sending Aviation/TNL protocol at the same time to the VisionAir X.
- Only the first 31 waypoints of the route will be transferred via Crossfill, due to the structure of the Aviation protocol.

6.2. Transmission and Displaying of a User Route from an External Flightplanning Program

6.2.1 System description

VisionAir X accepts routes from external Flightplanning program in GPX format, transmission of the flightplan via USB stick.

6.2.2 Installation advice for USB port

Recommended is the usage of the USB via central connector, so the USBport can be provided at a suitable remote position and the MT-VisionAir X ETSO remains in place.

6.2.3 Prerequisites

- XFILL must be ordered and enabled
- the USB stick has to be formatted FAT32

6.2.4 Usage (see User manual)

→ navRTE → ROUTES → IMPORT

6.2.5 Error Messages using IMPORT Function

When giving the IMPORT command and no USB stick has been inserted, or if the USB memory cannot be read, the unit shows the following message:



In case no route files (in known format) are found:



When route files are found but cannot be interpreted:



7. Software Updates, OS Upgrade, Backup of User Data

7.1 Information about the system

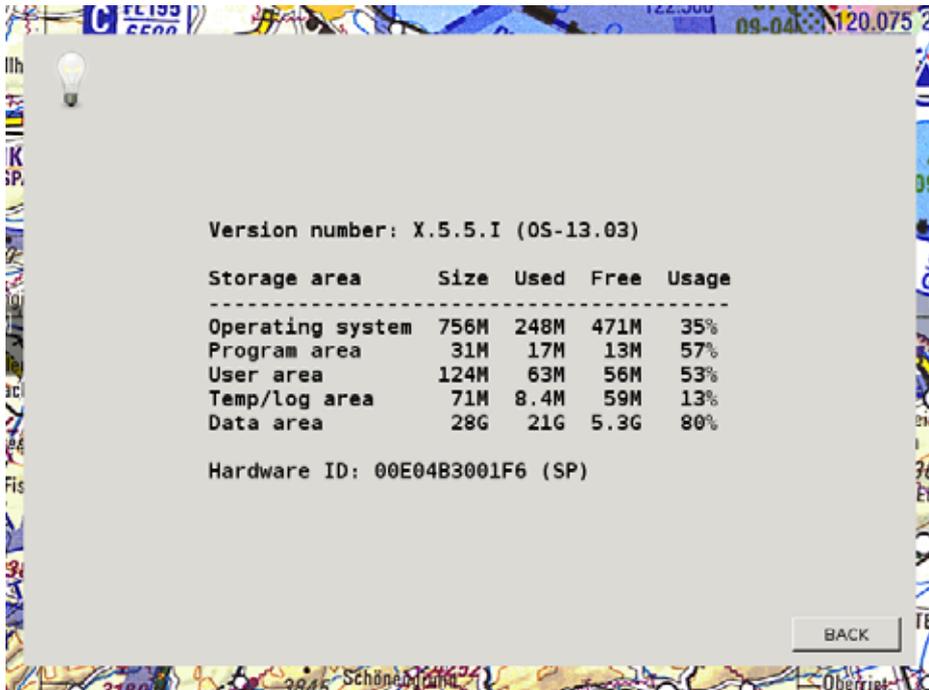
→ AUX → SETUP → VERSION

the current version number is displayed

1 x press: SW version



2 x press: version of operating systems
OS (operating system) version
Details for data storage
Hardware ID + (type of CPU)



7.2 Software Update / Update of Charts and Data

7.2.1 Prerequisites

For the updates you need:

- Power supply
- USB stick = update stick

The USB stick contains the file firmware.img.

Either the data have been downloaded from our website and saved on the stick or we send the prepared USB stick.

7.2.2 Procedure

Make sure a uninterrupted power supply is provided.

- Power off MT-VisionAir X ETSO
- Insert USB stick into the slot on the left bottom side of the MT unit with the logo showing upwards.
- Switch on MT-VisionAir X ETSO
- Update starts automatically
- Update was successful when the following message is shown: "Installation complete. Please remove update device and restart."
- Switch off MT-VisionAir X ETSO
- Remove the USB stick carefully and parallel to the slot.
- Switch on the unit again: starting the program might take some time. Once the keys are shining blue, background processes are running and MT program will be started soon.

NOTE

For a long update process, the screen may turn dark (enter the sleeping mode). To get the message of the successful update, please press the * button on the bottom left, so that the panel again „wakes up“. Wait for the message, do not pull out the stick before.

7.4 Backup of User Data

7.4.1 Prerequisites

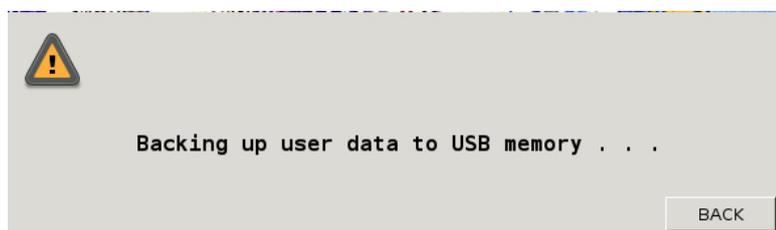
For the backup you need:

- Power supply
- USB stick (FAT32 formatted)

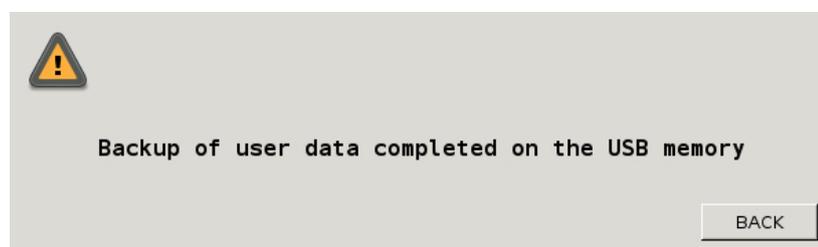
7.4.2 Procedure

Make sure a uninterrupted power supply is provided.

- Insert USB stick into the slot on the left bottom side of the MT unit with the logo showing upwards.
- Press → AUX → SYS → BACKUP
- This triggers a current backup of:
 - USER waypoints / routes / tracks
 - Logbook
 - Blitzplan FPL list and log in data
 - saved PDFs
 - current settings for display and system



- Wait till the status changes to:



- Press → BACK
- Remove the USB stick

The data backup is now completed and can be transferred to
other MT-VisionAir X ETSO
Backup workstation

7.4.3 Error Message

If the USB stick cannot be detected the following error message shows up:



7.5 Restore of User Data

→ RESTORE restores the data from the backup USB stick, e.g. to synchronize several MT-VisionAir X ETSO systems

7.5.1 Procedure

NOTE | All data on the unit will be overwritten!

Make sure a uninterrupted power supply is provided.

- Insert USB stick (FAT32 formatted) with user data you want to restore into the USB slot.
- Press → AUX → SYS → RESTORE
- Data which are restored (= overwritten):
 - USER waypoints / routes / tracks
 - Logbook
 - Blitzplan FPL list and log in data
 - saved PDFs
 - current settings for display and system

8. Entries in mtpro.ini - general info

To edit the mtpro.ini follow these instructions:

- Connect an USB keyboard
- Press SHIFT + 1 to call the configuration text editor
- Edit the desired parameters
- When finished press CTRL + X, then ,Y' to confirm and save the changes (,N' will discard all changes)
- Restart the system for the changes to take effect.

Note: -

- Lines with “;” do not take effect (comments)
- “[“ ”]” are square bracke
- upper- and lowercase notation is relevant

9. MT Satellite Radar and MT BLITZPLAN

9.1 System components for data transfer (Hardware/Software)

MT Satellite Radar and MT BLITZPLAN require the following components (hardware/software):

Hardware

- MT-VisionAir X ETSO with 50-pin MDR central connector for data transfer

plus

- a telephone connection

plus

- a GPS receiver.

Software

- For MT Satellite Radar: MT Satellite Radar Display software and access to DWD weather data (PCMET access) are required. You need to be a customer of PCMET.
- For MT BLITZPLAN: MT BLITZPLAN software needs to be installed.

9.1.1 Telephone connection

The telephone connection can be established via satellite telephone (Motorola Iridium 9555 or Thuraya XT-PRO) with data transfer cable and antenna and/or via UMTS-Modem.

NOTE

Satellite telephone connection and UMTS-Modem can be used in parallel. Switching must be done in the software (refer to section “8.5 Selection of the telephone connection (in the software)”).

When using the satellite telephone

- A special SIM-card is required for satellite telephones.
- Deactivation of Captains PIN (Iridium):
The Captains PIN must be deactivated. When shipped from Moving Terrain, the PIN is deactivated by default.
- Optional: Suppression of the security PIN code:
Standard satellite telephones (e.g. Iridium) allow the deactivation of the security PIN code, so that the telephone needs only be turned on. Further input is not required.

Using a UMTS-Modem

- The SIM-card of the UMTS-Modem must be international data roaming enabled. Contact the provider in your home country (or in the roaming country if you are on roaming) for detailed information.
- Following figure shows the insertion direction of the SIM-card:
-



Fig. 9.1.1: SIM-card insertion direction (UMTS-Modem)

- The security PIN of the SIM-card of the UMTS-Modem must be deactivated with your telephone beforehand.

9.1.2 GPS receiver

The GPS receiver can either be

- a Fast Integral GPS,
- or another type of GPS.

NOTE

The GPS has to transmit current time, because radar data download is not possible otherwise. Currently known GPS models that are not suitable and do not transmit the time: Garmin GNS430, GNS530.

If the GPS is not connected or has no access to the satellites, the time given by BIOS will be read in as UTC. A popup window will inform about this.

9.2 Connection of system components for data transfer

9.2.1 Block diagram of system components

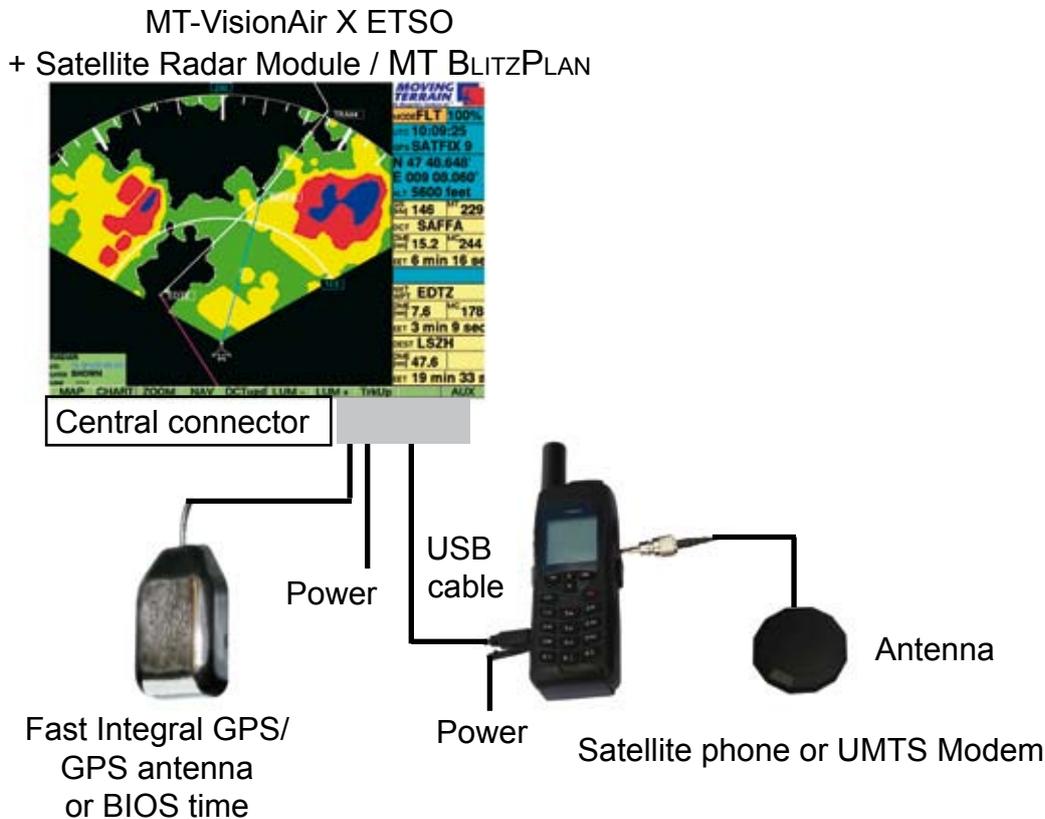


Fig. 9.2.1: Block diagram connections

NOTE

The components of the system must be correctly connected: For pin assignment of the central connector please refer to section “5.5 Pin layout of the central connector (50-pin MDR)”.

9.2.2 Connection options and Limitations

Depending on location of the unit there are different connection options:

- When the unit is mounted on the Easy mount in the cockpit: use the USB port of the central connector and the provided USB cable with central connector to connect the satellite telephone or the UMTS-Modem. Make sure to provide reliable power supply for the telephone (on board power).
- When connecting the satellite telephone via USB port of the central connector, it is necessary to install a satellite telephone holder for Iridium 9555 (for units with SP type of CPU) with a hub, see following section “6.3 Installation of the satellite telephone holder”.

- For mobile use: USB ports can be used directly to insert the UMTS-Modem stick.

NOTE

Signal Reception (UMTS stick installation)

If the UMTS stick is placed in the slot **and** the unit is mounted in the Easy mount the reception may not be sufficient. This must be considered and tested.

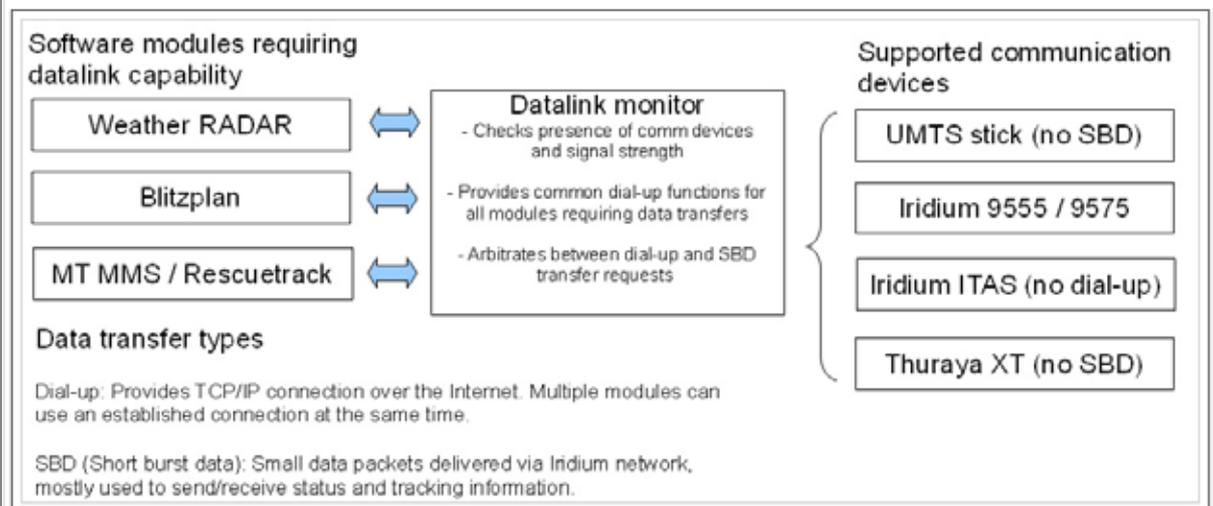
Alternativ solution is the connection via central connector in a suitable remote position.

NOTE

2 telephone sources via central connector

In case both telephone sources - the satellite phone and the UMTS stick - will be used and must be installed via central connector it is necessary to install a HUB to provide 2 connection the installation of a HUB is mandatory.

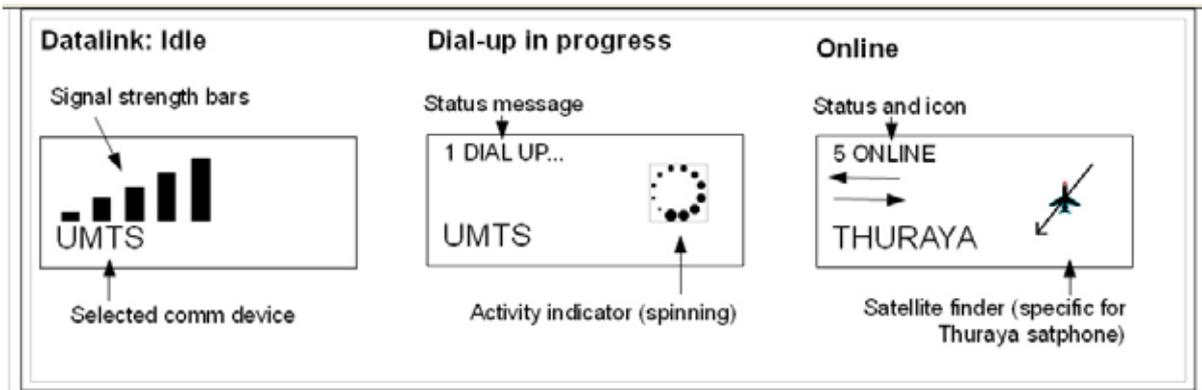
9.3 Datalink Overview



9.3.1 Datalink status infoblock

This infoblock appears on the left side of the 2D map screen whenever a data transfer is in progress or the RADAR menu is entered.

Graphic examples:



Corresponding screenshots with Download information:



9.3.2 Loss of communication with phone or modem

All communication devices are connected to the USB bus of the VisionAir X. In case of electromagnetic interference or bad cable connection the USB link may fail.

In this case the VisionAir X reacts as follows:

- IF: 1) a dial-up connection is requested (FPL or RADAR)
 2) .. and the modem / phone is not detected

THEN a prompt is shown and flashes periodically (~ 4 sec interval):

Modem not responding, check cabling/power. Retrying ...

Force USB reset (Y = Yes, perform USB reset; BACK = Cancel)

IF:

- 1) The communication device becomes available --> Prompt disappears and dial-up resumes automatically
- 2) The user presses ,Y' --> The VisionAir X resets the USB bus
- 3) The user presses any other key or button (e.g. BACK)--> Dial-up attempt is cancelled, RADAR goes to OFF

9.3.3 RADAR usage: Manual download / Live update

In DWD mode: press RADAR - M.LOAD to trigger a single RADAR download.

In Enhanced mode: the same button RADAR - LiveRad will behave differently depending on the current minute within the hour, as described in the following schema

| Time of request | Result |
|--|---|
| Minutes: 04 - 05, 19 - 20, 34 - 35, 49 - 50 | Downloads the latest 15-minute RADAR picture (during the first 2 minutes). |
| Minutes: 06 - 18, 21 - 33, 36 - 48, 51 - 03 | Requests a „Live update“ The RADAR server will recreate a composite RADAR image from the latest data available from each station. Some areas of the coverage may then show a more recent RADAR situation compared to the usual 15-minute picture. Live update needs 80 - 90 seconds more than a „normal“ download due to additional processing time on the weather server. |

Table 9.3.3: Time Sheet for Radar Update Requests

9.4 Satellite Phones

9.4.1 Thuraya XT-PRO

Usage

The Thuraya XT-PRO needs to get visual contact to the satellite which is in position 140°.

To get the connection it is needed to point towards 140° with the rod antenna.

Due to this restriction it is not possible to fix the Thuraya XT-PRO, because it is needed to point out of the window any time the download is needed.

Alternatively use an external antenna.

Use a docking station for Thuraya XT-PRO and a suitable antenna, e.g.

Antcom

P/N: 5GL1RxTxT-AP-XST-1

The download time is very fast - a few seconds for the complete European coverage. During this time the visual contact with the satellite must be provided.

Once it gets connection to the Thuraya net it remains online.

Costs: Only real data loading will be charged for.

Connection directly via USB via MDR50 central connector.

9.4.2 Iridium 9555

Usage

MT-VisionAir X ETSO unit with SP board:

Demands the mounting of the satellite telephone holder which provides a HUB to transform from USB 1 standard to USB 2 standard.

MT-VisionAir X ETSO unit with TT board:

No hub needed, direct connection to USB via central connector ok.

How to check the board type?

Use <AUX> <SETUP> <VERSION> <VERSION>

9.4.3 Installation of modified antenna adapter for Iridium 9555

9.4.3.1 Mounting / cable routing



Fig. 9.4.3.1: Parts / Cable routing of satellite telephone holder

1. Mounting of the back plate

Mount the back plate (D) of the holder in the cockpit according to your specification.

2. Cable routing to the satellite telephone

Lead the power supply cable (A) for the satellite telephone from below to the left hand side of the holder. Lead the USB cable from MT-Vision-Air X (B) and the audio cable of the SafetyCell (K) from below to the right hand side of the holder.

3. Cable routing from satphone

Lead the reserve cable from the USB hub (C) (for the optional 3G UMTS USB Stick), coming from the left hand side of the integrated USB hub, to the bottom of the satellite telephone holder.

9.4.3.2 Connections



Fig. 9.4.3.2.: Connections of satellite telephone holder

1. USB connection

Connect the USB cable from MT-VisionAir X ETSO (B) with the USB Hub of the satellite phone holder. Ensure that the plug is located straightly.

2. Secure screws with the holder / Strain relief

Now secure the front plate (E) to the back plate (D) with the connecting screws (F). The USB cable from MT-VisionAir X ETSO (B) must be clamped straightly.

3. Connection of the satellite telephone

Insert the satellite telephone into the cradle (G) of the holder. Connect the plugs (H), (J), (K) with the respective connector sockets.

9.4.3 Iridium 9575

Usage

Similar to Iridium 9555.

9.5 Installation of the iridium antenna

9.5.1 Recommended installation location of the iridium antenna

Like with the Fast Integral GPS the visible segment of the sky must be as big as possible (see “Installation of Fast Integral GPS”).

Position of the antenna:

The satellite antenna needs ideally about 180° free vision. The positioning on the glare shield is not ideal as it offers only vision of 2/3 of the sky.

Solutions:

- Installation in the rear roof window (Cessna)
- Installation directly under the plastic fuselage
- External antenna (mounted on the roof).

NOTE | The external antenna is the best and recommended solution.
| Contact your avionics installer.

9.5.2 Extension of the antenna cable

The antenna provided by Motorola can be extended using the RG58 cable (ideally shielded against interference).



Fig. 9.5.2: Extension cable of Motorola antenna

Material: RG58C/U 50 Ohm cable with foil- and braided shield
TCN male connector for RG58
SMA female connector for RG58
SMA male connector for RG174 resp. RGS316

NOTE | Trim the thin antenna cable as close as possible to the antenna.

9.5.3 Recommended solution of external antenna for Thuraya communication

Same instructions are to be maintained.

9.5.4 Solutions for improving reception

Mounting antenna on a ground plane

For the installation a ground plate (min 20x20 cm) made of conducting material is recommended. On this ground plate the antenna is mounted **with upward vision**. Conducting material (e.g. galvanized sheet metal) improves the reception. Make sure the plate is grounded to metallic part of the structure.

Avoiding interference of the antenna

- Distance (GPS to Iridium antenna) for optimal GPS reception must be 1.3 m or more.
- A distance of less than 40 cm between the antennas results in complete failure of GPS => SATACQ.

NOTE Interference often only shows up on the GPS (SATACQ or other error messages), but the satellite telephone has no reception in spite of showing a good signal quality. A good signal doesn't mean a good reception.

Non-MT GPS receivers sometimes show no error message in spite of a failure, because they still send data from the cache.

NOTE An ideal SatRadar download with Iridium takes approx. 3 min.
The Iridium reception is generally unstable, sometimes weak. The Iridium antenna should be installed with an optimal vision of the sky (horizon to horizon).
At testing keep enough distance to hangar etc.
While installing the Iridium antenna watch out for other GPS antennas (non-MT)!

9.5.5 Example for an internal installation

Installation of the GPS antenna on the glare shield, the antenna of the satellite telephone in the rear window - if available - facing up, such as in a Cessna. Such an installation is well suited as long as the minimum distance to the GPS antenna is 1.3 m.

9.5.6 ITAS module for MT-Mission Management System

All advises regarding the antenna position and the minimum distances between GPS and GPS antenna apply for ITAS module.

9.5.7 Advice for certification tests

Please be aware that interference of GPS reception by use of a satellite telephone cannot be totally ruled out (see also AC-20-138B, Advisory Circular - Airworthiness Approval of Positioning and Navigation Systems). It is therefore recommended to check the critical avionic devices when the satellite telephone is turned on during a ground test and during a test flight.

9.6 To adjust of the telephone connection(s) (in the software)

9.6.1 Authorization for download of radar data

Before radar data can be downloaded from Deutscher Wetterdienst (DWD) prior authorization is required once.

NOTE | Normally the authorization data (when known) are preset by Moving Terrain before shipping.

- (1) Turn on the unit.
- (2) Press the keys <AUX> <SETUP> <DIALUP> <RadAuth>.

This leads to the **DWD AUTHORIZATION** page:

Enter **FTP USERNAME** (beginning with Lf)

FTP PASSWORD

online username

online password.

These are communicated by DWD on request.

Upper and lower case must be observed.

| Key | Function |
|------|--|
| SAVE | To save the input |
| DEL | To delete a single character, if hold the whole input will be deleted |
| CAPS | To enter an uppercase letter: First press CAPS key, followed by the appropriate letter key. |
| NEXT | Tab between the fields USERNAME and PASSWORD |
| BACK | Confirmation of entries. Both entries will be automatically stored. These need not to be re-entered. |

Table 9.6.1: Description of keys and functions on PCMET FTP USER AUTHORIZATION screen

- (3) Confirm the entries by pressing the key <BACK>.
- The RADAR screen is displayed.

9.6.2 Selection of the telephone connection (in the software)

First connect the satellite phone / UMTS Modem, then turn on the MT-VisionAir X ETSO unit.

(1) Press the keys <AUX> → <SETUP> → <DIAL-UP>.

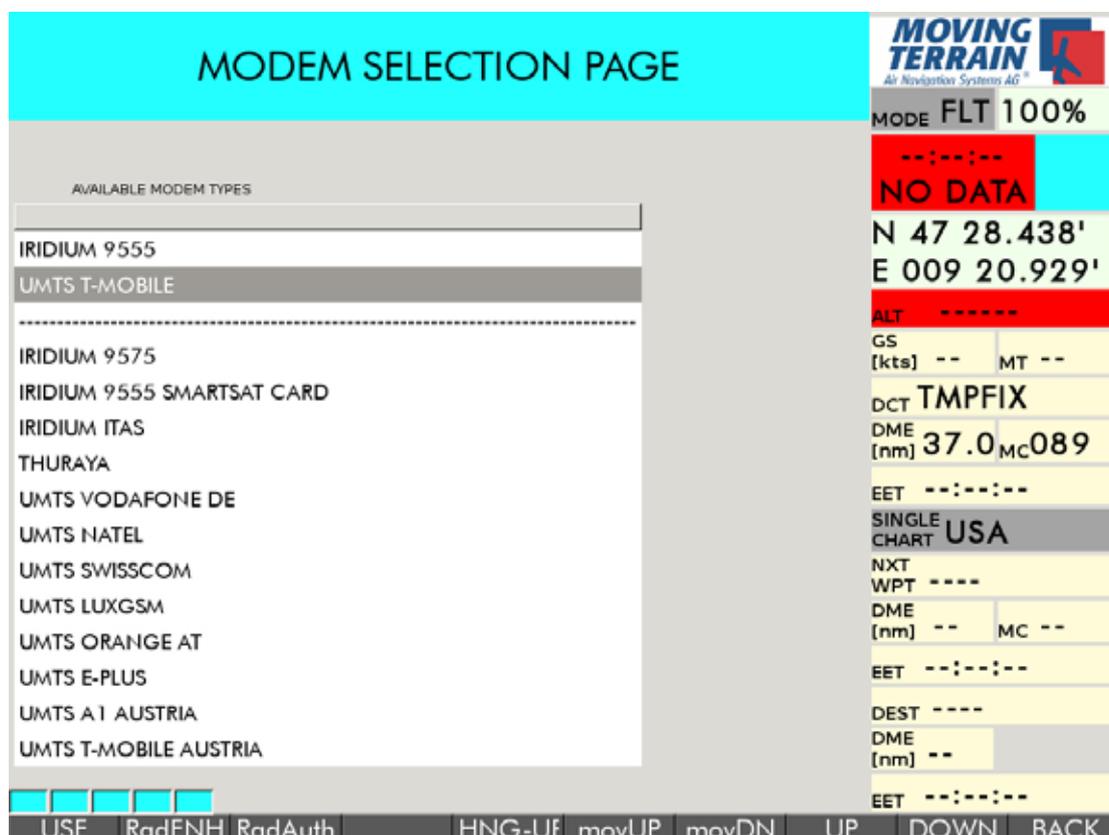


Fig. 9.6.2: MODEM SELECTION PAGE (Example)

| Key | Function |
|-----------------|--|
| USE | Confirmation of the selected choice of modem type |
| RadDWD / RadENH | Toggle between Sat Radar DWD (central European coverage) and Sat Radar Enhanced (European Coverage) |
| RadAuth | Authorization page |
| HNG-UP | Hang up, manual termination of modem connection. The connection is active for 3 minutes and ends automatically afterwards. During the countdown from 180 to 0 seconds the connection can be interrupted by pressing <HNG-UP>, e.g. for starting a new request. |
| movUP | To move a telephone source upwards within the list |
| movDN | To move a telephone source downwards within the list |
| DOWN / UP | Selection of items in the list. The key labels change depending on position. |
| BACK | Return to previous screen |

Table 9.6.2: Description of keys and functions on MODEM SELECTION PAGE

(2) Sort the modem selection page according to the telephone sources which are in use:

Move the 2 telephone types you will use above the line by pressing <movUP> and <movDN>

(3) Select desired item in the list with the key <DOWN> resp. <UP>.

(4) Confirm with <USE>.

(5) Return to previous screen by pressing <BACK>.

The selected modem type is valid for both MT Satellite Radar and MT BLITZPLAN.

NOTES

If you want to make Data Call, then select the VODAFONE option as default. If an error message occurs (protocol error) then try using the TMOBILE option.

Use "Iridium 9555 smartsat card" when you have a contract with Smart Sat COM. If you have a contract with another provider use "Iridium 9555 satellite phone".

9.7 Test of radar data download: MT Satellite Radar (Enhanced)

Following installation of the telephone connection a test of radar data download should be performed to ensure that installation has been successful.

9.7.1 Download of radar data for MT Satellite Radar (standard)

Prerequisites

- Telephone connection is provided
- Fast Integral GPS is connected -> UTC will be delivered

Procedure

- (1) Turn unit on.
- (2) Press key <RADAR> (MT Satellite Radar).

The RADAR screen is displayed.

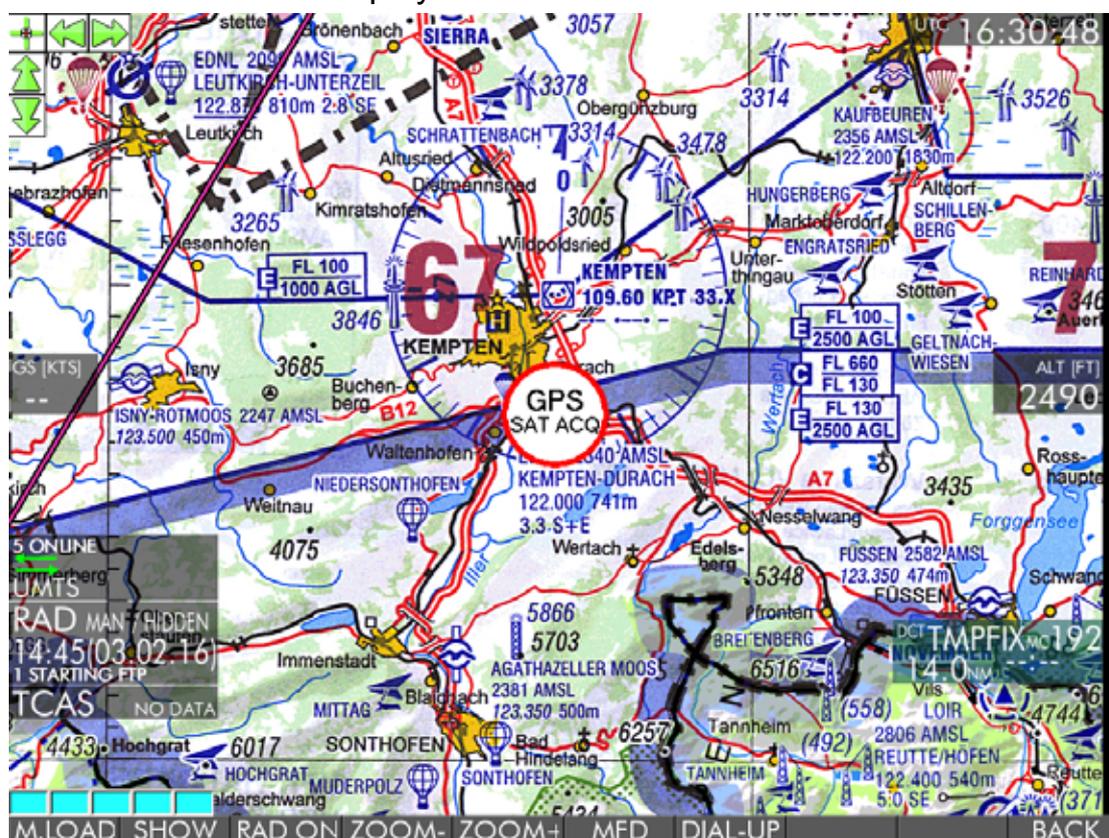


Fig. 8.7.1: RADAR screen (initial)

| Key | Function |
|-------------|---|
| M.LOAD | Manual Mode: Manual download of radar data. Allows an immediate one time download of radar data, e.g. at the beginning of the weather briefing. |
| SHOW / HIDE | Display of radar data previously downloaded / Suppress radar layer for better legibility of the chart. The key labels change depending on available function. |

| Key | Function |
|------------------|--|
| RAD ON / RAD OFF | Starts / terminates the automated download of radar images every 15 min. Complete automated handling of the full procedure without any further inputs. In the case the telephone is busy due to a voice call, the procedure will start as soon as the line is available again. |
| ZOOM+ | Zooming in of the chart / decrease the scale factor for the displayed range of data. In steps of 500 / 400 / 300 / 200 / 150 / 100 / 50 % depending on the map scale. |
| ZOOM- | Zooming out of the chart / increase the scale factor for the displayed range of data. In steps of 50 / 100 / 150 / 200 / 300 / 400 / 500 % depending on the map scale. |
| DIAL-UP | Switches to MODEM SELECTION PAGE |
| << | Scroll back in the download history of radar data |
| >> | Scroll forward in the download history of radar data |
| BACK | Return to previous screen |

Table 9.7.1: Description of keys and functions on RADAR screen

NOTE | The keys are labelled with the appropriate function that can be executed.

The status window

The **status window** is displayed in the left part of the map display.



- ... information about connection status and type
- ... Status SHOWN or HIDDEN / type MAN or AUTO
- ... UTC time of data of displayed download
- ... Download message (see below for detailed description)

NOTE

The download messages provide information concerning the current download (success, progress and error messages). The progress messages are displayed quickly, so not all of them are readable.

- (3) Press key <M.LOAD> to start the manual download of radar data.
No further entries are required.
- (4) Check the download message.
 - If the latest file was already downloaded into unit, LATEST AVAILABLE is displayed. Press key <SHOW> to display.
 - Otherwise the download proceeds with the following steps:
 - Dialing
 - Establish a connection
 - File transfer via FTP (Starting FTP, searching file, downloading file)
 - Termination of connection.

9.7.2 Download of radar data for MT Satellite Radar Enhanced

Prerequisites

- Telephone connection is provided
- Fast Integral GPS is connected -> UTC will be delivered
- System is set to MT Satellite Radar Enhanced and prepared for downloads of the full European coverage <AUX> <SETUP> <DIALUP> <RadENH> (now the button shows <RadDWD> !)
- The subscription for the data downloads is valid

Procedure

- (1) Turn unit on.
- (2) Press key <RADAR> (MT Satellite Radar Enhanced).

The RADAR screen is displayed.

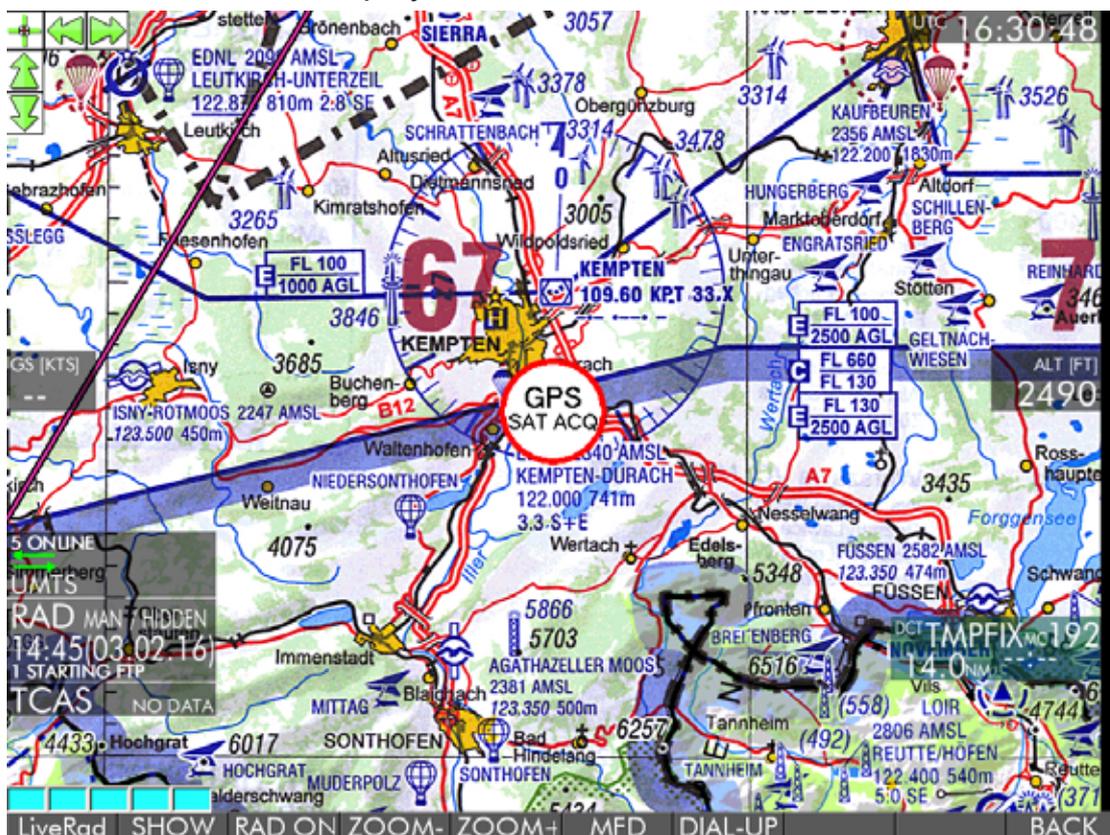


Fig. 8.7.2: MT Satellite Radar Enhanced screen (initial)

| Key | Function |
|------|--|
| Live | Download of radar pictures inbetween the 15 minutes download cycles: Provided by some countries in Europe |

| Key | Function |
|------------------|--|
| SHOW / HIDE | Display of radar data previously downloaded / Suppress radar layer for better legibility of the chart. The key labels change depending on available function. |
| RAD ON / RAD OFF | Starts / terminates the automated download of radar images every 15 min. Complete automated handling of the full procedure without any further inputs. In the case the telephone is busy due to a voice call, the procedure will start as soon as the line is available again. |
| ZOOM+ | Zooming in of the chart / decrease the scale factor for the displayed range of data. In steps of 500 / 400 / 300 / 200 / 150 / 100 / 50 % depending on the map scale. |
| ZOOM- | Zooming out of the chart / increase the scale factor for the displayed range of data. In steps of 50 / 100 / 150 / 200 / 300 / 400 / 500 % depending on the map scale. |
| DIAL-UP | Switches to MODEM SELECTION PAGE |
| << | Scroll back in the download history of radar data |
| >> | Scroll forward in the download history of radar data |
| BACK | Return to previous screen |

Table 8.7.2: Description of keys and functions on RADAR screen

NOTE | The keys are labelled with the appropriate function that can be executed.

The status window is analog to MT Satellite Radar.

plus information of satellite finder.

Online

Status and icon



Satellite finder (specific for Thuraya satphone)

The table below shows the process-step related progress, success and error messages and the necessary actions in case of an error.

9.7.3 Download messages in detail

| Process | Possible error message | Meaning / Error cause | User action |
|---------|--|---|--|
| DIALING | | Dialing to the network to make a connection. | |
| | GPS CLOCK ERROR | GPS clock has no valid UTC for downloading the weather file. | Connect GPS and get UTC from GPS. |
| | SIM PIN ISSUE | PIN not disabled for SIM card | Deactivate PIN (via telephone). |
| | SIM NO SIGNAL | No signal detected to carry out the call (Voice / Data) | Allow reception or wait for getting the signal. |
| | SIM NOT REGISTERED | SIM is not registered for network access. | Contact provider. |
| | SIM DATA TRANSFER DISABLED | SIM card has no data download option. | Contact provider. |
| | SIM FAILED AUTHENTICATION | Authentication for SIM card failed to enter the network. | Contact provider. |
| | SIM NOT DETECTED | SIM card not inserted correctly. | <ul style="list-style-type: none"> • Insert SIM card correctly. • Check SIM card. |
| | IRIDIUM NOT CONNECTED or STICK NOT CONNECTED | Selected modem type is IRIDIUM SAT RADAR or UMTS STICK, but no appropriate hardware connection was found. | <ul style="list-style-type: none"> • Connect telephone (when selected modem type is IRIDIUM SAT RADAR). • Connect UMTS Modem stick (when selected modem type is UMTS STICK). |
| | IRIDIUM ALREADY IN USE or STICK ALREADY IN USE | There is already an active call going on using the Iridium phone resp. UMTS Modem. | Terminate the connection by pressing the keys <AUX>, <SET-UP>, <DIAL-UP>, <HNG-UP> and start again. |

| Process | Possible error message | Meaning / Error cause | User action |
|---------------------|---|--|---|
| | WRONG MODEM SELECTION | The selected modem option is not a valid / supported option. | Select correct modem in Modem Selection page (refer to section 6.5). |
| WAITING FOR CARRIER | | | |
| CARRIER DETECTED | | Successful authentication searching for ISP or searching for the server | |
| | NO CARRIER DETECTED | Signal problem | Allow reception. Retry the action if signal is back after sometime. |
| | SEARCHING FOR ISP (for UMTS) or- SEARCHING FOR SERVER (for Iridium) | | |
| | ISP CONN PROBLEM | SIM card problem with the connection to the ISP (Internet Service Provider). | Check your APN (Access Point Network) settings. The MT software will retry, but in case it fails call your provider to get the APN information. |
| | PPP STARTED | | |
| CONN ESTABLISHED | | Connection to server (Internet Service Provider ISP or RADAR/BLITZPLAN) established. | |
| | LOGGED IN BLITZPLAN | | |
| | SERVER DOWN OR BUSY | | Retry after sometime |
| STARTING FTP | | Starting FTP (File Transfer Protocol) to download the latest radar file | |
| | WEATHER SERVER DOWN | RADAR server down or currently too busy to process the download request. | Try again later (e.g. in 1 minute) |

| Process | Possible error message | Meaning / Error cause | User action |
|------------------|------------------------|--|---|
| | SERVER UNREACHABLE | RADAR server unreachable for the moment. | Try again later (e.g. in 1 minute) |
| | SERVER LOGIN PROBLEM | DWD login information is incorrect. | <ul style="list-style-type: none"> • Contact MT support. • Change DWD login data. |
| | RETRYING FTP | Problem in carrying out the download. | Wait. Software will retry. |
| SEARCHING FILE | | Searching the RADAR file on server. | |
| | FTP TIMEOUT | Network speed too slow / file too big (at 1st occurrence). | Wait. Software will retry. |
| | SERVER RESPONSE ERROR | Unable to get a response from RADAR server (during retry). | Wait. Software will retry. |
| | FATAL ERROR | Probably the connection was lost during download. | Try again later. |
| DOWNLOADING FILE | | Download in progress. | |
| | Wrong UTC | UTC is invalid. | Verify GPS time and reception. |
| | WRONG BIOS UTC | BIOS time is wrong. | Report to MT. |
| 100% DOWNLOADED | | RADAR file fully downloaded. | |
| HANGING UP | | Hanging up an active call. | |
| DISCONNECTED | | The active call has been disconnected. | |

Table 8.7.3: Description of download messages in detail (status window)

9.7.4 Overview: RADAR download statuses, messages and timings

Note: Reported timings are typical for Thuraya
 R = Radar download step - message appears in RAD infoblock: D = Datalink step - message appears in Datalink infoblock

| Step | Message DWD | Message Enhanced | Thuraya / Iridium / UMTS Timings for Thuraya alt: Error Message |
|------|-------------------------------|--|--|
| R0 | 0 AUTO UPDATE 0 MAN UPDATE | 0 AUTO UPDATE 0 MAN UPDATE 0 LIVE UPDATE | 26 seconds to establish networking connection |
| D1 | 1 DIAL-UP... | 1 DIAL-UP... | < 1 sec |
| | | | RETRYING (MODEM NOT READY) |
| | | | THURAYA NOT CONNECTED [RAD ON] |
| D2 | 2 WAITING FOR CARRIER | 2 WAITING FOR CARRIER | < 1 sec |
| | | | RETRYING (NO CARRIER) |
| D3 | 3 PPP STARTED | 3 PPP STARTED | 3 sec |
| | | | RETRYING (PPP ERROR). |
| D4 | 4 SEARCHING FOR ISP | 4 SEARCHING FOR ISP | 21 sec |
| | | | RETRYING (PPP ERROR).. |
| D5 | 5 ONLINE | 5 ONLINE | -- |
| R1 | 1 CONTACTING SERVER | 1 REQ RADAR or 1 REQ RADAR (xx/90 s) | 8 sec (~90 sec for live upd.) |
| | | | FTP LOGIN ERROR Error: Check DWD Login |
| | | | [RAD ON] |
| | | | NO NEWER IMAGE |

Table over 2 pages!

| Description |
|--|
| RADAR download has been triggered, either manually (M.LOAD) or by the automatic timer (RAD ON) The message stays until the system has achieved a network connection |
| Modem Initialisation, Sending Modem Commands |
| The modem is not responding to commands --> Back to D1 |
| The satphone appears to be unplugged --> The connection is aborted --> Radar is switched off] |
| Wait for Modem Response |
| Modem reports it cannot connect ->(probably not enough signal strength or ->no satellite in view) --> Back to D1 |
| Negotiation of networking protocol is in progress |
| The networking protocol negotiation failed In this case the dial-up call also drops --> Back to D1 |
| Negotiation of networking protocol is in progress |
| The networking protocol negotiation failed In this case the dial-up call also drops --> Back to D1 |
| Networking established |
| VisionAir X has sent the request to the server to start the weather download, and it is waiting for an answer xx = counting up (seconds) |
| DWD Username and/or Password are not valid --> Download attempt is aborted |
| --> Radar is switched off |
| The server has no newer image than the VisionAir X, download skipped --> Go to R6 |

| Step | Message DWD | Message Enhanced | Thuraya / Iridium / UMTS Timings for Thuraya alt: Error Message |
|------|-------------|--------------------|---|
| | | | RETRYING (SERVER DOWN) |
| | | | RETRYING (SERVER UNREACHABLE) |
| | | | RETRYING (TIMEOUT) |
| | | | RETRYING (PROTOCOL ERROR) |
| | | | HTTP SERVER ERROR [RAD ON] |
| | | | HTTP BAD REQUEST [RAD ON] |
| | | | Unable to connect to weather server [RAD ON] |
| | | | Unable to read weather data [RAD ON] |
| | | | Try again in xx seconds. |
| | R2 | 2 SEARCHING FILE | |
| | R3 | 3 DOWNLOADING FILE | |
| | R4 | 4 DOWNLOADING: xx% | 4 DOWNLOADING: xx% 3 sec |
| | | | RETRYING (TIMEOUT) |
| | R5 | | DECODING IMAGE 7 sec |
| | | | DECODE ERROR (x) x = diagnostic code |
| | R6 | LATEST AVAILABLE | LATEST AVAILABLE |
| | | | TOTAL 18 sec for Rad Download only |
| | | | TOTAL 44 sec incl DialUp |

| Description |
|---|
| The server refused the connection --> Back to R1 |
| The network reports that the server cannot be reached --> Back to R1 |
| Timeout is 25 sec (or 120 sec for live update) without receiving any data |
| (DWD) error in FTP protocol --> Back to R1 |
| There was a fatal error on the server --> Download attempt is aborted --> Radar is switched off |
| The server did not understand the request (VisionAir X may need a firmware upgrade) --> Download attempt is aborted --> Radar is switched off |
| MT server cannot connect to weather server --> Download attempt is aborted --> Radar is switched off |
| MT server could not receive the whole image from the weather server --> Download attempt is aborted --> Radar is switched off |
| The MT server does not request another update from the weather server before 2 minutes have passed since the previous request. |
| |
| |
| File size: 14505 bytes |
| Timeout is 25 sec (or 120 sec for live update) without receiving any data |
| |
| |
| |
| |
| |
| |

9.7.5 Download test completed

After successful download radar data are shown on the screen.

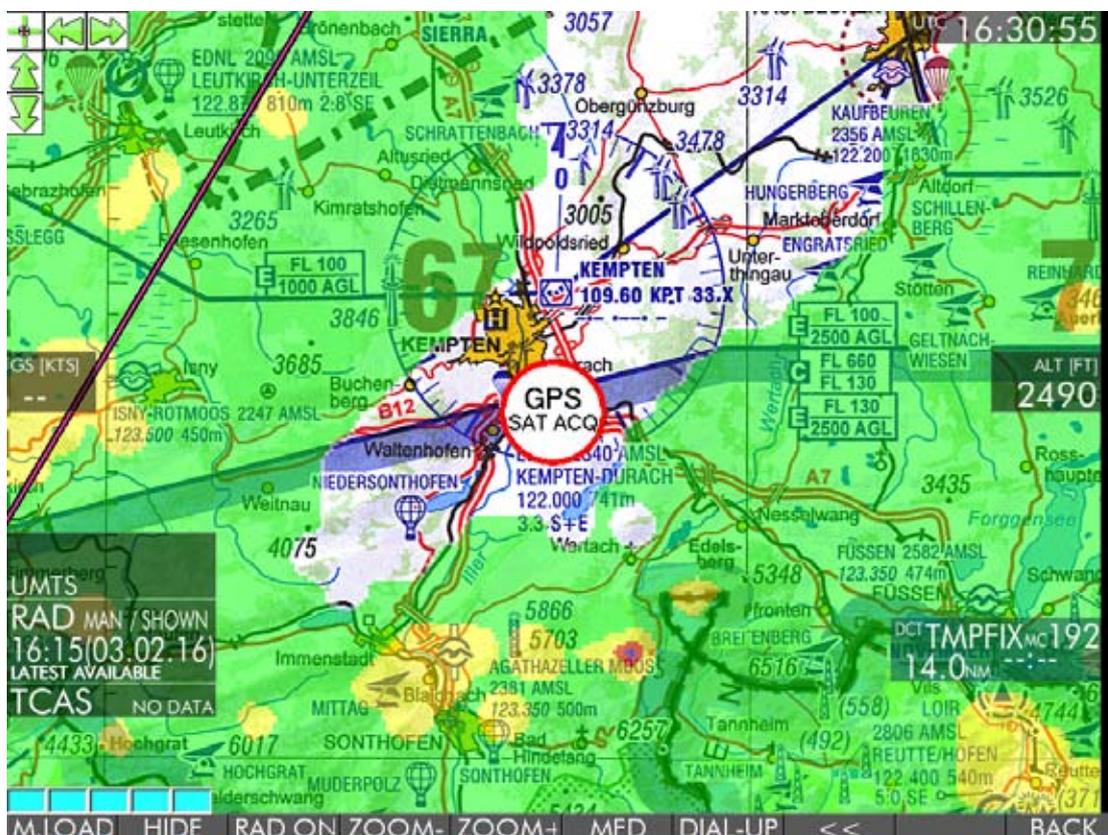


Fig. 9.7.4 (1): RADAR screen with radar data on ICAO chart

If precipitation information is not displayed there are two possible causes:

- Layer is still suppressed (status HIDDEN).
Solution: press <SHOW>.
- No precipitation was recorded for the area of the chart displayed.
Check status display, layer status is SHOWN
- Check in MFD Mode by using <ZOOM-> to adjust the range to European overview

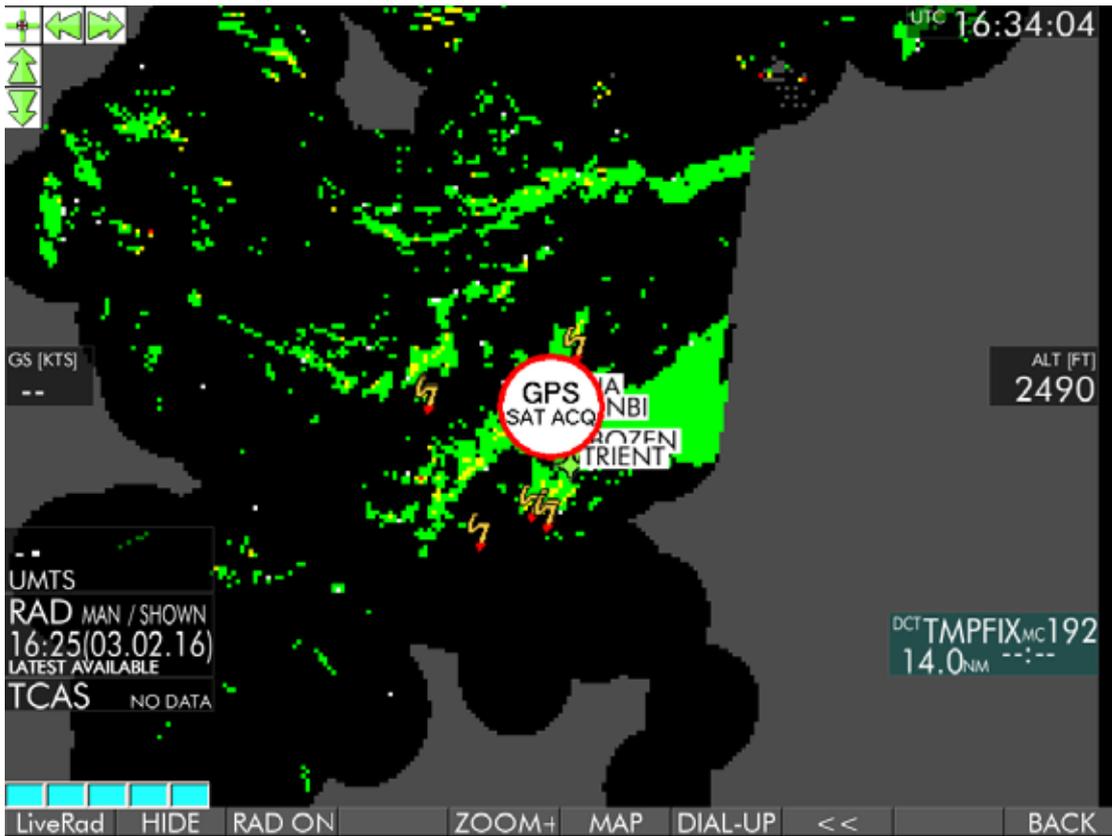


Fig. Fig. 9.7.4 (2) RADAR in MFD mode

After successful completion of the download, it may be assumed that installation is correct.

9.8 Test of MT BLITZPLAN connection

NOTE Before testing MT BlitzPlan connection make sure that the correct telephone modem has been selected. Refer to section “6.5 Selection of the telephone connection (in the software)”.

Starting MT BLITZPLAN

- (1) Turn unit on.
- (2) Press key <FPL> (Flightplan).

Either the MT BLITZPLAN Login screen (A) or Flightplan Archive screen (B) is displayed.

(A) Account information / LOGIN

When using MT BLITZPLAN for the first time with your MT-VisionAir X ETSO unit, Username and Password are required.

NOTE Normally the authorisation data (when known) are preset by Moving Terrain before shipping.

- (1) Type in your Username (or ACT ID without “-”) and Password.
- (2) Confirm with <Login>.

LOGIN data must be entered once and are then permanently stored.

Fig. 8.8 (1): MT BlitzPlan Login

| Key | Function |
|-------------|---|
| PREV / NEXT | Tabs between the fields USERNAME and PASSWORD |
| Login | Confirm data and log in |
| DEL | Deletes character last entered |
| Char | Enter special characters like SPACE, ., -, / |
| Archive | Shows the list of previously downloaded flights |
| Exit | Leave the LOGIN screen |

Table 8.8: Description of keys and functions on MT BLITZPLAN Login screen

(B) Flightplan Archive screen (when LOGIN data are correct)

Status messages are displayed in the upper right corner of the Flightplan Archive screen.

NOTE | With every request to the MT Server a modem connection is established.
 Connection time is 3 minutes and ends automatically afterwards.
 You can interrupt the connection during the countdown from 180 to 0 seconds by pressing <DIAL-UP >, then <HNG-UP>.

A list of stored flightplans is displayed on the Flightplan Archive screen. In case there are no flightplans in the archive, only the entry NEW IFR FLIGHTPLAN appears.

| Flightplan Archive | | | | | | | | OFFLINE DATA UMS T-Mobile |
|--------------------|----------|------|------|------------|------------|---------------------|---------------------|---------------------------|
| DOF | DEP Time | DEP | DEST | Acft Ident | Status | Date routed | Date uploaded | |
| 111031 | 1546 | EDDH | EDDM | DEMOZ | Not Valid | 2011-10-31 14:51:02 | 2011-11-08 16:15:50 | |
| 111029 | 1546 | EDDH | EDDM | DEMOZ | Route OK | 2011-10-27 16:36:58 | 2011-11-08 16:15:50 | |
| 111027 | 1000 | EDDH | EDNL | DEMGG2 | Route OK | 2011-10-25 11:28:57 | 2011-11-08 16:15:51 | |
| 111026 | 1546 | EDDH | EDDM | DEMOZ | Activating | 2011-10-25 14:31:00 | 2011-11-08 16:15:51 | |
| 111025 | 1000 | EDDH | EDNL | DEMGG2 | Route OK | 2011-10-24 17:02:53 | -- | |
| 111024 | 1746 | EDDH | EDDM | DEMGG2 | Cancelled | 2011-10-19 20:18:20 | -- | |
| 111024 | 1546 | EDNL | EDDM | DEMGG2 | Route OK | 2011-10-19 20:20:20 | 2011-11-08 16:15:50 | |
| 111024 | 1000 | EDDB | EDNL | DEMGG2 | Route OK | 2011-10-20 07:54:52 | -- | |
| 111023 | 1900 | EDDH | EDNL | DEMGG2 | Route OK | 2011-10-19 20:25:44 | -- | |
| 111023 | 1546 | EDDH | EDDM | DEMOZ | Route OK | 2011-10-21 14:01:44 | -- | |
| 111023 | 1546 | EDMK | EDDM | DEMOZ | Route OK | 2011-10-19 15:48:05 | -- | |
| 111022 | 1546 | EDDH | EDDM | DEMOZ | Route OK | 2011-10-19 17:37:21 | 2011-11-08 16:15:51 | |
| 111022 | 1000 | EDDH | EDNL | DEMOZ | Route OK | 2011-10-19 20:23:38 | -- | |
| 111022 | 1000 | LESB | EDDF | DEMGG2 | Route OK | 2011-10-21 16:38:56 | -- | |
| 111022 | 1000 | LESB | EDFZ | DEMGG2 | Not Valid | 2011-10-21 16:25:37 | -- | |
| 111021 | 1900 | EDDH | EDDM | DEMGG2 | Cancelled | 2011-10-19 14:27:27 | -- | |
| 111020 | 1746 | EDDH | EDDM | DEMGG2 | Cancelled | 2011-10-17 07:08:18 | -- | |
| 111018 | 1546 | EDDH | EDDM | DEMGG2 | Route OK | 2011-10-17 07:04:02 | -- | |
| 111018 | 1546 | EDDH | EDNL | DEMGG2 | Route OK | 2011-10-17 07:10:24 | -- | |

Fig. 8.8. (2): Flightplan Archive

Choose a flight plan which is marked “Route OK” but not uploaded yet (“Date uploaded” empty) and press “UPLFPL” to start the process. If the plan gets loaded the connection test was performed successfully.

If there are no plans available enter a new flightplan and get the routing by pressing ROUTE (only visible if all fields for the flightplanning are filled in correctly). Be aware that every query for routing will cause costs for the customer. Please call customer’s service at Moving Terrain for further help.

For detailed information about MT BLITZPLAN refer to the MT BLITZPLAN manual.

10. MT TCAD Interfaces

This chapter covers the installation (connections and configuration) of the different TCAS interfaces supported by the MT-VisionAir X ETSO. When **starting up for the first time after installation of the components**, the connected TCAS unit has to be selected. The selection will be saved for future use.

The selectable TAS sources are displayed by pressing the keys <AUX> <TCAS> → <TAS1SEL> and <TAS2SEL> in the MT main menu each giving the following options:

- **** NOT INSTALLED ****
- **Avidyne/Ryan**
- **ZAON**
- **FLARM**
- **GARRECHT TRX1090**

NOTE | After a change of a TAS source a restart of the system will be necessary.

10.1 MT TCAD Interface for Avidyne TAS600 series

10.1.1 System components Avidyne TAS600 series

Views, dimensions and weight

Total view of the components:

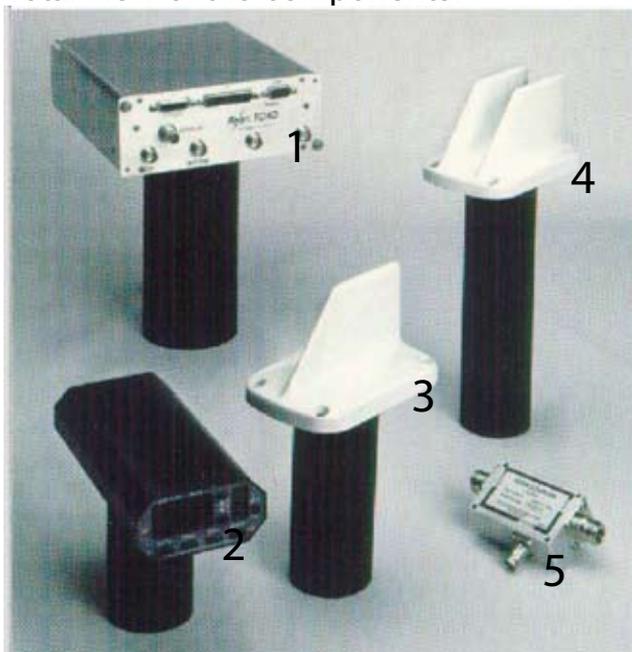


Fig. 10.1.1 (1): View of components

The overall system weight is 4.18 kg.

For a description of the components and the dimensions please refer to the

Dimensions of the components:

| Component | | Width [cm] | Height [cm] | Depth (with connectors) [cm] |
|-------------|--------------------------------|------------|-------------|------------------------------|
| No. in fig. | Name | | | |
| 1 | Processor | 18.41 | 7.87 | 23.68 (29.65) |
| 2 | Operating panel | 8.28 | 3.94 | 17.15 (21.59) |
| 3 | Directional antenna (serial) | 8.23 | | 13.06 |
| 4 | Directional antenna (parallel) | | | |
| 5 | Transponder coupler | 4.57 | 4.07 | 6.86 |

Table 10.1.1 (2): Dimensions of components

10.1.2 Avidyne TAS600 series standard installation of antennas

The Avidyne TAS600 series has two double antennas (two serial antennas in a single casing). Together both antennas are responsible for direction determination (bearing).

| Type of antenna | | Installation location | Diagram |
|---|---|-----------------------|--|
| Serial 2 antennas integrated in one casing |  | top | The diagram of the single casing antenna alternately points forward and back |
| Parallel 2 antennas parallel side by side |  | bottom | The diagram of the single casing antenna alternately points left and right. |

Table 10.1.2: Installation of antennas

Function

The four different antenna diagrams are wired sequentially. The bearing is calculated from the various signal strengths of the pulses received.

Distance is calculated from the time differential between the transmitted pulse and the received response pulse (as in any secondary radar).

10.1.3 Avidyne TAS600 series installation recommendations for serial antennas (head antennas)

The installation location should be close to the longitudinal axis of the aircraft.

For plastic covers install a ground plane (foil inside)

- Radius larger or equal 30 cm
- Diameter larger or equal 60 cm (l = 27 cm)
- At least 20 cm distance from other antennas.

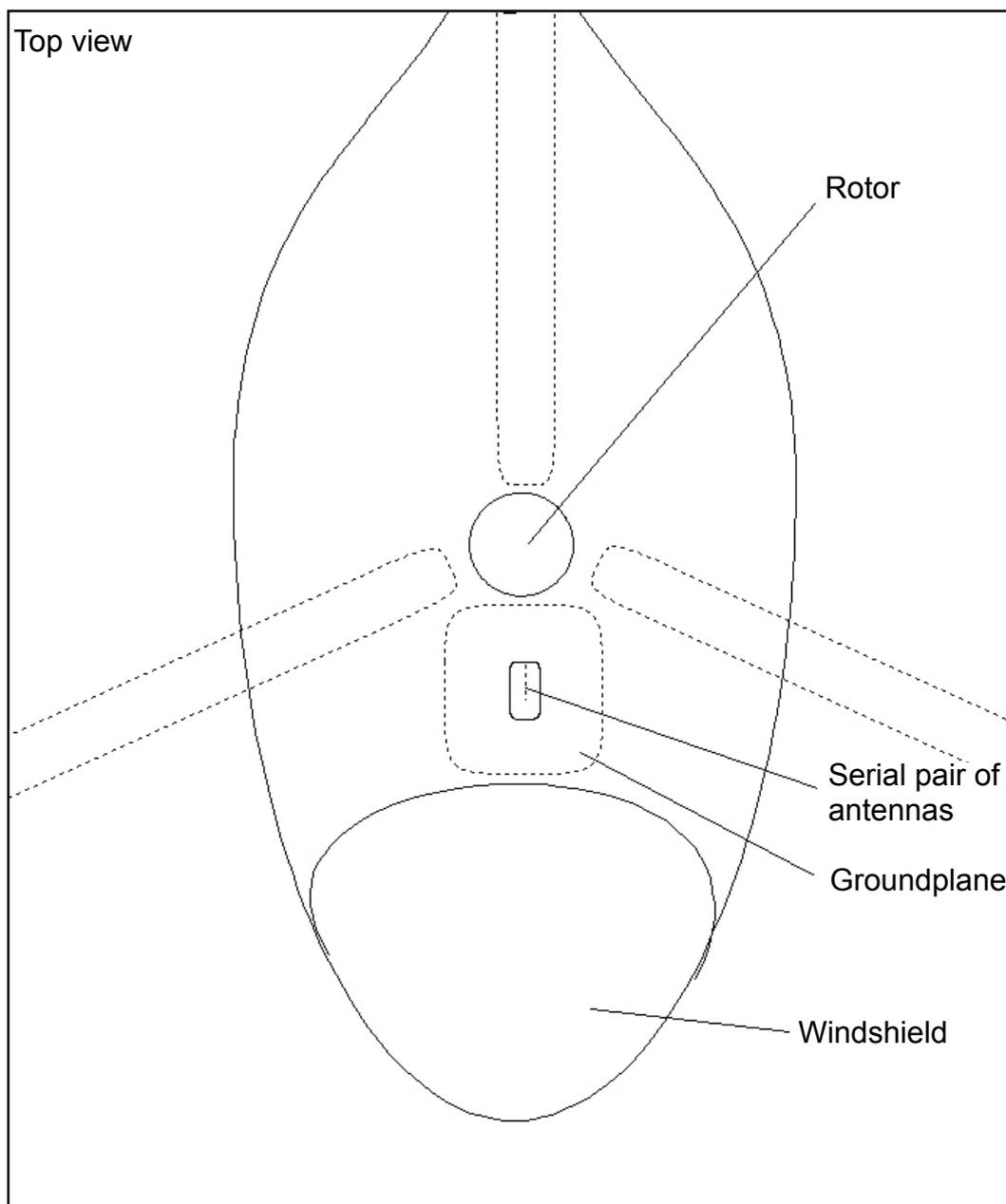


Fig. 10.1.3: Installation recommendation for serial antennas

10.1.4 Avidyne TAS600 series installation recommendations for parallel antennas (lower antennas)

The installation location should be close to the longitudinal axis of the aircraft.

- At least 1 m distance from transponder and DME.
- At least 30 cm distance from other antennas (e.g. glide slope, ILS).

Important:

The installation of both antennas should be symmetrical.
The serial antenna should have free visibility forwards.

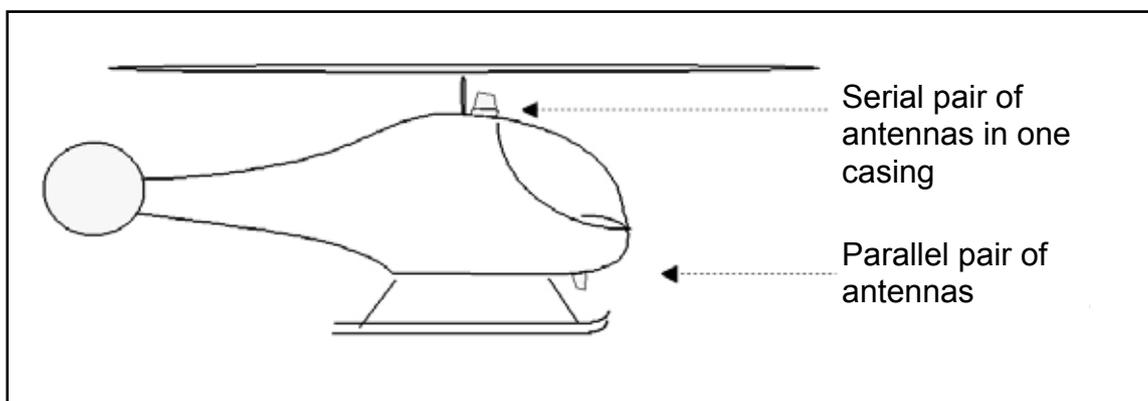


Fig. 10.1.4: Installation recommendation for parallel antennas

10.1.5 Avidyne TAS600 series non-standard installation of antennas

The installation location of the two antenna types may be swapped, e.g. if free forward visibility is not available for the serial antenna on top.

- Example Agusta 109 (pitot tubes mask the upper installation location).

Important:

For a non-standard installation with the serial antennas at the lower location the same recommendations apply as for the standard installation of the parallel antennas:

- Minimum 1 m distance from transponder and DME
- Minimum 30 cm distance from other antennas (e.g. glide slope, ILS)

10.1.6 Connection TCAD (Avidyne TAS600 series)

Any RS-232 port (RX/TX/GND 2, RX/TX/GND 3, or RX/TX/GND 4) on the TAS Processor may be used to connect to MT-VisionAir X ETSO (see the wiring diagram in this section).

The transmit line (TX) must be connected to the display receive line, and the receive line (RX) must be connected to the transmit line. Use twisted, shielded pairs or triples. Only one device can be connected to an RS-232 port.

NOTE Because the MT provides the control to take the TAS out of Ground mode, the “No Avidyne Display” jumper (Pin 15 of J1) need not be grounded.

The RS-232 transmit and receive lines from MT must be connected to the TAS to meet bi-directional communication requirements. Each display should be connected to its own RS-232 Processor port. There is no distinction of a master or slave display. Do not parallel RS-232 display connections.

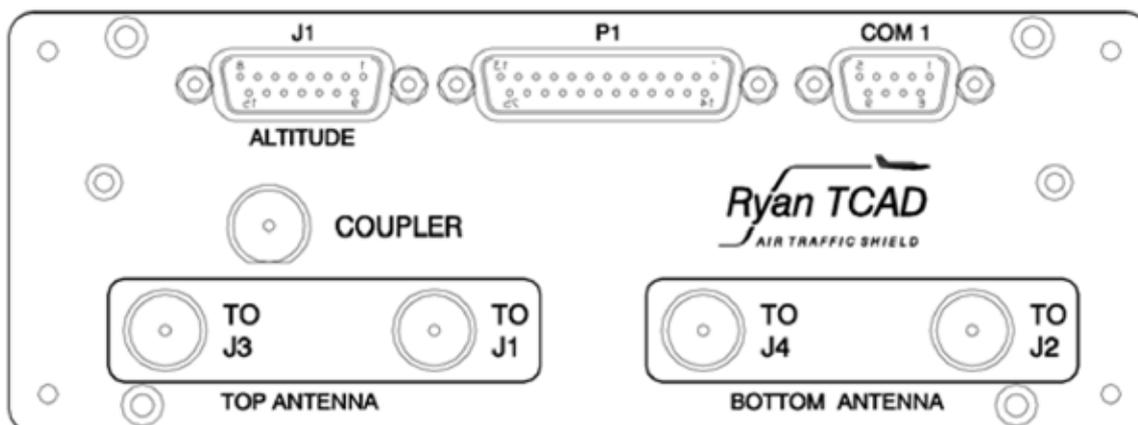


Fig. 10.1.6. (1): TAS processor front panel view

NOTE The TAS processor antenna terminations must be connected to antennas or appropriate loads before applying power to the processor. Failure to connect the antenna terminations can cause transmitter damage. See manual “Avidyne TAS Installation Manual Revision 4 – October 3, 2005”.

The cabling must be Null Modem crossover, i.e.

| TCAD | VX |
|-----------|----|
| RxD – TxD | |
| TxD – RxD | |

Wiring diagram for the TAS processor, P1

(as in "Avidyne TAS Installation Manual Revision 4 – October 3, 2005", page 45, figure 21)

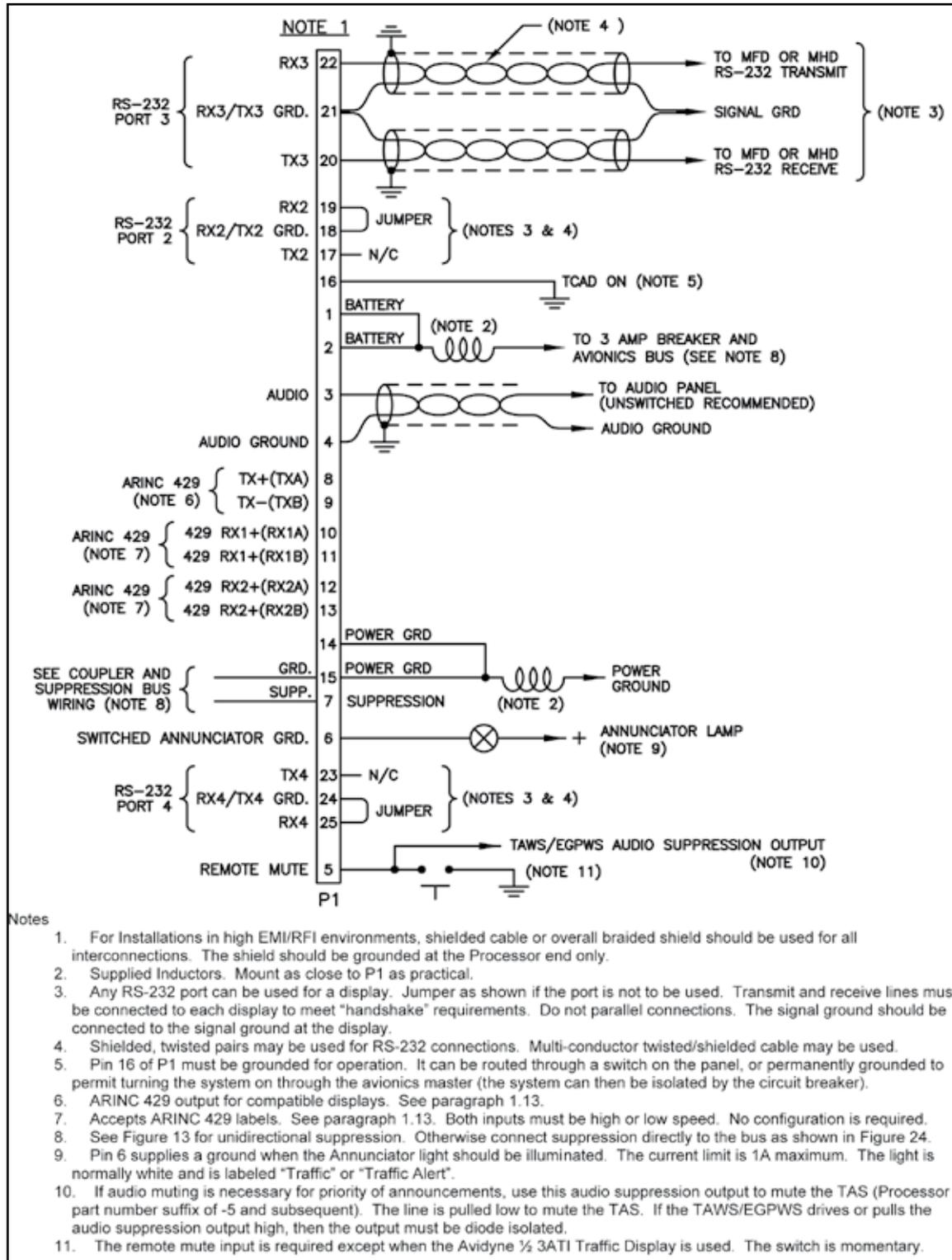


Fig. 10.1.6 (2): Wiring diagram for TAS processor

10.1.7 Pin assignment COM 1 port for MT-VisionAir X ETSO devices

For the pin assignment of the serial COM 1 ports (RS232-Port 1) for 50-pin MDR central connector refer to the following table:

| Signal | Pin |
|-------------|-----|
| COM 1 RxD | 45 |
| COM 1 TxD | 46 |
| GND COM 1–4 | 19 |

Table 10.1.7: Pin assignment COM 1 port

NOTE

If only one TAS source is connected TAS1SEL has to be used, the output port is COM1. If 2 different TAS sources are selected, the output port for TAS1SEL is COM1, for TAS2SEL it is COM3.

10.1.8 Configuration for the operation of the Avidyne TAS600 series with Moving Terrain

Display as MFD (Multi-Function Display) without Avidyne display.

1) Preconditions for the certified operation of the device are:

- Annunciator light (labeled “Traffic“ or “Traffic alert“) must be installed.
- Mute switch (labeled “Mute/Update“) must be installed.
- Feed into the audio system of the aircraft
- MFD is optionally certified.

2) Configuration

See “Avidyne TAS Installation Manual Revision 4 – October 3, 2005, page 34, Figure 11: Block Diagram of Electrical Wiring“.

- a) 1 switch ON/OFF to GND
Can be replaced with a permanent ground wire and + to the unit (permanent power)
- b) 1 switch Mute to GND (warning signal only to be interrupted, not switched off)
 - The mute switch must be within easy reach of the pilot.
 - The mute switch interrupts the optical and acoustic warning for a certain period.
 - The mute switch does not turn off the loudspeaker nor the TCAD.
- c) 1 switch for annunciator light to GND
- d) Connection to the audio system of the aircraft
- e) Optional: gear down switch or weight-on-wheel switch
(also works without a gear down/ w.o.w. switch due to recognition of

the altitude change from the altitude encoder)

Important: Apply power to the transmitter (including the Ryan TCAD) only when antennas (or substitute resistors) are connected!

10.1.9 Selection of the TAS source in MT program

- (1) Press keys <TCAS> → <TAS1SEL>
- (2) Select **Avidyne/Ryan** via pressing <UP> / <DOWN>. Press <USE> to confirm your selection.

NOTE | After a change of a TAS source a restart of the system will be necessary.

10.1.10 Entry in mtpro.ini

Check by pressing Shift+1

[TCAS]

PORT = 1

10.1.11 Testing of Avidyne TAS600 series

To start the system press the keys <TCAS> → <ON>.

To watch incoming data a simulated move of the aircraft is necessary. Please start the SIMULATION mode by pressing: <AUX> → <TRACK> → <SIM ON>.

The simulation starts with course 227°, speed 100 kts and altitude of 8000 ft.

As soon as transponder signals will come in, they will be displayed on the chart or in MFD mode.

How to adjust the simulator?

Turn

L or X Left turn: each key press turns the aircraft to the left 0,2 degrees.

M or Y Right turn: each key press turns the aircraft to the right 0,2 degrees

Please check the infobox to find out the current MT (Magnetic track).

Altitude

- J or 1 Decrease altitude by 100 feet
- I or 2 Increase altitude by 100 feet

Speed

- H or 3 Increase ground speed by 10 knots

Check the status message in the status window on the left rim:

- TCAS Avidyne OK: the reception of TCAS data is approved.
- NO DATA : no reception of TCAS data.



Fig. 10.1.10: TAS monitoring screen

| Key | Function |
|---------|---|
| ON/OFF | Turning ON / OFF of TAS 6XX monitoring |
| UNR | TAS 6XX in UNRESTRICTED MODE |
| GND | TAS 6XX in GROUND MODE |
| TAS1SEL | Selection of TAS source |
| BACK | Back to further options / main menu of MT program |

Table 10.1.10: Description of keys and functions on TAS monitoring screen

10.2 MT-PowerFLARM Interface

It is recommended to use Powerflarm Core device. Refer to PowerFLARM Core Manual EN, Version 150 here: <http://flarm.com/support/manuals-documents/>

10.2.1 Connector layout for RS232 Connector on Powerflarm Core:

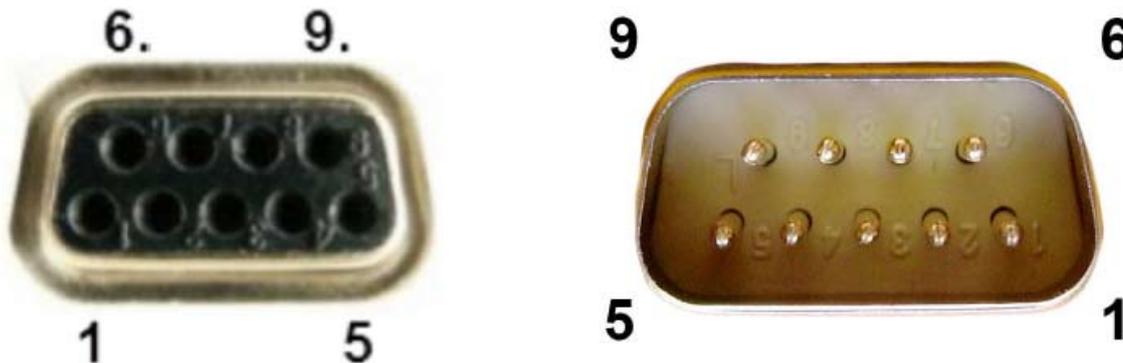


Fig. 10.3.1: RS232 connector Powerflarm Core

- 1: Audio OUT (referenced to GND; H/W versions \geq 1.1 only)
- 2: TX, Core sends (RS232)
- 3: RX, Core receives (RS232)
- 4: Do not connect
- 5: GND
- 6: Do not connect
- 7: +12 to +28VDC power supply
- 8: Core supplies +5VDC for PDA
- 9: Core supplies +3VDC for display Pin

Pin 2 transmits NMEA-0183 Version 2.0 data at a configured data rate (default is 19,2kbaud)

10.2.2 Adjustments for connection to MT VisionAir X

Set Baud rate to 38400.

Use protocol version 61. See <http://flarm.com/wp-content/uploads/2015/12/FTD-14-FLARM-Configuration-Specification-1.03.pdf>, p. 9f.

10.2.3 Connection to 50-pin MDR central connector for MT-VA X

Please install to the connector as given in layout for COM 1:

| Signal | Pin |
|-------------|-----|
| COM 1 RxD | 45 |
| COM 1 TxD | 46 |
| GND COM 1–4 | 19 |

Table 10.2.3: Pin assignment COM 1 port

NOTE | If only one TAS source is connected TAS1SEL has to be used, the output port is COM1. If 2 different TAS sources are selected, the output port for TAS1SEL is COM1, for TAS2SEL it is COM3.

10.2.4 Entry in mtpro.ini

Check by pressing Shift+1
[TCAS]
PORT = 1

10.2.5 Settings in MT program

- TCAS rights must be set: Please contact MT.
- FLARM is to be set in TAS sources as follows:
 - (1) Press keys <TCAS> → <TAS1SEL>.
 - (2) Select **FLARM** via pressing <UP> / <DOWN>. This selection is necessary when connecting PowerFLARM. Press <USE> to confirm your selection.

NOTE | After a change of a TAS source a restart of the system will be necessary.

10.2.6 Activating of PowerFLARM traffic warning

To start the system press the keys <TCAS> → <ON>.

10.2.7 Testing of PowerFLARM interface

Testing procedure is the same as for the MT TCAS Interface for Avidyne TAS600 series. Refer to section “8.1.10 Testing of Avidyne TAS600 series”.

Check the status message in the status window on the left rim.

Possible status messages:

- TCAS FLARM: the data transmission from PowerFLARM is successful.
- NO DATA: no data transmission.

PowerFLARM sends this airtraffic types:

| Type of signal | Symbolics on MT display |
|--------------------|--|
| FLARM | airtraffic shown at position as diamond or aircraft symbol |
| ADS-B | airtraffic shown at position as diamond or aircraft symbol |
| Transponder Mode C | undirected airtraffic, shown as range ring |
| Transponder Mode S | undirected airtraffic, shown as range ring |

Table 10.2.7 (1): Display of signals detected by PowerFLARM

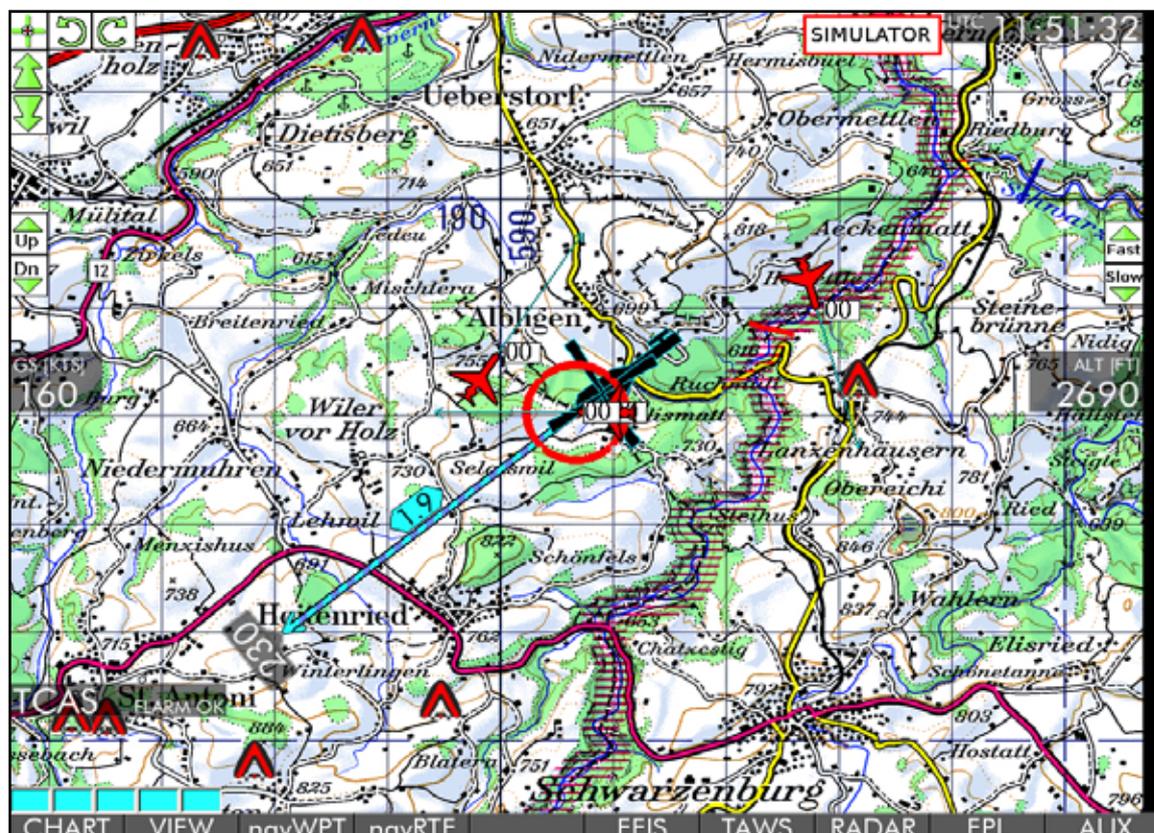


Fig. 10.2.7: PowerFLARM monitoring screen

Air traffic within the optical range of the PowerFLARM sensor is displayed on the chart in relation to the terrain.

If the scale of the chart is too detailed to display all detected aircraft the symbols are displayed on the rim of the screen in correspondent position.

To see the position of the airtraffic on the chart choose → ZOOM → ZOOM-

Color coding of traffic detected by PowerFlarm for all types of signals

| Aircraft symbol | Colour |
|---|--------|
| Above the critical cylinder | blue |
| Below the critical cylinder | brown |
| Within the height of the critical cylinder, distance out of danger zone | white |
| Within the critical cylinder, dangerously close | red |

Table 10.2.7 (2): Display of PowerFLARM data

10.3 Combination of Avidyne TAS600 series Interface with PowerFLARM Interface

10.3.1 Requirements for parallel use of interfaces

Requirements MT

- TCAS rights for combined use must be set: Please contact MT.

Settings in MT program

- (1) Press keys <AUX> → <TCAS> → <TAS1SEL>.
- (2) **Avidyne/Ryan** via pressing <UP> / <DOWN>. Press <USE> to confirm your selection.
- (3) Press keys <AUX> → <TCAS> → <TAS2SEL>.
- (4) Select **FLARM** via pressing <UP> / <DOWN>. Press <USE> to confirm your selection.

NOTE | After a change of a TAS source a restart of the system will be necessary.

COM Port selection

| Selected Source | COM Port |
|-----------------|----------|
| AVIDYNE/RYAN | 1 |
| FLARM | 3 |

Table 10.3.1: COM Port selection for combined TAS sources

10.3.2 Entry in mtpro.ini

Check by pressing Shift+1

[TCAS]

PORT = 1

[TCAS2]

PORT = 3

10.3.3 Connections to TAS sensors

Refer to the explanations in the the prior chapters.

COM 1 pin assignment for Avidyne TAS600 series on 50-pin MDR central connector of MT-VisionAir X ETSO

COM 3 pin assignment for PowerFLARM core on 50-pin MDR central connector of MT-VisionAir X ETSO

| Signal | Pin |
|-------------|-----|
| COM 3 RxD | 20 |
| COM 3 TxD | 21 |
| GND COM 1–4 | 19 |

Table 10.3.2 (2): Pin assignment COM 3 port

10.3.4 Initial operation of the combined signal interface of Avidyne/Ryan TAS signal with PowerFLARM signal

- (1) Start the system.
- (2) Allow GPS reception (from Fast Integral GPS)
- (3) Start TCAS by pressing <AUX> → <TCAS> → <ON>.
- (4) Check the status message in the status window on the left rim.

Possible status messages:

- TCAS AVIDYNE FLARM Installation successful, all data transmitted.
- TCAS NO DATA Both TAS sources failed, installation not successful.
- TCAS FLARM Only FLARM data are transmitted.
- TCAS AVIDYNE Only Avidyne data are transmitted

10.4 GARRECHT TRX1090 Interface

The use of a TRX-1090-ADS-B receiver is supported by MT VisionAir X.

For connection and configuration of this interface please contact the customer's service at Moving Terrain.

NOTE | GARRECHT TRX1090 interface can not be combined with other TAS sources and has to be connected to COM1.

11. MT Stormscope

11.1 System components

MT-Stormscope requires the following components:

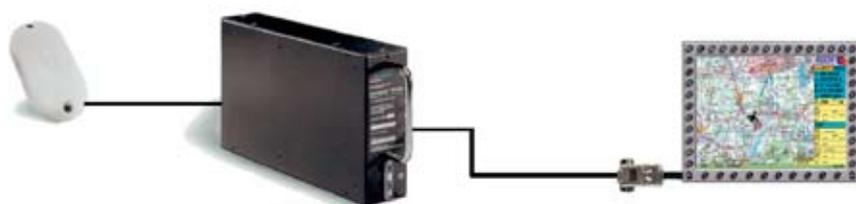
Hardware

- MT-VisionAir X with COM port for data transfer
- GPS receiver (MT Fast Integral GPS recommended) with antenna
- WX-500 / WX-670 Sensor with data transfer cable and antenna

Software

- MT-Stormscope display software

11.2 Block diagram



The components of the system must be correctly connected:

- Connection for power and GPS to the MT-VisionAir X are explained in the basic manual.
- Connection of the antenna, WX-500 / WX-670 and power supply for the WX-500 / WX 670 shown in the appropriate operation manuals.
- For the connection of the WX-500 / WX-670 sensor with the planned and labelled COM port (COM 4) that is fed out to MT-VisionAir X unit. A crossed RS232 data cable must be used.

11.3 Pin Assignment

COM 4 pin assignment for WX-500 / WX-670 on 50-pin MDR central connector of MT-VisionAir X

| Signal | Pin |
|-------------|-----|
| COM 4 RxD | 22 |
| COM 4 TxD | 23 |
| GND COM 1–4 | 19 |

Table 11.3 : Pin assignment COM 4 port

11.4 Entry in mtpro.ini

```
[STORMSCOPE]
```

```
PORT = 4
```

12. MT-VGA-Output Device for external screens

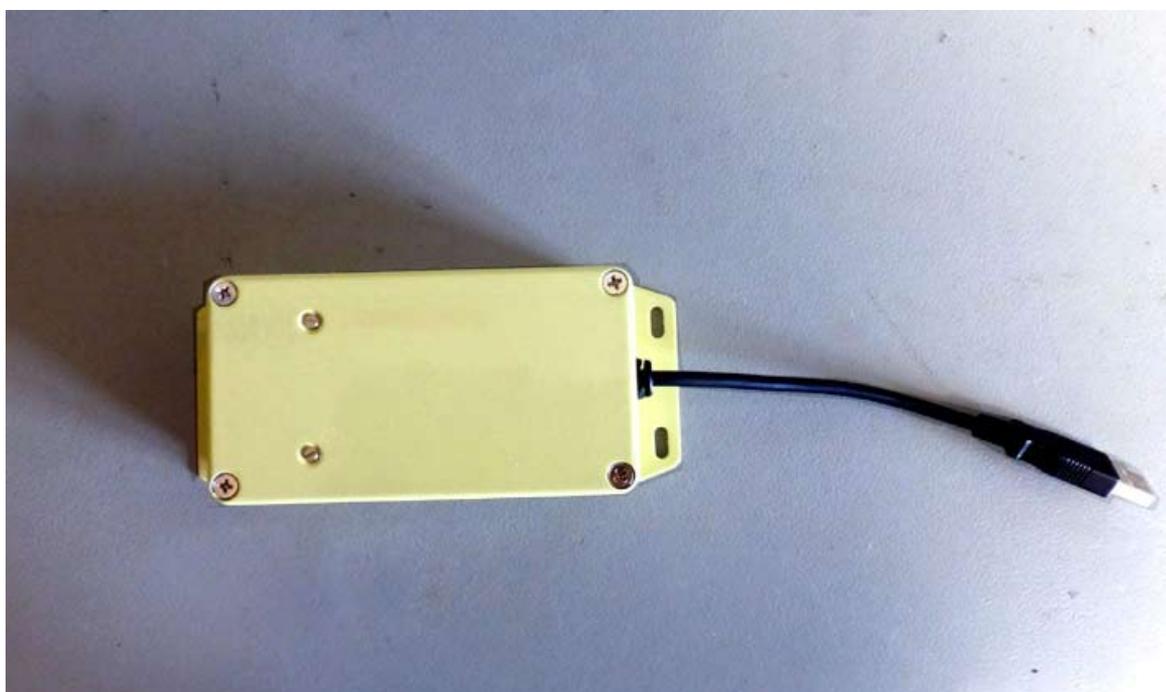
12.1 Technical description

Separate device MT-VGA-Output Device, PN MTEX/HW-22-00
USB connection to the unit

Further parts needed:

VGA cable (not part of the delivery) to connect the external screen

We recommend to connect "MT Passenger Entertainment and Information System" with 10,4" screen and mounting - DO 160 tested, PN MTEP/ES-00-00.



12.2 Connection to MT-VisionAir X ETSO via USB

The USB is to be connected to the central connector MDR50

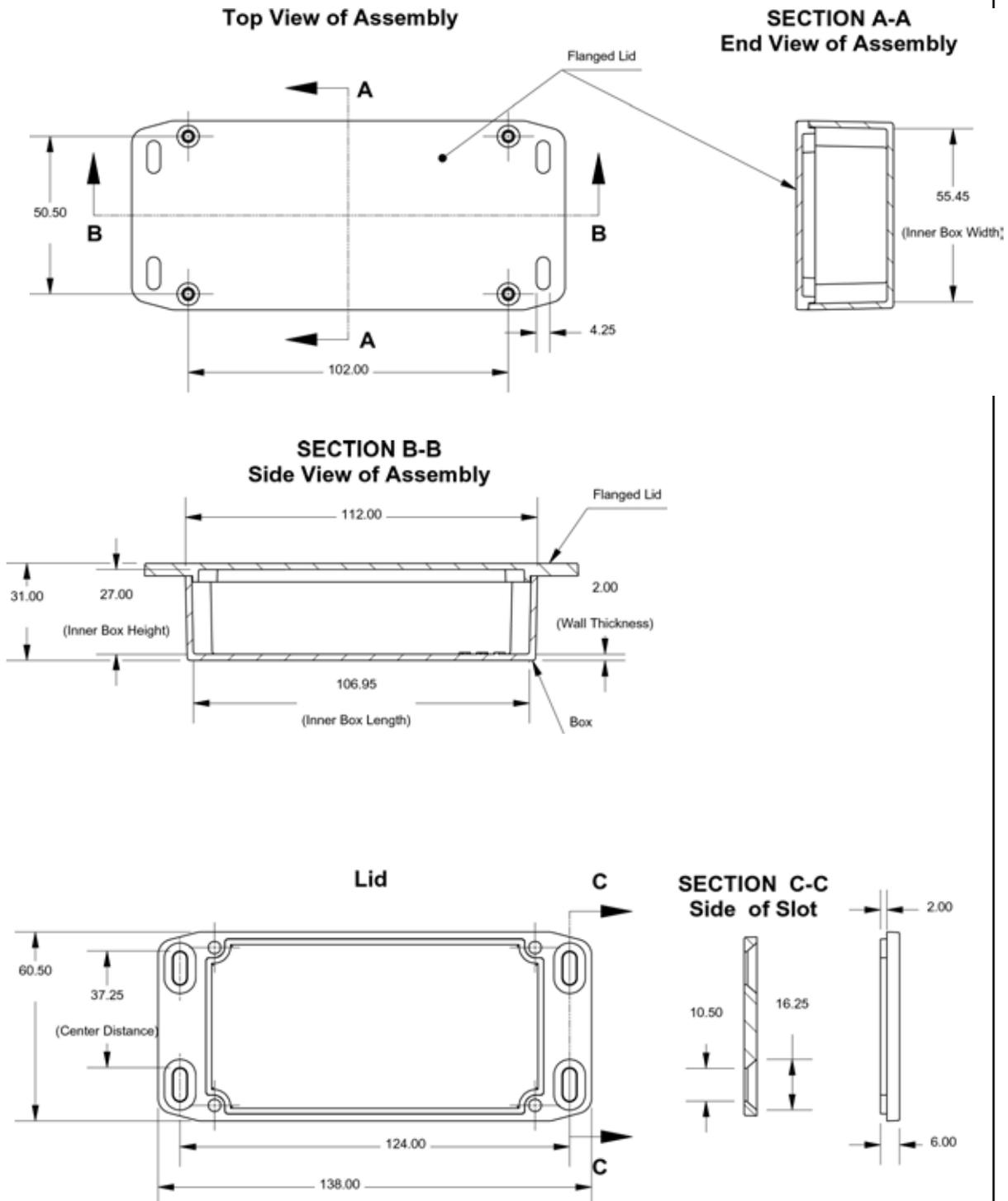
The MT-VGA-Output Device is powered by MT-VisionAir X ETSO (USB connection).

Interlock the USB plug connection with a bracket or tape against vibrations to ensure continuous power supply.

12.3 Usage

No inputs required!

12.4 Dimensions in mm



12.5 Functional Diagram



External Screen Power VGA MT-VGA-Output MT-VisionAir X: central connector with
VGA USB Power Fast Integral GPS

12.6 Connection USB to MDR 50 central connector

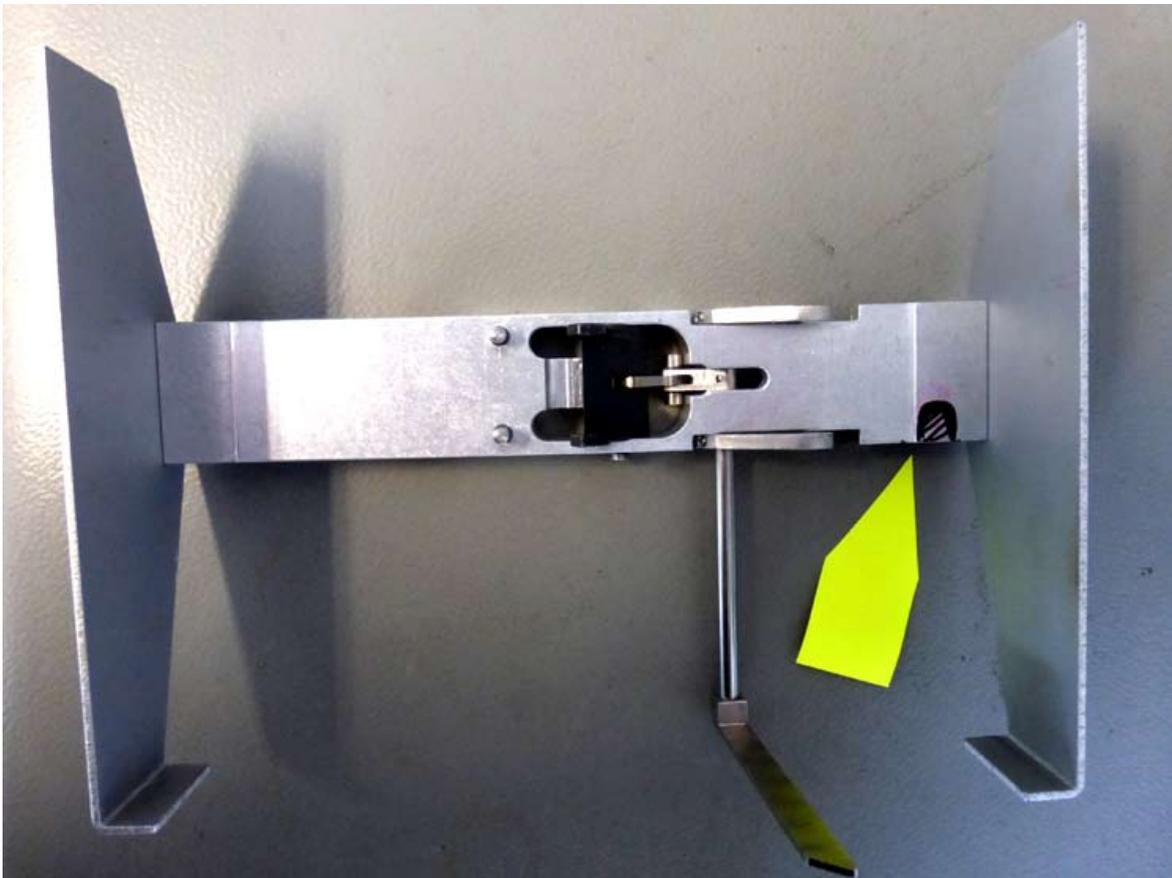
see "Connections".

12.7 Installation advices for simultaneous operation of MT-Video-Input Device and MT-VGA-Output Device

If both devices are in use, one of it has to be connected to an USB port on the rear side of the unit.

We recommend to connect the MT-Video-In Device to the rear USB on the left side with the longer tunnel.

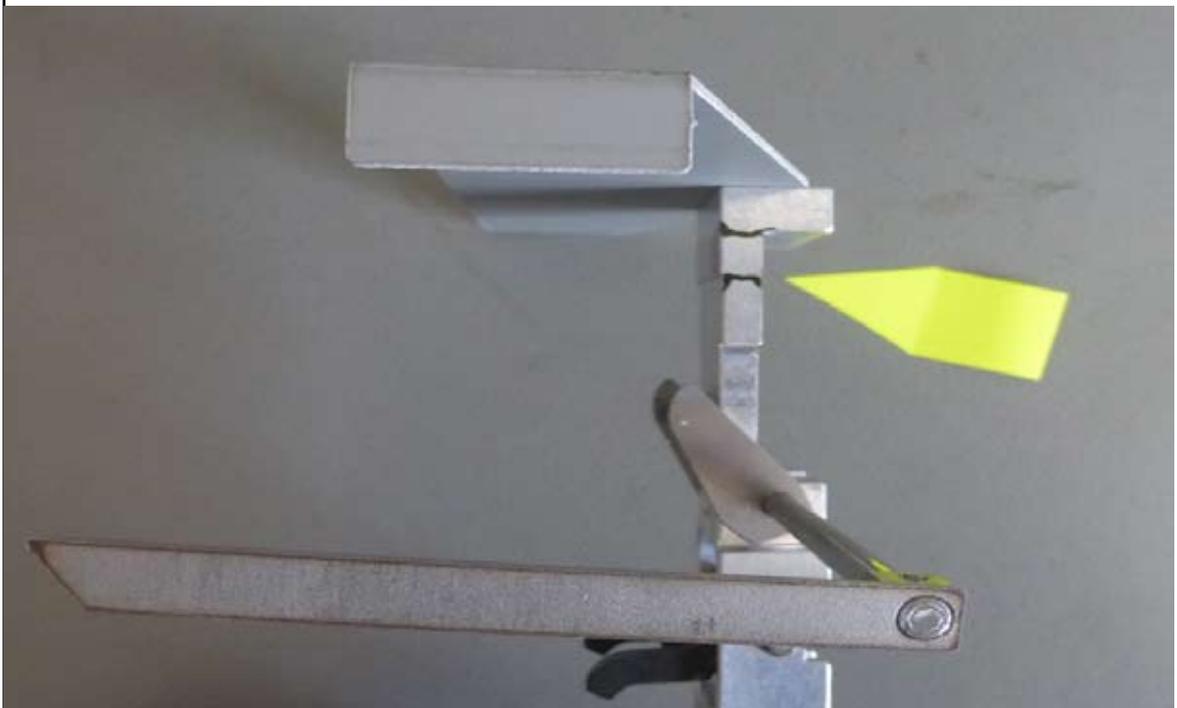
The Easy mount must be modified: a notch must be cut out to lead the USB cable through. Please see pictures for the recommended placing which will not effect the stability and functionality of the Easy Mount.



Easy mount with marked notch (front view total)



Easy mount with marked notch (front view detail, turned 90° counter clockwise)



Easy mount with marked notch (bottom view)

13. MT Video Input Device (MT Camera)

13.1 Technical description

Seperate device



Connection to MT-VisionAir X ETSO via USB

Power supply via MT-VisionAir X ETSO (USB connection)

Processible signals: Composite Video (FBAS, RS 170)
 PAL
 NTSC

Input: 1 x FBAS (composite video input, 75 Ohm) via BNC
 Cinch connection via BNC-Cinch adapter possible

Displaying: Full screen in 4: 3 format with max. resolution 1024 x 768 pixels

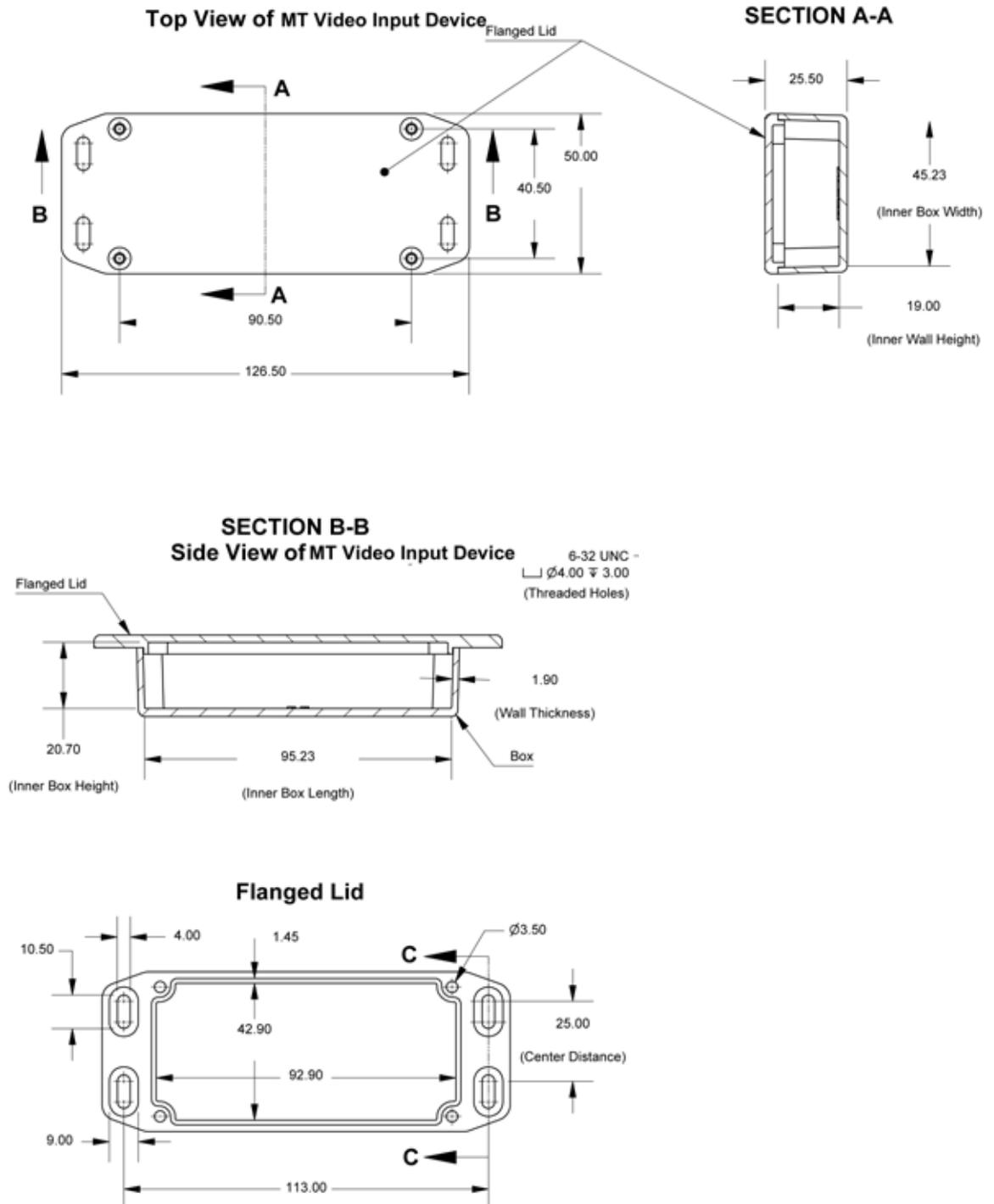
13.2 Directions for use

Usage via hotkey "C" = on the frame keyboard

C switch to video in

C switch back to MFD screen with Moving Map functions

13.3 Dimensions in mm



13.4 Adaptation of parameter in mtpro.ini

13.4.1 How to access the mtpro.ini for setting the parameters

- Connect USB keyboard (no need to connect the mouse)
- Press SHIFT + 1 (or the equivalent keyboard combination to print an exclamation mark, “!”)
- The configuration editor will appear full screen
- After making the desired changes to the configuration, press:
- CTRL + X, then Y and finally ENTER to exit the editor and confirm the changes

The editor closes and Moving Terrain program resumes full screen. It is now necessary to restart the unit to reread the new configuration.

13.4.2 MT-Camera Parameters

Parameters in mtpro.ini, section [CAMERA].

Note: If this section is not in the file, add it, make sure you use squared brackets.

| Parameter | Possible values | Description |
|-----------|-----------------|---|
| profile= | (empty) | Generic PAL video source This is the „factory default“ and the software assumes this setting if the „Profile“ entry is not found |
| | maxviz | Selects the Max Viz IR camera (video standard: NTSC) 3 |
| | maxviz-rot180 | Same as „maxviz“, but the image is rotated upside-down |

Table 14.4.2: Parameter for MT-Camera in mtpro.ini

Example:

```
[CAMERA]
profile=maxviz-rot180
```

If section [CAMERA] is missing

14. MT-VGA-Input Device

14.1 Technical description

Separate device MT-VGA-Input Device, PN MTEX/CA-15-00

Cables: 1. VGA cable
 2. Special USB cable (blue, mounted to MT-VGA-Input Device)

14.2 Connection to MT-VisionAir X ETSO

Connection 1: VGA from external computer to MT-VGA-Input Device, PN MTEX/CA-15-00

Connection 2: Special USB cable to one of the direct USB ports of MT-VisionAir X ETSO on the rear side.

14.3 Prerequisites

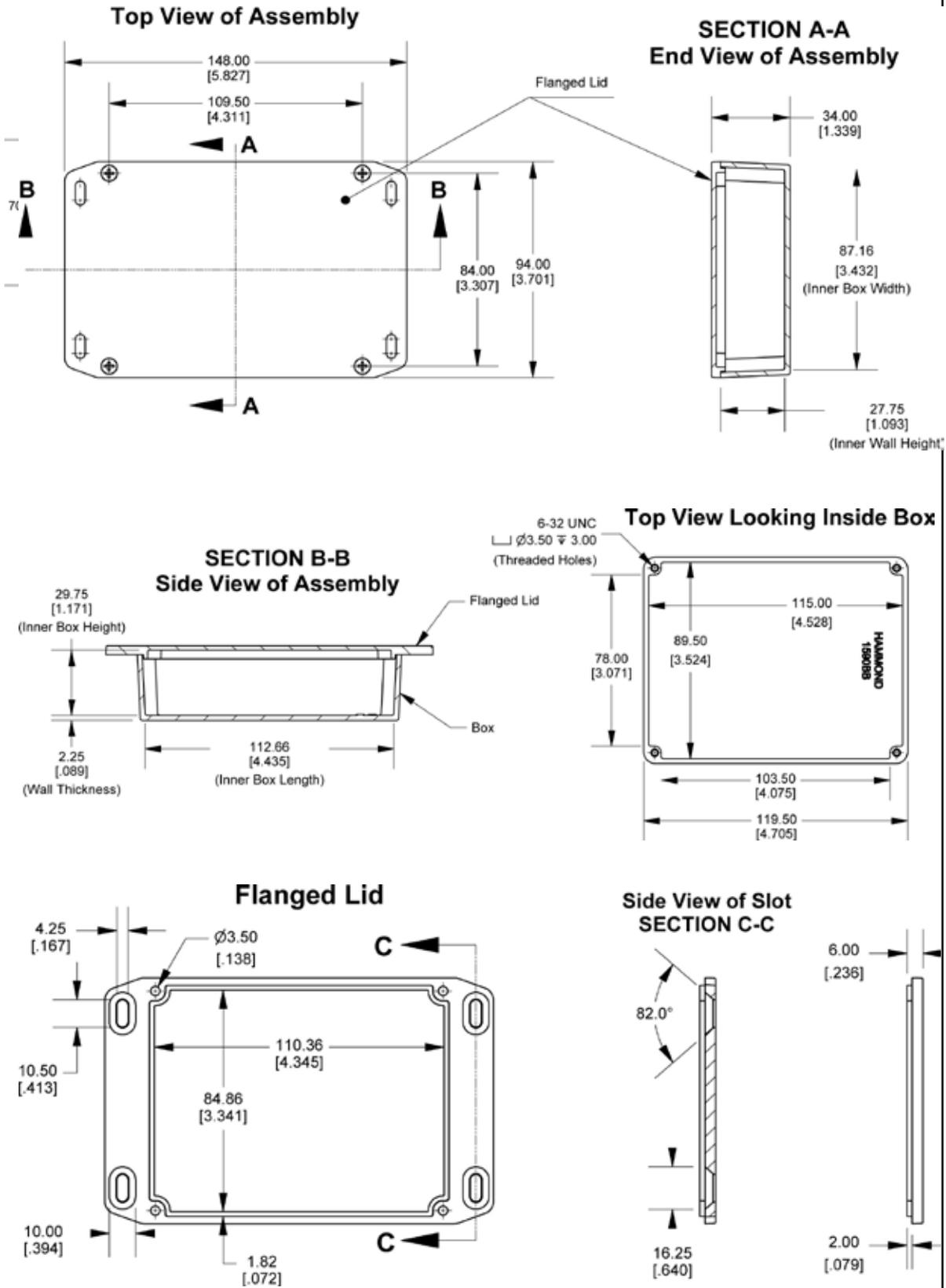
OS 13.5 for MT VisionAir X.
SW Version 6.0 or higher.
MT Camera must be enabled.

14.4 Directions for use

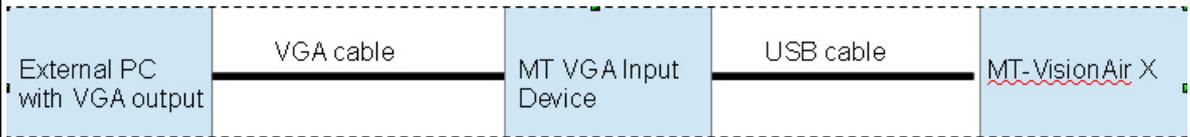
Usage via hotkey "C" = on the frame keyboard
(normal keypress, not hold)

C switch to VGA input
C switch back to MFD screen with Moving Map functions

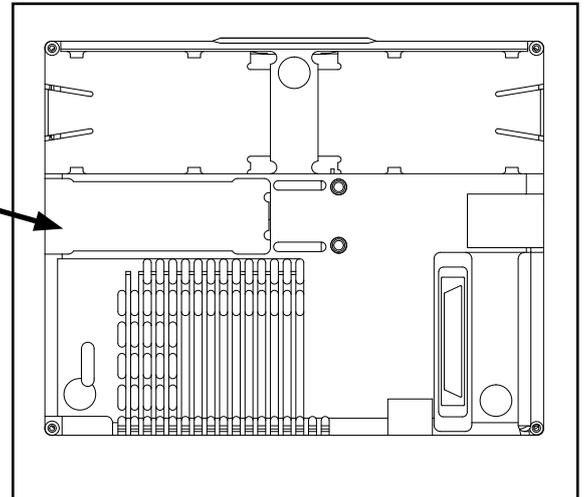
14.5 Dimensions MT-VGA-Input Device in mm



14.6 Installation diagram



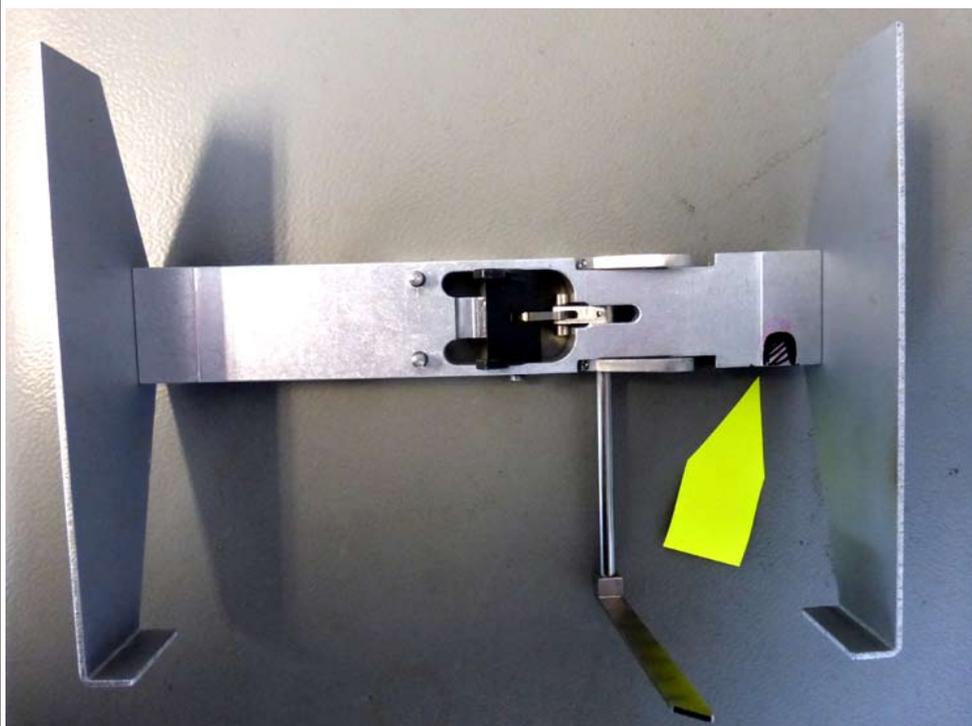
We recommend the usage of this USB port.



Suggestion: Modification of Easy Mount

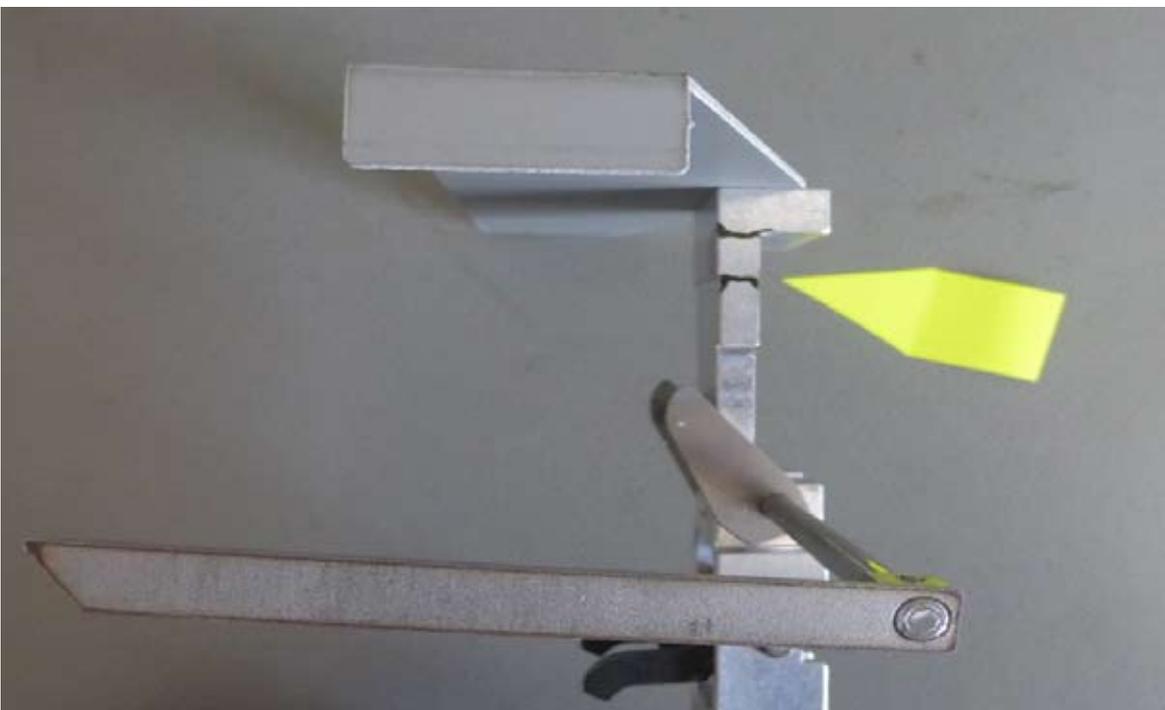
We recommend to connect the MT-VGA-Input Device to the rear USB on the left side with the longer tunnel.

The Easy mount must be modified: a notch must be cut out to lead the USB cable through. Please see pictures for the recommended placing which will not effect the stability and functionality of the Easy Mount.





Easy mount with marked notch (front view detail, turned 90° counter clockwise)



Easy mount with marked notch (bottom view)

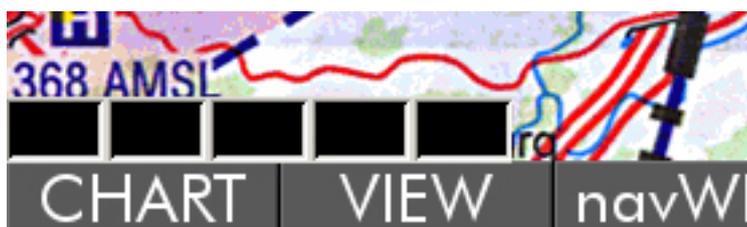
15. MT-VisionAir X ETSO - External Dimming

15.1 Functionality

External dimming mode is activated by setting the lowest brightness level manually

Use the * button (left corner) to set to the lowest brightness

The brightness indicator shows 5 black squares:



16.1.1 No external dimmer connected

If no external dimmer is connected, the brightness actually goes to minimum = analog input voltage is zero

15.1.2 External dimmer connected

If external dimmer is connected, then it directly controls the system brightness.

Note 1 NVG mode is not impacted

Note 2 The „manual“ brightness levels (1 to 5) work normally

15-1.3 Entries in mtpro.ini for [DIMMING]

Example:

```
[Dimming]
ADCMin=72
ADCMax=180
BrightMin=1
BrightMax=75
NLExp=5.0
```

Values are to be verified.

15.2 Wiring

Voltage between Pin 31 and PIN 4 (GND) on the MDR50 central connector.
See "Installation manual" PN MTEX/IA-62-02 page 42,43

Input voltage 0 – 28V
0V = minimum brightness
28V = maximum brightness

16. MT Mission Management System (MT-MMS)

16.1 Requirements

1. A supported Iridium Satphone or Modem

The MMS software module has been tested successfully with:

- Iridium 9555 Satphone
- Iridium 9575 Satphone

2. An active SBD (Short Burst Data) contract on the Satphone, linked to the appropriate e-mail address(es) which will be used for tracking (see chapter MT OPS Center). The contract is linked to the IMEI number of the telephone.

3. The MMS module must have been purchased for this VisionAir X unit.

4. The MT-VisionAir X must be connected via USB to the Iridium Satphone
NOTE: if the central connector is used, then it is necessary to install an external USB hub between unit and satphone (this applies for MT-VisionAir X with SP boards, TT board units can be used directly. To check board type use: <AUX> <SETUP> <VERSION> <VERSION>).

5. The Satphone must have a clear view of the sky or be connected to an external antenna.

16.2 Usage

NOTE: The Iridium Satphone must be switched on manually during preflight and should be turned off manually, as well, after the flight. The MT-VisionAir X software cannot control the Satphone power.

No other operation should be needed on the Satphone while using the MMS functions.

To turn on aircraft tracking: on the VisionAir X button bar press AUX --> MMS --> TrkON

When tracking is on there will be a thin gray message area on the bottom left of the map screen (just to the right of the brightness indicator). It will show the MMS tracking status, including error conditions.

By default the system will try to send a position report every 60 seconds approximately, but will retry every 15 seconds in case of error.

Depending on several factors the ground tracking software (MT OPS

should show the position report with an average delay between 6 and 20 seconds after it has been generated by the onboard VisionAir X.

To turn off aircraft tracking: on the VisionAir X button bar press
AUX --> MMS --> TrkOFF

The message area on the bottom of the screen will disappear.

To set a custom position report interval:

- Press: AUX --> TRACK,
- Type the special command: PRI nn J (where „nn“ is the tracking interval in seconds).

Example: AUX --> TRACK, PRI45J will set the position report interval to 45 seconds.

A message window will confirm the change (press BACK to clear it).

NOTE 1: The tracking status and interval is remembered between sessions, so that if it was ON on last shutdown, it will start active on the next flight.

NOTE 2: Each successful position report transmits an Iridium SBD packet with a size of 16 bytes. Failed transmission attempts are not charged. This information can be used to estimate tracking costs according to the SBD contract linked to the Satphone.

Example for the typical standard SBD contract with no options:

Minimal billable SBD packet size = 30 bytes ; Fee for minimal billable SBD packet = 0.05 \$.

The onboard software will report the position approximately every 60 seconds (thus approximately 60 times per hour).

Thus one hour of tracking will be billed approximately as: $0.05\$ \times 60 \text{ min} = 3\$$

16.3 List of MMS status messages on the VisionAir X

16.3.1 „Normal operation“ messages

| Message text | Explanation |
|---------------------------------|---|
| OFFLINE | May appear briefly when MMS is switched on or when the system starts with MMS already active. It will change to a different status message as soon as MMS starts the first position report. |
| MMS: Sending position report... | The position report is being sent, it usually takes 3 to 30 seconds depending on the instantaneous quality of the satellite signal. |
| MMS: Last position report OK | Last position report was successfully sent to the Iridium satellite |

16.3.2 Common error conditions (usually temporary)

| Message text | Explanation |
|--------------------------------|--|
| Satphone not found(unplugged?) | The USB cable between the VisionAir and the Satphone may be unplugged or the phone may be switched off |
| Satphone comm problem(cable?) | The Satphone was detected but the software does not get responses when sending commands. Either the USB cable is not firmly connected or there is another hardware/software condition which garbles the communication between the VisionAir and the phone. In extreme cases could be due to strong electromagnetic interference especially if the USB cable is not shielded. |
| Satphone locked by Iridium | There could be a problem with the Iridium SBD contract linked to the Satphone. |
| Satphone: no network coverage | The Satphone is not registered on the Iridium network (satellite link is not available) |
| Iridium: bad reception (18) | Satellite link dropped while sending the last message |
| Iridium: bad reception (32) | Satellite link quality was not good enough to send the last message |

| Message text | Explanation |
|-----------------------------|--|
| Satphone busy (Voice call?) | The Satphone reports that its radio channel is busy, it means either that it is not yet fully initialized or a Voice/Data call is in progress. Tracking will resume as soon as the Satphone is available (the software checks its status every 15 seconds) |
| Iridium timeout, will retry | The last message could not be transmitted within the time allowed by the network, transmission will be retried within 15 seconds |
| Unknown Iridium error (0) | May appear briefly if the Satphone is not ready to communicate. If it persists it may indicate a software or hardware fault. |

16.3.3 Uncommon error conditions (hardware or software faults, may need maintenance)

| Message text | Explanation |
|--------------------------------|--|
| Unknown Iridium error (x) | The VisionAir X has received an unknown error code from the Satphone (the error code is reported in place of the „x“, for diagnostic purposes) |
| Iridium queue full gnd station | The message queue is full at the Iridium ground station. Either the ground tracking software (MT OPS Center) is not configured correctly or it has not been run for a long time, so that tracking messages have accumulated. |
| Iridium message error (12) | This error should be reported to MT for VisionAir X diagnostic, may also indicate a Satphone hardware/firmware fault. |
| Iridium error at gnd station | Temporary or permanent error at the Iridium ground gateway |
| Iridium message error (14) | This error should be reported to MT for VisionAir X diagnostic, may also indicate a Satphone hardware/firmware fault |
| Iridium: network access denied | Could indicate a problem with the Satphone and/or SBD contract with Iridium |
| Satphone locked by Iridium(16) | Could indicate a problem with the Satphone and/or SBD contract with Iridium |
| Iridium: protocol error (19) | This error should be reported to MT for VisionAir X diagnostic, may also indicate a Satphone hardware/firmware fault |
| Iridium antenna fault (33) | Possible hardware fault with the Satphone or physical problem with the antenna (either internal or external if connected) |
| Iridium radio is disabled (34) | Possible hardware problem with the Satphone, or unusual configuration |

| Message text | Explanation |
|-------------------------------|---|
| Iridium: temporary error (36) | Should be a temporary condition due to the Satphone not being able to successfully register on the Iridium network |
| SBD service temp.disabled(37) | May indicate an Iridium network error or a problem with the SBD contract |
| SBD temporary overload (38) | The phone is temporarily refusing to send SBD messages to lower the load on the Iridium network. It is a built in feature of Iridium Satphones („Traffic management period“) and should not harm normal operations. |
| Satphone hardware error (64) | Possible hardware problem with the Satphone „Band violation (attempt to transmit outside permitted frequency band)“ |
| Satphone hardware error (65) | Possible hardware problem with the Satphone „PLL lock failure; hardware error during attempted transmit“ |

16.4 MT Operations Center 1.0

See User manual.

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17. Mission Management System: Rescue Track communication via ITAS (Iridium Transceiver Antenna System)

17.1 System Components and Prerequisites

17.1.1 Hardware

MT-VisionAir X, software version higher than X.5.1 (OS13)

Iridium Transceiver Antenna System (ITAS)

9602 SBD Modem + enclosure

Power/Serial M12/8pin connector

Serial interface: 19200 bps

Max message size: Tx 340 Bytes, Rx 270 Bytes

The ITAS connects to the MT VisionAir X via serial port (by default COM3).

Connection via MDR50: minimum equipped with power, Fast Integral GPS and COM3 (please refer to pin assignment)

In addition to the ITAS, the RescueTrack feature will work with Iridium Satphones (9555, 9575).

Restriction: During voice calls SBD messages cannot be transmitted nor received, and the software has no way to know beforehand if the pilot is dialing a phone number nor receiving a call.

The effect is that the RescueTrack control center will not see position reports during voice calls and will not know the reason.

17.1.2 Contract with Iridium Provider for SBD (Short Burst Data)

Prerequisite for the conclusion of the SBD contract is the knowledge of the IMEI number of the ITAS and the selection of the billing mode.

Note: Mo ACK is not required.

17.1.3 Contract with Rescue Track

The ITAS equipment (identified by its IMEI code) needs to:

- a) Have an active SBD contract, which must be set up to send SBD data to a specific RescueTrack IP address
- b) Be associated to the Moving Terrain account by RescueTrack

As such it is necessary to request assistance from RescueTrack:

- a) Ask RescueTrack - What is the „direct IP“ address to put on the SBD contract?
- b) Ask RescueTrack to associate the IMEI code of the ITAS device to the MT test account

Once the ITAS has an SBD contract and is associated with the Moving Terrain test account in Rescue Track it is possible to log into their website for testing:

Usually MT takes care of all steps and delivers a tested system.

Contact Convexis GmbH: phone +49 7121 9455-0.
daniel.korn@convexis.de
Florian.Schenk@convexis.de

17.2 Software

17.2.1 Basic Information

Prerequisite Software version X.5.1 and higher on OS 13.
The option must be enabled.

17.2.2 Settings on the MT-VisionAir X System

17.2.2.1 MTPRO.INI

How to work with mtpro.ini:

- Connect an USB keyboard
- Press SHIFT + 1 (or equivalent for „!“) to call the configuration text editor
- Edit the desired parameters
- When finished press CTRL + X, then ‚Y‘ to confirm and save the changes (‚N‘ will discard all changes)
- The new configuration can then be applied quickly by pressing SHIFT + 2: the VisionAir X will reinitialize. Otherwise the system has to be shut down and restarted for the changes to take effect.

Configuration (usually already done before delivery)

- A new ITAS section is added, where the corresponding serial port can be specified:

```
[ITAS]
```

```
Port = 3
```

Default port, if not indicated or set to 0 (zero), will be COM3

- Under the [MMS] section specify whether the Mission Management System will use MT or RescueTrack protocol:

[MMS]
Mode = RescueTrack

The default, when missing, is: Mode = MT

There are two additional parameters (optional) that can be used under the [MMS] section:

UpdateOnStatusChange = 1
When this is set, the VisionAir X will send a position update to RescueTrack as soon as the pilot selects a new status.

UpdateOnTargetChange = 1
When this is set, the VisionAir X will send a position update as soon as the pilot selects a new DCT destination.

Otherwise the standard time between position updates is 60 seconds.

17.2.2.2 Setting of ITAS Module for Communication

→ AUX → SETUP → DIAL-UP
Choose IRIDIUM TRANSCEIVER ANTENNA SYSTEM (ITAS) by pressing UP / DOWN and confirm with USE.

This setting will be saved.

17.2.2.3 How to Activate the Data Transfer to and from Rescue Track

The tracking system is always on and the position data is transmitted every 120 seconds to the Rescue Track server.

The initialization of the communication with RescueTrack was carried out at the factory.

An interruption / shutdown can take place by switching off the ITAS module.

17.3 Rescue Track MMS on the Screen

→ AUX → MMS

| Received messages (latest on top) | RescueTrack status | | | | | | | | |
|---|--|-------|-------|-------|-------|--|------|--|------|
| 2015-02-21 14:57 from: Sender Text of received message 5 N42°12.1 E013°20.5 2015-02-21 14:50 from: Sender Text of received message 4 2015-02-21 14:40 from: Sender Text of received message 3 2015-02-21 13:25 from: Sender Text of received message 2 2015-02-21 13:20 from: Sender Text of received message 1 | Frei auf Funk > Frei auf Wache > Einsatz übernommen > Am Einsatzort > Sprechwunsch > Außer Dienst > Patient übernommen > Im Krankenhaus > Ferry Flight > | | | | | | | | |
| <i>(in the background: normal map screen)</i> | | | | | | | | | |
| <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">GOTO</td> <td style="border: 1px solid black; padding: 2px;">DCT</td> <td style="border: 1px solid black; padding: 2px;">msgUP</td> <td style="border: 1px solid black; padding: 2px;">msgDN</td> <td style="border: 1px solid black; padding: 2px;"></td> <td style="border: 1px solid black; padding: 2px;"></td> <td style="border: 1px solid black; padding: 2px;"></td> <td style="border: 1px solid black; padding: 2px; text-align: right;">BACK</td> </tr> </table> | | GOTO | DCT | msgUP | msgDN | | | | BACK |
| GOTO | DCT | msgUP | msgDN | | | | BACK | | |

17.3.1 Description

Left half: Incoming news, latest at the top.
 Right half: Standardized messages sent by the helicopter.

17.3.2 Incoming Messages

The last 5 incoming messages are displayed in the left half of the screen, the latest at the top.
 Automatically, the latest message is set active (green high-lighted).
 It is possible to select one of the other messages
 → msgUP to the top or
 → msgDN down.
 The selected message will be green high-lighted.

As soon as the message contains coordinates, these options are available on the button bar:

- GOTO → the map is centered on the given coordinates
(NOTICE: This terminates the MMS menu!)
- DCT → set a DIRECT to the given coordinates
The destination is displayed as RTDEST.

17.3.3 Note on an Incoming Message on the Moving Map

As soon as a new message arrives, a message symbol in the the info block in the main menu (moving map) is shown.

As soon as the pilot looks into the message with → AUX → MMS, the symbol will be deleted in the info box.

The notice of the message is displayed on the moving map
B L I N K I N G to increase attention.



17.3.4 Selection of Standardized Status Messages: Bezels 2-0

By pressing the corresponding key the message will turn “cyan”.
Automated sending together with the next position report
The communicated message stays „green“, until another message will be selected.

Color coding for current status:

- „cyan“ highlighting = Selected but not yet transmitted
- „green“ highlighting = Selected and transmitted

17.3.5 BACK

Back to Main Menu – Moving Map.

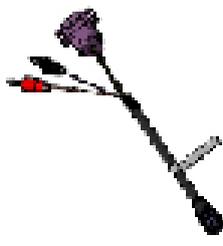
17.3.6 Saving of Current Setting

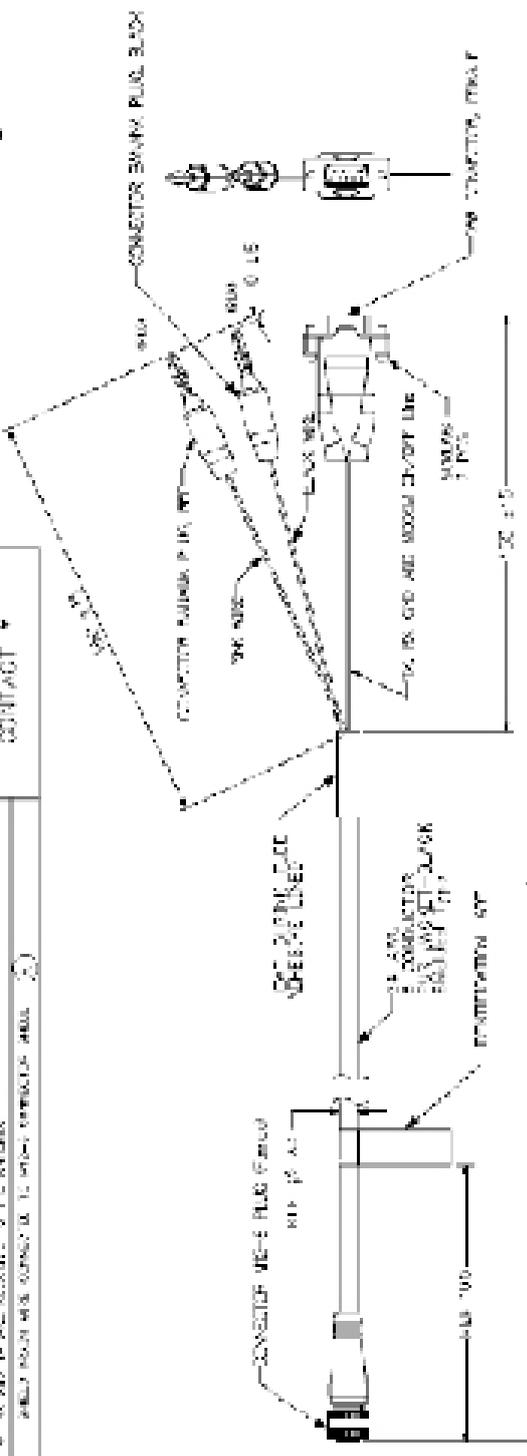
The tracking setting remains stored and will be activated immediately at system startup. If the communication with the ITAS module is not given, an error message appears.

17.4 ITAS System Components and Connection

17.4.1 Technical Information for ITAS Test Cable

17.4.1.1 Data Sheet (copyright: Hirschmann Car Communication Inc.)





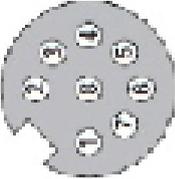
NOTES:
 - BLUE - RELEASED
 - RED - HOLDING

Technical specifications to DIN EN 50157-1

| Parameter | Min | Typ | Max | Unit | Min | Max | Unit |
|--------------|------|------|------|-------|------|------|-------|
| Temperature | -40 | 0 | 125 | °C | -40 | 125 | °C |
| Humidity | 30 | 95 | 100 | % | 30 | 100 | % |
| Conductivity | 0.01 | 0.02 | 0.05 | µS/cm | 0.01 | 0.05 | µS/cm |

| | | |
|-----------------|--------------|----------------|
| 102. 48 0124-03 | 2000-03 | X08 48 0124-03 |
| 103. 48 0124-02 | 2003-07 | X18 48 0124-02 |
| 104. 48 0124-01 | 1994-00 | X08 48 0124-01 |
| Part Number | Cable Length | Part Number |

CONTACT



Pin 1: Ground
 Pin 2: 30 Ohm 2-wire Blue Green wire
 Pin 3: 30 Ohm 2-wire Red Green wire
 Pin 4: 30 Ohm 2-wire Green
 Pin 5: 30 Ohm 2-wire Green
 Pin 6: 30 Ohm 2-wire Green
 Pin 7: 30 Ohm 2-wire Green
 Pin 8: 30 Ohm 2-wire Green

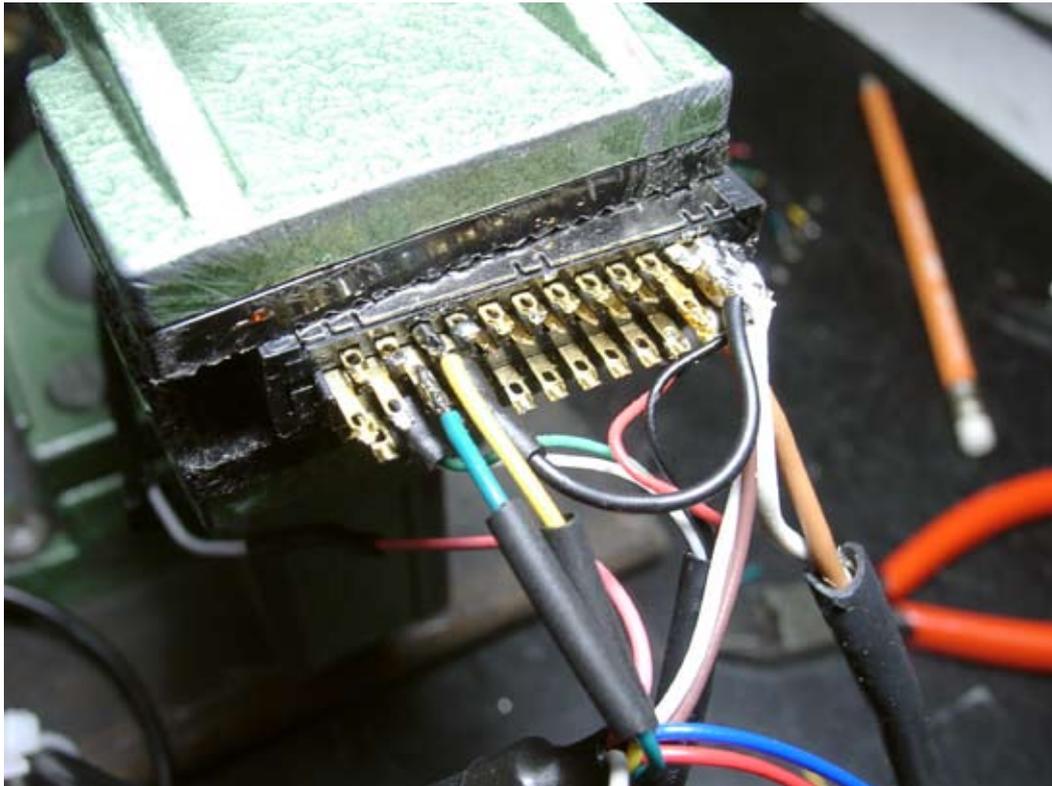
17.4.1.2 Installation Advices

All installation advices are based on HIRD - SX - 0129x-01 (ITAS 832 SP), please refer to the data sheet.

TX and RX is related to the respective device.

Standard ComPort on MT in Com3 on the MDR50 central connector.

Com Gnd 19 is to be connected to pin 26 -29 (MDR50)

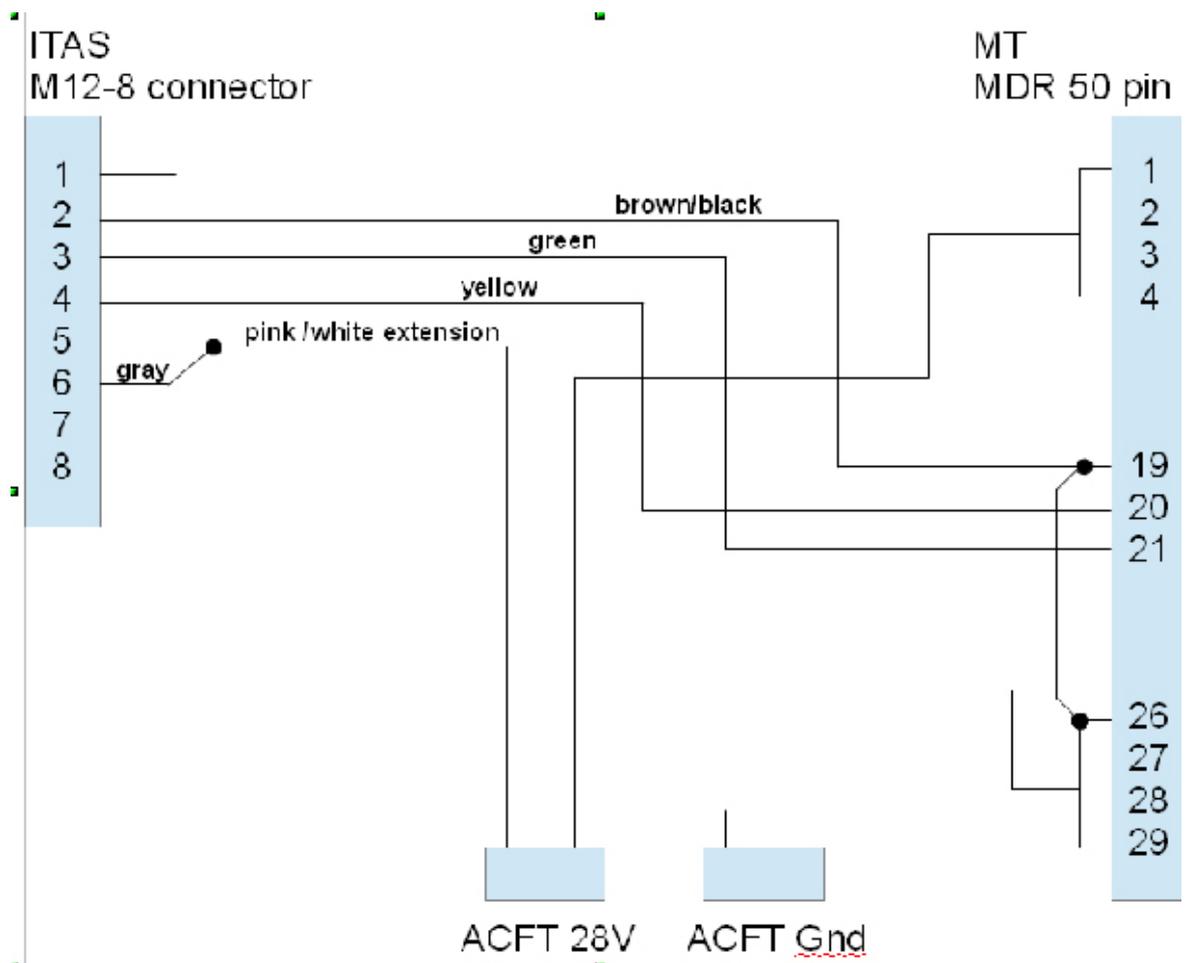


On/Off Control activation pin (pin 6/grey in M12-8 ITAS) is to be connected to pin 5 =

- External Power Source: 8—32 VDC (5VDC optional¹)
- Power Consumption: 1 Amp max transmit
- 65mA Standby
- on/off signal line
- Transient Protection: SAE J1113/11/12
- Reverse Voltage Protection: 24V tested

Note: On/Off control through power-line results in a 30sec start-up delay.

17.4.1.3 Example Installation



17.4.1.4 Test Procedure

- AUX → TRACK -> type MTITESTJ and start simulator.
- AUX → TRACK -> SIM ON

MT Internal test procedure to check the COM port (not open for customers)

shift 4 to get a terminal

nano .xinitrc

type # as leading character in front of the last line and
delete # in front of the 2. last line.

COM port will not be blocked, MT program will not start automatically

reboot

minicom -b 19200 -D /dev/ttyUSB2

opens COM3 with 19200 baud

ati4

type in minicom

answer should be „IRIDIUM 9600 Family“

communication with modem established

strg-z x

exit minicom

nano .xinitrc

revert the # in front of the last / 2. last line and save

reboot

17.4.2 Technical Information for ITAS Module

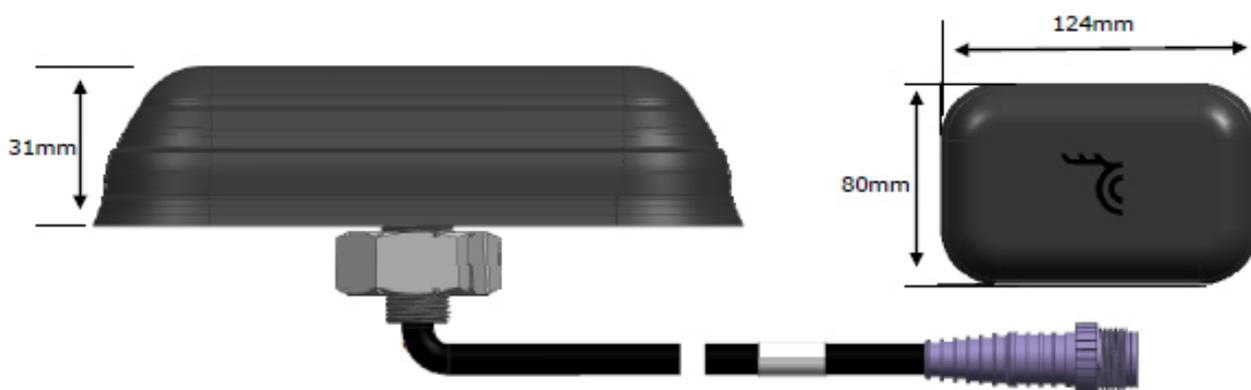
Copyright: Hirschmann Car Communication Inc. (We accept no liability for errors.)

Hirschmann Solutions

A business unit of Hirschmann Car Communication

Installation Instructions Iridium Transceiver Antenna (ITAS/Q-Puck)

Technical Data



| | |
|--------------------------------|---|
| Dimensions | 124mm x 80mm x 31mm / 4.9 x 3.1 x 1.22 in. |
| Weight | ca. 500 g / 17.6 oz. |
| Temperature range | -40°C to +85°C / -40°F to +185°F |
| Protection class | IP66 (acc. IEC 60529) |
| ESD Protection | ± 15 kV |
| IRIDIUM Antenna | |
| Frequency range | 1616 - 1626.5 MHz |
| Gain / Gainangle | 3 dBi ¹⁾ |
| Polarization | RHCP |
| Axial ratio | < 4 dB |
| Lightning protection | DC grounded |
| Iridium Communication | |
| Transmit power | 1.6W ¹⁾ |
| Max. message size | Tx 340 Bytes, Rx 270 Bytes ¹⁾ |
| Data type | Short-burst data (SBD); no voice |
| Latency (message transmission) | 20 sec (typ) ¹⁾ |
| Default Baud Rate | 19200 bps |
| Start-up delay | 30 sec on power-up; no delay with on/off line when powered ²⁾ ; 3 sec optional |

| | |
|----------------------------|---|
| Data Interfaces | |
| Type | 1 serial RS-232C |
| Connector | M12/8P male |
| Cable length | 254mm pigtail |
| Extension cables | Consult HCC |
| Power | |
| Voltage supply | 8-32 VDC or 5 VDC regulated (depending on product version) |
| Current consumption | 1.5 Amp max transmit; 6.5mA stand-by; on/off signal line |
| Transient protection | SAE J1113/11/12 (only for 8-32 VDC supply power product version); compliant to test-pulse 1, 2a, 2b, 3a, 3b, 4, 5b (load-dump transient suppressed) |
| Reverse Voltage protection | 24V tested |

¹⁾ according to Iridium W602 Modem Specification and subject to change

²⁾ d.c.: referenced to an isotropic radiator, circular polarization

³⁾ refer to Iridium W602 Developers Guide (available on request)

Customer specific product versions may deviate from the data published in this document.

Product Family / Familia de Productos

| Order Code (customer specific versions not listed) ITAS | Power Version | External on/off line | Remarks |
|--|---------------|----------------------|--------------------------------------|
| HIRD - SX - 0129x-01 (ITAS 832 SP) | 8-32V | enabled | Electrical Installation see 5a or 5b |
| HIRD - SX - 0129x-30 (ITAS 832 SP) | 8-32V | disabled | Electrical Installation see 5c |
| HIRD - SX - 0130x-01 (ITAS 5 SP) | 5V regulated | enabled | Electrical Installation see 5a or 5b |

| Order Code (customer specific versions not listed) ACCESSORIES | Length | Configuration | Remarks |
|---|---------|--------------------|---------------------------|
| Extension Cables | various | Straight or angled | Please contact Hirschmann |

Hirschmann Car Communication Inc.
1183 Centre Road
Auburn Hills, MI 48326
United States of America
Phone: +1 248 373-7150

Right of modification reserved

After its use, this product has to be processed as electronic scrap to a proper disposal according to the prevailing waste disposal regulations of your community / district / county / state / country.

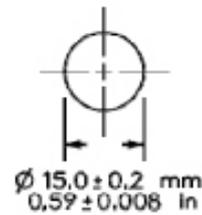
The performance features described here are binding only if they have been expressly guaranteed in the contract. This publication has been created by Hirschmann Car Communication Inc. according to the best of our knowledge.

Installation Procedure

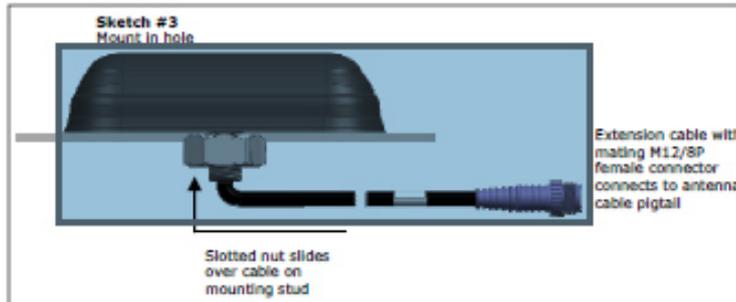
Mounting requirements and restrictions

- Choose appropriate mounting location on flat surface—allowing unobstructed view to the sky
- Max. tolerable material thickness of mounting surface: 3 mm/ 0.118 in.
- Safely drill 15 mm/ 0.6 in. mounting hole at desired location (see Sketch #1)
- Unscrew mounting nut (see Sketch #2)
- Insert threaded antenna mounting stud through mounting hole (see Sketch #3)
- Slide slotted mounting nut on and screw back on to antenna mounting stud.
- Maximum tightening torque is 5Nm.
- Connect connector to mating connector on extension cable or device (Sketches #4 and #5a-c)
- 24 AWG recommended wire gauge for extension cable.

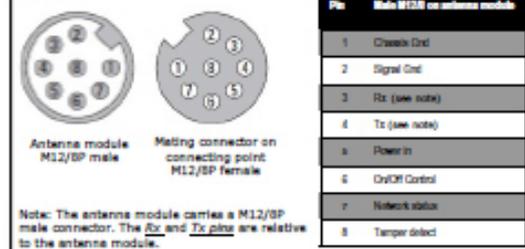
Sketch #1
Required Mounting hole



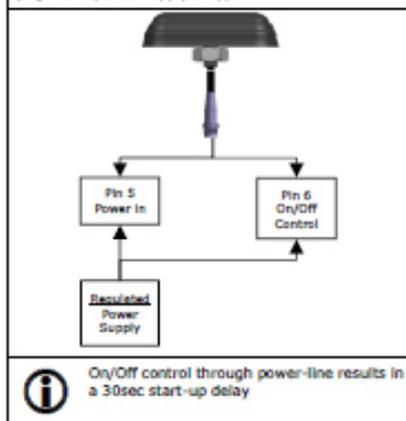
Sketch #2
Mounting Nut



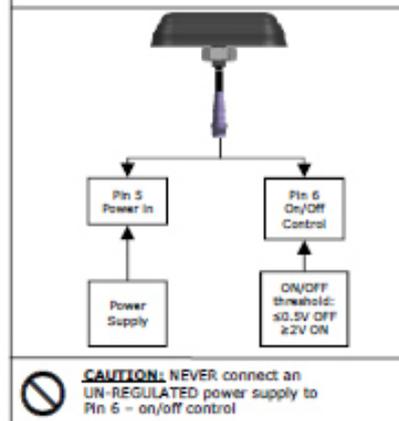
Sketch #4
Pin-Outs



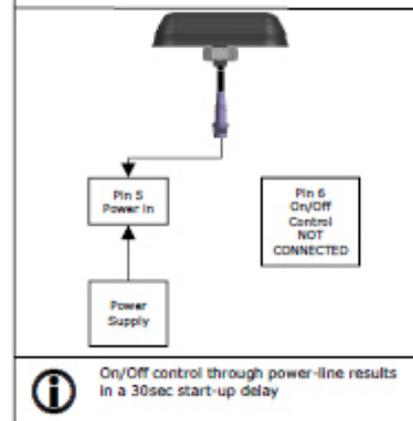
Sketch #5a
External ON/OFF control ENABLED
Modem ON/OFF controlled through power-line
(regulated power supply only)



Sketch #5b
External ON/OFF control ENABLED
Modem ON/OFF controlled through ON/OFF line



Sketch #5c
External on/off control DISABLED
Modem ON/OFF controlled through power-line



Reference Documents

- For technical information regarding the Iridium 9602 modem please reference the most recent Iridium developers guide (latest version at time of printing: Release 3.1—Oct. 29, 2012); the developers guide is available for ITAS-customers through Hirschmann Solutions
- For AT-command reference please refer to the most recent Iridium ISU AT Command Reference (latest version at time of printing: MAN0009 Version 2—July 27, 2012); the ISU AT Command Reference is available for ITAS-customers through Hirschmann Solutions

Caution Notes / Disclaimer

- On ITAS-units with enabled external ON/OFF line NEVER connect an UN-REGULATED power supply to Pin 6 - on/off control. The on/off control through Pin 6 needs to be made through an GPIO type interface or a regulated power supply.
- By default the ITAS is set to 3-wire interface. Do NOT use AT-commands to convert the Iridium 9602 modem to 9-wire interface.
- The ITAS product is Iridium certified according to Iridium LLC's requirements. Systems using the ITAS have to be approved/certified by Iridium LLC or through an Iridium partner.

Document Revision History

| Release Date | ECO-No. | Description of Change |
|--------------|----------|---|
| 4/30/2013 | 1,304-06 | Initial release |
| 5/08/2014 | - | Corrected values for current consumption and start-up delay |

Product Specification

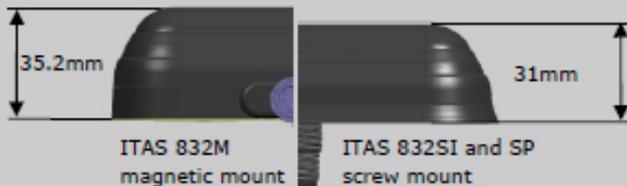
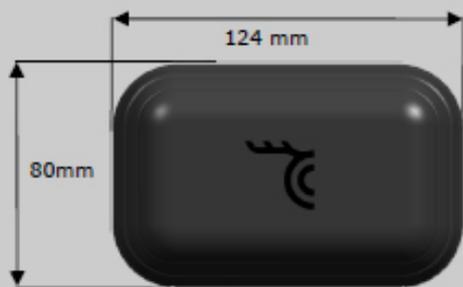
Communications – IRIDIUM

Transmit Freq: 1616 – 1626.5 MHz
 Transmit Power: 1.6W [‡]
 Max Message Size: Tx 340 Bytes Rx 270 Bytes [‡]
 Latency: 20 sec (typ) [‡]

[‡] according to Iridium 9602 Modem Specification and subject to change

Dimensions / Mechanicals

Length/Width/Height: 124.3mm/80.3mm/31mm
 (35.2mm for magnet mount)
 Weight: ca. 540g
 Mounting options: Through hole (hole diameter 15mm)
 magnetic mount option available 2013



Power

External Power Source: 8–32 VDC (5VDC optional[‡])
 Power Consumption: 1 Amp max transmit
 65mA Standby
 on/off signal line
 Transient Protection: SAE J1113/11/12
 Reverse Voltage Protection: 24V tested

[‡]Utilization of the Iridium satellite network is not guaranteed when the modem's voltage drops below 5 VDC.

Data Interfaces

Type: 1 Serial RS-232C
 Default baud rate: 19200
 Interface protocol: AT Command Set
 Flow control: Software
 Connector: Direct connect or pigtail
 M12-8M male (3-wire RS232C)
 Cable: 254mm multicond. (ITAS 832SP)
 tbd. multicond. (ITAS 832M)
 Extension Cables: Customized on request

| Pin | Male M12 on antenna module |
|-----|----------------------------|
| 1 | Chassis Gnd |
| 2 | Signal Gnd |
| 3 | Rx (see note) |
| 4 | Tx (see note) |
| 5 | Power in |
| 6 | On/Off Control |
| 7 | Network Status |
| 8 | Tamper detect |



ITAS module
M12/8P male



Mating connector
(connecting cable)
M12/8P female

Note: The antenna module carries a M12/8P male connector. The *Rx* and *Tx* pins are relative to the antenna module.

Environmental Specification

Operating Temperature: -40C to +85C
 Storage Temperature: -40C to +85C
 Low Pressure storage: up to 16hrs at 40,000 ft.
 Humidity: SAE J1455 (test conditions avail.)
 Cyclic humidity: 4 days @ -40 to 85C
 Thermal Shock: 36 4hr cycles; -40 to 85C
 Shock: SAE J1455
 Vibration: SAE J1455
 Protection Class: IP66

Certifications (including pending)

Iridium, FCC, CSA, CE

Order Codes

| | | |
|------------|--------------------------|------------------|
| ITAS 832SI | 8-32V, integrated M12/8 | HIRD-SX-0126x-01 |
| ITAS 832SP | 8-32V, 254mm cable M12/8 | HIRD-SX-0129x-01 |
| ITAS 832M | 8-32V, tbd cable M12/8 | HIRD-MX-0128x-01 |
| ITAS 5x | 5V version | upon request |

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18. Check List for Acceptance after Installation

This check list is intended for the use of the pilot. Please check following items to ensure that MT-VisionAir X ETSO has been correctly installed.

18.1 General installation check

| Check point | Correct? |
|---|--------------------------|
| The unit can be easily inserted into / removed from the Easy mount? | <input type="checkbox"/> |
| The power supply takes place via the Ground Clearance Switch / Hot Bus / Battery Bus? | <input type="checkbox"/> |
| The GPS positions correctly (SATFIX)? | <input type="checkbox"/> |
| The correct GPS source is selected? | <input type="checkbox"/> |
| The GPS signal is not shielded by a heated windshield? | <input type="checkbox"/> |

18.2 Check Moving Terrain with satellite telephone

18.2.1 Check satellite telephone antenna

| Check point | Correct? |
|---|--------------------------|
| The distance between GPS antenna and satellite telephone antenna is at least 1.3 m? | <input type="checkbox"/> |
| The Sat Tel antenna has optimal view (about 180°) to the sky? | <input type="checkbox"/> |
| The position of the satellite telephone antenna is suitable for reception? <ul style="list-style-type: none"> • Is it neither installed vertically nor installed vice versa? • Please inform yourself in detail about the installation! | <input type="checkbox"/> |
| The extension of the antenna was done according to the guideline? | <input type="checkbox"/> |
| Ground plane installed? | <input type="checkbox"/> |

18.2.2 Check telephone connection (satellite telephone)

| Check point | Correct? |
|--|--------------------------|
| The satellite telephone is supplied/loaded by on board power? | <input type="checkbox"/> |
| The satellite telephone is connected correctly with MT? | <input type="checkbox"/> |
| Cable connection with the central connector at the MT established? | <input type="checkbox"/> |

18.2.3 Check satellite telephone in use

| Check point | Correct? |
|---|--------------------------|
| Telephone switched on? | <input type="checkbox"/> |
| Captains PIN deactivated? | <input type="checkbox"/> |
| The satellite telephone can receive data? | <input type="checkbox"/> |

18.2.4 Check settings in the Moving Terrain

| Check point | Correct? |
|---|--------------------------|
| The UTC (see Info Box) is transmitted by GPS? | <input type="checkbox"/> |
| The correct telephone source is selected? | <input type="checkbox"/> |

18.3 Check Moving Terrain with UMTS

| Check point | Correct? |
|--|--------------------------|
| Security PIN code deactivated with a cell phone? | <input type="checkbox"/> |
| The correct telephone source is selected? | <input type="checkbox"/> |
| | |

18.4 Check further Com Port connection(s)

| Check point | Correct? |
|--|--------------------------|
| TCAD: AUX TAS Sel: Check TAS signal: Avidyne OK / FLARM OK | <input type="checkbox"/> |
| Stormscope AUX Stormscope OK -> Stormscope OK | <input type="checkbox"/> |
| ITAS: Data transfer confirmed? | <input type="checkbox"/> |

19. Technical Specifications

19.1 MT-Vision Air X ETSO

(subject to change without notice)

| Item | Specification |
|-------------------|---|
| Type | Electronic charting system and Multi Function Display with optimized size for cockpit use. The system may serve for helicopters and fixed wing, and can be applied by panel mount or mobile use. |
| Screen | TFT active matrix display 6.5" (diagonal), 1024x768 pixels, 16 million colours, LED backlight. Viewing angle: left / right side 80° (typ.) up side 80° (typ.) down side 60° (typ.) Sunlight readable Surface finish: clear + anti reflection |
| Presentation | – Landscape (typ.) – Portrait (special software required) Arrangement of keys enables both presentations |
| NVG | Night vision goggles compatibility with special software option |
| Keyboard | Silicone keypad with 36 alphanumeric keys + 10 multi function keys + ON/OFF switch + * key to adjust screen luminance in 8 steps. Gold plated contacts on both – matrix and key - sides. Keys illuminated blue (NVG compatible), dimmed together with display luminance. |
| Ports | 4 USB ports: 1 for direct insertion of UMTS / modem stick 2 service ports (e.g. for updates) 1 via central connector 4 COM ports (via central connector) 2 analog out (via central connector) 1 VGA (via USB and MT-VGA out device) Audio I/O (via central connector) 1 Ethernet port |
| Central connector | Type: 50-pin MDR central connector for – Power – GPS – USB (e.g. for updates) – COM 1–4 – Audio I/O Lateral or rear connection possible |

| Item | Specification |
|--------------------------------------|--|
| Casing | Aluminum, scratch proof black powder coating |
| Weight | 585 g |
| Dimensions (W x H x D) | 157 mm x 126 mm x 33.1 mm |
| Power supply | 12–28 V nominal, max 32 V (e.g. for APU) min 7 V (battery) |
| Aircraft side required fuses | Operating voltage 12 V -> min. 5 A, slow Operating voltage 24 V -> min. 2 A, slow |
| Power consumption | 14 W + reserve wattage up to approx. 30 W for optional equipment |
| Environmental conditions | Temperature and altitude low ground: Category C4 Survival temp low short-time: –55 °C (short –10 °C) Minimum temperature low operation: –20 °C Operating temp low operating –10 °C Temperature high ground survival: +85 °C Temperature high short-time operation: +50 °C Temperature high operating: +50 °C |
| Shock and g loading | Operational Shock Test according to RTCA DO-160F, section 7.2.1 in X-Y-Z-Axis |
| Vibration | Operational Vibration Test according to RTCA DO-160F, section 8.8.3. Random Test Procedure for Category U2: Unknown Helicopter / fixed wing frequencies. |
| Mounting | “Easy Mount” for panel or yoke / side mounting. Performed Operational Shock Test according to RTCA DO-160F, section 7.2.1 in X-Y-Z-Axis. |
| Required dimensions for panel cutout | Width: 160.5 mm or respectively min. 157.5 mm (with latches in the rack) Height: 128 mm Depth: 46 mm (all dimensions incl. + 0.5 mm tolerance) |
| Options | |
| Option Rechargeable battery packs | Pack of 2 slim battery for 2 h 15 min Loading station |
| Option VGA out | Passenger Entertainment Screen 10" via USB and VGA-Out Device |

Table 19.1: Technical specifications MT-VisionAir X ETSO

19.2 Fast Integral GPS

The Fast Integral GPS is a product of Moving Terrain AG.

| Item | Specification |
|-------------------------|--|
| Frequency | L1, 1575.42 MHz |
| C/A Code | 1023 MHz |
| Channels | 50 max. |
| Positioning update rate | 4 Hz |
| High sensitivity | 160 dBm |
| Support | DGPS, WAAS, EGNOS, MSAS AssistNow Online (14 days Almanac data) |
| Base setting | WGS-84 |
| Dimensions (W x H x D) | 49 mm x 23 mm x 81 mm |
| Extension cable | 4 line RS232 data cable with RX, TX, power, ground. Shielding: Aluminium foil in combination with copper mesh tin coated, approx. 90 % covering |

Table 19.2: Technical specifications Fast Integral GPS

19.3 COM Ports in MT-VisionAir X ETSO

| Ports | Assignment to | |
|--------------|--|--|
| COM 1 | Signal from TAS 600 series Signal from FLARM Signal from Garrecht TRX1090 | Protocol in <TCAS> <TAS1SEL>: – Avidyne/Ryan – ZAON (no longer supported) – FLARM – Garrecht TRX1090 |
| COM 2 | GPS signal | Protocol in <AUX> <SETUP> <GPS>: – Integral GPS – Fast Integral GPS – Trimble – King KLN90 – Garmin 430/530 – Universal FMS – FLARM |
| COM 3 (1) | Signal from FLARM (only used, if FLARM is combined with Avidyne/Ryan) | Protocol in <TCAS> <TAS2SEL>: – FLARM and mtpro.ini |
| COM 3 (2) | Serial port for ITAS modul | Protocol set in mtpro.ini |
| COM 3 (3) | Serial port for Crossfill from Garmin | no entry in mtpro.ini Check possible conflict with TCAS combined! |
| COM 4 | Stormscope WX-500 / WX-670 | Protocol set in mtpro.ini |
| | | |

Table 19.3: COM Ports assignment

NOTES

Technically COM ports 1–4 are equivalent.

In mtpro.ini the following is to be obtained:

- Modem = COM 0 is mandatory!
- Specification of COM port = 0 can be set to several ports which are not in use.

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