

Electronic Charting 2023

“What electronic navigation tools should I be using to navigate with as I go further offshore?”

Or.. How to stay off the Rocks



Sherry & Dave McCampbell
www.SVSoggyPaws.com



Recognition/Thanks

- **OpenCPN development team**
- **Paul Higgins-** Sat2Chart chart maker program
- **Terry Sargent-** SV Valhalla
- **Bruce Balan-** SV Migration
- **Jon Hacking-** SV Ocelot
- **Sherry McCampbell-** SV Soggy Paws
- And its all still FREE!
- This presentation on our website:
svsoggypaws.com/Presentations/Navigation
- See 'Using Satellite Charts with OpenCPN'

Avanti, Beveridge Reef, Aug 2017



“I had no idea the reef was there. I knew we’d hit something and were taking on water. We were ready to abandon ship.”

Robbie Cooper, s/v Avanti, Beveridge Reef, September 2017

Chart Zooms / Avanti Wreck

From sv Golden Glow on Noonsite

“Beveridge Reef appears on our Furuno Chart, but only when it’s zoomed in to a map size of 35 nm across the screen (at 40 nm size it’s NOT visible).

Navionics and iNavx apps DO show Beveridge Reef, but our Earthmate (Garmin) app, the map for our Delorme explorer device, does NOT show the reef.”

Vestas Wind
Cargado Shoals,
Indian Ocean
2014



“Team Vestas Wind’s grounding on the Cargados Carajos Shoals comes down to a basic failure in overall passage planning, and an over-reliance on electronic navigation.”

Tanda Malaika
Huahine
2017

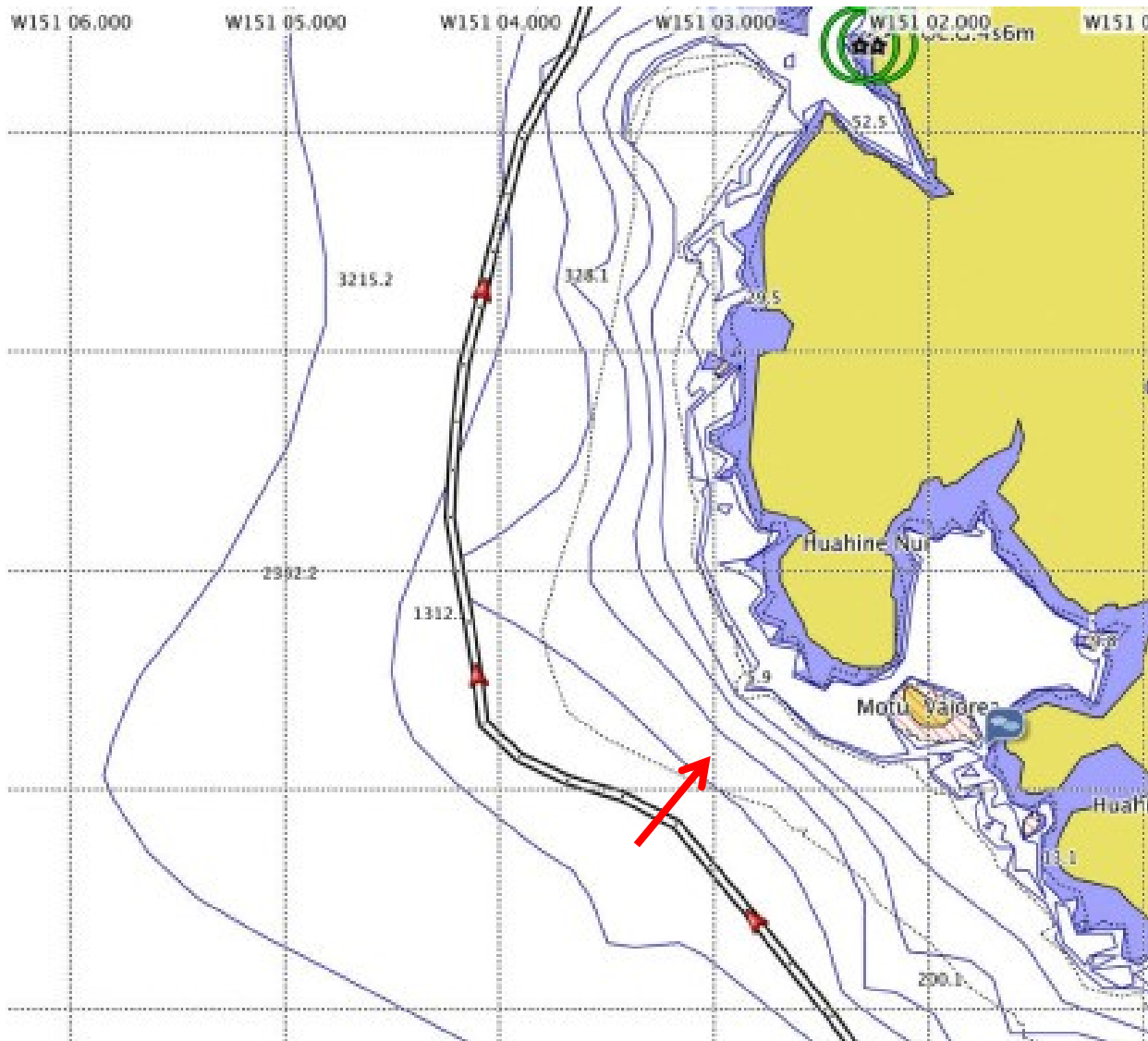


*“When they asked us what happened and we told them that our **chart did not show reef, they asked us if we had been using Navionics charts, and I said yes.** He then shook his head and said that at least five boats end up on those reefs a year who were using Navionics charts.”*



On the rocks, NW Australia, June 2016

Moonshadow's Close Call



“We had plotted a route that kept us outside the 300-foot depth contours”

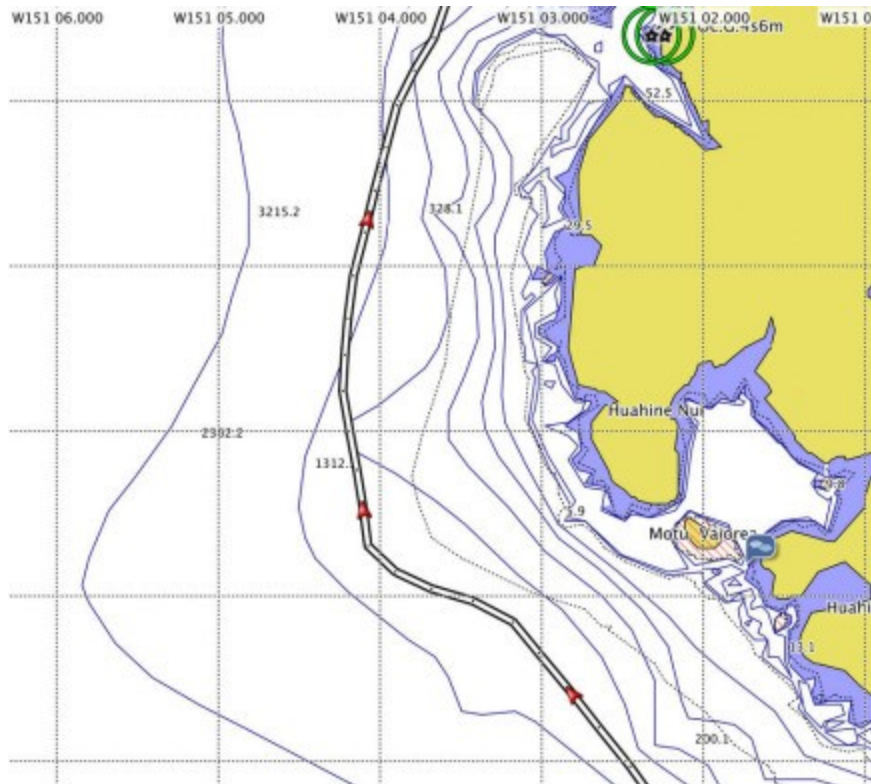
Moonshadow's Close Call



“We looked up, and to our horror found that we were only about 900 feet from the surf!

Had it been nighttime, we almost certainly would have ended up in that surf”

Side-by-Side Comparison



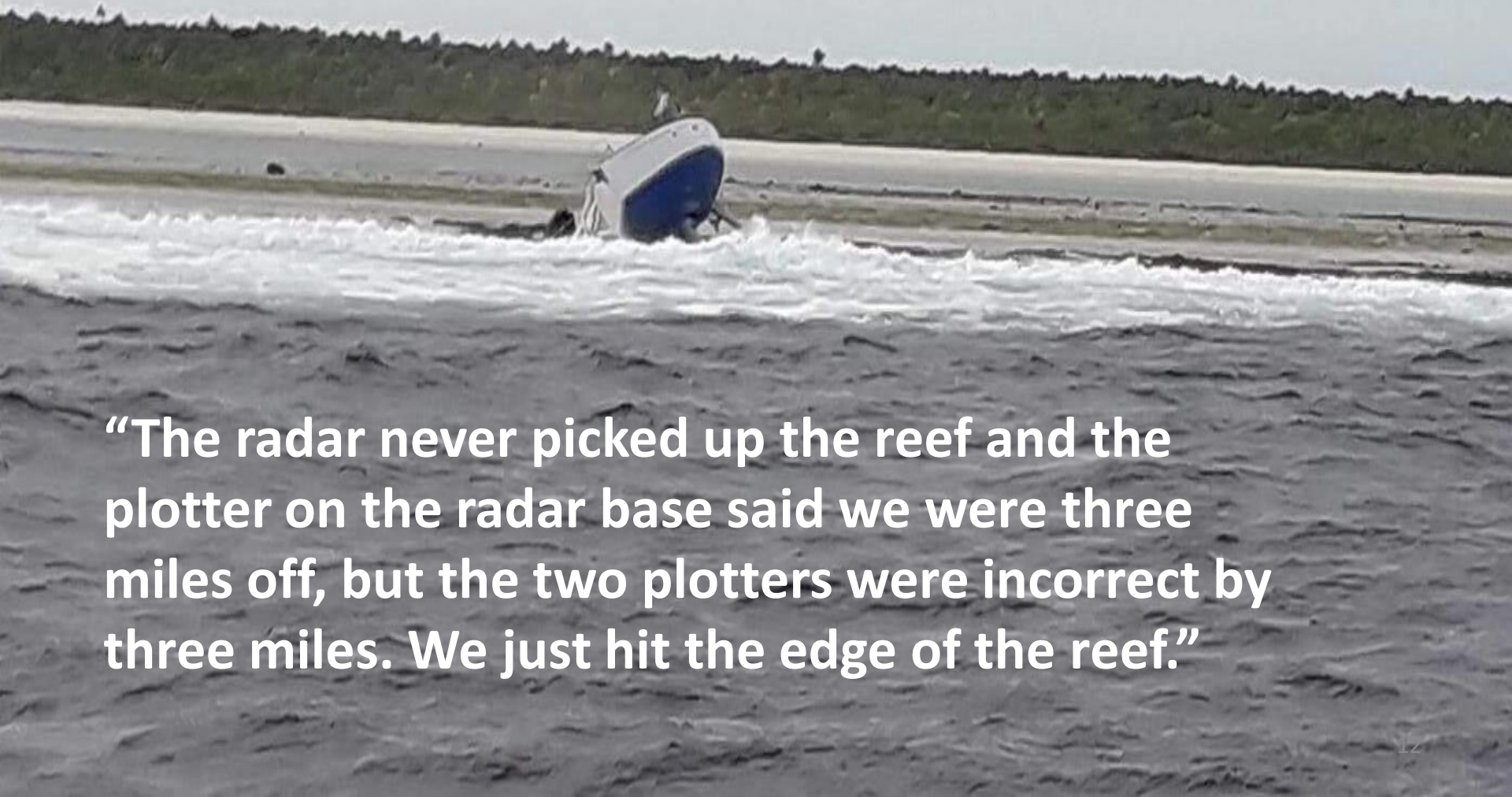
USS Guardian MSO Tubataha Reef 2010



The coastal scale electronic chart supplied to USS *Guardian* was flawed due to human error on the part of the NGA. This error **mis-located the Tubbataha Reef by 7.8 nautical miles** from its actual location. NGA was aware of this error in 2011 and updated a smaller scale electronic chart, but failed to publish a correction for the larger scale chart that the USS *Guardian* was using when she ran aground.

Southern Fiji, June 2017

60 ft Oyster with Crew of 4, at night



“The radar never picked up the reef and the plotter on the radar base said we were three miles off, but the two plotters were incorrect by three miles. We just hit the edge of the reef.”

Things to Think About

- Be suspicious of your charts
- Why not to use your iPad / Android tablet as your only navigation tool
- Why not to use your chartplotter as your only navigation tool
- Paper vs Raster vs Vector vs Satellite Charts
- Validating the accuracy for the next stop
- Navigating at night
- Introducing the power of GE2KAP
- Introducing the power of OpenCPN

Note: All tools and resources referenced in this presentation are linked on the reference pages at the end.

Paper Charts

- Satisfyingly “there” feel
- Only as good as the survey they are based on
- A pain in the ass to keep updated
- Bulky, expensive, hard to acquire
- Hard to store large quantities
- They can blow away, they can get wet
- But islands don’t disappear!

Electronic Raster Charts

- **Essentially a scanned paper chart**
- All paper chart info is retained
- Easiest to adjust to using (if you are familiar with paper charts)
- Take up **MUCH more electronic storage space** (vs Vector charts)
 - 24 CD's to cover the world, partially
- Everything zooms at the same rate

Raster vs Vector



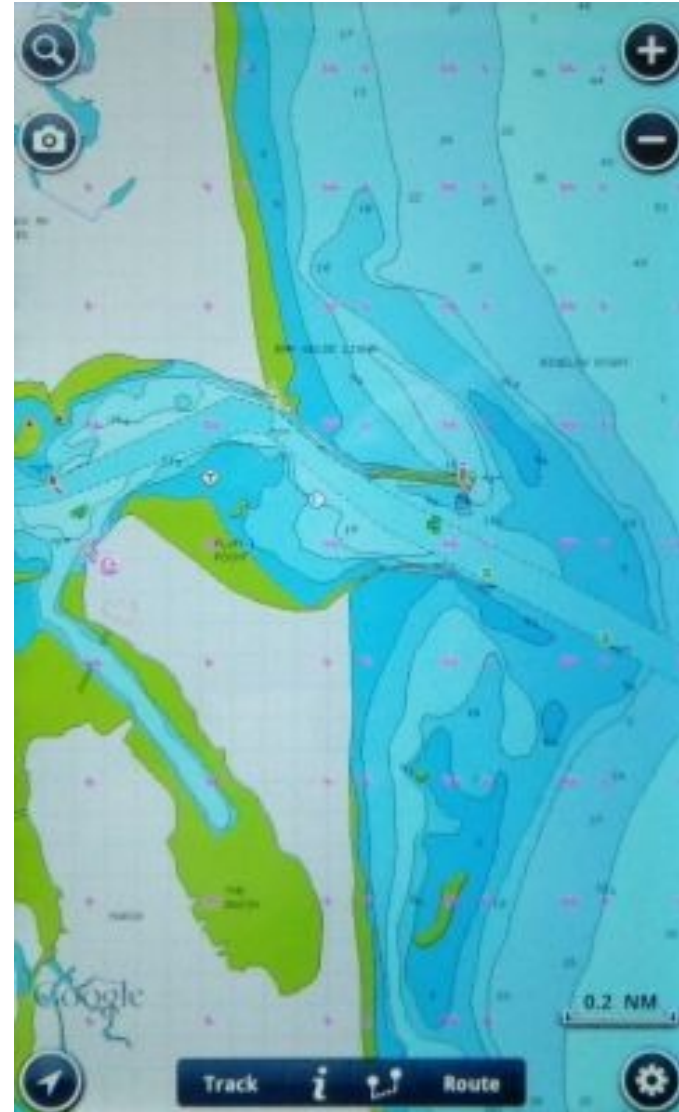
Electronic Vector Charts

- Vector charts have been drawn from paper charts by *someone*
- Are only as accurate as the underlying chart they were made from
- Take up SIGNIFICANTLY less space on electronic storage
 - The Whole World in one folder
- Contain lines, “objects”, and “data”

Electronic Vector Charts

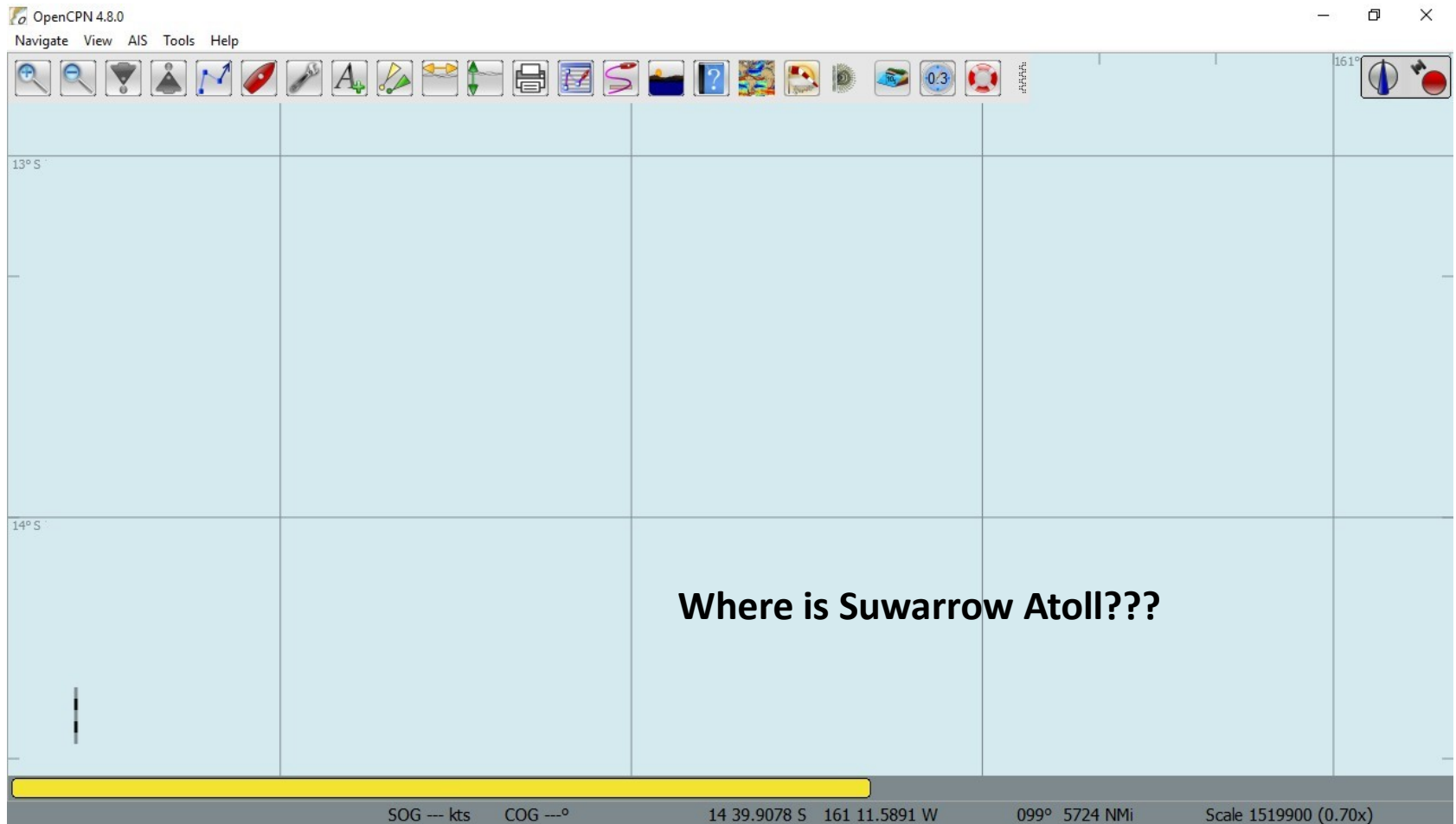
- Most chart plotters are using vector charts
- Most tablet/phone apps are using vector charts
- Take a significantly smarter program to display and use
- Very powerful if used correctly
- Sometimes confusing to use and/or set up (flexibility = complexity)

Raster vs Vector



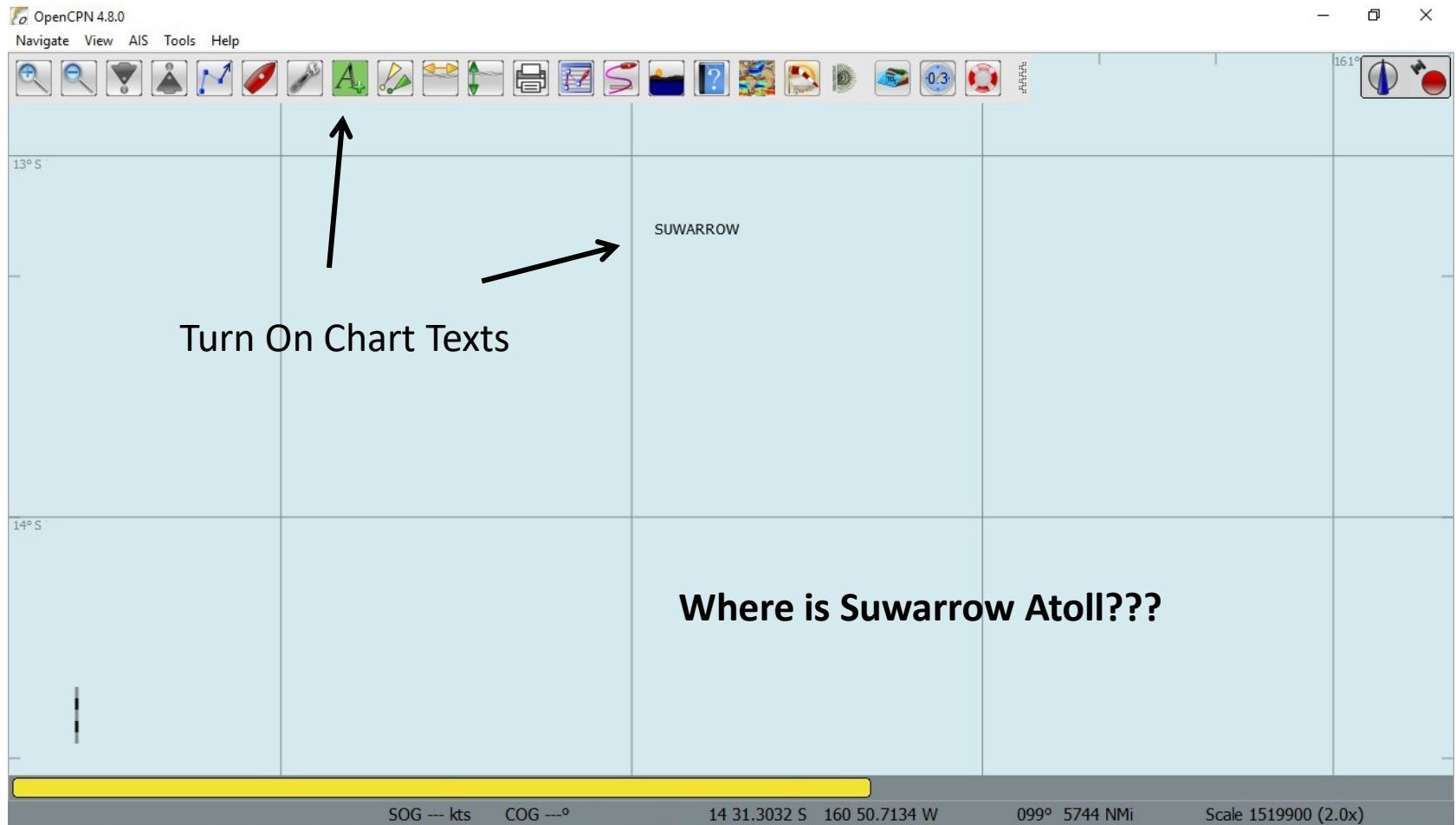
Problems with Vector Charts

The Disappearing Island – Chart Zooms



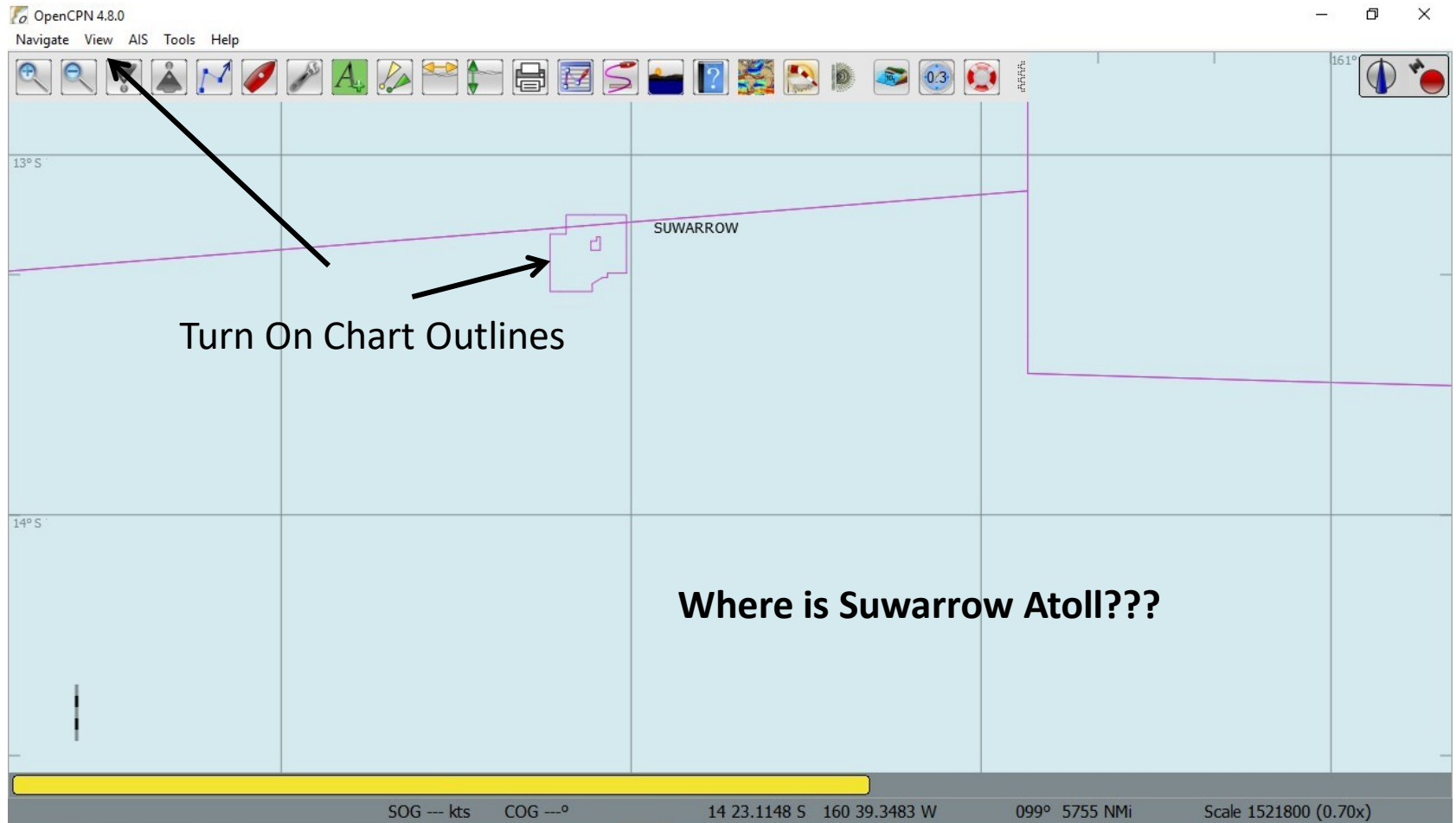
Problems with Vector Charts

The Disappearing Island – Chart Zooms



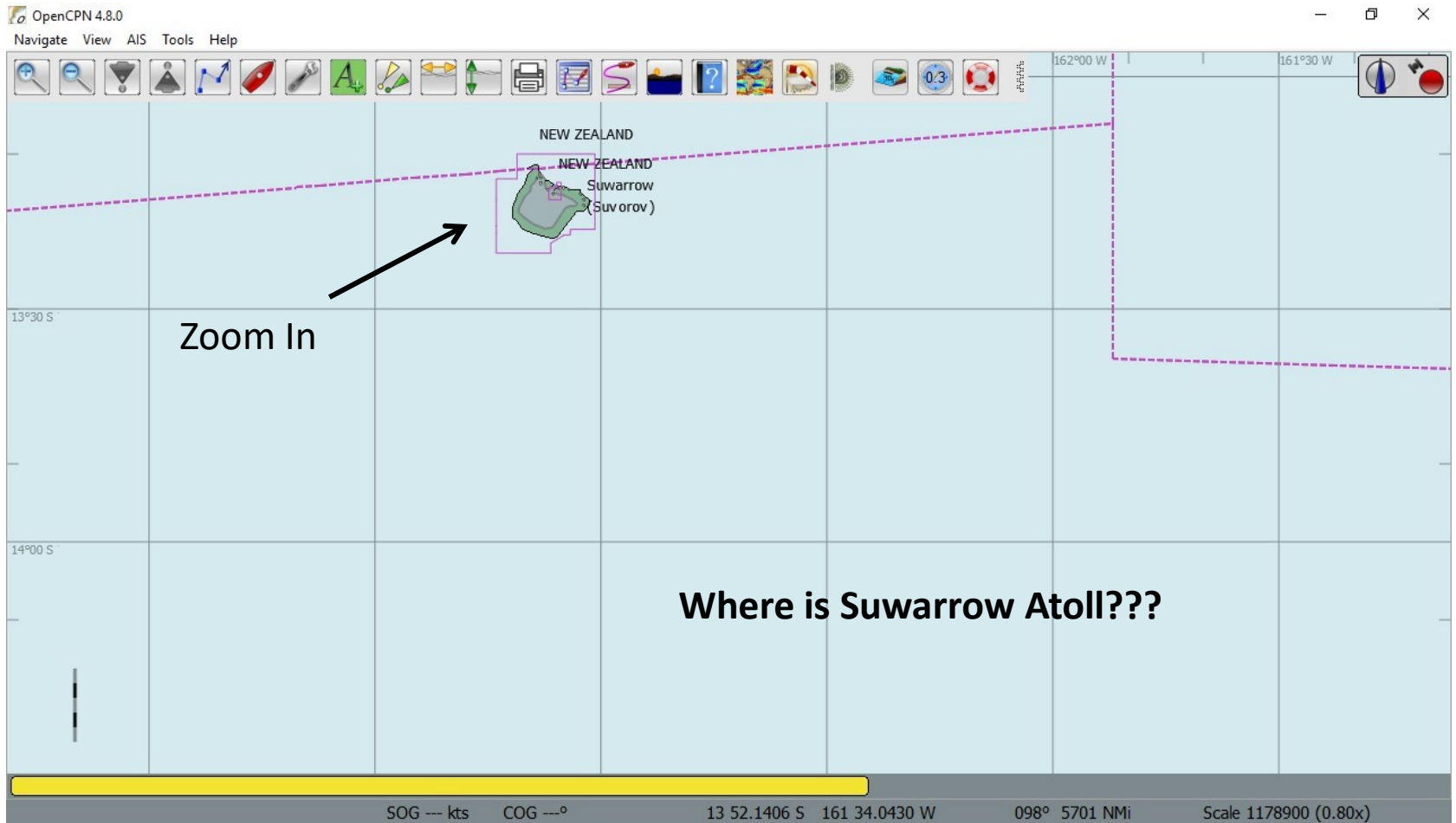
Problems with Vector Charts

The Disappearing Island – Chart Zooms

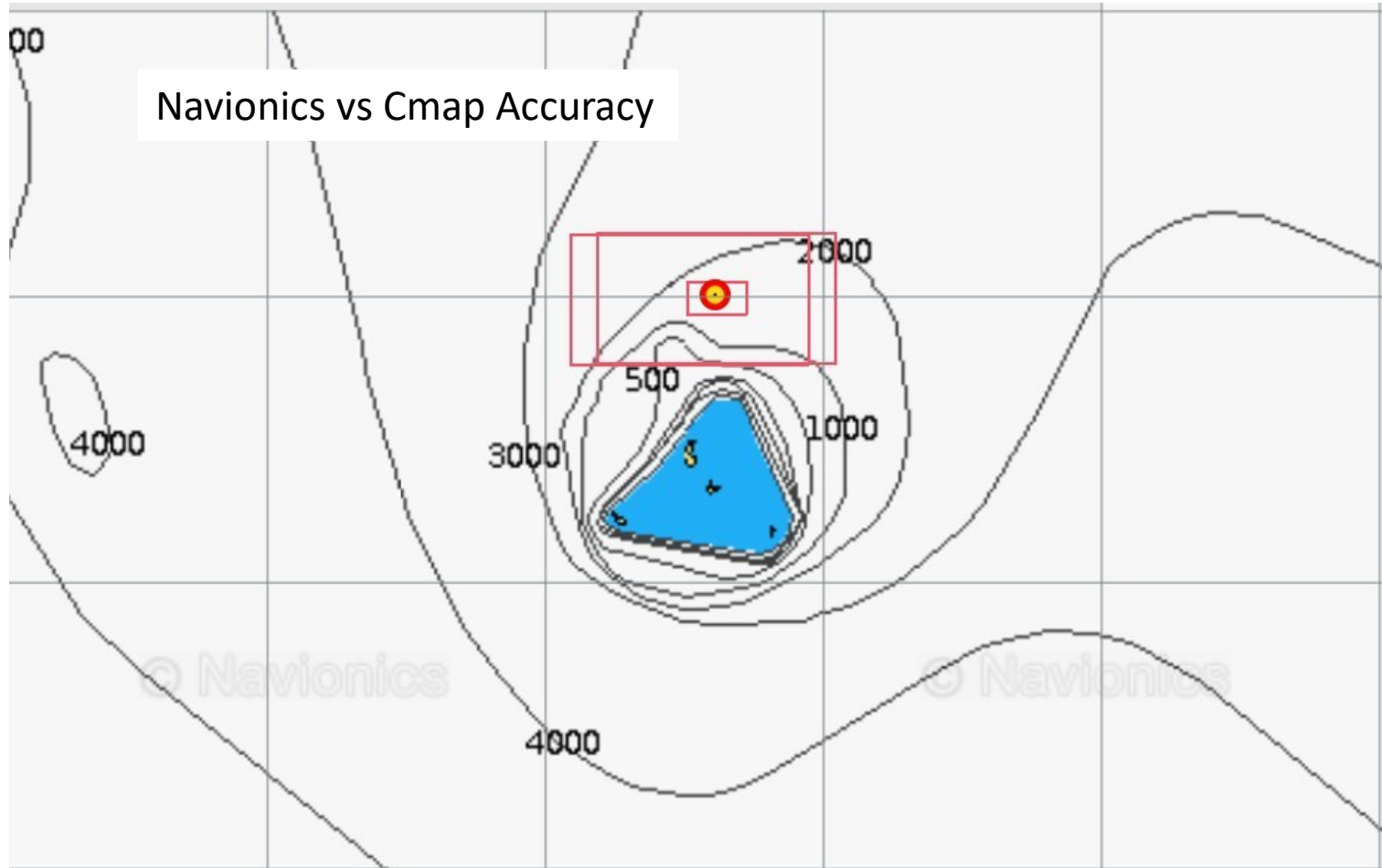


Problems with Vector Charts

The Disappearing Island – Chart Zooms



Suwarrow Atoll- The disappearing island is also misplaced.



The Disappearing Island-

is it really misplaced?



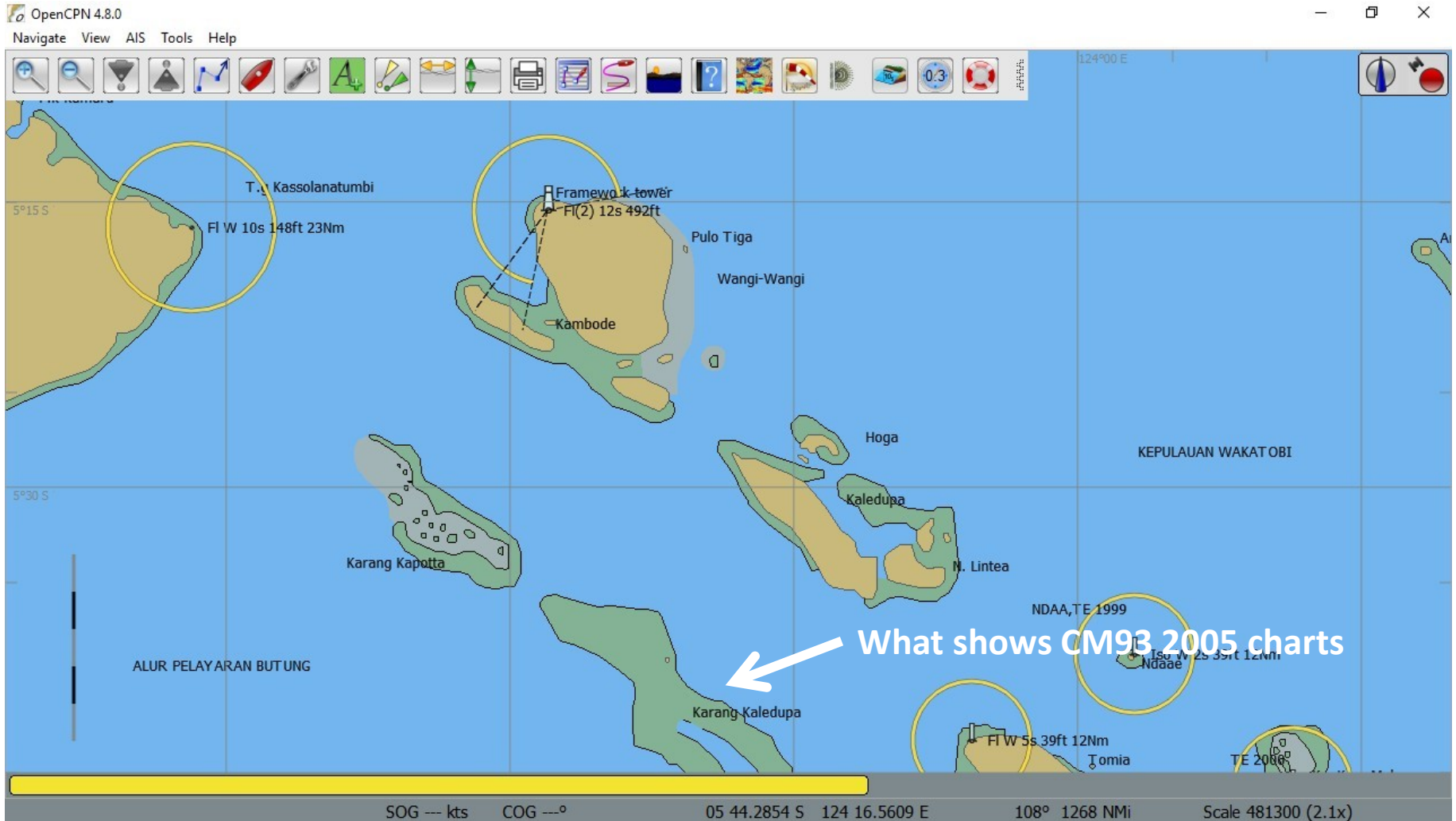
The Disappearing Reef

Sat Chart Version



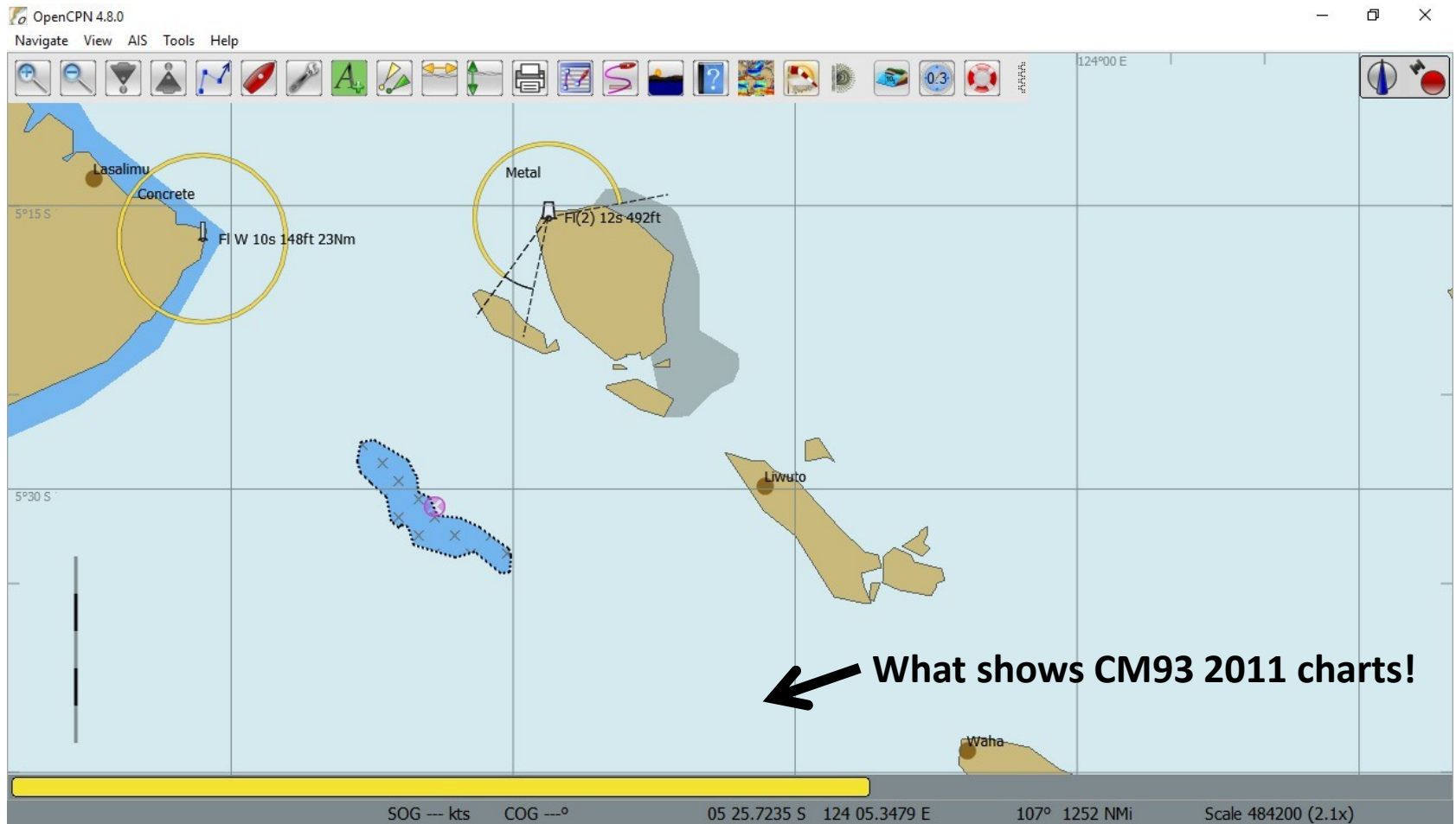
The Disappearing Reef

Chart Versions



The Disappearing Reef

Chart Versions



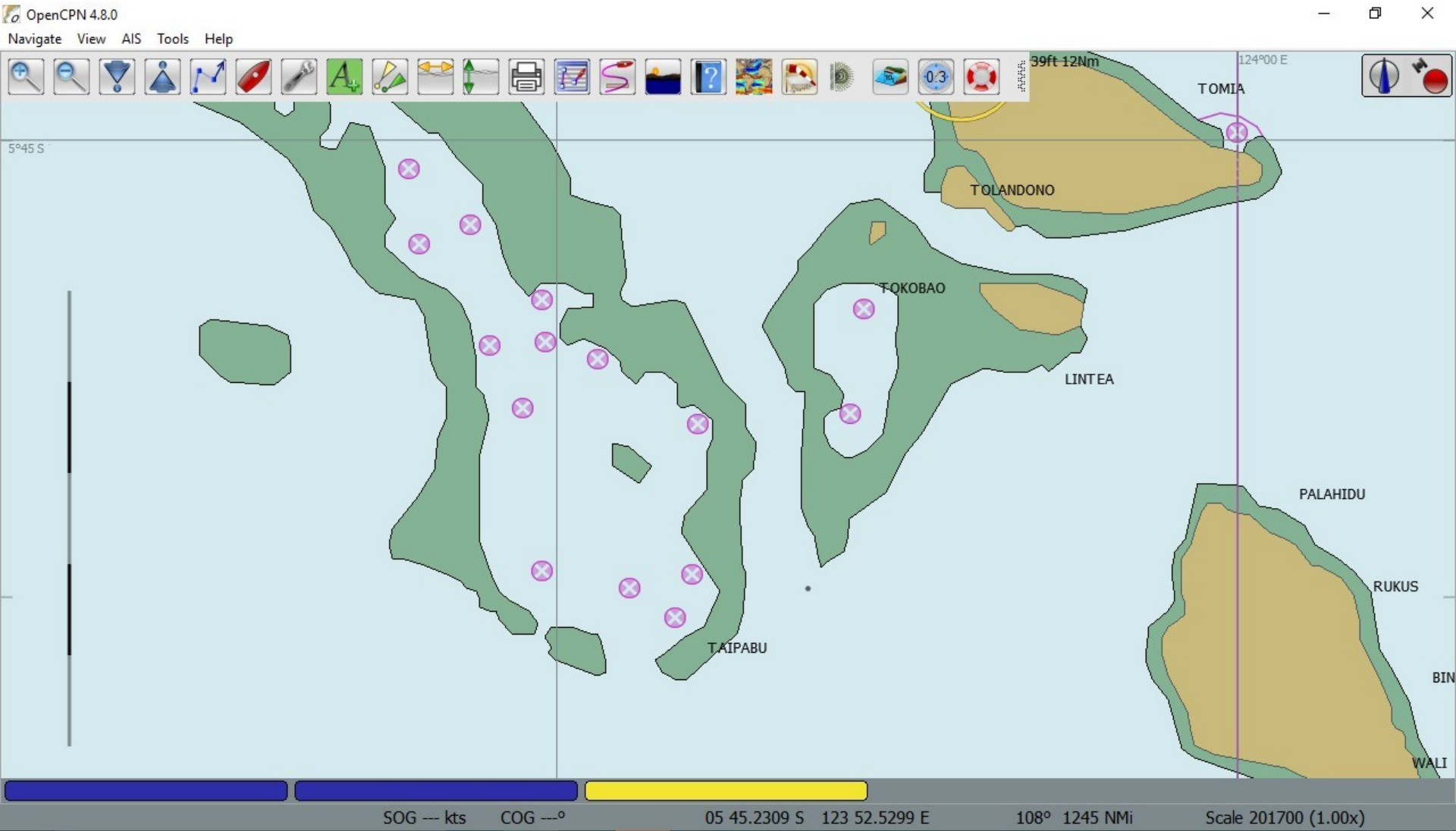
Some Sources of Vector Charts

- Your local country's chart purveyor
 - Sometimes free, sometimes not
- CM93 v2 (stopped updating in 2010/2011)
- CM93 v3 Cmap / Time Zero (Furuno)
- Garmin (\$250-\$350 per region)
- Navionics
- Raymarine
- Other Cruisers
- The Apple Store!

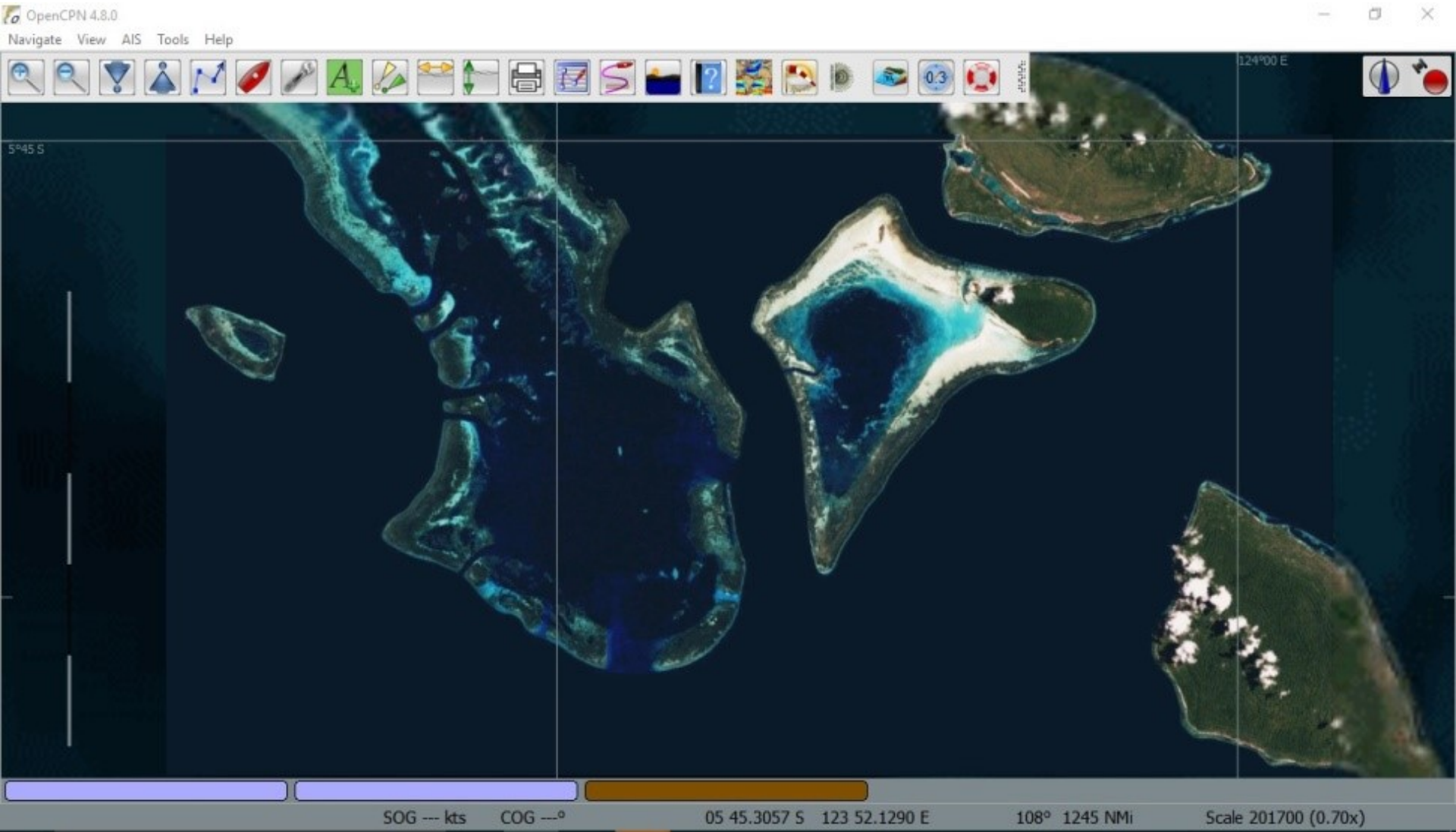
What Can Run Satellite Charts

- GoogleEarth (Windows only)
- SAS Planet (Windows only)
- Ovital Maps (Tablet only)
- OpenCPN & GE2KAP Charts (Windows, Linux, Apple Mac, Android (tablet & phone),
- **Sorry, not iPad or iPhone**
- Some chartplotter chart sets
 - Garmin G2 Vision (but poor resolution)

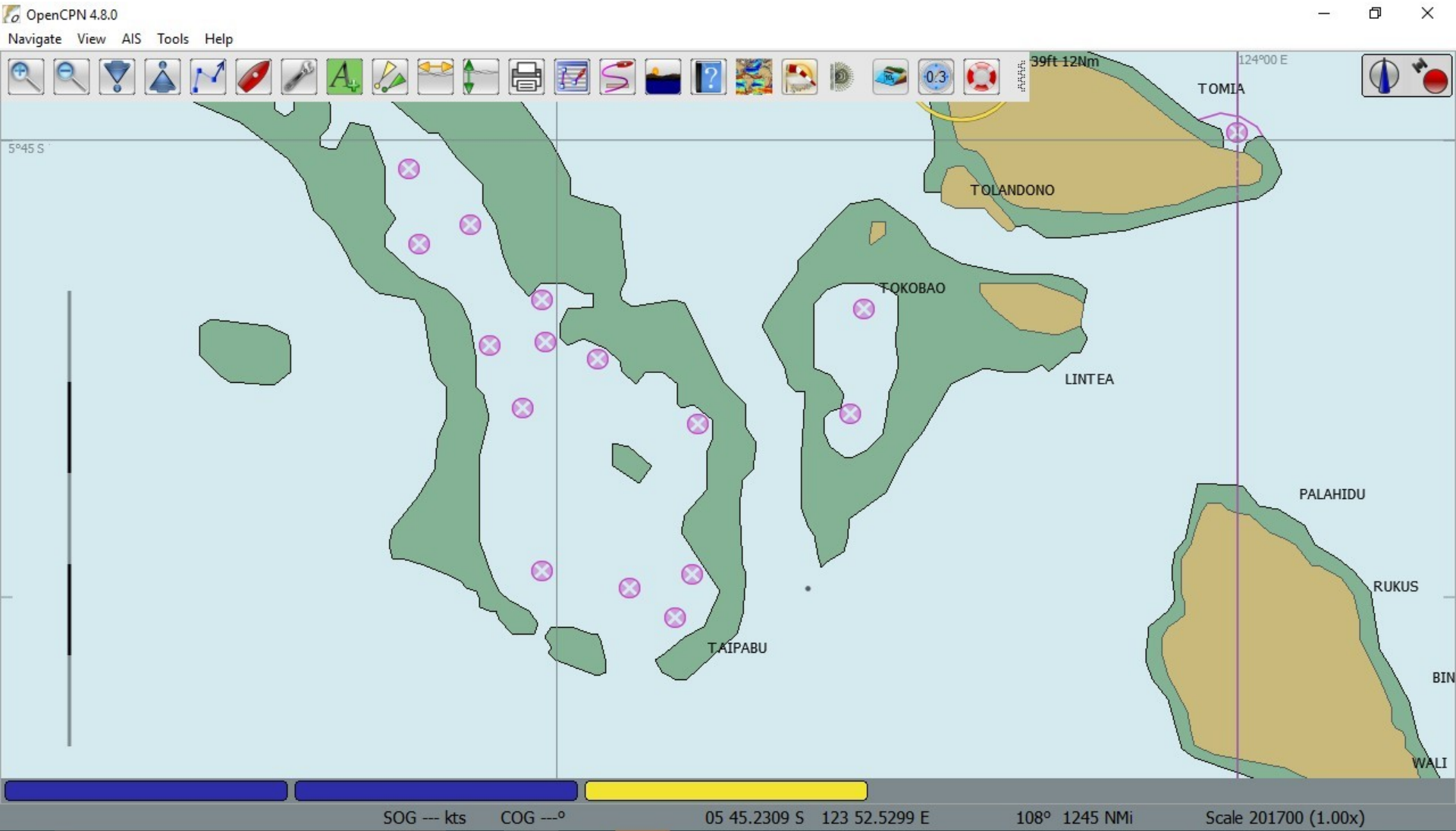
Which Would You Choose?



Which Would You Choose?



Which Would You Choose?



Using Satellite Image Programs Directly

- GoogleEarth
 - You are not in control of the chart-saving
 - Not made for navigation
 - Integrating other navigation information
 - You MUST download
- SASPlanet
 - Can control what is saved
 - Possible to populate from other's saved data
 - Not as user friendly
- Is chart there or not???

Benefits of Making Satellite Charts Before Getting Underway

- You know absolutely what you have charted
- You can share your charts with others
- You know who made it and how well it is done

GoogleEarth vs SAS Planet

- GoogleEarth
 - Easier to use but less flexibility
 - Updates may cause problems
 - Limited to JUST Google imagery
 - Infinite / specific altitude settings
 - Many layers and overlay capabilities
- SAS Planet
 - High flexibility
 - Multiple imagery sources
 - User interface is quirky
- For best imagery check both when making charts

Sat2Chart & OpenCPN Tutorials

- Terry (Valhalla)
 - Sherry (Soggy Paws)
 - Jon (Ocelot)
 - Bruce (Migration?)
-
- Also embedded in Sat2Chart and on OpenCPN

Sources of Pre-Made GoogleEarth Charts

- Mike on Zen Again (world?)
- Terry on Valhalla (SE Asia, W Pac, IO)
- Sherry on Soggy Paws (Fr Poly to SE Asia)
- Jon on Ocelot (SE Asia)
- Bruce on Migration (Carib & Pacific)
- Rally Groups (Puddle Jumpers)
- Other Cruisers' hard drive swap
- Best to download big collections in person via hard drive

Sources of Satellite Charts

<u>Migration's ChartLocker</u>	Mexico, all the Pacific Islands, the Dominican Republic, Panama, Australia mbtiles 2021/2023
<u>Ocelot's mbtiles Charts</u>	SE Asia, Western Pacific, and Indian Ocean 2021/2022
<u>Zen Again's Charts</u>	Pacific Ocean, SE Asia, Crossing to S Africa, S Atlantic, Brazil
<u>Valhalla's Charts</u>	SE Asia, Indian Ocean, and Western Pacific And CM93 v2 Download for OpenCPN. Downloadable anchorage waypoints in GPX format. Mbtiles
<u>Jacaranda's Charts</u>	French Polynesia
<u>Soggy Paws' Charts</u>	Red Sea (Complete), Philippines (Partial), Papua New Guinea, Solomon Islands, Micronesia, Marshall Islands, Fiji, French Polynesia

Links to all these sources can be found on

<https://svsoggypaws.com/SatCharts/>

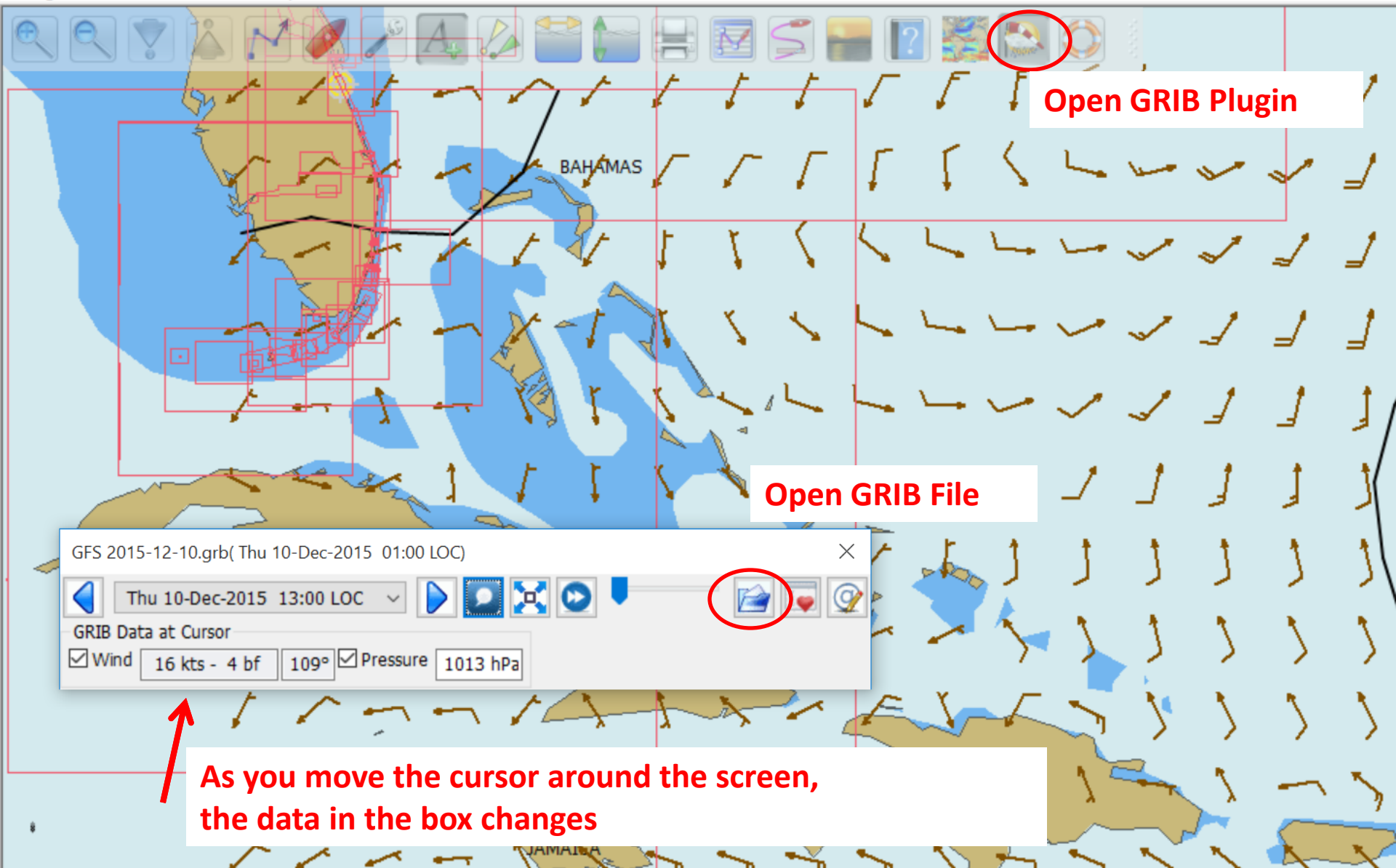
Choosing a Charting Program

- Are you held captive??
- Chartplotters = captive, expensive, ruggedized
- Time Zero (ex Nobeltec) = captive, expensive
- Most tablet apps = captive, cheap
- OpenCPN = OPEN!, free!

Benefits of OpenCPN

- **Free, free, free**
- Runs on almost everything (exc iPad ☹️)
- Supports many chart formats
- Great for sharing tracks and waypoints (gpx)
- Permits adjustment to CM93 v2 Charts
- Good website and extensive help
- Many, many Plug-ins to add functionality

GRIB Plugin



Open GRIB Plugin

Open GRIB File

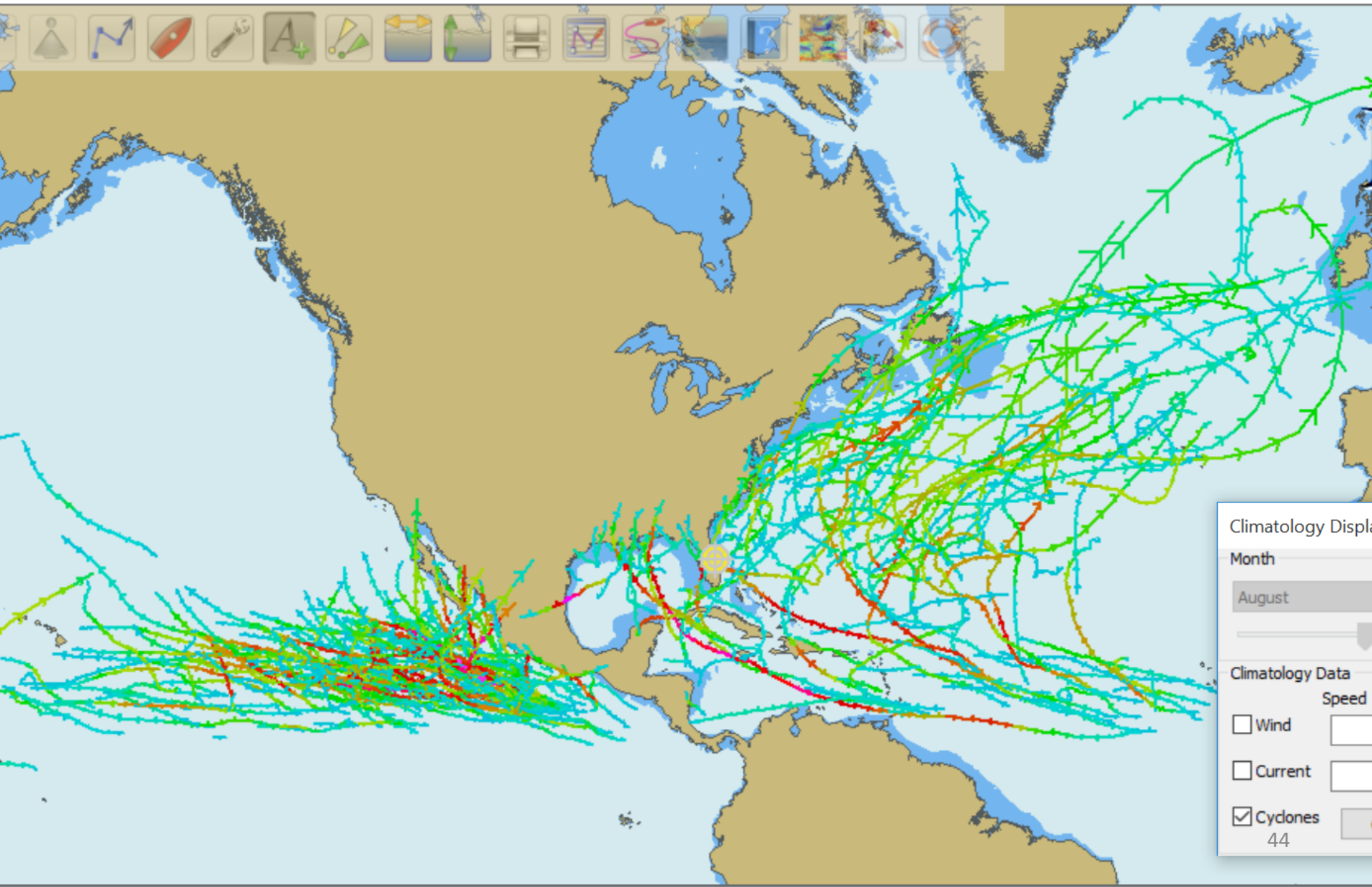
As you move the cursor around the screen, the data in the box changes

Climatology Plugin

- Pilot charts overlaid on your chart
- Updated with fairly recent data
- Wind, currents, and tropical storm tracks
- Traditional wind rose display, or wind barbs

“Climatology data is generally averaged since the 1980's depending on data type and sources available (for example, Wind data is averaged 6 hr data since 1987)”

Where is a Safe Place to Be In August?



More OpenCPN Plugins

- Radar overlay (Garmin & Navico)
- Weather Routing
- Create your Polar file
- Voyage Data Recorder
- Stowage Manager
- Logbook Function
- NMEA Instrument Display
- Squidio – Alternative to Active Captain

Accuracy of GPS

- Understand the limitation of your GPS
- Time to acquire fix varies widely
 - How many receivers it has (8,12,48 channels)
 - How long since last use
 - How far away from last use
 - Signals blocked (cabin, trees, buildings)
 - Newer devices can perform significantly better

Entering a new Area?

How to Check Your Chart

- Accuracy
 - Plot a known set of waypoints
 - GPX / Friend you trust / Satellite / Guidebook
- Detail
 - Check vs other sources
- Plot route and check at low level
- If you change your route, check your NEW route at low level

Entering a new Area?

What Charts to Use?

- ASK “what are the best charts for...”
- Make sure you validate
 - Chartplotter, tablet, or computer
 - What “generation” of chart
- Ask people who “go places”
- Harbor charts for busy ports are almost always accurate everywhere
- The further off the beaten path, the more likely the charts will be inaccurate

The Bottom Line

- Know the true accuracy of your GPS device
- Plot a detailed route and examine for anomalies
- If your route changes, examine it again
- Don't sail around reefs at night
- Use all the tools available
 - Paper charts
 - Electronic charts from several sources
 - GoogleEarth & other satellite charts
 - Other cruiser's tracks and waypoints
 - Cruising guides



The End
www.SVSoggyPaws.com



The End

<http://svsoggypaws.com>