AAT User Manual

Sunsight RF Panel Antenna Alignment System (models AAT, AAT Mini, AAT Max)

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www.sunsight.com
support@sunsight.com

+1-321-244-9443 x2

This manual applies to firmware Release 3.0. This document, as well as other support documents, firmware and Android apps and training videos are available from: sunsight.com/aat_mw_support

For the purpose of this document the term "AAT" is used for all models (AAT, AAT Mini, and AAT Max)

1. Getting Started

The typical use of the AAT is to align RF cellular panel antennas. However, the AAT can be used for many other applications where accurate and repeatable equipment alignment is required. See www.sunsight.com for more information about applications.

- **The AAT is a battery-operated tool that measures azimuth, tilt, roll, height, latitude, and longitude**
- **The AAT kit has all the essential items to perform most antenna alignment tasks**
- **The AAT uses GPS, Galileo, Beidou, QZSS, SBAS and GLONASS satellites for both L1 and L2 frequencies to determine azimuth**
- **The AAT is operated from a handheld device using WiFi or USB-C cable (Android only).** For this document, "handheld device" means smartphone, tablet, or laptop.

- **An Android-based handheld device is the highly preferred method to operate the AAT.** Android devices allow the most functionality from the AAT, including advanced features, when using the free Sunsight Android app. Report pictures can be added only by using the Sunsight Android app. The Android device can be connected to the AAT using WiFi or USB-C cable. **Other devices (e.g. laptop or iPhone) can be used to operate the AAT but will not be able to access the advanced features.**

The AAT can measure and record alignment results in two ways:

1) **Snapshot** mode allows the user to mount the AAT and capture the actual measurements without pre-programming alignment targets. If desired, alignment target values can be added during the snapshot process by entering the target values before capturing real-time alignment data or when creating the Snapshot once saved. The resulting reports will contain 1) the actual measurements at the time of data snapshot, 2) the date/time of the snapshot, and 3) any target data entered. Various other fields are included in the report.
2) **Target** mode allows the user to pre-program the AAT with target data. Pre-programming allows a user to enter all the target data, which can be quite extensive, before performing alignment in the field. A scenario for pre-programming target data would be to program the AAT with a week's worth of target alignment data. Once in the field, the pre-programmed targets can be quickly accessed for use at the time of alignment. This method minimizes field time (tower time) and minimizes potential hazardous environment exposure. The resulting reports show both target and captured snapshot data.

Reporting

Reports can be generated for a single alignment record (i.e., a single antenna) or a full site record (i.e., where several alignment records for multiple antennas create one report). Reports can include pictures if desired. Photos are embedded with alignment results. The AAT can create PDF, CSV, and Google Earth files.

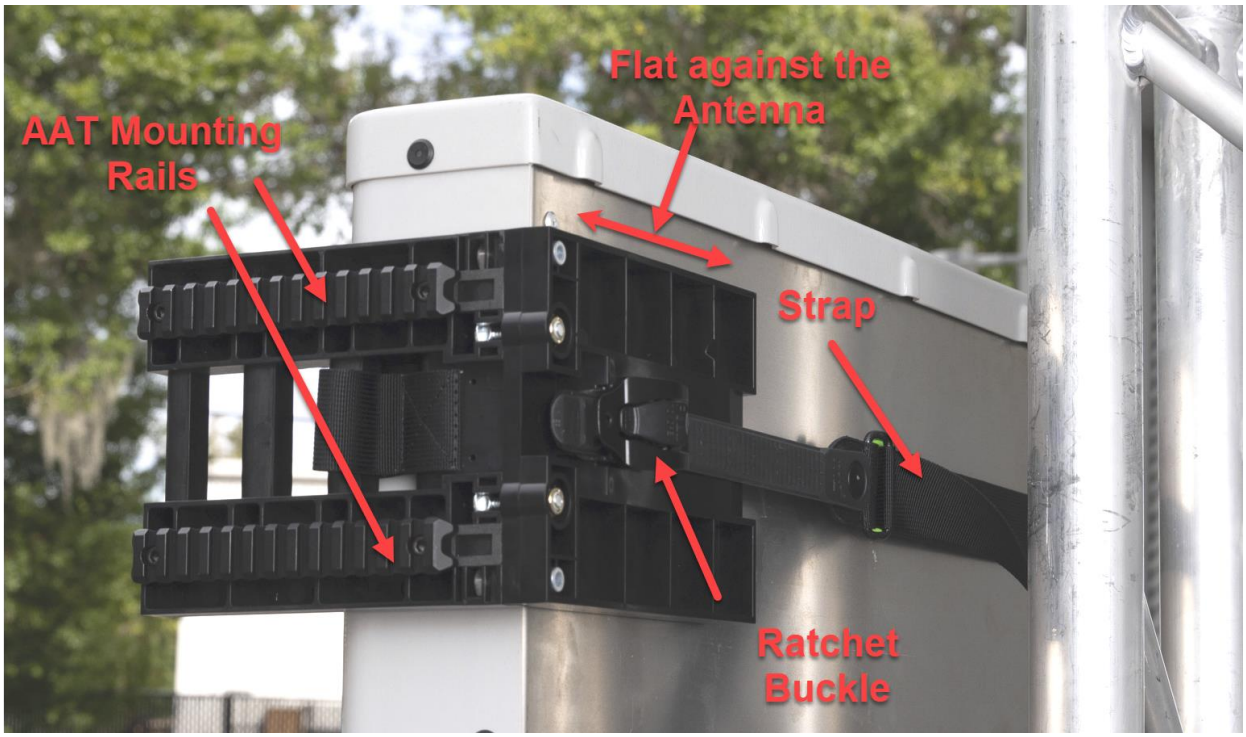
Reports can be viewed and downloaded using the handheld device. Reports can be emailed from the handheld device any time a cellular or WiFi internet connection is available. Reports can be generated by the AAT at a later time, using a different handheld device, if desired.

2. Mounting the AAT

Secure the RF panel side mount.

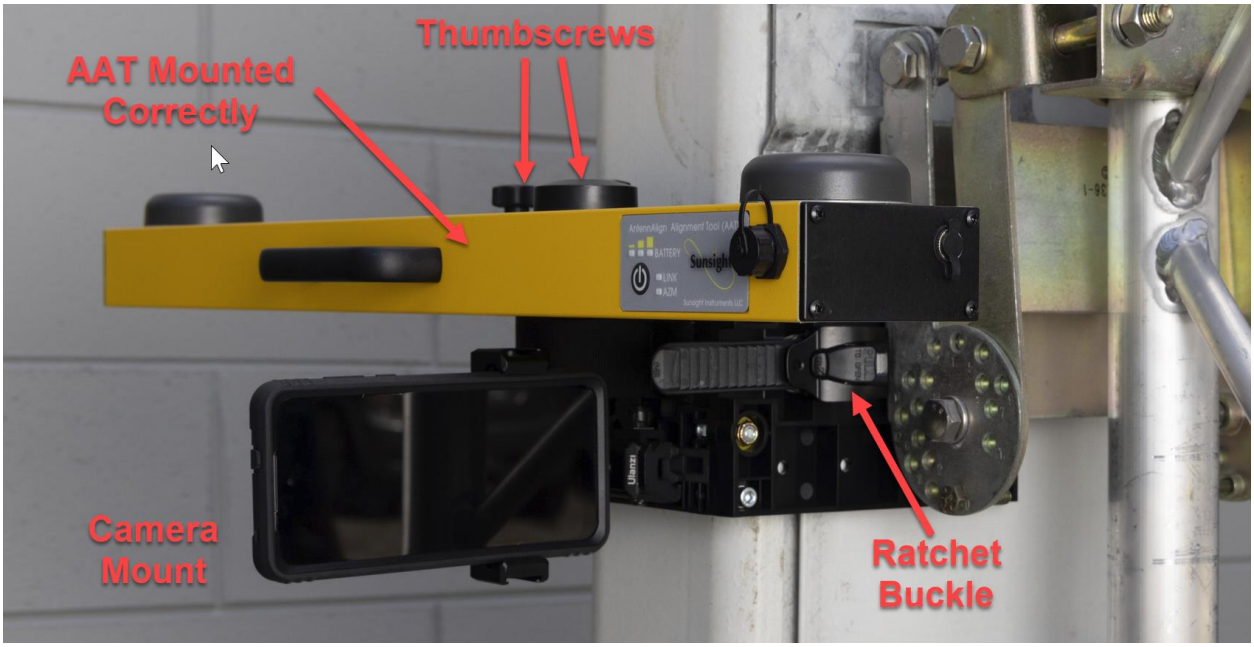
It is extremely important that the AAT has a good view of the sky for the best azimuth results. GNSS satellites use line-of-sight technology, so sky view is critical.

- Position the RF panel side mount as **high as possible** on the antenna to be aligned.
- Loop the side mount strap around the antenna.
- Run the strap through the side mount slot that correlates with the side of the antenna.
- Feed the strap end into the ratchet buckle and pull the slack from the strap.
- Use the ratchet buckle to tighten the strap. 2 – 3 clicks are usually sufficient to secure the mount. ***DO NOT OVERTIGHTEN!***
- Ensure the mount sits square on the back and side of the antenna. Adjust the mount position as necessary to obtain correct contact.



Secure the AAT to mount

- Secure the AAT to the mount by positioning the upper groove of the grip plate on the back of the AAT unit onto the upper lip of the top mounting rail.
- Rotate the AAT down and onto the mounting rail. The user should feel AAT "click" into position.
- Tighten both thumbscrews securely
- Examine the AAT in the mount to ensure it is seated correctly. **Be sure the AAT is mounted correctly and securely!**
- Use the included tool lanyard to secure the AAT and AAT mount safely. Attach the lanyard to the AAT handle, then through the loop in the mounting strap, and then to a stable anchoring point on the structure being aligned.
- Verify that the two black antennas on the top of the AAT have a good view of the sky.



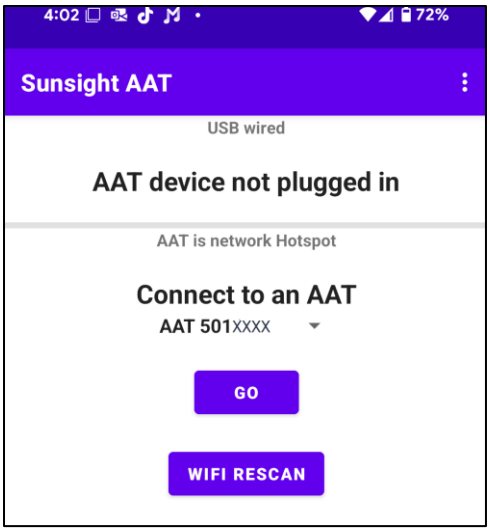
3. Connecting to the AAT

The AAT can be accessed in three ways:

1) **Using the Sunsight Android app over WiFi** from a handheld device (ex. Smartphone). This is the highly preferred method and allows accessing advanced features such as adding photos to reports
2) **Using the USB-C** cable from an Android device
3) **Using an iPhone or laptop** over Wifi (no app)

Sunsight Android App Over WiFi

- Download and install the Sunsight Android app. The Sunsight Android app is available on the Sunsight website support page: sunsight.com/aat_mw_support
- Press the power button on the front of the AAT, and an LED will light
- After a few seconds, the green LINK LED and the blue azimuth LED will flash. The AAT is now ready to connect to the handheld device.
- Launch the Sunsight app on the Android-based handheld device. If asked, allow camera usage, device location, photos and videos (app remembers choices).
- Once the app is loaded, press WiFi RESCAN to search for the AAT



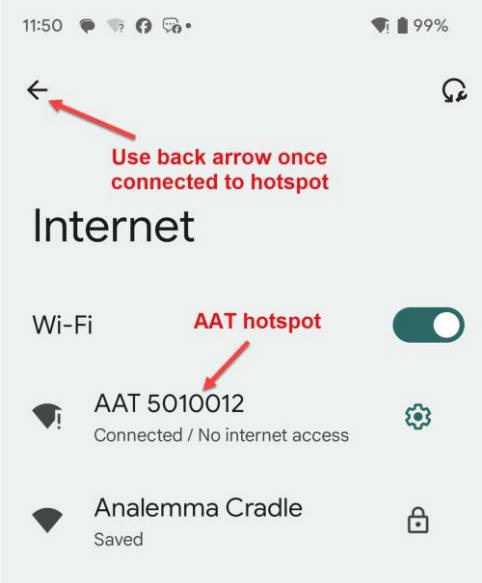
- Select the AAT 501xxxx that matches the serial number for the AAT and press Go. Follow the prompts to complete the Wifi connection to the AAT.

Sunsight Android App Over USB-C

- Connect the supplied USB-C cable from the handheld Android device to the AAT and the connection will be made automatically using the Sunsight App

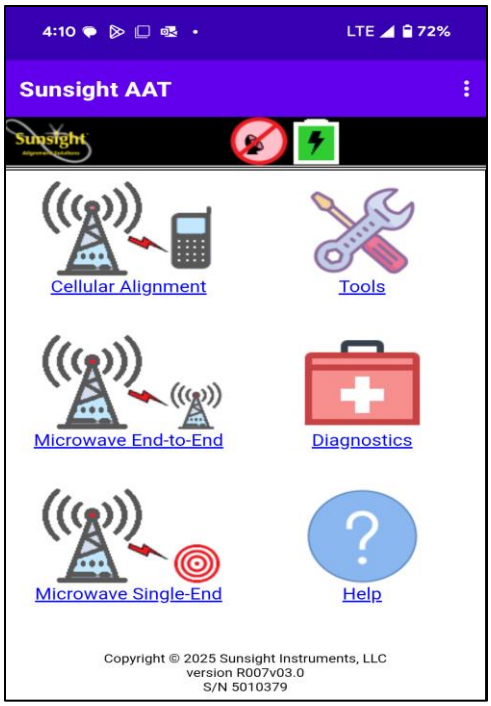
iPhone or Laptop

- Press the power button on the front of the AAT, and an LED will light
- After a few seconds, the green LINK LED and the blue azimuth LED will flash. The AAT is ready to connect to the handheld device
- On the handheld device, navigate to view the available WiFi networks.
- Select the AAT WiFi network from the WiFi network list. The AAT WiFi network is identified by AAT plus the AAT serial number (i.e., AAT 501xxxx)



- If asked, opt to allow the device to stay connected without the internet (app remembers the choice
- If asked, allow automatic connection to the AAT WiFi network (app remembers the choice).
- Launch a web browser on the handheld device (iPhone or laptop)
- In the web browser, navigate to http://192.168.0.50 . This is the AAT's internal website. The website will be used to operate the AAT.

Once connected to the AAT using one of the methods above, the AAT's home page should be displayed similar to the picture below:

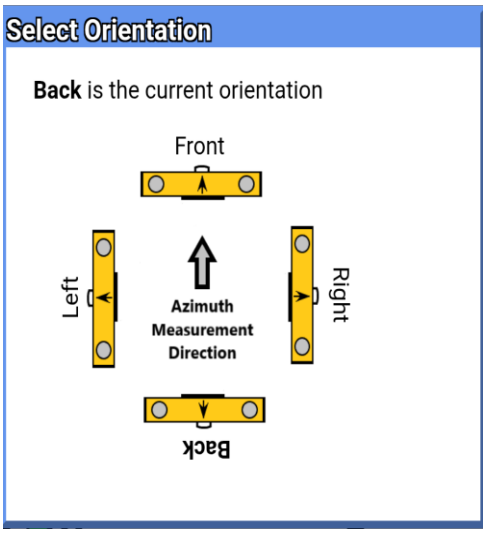


4. Capturing Alignment Data Using Snapshot Mode

From the **Main menu,** choose **Cellular Alignment,** then **Snapshot / Measure**

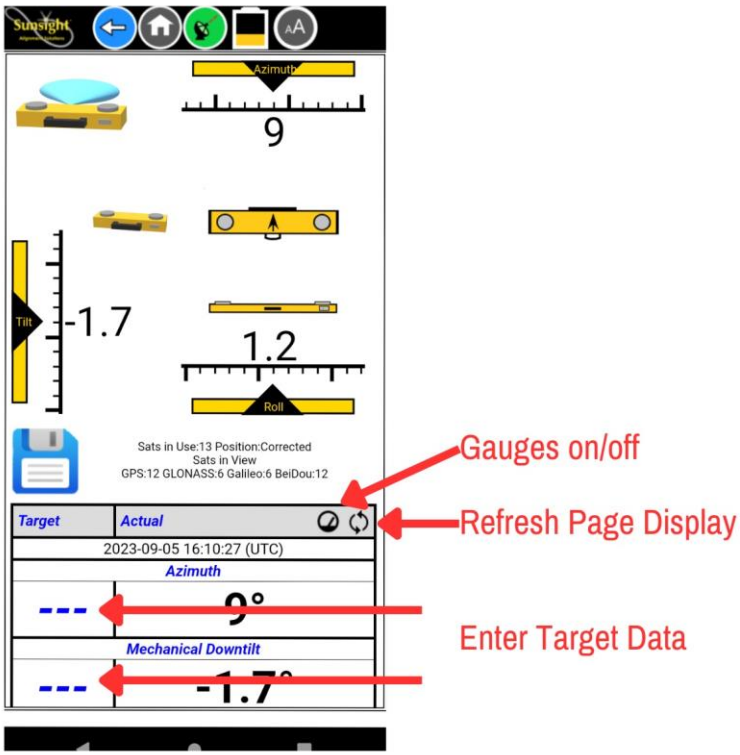
Select Orientation

- Select the orientation that matches the how the AAT is mounted when looking out from behind the antenna toward the direction of antenna radiation. The AAT orientation can be front/back/right/left.



View real-time alignment data.

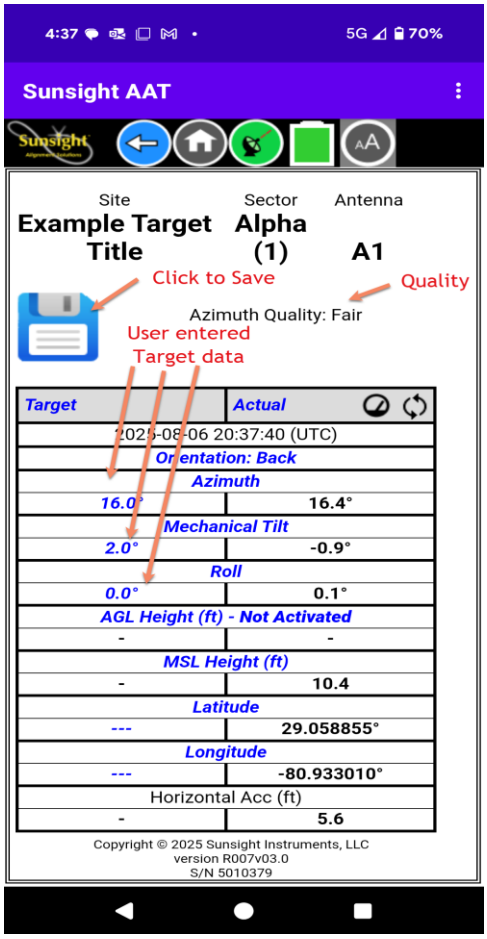
The **Actual** live data is displayed in the right column and alongside or under the gauges.



- Choose to view or hide the visual gauges at the top of the page by pressing the gauge icon at the top of the Actual column.
- Pressing the individual name of a field will hide that field (i.e., Azimuth, Tilt, etc. can be

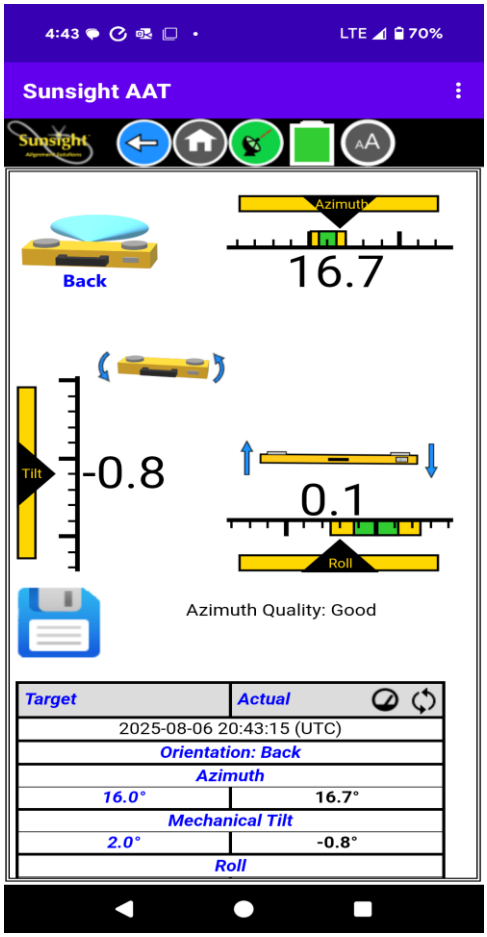
hidden.

- To add gauges or fields back, press the refresh symbol at the top of the Actual column.
- Choose to add Target data in the left column if desired by pressing the blue dashes in the desired field or take a snapshot without target data.



Perform Snapshot

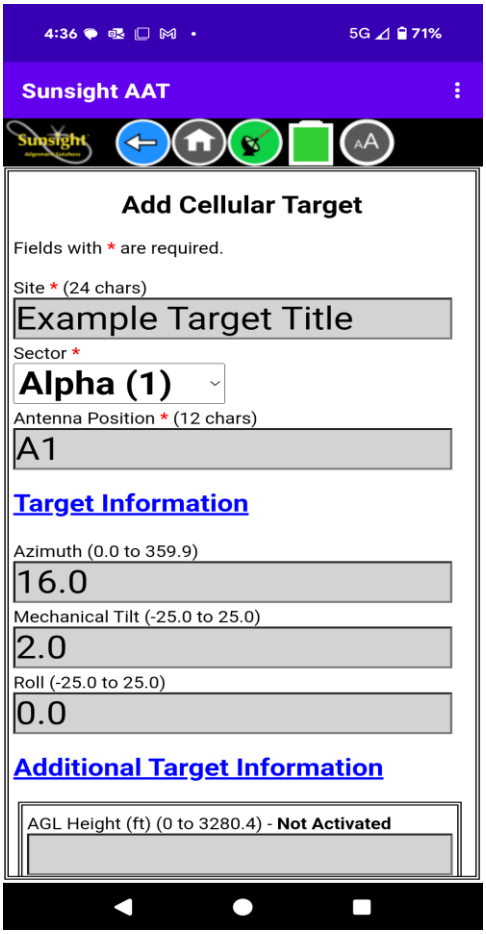
- Select the **Save** (floppy disk) icon to capture the alignment results. After the timer countdown, captured information will be displayed. Note that azimuth data must be valid to perform a **Save.**
- Choose to **Accept** or **Reject** the Snapshot data to continue. Rejecting the data will return to the Measuring screen.



- Once the snapshot data is accepted, Enter the Site Name, Sector, and Antenna Position to continue the save process. All three fields are required.
- Additional fields can be added (optional) to the snapshot data prior to saving.
- Finally, as part of the save process, the user may
    - Add photo(s) (Sunsight app only)
    - Determine data to be embedded in photo(s) (Sunsight app only)
- Once a snapshot is saved, it can be accessed via the **Reports** from the Cellular Alignment page.

5. Creating pre-programmed alignment "Targets"

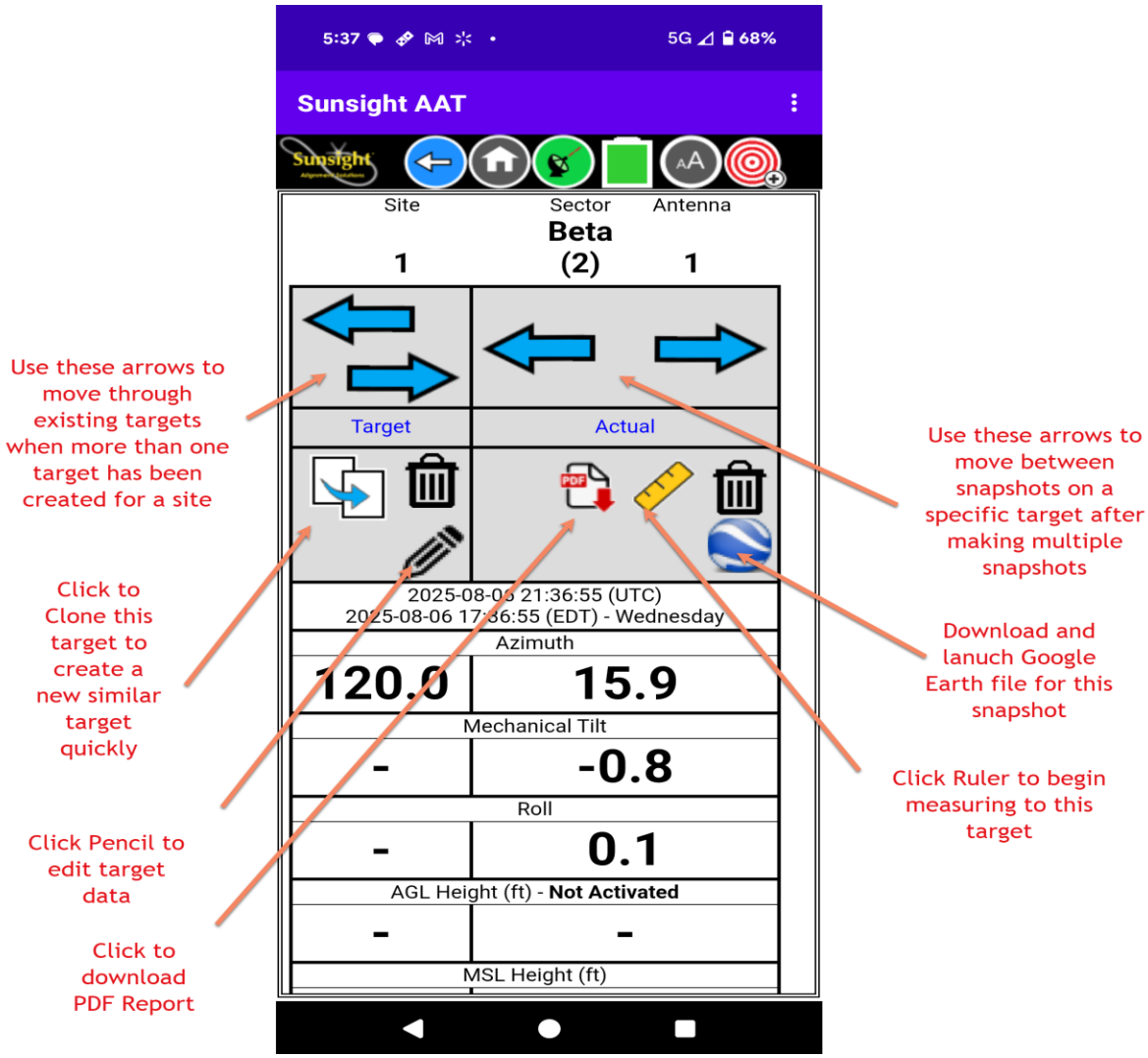
- From the Cellular Alignment menu, select **Add Target**



- Input desired target data
- Input any desired optional information (antenna S/N, notes, etc.)

**** Required fields and target values may not be changed once a Target has been created. Optional fields may be modified or added after measurement capture/snapshot.***

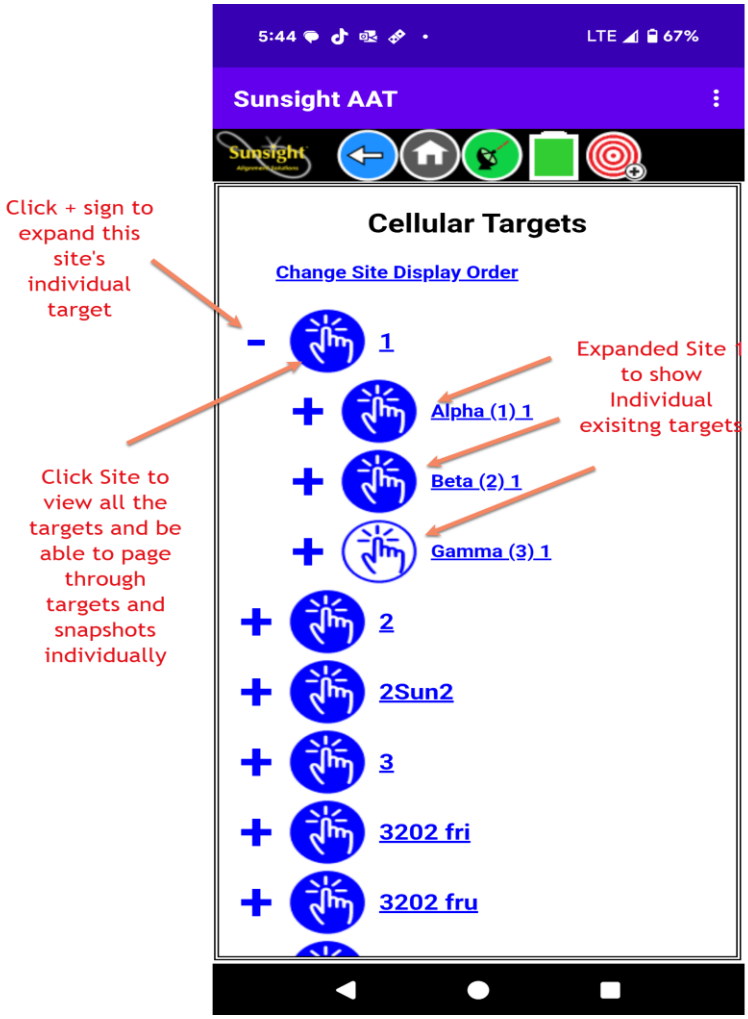
- Select the **Save** (floppy disk) icon at the bottom of the page to save the data.
- The AAT will validate and store the information input by the user. The site information will be displayed on screen.
- Below is a graphic of an existing target once created:



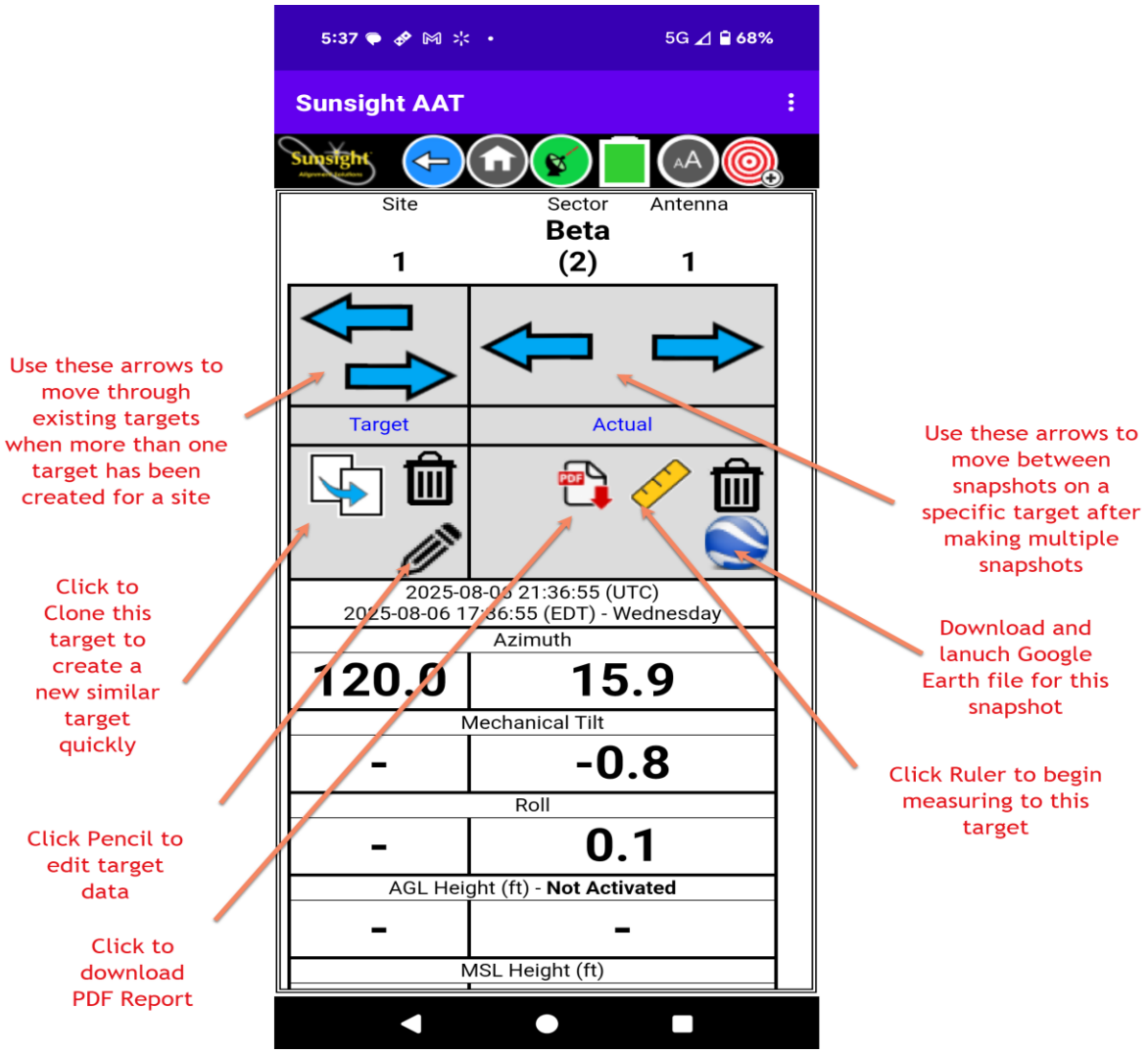
- To add additional antennas to a job site, select the **Clone** icon, changing Sector, Antenna Position, and Target data as necessary. In this way, the user can quickly create additional targets changing only the necessary data fields
- Click the ruler icon to begin measuring for this target
- Click the PDF to download a PDF report
- Click the pencil to edit the target data
- Click the blue globe to launch a Google Earth session for this snapshot (Google Earth must be installed for this feature)

6. Aligning to an Existing Target

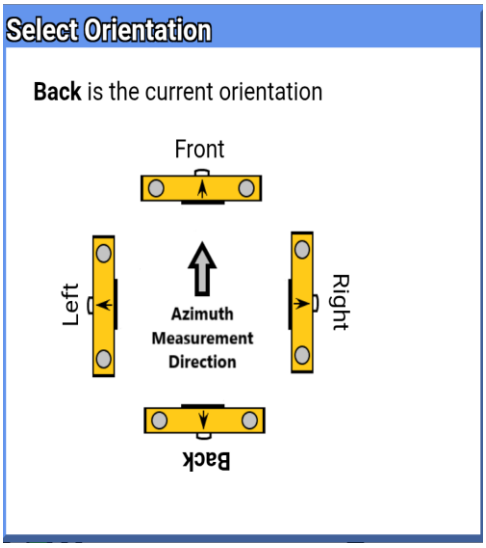
- Select **Cellular Alignment** from the main menu and then select **Existing Targets.** A list of target profiles will be displayed
- Expand the appropriate **Site Name** by selecting the +



- Click the Site name and all the existing targets and snapshots for that site can be viewed by using the arrows as shown below:



- Select the ruler icon next to the correct antenna position stored under the Site to launch the Snapshot/Measure page and begin measuring.
- Select the desired **Orientation** by choosing Left/Right/Back/Front based on the AAT's mounted position.



- **View real-time alignment data.** The Target data is displayed in the left column, and live **Actual** data is displayed in the right column.
    - Choose to view or hide the visual gauges at the top of the page by pressing the gauge icon at the top of the **Actual** column.
    - Pressing the individual name of a field to hide that field (i.e., Azimuth, Tilt, etc.)
    - To add gauges or fields back, press the **refresh** symbol at the top of the **Actual** column.
- Once the antenna is aligned correctly, select the **Save** (floppy disk) icon to capture the alignment results. After the timer countdown, captured information will be displayed.
- Choose to **Accept** or **Reject** the Snapshot data to continue. Rejecting the data will return to the Measuring screen.
- Finally, as part of the save process, the user may
    - Add photo(s)
    - Determine data to be embedded in photo(s)
- Once a snapshot is saved, it can be accessed via the **Reports** from the Cellular Alignment page.

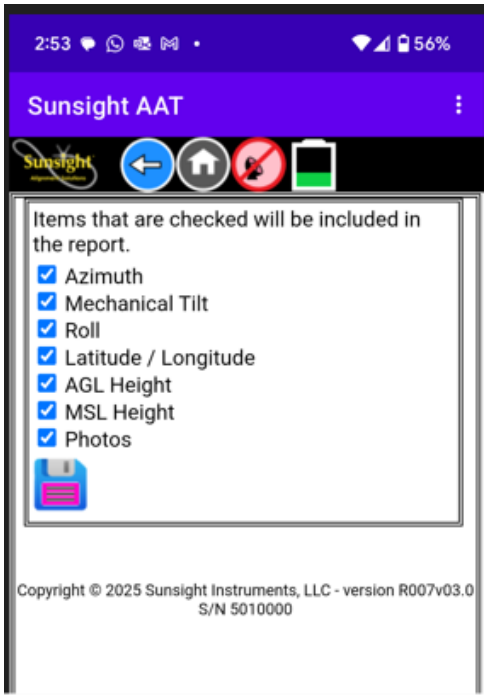
7. Generating Reports

Note: Reports may be generated and emailed directly from the field prior to departure from the job site* or any time cellular data is available on the handheld device

The AAT can generate full site reports, individual snapshot reports, CSV reports as well as Google Earth reports. All reports generated are downloaded onto the handheld device. Report data remains on the AAT and additional reports can be generated from the AAT at a later time if desired.

- Power on and connect to the AAT.
- Navigate to the Cellular->Reports page from the Home page.

- Locate the Site or individual snapshot for the report to be generated.
- Click the desired report icon (PDF, CSV, Google Earth) to create a report.
- Choose the reporting options and **Save**. The report will be generated and downloaded to the handheld device.



- The report can be saved to various directories on the handheld device as chosen by the user. Be sure to remember where the report was saved for future access.

8. Tools

General Settings

- **Website Colors**
  Choose the website color scheme you prefer to make the website easier to read
- **Height Units**
  Choose which units of measure to use for AGL and MSL height

- **Connection Mode**
  WiFi can be disabled for the AAT allowing operation via USB-C cable only. Contact Sunsight Technical Support to configure the AAT as USB-C only.
- **WiFi Channel**
  If you are having trouble communicating with the AAT (high RF interference environment), move the AAT to an area where WiFi connection is possible, connect to the AAT and change the WiFi channel to a number different from the current value. Save the selection, restart the AAT, and attempt to reconnect. If WiFi connection is not possible due to local RF interference, the AAT can be accessed using the USB-C wired connection. Most RF interference issues are due to poor PIM performance near the AAT.
- **Latitude and Longitude Display**
  Choose display format of decimal or degrees/minutes/seconds
- **Owner Information**
  Enter company/owner information to be printed on the top right of all PDF reports
- **Azimuth Display Correction**
- Azimuth is now rotationally compensated using matrix mathematics to allow corrected azimuth display at higher tilt and roll angles by default. Optionally the azimuth can be set to operate without this compensation.
- **Roll Value Display**
  The displayed roll value can be either positive when rotated clockwise or negative when rotated clockwise. The default is positive when rotated clockwise.
- **Initiate Restart**
  Allows user to restart the AAT via firmware rather than having to power cycle the AAT using the Power button
- **Initiate Shutdown**
  Allows user to power down the AAT via firmware rather than having to press and hold Power button
- **Inactivity Power Down**
  Allows user to override AAT automatic shutdown feature. By default, AAT shuts down when idle for 1 hour.

File Management

File management is not typically used during normal AAT operations. It can be useful for downloading a copy of the AAT prior to firmware updates, or when moving data to a second AAT Tool.

- **Reset Database**
  Clears all Targets, Snapshots, and Photos from AAT.
- **Download Database**
  Downloads all Targets, Snapshots, and Photos from AAT. The database is a proprietary format and cannot be read by software programs
- **Upload Database**

Uploads all Target, Snapshots, and Photos to AAT from proprietary database file

Tilt Roll Calibration

Tilt and Roll calibration affects only the tilt and roll values. The calibration is similar to calibrating a digital level. This is the only calibration required on the AAT. **It is not necessary to send the AAT back to the factory for calibration.**

Follow the steps on the display to calibrate the tilt/roll sensor. The updated calibration date will be included in all future data snapshots, PDF and CSV reports.

Firmware Update

The AAT uses a .bin file to update the internal AAT's firmware. This is separate from the Sunsight app, which is installed on the handheld device.

The firmware version currently installed on your AAT is displayed at the bottom of the page in the Copyright line. Example: (r007v00.xxxx) Where xxxx represents the firmware version.

Check the Sunsight.com website Support page to see if there is a newer version of the firmware and app (sunsight.com/aat_mw_support). Instructions for updating the firmware and app are available on the same support page.

9. Diagnostics

Displays GPS diagnostic information. Any indicator of Poor generally requires repositioning of the AAT for GNSS signal optimization.

Questions? We have answers!

Live technical support is available Monday—Friday, 9:00 AM to 5:30pm Eastern Time.

After-hours calls and emails will receive a response as quickly as possible, often on the same day but no later than the following business day.

Sunsight Technical Support

www.sunsight.com

support@sunsight.com

+1-321-244-9443 x2