

ARRF

Augmented Reality Rangefinder

How-to-Use Guide for Early Testers and Creators

EARLY TESTER EDITION



Estimate only. Awareness only. ARRF is not a safety device and not a substitute for a laser rangefinder. Never use it to decide whether it is safe to shoot, or to aim a firearm.

SECTION 1

Welcome. Here is what ARRF is (and is not).

⚠ READ THIS FIRST: AWARENESS ONLY

- ARRF gives an **estimate**. It can be wrong.
- ARRF is **not a safety device** and **not a substitute for a laser rangefinder**.
- **Never** use ARRF to decide whether it is safe to shoot. **Never** use it to aim a firearm.
- Building outlines are an awareness layer. Map data can be missing, old, or offset.

Thanks for testing ARRF. Your footage and notes help us make it better.

ARRF (Augmented Reality Rangefinder) is an Android app from Lighthouse CodeLabs LLC. It uses your phone camera, AR (ARCore), and all of the phone's sensors, not just GPS. It estimates the distance to the spot where a target meets the ground. It also draws Mapbox building outlines downrange, so you can see what structures may be out there.

ARRF is...

- A distance **estimate** to a ground point
- An awareness layer for buildings downrange

ARRF is not...

- A safety device or a laser rangefinder
- A tool for aiming, or for any shoot / don't-shoot decision

What's in this guide

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SECTION 2

Before you start

A few minutes of setup makes every estimate better.

Go outdoors, under open sky

- Use ARRF **outdoors**. Indoors, GPS gets weak and the map can drift.
- Pick a spot with a clear view of the sky. Tall trees, steep walls, and roofs block GPS.
- Give GPS a minute to settle after you open the app.

Power and connection

- Start with a **well-charged battery**. Camera, AR, and GPS together use a lot of power.
- Building outlines load from the internet. Have mobile data or Wi-Fi on.
- Turn on **Location** and allow the camera when asked.

Hold phone securely

- Hold the phone in front of you with **both hands**, elbows relaxed.
- Move slowly. Smooth motion helps AR track the ground.
- Keep fingers off the camera lens. Wipe the lens if it's smudged.
- A wrist strap or grip is a smart idea near water or rough ground.

Never use ARRF while driving or in a moving vehicle. Stand still on steady ground. Stay aware of your surroundings, traffic, and footing while you look at the screen.

★ HUNTER'S TIP

Find your spot, catch your breath, then open the app. A steady stance beats a fast one every time.

SECTION 3

First launch

- 1 **Face roughly north.** Hold the phone up with the camera looking out.
- 2 **Keep eye level at the horizon.** Hold the phone upright so the horizon sits near the middle of the screen.
- 3 **Read the Terms of Use & Privacy.** Scroll to the bottom, then tap **I UNDERSTAND & ACCEPT**. The notice explains that ARRF is an estimate-only awareness tool. ARRF has no ads and collects nothing.

Facing north and starting level gives the sensors a clean starting point. You will fine-tune both in the next steps.

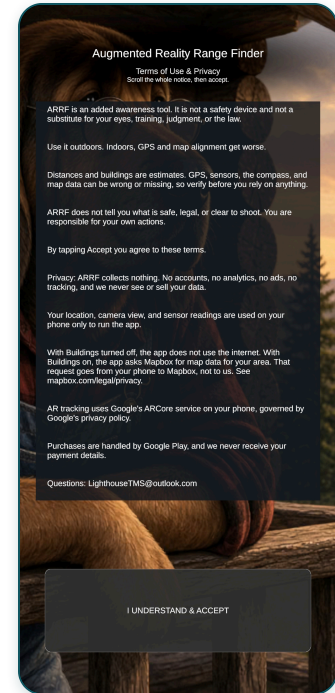


Photo 1: The Terms of Use & Privacy screen. Scroll to the bottom, then tap **I UNDERSTAND & ACCEPT**.

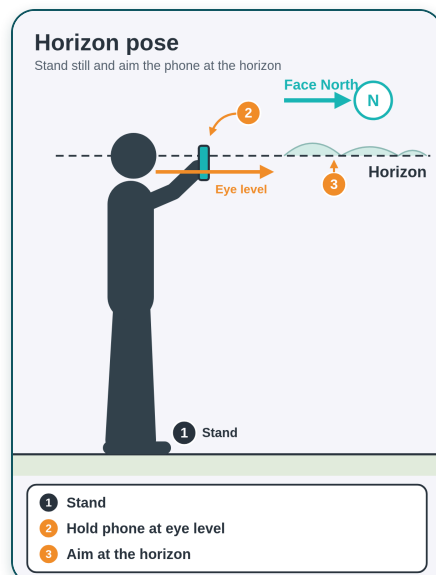


Illustration: Photo 2: The horizon pose. Stand still, hold the phone at eye level, and aim at the horizon while facing roughly north.

★ HUNTER'S TIP

Not sure where north is? "Roughly" is fine here. Face the way your compass app or the sun suggests, then keep going.

SECTION 4

Calibrate Height

Teach ARRF how high the phone is above the ground.

- 1 **Stand up straight** on level ground. Hold the phone where you normally will.
- 2 Tap **Calibrate Height**.
- 3 Start with the camera on the **horizon**.
- 4 **Tilt slowly down** until the camera points at **your feet**.
- 5 Hold still while ARRF maps your height above the ground. Check the result on screen.

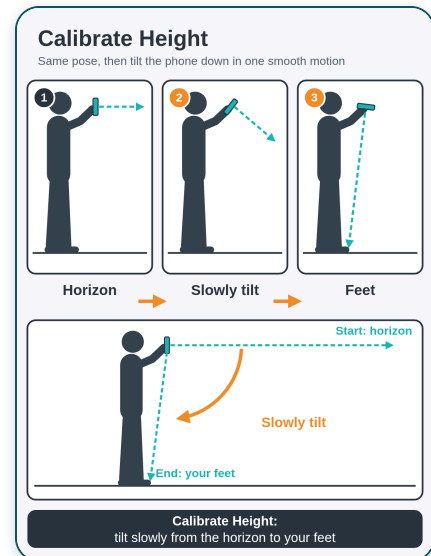


Illustration: Photo 3: Calibrate Height. Start on the horizon, then tilt slowly down to your feet in one smooth motion.

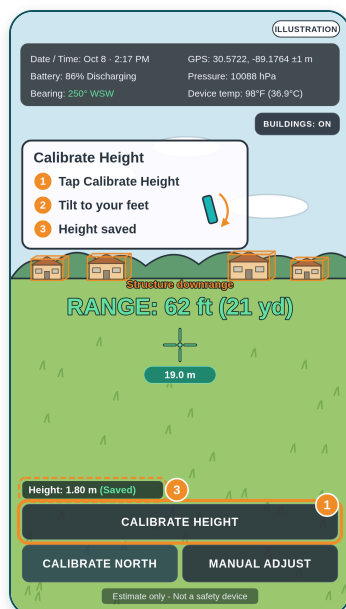


Illustration: Photo 4: After Calibrate Height, the saved height shows above the button (here 1.80 m, Saved).

Why it matters

Range is worked out from the phone's height and its downward angle. If the height is off, every range is off.

With the default height, ranges read about **17–23% short** in our testing. Calibrate first.

Calibrate STANDING. Then range standing. If you sit, kneel, or move to a new spot, calibrate again.

SECTION 5

Calibrate North

Lock in a true-north heading you trust.

Phone compasses drift. Metal, cars, and power lines can pull them off. Calibrate North fixes that.

- 1 Find a **known north reference**. Examples: a road or fence line you know runs north, a landmark due north on a map, or a trusted compass reading.
- 2 Point the center of the screen at that reference.
- 3 Tap **Calibrate North**.

ARRF **freezes that heading as true north**. It then **overrides the phone compass**, so the building outlines stop wandering.

When to redo it

- You moved to a new spot.
- Outlines slowly slide away from the real buildings.
- You restarted the app.

★ HUNTER'S TIP

A better reference beats a faster tap. Take a second to line it up dead center.

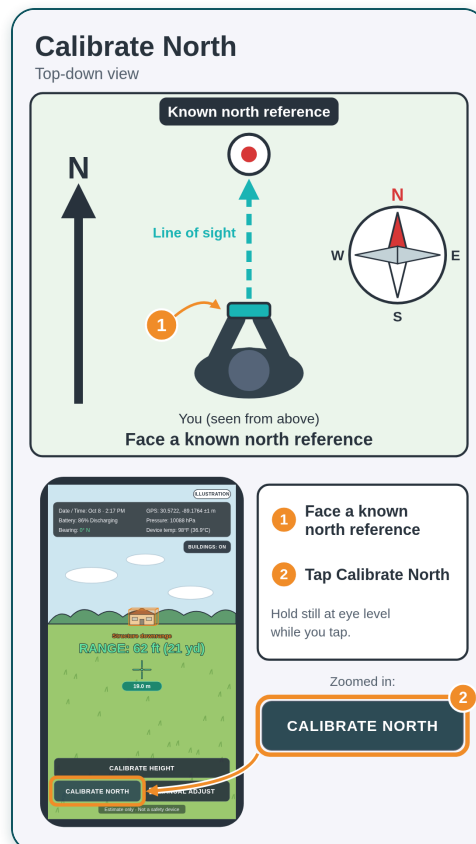


Illustration: Photo 5: Face a known north reference, hold at eye level, and tap Calibrate North.

SECTION 6

Manual Adjust

Nudge the outlines until they sit on the real buildings.

Use Manual Adjust when the outlines **do not line up** with buildings you can see, even after Calibrate North.

Control	What it does
-5° -1° +1° +5°	Yaw. Rotates the outlines left or right around you.
N S E W	Position nudge. Shifts your map position about 1–2 m per tap.
Reset Alignment	Clears your adjustments.

How to line it up

- 1 Aim at a building you can clearly see.
- 2 Use **yaw** first, big steps then small, until the outline is centered on it.
- 3 Use **N/S/E/W** to slide it the last little bit.

Adjustments are **saved on the phone**. Tap

Reset Alignment when you change locations.

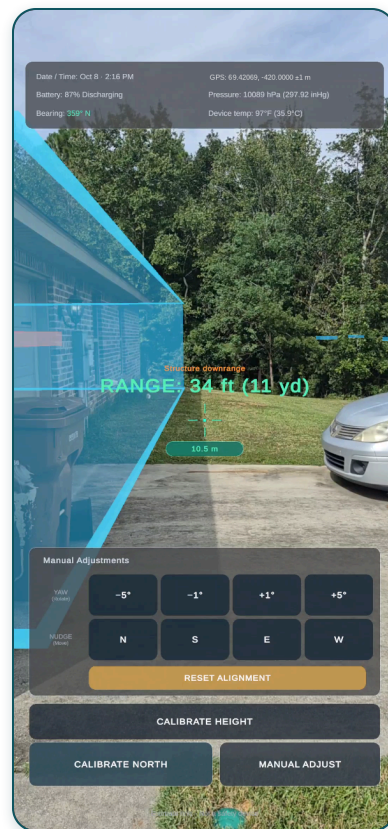


Photo 6: Manual Adjustments open: yaw (–5° to +5°), N/S/E/W nudge, and Reset Alignment. A building outline sits on the house at left. RANGE reads 34 ft (11 yd) under the “Structure downrange” line.

SECTION 7

Taking a range

Aim at the ground, not the top of the target.

- 1 Stand where you calibrated height.
- 2 Put the **center reticle** on the spot where the target **touches the ground**: the base of a post, the bottom of a tree, the feet of a target stand.
- 3 Hold steady for a moment.
- 4 Read the estimate.

Reading the numbers

Where	What you see
RANGE	Distance in feet , with yards beside it
Pill under the reticle	Same distance in meters

Aiming at the top of a target, or at the sky, gives a meaningless number. Always use the ground-contact point.

★ HUNTER'S TIP

Follow the target straight down to the dirt. That's your spot.



Photo 7: A clean readout in an open field: RANGE 62 ft (21 yd), with the same distance, 19.0 m, in the pill under the reticle.

SECTION 8

Reading the HUD: the top panel

A quick status check before you trust a reading.

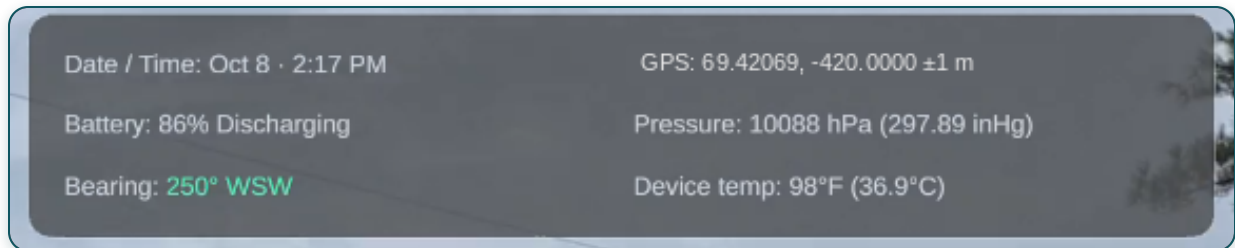


Photo 8: The top panel. Date/time (Oct 8, 2:17 PM), GPS with ± 1 m accuracy, battery 86%, pressure 10088 hPa (297.89 inHg), bearing 250° WSW, and device temp 98°F (36.9°C).

Item	What it tells you
Date / time	When the reading was taken. Handy when you review footage.
GPS + accuracy	Your position, plus how far off it might be in meters. Smaller is better. Wait for about 3–5 m under open sky before you trust the map.
Battery	Charge left. AR drains it fast.
Pressure	Barometer reading from the phone.
Bearing	The direction the camera is pointing.
Device temp	Phone temperature. A hot phone can throttle and lag.

★ HUNTER'S TIP

The GPS number is meters of possible error (smaller is better). Stand in the open and wait until it settles around 3–5 m before you trust a reading.

SECTION 8 (CONTINUED)

Reading the HUD: building awareness

A **building awareness line** sits just above the range. It notes structures the map shows downrange. Outlines are drawn on screen in three colors:

To show or hide outlines, tap the **Buildings: ON/OFF** button. It sits at the top right, just under the data panel. With Buildings off, ARRF does not use the internet.

BLUE outline

The **normal** building outline. Blue is not a warning.

ORANGE outline

A structure downrange inside the **wider awareness cone**.

RED outline

A structure **on or near the aim line**.

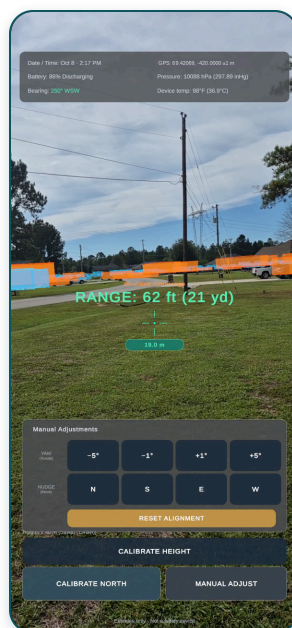


Photo 9: Orange outlines on houses along the horizon, inside the wider awareness cone. The reticle stays on open grass (62 ft).

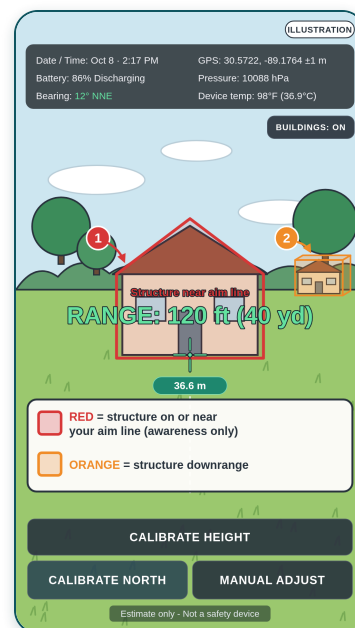


Illustration: Photo 10: A red outline on a house on or near the aim line (120 ft). A house off to the side shows orange.

COLORS ARE AWARENESS, NOT A VERDICT

Red or orange is **never** a judgment about safety. **No color, or no outline, does not mean "clear."** Map data can miss structures, people, animals, and vehicles. Always see and know what is beyond your target with your own eyes.

SECTION 9

Tips and limits

Know where ARRF shines and where it gets rough.

Topic	What to expect
Distance	Estimates are very good out to just over 50 yards . Beyond that, they get rougher . Treat long readings as a ballpark.
Hills and terrain	ARRF works best on fairly level ground. Slopes, dips, and ridges between you and the target can throw the estimate off.
Tall buildings	Tall structures can block GPS and bounce its signal. Outlines may shift. Ranging to the top of a building won't work; use its base.
GPS needs open sky	Trees, canyons, and roofs weaken GPS. Indoors is worst. Watch the accuracy number on the top panel.
Heat	Direct sun and long sessions heat the phone. A hot phone can slow down, dim the screen, or close the camera. Rest it in the shade.
Height	Calibrate Height standing. Recalibrate if your stance or location changes.

Habits that help

- Calibrate Height, then Calibrate North, then check outlines. Every new spot.
- Compare a few readings against a known distance (a tape or a laser rangefinder) and note the difference.
- Move slowly and give AR a second to settle.

★ HUNTER'S TIP

Short and steady wins. Test close targets first, then step out farther and see how it holds up.

SECTION 10

Recording your testing

Samsung Screen recorder

- 1 **Swipe down twice** from the top of the screen to open Quick Settings.
- 2 Tap **Screen recorder**. (If it's missing, tap the pencil / edit button and add it.)
- 3 Pick a sound option. Choose media + mic if you want to **narrate**.
- 4 Open ARRF and test. Stop from the floating recorder bar. Videos land in your Gallery.

Landscape or portrait both work. Talk us through what you see if you like.

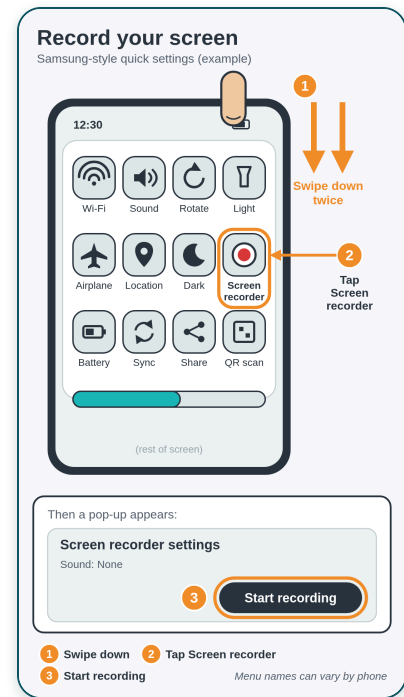


Illustration: Photo 11: Swipe down twice, tap Screen recorder, then Start recording. Menu names can vary by phone.

Please SEND US your footage and notes.

Every clip helps us improve ARRF.

Email: LighthouseCodelabs@gmail.com

Large files: send a share link (Google Drive, OneDrive, etc.).

What to include

- **Device:** phone model and Android version (e.g., Galaxy S24 FE).
- **Location type:** open field, backyard, neighborhood, wooded, hilly, urban.
- **Distances tested:** what ARRF said vs. the true distance, if you know it.
- **What looked wrong:** outlines off, short ranges, lag, heat, crashes.

SECTION 11

Feedback checklist & troubleshooting

Before you send feedback

- ☐ Tested outdoors, under open sky
- ☐ Ran **Calibrate Height** while standing
- ☐ Ran **Calibrate North** on a known reference
- ☐ Used **Manual Adjust** if outlines were off (and noted how much)
- ☐ Wrote down GPS accuracy, phone model, and location type
- ☐ Noted ARRF readings vs. known distances
- ☐ Recorded the screen, with narration if possible

Troubleshooting

Problem	Try this
No buildings showing	Make sure Buildings: ON is set. Check GPS and internet. Move outdoors to open sky. Wait for GPS accuracy to improve. Some areas have little map data.
Outlines misaligned	Run Calibrate North first. Then use Manual Adjust (yaw, then N/S/E/W).
Ranges read short	Run Calibrate Height while standing . Aim at the ground-contact point.
Readings jump around	Hold steadier, move slower, and check that the lens is clean.
Phone hot or laggy	Rest it in the shade. Close other apps.

Remember: ARRF is an estimate and an awareness layer. It is not a safety device or a laser rangefinder. Never use it to decide whether it is safe to shoot, or to aim a firearm.