SOLARIS TECHNOLOGIES SERVICES

MOBILE INTERNET TOWER TECHNOLOGY

SOLARIS MITT OPERATING MANUAL

24/7 mobile tower assistance:
972-721-0150
support@solaristechservices.com

Visit our website: www.solaristechservices.com

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Safety

Please thoroughly read and understand every aspect of the tower deployment before attempting to deploy the MITT tower. A minimum of **two** people should manage the installation, deployment, and recommissioning of the tower.

For 24/7 mobile tower assistance call the
Solaris Technologies Services tower experts at:

972-721-0150
support@solaristechservices.com

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SITE PLANNING

This tower is rated for a tilt load of 500 pounds and a vertical lift load of 500 pounds. Do not exceed these specified limits.

The site location must be taken into consideration for a safe tower deployment. The site must have as level of terrain as possible and be free from standing water and overhead obstructions such as trees and power lines. Check the local weather forecast for bad weather and high wind scenarios. Do not erect a tower in poor weather conditions or when wind speed exceeds 40 mph.

The total recommended area for proper guying of the trailer and its outriggers is approximately half of the height of the tower plus half of the width of the trailer.

Fully extended 60ft deployment example equation:

Tower height: 60ft — Width of trailer: 5ft

$(60 \times ½) + (5 \times ½) =$ **32 ½ feet** for proper guying.

30 + 2½

Anchor the guy wires 32 feet distance circumferentially from the trailer using 3 guy points at 120-degree spacing. ***See Diagram for visual on page 4.***

Perform a visual inspection of the tower, and look over all cables for any wire fraying. Also, inspect all guide rollers & pulleys to be sure that they are well lubricated. If the wheels look to be dry, you may apply an equal substitute, ex: Marine Grease.

A 12 Volt battery is provided with the mini tower to provide the proper amount of power necessary to operate the wench.

Check electrical source and all cabling before you start to deploy the tower.

MOBILE TOWER DEPLOYMENT FOOTPRINT

Half the distance of the deployment height plus 4 feet is the footprint needed to deploy your mobile tower.
If your site does not have enough footprint for the tower, anchor stones could be utilized to reduce the footprint.

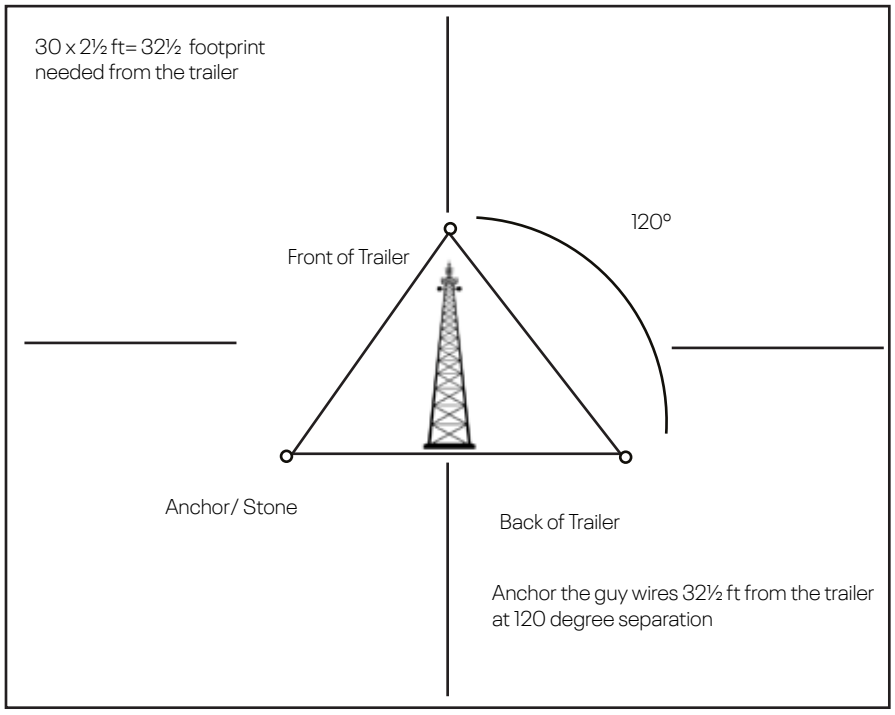
Call Solaris for anchoring instructions at 972-721-0150.

EXAMPLE SCENARIO:
MINI/MITT TOWER DEPLOYMENT

Available Site:
100ft2

Tower deployment height needed:
60ft

	Tower height: 60ft		Width of trailer: 5ft		
	(60 x ½)	+	(5 x ½)	=	**32 ½ ft**
	30	+	2½		



Note:
Anchor Points will be 32 ½ ft from the trailer at 120 degree separations.

**Guying can begin at any point with 120 degree separations.

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Guy kit includes

A. Three (3) guy anchors (screw anchors)

B. Three (3) guy wires
   • 1 each of these lengths:
   60ft/ 18.28m ¼″ x 77′

C. Three (3) ½″ anchor shackles

D. Three (3) ⅝″ anchor shackles

E. Three (3) ⅜″ anchor shackles

F. Three (3) ⅜″ turnbuckles

G. Three (3) ¼″ thimbles

H. Nine (9) ¼″ U-bolt clips

I. Two (2) bolts

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BEFORE MOVING OR RELOCATING THE TOWER:

- Secure tower in the full down position
- Lock each outrigger in storage position
- Check cable for slack. It should have about 0.5in (1.27cm) of play
- Attach safety chain to tow vehicle
- Hook up trailer lights and brakes
- Check trailer for any visible loose bolts
- Check trailer for any unsecured doors on control box or toolbox
- Securely strap down tower to trailer using the provided ratchet and tie-down straps

SET UP PROCEDURE

• Choose a level area free from standing water and overhead obstructions such as trees and power lines. The clear area should be ½ the distance of the tower + ½ the width of the trailer (60ft x ½)= 30ft + (5ft x ½)= 2½ ft = Totaling ***32½ ft of installation clearance*** for a tower deployed at a full 60ft.

• Check all cables for fraying areas and excessive wear.
Do not use a tower with frayed cables.

• Release the outrigger lock and extend the outrigger beam.
Pull outrigger until locking pin engages.

• Caution: Do not overextend beyond outrigger lock pinhole.
This could cause the outrigger to fall out of its placement.

• Attach a jack-stand to the end of the outrigger. Make sure the ground pads are placed under the jack stands to prevent them from sinking into the ground. (Ground pads not included)

• Level trailer to a horizontal plane using the leveling guides on the tower. One located on the tower base near the electrical box, and one is located on the opposite side of the tower base.

• Check battery to ensure you have 12 volts of power.
This is needed to properly operate the wench.

• Set three (3) screw-in anchors 32ft (9.37m) from tower at a 120-degree angle from the other anchors.
See page 4 for assistance.

• Attach guy wires to the tower before tilting and extending.
Do not tighten guy wires until the tower is upright.
See page 4 for assistance.

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TILTING TOWER VERTICAL FOR DEPLOYMENT

• Check local weather forecast for bad weather and high winds. Do not erect a tower on poor weather conditions or wind speed that exceeds 40 mph.

• Check that there are no overhead obstructions such as trees and power lines before tilting the tower.

• Be sure to unstrap the tower from securing strap.

• Hold the TILT button in the electrical box in the up position until the tower is completely vertical, and comes into contact with the stop plate. Watch the tower as it rises to ensure the tower actually stops at the stop plate. Do not force the tower. If the winch appears to bind, let the tower down and check for any obstructions.

• Secure two (2) bolts to the trailer safety plate located at the rear of the trailer once the tower is completely vertical. Use a crescent wrench and supplied bolts on each side of the safety plate.

• Recheck the angle of the tower by holding a level to the side of the tower base section in various locations.

• Tighten guying hardware on the base section until tight.
Do not tighten remaining guy wires until the tower is extended. ***See page 4 for assistance.***

EXTENDING TOWER

• Hold the ERECT button in the control area in the up position until the tower is extended to the desired height.

• When erecting the tower and stop plate becomes visible on section 2, ***STOP ERECTING. DO NOT*** force the winch to extend any further, you will risk damaging the winch motor and cable.

• Tighten remaining guy wires.

RETRACTING TOWER

• Evenly loosen the guy wires at the turnbuckle to provide slack for retracting.
Do not loosen guy wires on the base selection until after the tower has been retracted.

• Hold the ERECT button in the electrical box in the down position until the tower is fully retracted. While the tower is retracting, make sure the cables on the take-up drums of the winch assembly do not cross or tangle.

TILTING TOWER HORIZONTAL FOR TRANSPORT OR STORAGE

• Loosen remaining guy wires on the base section.

• Remove base section securing bolts from the securing tabs with a crescent wrench before lowering the tower.

• Hold the TILT switch in the electrical box in the down position until the tower is completely horizontal and the full weight of the tower is on a rubber cushion on the tower base.

• Remove guy wires and guying hardware.

• Remove jack-stands and ground pads.

• Retract outriggers.

• Replace all equipment in the toolbox. Don't forget all bolts and wrenches. ***Refer to page 6 for steps required to prepare the mobile tower for transportation.***

Network Configurations

CLOUD CONFIGURATION

All of Solaris' MITT deployments utilize Ubiquiti head end cloud gateways for easy to configure, easy-scalable network configurations. Inside the UI dashboard for each MITT, users are able to configure almost any desired network configuration settings from WLAN, LAN, ISP, VLANs, firewall configurations, and more.

WIFI RADIO CONFIGURATION

MITT deployments come standard with a Ruckus outdoor series high power wireless access points for connectivity. Configuration of the WiFi radios is handled through Ruckus Unleashed Cloud Manager. Through the unleashed controller, users are able to setup all radio configurations that provide WiFi connectivity to users. This includes SSIDs, passwords, radio power, channel utilization, and more. Feedback and realtime monitoring is also shown on the main dashboard of the unleashed manager to give users a closer look into fine tuning deployment configurations.

MANAGEMENT

Prior to MITT deployments, clients are given login credentials for management of onboard MITT systems including gateway/network configurations and WiFi radio systems.

UPS SYSTEMS

MITT deployments comes standard with double conversion uninterruptible power supplies to provide clean, stable power to all electronics onboard. Management software is available to view realtime power usage and statistics.

WIRED CONNECTIONS

Network switches and gateway systems onboard the MITT can allow either a copper ethernet hardwire connection or a fiber connection via SFP. These connections can be setup and configured through the cloud configuration for the MITT. Hardwire connections can provide a stable-hassle free way to connect in challenging environments.

MAINTENANCE

Annual inspection and maintenance of this tower is strongly recommended. More often if the tower has been placed under high-stress levels (wind gusts, earthquakes, icing, loads, etc.), environmental conditions such as salt spray, rain, chemical fumes, excessive temperature and humidity of tropical climates, and wear from frequent raising and lowering of extendable towers.

MAINTENANCE CHECKLIST

• Check tower for any signs of rust or corrosion. Clean any corroded areas thoroughly with a steel brush and cloth. Spray area with a rust-inhibitor and cold galvanize.

• Inspection of guy wires should be quite frequent if there is any reason to suspect possible sabotage of the guy wires by cutting or filing.

• All cables should be inspected before every installation.If any frayed, pinched or worn areas are detected, the cable should be replaced. Call Solaris for a quote on new cables and general maintenance needs at (972)721-0150.

• Hoisting cables and pulleys are constantly exposed to weather and subject to corrosion. Under normal conditions with frequent inspection, proper maintenance, and lubrication, hoisting cables should last a long time. However, it is recommended that the hoisting cables be replaced as a matter of routine every three years or sooner if an inspection should show premature wear or corrosion.

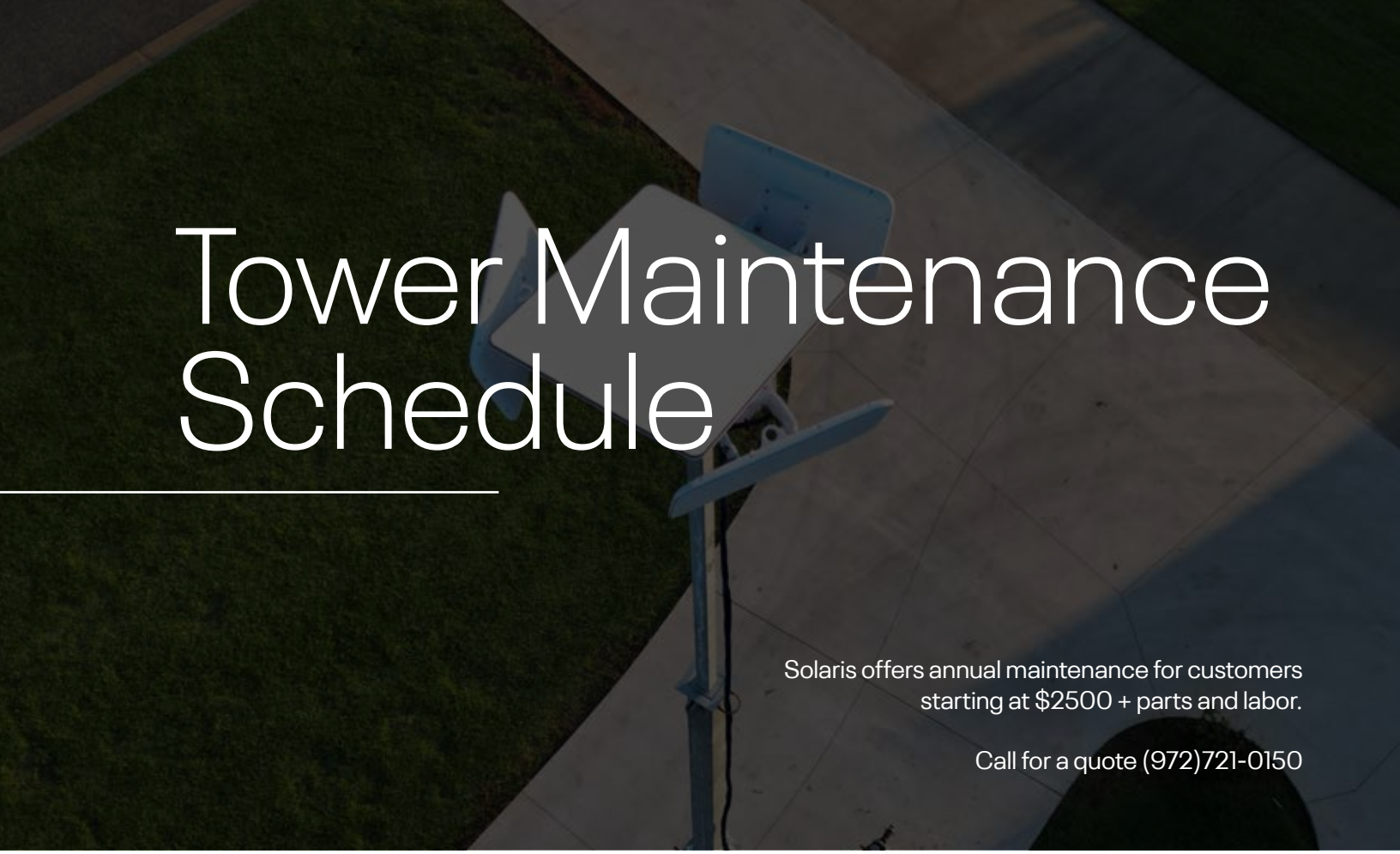
• If any lifting or lowering cables are slack or loose, they should be tightened until taut again (tighten cables while the tower is fully nested).

• Cable sheaves can be lubricated every three months with a lightweight lubricant like marine grease.

• Lifting and tilting cables are to be kept lubricated with a lightweight lubricant like marine grease.

• Inspect winch to ensure proper coiling and extending can be achieved. Grease as needed.

• Battery is not continually charging and may need trickle charging or need to be jumped to recharge prior to deployment of the tower.



Tower Maintenance Schedule

Solaris offers annual maintenance for customers starting at $2500 + parts and labor.

Call for a quote (972)721-0150

PER DEPLOYMENT:

- Inspect all cables
- Inspect all rollers, pins, and clips
- Look for gear oil leaks
- Inspect electrical cables going to electrical box
- Inspect trailer lighting systems and brake lights
- Inspect wear on trailer tires
- Inspect spare tire
- Inspect anchors are not bent
- Ensure no obstructions are on the tower (leftover equipment, bird nest, etc.)
- Inspect chain lock is operable
- Inspect sprocket for cracks or broken teeth
- Inspect jacks are operable
- Check for any missing screws or bolts
- Inspect sections and the tower base for any bent parts or for damage

1 YEAR CHECKLIST:

- Add Worm Gear Marine Grease to gear as needed
- Remove and grease all rollers and pins
- Replace any worn clips
- Replace any worn cables (guying, section cables, winch cable, and tilt cable)
- Inspect spring
- Grease and inspect all pulleys
- Inspect electrical cables going to electrical box
- Inspect trailer lighting systems and brake lights
- Inspect wear on trailer tires
- Inspect spare tire
- Test motors
- Test winch
- Test limit switches
- Check tower sections for damage
- Test electrical systems
- Full tower test
- Check toolbox to ensure guy kit is complete
- Inspect anchors are not bent
- Replace any missing screws

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WINCH SPECIFICATIONS

Brand: Smittybilt
Mfg part numbers: S/B97495
Mechanical Specifications
Rated line pull: 9,500 lbs.
(4,309kgs) single-line
Motor: 6.6hp series wound
Control: remote switch, 12″
(3.7m) lead
Gear Train: 3-stage planetary
Gear ratio: 161.28:1
Waterproofing: IP67 rating
Fairlead: 4-way roller
Bolt pattern: 10.0″ x 4.5″
Brake: automatic in-drum
Drum size: diameter 2.5″
Cable type: wire rope
Cable: 93.5 feet 5/16 inch diameter

WINCH DIMENSIONS

Length: 22.3 in.
Width: 5.4 in.
Height: 9.4 in.
Weight: 78.0 in.

MOBILE TOWER SPECIFICATIONS

	60' Mini Site-on-Wheels, Bumper Pull	82' or 85' Site-on-Wheels, Bumper Pull	106' Site-on-Wheels, Bumper Pull	120' Site-on-Wheels, Bumper Pull	150' Site-on-Wheels, Gooseneck
Model Number	ST-MINI-60-BP ST-MITT-60-BP	ST-SOW-82-BP ST-SOW-85-BP	ST-SOW-106-BP	ST-SOW-120-BP	ST-SOW-150-GN
TOWER SPECIFICATIONS					
Hot-dipped galvanized sections, equal sections	6 - square tubing	4- lattice design	6- lattice design	7- lattice design	9- lattice design
Tower marked with 11' height increments	N	Y	Y	Y	Y
Main motor (Tilt)	12 VDC/ 1.5 HP	1.5 HP	1.5 HP	1.5 HP	1.5 HP
Waterproof winch motor	9,500lb pull	11,000lb pull	11,000lb pull	11,000lb pull	11,000lb pull
Gear Reducer (Erect) 5.0	N/A	Y	Y	Y	Y
Gear Reducer (Erect) 2.91	N/A	Y	Y	Y	Y
Tilt winch electric motor with reducer pulley	N	Y	Y	Y	Y
Galvanized stranded lifting cables	1/4"	5/16"	5/16"	5/16"	3/8"
Galvanized lifting security safety cable	N	5/16"	5/16"	5/16"	5/16"
Tilt winch galvanized aircraft cable	1/4"	3/8"	3/8"	3/8"	3/8"
User operation and electrical box	Y	Y	Y	Y	Y
Electrical box equipped with automatic tower lift switch	Y	Y	Y	Y	Y
Safety limit switch	N	Y	Y	Y	Y
Tower power requirements	12V battery	30 Amp AC 120v/60Hz	30 Amp AC 120v/60Hz	30 Amp AC 120v/60Hz	30 Amp AC 120v/60Hz
Tower minimum operations height	16.11ft/4.91m	30ft/9.144m	30ft/9.144m	30ft/9.144m	30ft/9.144m
Tower self suppporting height (w/o guy wires) 40 mph windspeeds	40ft/12.19m	60ft/18.288m	60ft/18.288m	60ft/18.288m	60ft/18.288m
Operational setup time	10 minutes	20 minutes	25 minutes	25 minutes	40 minutes
Weight load on tower 1,100lbs/ 317.51kg	N (500lb)	Y	Y	Y	Y
Weight tilt load on tower 1,100lb/ 317.5kg	N (500lb)	Y	Y	Y	Y
Maximum standstill windspeed when guyed	90mph/ 144kph	110mph/ 177kph	110mph/ 177kph	110mph/ 177kph	110mph/ 177kph
TIA/EIA-222-G, aand IBC	Y	Y	Y	Y	Y
TRAILER SPECIFICATIONS					
Overall trailer length	10ft/3.05m	18ft/5.486m	18ft/5.486m	18ft/5.486m	25ft/7.620m
Overall trailer width	5ft/1.52m	8ft/2.590m	8ft/2.590m	8ft/2.590m	8ft/2.590m
Tower transport bracket	N	N	N	Y	N
Overall tower and trailer height in transportation mode	9ft 9in/3.017m	9ft 9in/3.017m	9ft 9in/3.017m	9ft 9in/3.017m	9ft 9in/3.017m
Trailer and tower curb weight (w/ standard equipment)	1800lbs	10,200lbs	10,200lbs	10,200lbs	16,200lbs
Trailer gross vehicle weight rating (GVWR)	3500lbs	16,000lbs	16,000lbs	16,000lbs	30,000lbs
Available deck for options	10ft x 5ft	11ft x 8ft	11ft x 8ft	11ft x 8ft	11ft x 8ft
	3.05m x 1.52m	3.352 x 2.438m	3.352 x 2.438m	3.352 x 2.438m	3.352 x 2.438m
Dual axle suspension	N	Y	Y	Y	Y
Electric brakes per trailer	1	1	1	1	1
Tower stabilizing outriggers	4	4	4	4	4
Toolbox - lockable	1	1	1	1	1
Spare tire	1	1	1	1	1
Leveling guides	2	2	2	2	2
Safety chains	1	2	2	2	2
Break away kit	1	1	1	1	1
7 pin RV trailer kit	Y	Y	Y	Y	Y
2 5/16" ball hitch (adjustable height)	Y	Y	Y	Y	Y

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TROUBLESHOOTING

ELECTRICAL SYSTEM FAILURE MODE ANALYSIS

SYSTEM: TRAILER LIGHTS

FAILURE MODE:	PROBLEM CAUSE:
One or more lights stay on when the switch is turning off	Tow vehicle fault
One or more lights do not come on All Systems	Worn out connector Tow vehicle fault
All of one system	Worn out connector Worn out trailer wiring Tow vehicle fault
One bulb only	Bulb burned out Corroded or dirty bulb holder Worn out or damaged wire(s) Rust or corrosion between light fixture
One or more lights flicker or operate intermittently	Bulb defective Loose or damaged wire Loose or damaged connector

SYSTEM: WINCH

FAILURE MODE:	PROBLEM CAUSE:
Does not operate (motor does not drive)	Fuse burned out Worn out switch Worn out wiring Motor burned out
Winch does not stop when tower reaches stop plate	Winch is not functioning Worn out wiring

This report is designed to give information regarding the MITT solution and the capabilities of the onboard technology and explain the additional functionality beyond the general Wi-Fi connectivity.

MITT (Mobile Internet Tower Technology)

The general design of the MITT tower utilizes our 60' C.O.W. and combines Solaris' proven tower manufacturing with leading-edge technology onboard to provide the client with a rapid deployment of mobile network capabilities. Our MITT towers come with enterprise-grade network equipment onboard along with interactive UPS surge protection and battery backup technology. The MITT comes pre-fabricated with mounting solutions for SpaceX's "Flat High Performance" mobile internet terminal. All of our network components are located in a thermal-controlled electronic enclosure located on the base of the tower. The MITT requires a basic 120 VAC, 15 Amp circuit to operate, and we offer power generation options including generator, solar, and more if requested.

Components Onboard the MITT

SOLARIS 60' C.O.W.

The MITT utilizes the 60' C.O.W. manufactured in-house by Solaris to provide network and wifi capabilities in a 360 degree radius around the tower. The 60' tower is powered via 24VDC with onboard batteries and is deployable in a matter of minutes.

NETWORK COMPONENTS

Ubiquiti Network Components provide enterprise-grade connectivity with features like firewall security, VPN, and custom IP schemes, allowing scalable network setups and rapid on-site deployment. Additionally, the Ruckus T750 outdoor access point complements this with dual-band support (2.4 GHz/5GHz) and WiFi 6, ensuring reliable performance in high-density outdoor environments.

THERMAL CONTROLLED ELECTRONIC ENCLOSURE

At the base of the tower is our NEMA rated thermal controlled electronic cabinet that houses all of the onboard electronic components. Our enclosure comes pre-fabricated with a heat exchanger to ensure components are kept at optimal temperatures regardless of deployment location.

TRI-RADIO WIRELESS ACCESS POINTS

Tri-Radio 5 GHz Wave 2 Access Points are mounted to the mast of the MITT providing WiFi broadcasting in a 360 degree radius around the tower. These high performance access points include a beam forming antenna designed to support large network traffic and high-density networks. Each access point operates with a phased array antenna system to allow software adjustable antenna coverage.

Components Onboard the MITT

SPACE-X STARLINK & OTHER MOUNTING SOLUTIONS

The MITT comes pre-fabricated for mounting a Space-X "Flat High Performance" Starlink terminal to the top for internet connectivity. Mount solutions for other Starlink terminals or custom solutions are available as well. The MITT allows a customer to connect their Starlink terminal to the top of the mast, and instantly deploy a enterprise grade network with WiFi coverage.

4G, 5G LTE MODEM

Our solution provides secondary internet connections via 4G, 5G, LTE connectivity via cellular to ensure backup reliability to the tower, or a load balanced connection. The client simply inserts a SIM card into the LTE modem from the cellular provider of their choice, giving the MITT cellular connection to the onboard network.

SURGE PROTECTION & BATTERY BACKUP

The electronic enclosure is powered and protected by a un-interrupted 120VAC interactive battery backup that includes surge protection from power spikes and interruptions. If power is lost to the MITT the onboard UPS will continue to provide power to the onboard electronics for a short period of time until power can be reconnected.

REMOTE CONNECTIVITY AND MONITORING

All electronic devices on the MITT are powered through an onboard smart controlled PDU (Power Distribution Unit) to allow for remote monitoring, power controls, and more. This allows the end-user to monitor power consumption, reboot devices remotely, and diagnose system performance.

Each MITT unit comes configured with client requirements and will be reviewed during MITT training. For technical troubleshooting, please call our team at 972-721-0150

PRIORITY DATA PACKAGING

The MITT comes with three levels of Mobile Priority Data options.

- The basic Level (L1) comes with 50GB.
- The mid-range level (L2) comes with a max of 1TB
- The Platinum High Priority level (L3) offers 5TB.

The multi-level Priority Data Packaging offers the ability to flow-between plans with ease and real-time control over data usage. Each of our plans comes with a defined data capacity. If you exceed that quota, don't worry, any additional data can be processed on-demand. Since the additional data does cost more, we recommend picking a plan that pre-pays for a little more than you think to avoid paying on-demand rates. The MITT Data Plans also has the availability to be paused, restricted and redirected during the duration of any event or rental term. This gives the client the highest level of efficient data usage.

USE-CASE FOR THE MITT

The MITT is a great candidate for any customer needing internet and network connectivity in any location throughout the US. The MITT allows rapid deployment of not only internet connectivity, but also an enterprise grade network at any location. While many customers could purchase their own satellite based internet components to access internet in rural areas, these would not include a high-performance network solution with remote connectivity and controls along with it.
Offering the MITT as a solution pre-fabricated for a Starlink terminal is an ideal solution. Simply purchasing an MITT tower from Solaris, and mounting the customer owned Starlink terminal to the mast, will give them an instant enterprise grade network at any location.

ABOVE AND BEYOND

While the MITT comes pre-fabricated to provide a network/internet solution, this is only the beginning of its capabilities. Since we utilize internet based control gateways and remote power controls, the MITT is capable of housing and controlling more equipment such as:

- Security Cameras
- PTZ Controlled Surveillance Cameras
- Lighting Solutions
- 4G, 5G Cellular Repeaters
- And More.

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