

# ***M/V Alucia* and the Dalio Ocean Initiative**

**Rob Munier**  
**Vice President**  
**Woods Hole Oceanographic Institution**

**Vincent Pieribone**  
**Chairman**  
**Dalio Ocean Initiative**

- Historical Perspective - Rob
- Dalio Ocean Initiative - Vincent
- Discussion



**Ray Dalio**

Founder and Principal, Bridgewater Associates

Dalio Foundation, Ray and Barbara Dalio

Founder, Dalio Ocean Initiative

- Philanthropist
- Ocean enthusiast and advocate
- Ideas into action

# M/V *Alucia*

**M/V *Alucia***

Ex-*Nadir*

56 m

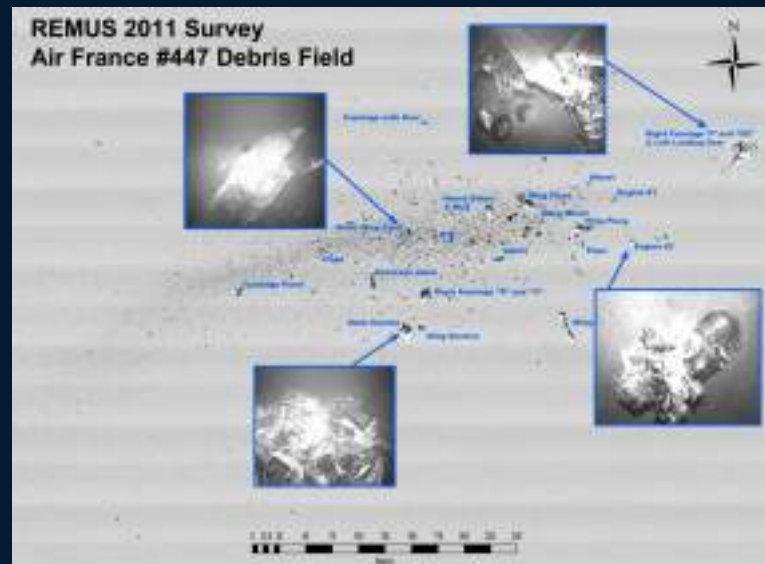
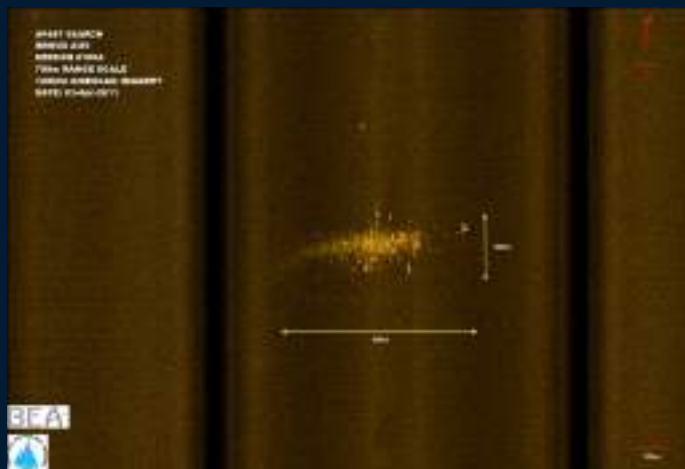
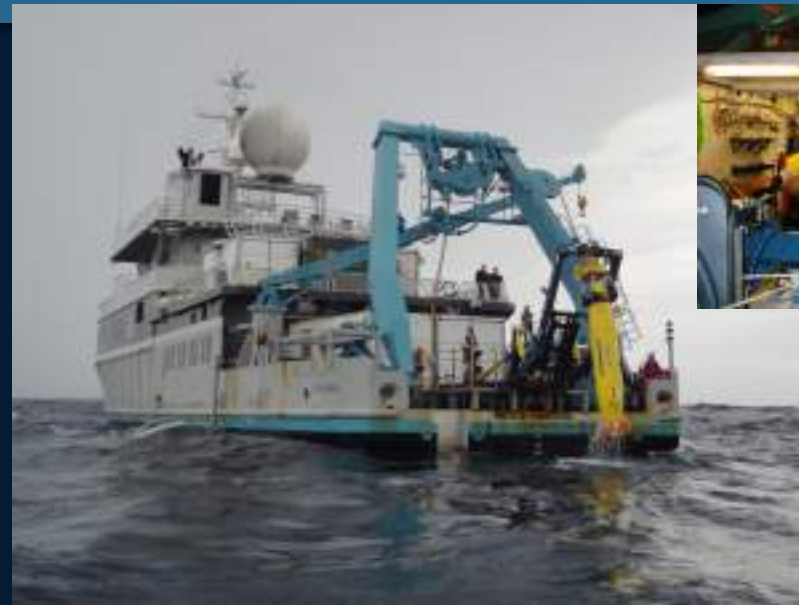
1300 tons

42 berths



# Initial Link

# Air France Flight 447



# Key Milestones

## 2011

Acquisition of Alucia  
1<sup>st</sup> Alucia refit

## 2012

First Mission – Giant Squid  
WHOI management of Alucia

## 2013

Alucia Productions founded  
Acquisition of REMUS 6000  
Acquisition of Umbra

## 2014

REMUS lease executed  
WHOI management of Umbra

## 2015

Acquisition of VPR  
Alucia bareboat charter  
Dalio Ocean Initiative established

## 2016

Acquired Volstad Surveyor  
Sold Umbra

# An Evolutionary Process

- Create a credible oceanographic capability through investments and partnerships
- Focus on science and exploration
- Create a capability to address awareness issue
- Add media element
- Launch missions that meet a high science and media bar
- Create integrated solution

*Participate and enjoy the process along the way*

# M/V Alucia - Operations

## Commercial Arrangement

Owned by Beta Maritime (an SPE)  
Operated by WHOI under bareboat charter  
Charter revenues go to WHOI  
Capital improvements paid by BM as approved





# Submersibles



## HOV Triton

3 person

1000 m

Top load

Platform for HD imagery



## HOV Deep Rover 2

2 person

1000 m

Bottom load

Platform for science and imagery

# Helicopter



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# Dive System



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# *Alucia* Mission Control



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# Projects



Fabricate new sphere for DR 2 submersible 2014



Provide motion compensated oceanographic winch system

2013

# Projects



M/V Alucia in dry dock, Bay Ship & Yacht, Alameda, CA 2015



Engineer, procure and install soot elimination system

2013

# REMUS 6000

## Commercial Arrangement

Owned by Dalio Foundation  
Managed by WHOI under lease agreement  
Annual O&M fee paid to WHOI  
Project revenues go to WHOI  
Use Fee paid to DF per operational day  
Capital improvements paid by DF as approved

## Projects

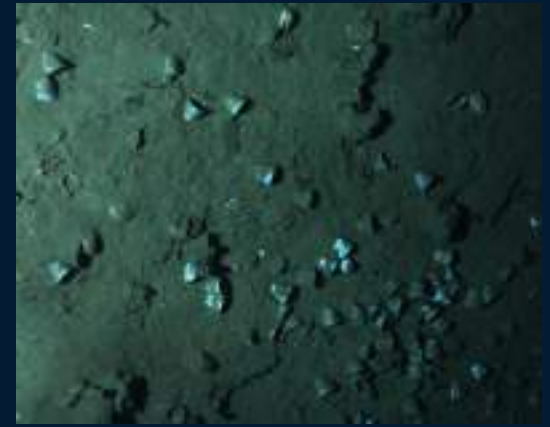
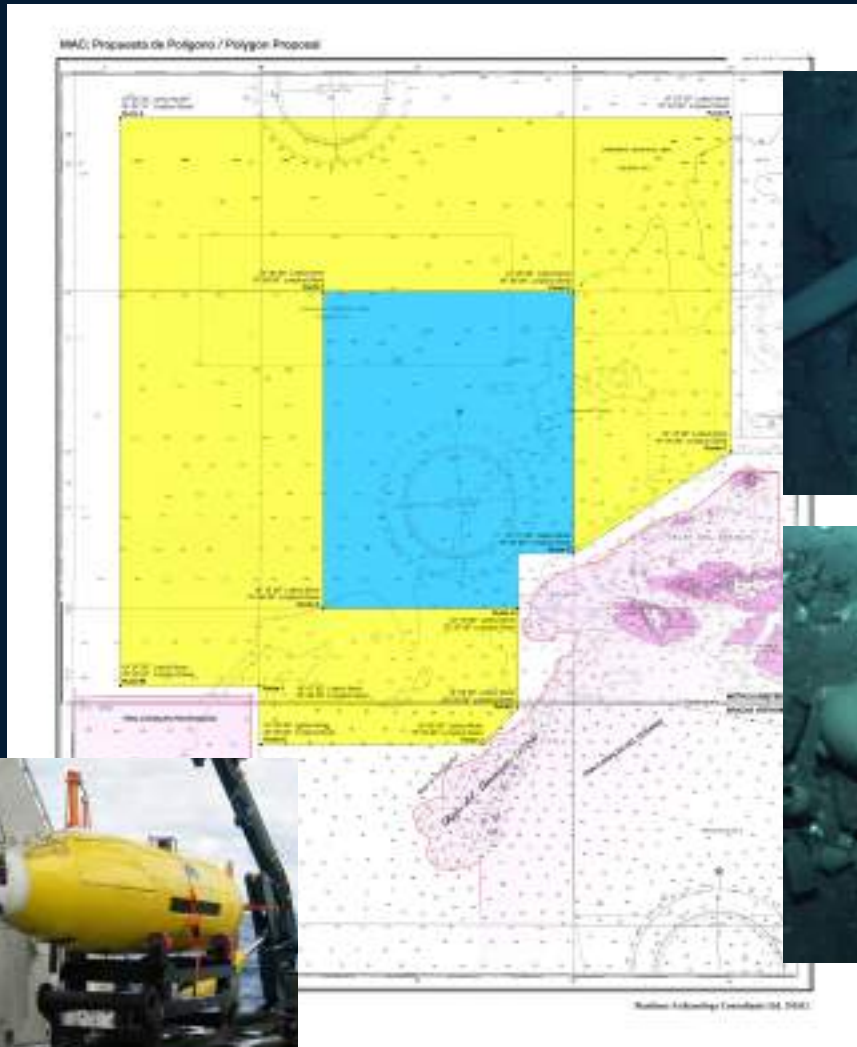
Deep bathymetric surveys  
Searches





# Remus 6000

# Spanish Galleon *San Jose*





# Video Plankton Recorder

## Commercial Arrangement

Owned by Dalio Foundation  
Managed by WHOI under no-cost lease  
Charged at cost; no fee for use  
Capital improvements paid by DF as approved  
Grant for development of next gen VPR



## Projects

Trans-Pacific  
Tropical Atlantic



# Alucia

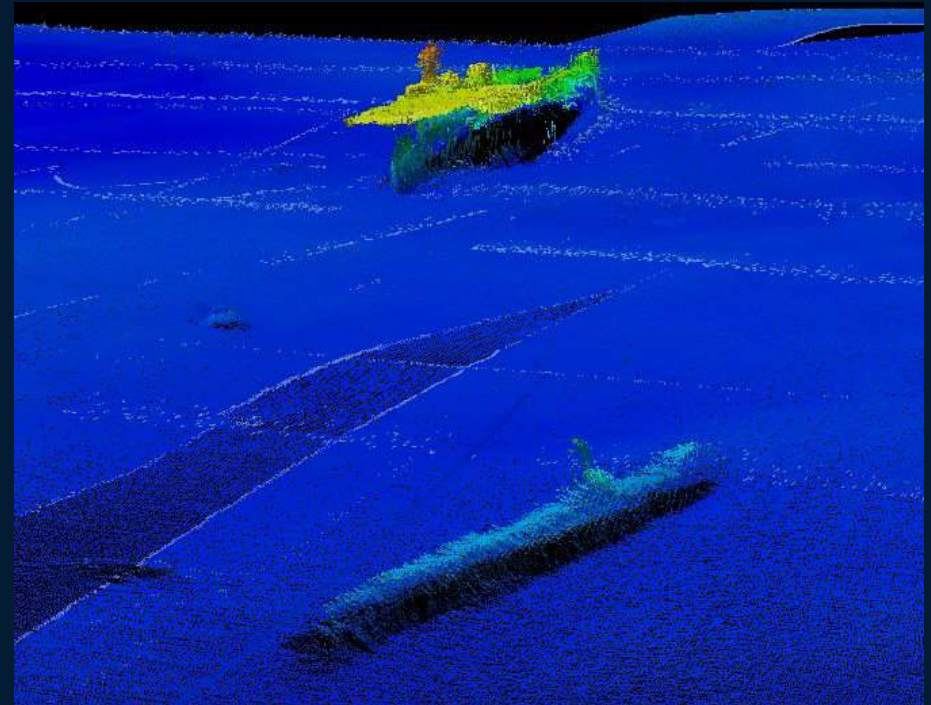
# Operational Summary

Science missions	26
Media Missions	15
Private Missions	<u>8</u>
Total	49

Shipyards Periods	4
Maintenance periods	2
Crossings of the Pacific	2
Crossings to Antarctica	3

Countries visited 20

*US Japan Micronesia Palau New Zealand Solomon Islands Australia*  
*Papua New Guinea Indonesia Vanuatu French Polynesia Easter Island*  
*Fiji Costa Rica Panama Mexico Chile Antarctica Uruguay Brazil*



# Partners



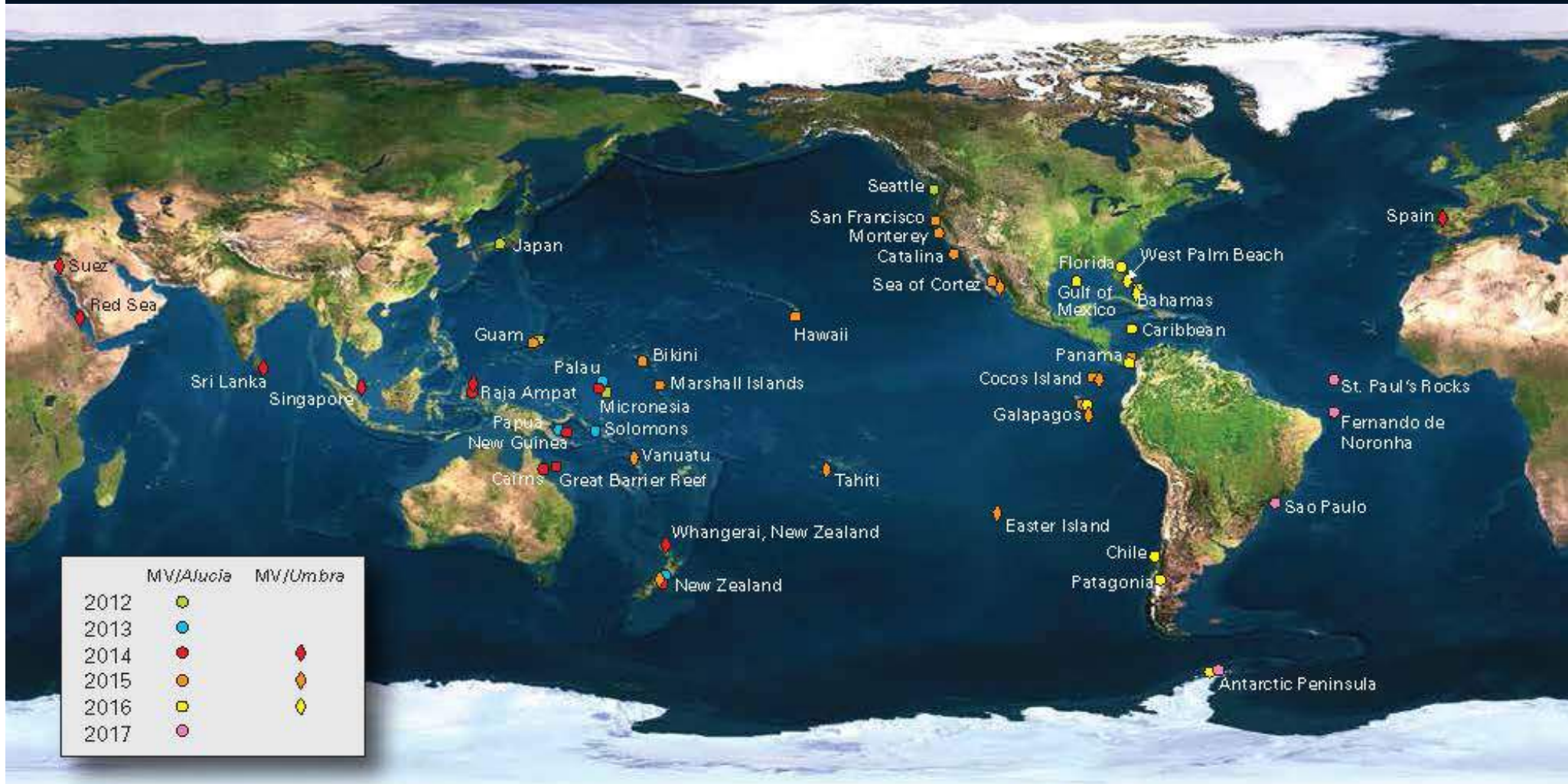
CONSERVATION  
INTERNATIONAL



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# Vessel Operation Areas



# Research



Hughen and Aprill    Micronesia    2013



Moore                      New Zealand                      2013



Soule et al                      Galapagos                      2015



# Research



Buesseler et al      Bikini      2015



Whale Sharks, Galapagos      *Pretoma*

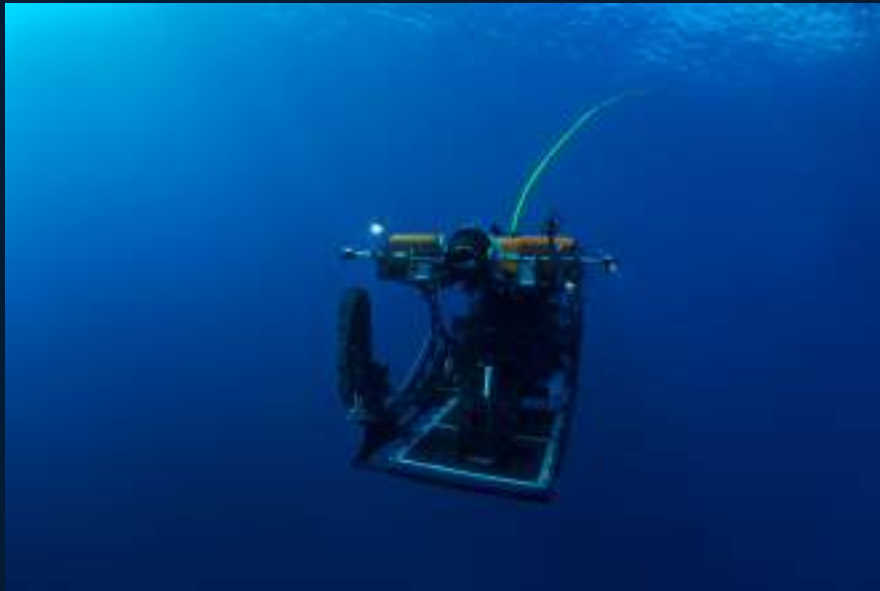


Jenouvrier et al      Antarctica      2015-2016



Pineda et al      Panama      2015

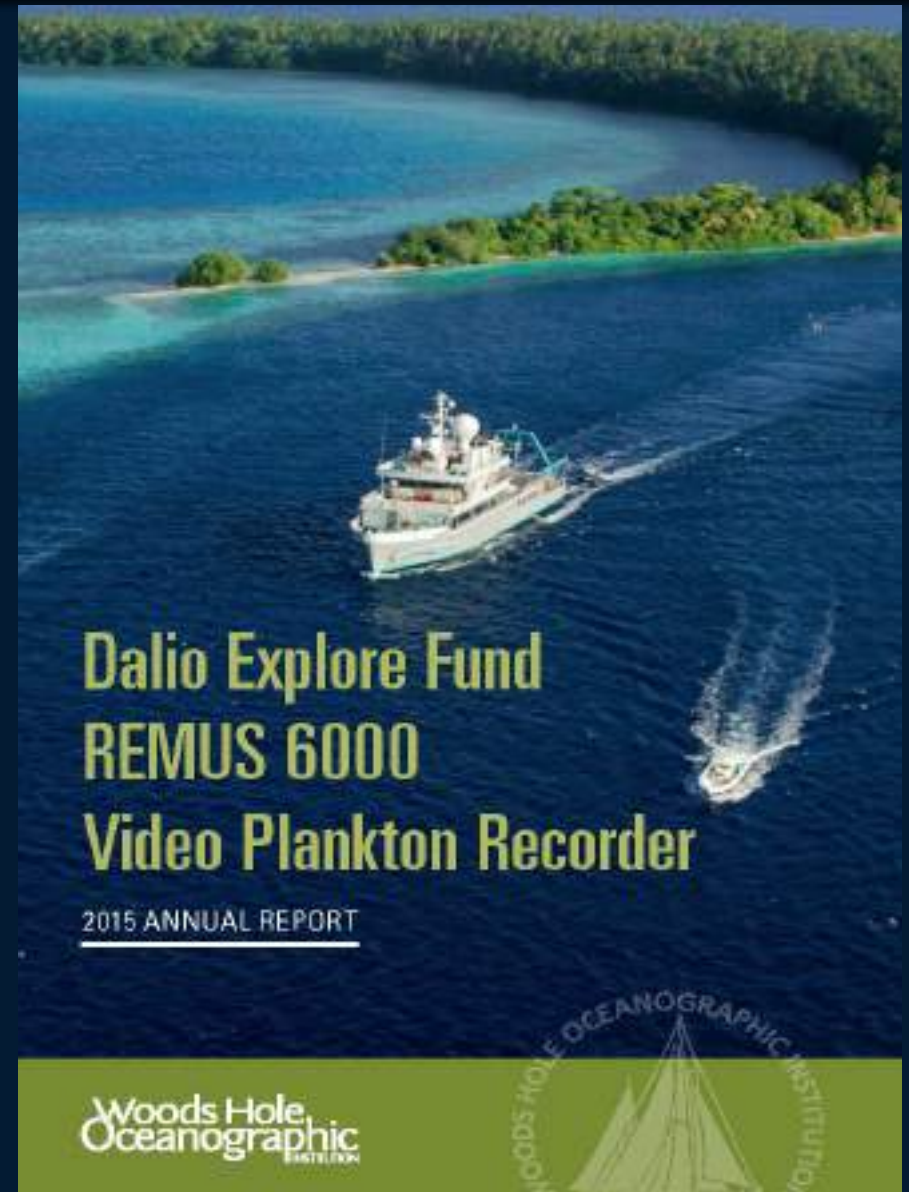
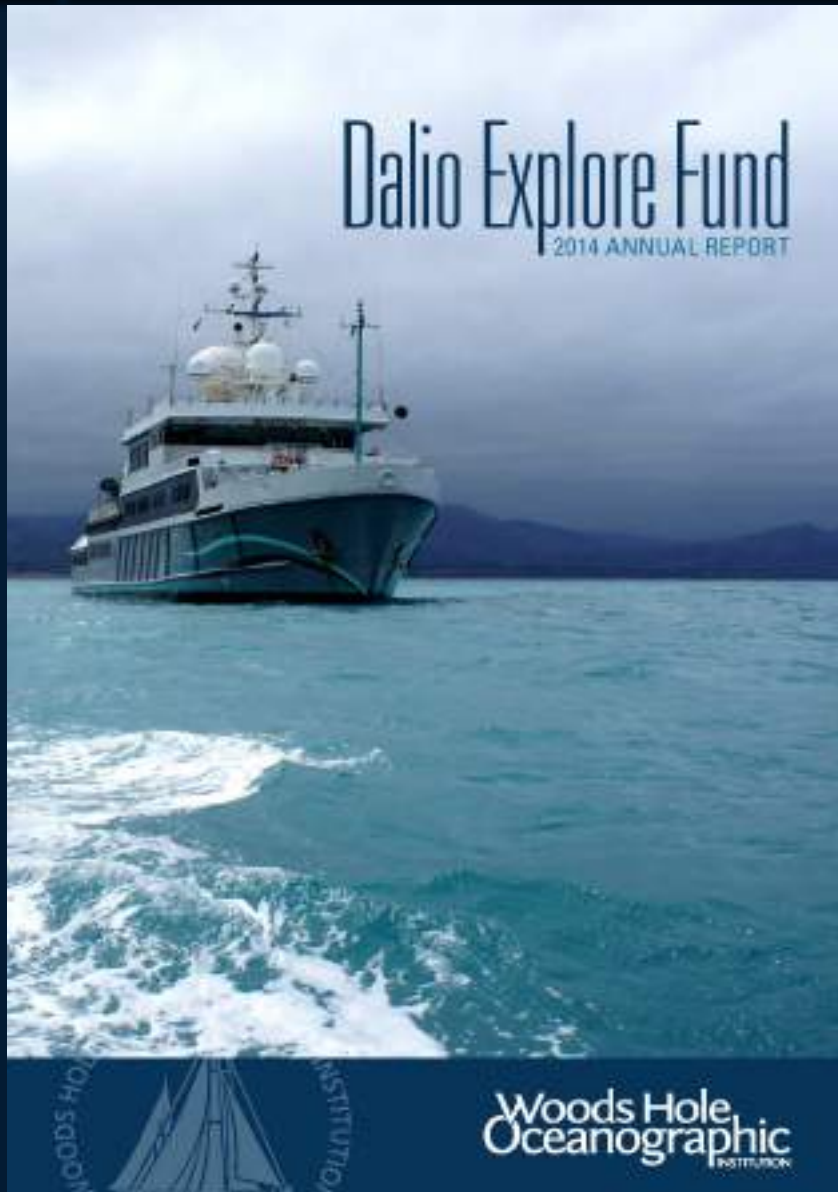
# Technology



Nereid Hybrid Tether  
Optical Communications  
CPICS



# Dalio Explore Fund



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# Peer Reviewed Publications

Published papers by WHOI scientists regarding Dalo, Dalo Ocean Initiative, Dalo Family as of 6/2017

- Neave, M. J., Rachmawati, R., Xun, L. P., Michell, C. T., Bourne, D. G., Appril, A., & Voolstra, C. R. (2017). Differential specificity between closely related corals and abundant *Endosymbionas endosymbiontes* across global scales. *ISME Journal*, 11(1), 186-200. doi: 10.1038/ismej.2016.96
- McNally, S. P., Parsons, R. J., Santoro, A. E., & Appril, A. (2017). Multifaceted impacts of the stony coral *Porites astreoides* on picoplankton abundance and community composition. *Limnology and Oceanography*, 62(1), 217-234. doi: 10.1002/lno.10389
- Barkley, H. C., Cohen, A. L., McCorkle, D. C., & Golbuu, Y. (2017). Mechanisms and thresholds for pH tolerance in Palau corals. *Journal of Experimental Marine Biology and Ecology*, 489, 7-14. doi: 10.1016/j.jembe.2017.01.003
- Work, T. M., Aeby, G. S., & Hughan, K. A. (2016). Gross and Microscopic Lesions in Corals from Micronesia. *Veterinary Pathology*, 53(1), 153-162. doi: 10.1177/0300668515571669
- Pineda, J., D'Onofrio, W., Starczak, V., Govindarajan, A. F., Guzman, H. M., Gichar, Y., Holleran, R. G., Churchill, J., Singh, H., & Ralston, D. K. (2016). A crab swarm at an ecological hotspot: patchiness and population density from AUV observations at a coastal, tropical seamount. *PeerJ*, 4. doi: 10.7717/peerj.1770
- Brandon, C. M., Woodruff, J. D., Orton, P. M., & Donnelly, J. P. (2016). Evidence for elevated coastal vulnerability following large-scale historical oyster bed harvesting. *Earth Surface Processes and Landforms*, 41(5), 1136-1143. doi: 10.1002/esp.3951
- Barkley, H. C., & Cohen, A. L. (2016). Skeletal records of community-level bleaching in *Porites* corals from Palau. *Coral Reefs*, 35(4), 1407-1417. doi: 10.1007/s00335-016-1483-3
- Donnelly, J. P., Hawkes, A. D., Lane, P., MacDonald, D., Shuman, B. N., Toomey, M. R., van Hengstum, P. J., & Woodruff, J. D. (2015). Climate forcing of unprecedented intense-hurricane activity in the last 2000 years. *Earth's Future*, 3(2), 48-65. doi: 10.1002/2014EF000274
- Brandon, C. M., Woodruff, J. D., Donnelly, J. P., & Sullivan, R. M. (2014). How Unique was Hurricane Sandy? Sedimentary Reconstructions of Extreme Flooding from New York Harbor. *Scientific Reports*, 4. doi: 10.1038/srep07369
- Aeby, G. S., Work, T. M., & Hughan, K. A. (2014). The first cyanobacterial infection of crustose coralline algae discovered on the reefs of Pohnpei, Micronesia. *BULLETIN OF MARINE SCIENCE*, 90(3), 673-674. doi: 10.5343/bms.2014.1018
- Barkley, H. C., Cohen, A. L., Golbuu, Y., Starczak, V. R., DeCarlo, T. M., & Shamberger, K. E. F. (2015). Changes in coral reef communities across a natural gradient in seawater pH. *Sci Adv*, 1(5), e1500325. doi: 10.1126/sciadv.1500325
- Bowen, A. D., Jakuba, M. V., Farr, N. E., Ware, J., Taylor, C., Gomez-Ibanez, D., Machado, C. R., & Pontbriand, C. (2013). An un-tethered ROV for routine access and intervention in the deep sea.
- Breier, C. F., Pike, S. M., Sobesta, F., Tradd, K., Breier, J. A., & Buesseler, K. D. (2016). New applications of <sup>235</sup>U-PAN resin for broad scale monitoring of radionesium following the Fukushima Dai-ichi nuclear disaster. Paper presented at the 10th International Conference on Methods and Applications of Radioanalytical Chemistry (MARC), Kailua Kona, HI.
- Pausata, F. S. R., Emanuel, K. A., Chiacchio, M., Diro, G. T., Zhang, Q., Sushama, L., Stager, J. C., & Donnelly, J. P. (2017). Tropical cyclone activity enhanced by Sahara greening and reduced dust emissions during the African Humid Period. *Proc Natl Acad Sci U S A*. doi: 10.1073/pnas.1619111114
- Weber, L., DeForce, E., & Appril, A. (2017). Optimization of DNA extraction for advancing coral microbiota investigations. *MICROBIOME*, 5(ARTN 18). doi: 10.1186/s40168-017-0229-y
- Barkley, H. C. (2016). A scientific framework for evaluating coral reef resilience to climate change. (Ph.D.), Massachusetts Institute of Technology and the Woods Hole Oceanographic Institution. Retrieved from <https://hdl.handle.net/1912/9427>

# Media



BBC  
NHK  
Atlantic Productions  
Alucia Productions  
MFF  
Silverback



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Nicklen

# Three Thumbs Up

- Good science
- Good media
- Economic sustainability

# “Three Thumbs Up” Missions



Giant Squid NHK Japan



Bioluminescence AMNH Solomon Islands



Years of Living Dangerously Bahamas, Turks & Caicos, Haiti

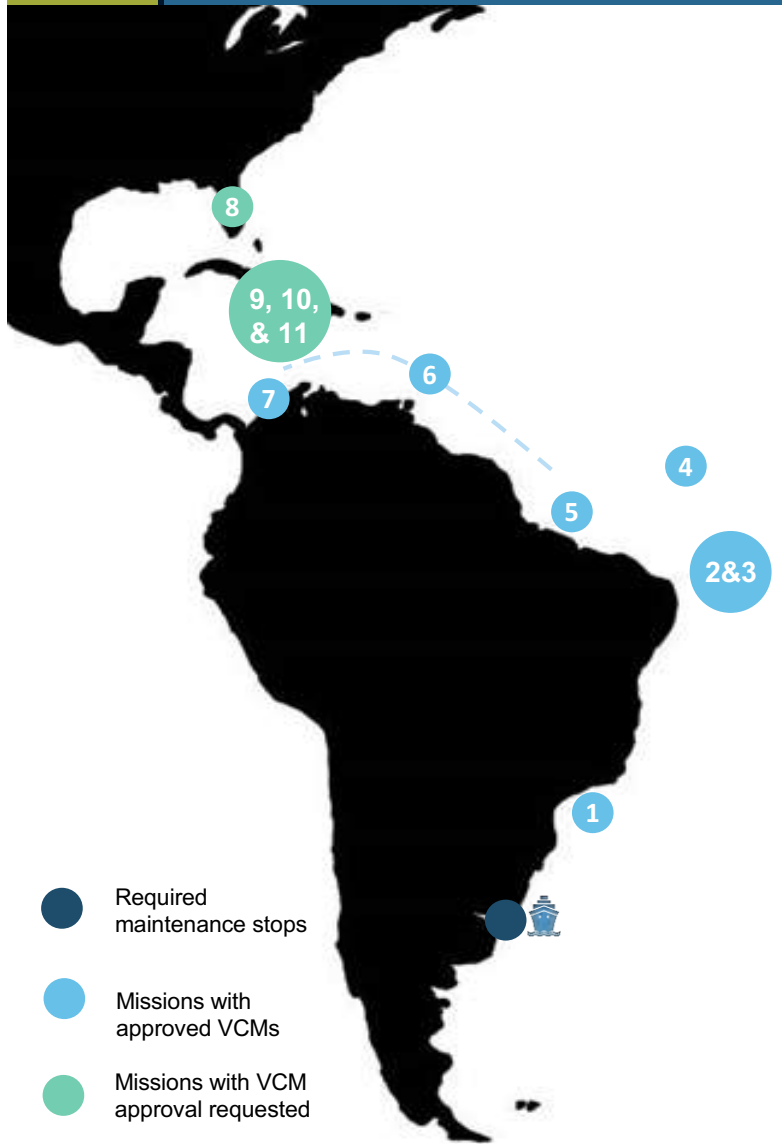


Documentary Great Barrier Reef David Attenborough

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# 2017 Vessel Mission Partnership Summary



Location	Dates	Mission	Media Partner	Science
Montevideo, Uruguay	Mar - Apr	Maintenance & ABS Survey	N/A	
1. Sao Paulo Coast, Brazil	Apr 24 - May 5	Bioluminescence Discovery	MACGILLIVRAY FREEMAN AMERICAN MUSEUM OF NATURAL HISTORY	
2. Fernando de Noronha, Brazil	May 15 - 28	Spinner Dolphins & Cookiecutter Sharks	MACGILLIVRAY FREEMAN	
3. Fernando de Noronha, Brazil	June 1 -14	Spinner Dolphins	TBD <sup>1</sup>	
4. St. Paul's Rock, Brazil	June 18 - Jul 9	Hydrothermal Vents	CALIFORNIA ACADEMY OF SCIENCES	WOODS HOLE OCEANOGRAPHIC INSTITUTION 1930
5. Mouth of Amazon, Brazil	Jul 13 - 26	Coral Discovery & Exploration	PBS BBC	
6. Transit from the Amazon to Cartagena	Jul 30 - Aug 10	VPR II Transit	N/A	WOODS HOLE OCEANOGRAPHIC INSTITUTION 1930
7. Cartagena, Colombia	Aug 14 - Sep 3	Deep-sea Exploration & CI Celebrity Event	CONSERVATION INTERNATIONAL	WOODS HOLE OCEANOGRAPHIC INSTITUTION 1930
8. Florida	Sep 13 - 24	Lophelia Reefs	SILVERBACK	
9. Cuba	Oct 12 - 27	RTD trip	N/A	Approval Requested
10. Cuba	Oct 31 - Nov 11	Gardens of the Queen	UNIVISION FUSION	WOODS HOLE OCEANOGRAPHIC INSTITUTION 1930
11. Cuba	Nov 12 - 24	Bioluminescence	MACGILLIVRAY FREEMAN AMERICAN MUSEUM OF NATURAL HISTORY	

1. Contractual breach CNN with Phillipe Cousteau – exploring mission options later in year

# Setting the Stage

- Access to resources
- A new model
- Nimble
- Investment in Infrastructure
- O&M

*An opportunity for partnerships*