

# Navigation and the tools that help

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# What we're going to talk about

## ▶ Navigation

- ▶ Tactical nav vs 'normal' navigation
  - ▶ briefly touch on what goes into 'tactical navigation'
- ▶ Software and apps available for both

## ▶ Instruments and hardware

- ▶ Keeping old instrument systems smart, by being able to output data via wifi
- ▶ Using new instrument systems for their data

## ▶ Weather and the weather apps available

# Navigation

- ‘Normal’ Navigation:
- Getting from A to B
- In and out of ports
- Around sandbanks
  - Apps?
    - Navionics
    - iNavX
    - Marine Traffic
    - Garmin’s BlueChart Mobile

- ▶ Tactical Navigation:
- ▶ Time to the line
- ▶ Leg splits
- ▶ Next leg info
- ▶ Weather trends
  - ▶ Apps?
    - ▶ Expedition/Adrena/Deckman (expensive)
    - ▶ iRegatta
    - ▶ SailRacer.net

# Tactical Navigation

- ▶ Is not an exact science (yet)
- ▶ Requires well calibrated instruments
  - ▶ Hours of sailing in various conditions
- ▶ Is so much more than knowing the position of the next mark
  - ▶ TWA on next leg, expected sail combination, splits per tack, heading (and course to steer) to the next mark, obstructions in the way, etc.
- ▶ Tactician/strategist and navigator have a very close relationship
  - ▶ Navigator provides 'big picture' information to the tactician. Tactician still makes the calls on where to position the boat on the race course, especially in boat-on-boat situations
- ▶ Software is normally quite pricey
  - ▶ Deckman: £1300, Expedition: \$1250, Adrena: from \$1500
- ▶ Is a full time job on board
- ▶ Starts days before the regatta, ends days after!
  - ▶ Hours of prep before race day. Data analysis in the days after!

# Tactical Nav - the software and hardware

- ▶ For Windows pcs
  - ▶ Expedition
  - ▶ Adrena
  - ▶ Deckman for Windows
    - ▶ All three do very similar tasks.
    - ▶ Expedition and Adrena constantly updated and upgraded by team of developers
    - ▶ Deckman hasn't received an update in years, is very fiddly, but is by far the most customizable and powerful program available.
    - ▶ All connect directly to your instrument system, interpret and use the data
    - ▶ Have the ability to log and analyse data
    - ▶ Far more complex (however, more powerful) than smartphone apps

# Software - continued

## ▶ For phones/tablets

### ▶ iRegatta

### ▶ SailRacer.net

- ▶ Both are similar and considered the best tactical navigation apps available
- ▶ Offer similar features to that of the PC applications, however, less customizable and far less flexible.
- ▶ Ability to import polar files - important
- ▶ SailRace has the ability to log data, which is saved as a csv for your own analysis.
- ▶ Both have startline functionality - time to line, time to burn, favored end etc.
- ▶ SailRacer charts not yet available for RSA

# 'Normal' navigation - apps

## ▶ Navionics

- ▶ Probably the best mobile charting tool available.
- ▶ Charts are available for purchase (relatively inexpensive -R600 for Africa)
- ▶ Uses onboard GPS for positioning - no external data source required

## ▶ iNavx

- ▶ Doesn't come bundled with charts - additional purchase
- ▶ Connects to your instrument data via wifi (nmea to wifi multiplexer)
- ▶ Works as a mobile chartplotter - all data displayed. Can add waypoints and routes

## ▶ Marine Traffic - AIS app

- ▶ Reports known AIS locations of all vessels transmitting (with some limitations)

## ▶ Garmin Bluechart mobile

- ▶ Allows planning, waypoints, courses etc to be done at home from a tablet. Info wirelessly pushed to on-board plotter when on boat.
- ▶ Only works with Garmin, further, only works with certain models.

# Instruments

- ▶ How do you get your data out of your instruments and into your tablet?
- ▶ Multiplexers are available in various shapes, sizes and prices. All with their own pros and cons.
- ▶ ShipModul, TeamSurv -NMEA Tools, Digital Yacht, etc.
- ▶ The TeamSurv multiplexer is a new player - its substantially cheaper than the competition. [www.nmeatools.com](http://www.nmeatools.com)



# Using new instrument systems

- ▶ Most of the big Instrument manufacturers have wifi output built in
  - ▶ Raymarine - brilliant for the club racer
  - ▶ B&G - Pricey, but making great strides towards being simpler
  - ▶ Garmin - solid player, works well within it's ecosystem. Can integrate with the new 'Garmin Quatix'
- ▶ These companies all have their own apps available that have various features
  - ▶ Raymarine - viewer and controller
  - ▶ B&G - viewer and controller
  - ▶ Garmin - viewer and controller as well as watches with dedicated applications
- ▶ Remember, wired connections are always more reliable...

# Weather and apps

- ▶ There are millions of weather apps!
- ▶ All use the same underlying data (mostly)
- ▶ All interpret it differently, using different variables
- ▶ I've found PredictWind to be the most accurate (note pricey)
  - ▶ 1km resolution model is incredible!
  - ▶ Comparison of 2 models next to each other is very useful!
  - ▶ Dedicated 'offshore' app for tablets, designed for use over low-bandwidth networks.
- ▶ App examples: PredictWind, Windguru, WindFinder, Windyty, BuoyWeather, TideTrac

# Example

## Windguru

Init: 18.07.2017 12 UTC	Tu 18. 14h	Tu 18. 17h	Tu 18. 20h	We 19. 05h	We 19. 08h	We 19. 11h	We 19. 14h	We 19. 17h	We 19. 20h
Wind speed (knots)	5	4	5	4	5	9	10	7	6
Wind gusts (knots)	6	5	6	6	7	11	13	11	9
Wind direction	↘	↘	↘	↘	↘	↘	↘	↘	↘
Wave (m)	4.9	5.1	5.2	4.6	4.4	4.2	4.1	4	4.1
Wave period (s)	14	14	15	15	15	15	14	14	14
Wave direction	↗	↗	↗	↗	↗	↗	↗	↗	↗
*Temperature (°C)	14	14	11	10	11	14	15	14	13
Cloud cover (%) high / mid / low	-	-	-	-	-	-	-	-	-
*Precip. (mm/3h)	-	88	66	-	-	-	18	97	98
Windguru rating	-	-	-	-	-	-	-	-	0.4

## Predict Wind

Day	Wed 19																								
Local Time	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Speed (Knots)	PWG	8	9	6	4	8	9	11	10	12	13	15	17	17	15	16	16	16	15	17	15	18	15	12	12
	PWE	3	1	1	6	7	8	9	11	10	12	15	18	19	15	16	16	15	16	19	15	15	15	14	11
	ECMWF	6	6	7	7	7	7	7	7	10	10	10	12	12	12	12	12	12	13	13	13	11	11	11	10
Direction (True)	PWG	W	W	W	W	NW	NW	NW	NW	N	N	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	W	W
	PWE	SW	N	W	NW	NW	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	W	NW	NW	NW	NW	W
	ECMWF	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	NW	NW	NW	NW	NW	NW	NW	NW	W
Gust (Knots)	PWG	12	13	11	9	11	12	13	13	14	16	18	19	20	19	18	20	21	21	22	20	21	19	19	18
	PWE	13	11	11	10	11	12	12	13	14	15	18	21	22	18	19	21	20	22	22	22	22	19	19	17
	ECMWF	8	8	9	9	9	10	10	10	13	13	13	15	15	15	17	17	17	17	17	17	17	16	16	15
Wave Height (m)	PWG	4	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4	4	3.9	3.9	3.8	3.8	3.7	3.7	3.6	3.6	3.5	3.5	3.4	3.4	3.3
	PWE	4	4.1	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.1	4.1	4.1	4	4	3.9	3.8	3.8	3.7	3.7	3.7	3.6	3.6	3.5	3.5
	ECMWF	3.9	3.9	3.9	3.9	3.9	3.8	3.8	3.8	3.7	3.7	3.7	3.5	3.5	3.5	3.4	3.4	3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.4
Period (s)	PWG	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	10
	PWE	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
	ECMWF	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11	11
Wave Direction (True)	PWG	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
	PWE	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
	ECMWF	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
Temp (Celsius)	PWG	12	12	12	12	12	12	12	12	12	12	12	13	13	13	13	14	14	13	14	14	13	13	13	13
	PWE	11	11	11	11	12	11	11	11	11	12	13	13	13	14	14	14	14	14	14	14	14	13	14	14
	ECMWF	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	15	15	15	15	15	15	15
Rainfall (mm/hr)	PWG															0.1		0.1	0.5				0.4		
	PWE																			0.1			0.2	0.3	0.4
	ECMWF									0.1	0.1	0.1							0.1	0.1	0.1	0.4	0.4	0.4	0.4
Cloud (Cover %)	PWG			40	80	70	50	50	50	80	60	40	60	40	90	100	60	100	90	80	90	90	80	20	60
	PWE			20	30	50	20	30	10	20	50	30	30	40	50	60	50	90	70		70	80	100	100	
	ECMWF			10	10	10	50	50	50	30	30	30	80	80	80	80	80	80	90	90	90	100	100	100	40

# Example

