

# CSB on the Great Barrier Reef: Lessons Learned

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# Vessels

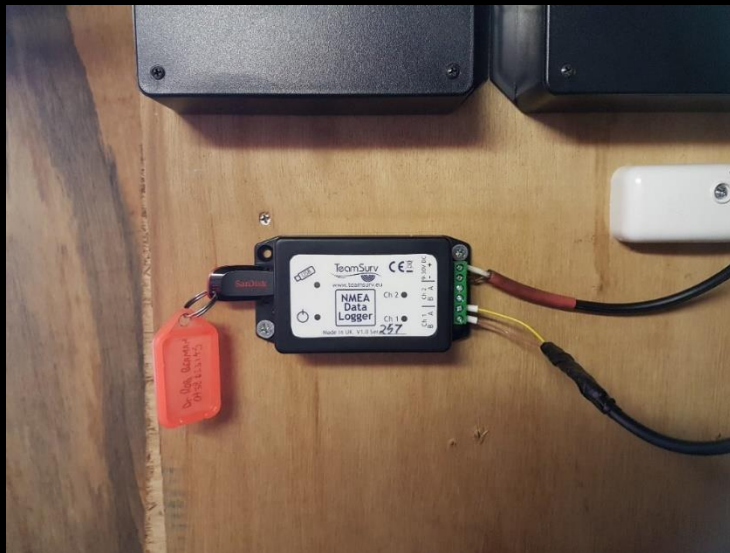
- Argo 24 m based at Yorkeys Knob, Cairns
- Aroona 22 m based at Yorkeys Knob, Cairns
- Gundoo Spirit 14 m based at North Keppel Is
- Sharpshooter 22 m based at Cairns Port
- Zosteria 4.2 m based at Brisbane, Moreton Bay
- Spoilsport 20 m based at Cairns Port
- Flying Fish V 23 m based at Cairns Port
- Boab Boats 4.2 based at Cairns
- Kalinda 22 m based at Townsville

# Vessels



# Installation

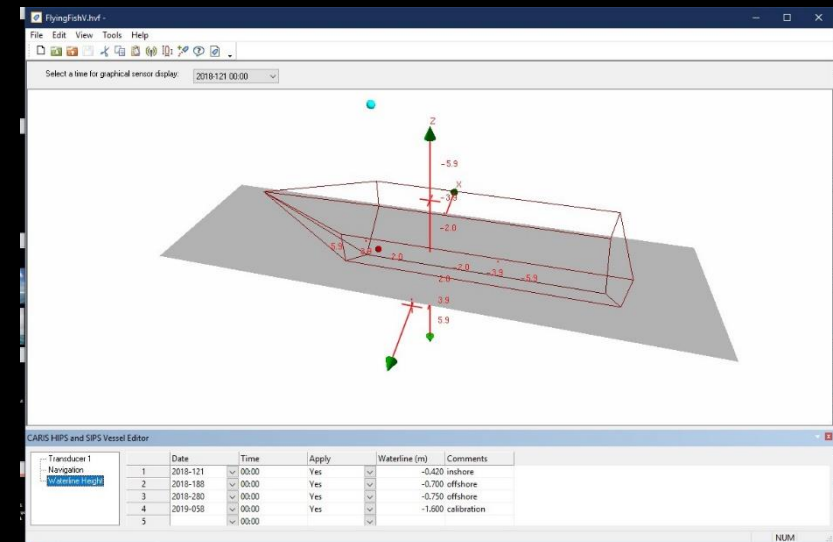
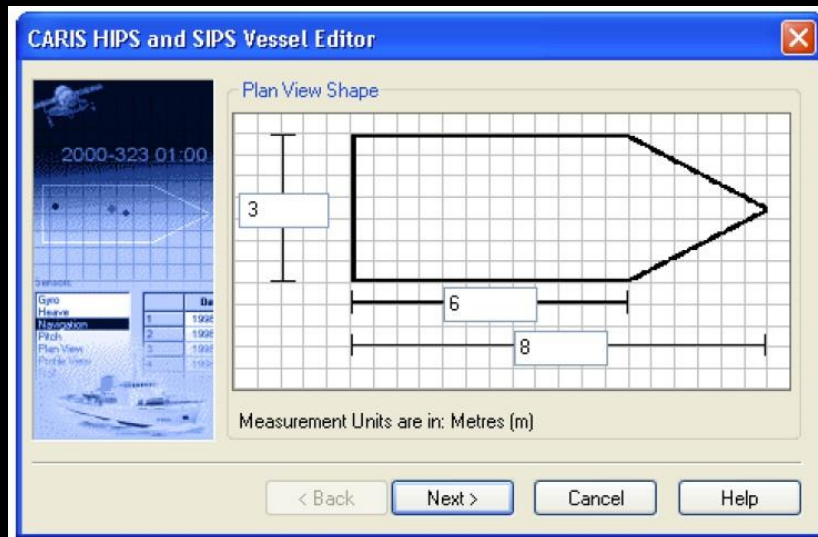
- TeamSurv SmartLog USB logger
  - marine technician to install
  - 12/24VDC plus NMEA channel 1
  - sensitive to over-voltage
  - format 8GB USB to lowest allocation
- have tried Raymarine, Furuno, Garmin systems ~\$5000
  - transducers 1 kw to 600 w
  - best use single chart plotter output
  - avoid two NMEA channel feeds from separate sounder, GPS units





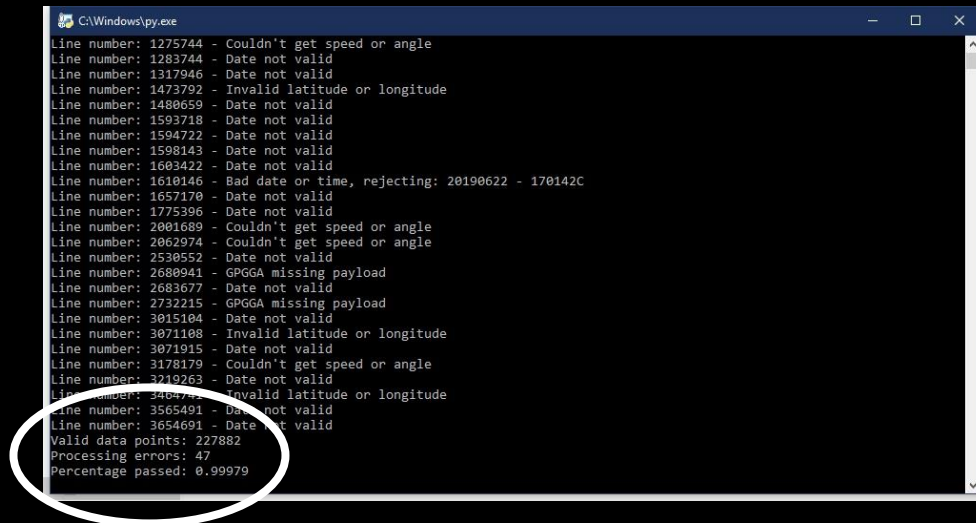
# Calibration

- use Caris HIPS Vessel Editor template
- use 30 m tape to measure offsets
- GPS aerial is measured to sounder
- reference point (RP) is the sounder transducer itself
- measure depth with leadline
- calculate waterline height for HIPS
- apply the waterline height on merge
- tweak waterline height after check against coincident survey data

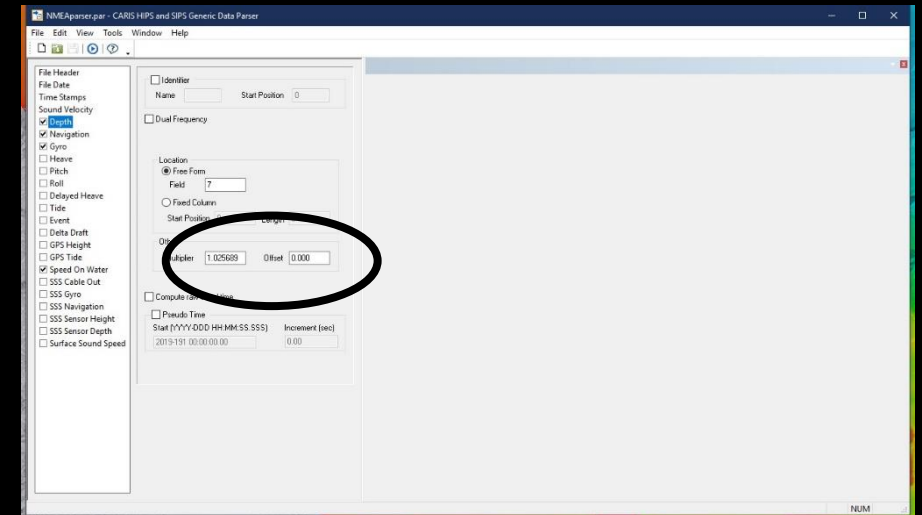


# Processing

- data logger stores .TSV files
- use python script as first pass filter
- needs GGA, RMC, DBT strings
- lat,long,date,time,course,speed,depth
- report of errors, valid data points, %
- python output split into Julian Day
- use HIPS Generic Data Parser to I/P
- Date,Time,SV,Depth,Navigation,Gyro, Speed on Water
- assumes 1500 m/sec, but GBR shelf ~1538 m/sec, so Depth x 1.025689

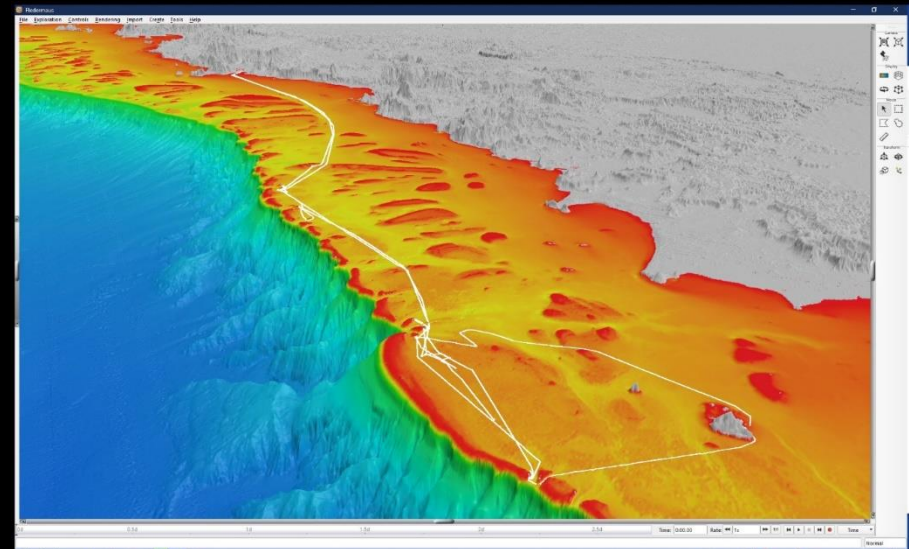
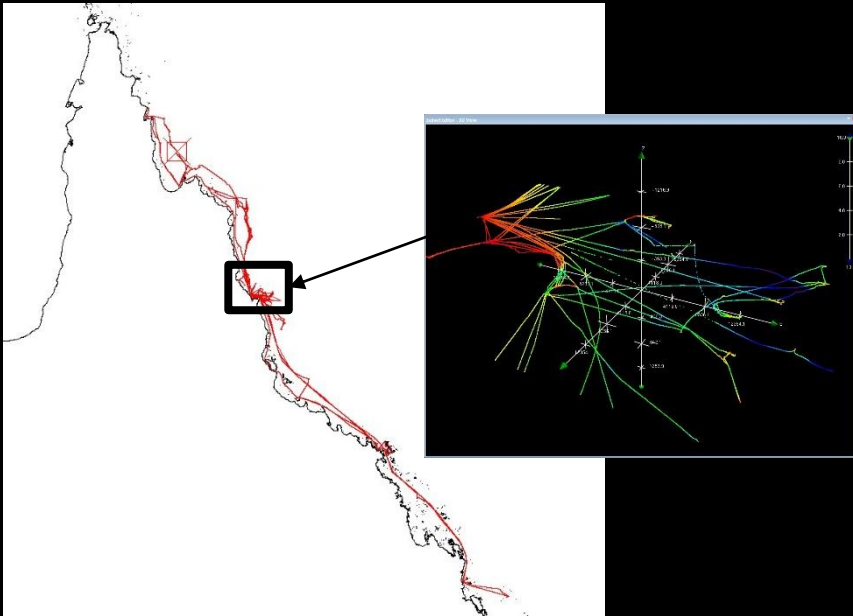


```
C:\Windows\py.exe
Line number: 1275744 - Couldn't get speed or angle
Line number: 1283744 - Date not valid
Line number: 1317946 - Date not valid
Line number: 1473792 - Invalid latitude or longitude
Line number: 1480659 - Date not valid
Line number: 1593718 - Date not valid
Line number: 1594722 - Date not valid
Line number: 1598143 - Date not valid
Line number: 1603422 - Date not valid
Line number: 1610146 - Bad date or time, rejecting: 20190622 - 170142C
Line number: 1657170 - Date not valid
Line number: 1775306 - Date not valid
Line number: 2001609 - Couldn't get speed or angle
Line number: 2062974 - Couldn't get speed or angle
Line number: 2530552 - Date not valid
Line number: 2680941 - GPXGA missing payload
Line number: 2683677 - Date not valid
Line number: 2732215 - GPXGA missing payload
Line number: 3015104 - Date not valid
Line number: 3071108 - Invalid latitude or longitude
Line number: 3071915 - Date not valid
Line number: 3178179 - Couldn't get speed or angle
Line number: 3219263 - Date not valid
Line number: 3464711 - Invalid latitude or longitude
Line number: 3565491 - Date not valid
Line number: 3654691 - Date not valid
Valid data points: 227882
Processing errors: 47
Percentage passed: 0.99979
```



# Results

- Cape York to Moreton Bay and into the Coral Sea
- 10,170 line km as of July 2019
- collecting ~700 line km per week
- ~1.5mill soundings at 2sec interval
- apply predicted tides for nearest ports
- min depth 2.6 m, max depth 704 m
- very little noise, e.g. few 0 m values
- very few nav spikes (using raw GPS)
- good match against IHO S44 1a/b survey data



# Costs and Time

## Installation (one off):

- \$450 logger
  - \$10 USB stick
  - \$500 marine tech
- ~\$1000 per vessel <sup>a</sup>

<sup>a</sup> compare against \$1000 to \$5,000 vessel costs per day

## Software (annual):

- \$1000 Fledermaus
  - \$3900 Caris HIPS
  - \$100 AusTides
- ~\$5000 per year <sup>b</sup>

<sup>b</sup> paid for by other project funds but needs sustaining

## Time:

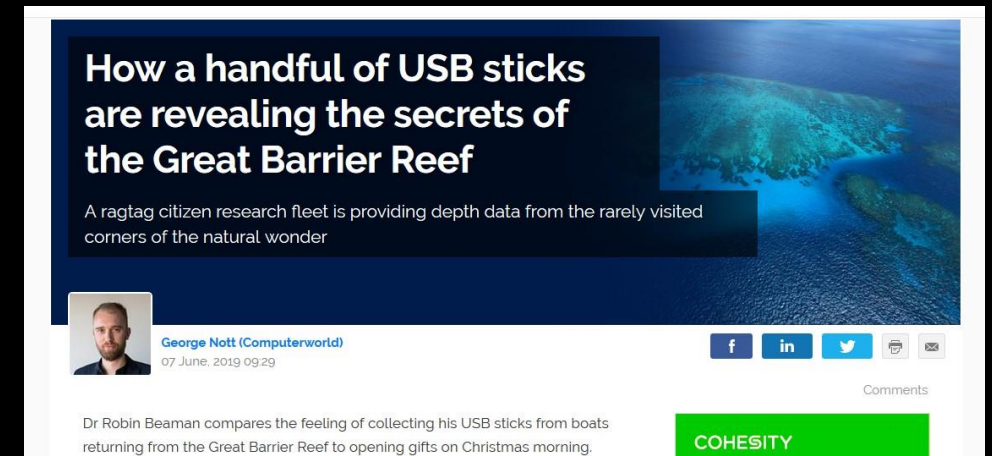
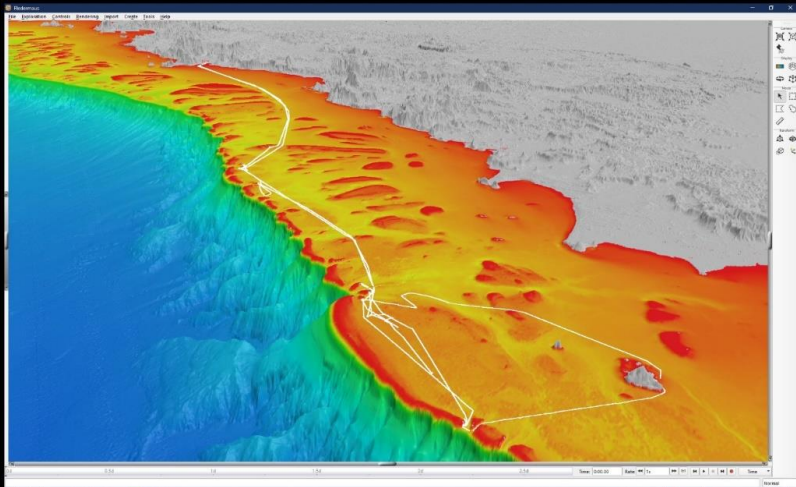
- 3-4 hours installation <sup>c</sup>
- 1 hour data download
- 1 hour data preparation
- 1 hour HIPS process
- 1 hour email/feedback

<sup>c</sup> one off time cost



# Feedback

- owners of volunteer vessels have a wide variety of motivation
- e.g. 'to help the GBR', demonstrate sustainability, use in education etc.
- need to establish a relationship
- JCU Consent and Release Form
- contact each vessel every 1-2 months
- download data and show 3D at boat
- later provide 3D image and email feedback to owner
- give feedback to funding agency
- seek opportunities for media outreach



<https://www.computerworld.com.au/article/662628/how-a-handful-of-usb-sticks-are-revealing-the-secrets-of-the-great-barrier-reef/>

# Future work

- complete JCU as IHO 'Trusted Node'
- upload clean (untided) data to IHO DCDB
- send clean (untided) data to AHO via AH68 form
- generate total propagated error (TPE) for each vessel
- develop crowdsourced bathy guideline for Australia
- aim for 20 vessels by end of 2020
- raise more funds