HF CONDITIONS SOUTH AFRICA

Beta guide

How the site works, page by page, and what we would like you to test

Site: https://zs1gfl.ampr.org/HFSA/ **Status:** beta, updated 28 September 2026 **Audience:** South African radio amateurs helping to test the site

This document explains what the site is, how it produces its numbers, what each page shows, and what we would like you to test. If you read only one section, read **How the site works** and **What we would like you to test**.

1. What this is

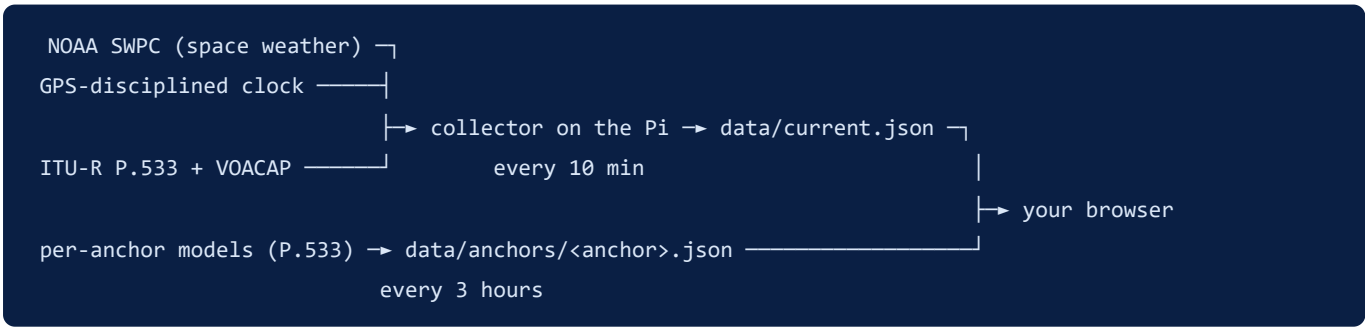
A free, independent, non-commercial HF propagation outlook aimed at radio amateurs in South Africa. It collects public space-weather data, runs standard propagation models, and presents the result in plain language.

It is a **guide to what the ionosphere is doing, not a promise**. Everything is labelled with where it came from and how old it is. It is run on private equipment on a best-effort basis, is not affiliated with any government body, and must not be used for anything safety-critical — see the Disclaimer.

2. Quick start

1. **Accept the licence.** Nothing loads until you do; the choice is remembered in that browser.
2. **Set your station** (optional but recommended): open **Station** in the menu, enter your callsign (optional) and your four-character Maidenhead locator, for example `JF96`, and press Save.
3. **Read the Home page.** The outlook rating and the SFI / Kp / Sunspots / X-ray tiles are the headline. Then work through the section pages below.

3. How the site works



- A **collector** on a Raspberry Pi fetches NOAA data every 10 minutes, runs the models, and writes small JSON files.
- Your **browser** fetches those files and draws everything. Nothing about you is sent to the server except the optional station choice, which stays in your browser (see §7).
- The **clock is GPS-disciplined**, so every timestamp and age on the site is referenced to that clock rather than to your device.

- All the **local geometry** for your own square — sunrise, sunset, grey line, day/night, band re-rating — is calculated in your browser from your locator, so it is exact for your position and costs the server nothing.

The four labels

Label	Meaning
MEASURED	A real observation (NOAA instruments, WSPR reception reports)
FORECAST	Issued by NOAA in advance (Kp, F10.7, R/S/G)
MODELLED	Produced by ITU-R P.533, cross-checked with VOACAP
DERIVED	Calculated by this site from the current state (outlook, band ratings, sun times)

Trust order: MEASURED beats FORECAST beats MODELLED beats DERIVED. See the glossary.

Freshness states

Every source is also shown with a freshness state: **LIVE** (within ~20 minutes), **CACHED** (up to about three hours old, or the provider was unreachable and this is the last good snapshot), **STALE** (older than that), **UNAVAILABLE**. If something is CACHED or STALE, treat the numbers with more caution. See the glossary.

How often it updates

What	How often
NOAA data and the published snapshot	every 10 minutes
Path model for the Cape Town reference	about hourly
Path models for the six anchor groups	every 3 hours
Validation against real WSPR spots	every 6 hours
Your browser re-checks the snapshot	every 5 minutes
Clock display	every second

Measured data can therefore be up to ~10 minutes old, the Cape Town path table up to ~1 hour, and the per-anchor tables up to ~3 hours.

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4. The pages

Home — the outlook rating (EXCELLENT / GOOD / FAIR / POOR / CLOSED) with a one-line reason, the four space-weather tiles, the best bands right now, a card for your station, quick links to every section, settings and the **Refresh now** button. Any active NOAA alert appears as a strip at the top.

Station — your callsign and Maidenhead locator, and everything computed for your square: your square and nearest model anchor, sunrise / sunset / solar noon / current state and the grey line, bands re-rated for your latitude, a local forecast, and the path tables for your anchor.

Bands — all ten HF bands with the current rating and what each rating suggests. Use it to choose a band, then check Paths.

Map — a full-width world map showing daylight and night, the grey line, the subsolar point and the modelled paths from Cape Town, colour-coded by reliability (green dependable, amber marginal, red unlikely).

Paths — two tables: six domestic call areas and **30 DX destinations** (36 modelled circuits in total). Each row gives a recommended band, the MUF and a reliability percentage. Every path is ALSO run through VOACAP — an unrelated model — and the two are compared; agreement is shown rather than hidden.

Forecast — NOAA's predicted planetary K index for the next 48 hours plus predicted F10.7 and the R / S / G scales for the coming days. Days with no expected events read **QUIET** (NOAA only issues a scale when an event is expected, which is normal at low solar activity).

Alerts — NOAA alerts, warnings and watches decoded into plain language, with the severity and the original product code.

QO-100 — the amateur satellite: fixed pointing from Cape Town, the twice-yearly solar outage window, and links to live monitors. QO-100 sits above the ionosphere, so HF propagation does not affect it.

Source Status — every data source with its freshness state and age, the time base, and the model cross-check summary. If something is STALE, do not trust the numbers derived from it.

Guide — the same material as this document, page by page, with a 30-second version, a cadence table and how to interpret conditions in practice. The guide is also available as a downloadable, printable PDF from the Guide and Home pages.

Glossary — every term and label used on the site, including the ZS call areas and how the predictions are verified.

About / Data Sources, **Licensing**, **Disclaimer**, **Privacy** — exactly what they say.

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5. Your own location (My Station)

- Enter an **optional callsign** and your **four-character Maidenhead locator** (four or six characters accepted; the first four are used).
- It is stored **only in your browser** — `localStorage` for visits in future, plus a session mirror — and is never uploaded. The **Forget** button removes it.
- Everything recomputes **instantly** for that square on every page load, and the moment you change the locator.
- If your callsign's ZS area disagrees with the locator, the site warns you but still uses the locator.

The one approximation to understand. There are 76 four-character locator squares over South Africa. Running the path model for every one would take about three hours of CPU per refresh, so the squares are grouped into **six anchors**: Cape Town, Gqeberha, Kimberley, Bloemfontein, Durban and Johannesburg. No operator is more than about **618 km** from their anchor, and each group spans at most 24 minutes of solar time.

- **Exact for your square:** sunrise, sunset, solar noon, daylight/twilight/night, the grey line, and the band ratings.
- **From your nearest anchor:** the **path tables**. A short domestic path can be affected by the distance to the anchor; long DX paths barely change at all.

The full picture is on the guide.

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6. Refresh now

The button in the banner **asks the server to recalculate the model for your area**:

- It recalculates your nearest anchor if you have set a station, otherwise the Cape Town reference tables.
- It takes about **two minutes**; the page shows progress and reloads when done.
- The server allows one forced recalculation **every 30 minutes in total**, so if someone else has just used it you will be told how long to wait. Your browser also counts down its own 30-minute cooldown so you can see when you can ask again.

- If the request cannot be served, the button quietly falls back to reloading the latest published snapshot — the page never breaks.

Automatic updates continue regardless: data every 10 minutes, Cape Town's model hourly, the anchor models every 3 hours.

7. Reading the numbers

Value	How to read it
Outlook	Derived summary of the three best bands. A guide, not a forecast
SFI / F10.7	Solar flux. Below ~100 low, 100–150 normal, above ~150 high. Higher supports the higher bands
Kp	Geomagnetic disturbance 0–9. 0–3 quiet, ~4 unsettled, 5 and up storm. Storms depress the MUF
Sunspots	Long-term solar activity indicator; higher means more ionisation
X-ray	Background flare class. C can cause minor fadeouts; M and X significant ones on the sunlit side
Band rating	EXCELLENT / GOOD / FAIR / POOR / CLOSED for that band, derived for your latitude
MUF	Highest usable frequency for that circuit. Work below it or the signal passes through
Reliability	Percentage of the time the circuit is expected to meet a usable signal-to-noise level
Grey line	The twilight band along the day/night boundary; paths along it are often unusually good for DX
R / S / G	NOAA scales for radio blackouts, radiation storms and geomagnetic storms, 1–5; QUIET means none expected

The guide and glossary go deeper, and every live value on the site has a tooltip explaining it.

8. Installing it as an app

Where your browser supports it, the **Install App** button appears in the banner. Once installed, the button **removes itself for good** — including when you next visit in a normal browser tab. On iPhone use Share → Add to Home Screen instead; Safari never offers the button.

9. Offline and cached behaviour

The site installs a service worker, so the **app shell and the last-known data remain available offline**; the age of the data is always shown, so you can see that you are looking at a cached copy. A proper offline page appears if a page cannot be reached at all.

10. Honest limitations

- **These are models.** P.533 and VOACAP describe the average ionosphere; a quiet day is predicted better than a disturbed one.
- **Band ratings are derived**, not modelled per path: they come from the solar and geomagnetic state plus your latitude, so they can differ slightly from the Cape Town table.
- **Path tables use your nearest anchor**, not your exact square (§5).

- **Validation against real WSPR spots runs on the server** every six hours and is recorded, but is not currently published on a page. Model-to-model agreement (P.533 vs VOACAP) is shown.
- **No ionosonde data yet.** Hermanus and Grahamstown foF2 would be a real measurement of the ionosphere; that is waiting on permission from SANSA.
- **WSPR has an activity bias** — absence of spots is not proof of absence of propagation.
- **The site is best-effort** on private equipment; it can be unavailable.

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11. What we would like you to test

Please try, and report anything wrong, unclear or ugly — screenshots welcome.

The basics - Browse every section on a phone and on a computer. - Are the numbers plausible for what you are actually hearing on air?

Station and locator - Set a callsign and locator, then **refresh the page** — is it still there? - **Close the browser completely**, reopen the site — is it still there? - Change the locator — does everything recalculate immediately? - Check the header chip (e.g. `JF96 · ZS1`) and the Home page **My Station** card. - Enter a callsign that disagrees with the locator — does the warning show? - Press **Forget** — is it removed?

Accuracy - Check your own ZS area in the domestic path table. - Look at the 30 DX destinations: do the recommendations match your experience? Is anything missing that you would want? - On a disturbed day, do the Kp figures and the warnings match what you hear?

The refresh button - Press **Refresh now** with a station saved: it should ask the server to recalculate your area (about two minutes) and then reload. - Press it again: it should tell you how long until the next one is allowed.

Reading it - Does the **Guide** answer your questions? Is anything missing or unclear? - Are the tooltips correct and useful (hover on a desktop)?

Installing - Install on Android/Chrome or iPhone (Add to Home Screen) and confirm the install button disappears afterwards.

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12. How to report

Include: which page, what you did, what you expected, what happened, and your device and browser. If it is about your area, include your locator. A screenshot is worth more than a paragraph.

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13. Where to go deeper

- **Guide:** https://zs1gfl.ampr.org/HFSA/guide.html
- **PDF:** the same document is published as a PDF next to the guide — beta-guide.pdf
- **Glossary:** https://zs1gfl.ampr.org/HFSA/glossary.html
- **Data sources and models:** https://zs1gfl.ampr.org/HFSA/sources.html
- **Licensing and terms:** https://zs1gfl.ampr.org/HFSA/license.html
- **Disclaimer:** https://zs1gfl.ampr.org/HFSA/disclaimer.html

Thank you for testing. Every report makes the site more useful for South African amateurs.