

THE SAILOR'S KNIFE

Maritime Navigation Toolkit

User Manual & Onboarding Guide

Field: Niche But Brilliant · Knife 25 of 50 · \ Offline.Ltd

9

TOOLS

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This manual covers every tool and feature in The Sailor's Knife — a single HTML file that puts nine maritime navigation instruments in your browser, completely offline. From unit conversion and Beaufort wind scale to dead reckoning plots, celestial almanac data, and emergency man-overboard procedures, every function is documented with inputs, outputs, use cases, and pro tips.

Version 2.0 · For use with the_sailors_knife.html

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1. Getting Started

The Sailor's Knife is a single HTML file that runs entirely in your browser. No installation, no account, no internet connection required. Open the file and your maritime toolkit is ready.

System Requirements

BROWSER	VERSION	NOTES
Chrome / Edge	90+	Recommended. Full localStorage and canvas support.
Firefox	88+	Fully supported.
Safari	14+	Fully supported. Works on iPhone and iPad.
Opera	76+	Chromium-based, fully supported.
Internet Explorer	—	Not supported. Use Edge instead.

How to Open

Save the HTML file anywhere on your device. Double-click it (or tap on mobile) to open it in your default browser. The welcome modal explains the basics. Click "**Got it — open the knife**" to dismiss it.



THE EMAIL TRICK

Email the HTML file to yourself. On any device, download and open it in a browser. Your toolkit travels with you — offline and private, on any device, forever.

2. Interface Overview

The interface has five zones: the header bar, the MOB button, the tab bar, the content area, and the disclaimer bar.

The Header

The header shows the product name with the red backslash (\) brand mark, the field category, and the knife number. The red ■ MOB button is always visible in the header for emergency use.


The Tab Bar

Nine tool tabs plus three system tabs. Tool tabs: Nautical Units, Beaufort, Tides, Compass, Knots, Buoys, DR Plot, Astro. System tabs: ■ MOB Log, ■ Files, ? Help. The active tab has a red underline. Use keyboard shortcuts (Ctrl+1 through Ctrl+9) to switch tools.

Tooltips

Fields with an ■ icon have tooltips. Hover (desktop) or tap (mobile) to reveal the explanation. On mobile, tap elsewhere to dismiss.

3. Saving & File Management

Your inputs are saved automatically to your browser's localStorage. No data leaves your device. Use the  Files tab to export and import state files.


Auto-Save

Every change is persisted to localStorage within 400ms. If you close the browser and reopen the file, your data is waiting.

Exporting State

1. Open the  Files tab. 2. Click **Export state** ↓. 3. A JSON file downloads: `sailor.knife.state_YYYY-MM-DD.json`. 4. Keep it alongside the HTML file.

Importing State

1. Open the  Files tab. 2. Click **Import state** ↑. 3. Select a previously exported JSON file. 4. All tools are restored.



CAUTION

Importing a state file overwrites all current data in every tool. Export your current state first if you want to keep it.

Per-Tool Export

Each tool can be exported individually from the Files tab. Useful for sharing a single tool's configuration without overwriting others on import.



PRO TIP

Name your state files by voyage or scenario: `sailor.atlantic_crossing_2025.json`. It makes finding the right file months later much easier.

4. Nautical Unit Converter

■ Ctrl+1

Converts between nautical and standard units across four categories: distance, speed, depth, and temperature. Covers all common maritime units including nautical miles, fathoms, cables, and knots.

Inputs

FIELD	DESCRIPTION
Category	Distance, Speed, Depth, or Temperature
From	Source unit (selected from dropdown)
To	Target unit (selected from dropdown)
Value	Numeric value to convert

Outputs

FIELD	DESCRIPTION
Result	Converted value with unit name

Use Cases

Quick conversion during passage planning. Verify chart depths in unfamiliar units. Convert weather forecast wind speeds between knots, km/h, and m/s.

Common Difficulties

PROBLEM	CAUSE & SOLUTION
Result shows NaN	Non-numeric input. Enter a valid number.
Temperature seems wrong	Check from/to are not the same unit. Kelvin cannot go below 0.



PRO TIP

The Quick Reference table below the converter lists the most common nautical conversion factors at a glance — no inputs needed.

5. Beaufort Wind Scale

■ Ctrl+2

Complete reference for the Beaufort wind force scale (0–12). Enter a wind speed in any unit to find the matching force. Shows sea state descriptions, wave heights, and conditions for each force level.

Inputs

FIELD	DESCRIPTION
Wind speed	Numeric value in selected unit
Speed unit	Knots, mph, km/h, or m/s
Filter	All Forces, Light, Moderate, Strong, Gale, Storm

Outputs

FIELD	DESCRIPTION
Force cards	Matching force highlighted in amber. Shows force number, name, speed range, sea description.

Use Cases

Correlate observed sea state with instrument readings. Decide whether to reef. Prepare weather forecasts for crew briefings.

Common Difficulties

PROBLEM	CAUSE & SOLUTION
No card highlighted	Speed field is empty or the value exceeds Force 12 (64+ kts).
Wrong speed range shown	Change the speed unit dropdown to match your input.



PRO TIP

Learn to estimate wind speed from sea state — whitecaps start at Force 3–4 and spray begins at Force 6. The fastest way to verify your instruments.

6. Tide Pattern Visualizer

■ Ctrl+3

Generates a visual tide curve based on high/low water heights, timing, and tidal period. Shows the Rule of Twelfths breakdown in a reference table. Supports semi-diurnal, diurnal, and mixed tide types.

Inputs

FIELD	DESCRIPTION
Tide type	Semi-diurnal, Diurnal, or Mixed (unequal)
High water (m)	Height at high tide in metres
Low water (m)	Height at low tide in metres
High water time	Time of first high water (HH:MM)
Tidal period (hours)	Duration of one tidal cycle (default 12.42h)

Outputs

FIELD	DESCRIPTION
Tide curve	Canvas chart showing height over 24 hours
Info row	High water, low water, range, HW time, LW time estimate
Rule of Twelfths	Table: rise/fall per hour, cumulative, percentage

Use Cases

Estimate depth at anchor over the next cycle. Plan departure around sufficient water depth. Visualise the difference between spring and neap tides.

Common Difficulties

PROBLEM	CAUSE & SOLUTION
Curve looks flat	High and low water values are too close together. Increase the range.
LW time seems off	LW is estimated as HW + half the period. Actual LW may differ in mixed tides.



PRO TIP

The Rule of Twelfths: 1/12, 2/12, 3/12, 3/12, 2/12, 1/12 of the range per hour. Quick mental maths when you're anchored and watching the depth sounder.

7. Compass Bearing Calculator

■ Ctrl+4

Converts between true, magnetic, and compass bearings by applying variation and deviation. Features a live compass rose SVG and the classic "True Virgins Make Dull Companions" mnemonic.

Inputs

FIELD	DESCRIPTION
True bearing (°)	Bearing from true north, 0–360°
Variation (°)	Magnetic variation/declination. West is negative, East is positive.
Deviation (°)	Compass deviation from vessel's magnetic field. West is negative.

Outputs

FIELD	DESCRIPTION
Compass readout	Large degree display with cardinal direction
Bearing breakdown	True, Magnetic, and Compass values
Compass rose	SVG compass with rotating needle
Stats grid	All bearings and variation displayed as cards

Use Cases

Convert chart bearings for steering. Apply deviation card values. Verify compass heading against GPS course.

Common Difficulties

PROBLEM	CAUSE & SOLUTION
Compass and magnetic are the same	Deviation is set to 0. Add your vessel's deviation from the deviation card.
Values exceed 360	The tool wraps automatically. Inputs outside 0–360 are normalised on blur.



PRO TIP

Remember "CADET" — Compass ADd East for True. The mnemonic gives the reverse conversion direction.

8. Knot Tying Guide

■ Ctrl+5

Visual reference for eight essential sailing knots. Each knot has an SVG diagram, use case description, and step-by-step tying instructions. Filter by category: Loop, Hitch, Bend, Stopper.

Inputs

FIELD	DESCRIPTION
Filter	All Knots, Loops, Hitches, Bends, Stoppers
Selected knot	Click any knot card to see details

Outputs

FIELD	DESCRIPTION
Knot cards	Grid of knot previews with SVG and name
Knot detail	Expanded view with SVG, use case, and tying steps

Use Cases

Quick reference when tying unfamiliar knots. Teaching crew. Deciding which knot to use for a specific attachment.

Common Difficulties

PROBLEM	CAUSE & SOLUTION
Knot detail not showing	Click a knot card to select it. Click again to deselect.



PRO TIP

Master these three and you'll handle 90% of situations: bowline (loop that won't slip), cleat hitch (securing to a cleat), and round turn and two half hitches (attaching to a ring or rail).

9. IALA Buoyage Reference

■ Ctrl+6

Visual guide to the IALA maritime buoyage system. Covers lateral, cardinal, isolated danger, safe water, special, and emergency wreck marks. Includes SVG buoy renderings, colour/shape descriptions, topmark details, and light characteristics.

Inputs

FIELD	DESCRIPTION
Region	IALA Region A (Europe, Africa, Asia) or Region B (Americas, Japan, Korea)
Filter	All Marks, Lateral, Cardinal, Danger, Safe Water, Special

Outputs

FIELD	DESCRIPTION
Buoy grid	Cards with SVG buoy, name, meaning, colour, shape, topmark, and light
Light characteristics table	Abbreviation, pattern, and description for each light type

Use Cases

Identify an unfamiliar buoy in the channel. Verify light characteristics at night. Study IALA differences between regions when planning a transatlantic voyage.

Common Difficulties

PROBLEM	CAUSE & SOLUTION
Buoy colours look wrong	Check you have the correct IALA region selected. Region A and B swap port/starboard colours.



PRO TIP

"Red right returning" works in Region B (Americas). In Region A, it's reversed — red marks port when entering harbour. Cardinal marks are universal and arguably the most important to learn.

10. Dead Reckoning Plotter

■ Ctrl+7

A working dead reckoning navigation tool. Log legs with course, speed, duration, and leeway. The plotter draws your running track on a canvas chart, shows your current Estimated Position (EP) with an uncertainty circle, and calculates distance made good. Integrates with the Compass and Beaufort tools.

Inputs

FIELD	DESCRIPTION
Start Lat / Lon	Starting position in decimal degrees. Negative = South/West.
Chart scale (nm/side)	Zoom level of the chart canvas
Course (°T)	True course for this leg. Can pull from Compass tool.
Speed (kts)	Speed over ground in knots
Duration (min)	Leg duration in minutes
Leeway (°)	Wind-induced leeway angle. Auto-estimated from Beaufort.
Set/drift	Current set (degrees true) and drift (knots), comma-separated

Outputs

FIELD	DESCRIPTION
EP card	Estimated Position in lat/lon with uncertainty radius
Stats grid	Legs, total NM, distance made good, total minutes
Canvas chart	Visual track with waypoints, uncertainty circle, and grid
Leg table	Detailed log of all legs with computed positions

Use Cases

Fog navigation when GPS is unavailable. Night watch position tracking. Training exercise for traditional navigation. Passage planning with manual DR legs.

Common Difficulties

PROBLEM	CAUSE & SOLUTION
Track goes off canvas	Increase the chart scale (nm/side) to zoom out.
Leeway not auto-filling	Enter a wind speed in the Beaufort tool, then click "Pull from Compass".

PROBLEM	CAUSE & SOLUTION
EP seems inaccurate	DR is inherently approximate. The uncertainty circle shows the error margin. Update frequently.

**PRO TIP**

In fog or at night, update your DR every 15 minutes. The uncertainty circle grows with time — the more often you log, the smaller the circle stays. Export the track image for your logbook.

11. Astronomical Assistant

■ Ctrl+8

Calculates sunrise, sunset, solar noon, all three twilights (civil, nautical, astronomical), moonrise, moonset, and moon phase for any date and position. Features a beautiful SVG moon rendering and a visual twilight timeline bar. Recommends the best time window for celestial star sights.

Inputs

FIELD	DESCRIPTION
Date	Any date (defaults to today)
Latitude	Decimal degrees. Negative = South.
Longitude	Decimal degrees. Negative = West.

Outputs

FIELD	DESCRIPTION
Moon SVG	Phase-accurate moon rendering with name and illumination percentage
Event grid	Sunrise, solar noon, sunset, moonrise, moonset, day length
Twilight bar	Colour-coded timeline: night, astronomical, nautical, civil, day
Star sight recommendation	Best morning and evening windows for celestial navigation

Use Cases

Plan star sights during nautical twilight. Check moon phase before a night passage. Determine daylight hours for passage timing. Identify if moonlight will affect star visibility.

Common Difficulties

PROBLEM	CAUSE & SOLUTION
Times show "--"	At extreme latitudes, the sun may not rise or set (midnight sun or polar night). This is correct.
Moon times seem off	Moonrise/set calculations are approximate (± 15 min). For precision, cross-reference a nautical almanac.



PRO TIP

The golden window for star sights is during nautical twilight — when the horizon is still visible but navigator stars are out. Morning twilight often gives better results because the atmosphere is more stable after a cool night.

12. MOB Guardian

■ Ctrl+9

Emergency man-overboard tool. One tap of the red MOB button captures time, heading, reciprocal course, magnetic bearing, Beaufort force, and wind speed from existing tools. Starts a timer, displays three recovery manoeuvre diagrams (Williamson Turn, Figure-8, Anderson Turn) with step-by-step instructions. Logs all incidents.

Inputs

FIELD	DESCRIPTION
MOB button tap	Captures all current navigation state automatically

Outputs

FIELD	DESCRIPTION
Timer	Elapsed time since MOB activation
Incident data	Time, heading, reciprocal, Beaufort, wind, magnetic bearing
Recovery manoeuvres	Three diagrams with SVG and step-by-step instructions
Incident log	Historical record of all MOB events this session

Use Cases

Immediate response when someone falls overboard. Practice MOB drills. Review incident logs after recovery.

Common Difficulties

PROBLEM	CAUSE & SOLUTION
Heading shows 0°	Set your current heading in the Compass tool before a MOB event for accurate data capture.
Wind shows F0	Enter current wind speed in the Beaufort tool for automatic capture.



PRO TIP

Practice the Williamson Turn in calm conditions until it's muscle memory. In the real moment, the Knife gives you the steps — but your hands on the helm need to already know the feel.

13. Keyboard Shortcuts

All shortcuts use Ctrl (or Cmd on macOS).

Ctrl+1	Nautical Unit Converter
Ctrl+2	Beaufort Wind Scale
Ctrl+3	Tide Pattern Visualizer
Ctrl+4	Compass Bearing Calculator
Ctrl+5	Knot Tying Guide
Ctrl+6	IALA Buoyage Reference
Ctrl+7	Dead Reckoning Plotter
Ctrl+8	Astronomical Assistant
Ctrl+9	MOB Guardian
Ctrl+S	Export full state
Ctrl+H	Open Help
Esc	Close modal

14. Troubleshooting

Nothing loads or looks broken

JavaScript must be enabled. Check your browser settings. Some corporate proxies strip scripts from local files — try opening from your desktop or home network.

My data disappeared

localStorage was cleared (browser cleanup, incognito mode, or "Clear all data" in the Files tab). Always export your state file as a backup.

Tab bar is scrolling on mobile

This is normal. Swipe left/right to see all tabs. The tab bar scrolls horizontally when the screen is narrow.

Imported file says "Wrong knife"

The state file was exported from a different knife product. Each knife validates the "knife" field in the JSON.

DR Plot canvas is blank

Switch to the DR Plot tab to trigger rendering. The canvas only draws when the panel is visible.

Astro times look wrong

Calculations use simplified astronomical algorithms. They are typically accurate to ± 2 minutes for sun events and ± 15 minutes for moon events. For precision navigation, cross-reference a nautical almanac.

MOB button does nothing extra on second tap

If MOB is already active, tapping the button again switches to the MOB tab. End the current incident before starting a new one.

15. Accuracy & Limitations

The Sailor's Knife uses standard mathematical formulae and reference data. Here is a summary of what you can expect from each tool.

TOOL	TYPICAL ACCURACY	NOTES
Unit Converter	Exact	Standard conversion factors. Rounding display only.
Beaufort Scale	Exact reference	Official WMO Beaufort scale values.
Tide Visualizer	Illustrative	Simplified sinusoidal model. Not a tide prediction.
Compass Bearing	Exact formula	Accuracy depends on your variation/deviation inputs.
Knot Guide	Reference only	Practice with real rope for proficiency.
IALA Buoys	Authoritative reference	Based on IALA Maritime Buoyage System standards.
DR Plot	Approximate	DR is inherently approximate. Uncertainty grows with time/distance.
Astro (Sun)	±2 min	Meeus simplified algorithms. Refraction-corrected.
Astro (Moon)	±15 min	Simplified lunar model. Phase accuracy is good; times are approximate.
MOB Guardian	Depends on inputs	Captures whatever is in Compass/Beaufort. Only as accurate as your tool state.



DISCLAIMER

This tool is for education, reference, and passage planning support. It is not a substitute for official nautical charts, tide tables, almanacs, or certified navigation equipment. Do not rely on it as your sole source of navigation data at sea. Always carry proper charts and publications.

16. Glossary

Bearing	Direction measured in degrees (0–360°) from a reference point. True bearing is from true north; magnetic bearing from magnetic north; compass bearing from the vessel's compass.
Beaufort Scale	A 13-level scale (0–12) for classifying wind speed by observed sea conditions, developed by Admiral Beaufort in 1805.
Cable	A unit of distance equal to one-tenth of a nautical mile (185.2 metres / 608 feet).
Cardinal Mark	An IALA buoy that indicates the direction of safe water relative to a danger. Named for compass quadrants: North, East, South, West.
Dead Reckoning (DR)	Estimating current position by advancing a known position using course, speed, and time. Does not account for external forces unless leeway and drift are applied.
Deviation	The error in a magnetic compass caused by the vessel's own magnetic field. Varies by heading and is recorded on a deviation card.
Estimated Position (EP)	A DR position that has been adjusted for estimated leeway and/or current set and drift.
Fathom	A unit of depth equal to 6 feet (1.829 metres). Historically the span of outstretched arms.
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities. Defines the global maritime buoyage system in Regions A and B.
Knot	A unit of speed equal to one nautical mile per hour (1.852 km/h). Not a unit of distance.
Lateral Mark	An IALA buoy marking the port or starboard side of a navigation channel.
Leeway	The sideways drift of a vessel caused by wind, measured as the angle between the heading and the actual track through the water.
Magnetic Variation	The angular difference between true north and magnetic north at a given location. Changes with position and over time. Found on nautical charts.
Man Overboard (MOB)	Emergency situation where a person has fallen into the water from a vessel.
Nautical Mile	A unit of distance equal to one minute of latitude (1,852 metres / 6,076 feet / 1.151 statute miles).

Nautical Twilight	The period when the sun is between 6° and 12° below the horizon. The horizon is still visible, and navigator stars are bright enough for celestial sights.
Reciprocal Course	The opposite direction, 180° from the current course. Used in MOB recovery manoeuvres.
Rule of Twelfths	An approximation for tidal rise/fall per hour: 1/12, 2/12, 3/12, 3/12, 2/12, 1/12 of the total range across six hours.
Set and Drift	Set is the direction a current flows toward (in degrees true). Drift is the speed of the current (in knots).
Williamson Turn	A MOB recovery manoeuvre: turn hard toward the side the person fell, then reverse helm at 60° off course, and steady on the reciprocal heading to retrace the track line.

THE SAILOR'S KNIFE

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Fair winds.

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