A Portable Red Tide Detection/Counting System For Under $500

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GCOOS-RA
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ABOUT ME

• Four years in the US Navy as Naval Aircrew
• 2 years at Duke Marine Lab as EE on R/V Cape Hatteras
• Seismic data cruises to Indian Ocean/Africa with LDEO/Columbia University
• 18 years at Duke University as Director of Data Communications
• 9 years at Mote Marine Laboratory as Senior Data Engineer
• GCOOS-RA since November 2014 as Data Scientist/Research Specialist
• Research focus on data exploration/visualization and deep learning
• Passionate Open Source Advocate
HABSCOPE TEAM

DR. RICK STUMP
Principal Investigator

DR. BARBARA KIRKPATRICK
Co-PI/GOOS Executive Director

BOB CARRIER
Senior Data Engineer/Product Developer

DR. WAYNE LITAKER
NOAA

RANCE HADSON
NOAA

CHRIS HOLLAND
NOAA

DR. JOHN PAUL

DR. TRACY PANARA

DEVIN BURRIS
HAB forecasts are low resolution – per county or a subset of beaches
Long lead time for results – up to a week
Limited staff for sampling
Original concept: volunteers with smart phones
Low-cost “Instructables” microscope w/laser pointer lens
Videos uploaded to GCOOS for hosting
Videos reviewed by HAB analyst
Provide localized data for NOAA forecasting models
INITIAL CONCEPT
PROBLEMS WITH INITIAL CONCEPT

- Extremely hard to align camera with lens hole
- Low quality laser pointer lens
- Magnification too high
- Very limited field of view
- No protection from environmental conditions
- Vibration/bumping a problem
NEW PLAN

- Off-the-shelf microscope
- Apple iPod Touch
- 3D printed adapter by GJK
- Straight Talk hot spot
- Total Cost: $500
VOLUNTEERS COLLECT WATER SAMPLES
VOLUNTEERS COLLECT WATER SAMPLES
Processing on-site
AUTHENTICATION AND UPLOAD

Login

-82.55738  28.89645

Capture Video

Upload Video

Log out
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HABSCOPE IN ACTION
• Cell counts accurate to within +/- 10% of manual count
• The lower the cell count the wider the margin of error
• We are counting LIVE cells in motion w/only 30% FOV
• Some problems w/objects of similar size, shape and movement
• Some problems w/camera noise on edge of image
Disclaimer

**Please Note:** This is an experimental forecast of potential respiratory irritation that may occur because of airborne toxins produced by the Gulf of Mexico red tide organism *Karenia brevis*. It indicates a greater or lesser likelihood of negative conditions based on predicted wind and ocean currents.

The location and time of respiratory irritation can change due to unpredicted bloom movements or unexpected changes in actual wind or ocean currents. Health officials advise that people with underlying chronic respiratory problems should avoid red tide areas and take all medications as prescribed, including having access to rescue inhalers.

This experimental forecast is currently being tested for efficacy and is not yet an official forecast. Daily availability of the product cannot be assured.

[Disclaimer](https://habscope.gcoos.org/forecasts)
RESPIRATORY FORECASTS

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MUCH WORSE LAST MONTH...

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Recently heard from WHOI Imaging Flow Cytobot group
- They are interested in leveraging HABscope’s work with DL
- Two Letters of Intent submitted to NOAA MERHAB funding opportunity
- LOI to add multiple species to HABscope model list
- LOI to ‘operationalize’ Every Beach Every Day forecasting tool
- Many counties, agencies and researchers queued up to try HABscope
ACKNOWLEDGEMENTS

- NASA for the Research Opportunities in Space and Earth Sciences grant
- NOAA scientists and technicians
- Florida Fish and Wildlife Conservation Commission
- Pinellas County staff
- All of our wonderful HABscope volunteers

THANK YOU