SCOUTTRACT USER GUIDE · DESKTOP EDITION

GPS field guide: Survey (Beta)

For the office: projects, imports, COGO, exports and file prep, OPUS and the office checklist. Field work is on the phone.

For pilot testers. Updated 2 Nov 2026.

Online: scouttract.com/guides/gps/desktop

Contents

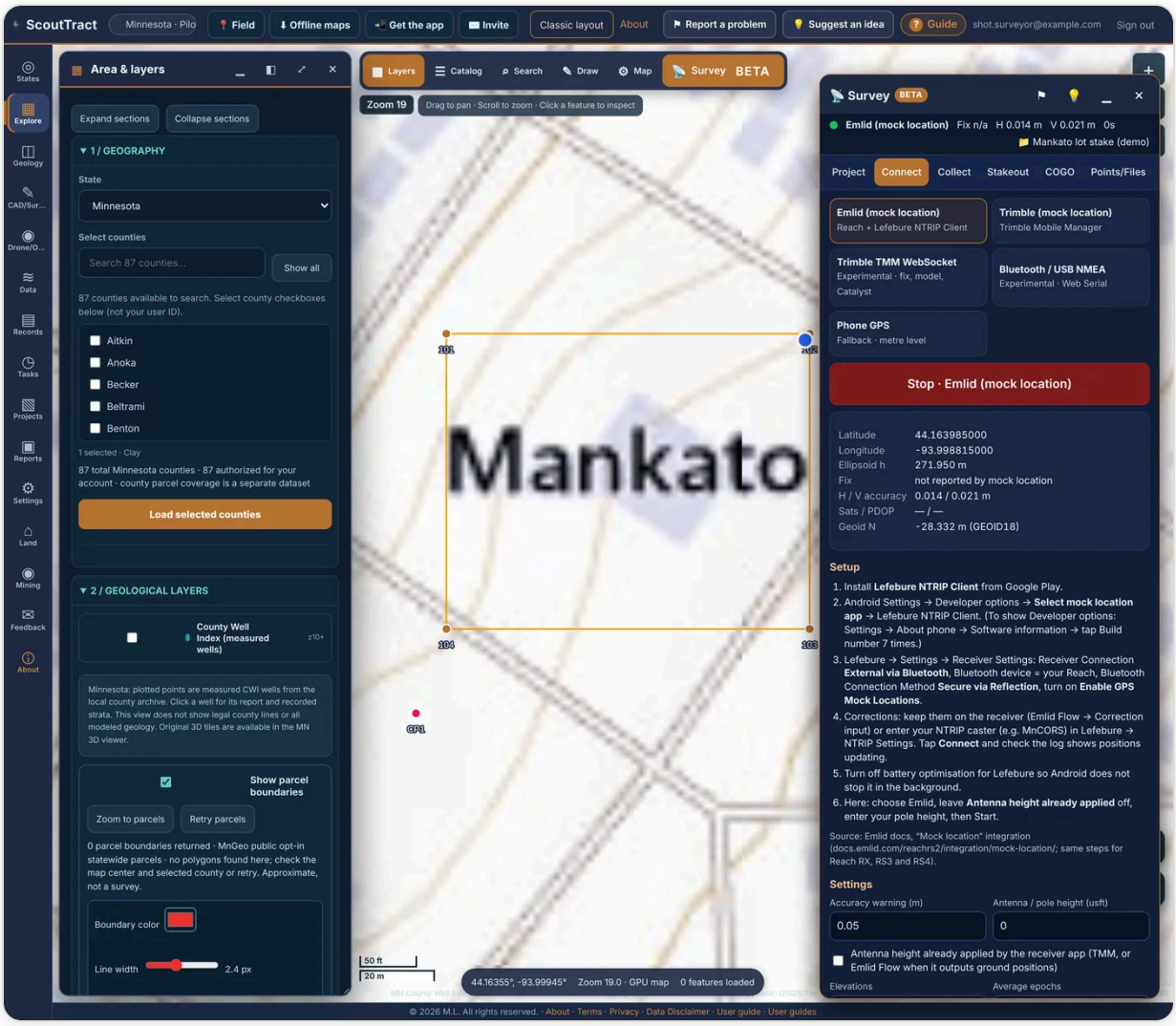
1. What the Survey tab does
2. What you need
3. Field work is on your phone
4. Projects and importing
5. COGO
6. Exports and loading into Emlid Flow / Trimble
7. OPUS: static RINEX to a control point
8. Troubleshooting
9. Office prep checklist
0. Sources (checked 2 Nov 2026)

1 · What the Survey tab does

Survey (Beta) is a pop-out panel on the ScoutTract map. It turns an RTK GNSS receiver plus your Android phone into a light data collector. You can:

- collect averaged points;
- stake out points and lines;
- run COGO;
- move files to and from Emlid Flow, Trimble Access and CAD;
- prepare OPUS static submissions and turn the emailed solution into a control point.

To open it: sign in, then click 📡 **Survey Beta** in the map bar. Or add `#survey` to the address. The panel opens on the right of the map.



Survey on a computer: the map with the Survey panel on the right.

> **This is the Desktop edition.** Live GPS comes into ScoutTract through Android mock location, so field work is done on an Android phone. Use the computer to:
>
> - set up projects;
> - import stake targets and control;
> - run COGO;

- export files for Emlid Flow, Trimble Access and CAD;
- prepare OPUS submissions.

For field work, see the Mobile edition. Projects are saved to your account, so a project you set up here opens on your phone when you sign in.

The panel's tabs: Project · Connect · Collect · Stakeout · COGO · Points/Files · OPUS · Help.

The header buttons:

- ⚑: report a problem.
- 💡: suggest an improvement.
- _: minimise the panel.
- ✕: close the panel.

Your projects and points are private to your account.

The first time you open it, a **Survey is in Beta** card appears. Click **Got it** to close it.

Beta: Check into a known control point before you rely on results. ScoutTract does not replace your field software's QA or a licensed surveyor's judgement.

The status bar (always visible)

The status bar shows:

- a coloured dot;
- the source, or **Not connected**;
- the fix, or **Fix n/a**;
- **H** and **V** accuracy in metres;
- satellites and PDOP, when the source reports them;
- the age of the last position in seconds;
- 📁 and the open project.

Dot	Meaning
🟢 green	Horizontal accuracy is at or under your limit (default 0.05 m). The fix is RTK fixed, or the source doesn't report a fix.
🟡 amber	Accuracy is within 4× the limit, or the source doesn't report accuracy. Also amber for a fix that isn't RTK fixed (e.g. float) but whose accuracy is within the limit.
🔴 red	Accuracy is worse than 4× the limit. Also red for a non-fixed solution whose accuracy is worse than the limit.

A warning line appears under the bar in these cases:

- *"No position for N s — check the receiver connection."* No position has arrived for more than 5 s.
- *"Accuracy X m is worse than your 0.05 m limit — not survey grade."*
- *"Fix is RTK float — wait for RTK fixed."*
- *"Accuracy not reported by this source — verify on a known point."*
- *"Fix status unknown — confirm FIX in Lefebure/TMM."* Mock location doesn't carry the fix type (see section 5).

- *"Choose your receiver model on the Connect tab so the antenna phase-centre offset is right."*

2 · What you need

- An **Android** phone or tablet with ScoutTract open in Chrome or the installed app. Mock location is an Android feature.
- One of these receivers:
  - an **Emlid Reach** (RS2/RS2+, RS3, RS4, RX) with **Emlid Flow** and the **Lefebure NTRIP Client** app;
  - a **Trimble** receiver (R2, R8s, R10, R12i, R580, R780, Catalyst DA2) with **Trimble Mobile Manager** (TMM).
- RTK corrections. These come from an NTRIP network such as MnCORS (NAD83(2011)), your own base or Trimble RTX/VRS.
- A **project** in the State Plane zone and units you'll deliver in.

> **Tip:** Only one app can be Android's mock-location app at a time: Lefebure *or* TMM. Switch it in Developer options when you change receivers.

3 · Field work is on your phone

Connecting a receiver, checking the fix, collecting and stakeout all use the receiver's position. ScoutTract gets that position from **Android mock location**, which only exists on an Android phone or tablet:

- **Emlid:** Reach → Lefebure NTRIP Client [1].
- **Trimble:** Trimble Mobile Manager [9].

The Mobile edition covers:

- Emlid Reach and Trimble setup;
- the Connect settings, FIX/float and antenna height;
- checking in on a known point;
- Collect and Stakeout;
- the field checklist.

What still matters on the computer

- **Coordinate system and units.** Pick the zone and units you'll deliver in. The phone, Emlid Flow or Trimble Access, and your CAD must all match.
- **Elevations** (Connect tab). Choose **Orthometric NAVD88 (GEOID18)** or **Ellipsoidal**. This setting is saved per browser, so set it again on the phone.
- **Bluetooth / USB NMEA** (experimental). Chrome on a computer can read a receiver's NMEA through Web Serial. It shows the real fix type. It's meant for testing, not field work.

> **Antenna height:** on the phone, pick the **Receiver model** and enter the pole height to the bottom of the receiver. For Emlid Reach, ScoutTract adds the NGS antenna phase-centre offset, e.g. 0.1349 m for RS2/RS2+/RS3 [14]. For

> Trimble via TMM it adds none. Check in on a known point before you rely on results. The Mobile edition explains this.

4 · Projects and importing

1. Go to **Project** → **New project** and type a **Name** (e.g. "Lot 7 Smith Addition").
2. Choose the **Coordinate system**. **Suggest for my location** fills the "Suggested here" list. State Plane zones are NAD83(2011), the same as MnCORS.
3. Choose **Units**: **US survey feet**, **International feet** or **Metres**. Then tap **Create**.
4. Use the computer for this: the full keyboard makes long names and zone searches easier.
5. Under **Your projects** you can **Open**, **Rename**, **Duplicate** or **Delete** a project. To delete, you must type the project name.

Import (Points/Files → Import → stake targets)

Choose the file. ScoutTract shows **Detected:** with the file type, then the options for that type.

Formats: CSV/TXT, DXF, zipped shapefile, GeoJSON, KML/KMZ, and Trimble CSV or JobXML, up to 25 MB.

CSV options:

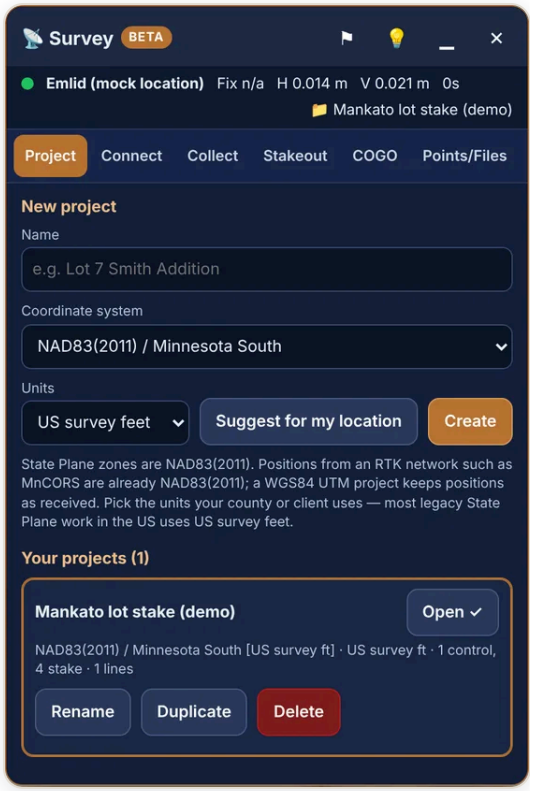
- **Layout**: **Auto (header names)**, **PNEZD**, **PENZD**, or **Use the column mapping below**.
- **Coordinates**: **Grid N/E (project system)** or **Latitude / longitude**.
- **File units**.

DXF options: DXF units.

Shapefile: must be zipped with its `.prj`. It's reprojected from the .prj.

Settings for every import:

- **Import as**: **Stake targets**, **Control** or **Measured**.
- **Layer**.
- **Duplicate names**: **Rename** (adds _1), **Skip** or **Replace**.



Project tab: New project, coordinate system, units, Your projects.

Then click **Import**. DXF coordinates are read as grid coordinates in the project system.

To add a single point, use **Key in a point** under the point list.



Points/Files: Import, Export and the point list.

5 · COGO

Calculations available:

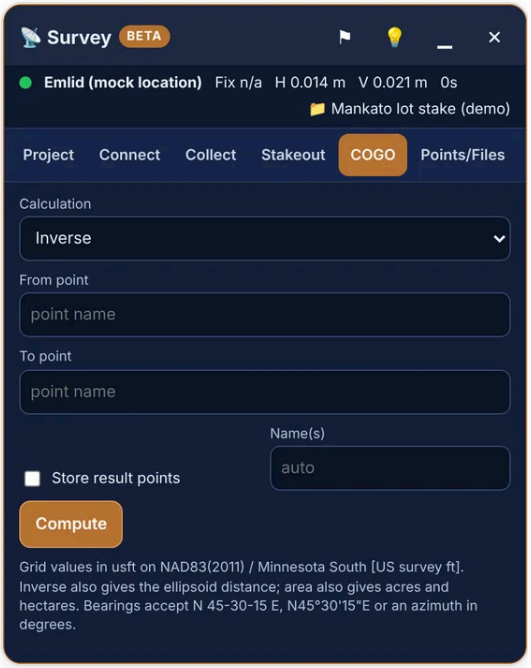
- **Inverse**: bearing, azimuth, grid and ellipsoid distance, dN/dE, dZ, slope and grade.
- **Forward (bearing & distance)**.
- **Traverse**: one "bearing, distance" leg per line, with optional **Close to point**. Gives the misclosure and precision.
- **Intersections**: bearing–bearing, distance–distance and bearing–distance.
- **Station / offset of a point**.
- **Point at station / offset**.
- **Area & perimeter**: square units, acres, hectares and ellipsoid area.

To store results: tick **Store result points** and set **Name(s)** (default "auto"). Then click **Compute**.

> **Tip:** Key in record traverses on the computer before the field day. Store the computed corners, then stake them on the phone. They're in the same project.

Bearing formats accepted:

- `N 45-30-15 E`;
- `N45°30'15"E`;
- an azimuth in degrees.



COGO: choose a calculation, enter points, Compute.

6 · Exports and loading into Emlid Flow / Trimble

Go to **Points/Files** → **Export**. You can filter by **Layer** and **Points** (All, Measured + control, Stake, As-staked or COGO), then tap **Download**. The file name includes the EPSG code and units.

Format in ScoutTract	Use it for
CSV — Emlid Flow	Emlid Flow **CSV** import. The header is `Point,Easting,Northing,Elevation,Description,Code`. Flow needs Point, Easting, Northing and Elevation headers [5].
CSV — PNEZD (Trimble Access, Carlson, Civil 3D) · CSV — PENZD	Emlid Flow **PNEZD/PENZD** (no header) [5], Carlson, Civil 3D.
CSV — P,N,E,Z,Code (Trimble Access)	A Trimble Access CSV linked file. The job's **Coordinate order** must match [12].
DXF (points, labels, linework)	CAD. Emlid Flow "DXF as geometries" [5]. Trimble Access DXF [12].
Shapefile .zip with .prj	GIS. Emlid Flow shapefile (ZIP with .shp/.shx/.dbf) [5]. Trimble Access .shp [12].
KML (Google Earth)	Google Earth, Emlid Flow, Trimble Access (WGS 84) [12].
Trimble JobXML .jxl (experimental)	Trimble office software. Test it before relying on it.
CSV — full / Stake report CSV / Check-in report CSV	Records: fix, accuracy, lat/lon, stake deltas and check-in results.

Getting files to the field

- **Staking with ScoutTract on the phone:** nothing to copy. Import on the computer, then open the same project on the phone.

- **Staking with Emlid Flow or Trimble Access: Download** the export and copy it to the controller or phone. Email, Drive or USB all work. Then import it there (see below).

Converting a shapefile to DXF or CSV

1. Import the zipped shapefile in **Points/Files**.
2. Export it as **DXF**, or as any of the CSVs.

Loading into Emlid Flow

1. Create the Flow project in the **same coordinate system and units**.
2. Swipe up the project drawer and tap **Import**, then choose the format [5].

Loading into Trimble Access

1. Copy the file into the project folder and link it to the job. Trimble Access reads CSV/TXT, DXF, Shapefile and KML/KMZ [12].
2. Make sure the file and the job use the same coordinate system [12].

---

7 · OPUS: static RINEX to a control point

> **Tip:** OPUS is easiest on the computer. The RINEX file is usually there after you download it from the receiver, and you can keep the NGS page open in another tab.

> **Limitation:** ScoutTract **doesn't log raw GNSS observations or RINEX**. Mock location and NMEA carry positions only. Record the static file on the receiver, then bring it here to check.

Emlid:

1. In Emlid Flow, go to **Logging** → **Recorded logs and settings** → ⚙.
2. Choose the **OPUS** preset with RINEX 3.03.
3. Enter the height to the bottom of the receiver.
4. Tap **Start recording**. Emlid suggests at least 4 h for best accuracy.
5. Tap **End recording**, then download the file [6].

UBX logs can be converted in Emlid Studio. For OPUS, use a 30 s interval, time rounding and GPS only [8].

Trimble: log static data on the receiver and convert it to RINEX in your office software.

1 · Check the RINEX file

1. Choose the file. Accepted: .yyO, .obs, .rnx, .gz, .zip or Hatanaka.
2. Enter the **Antenna (NGS code)**, e.g. `EML_REACH_RS2 NONE` (RS2+: `EML_REACH_RS2+ NONE`; RS4: `EML_REACH_RS4 NONE`) or `TRMR12I NONE` [7][14].
3. Enter the **ARP height** in metres: vertical from the mark to the antenna reference point. On a Reach, that's the bottom of the receiver [4].
4. Fill in **Email for results**, an optional **State Plane zone** and the **Project**. Then tap **Check file**.

ScoutTract checks:

- the duration: 15 min–2 h → OPUS-RS; 2–48 h → OPUS-S;
- midnight crossing and the logging interval;
- L1/L2 dual frequency (NGS requires dual-frequency GPS) [13];
- the antenna, the height and the file size.

When the file passes, ScoutTract shows ✓ **Ready for OPUS-RS/OPUS-S** with **Copy** buttons.

5. Tap **Open NGS OPUS upload ↗**.
6. On the NGS page, enter the data file, antenna, antenna height and email.
7. Press **Upload to Rapid-Static** or **Upload to Static** [13].

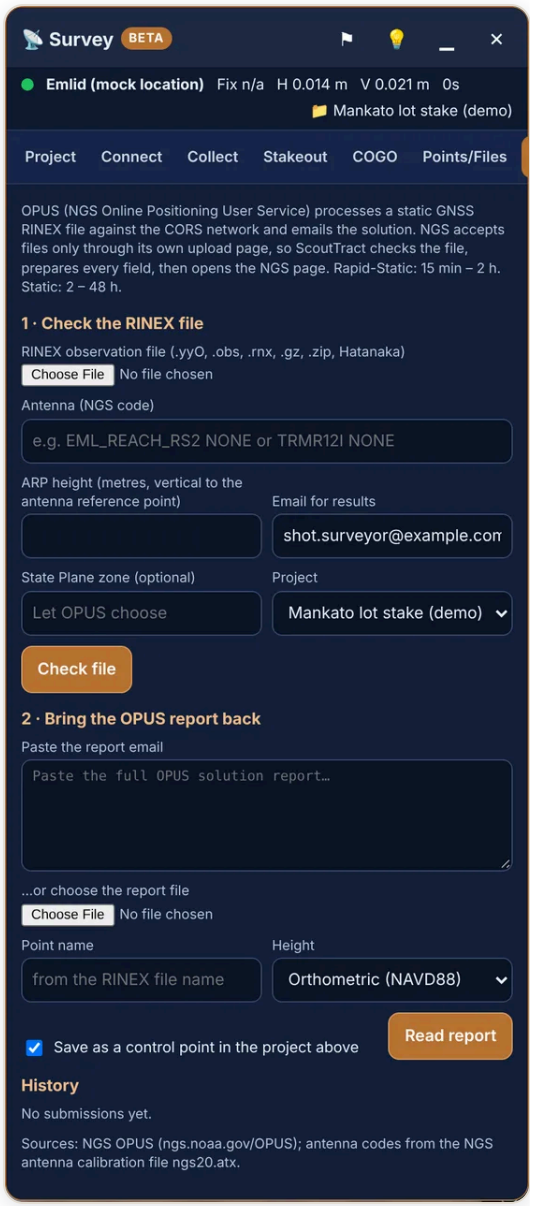
2 · Bring the OPUS report back

1. Paste the report email, or use **...or choose the report file**.
2. Set the **Point name** and the **Height**: **Orthometric (NAVD88)** or **Ellipsoidal**.
3. Keep **Save as a control point in the project above** ticked, then tap **Read report**.

ScoutTract checks the report against NGS guidance:

- more than 90% of observations used;
- more than 50% of ambiguities fixed;
- RMS under 3 cm;
- peak-to-peak under 5 cm.

It shows ✓ **Solution meets NGS quality guidance** or **! Review this solution**. The saved point gets code OPUS and the type Control. NAD83 projects use the NAD_83 coordinates and WGS84 projects use ITRF. Mark each upload in **History** with **Mark submitted**.



OPUS tab: check the RINEX file, then bring the report back.

> **Please note:** NGS is modernising the NSRS. Its page sets a deadline of 13 Jan 2027 for OPUS Projects and levelling submissions to the current datums. Regular OPUS uploads aren't affected by that notice [13].

8 · Troubleshooting

What you see	Try this
Elevations off by ~0.09–0.15 m (Reach) or by the pole height	Wrong receiver model or antenna-height setting, or the height is set in two places. See sections 3 and 4, then use **Check in on known point**.
Elevations off by ~30 m	**Elevations** is set to the wrong type: ellipsoidal vs NAVD88. Match your deliverable.
Import lands in the wrong place	Check **Coordinates** (grid vs lat/lon), **File units**, the PNEZD vs PENZD order, and that the shapefile .zip has its .prj.
Emlid Flow rejects the CSV	Use **CSV — Emlid Flow** with Flow's **CSV** import, or **PNEZD** with Flow's **PNEZD** import.
OPUS check fails	Single-frequency data, an interval OPUS doesn't accept, or a file under 15 min or over 48 h. For Reach, re-convert in Emlid Studio (30 s, GPS only).
Something else	Tap ⚑ in the Survey header to report a problem. It goes to the ScoutTract team.

9 · Office prep checklist

Project

- [ ] Project created: right State Plane zone (NAD83(2011)), units
- [ ] Same zone, units and geoid planned in Emlid Flow / Trimble Access / CAD
- [ ] Control imported as **Control**; targets as **Stake targets**
- [ ] Import checked: grid vs lat/lon, file units, PNEZD vs PENZD
- [ ] Shapefile .zip includes its .prj

Computations

- [ ] Record traverse keyed in; misclosure and precision acceptable
- [ ] Computed corners stored (**Store result points**)
- [ ] Area & perimeter checked against the record

Files for the field

- [ ] ScoutTract on the phone: same project opens after sign-in
- [ ] Emlid Flow: **CSV — Emlid Flow**, DXF or Shapefile exported and copied
- [ ] Trimble Access: **CSV — P,N,E,Z,Code**, DXF or Shapefile; coordinate order matches

After the field

- [ ] Stake report CSV downloaded and reviewed (horizontal miss, dZ)
- [ ] Check-in report: every check-in PASS
- [ ] OPUS: RINEX checked, uploaded, report read, control point saved
- [ ] Exports downloaded for CAD and records

The field checklist (receiver, mock location, antenna height, check-in) is in the Mobile edition.

Sources (checked 2 Nov 2026)

1. Emlid, "Getting Reach coordinates on Android via BT" (Reach RS2/RS2+). docs.emlid.com/reachrs2/integration/mock-location/
2. Emlid, mock-location guide for Reach RS3. docs.emlid.com/reachrs3/integration/mock-location/
3. Emlid, RTK over NTRIP (RS2: docs.emlid.com/reachrs2/rtk-quickstart/ntrip-workflow/; RS3: .../reachrs3-as-rover/rtk-over-ntrip-service/)
4. Emlid, "How to set up antenna height for RTK". docs.emlid.com/reachrs2/rtk-quickstart/antenna-height-rtk/
5. Emlid Flow, "Create or import project". docs.emlid.com/emlid-flow/setting-up-team-and-projects/creating-project/
6. Emlid, "How to log data for OPUS". docs.emlid.com/reachrs2/ppk-quickstart/how-to-record-and-download-logs/opus-logging/
7. Emlid, "NOAA's OPUS" workflow. docs.emlid.com/reachrs2/base-setup/determining-base-position/online-post-processing-services/opus-workflow/
8. Emlid Studio, "Convert to RINEX". docs.emlid.com/emlid-studio/convert-to-rinex-workflow/
9. Trimble Mobile Manager help, "Location sharing with other apps". help.fieldsystems.trimble.com/trimble-mobile-manager/location-sharing.htm
10. Trimble Mobile Manager help, "Get started". help.fieldsystems.trimble.com/trimble-mobile-manager/get-started.htm
11. Ultimate Positioning Group (Trimble dealer), "Location Sharing". help.upgsolutions.com/hc/en-au/articles/7494420755087
12. Trimble Access help, "Point and line files". help.fieldsystems.trimble.com/trimble-access/latest/en/data-files-points-lines.htm
13. NGS, OPUS upload page. www.ngs.noaa.gov/OPUS/
14. NGS, antenna calibrations file ngs20.atx (G01 north/east/up, radome NONE): EML_REACH_RS2/RS2+/RS3 134.92 mm, RS4/RS4P 93.72 mm, RX 147.08 mm; TRMDA2 53.66, TRMR2 91.16, TRMR10 128.36, TRMR10-2 128.64, TRMR12 128.75, TRMR12I 129.32 mm. geodesy.noaa.gov/ANTCAL/ (files.ngs.noaa.gov/pub/antcal/)
15. Trimble Mobile Manager help, "Configure the antenna height". help.fieldsystems.trimble.com/trimble-mobile-manager/antenna-height.htm

ScoutTract Survey is in Beta. Results depend on your receiver, corrections, datum and setup. This guide doesn't replace your field software's QA or a licensed surveyor's judgement.