A Novel Wave Glider Based Tsunami Warning System

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The ocean is a difficult, dangerous, and expensive place to operate

Send robots, not researchers!

Why Ocean Robots?

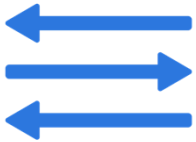
When ocean data collection is…

DANGEROUS

Requires operating in a high risk environment

EXPENSIVE

Requires satellites, ships, buoys, and planes



DYNAMIC

Needs continuous monitoring and retasking

GLOBAL

Covers vast, hard to reach areas

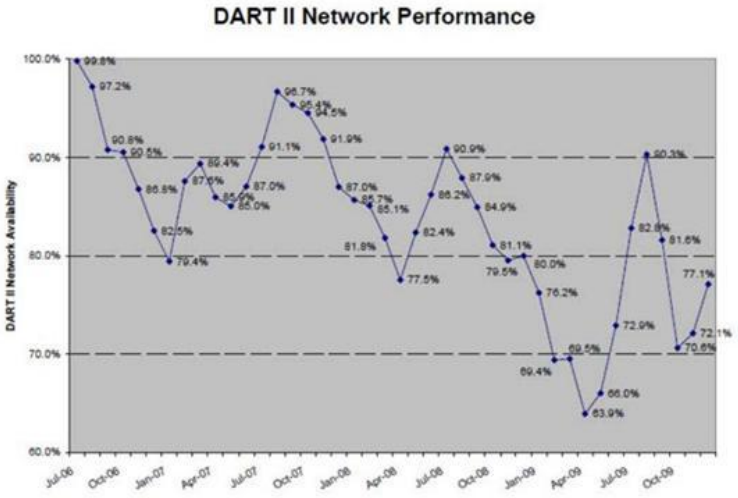
Tsunami buoys are good but…

Placement is expensive

They need placed in dangerous, remote areas

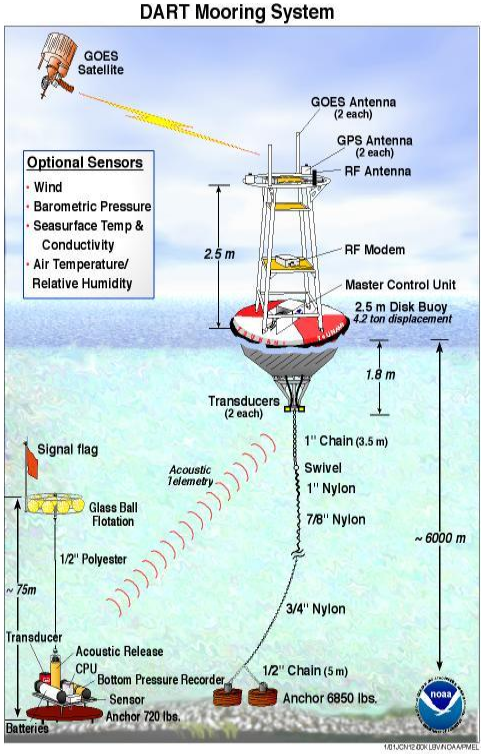
They can not swim away from vandals

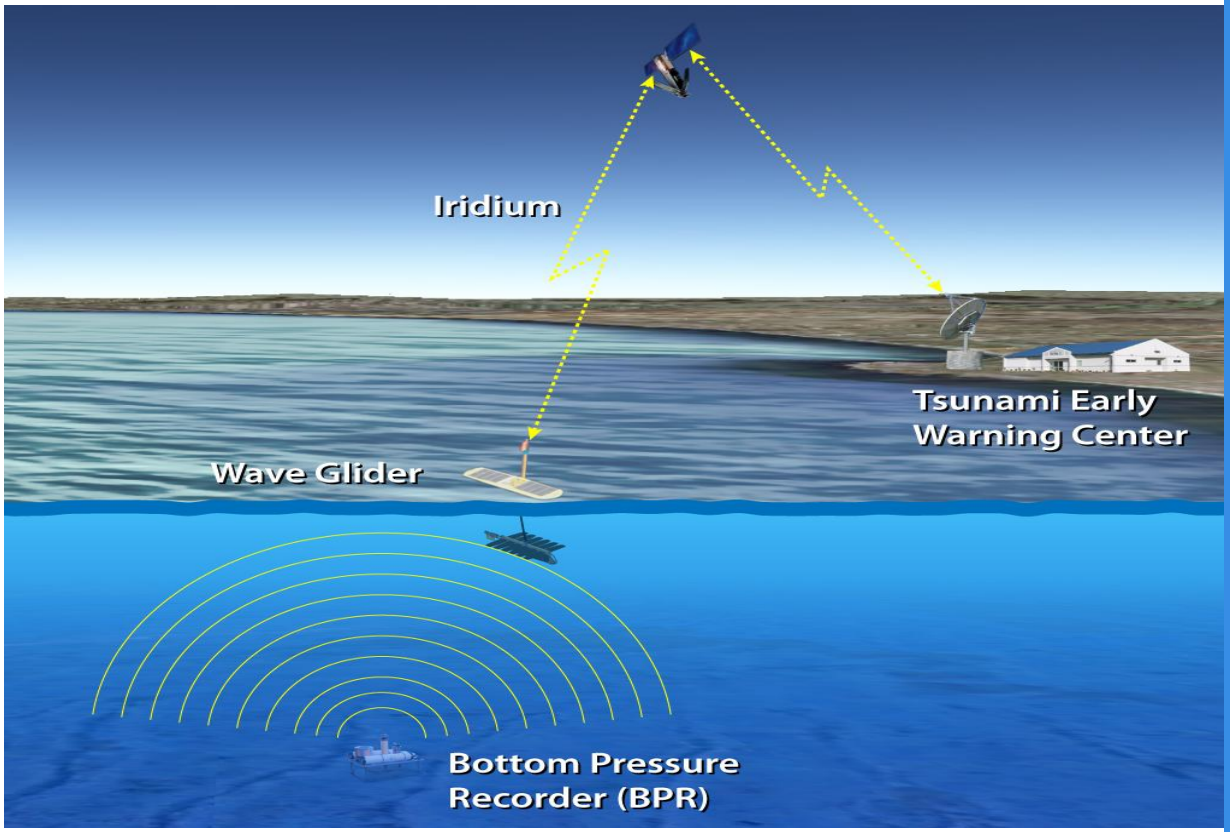
They are prone to collision and failure

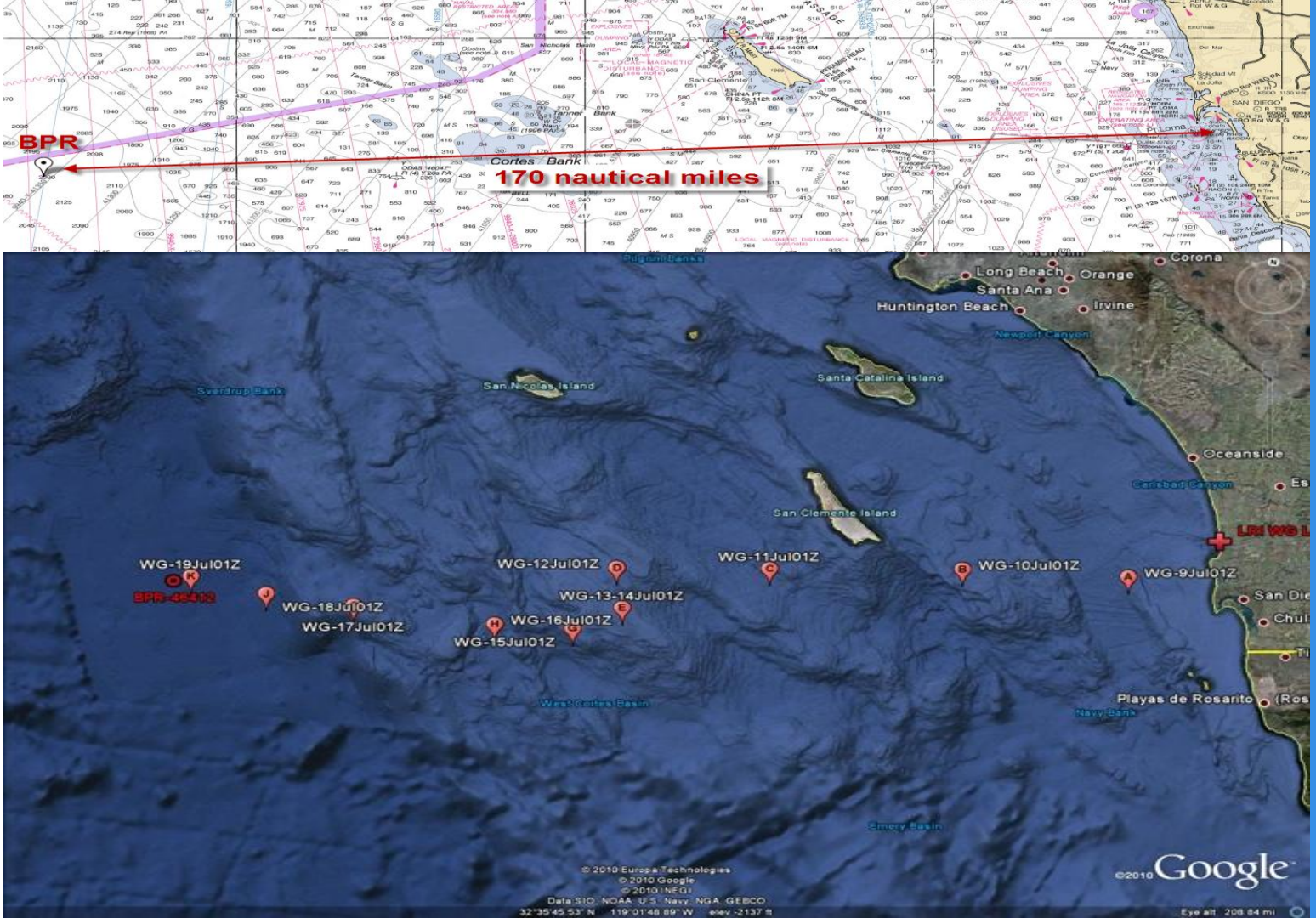


Wave Glider SV3

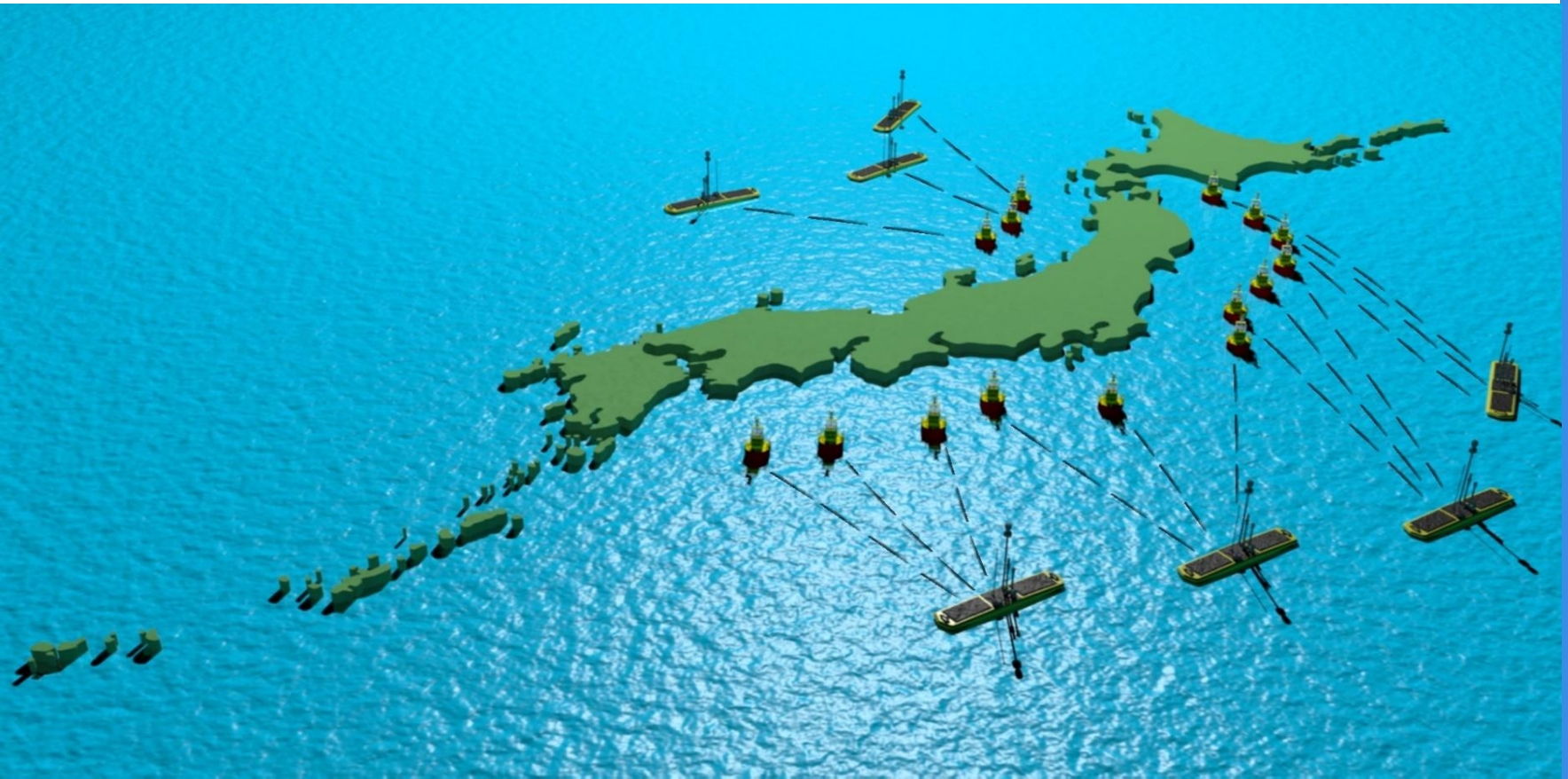
- Autonomous sensor platform
- Optimized for fleets at global-scale
- All weather, 24/7/365
- Persistent access, up to 12-month missions
- Secure seafloor-to-space communications
- Scalable onboard computing
- High ROI







Tsunami detection networks become more reliable and lower cost.

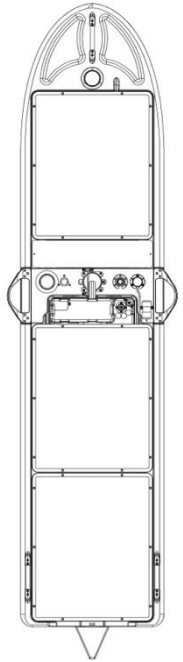


What can fleets of Wave Gliders do for you?

Backup

Platform Specifications

Endurance	Up to 1 year
Operating Water Depth	> 10m
Station Keeping	40m radius (CEP90)
Speed	1 to 3 kts
Payload	7 Modular bays (93L)
Avg Continuous Power	5 – 20W
Peak Power Potential	360W
Solar Collection Rate	150W
Battery Storage	0.9 – 4.5kWh
Communications	Cell, Satellite, WiFi



Software + Computing

Software

Intelligent autonomy for fleets

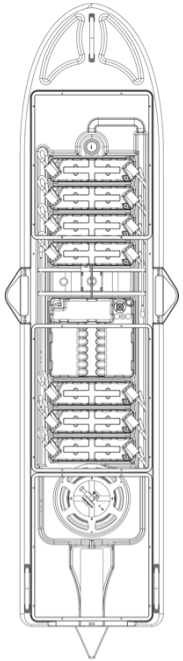
Real-time downloads and mission reconfigurations at sea

Data preprocessing and compression

Java-based kernel running on Linux (Regulus OS)

Data Portal

Wave Glider Management System (WGMS)



Computing

Low power, scalable computing and storage

Unified, dynamic comms framework

Data queuing optimization

Single Core DM3730 processor, 800 MHz

512 MB flash memory

2 to 14 TB storage (expandable)

Payload Connections: Bluetooth, Serial Ethernet, WiFi

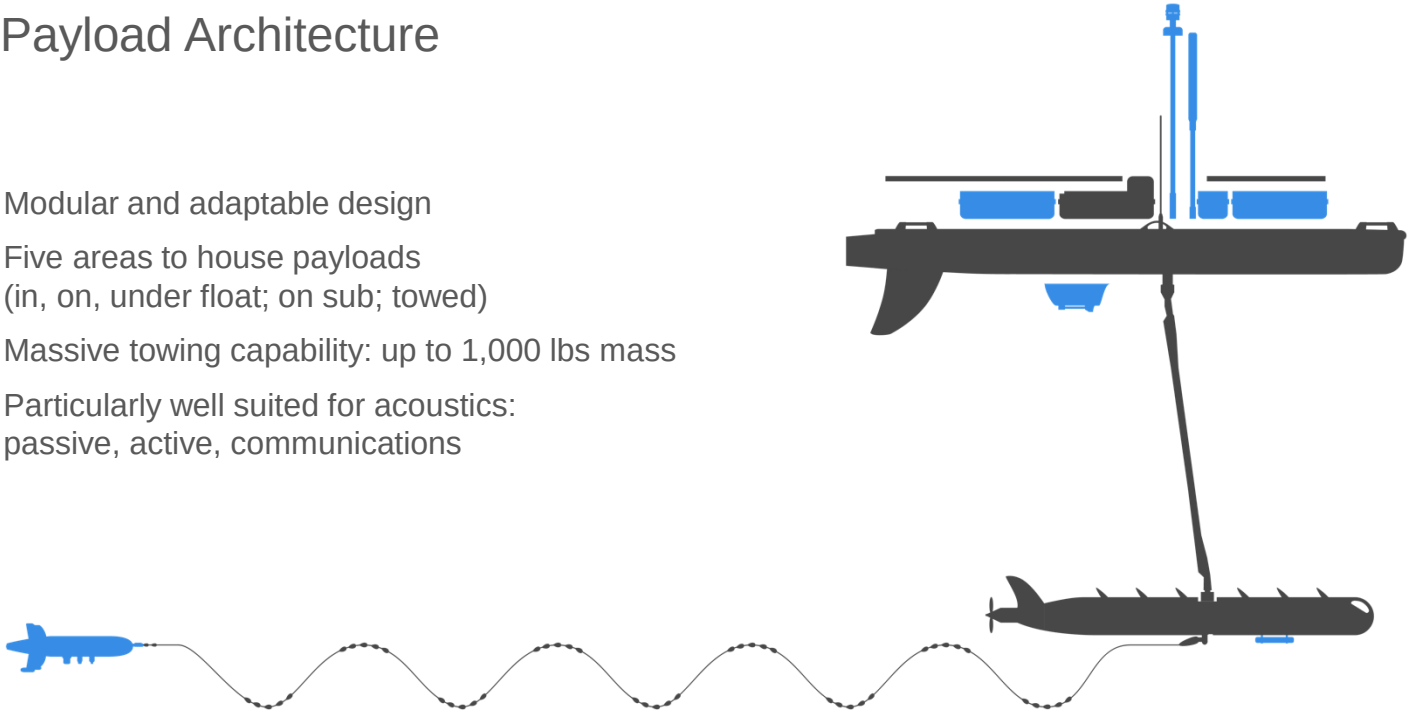
Payload Architecture

Modular and adaptable design

Five areas to house payloads
(in, on, under float; on sub; towed)

Massive towing capability: up to 1,000 lbs mass

Particularly well suited for acoustics:
passive, active, communications



15	Hurricanes navigated
51	Unique sensors integrated
282	Vehicles manufactured
9,380	Longest single mission (NM)
15,786	Total days at sea
225,000	Platform cost (US$)
400,000+	Miles traveled to date
24,000,000	Data packets delivered (2014)

Low-observable