Early experiences with the MarkSetBot

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What we are going to talk about…

- What the heck are bots and who uses them
- Our experience – the shining
- Our experience – the not-so shiny
- Lessons learned (how to polish the not-so-shiny)
- Care and Feeding of Bots
- Safety Concerns
- Getting one of your own

Where we have used and seen them - From lakes and rivers to the Oceans

- AYC – one bot for summers 2020, 2021
- Miami – 4 bots trapezoid courses
- Block Island RW – multiple bots on multiple cources
- AYC – J70 and NOOD – 4 bots, 1 WL course
- US Sailing Youth Championship
- Inland Lakes - E Scow Nationals
- Italy – Lake Garda – Italian "gps marks"

Lake Garda's GPS Marks

- Lake's yacht clubs worked to buy fleet

- Bluetooth level remote only – no internet needed

- Hard hull, less inflatable

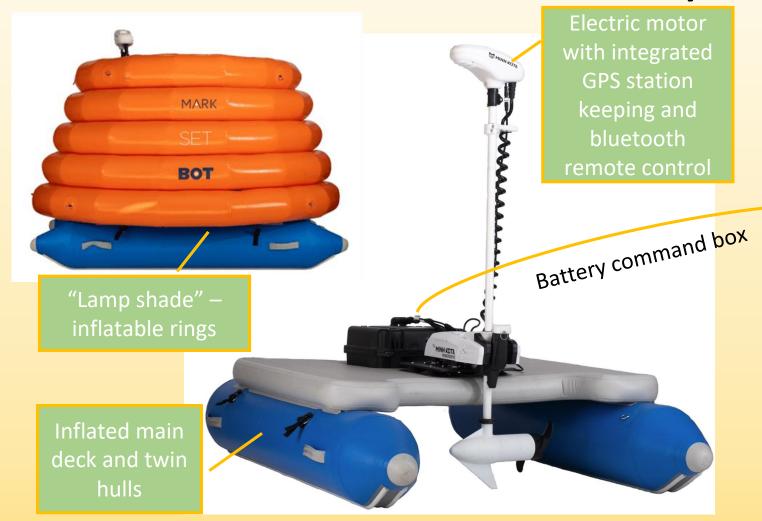- More rugged? Less visible ?

Italy's bots

MarkSetBots

- US based company

- All inflatable hull / rings

- Uses mix of GPS motor, internet, mobile app for remote controlling

- Ambitious plans to fully automate race management, options for
    - Remote onboard horn
    - Wind sensing
    - Video

- Work with on-boat trackers with goal to fully automate OCS/Finishes*
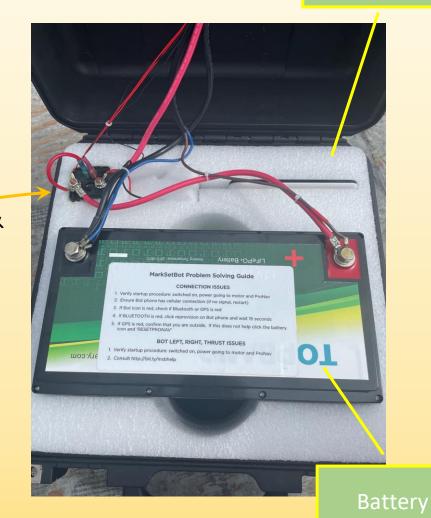   - * Taran and Sandy have not yet seen / tried this

MarkSetBots - how do they work?

Android cell phone

Electric motor with integrated GPS station keeping and bluetooth remote control

Battery command box

"Lamp shade" – inflatable rings

Inflated main deck and twin hulls

Battery

MarkSetBot Problem Solving Guide

CONNECTION ISSUES

1. Verify startup procedure: switched on, power going to motor and ProNav
2. Ensure Bot phone has cellular connection (if no signal, restart)
3. If Bot icon is red, check if Bluetooth or GPS is red
4. If BLUETOOTH is red, click reprovision on Bot phone and wait 15 seconds
5. If GPS is red, confirm that you are outside. If this does not help click the battery icon and 'RESETPRONAV'

BOT LEFT, RIGHT, THRUST ISSUES

1. Verify startup procedure: switched on, power going to motor and ProNav
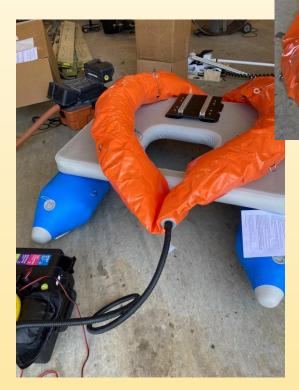2. Consult http://bit.ly/msbhelp

There's an app for that (of course)

- Chart / Drag 'n' drop mobile app

- Drag circle (the bot target) using finger on chart
  - Press the "go" button and off the bot goes

- Can also generate a course plot and have bot(s) waypoints set automatically

- Really VERY simple

- Mobile app sends commands to The Cloud; cell phone on bot picks up the commands (go, stay, drift etc) and executes; bot uses onboard cell phone to transmit location, speed, battery status etc)

Assembly

Our experience – where they shine

- Deep water

- Reliable cellular communications

- Starting/ finishing pin, keeping a square gate - where fast precise positioning matters

- Coordinated course management of multiple bots

- Saving the overworked back muscles of mark boat teams

Competitor Concerns, 1

- That bot is moving! I can see its bow wake!

- Is it really staying put?

- In current and strong winds, bot uses motor to hold GPS location – may well leave a prop wash

- Solutions
  - Keep a log of actual bot locations
  - Be ready to share log (especially over a beer ashore)
  - Competitor teaching – use radio to tell when moving
  - Bots are normally *much* stabler holding position that anchored RC / marks

Competitor Concerns, 2

- Is the RC moving the bot when we aren't looking?
  - Very easy and tempting for RC to tweak it – RESIST that urge
  - If RC wants to tweak it, use SI to define when and how much
- After getting hit/dragged by racing boat(s), bot goes back to target location
  - Yep, it will do that (probably legal per RRS 34, no cases/appeals)
  - If havoc about to occur, have mark boat ready with bluetooth remote to freeze bot in place until rounding complete

Our Experience – Challenges (w/ solutions), p 1

- Off on a walkabout
  - Challenge - occasionally misses a "stop here" command
  - Solution – keep an eye on it – by eyeball or by app

- Reboot/drift mode in mid start
  - Challenge – decides to re-boot on any sort of short
  - Solution – check connections carefully every morning

- Lost/jammed propellor
  - Challenge – no thrust or jammed prop shuts down
  - Solution – team needs to know how to pull and clean propellor (not hard, but learn it ashore)

Our Experience – Challenges (w/ solutions), p 2

- Dead battery - or otherwise becomes "dumb bot"
  - Challenge – low/dead battery – just stops doing anything
  - Solution
    - Use mark boats to tow bots out and otherwise let them "rest" – save battery for station keeping
    - Have an anchor and rode – then just use it like a normal dumb mark
- Lost cell phone comms
  - Challenge – app can't talk/find a bot, but bot is on station
  - Solutions
    - use bluetooth remote control (have aboard mark boats, or clipped on mark itself)
    - Hit the master off button – use as normal dumb mark

Our Experience – Challenges (w/ solutions), p 3

- Strong (>3 knots) current
  - Challenge – can't hold station or move effectively in very strong current
  - Solutions
    - Hit the master off button – use as normal dumb mark
    - Use mark boat to handle towing bot near location, then save bot motor for station keeping
- Bots moving slowly
  - Challenge – Bots move to new locations too slowly
  - Solution
    - Plan ahead !
    - Tow bots to course (max tow speed 6 knots) instead of "bot speed" (3-4 knots)
    - Roughly pre-position bots early (again, possible with mark boats)
    - In shifting winds – use change mark (avoid relying on moving a bot to a new location)

Lessons learned summary

- If they don't work, not hard to make them a dumb bot (just tow and anchor)

- Failed comms, have and use bluetooth remote

- Jostled out of position and don't want it to return, the "stay put" button

- Plan general position well ahead - they don't swim fast

- For a regatta, assign a "Bot Master" – person who controls bots, makes sure they get charged, and "fed"

- These are VERY expensive marks – but pretty inexpensive mark boats
  - In cost equation – consider reduced need for RC boats/bodies

Care and Feeding of Bots

- Assembly and storage

- Launch and towing

- Study the videos!

- Timeline / practice

- Tips and Tricks

- Removing rings for faster transit

- Combine with a tetrahedron to "change" color/shape

Safety Concerns

- Boats hitting bot causing it to overturn

- Unusual but not unheard of

- Exposed propeller biggest issue

- Solution – propeller guard

Getting your own MarkSetBot(s)

- Subscription vs purchase
    - Can lease with significant monthly rate
    - Can purchases with much reduced monthly rates

- Our opinion:
    - Development / learning curve too high to purchase
    - Lease for a month more worth it
    - Consider teaming up with other local clubs to share bot rentals (if so – have 1 person as the bot's main keeper)
    - Marksetbot's technical support is pretty darn good in our experience

Where to learn more

- Marksetbot.com

- Youtube – search for "MarkSetBot"

QUESTIONS?