

# US Sailing Sanctioned Offshore Safety at Sea Course

United States Naval Academy  
Annapolis, MD

# Go Navy!



# Different types of Safety at Sea Courses

- Coastal SAS, ½ Day, 5-6 topics
- Offshore SAS, 1 Day, 11 topics
- International Offshore SAS, 2 Days, 15 topics
- Newly Available
  - Online Coastal SAS Seminar
  - Online Offshore SAS First Day Seminar
- Option to take the second day within a year
- Refresher Courses after five years



# US Sailing's Online Course

 **STAN HONEY**  
Professional Navigator-Sailor

0:13 / 2:15

CC HD

# Safety at Sea Handbook

## Global Weather Zones

Understanding weather forecasting begins with understanding the overall structure of global weather. This often-invisible 'sea' moves above the earth's surface in three dimensions, similar to the way ocean currents move below the sea's surface. Global patterns interact with local conditions to produce the weather we experience, so to prepare for developing conditions, it is crucial to understand these interactions.

The simplified diagram shows the major air currents, which rise up into the atmosphere at the equator and at 60° latitude and sink back to earth at 30° and at the poles. In between, these currents respond to the Coriolis Effect, the jet stream, and local conditions.

Working from the Equator and moving towards the poles, the major weather patterns can be divided into five major zones:

- Inter-Tropical Convergence Zone (ITCZ)
- Tradewinds
- Horse Latitudes
- Variable Westerlies
- Polar front

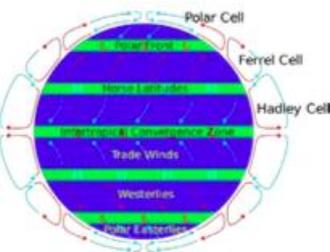
The **ITCZ** is also called the Doldrums or "Le Pot-au-Noir" (Pot of Black). The ITCZ will shift north during the northern hemisphere summer and south during the winter. It can be squally and unpredictable or exceedingly light, so a key tactical decision when racing is where to cross it.

The **Tradewinds** are generally delightful and enable consistent sailing. This is home to the seasonal Tropical Lows, one of the three critical types of lows, which we will discuss in detail later in this chapter.

The **Horse Latitudes** are home to semi-permanent summertime highs, such as the Pacific High and Azores High, which have a critical impact on transpacific and transatlantic passages. There is generally pleasant weather here, unless you are stuck in a stationary high with no wind.

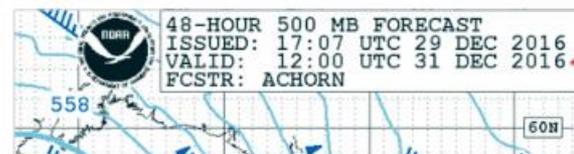
The **Variable Westerlies** are called "the variables" because they are home to another type of low, the transiting mid-latitude lows, with their associated fronts generating wind shifts from the southwest to the northwest. Of the three critical types of lows, mid-latitude lows are probably the best understood by sailors; TV weather reports are full of details about their associated cold fronts and warm fronts.

Most sailors can ignore the **polar front** and polar Easterlies. Round-the-world racing sailors make certain to stay on the equator side of the polar front, in order to stay in the Westerlies.



## Weather Maps

The best way to predict the weather is to understand weather maps. The first step is to note the "valid time." While a surface analysis shows current conditions, forecasts may have a valid time of 24-, 48-, or 96-hours in the future, so the features appearing on the chart may not be evident locally until one to three days later.



This map won't be valid until almost two days after it was created.

## Pressure Systems

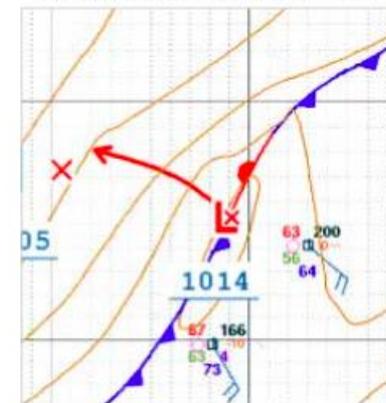
The following circulations occur in the Northern Hemisphere:

Wind flows clockwise around highs



Highs are shown with a bold H on weather maps. Wind descends in highs, which causes clear skies. The locations of highs 24 hours before/after the chart valid time are sometimes shown by a circled X, with an arrow to/from the valid time location.

Wind flows counter-clockwise around lows



Lows are shown on the maps as a bold L. Wind ascends in lows, forming clouds. The location of the low 24 hours before/after the chart valid time is sometimes shown by an X.

# Before we go any further, why are you here?

- How many of you consider yourselves racers?
- Are you participating in the...
  - Annapolis to Newport Race?
  - Marblehead to Halifax Race?
  - Some other long distance race?
- How many are non-racers?
  - Are you sailing over 500 miles this summer?
  - Any trans Atlantic crossings planned?
  - Anyone chartering in Europe?
- How many of you regularly sail on a multihull?
- How many powerboaters?



# Today's activities

- Lectures, punctuated by breaks and demonstrations
- Exhibitors are available during the breaks
- Rest rooms are on the second level, outer hallway and to your right and left
- Lunch will be served in Alumni Hall after the on-water demos
- Post-seminar reception will be held in the Bo Coppedge Room, second level
- Emergency exits are at the ground level and upper level



# A word from our sponsors!

- Marine Trades Association of Maryland
- United States Naval Academy Sailing Center
- The friendly safety equipment exhibitors on the second level
- Cruising World Magazine
- US Sailing



# 2015

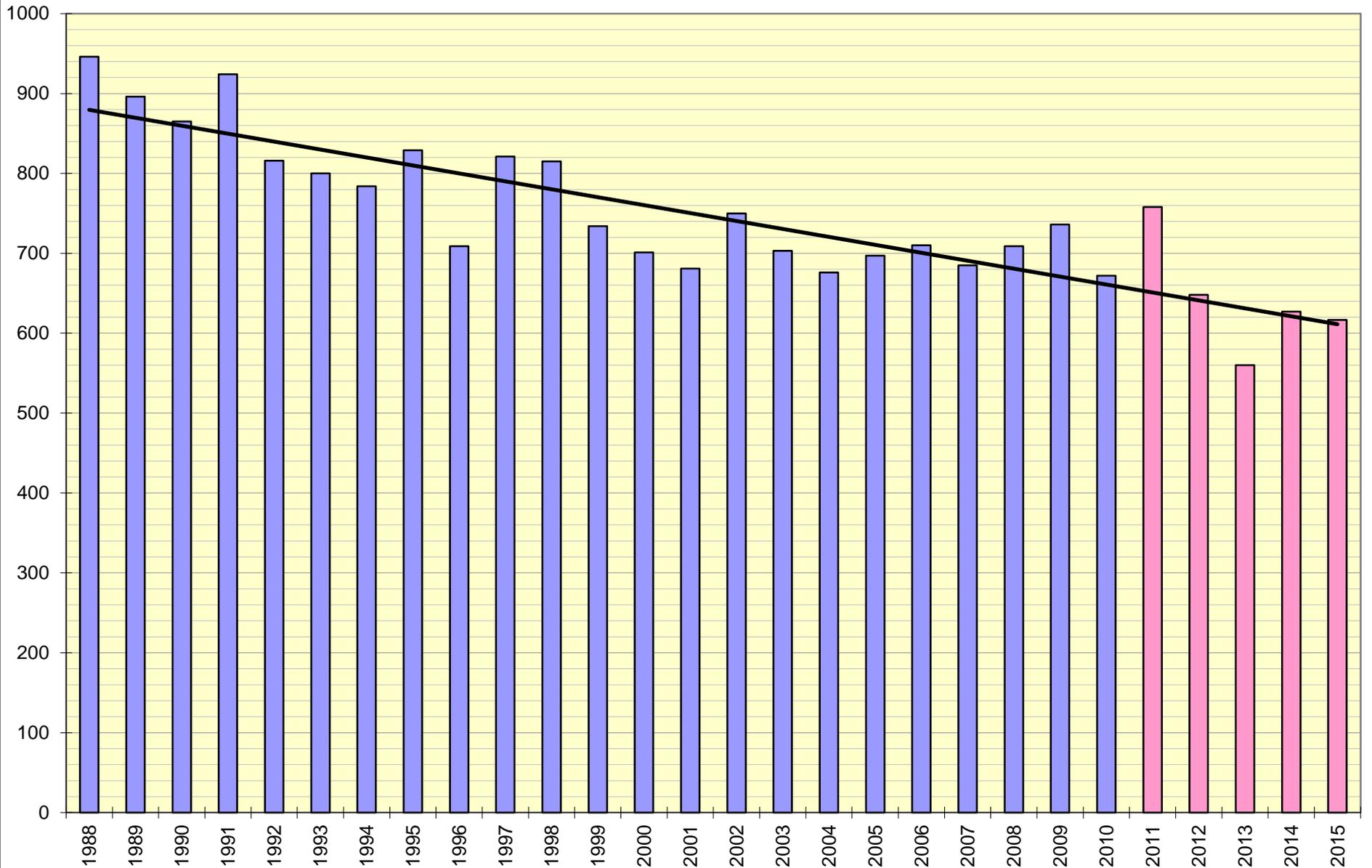
## Recreational Boating Statistics



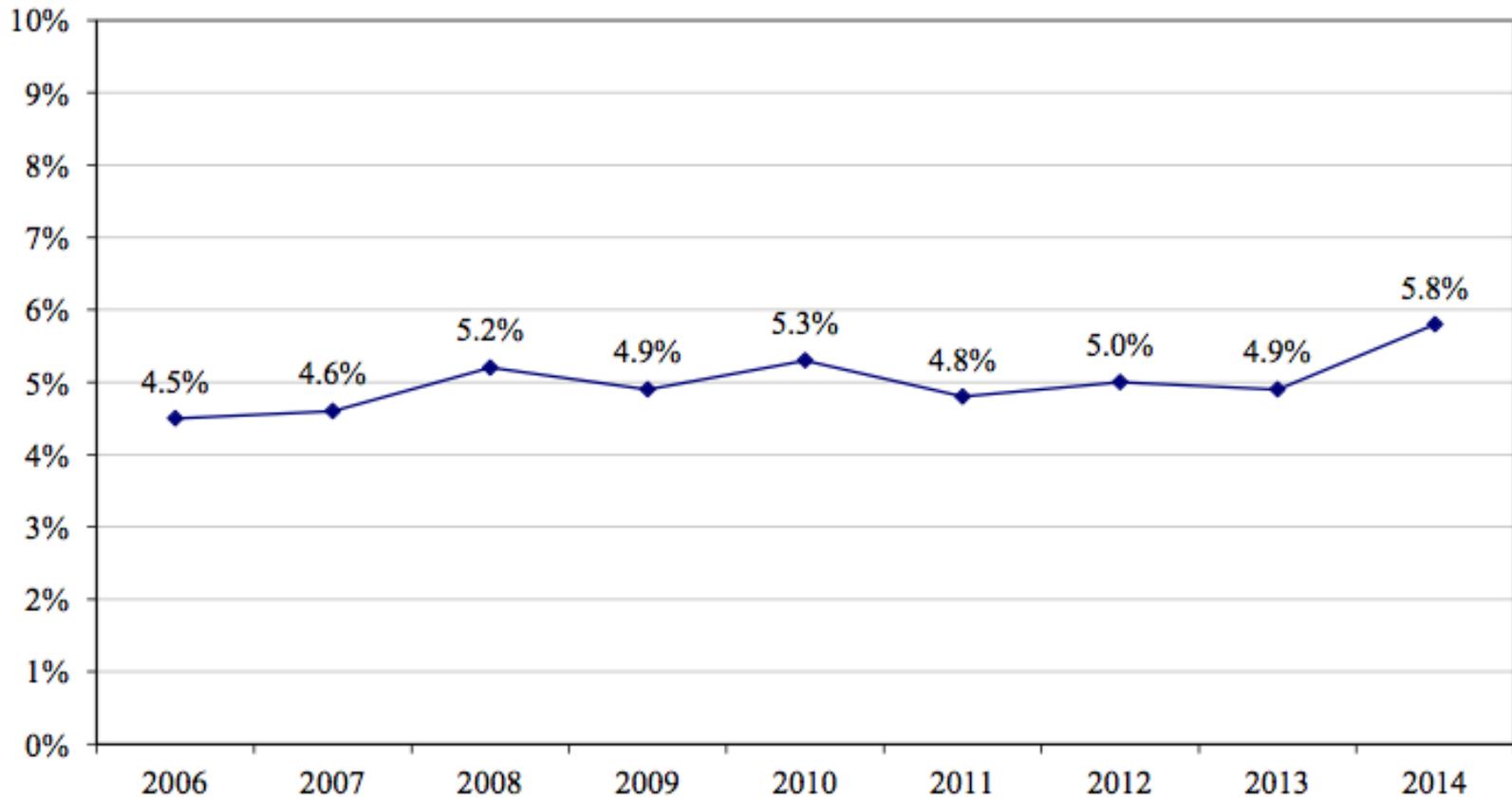
COMDTPUB P16754.29  
U.S Department of Homeland Security  
U.S. Coast Guard  
Office of Auxiliary and Boating Safety



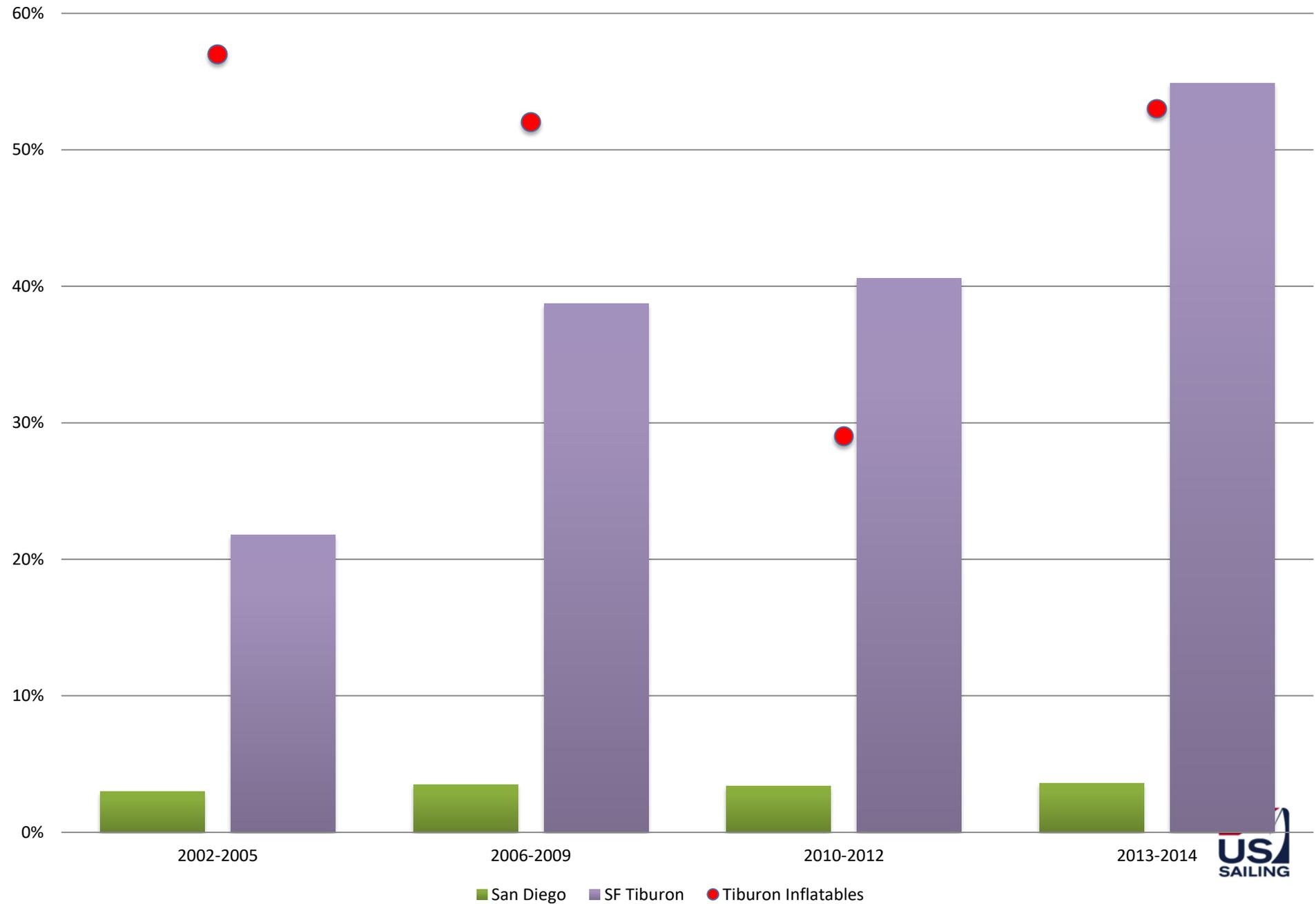
# Recreational Boating Fatalities, 1988-2015



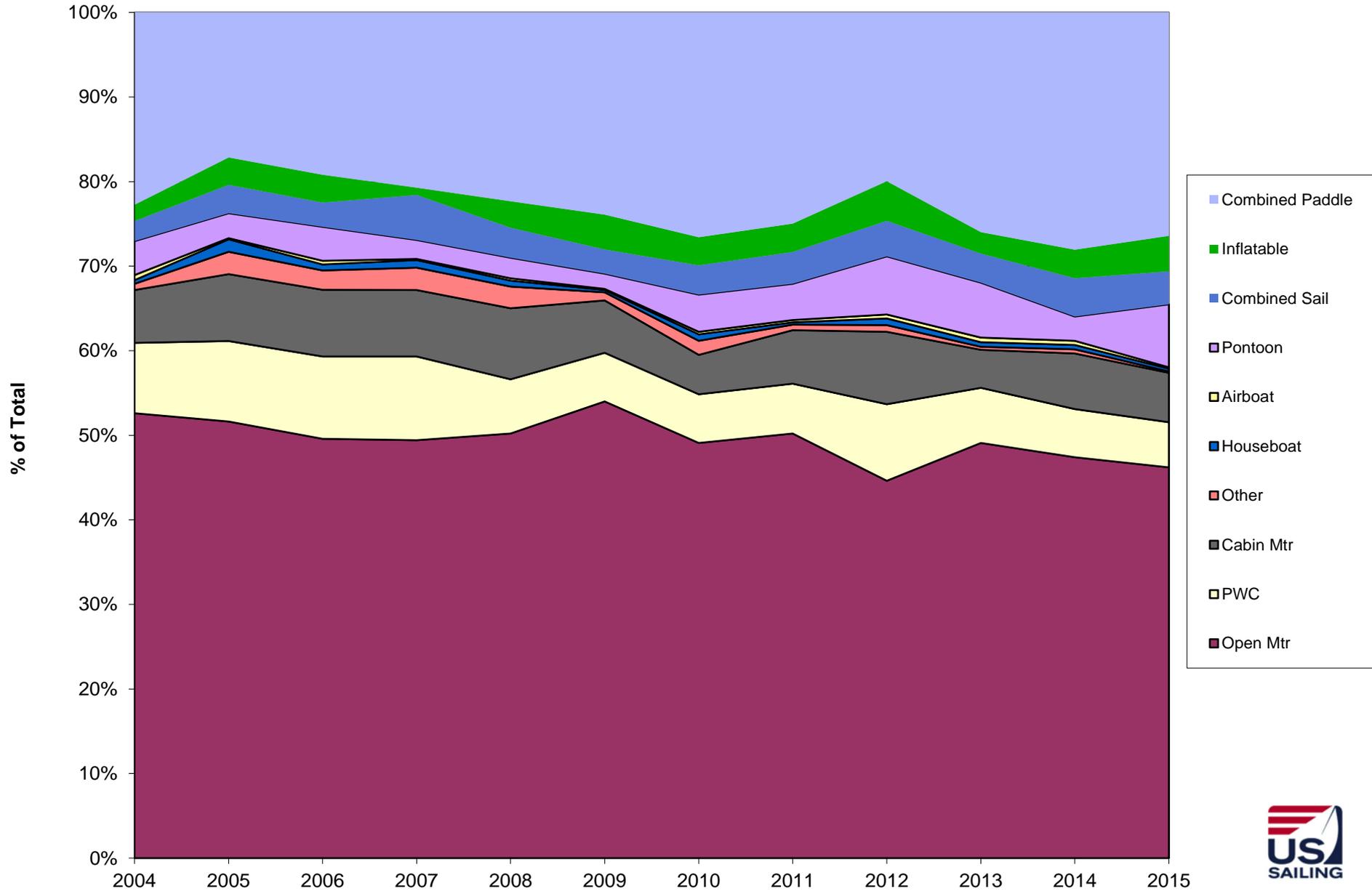
# Take a guess as to what this is...



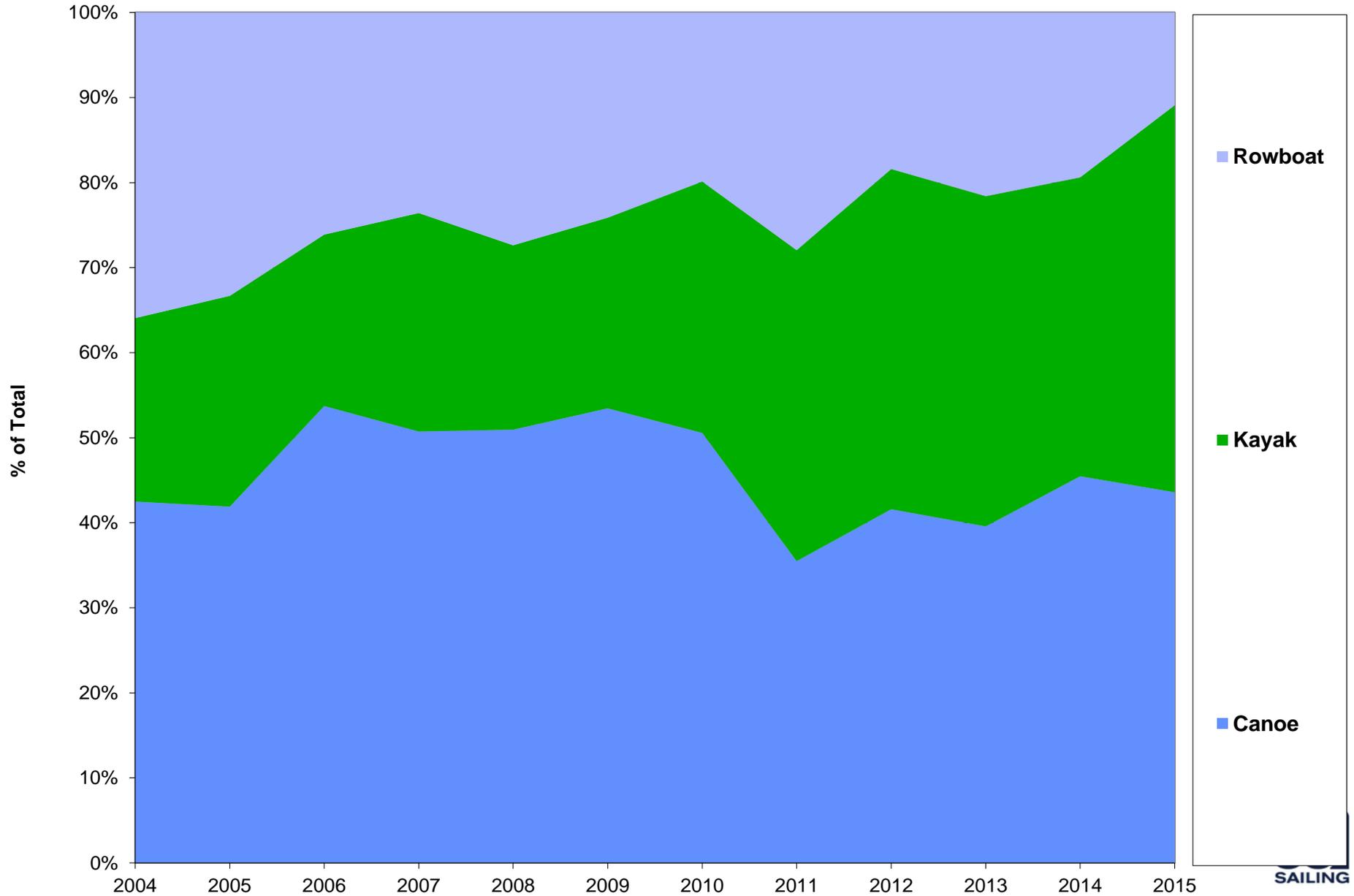
# Wear Rates for Cabin Sailboats in California



# Fatalities by Boat Type: 2004 to 2015



# Manually Powered Boat Fatalities: 2004 to 2015



# Recreational Boating Summary

- Boating is getting safer over time
- Sailboats comprise about 10% of rec boats, and account for about 3.5% of fatalities (24/year)
- 92% of the rec boating fatalities occur on inland waters
- 70% of the time the cause of death is drowning
- 85% of those who drown are not wearing life jackets
- The observed life jacket wear rate for adults in open powerboats is 6%



# Volvo Ocean Race Update

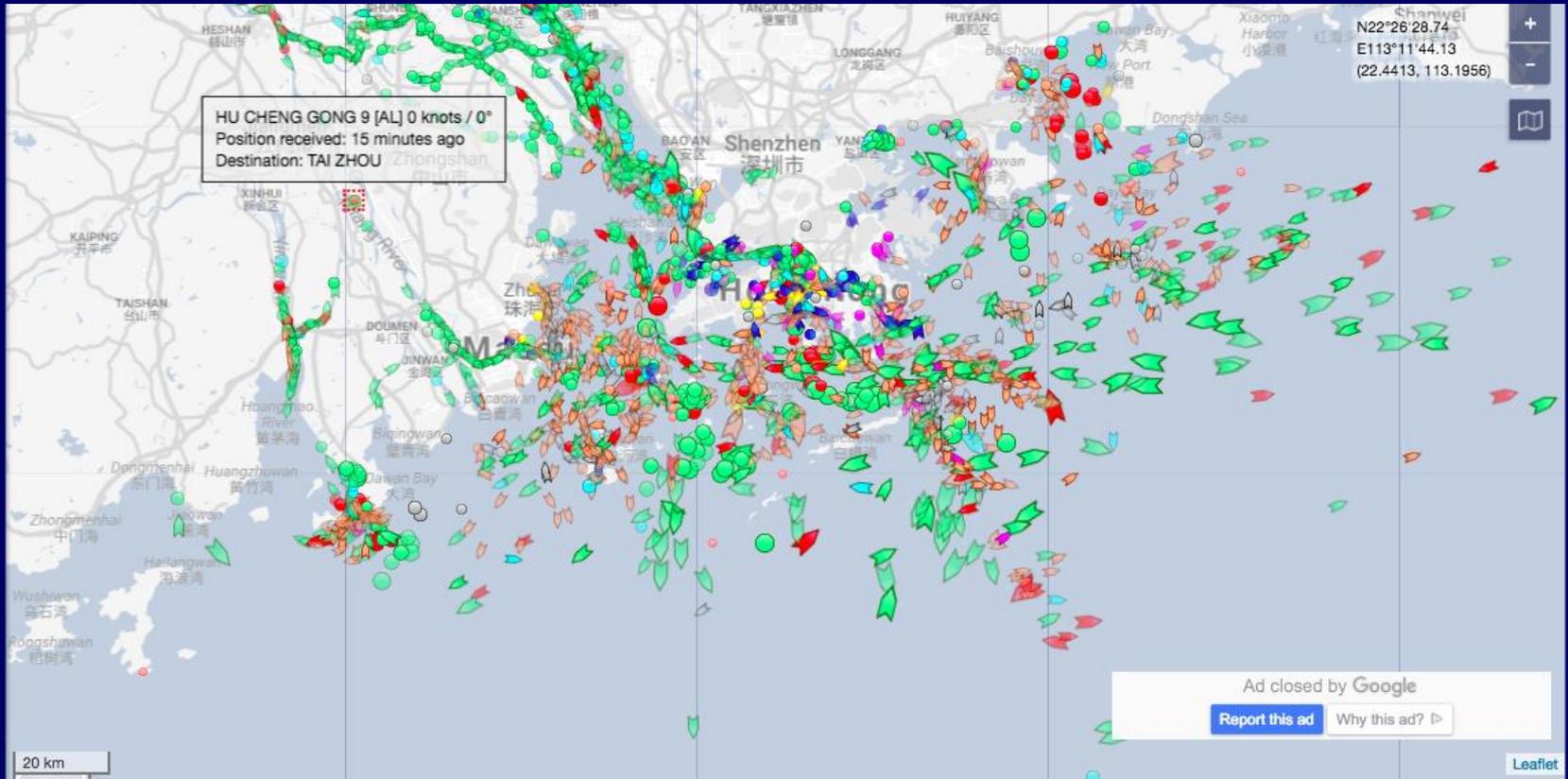


# Vestas 11<sup>th</sup> Hour Racing Collision

- Presented at the World Sailing Annual Meeting, 2018
- Chuck Hawley
- US Sailing Association



# Racing in HVTD Areas





Finish

Philippines

Papua New Guinea

Solomon Islands

Sydney

Melbourne

# Philippines to Port



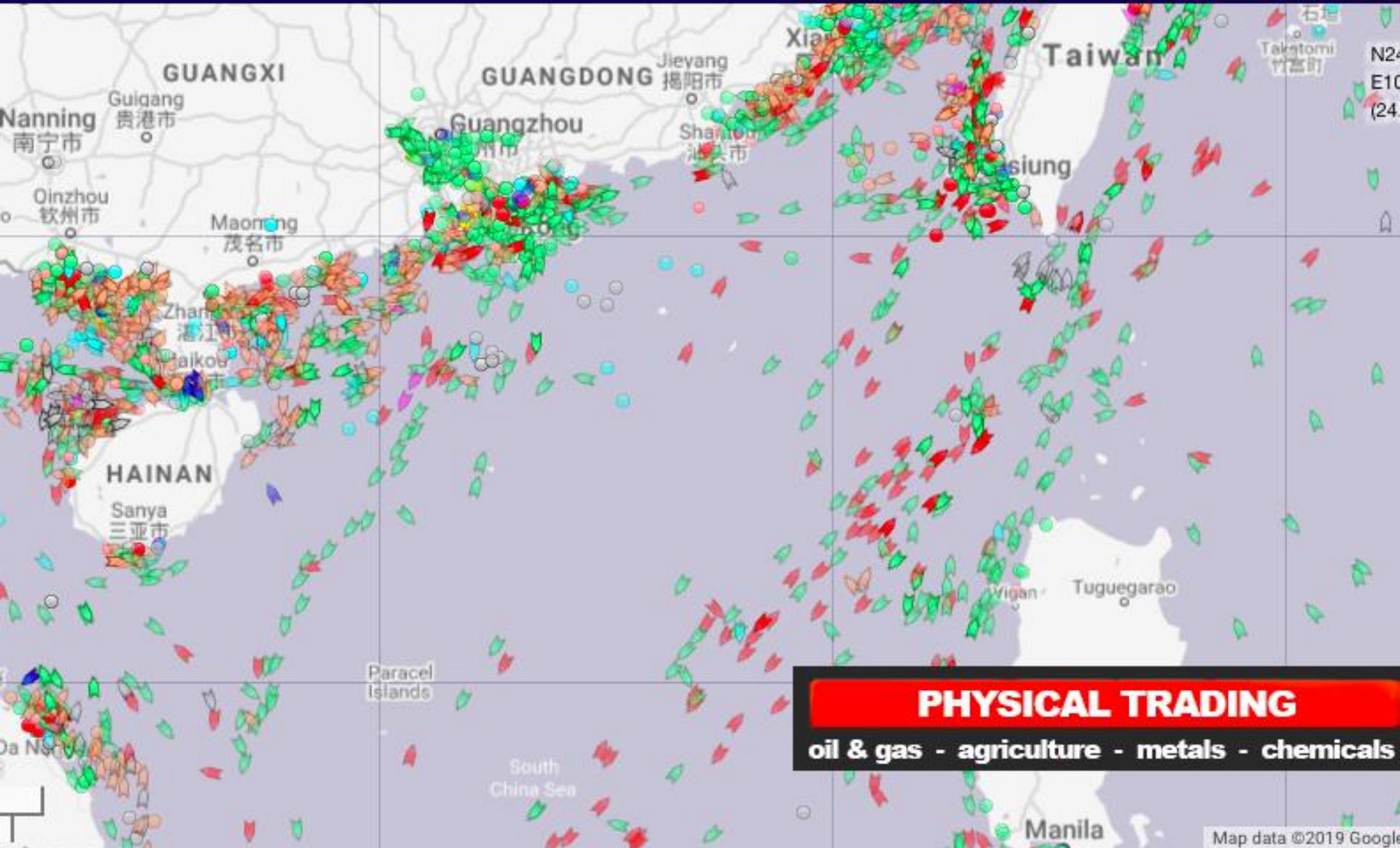


Image courtesy of MarineTraffic



# Trends in Long Distance Offshore Racing

- Faster boats with fewer sailors
- Routes cross the equator more frequently, causing them to pass through areas of high vessel density
  - Approaches to Qingdao, Hong Kong, Gibraltar, Brazil, Strait of Malacca
- Cities/states vie for vessel sponsorships and stopover status which may be on congested coastlines



# Vessel design changes

- Virtually all boats using asymmetrical headsails that reduce visibility and block nav lights at the sheerline
- Boats regularly sail with 25 degrees angle of heel
- Masts on a 65' boat are 90' above the water
- Sails are increasingly opaque to lower-power radar, especially with multiple wet headsails

Heel + spray + jibs on the water = tough watchkeeping.



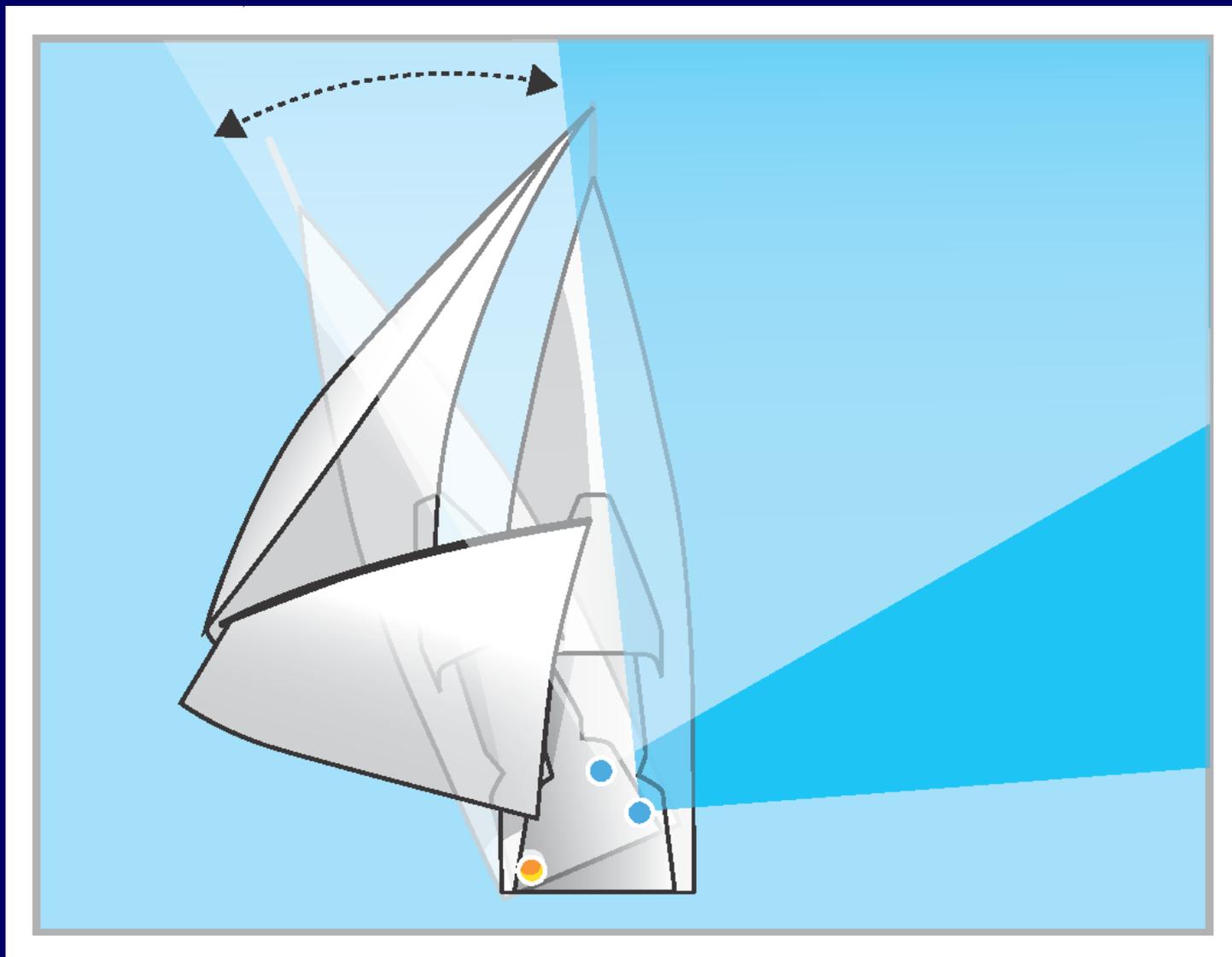
Photo credit: Ainhoa Sanchez, Volvo Ocean Race

# Risk Factors

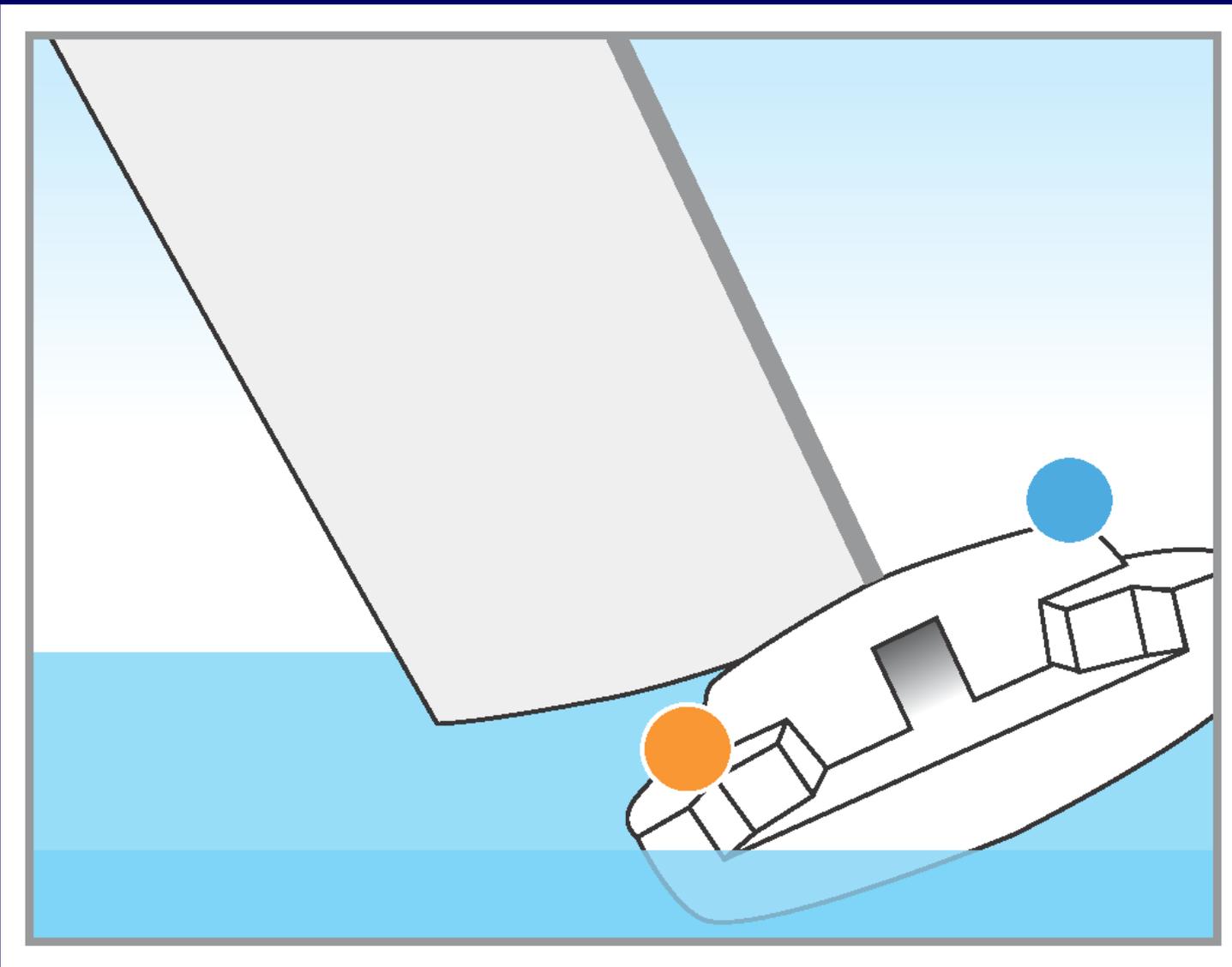


1. Limited visibility from the sailboat
2. Limited visibility of the sailboat from surrounding vessels
3. Local fleets unaware of the vessels' arrival or speed
4. AIS in near universal use, but may be on nets or skiffs
5. Fishing vessels are lit, but not with IRPCAS lights

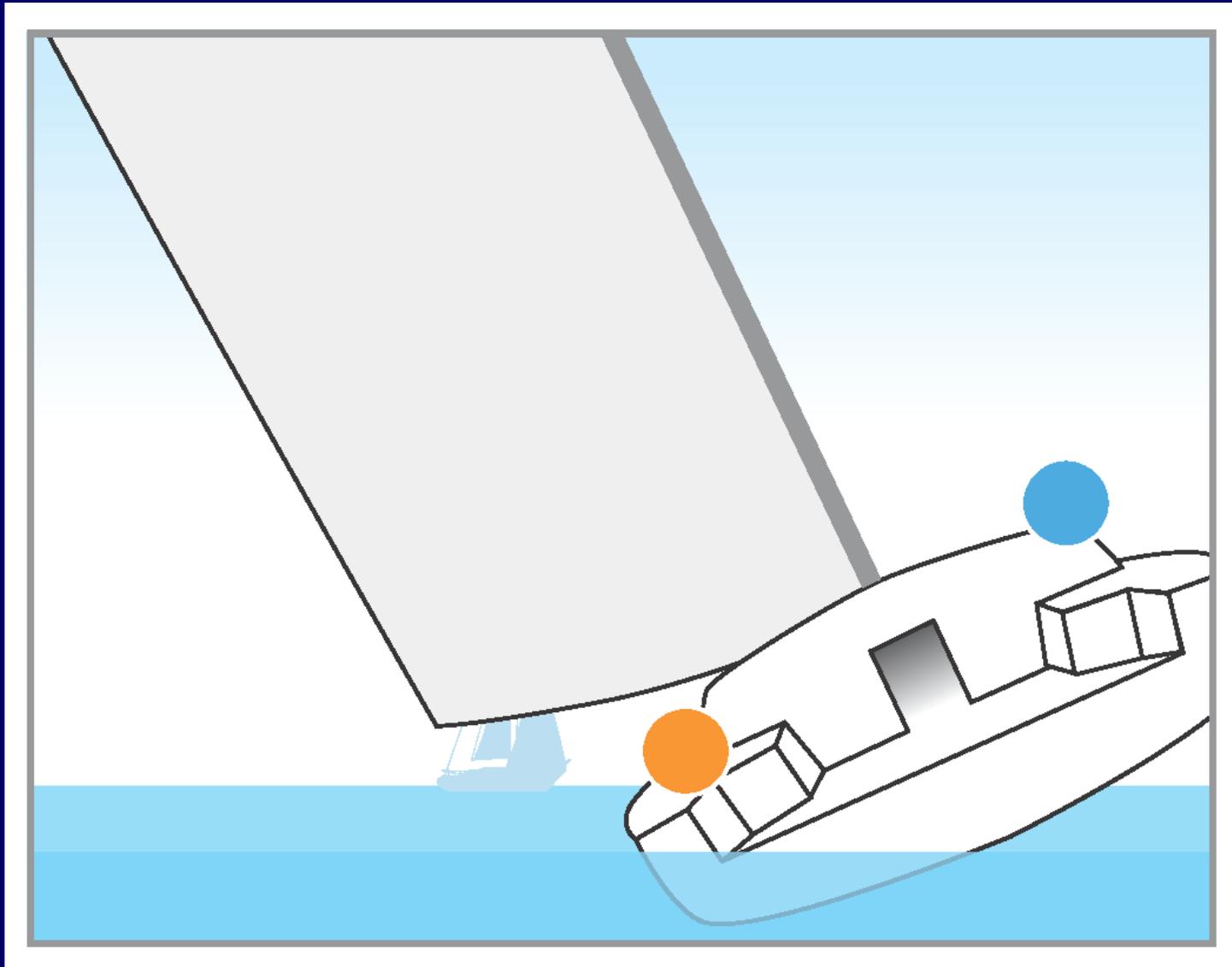
# Dipping the Bow



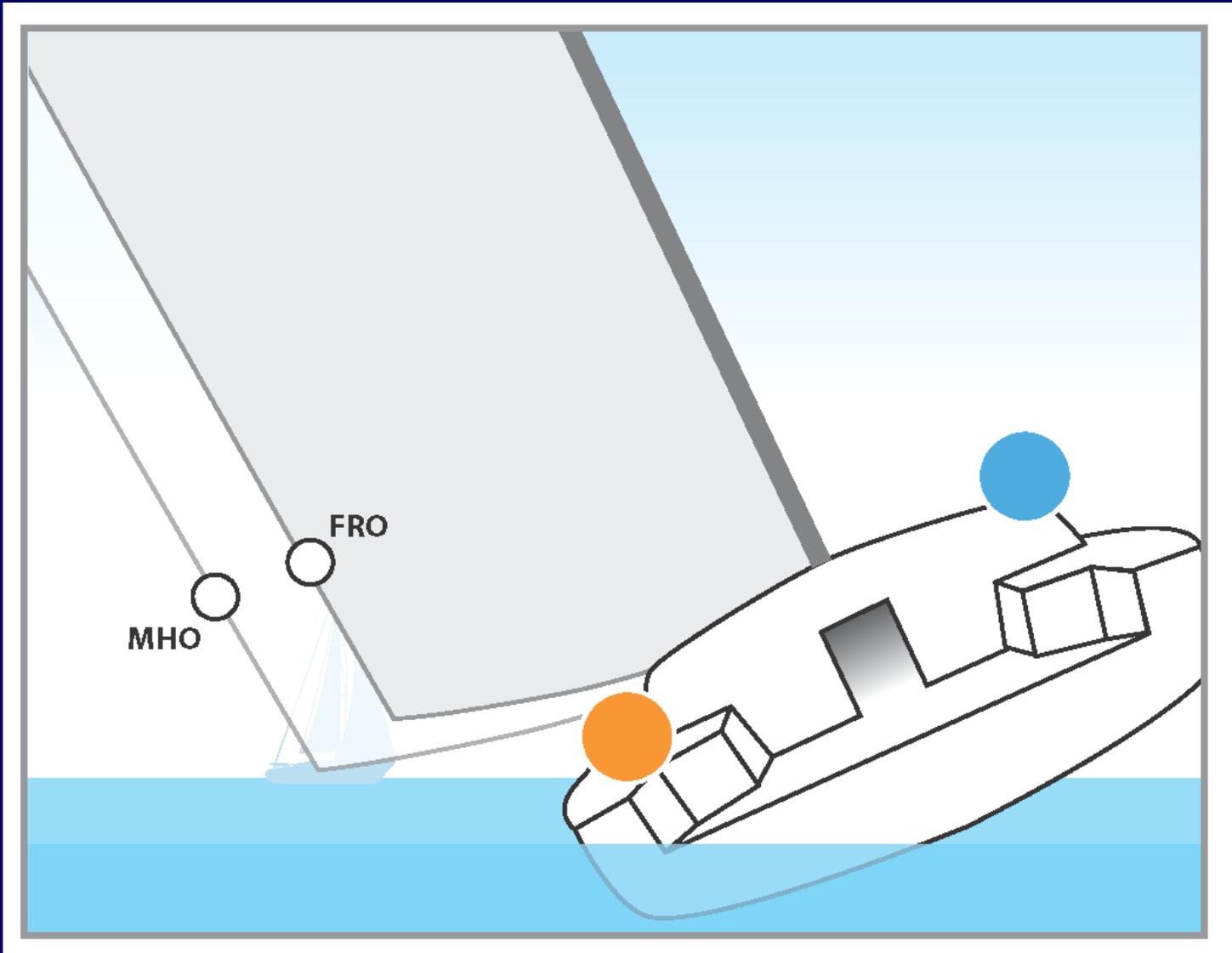
# Crew to Leeward



# Timing is everything



# Less overlap = more visibility



# Navigation light conundrum

- Up to 20m, vessels can use a combined nav light at the masthead for sailing
- Above 20m, separate sidelights and a sternlight
- Cannot be used under power, necessitating additional lights
- Lights at the sheerline are blocked by sails
- Lights on the prod are frequently underwater



# VO 65 solution

- Three LED modules, mounted to the carbon wind sensor mast
- Not blocked by anything but the Windex and VHF antenna



# Current “tricolor” light



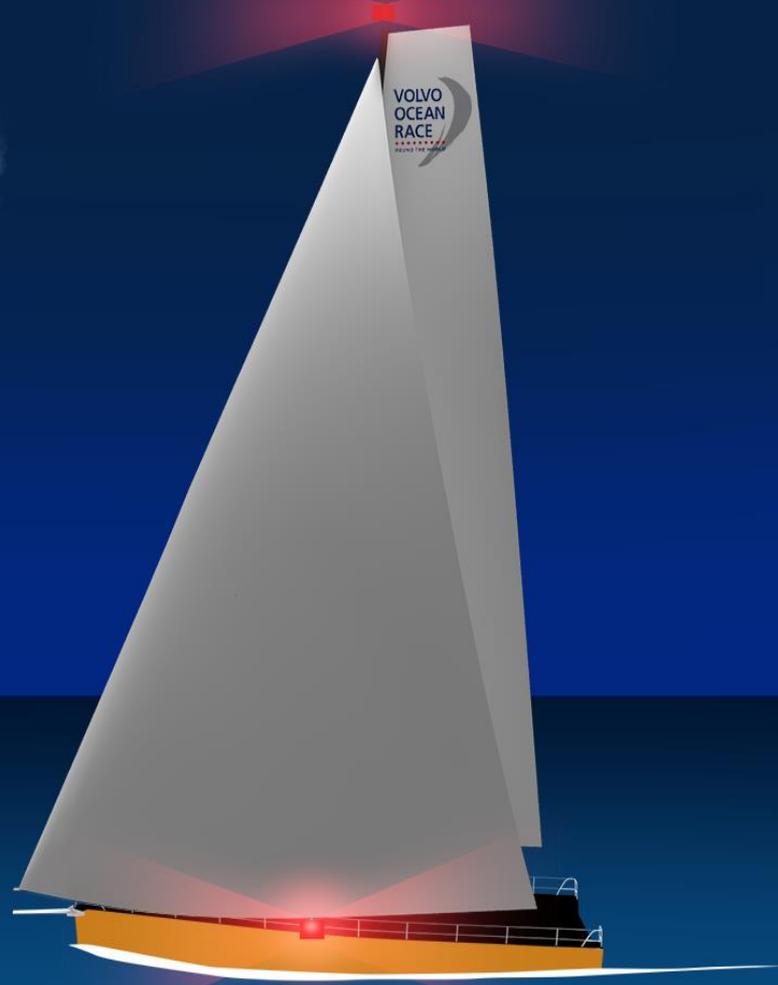
# Current “tricolor” light with “uplight”



# Prod-mounted and “tricolor” lights



# Sheerline and “tricolor” lights



# Blinking and “tricolor” lights





# AIS targets can be overwhelming

- Image taken from a Clipper Round the World race boat near Qingdao.
- Which vessel is a threat?
- Which vessel isn't a vessel at all?

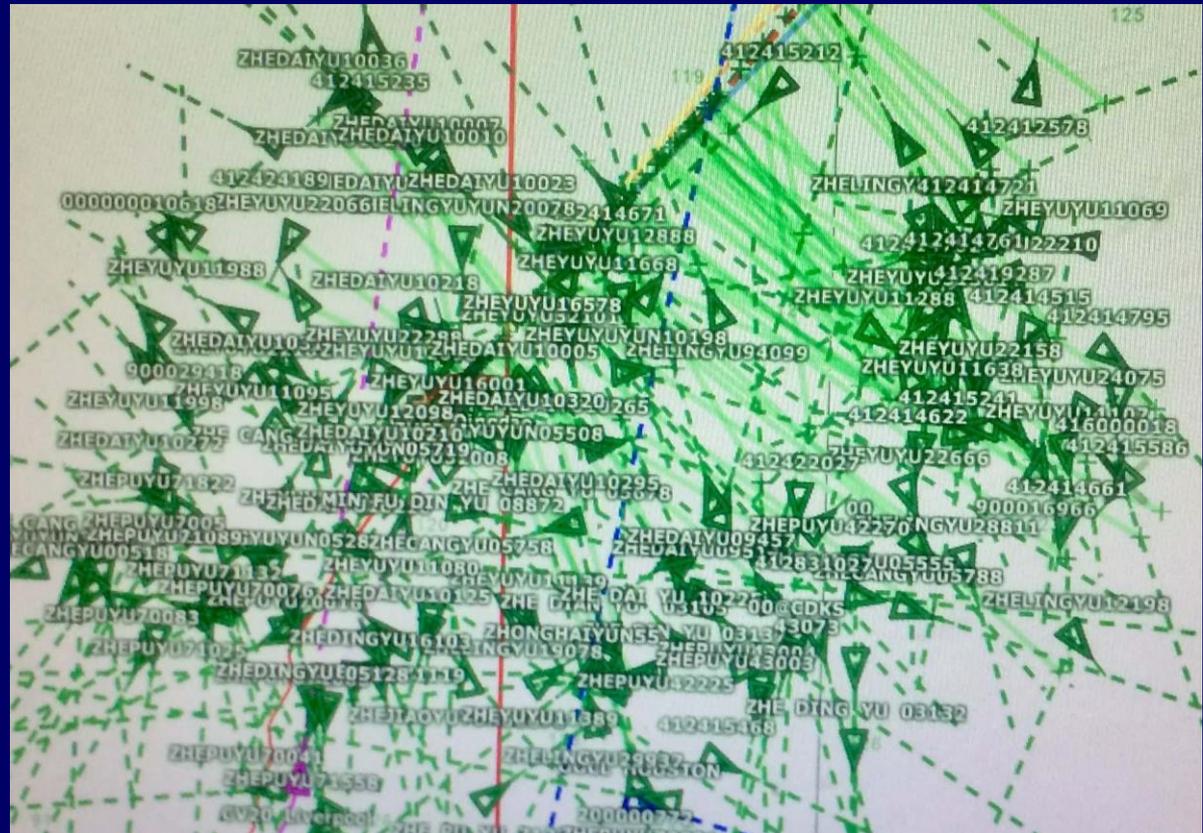


Image courtesy of Sir Robin Knox-Johnston



# Improving Radar Performance

- Avoid use of broadband radars; substitute pulse modulated or pulse compression radars
- Add radar ability (software) to laptops running navigational software



# Pulse Compression Radar Antennas

- Intended to give the best close-up detail as well as long-range anti-collision use.



# Would Forward Looking Infrared technology help?



- Sensors are getting smaller, and could be built into the masthead of the vessels.
- Target tracking is also possible with current technology.





# Virtual Collision

AIS recorded T-bone



# Conclusions

- Several ways are recommended to increase the likelihood of being noticed
  - Oceanic and Offshore Committee has created a WG to investigate
- The importance of AIS is difficult to overstate, but requires training
- Different radar technology may improve detection and tracking at a distance
- New technologies (FLIR) could extend the ability to “see” at night

# Today's Schedule

Topic	Speaker
Introduction	Chuck Hawley
Keynote Presentation	Ken Read
MOB Prevention and Recovery	Coach Jahn Tihansky
Break	
USCG Communications and SAR	CAPT Kip Louttit, USCG (ret)
Damage Prevention and Control	Steve D'Antonio
On-Water Demonstrations	Chuck Hawley, Jon Wright
Lunch	Alumni Hall
Weather Forecasts and Features	Dr. Gina Henderson, Joe Sienkiewicz
Storm Sails and Heavy Weather	CAPT Mark Lenci, USN (ret)
Break	
Emergency Medical Care and Hypothermia	Dr. Michael Jacobs
Care and Maintenance of Safety Equipment	CAPT Kip Louttit, Chuck Hawley
Lessons Learned, Reception	Chuck Hawley