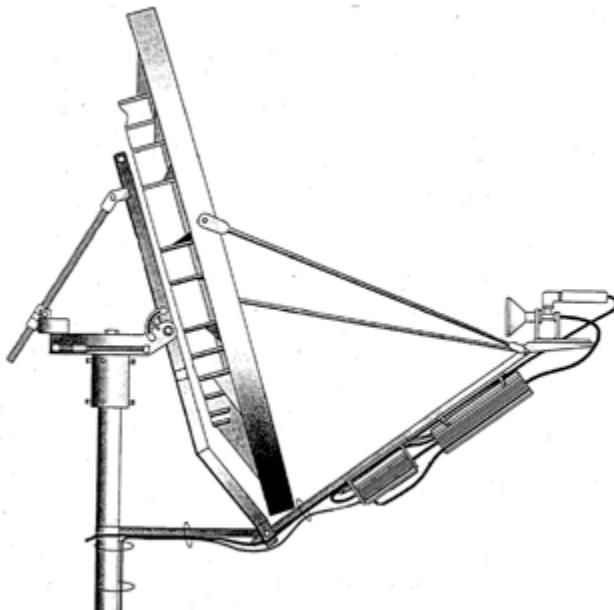


VSAT SITE SURVEY & DESIGN PROCESS



INTRODUCTION

A Site Survey Report has to be conducted prior to an installation in order to clarify the current condition at the site and state what is needed to get the location ready and subsequently ensure an effective and successful installation.

The Site Survey Report consists of different sections. The first section describes general information about the customer site, contact persons, access to the customer site etc.

This is followed by sections related to the satellite and the Outdoor Unit (ODU - the whole assembly placed outside such as antenna, receive and transmit equipment), including mount and cabling issues.

Next are sections related to the Indoor Unit (IDU - the equipment to be placed inside the computer/server room such as e.g. DVB receiver, router, modulator, switch etc. IP Flex) including power issues.

The Site Survey Report ends with some general terms and conditions which the customer must also ensure is in order upon arrival of the VSAT installation engineer.

Where it makes sense, the sections contain three main points which are:

- the **requirements for the installation**. This point will state what needs to be ready at the site location (and why) to ensure a successful installation. This is the VSAT engineer's check-list.

- what is the **current condition at the site**. This point will state the present situation, such as power measurements (is clean and stable power provided?), condition of the computer/server room (is air condition installed?) etc.
- the **civil works (customer responsibility)**. This point states what needs to be prepared by the customer before the actual VSAT installation can take place. This is the customer's check-list of tasks to be completed.

The sections should be supported by photographs, drawings / sketches and detailed descriptions in order to avoid misunderstandings.

Photographs should be marked with the direction in which the photograph was taken or viewed from. Especially photographs or drawings / sketches of the actual antenna location should include an aerial plan with details such as direction (an accurate indication of North), elevation and exact position (distance between the recommended location of the antenna mount and the surrounding fixed points (e.g. to the edge of the roof/garden, roads, landmarks, buildings, trees)).

All dimensions and distances should be followed by unit of measurement.

During the site survey it is highly recommended that the VSAT engineer and the customer communicate on the different issues that need to be dealt with by the customer afterwards - a comprehensive explanation of the civil works to be completed.

All agreements made between the VSAT engineer and the customer during the site survey should be clearly and accurately described within this site survey report, and confirmed with a signature by both parties on the final page of this document.

GENERAL CUSTOMER INFORMATION

Site Location

Company Name: name

Link Name: name

Street Address: name

City/Town: name

Country: name

Site Latitude: 0°00'00.00"S

Site Longitude: 0°00'00.00"E

Site Contacts

Name of Technical Contact Person: name

Title: Mr

Telephone/Mobile: +0000

Email: name@name.com

Site Access

Hours during which work may be performed:

- What are the working hours on normal weekdays?

Monday - Friday 0:00 am - 0:00 pm

- Is access after normal working hours on a weekday possible?
 Yes No
- Is access/work during weekend possible?
 Yes No
- Describe any special identification required for access: text

OUTDOOR UNIT (ODU)

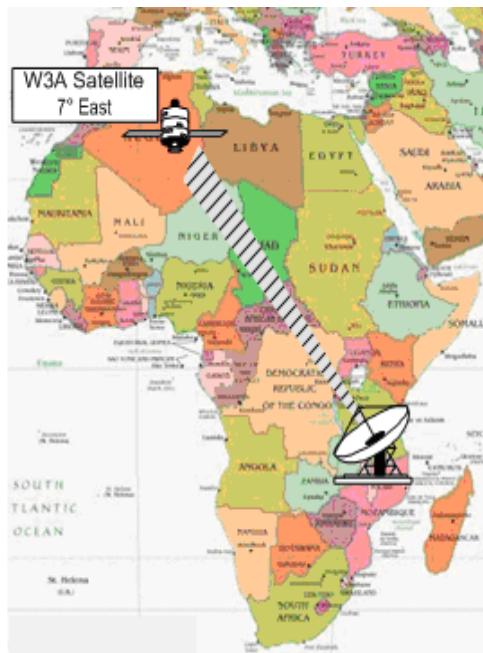
Satellite Details

Please tick off which antenna will be used for the installation:

	<u>Name of satellite</u>	<u>Geostationary Position</u>
<input type="checkbox"/>	W3A	7° East
<input type="checkbox"/>	PAS1R	45° West
<input type="checkbox"/>	ABS-1	75° East

- Antenna Pointing Angle: Azimuth: 00.00°, Elevation: 00.00°

The position of the satellite mentioned above is the geostationary position, which means that the satellite rotates "with" the Earth and therefore the satellite is always located above the same point relative to the Earth.



So even if the satellite is positioned in East according to the table above, the pointing of the antenna can in some cases be in e.g. the West depending on where the site is located on the Earth.

Please refer to the example shown on the picture to the left where the antenna should point to the North / West even if the antenna is located at 7° East.

Antenna Location

Requirements for the Installation

The VSAT engineer will make a decision on the most suitable location to place the antenna, taking into consideration the customer's requirements, susceptibility to damage, direct line-of-sight to the satellite and whether or not the fabric of the ground / roof / wall is sufficiently strong to support the antenna assembly (to be confirmed by a structural engineer if necessary).

- The antenna must have a direct and unobstructed line-of-sight to the satellite.

No buildings, mountains, trees etc. must obstruct the line-of-sight to the satellite. Remember that trees grow... Please avoid that a tree will obstruct the line-of-sight after a few years ☺

- The distance (cable length) between the antenna and the computer room (where the Indoor Unit is to be installed) is preferred to be less than 60 m.

The LMR cable (TX) standard length is 60 m. It is possible to get a 100 m cable (special delivery), but if the length can be less than 60 m this is preferred. However the maximum distance is 100 m. If the distance (cable length) is longer than 100 m the signal strength may be significantly weakened.

- Special natural circumstances (e.g. wind and weather conditions).

Are there any special circumstances that need to be taken into consideration before deciding where the antenna should be placed? E.g. storm/wind speeds above 200 km/hour, heavy rain.

Current Condition at the Site

- Does the recommended antenna location have a direct line-of-sight to the satellite?

Yes No

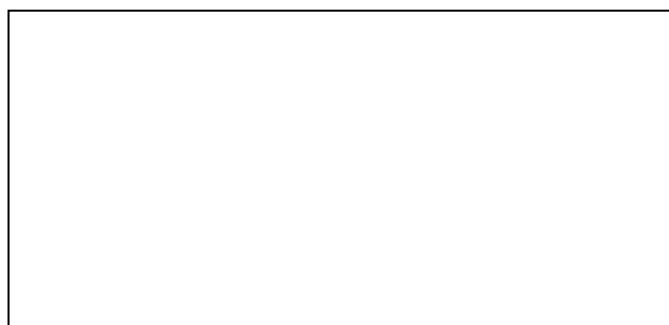
- Indicate any sources observed likely to interfere the line-of-sight to the satellite: text

- How long is the distance (cable length) between the antenna and the computer room?
0 meters (max 100 m)
- Should the design take the local wind and weather conditions into consideration?
 Yes No
- The recommended antenna location is on?
 Ground Roof Wall
- Is the fabric of the ground / roof / wall sufficiently strong to support the antenna assembly?
 Yes No

Civil Works (Customer Responsibility)

Describe in details what needs to be done in order to prepare the antenna location, e.g. clear the antenna location, cut down trees, strengthen / improve the structure of the roof/wall, precautions against local wind and weather conditions:

It is important that it is clearly specified where the antenna mount shall be placed (insert diagram in the box below):



Picture text

Aerial plan of site, with direction (North), elevation and exact dimensions of the distance between the recommended location of the antenna mount and surrounding fixed points (roads, buildings, trees etc.)



Picture of line-of-sight to the satellite. (The photograph must be taken from the

proposed antenna location towards the satellite).

Mounting Requirement

Requirements for the Installation

The antenna size and corresponding mast dimensions are shown below. Please tick off which antenna will be used for the installation:

	<u>Antenna size</u> (required diameter of dish)	<u>Pole size</u>	<u>Pole - outside diameter</u>
<input type="checkbox"/>	1.2 m	2.5" or 6.35 cm	2.88" or 7.32 cm
<input type="checkbox"/>	1.8 m	3.5" or 8.89 cm	4" or 10.16 cm
<input type="checkbox"/>	2.4 m	6" or 15.23 cm	6.63" or 16.83 cm
<input type="checkbox"/>	3.8 m	10" or 25.4 cm	10.75" or 27.3 cm

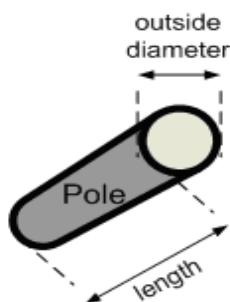
A mount is a construction which will keep the antenna tight, so it does not move once installed. There are 3 different types of mounts depending on where the antenna is going to be installed (on the ground, roof or wall).

The pole is the actual stick (a part of the mount) onto which you place the antenna. The pole must be a tube (hollow inside), because there is a screw on the antenna which goes inside the pole.

The *outside diameter of the pole* is specified in the table above and should be the exact diameter, as otherwise the antenna will not fit onto the pole.

The *length of the pole* is indicated in the table below. The length is relevant in order to make sure the antenna is placed at the correct height above where to it is fixed.

Please refer to the pole drawing below as regards the different measurements mentioned above.



Please tick off which type of mount will be used for this installation, the corresponding ballast needed and insert the required length of the pole:

	<u>Mount Type</u>	<u>Ballast needed</u>	<u>Length of pole</u> (enter the required length)

<input type="checkbox"/>	Non-penetrating mount (iron construction on ground/roof)	4-500 Kg	cm
<input type="checkbox"/>	Pole mount (pole directly in the ground/concrete)	0 Kg	cm
<input type="checkbox"/>	Wall mount (iron construction screwed onto wall)	0 Kg	cm

Current Condition at the Site

- Does the customer already have a mount suitable for this installation?

Yes No

Civil Works (Customer Responsibility)

A mount with the indicated specifications at the drawing below must be constructed by the customer. The specifications for the pole (outside diameter and length) can be found in the tables above.

Notice: A prefabricated Prodelin mount can also be bought via Interactive-Interactive. Please contact your account manager for a quote on the recommended mount type.

- Is additional support required for the antenna / mount structure to survive the wind loading in the region?

Yes No

If yes, please comment:

Drawing of the mount specifications including dimensions.

ODU Grounding / Lightning Protection

Requirements for the Installation

The ODU (outdoor unit) grounding must always have its own grounding point (it may NEVER share grounding point with the IDU (indoor unit) grounding).

This ODU grounding must maintain a maximum of 5 Ohm between the three measuring points at 10.000 Volt (measured with a ground resistance measuring unit).

The connection must always be fastened properly and the grounding wire must always have a proper diameter (10 mm²).

Whether the grounding is connected to an already established grounding point or a new grounding point established by cobber spears, cobber mats or other is irrelevant as long as the above is maintained.

Civil Works

- In the case of roof mounted antennas or antennas mounted in very open areas, does the customer have an existing lightening protection system installed nearby to avoid the antenna assembly (outdoor unit) to be struck by lightning?

Yes No

- If no, please recommend what to do: New lightening protection needs to be installed
 - If yes, can it be utilised to bond the antenna system in a way that does not impair the performance of the lightning protection system whilst providing the antenna with the required protection? (The lightning protection system must not be bonded to the antenna electrical earth, but must provide a separate path to the ground via the lightning protection system).

Yes No

Comments: text

Describe in details what must be done by the customer to maintain the requirements of the ODU grounding:
text

Cabling

Requirements for the Installation

In order to get the VSAT setup to work, the Outdoor unit must be connected to the Indoor unit.

Cables connecting the Outdoor unit with the Indoor unit should be installed via trunking (where needed).

Current Condition at the Site

- How long is the distance (cable length) between the recommended location of the antenna (Outdoor unit) and the computer/server room (Indoor unit)?

_____0 meter

Civil Works

- Will it be sufficient with 60 m cables between the antenna and the computer room?

Yes No

If no, please indicate the cable length required (max 100 m):_____0 meter

- The cables to be run are:

LMR cable (TX)

Sat2 cable (RX)

Other:

text cable

(Specify)

- Will the cables run alongside other cables (existing cable path)?

Yes No

If yes, will this be able to cause interference?

Yes No

Comments:

- It is required by the customer to run the cables (firmly installed where needed) between the recommended location of the antenna (Outdoor unit) and the computer/server room (Indoor unit) with the specifications.

INDOOR UNIT (IDU)

Computer / Server Room

Requirements for the Installation

The computer/server room is the location where the indoor equipment should be placed.

The environment in this room must comply with special conditions, such as temperatures between 16° to 32° C, humidity (20% to 80%, with no condensation), and actual shelves for the equipment must be provided as it will be exposed to dust and dirt if for example placed on the floor.

The customer LAN must be ready before the installation can take place. This enables the installations engineer to test and confirm that everything works satisfactorily.

Current Condition at the Site

- Does the computer/server room have an equipment chassis/rack mount with sufficient shelves or another flat surface suitable to place the indoor equipment?

Yes No

- Does the computer/server room have a type of climate condition (adequate ventilation such as air condition, fan)?

Yes No

Civil Works

A clean, light, dust free and air conditioned room which can be locked should be provided:

- The customer should provide a chassis/rack mount or another flat surface suitable for placement of the Indoor Equipment?

Yes No (already in place)

- If "Yes" the placement for the equipment should have the following dimensions:

_____ 0 * 0 * 0 _____ cm

- The customer should provide a type of climate condition (e.g. air condition, fan) in the computer/server room?

No (already in place)

- Where is the computer/server room located on the customer premises?

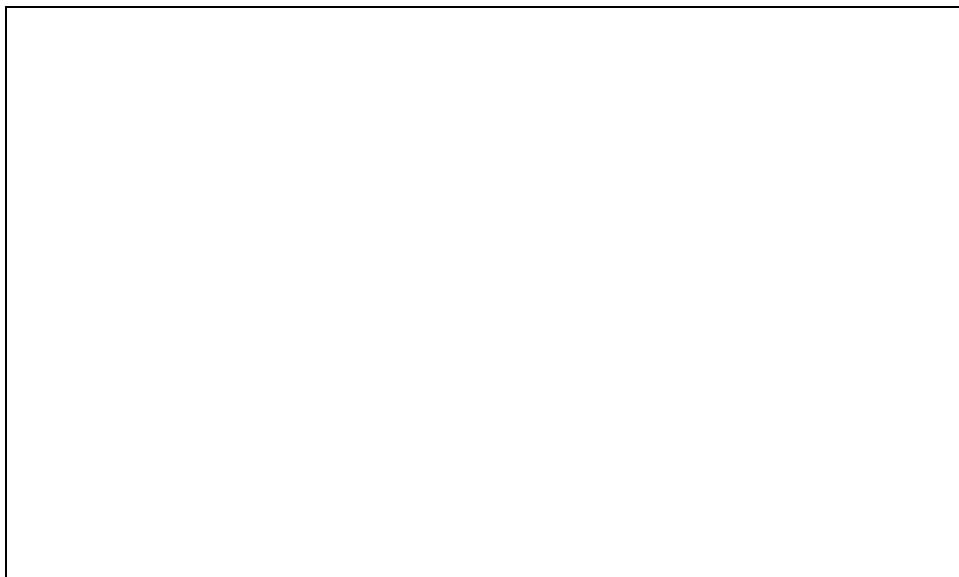
Please describe: text



Picture/diagram showing where the computer/server room is located on the customer premises.

- Where should the indoor equipment, be placed, inside the computer/server room?

Please describe: text



Diagram/drawing showing where the indoor equipment will be placed inside the computer/server room.

IDU Power

Requirements for the Installation

A voltage measurement must be made of the current power installations/power points to be used for the VSAT outdoor equipment. The values should be the following:

- LIVE / NEUTRAL: 220-240 Volt (105-115 V if 110 V power supply is used)
- NEUTRAL / EARTH: 0.0 Volt (close to 0.0 V is preferred but max. 5.0 V)

It is extremely important that clean and stable power is provided to the VSAT equipment, as experience shows that 80% of all faults on the VSAT are due to bad power.

Current Condition at the Site

Below is shown what is available at the time of the site visit:

	<u>Outlet 1</u>	<u>Outlet 2</u> (if more than one phase)	<u>Outlet 3</u> (if more than one phase)
LIVE / NEUTRAL	230 V	230 V	230 V
NEUTRAL / EARTH	0 V	0 V	0 V

- Which of the above measured phases are to be used for the VSAT equipment?

Phase 1 Phase 2 Phase 3

- Description of the current power supply – what is available:

City power - comments:

UPS - comments:

Generator - comments:

Stabilizer - comments:



Diagram of the current power setup.

Civil Works

If the measurements in the table above are not between 220-240 V for LIVE / NEUTRAL and 0.0 V for NEUTRAL / EARTH, this must be fixed before the installation can take place.

Please describe in details what the customer should do / provide / install in order to supply clean and stable power: text

IDU Grounding

Requirements for the Installation

As earlier described, the grounding for the IDU (indoor unit) must NOT use the same grounding as for the ODU (outdoor unit) – this is very important, because if the same grounding point is used for both the IDU and for the ODU, we risk the possibility that should a lightning strike the antenna, it may as well go into the IDU equipment as to the grounding point.

As for the ODU, the IDU grounding must maintain a maximum of 5 Ohm between the three measuring points at 10.000 Volt (measured with a ground resistance measuring unit). Also the connection must always be fastened properly and the grounding wire must always have a proper diameter (10 mm^2).

Whether the grounding is connected to an already established grounding point or a new grounding point is established done by copper spears, copper mats or other is irrelevant as long as the above is maintained.

Civil Works

Describe in details what must be done by the customer to maintain the requirements of the IDU grounding:
text

GENERAL TERMS AND CONDITIONS

Customer Responsibility – Check List

Please make sure the tasks below are all dealt with:

- All equipment to be installed must be available at the site upon arrival of the VSAT installation engineer.

Done

- Accessibility to all rooms and locations involved in order to carry out the installation.

Done

- Customer contact person should be available at the site during the entire installation. Please provide contact details for this person if it differs from the already given details for the site survey.

Done

- All the civil works pointed out in the report under each section "Civil Works (Customer Responsibility)" is the responsibility of the Customer. The customer must make sure that all points are dealt with and completed.

Done

- Upon completion of all civil works and when all equipment is available at the site, Interactive-Interactive should receive a written confirmation from the customer via e-mail stating that the site is ready for installation.

Done

SIGNATURE – END OF SITE SURVEY REPORT

The report has been prepared by the VSAT engineer and the customer has been informed of the details of the Civil Works required to be completed before the installation can begin.

The customer understands the responsibilities to be completed before the installation can take place.

name _____

dd/mm/yyyy _____

Customer's name

Customer's signature

Date

Name _____

dd/mm/yyyy _____

VSAT engineer's name

VSAT engineer's signature **Date**