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Simulsat-5B Installation Planning Guide

A Simulsat-5B (SS5B) installation is a significant project that requires detailed planning and well-executed follow-through in order to be completed efficiently and cost-effectively. This document provides a general overview of various aspects of a SS5B installation. Prior to the installation ATCi will forward a Scope of Work (SOW) to the customer that establishes ATCi's and the customer's responsibilities in greater detail. The SOW will need to be signed by the customer and returned to ATCi, after which ATCi will sign the SOW and return the completed SOW to the customer.

If the installation is an uncomplicated ground mount and all goes well, a Simulsat-5B installation can be completed in 3-4 days. A roof mount installation may take a day or two longer. Additional accessories (heat system, e.g.), poor labor and/or equipment support, inclement weather, or other issues can result in additional work days.

Satellite List and Service Request Form (SRF)

The customer's satellite list (sat list) is critical for determining the SS5B's configuration (azimuth, elevation, and roll). The SS5B satellite view arc is 70° of satellite longitude (which is not the same as ground azimuth). If the sat list is less than 70° of satellite longitude, the customer will need to decide what 70° satellite arc segment they want the antenna to be positioned to receive. This determines the centerline of the antenna's foundation. The SS5B mount has approximately $\pm 10^\circ$ of azimuth adjustability, so there is some leeway regarding the azimuth orientation, but it is best to have the foundation oriented to the center of the desired 70° satellite arc. Below is a typical sat list for the United States.

87W, 91W, 101W, 103W, 121W, 123W, 125W, 127W, 131W, 133W, 135W

During the project process ATCi will send to the customer a Service Request Form (SRF), which is a writable PDF form in which the customer will define the sat list and provide other information about the project.

Antenna Site Planning

With the sat list and foundation centerline established, the customer's proposed installation site needs to be evaluated for potential obstructions between the antenna and the satellite arc and for logistics relative to installing and servicing the antenna. The SRF includes areas for the site address and/or geographic coordinates. With this information ATCi can view the site on Google Earth for a top-down view of the proposed installation site. ATCi can build a 3D model of the SS5B positioned at the proposed site in Solidworks using customer-supplied sketches, drawings, or other dimensional information. It is not uncommon for this process to be accomplished by having an ATCi field engineer perform a site survey, however, some sites are straightforward and a site survey or even site modeling may not be necessary.

Note that by policy ATCi does not provide 3D models to customers or subcontracted architectural firms. ATCi can provide 2D dwg files of a customer's Simulsat configuration.

Nominally, an area 40 ft. x 40 ft. (12m x 12m) minimum is needed adjacent to the antenna's foundation for the assembly of the reflector. This area must accommodate a crane with its



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outriggers extended and have room to build the reflector. A constricted work area may require alternative measures for assembling the reflector and may increase the time required to assemble and install the antenna. For reference, while the standard SS5B foundation is 13 ft x 14 ft (4m x 4.25m), the area under the foundation and the installed reflector will be approximately 25 ft x 32 ft (7.5m x 9.75m), with the front of the reflector extending past the front of the foundation. So the entire area required for the project is nominally approximately 40 ft x 60 ft (12m x 20m) with access to the site for delivery of the antenna on a large semi tractor-trailer.

Roof Mounts

ATCi has ample experience mounting Simulsats on roofs. **All architectural drawings for the load frame are the customer's responsibility.** ATCi will provide wind loads, mount interface drawings, and pictures of other Simulsat load frames as examples of how this has been done previously.

As Simulsat mounts are hot dip galvanized, ATCi prefers that Simulsat mounts be bolted to the load frame so as to not disrupt the galvanized finish, but some designers elect to weld the mount to the load frame. If the antenna is to be welded to the load frame, **the customer is responsible for providing a certified welder.**

The foundation kit template can be assembled without anchor bolts to assist in locating the holes for the bolts that will fasten the Simulsat mount to the load frame. Note that ATCi does NOT supply the bolts to be used for fastening the antenna to the load frame because the length of the bolts will be determined by the load frame design. **The customer will need to coordinate with the architectural firm to ensure that the correct bolts are on site for the installation.** For reference, the SS5B anchor bolts are 5/8-11 hot dip galvanized grade 5 (or A325).

Following is a picture of the assembled SS5B foundation template. The anchor bolts can be omitted when used for locating load frame hole locations.



While roof mounting does have benefits like not using valuable real estate (parking spaces) and likely shortening the interfacility link (IFL) run from the antenna to the headed, it has drawbacks such as greater exposure to terrestrial interference and more complicated access for servicing the antenna. Roof mounting also typically adds to the time required to complete the project.



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Site Survey

A site survey by an ATCi field engineer can greatly help to ensure that the proposed site is suitable for the SS5B antenna. The field engineer can assess multiple proposed sites for potential satellite arc obstructions and take detailed site measurements for 3D site model creation and site installation logistics evaluation. During a site survey a brief scan for terrestrial interference (TI) is done using a portable spectrum analyzer. This TI snapshot is not a full RF survey, but it is helpful to see if any major TI issues are present at the time of the survey. The field engineer will also provide input on conduit and/or fiber run placement and discuss project logistics with customer personnel.

Contact your ATCi sales representative for a site survey quotation.

Configuration Drawing

Based on the sat list and site location ATCi will create a satellite look angles document and a Simulsat configuration drawing for the site. This drawing depicts the orientation and dimensions of the reflector as it will be at the site and shows how the antenna will be oriented relative to true north.

Foundation Plan

Once the sat list and location have been established, ATCi's engineering department will create a site-specific foundation plan. The foundation plan is very detailed and complete; however it is only a suggestion on how to build the foundation, and is not "stamped". It is frequently implemented as is, but local codes as directed by a local architect and/or professional engineer will supersede this drawing, and **the customer will need to have a local PE stamp the drawing, if necessary.**

As part of the foundation plan there are two 2 ft (0.6m) diameter corner support pads that will need to be installed. Their placement is indicated on page 2 of the foundation plan. These pads are not structural, but the corner supports that are fastened to them help to keep the reflector stable during high winds and keep the antenna rigid over time. For a roof mount, accommodation must be made for attaching corner supports to the load frame.

The construction of the foundation and corner support pads is the responsibility of the customer.

Cables and Junction Box

A cable bundle may be purchased with the new antenna. The bundle is forty cables, 62 ft (19m) long. These cables are RG-6 quad-shield with F-type compression connectors. All cables are labeled one through forty.

A junction box is also an option when choosing accessories. The junction box can come in fiberglass or painted steel. Inside the junction box is a plate with forty F-type barrels. This pass-through serves as a test point and ground plate and frequently marks the hand-off from ATCi to the customer's IFL.

ATCi will work with the customer on any cabling issue that may come up.



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Conduit

If purchased, ATCi will supply two inch flex conduit from the feedbox to the base of the antenna (or junction box). This flex conduit will hold forty RG-6 quad shield cables. When installing conduit from the base of the antenna to the headend several factors need to be taken into consideration. The size of cable, length of the conduit, the path the conduit takes, and how many sweeps (90° turns) are in the path. If the length of cable from the base of the antenna to the headend is nearing three hundred feet, fiber-optics should be considered. ATCi's engineering department is available to assist in this decision-making process.

The customer is responsible for installing conduit from the antenna to the headend.

Heating System

ATCi can provide a reflector heating system for your Simulsat antenna. Speak with your ATCi Sales representative for information about reflector heating systems.

Grounding

The customer is responsible for grounding related to the installation. A ground rod installed near the antenna is typically sufficient. Many sites have a large ground ring. The Simulsat antenna itself is a fixed system and does not require grounding, but the junction box ground plate and the lightning protection system will need to be grounded.

Crane/Bucket Truck

The SS5B ships on a double-drop flatbed trailer, or open-top shipping container for international shipments. A minimum 15-ton hydraulic crane is needed to offload the rack of panels. If possible, the parts should be placed near the assembly area. Below is a picture of how the shipment arrives on a trailer. Your sales representative will provide offloading instructions.



Simulsat-5B antenna on truck



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It can be desirable to offload the antenna and immediately begin the installation. While a 15-ton crane can be used to offload and assemble the antenna, a minimum 25-ton crane is needed to lift the assembled reflector onto the mount. So in such a case a 25-ton crane will be required. Barring difficulties it is possible to offload the antenna and complete the assembly and lift onto the mount in one day.

In some cases it will be necessary to have a crane company representative visit the site to ensure that the crane size is correct. Many times it's not the weight of the item being lifted but the distance from the crane to the antenna mount that will determine the size of crane required. Please consult with your crane provider. The reflector assembly weighs approximately 4000 lbs (1800 kg).

A bucket truck or man lift with an articulating telescoping boom lift capable of reaching 30' vertical is required to access the antenna during installation and alignment.

Crane and bucket truck arrangements and costs are the customer's responsibility.

Other Equipment

Various other equipment and materials are to be provided by the customer. A detailed list will be provided in the SOW. ATCi's field engineer will bring nylon crane straps, hand tools, an electric impact wrench, and a portable spectrum analyzer. The customer will provide a 22 ft (7m) extension ladder, two 10-12 ft (3-4m) step ladders, one 4-6 ft (1-2m) step ladder, two 2-ton come-alongs, some 2x4 and 4x4 lumber, a circular saw, 110V AC electric power to within 50 ft (15m) of the installation site and two USA style electric power plug adaptors if necessary, three 100 ft (30m) extension cords, and sixteen 8" x 8" x 16" (20cm x 20cm x 40cm) cement blocks.

Labor

The customer will provide at least 4 laborers for the entire installation who speak English (or provide a translator) and are able to handle hand and power tools and lift approximately 30-40 lbs. Inadequate labor support will negatively affect the installation and may result in extra days being charged to the customer.

On the last day of the installation customer personnel who will be responsible for the operation of the Simulsat will need to be present for feed-peaking training, and the person who will sign for the acceptance of the installation needs to be present.

Site Access

Access of workers to the site can vary from simple to very difficult. If access to the site is highly restricted, the customer needs to ensure that ATCi's field engineer is able to move around the site as required to accomplish the installation. In extreme cases this can require a customer tender to be readily available to open doors or gain access to a roof. Even if access is not highly restricted the field engineer may need access to the site during weekend days.



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Time of Day

Some projects may require some or most of the work to be done outside of normal work hours. In such cases the customer will need to provide appropriate lighting.

Weather

The installation will proceed through inclement weather, but extreme weather may delay the installation. In the presence of lightning, work can only proceed when there is 30 seconds or more between the flash of nearby lightning and the sound of thunder from the lightning.

Clean Up

The field engineer will endeavor to run an orderly project and keep messes to a minimum, but after the completion of the installation the customer will be responsible for final site and antenna clean-up.

Unforeseen Circumstances and Costs

Additional costs and/or time incurred due to bad weather, bad or inadequate equipment, insufficient or poor labor support, etc. will be the responsibility of the customer.



Conclusion

ATCi understands that a project of this magnitude in combination with already busy work schedules can be a challenge, but with careful planning and open communication between ATCi and all concerned your new Simulsat antenna installation will proceed smoothly.

Please contact your ATCi sales representative with any questions. We appreciate your business.