World Ocean Forum 2016

Session 2-1

스마트조사선 이사부호의 대양탐사 계획과 해양강국의 대양탐사 동향

Ocean exploration plan using the smart research vessel 'Isabu' and the trend of ocean exploration in other marine powers

2016. 10. 12.

Youn-Ho Lee, Leader
Strategy Development Section
Korea Institute of Ocean Science and Technology

21st Century,
A New Era of Ocean Exploration

최신기사

뉴스 홈 > 최신기사

중국 심해 1만m 잠수 탐사 시대 열어

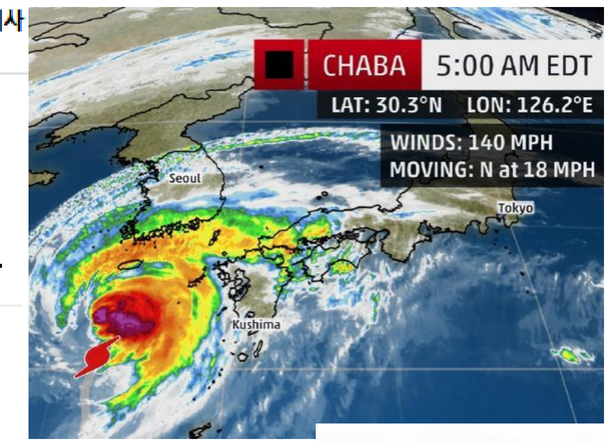
송고시간 | 2016/08/24 19:34

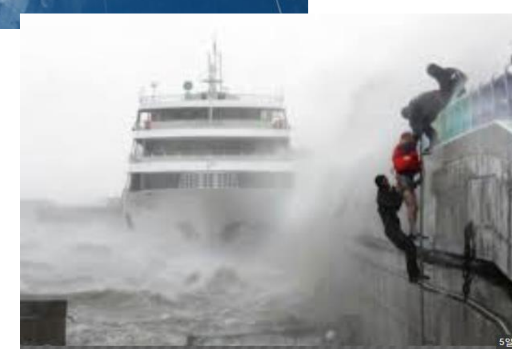
BAND blog

(베이징=연합뉴스) 심재훈 특파원 = 중국

24일 신화통신 등에 따르면 중국의 '탄쒀(

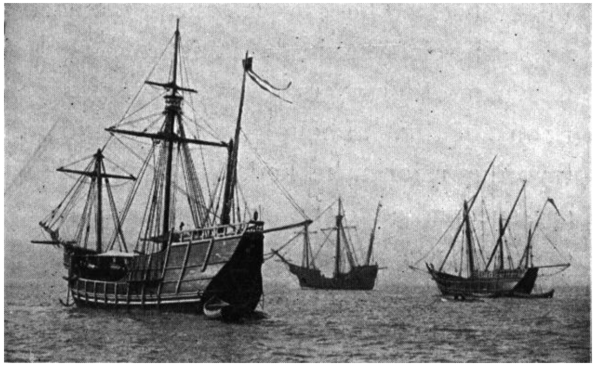
12일까지 진행된 마리아나해구 심해 탐사를 성공적으로 마무리했다.





History of Ocean Explorations

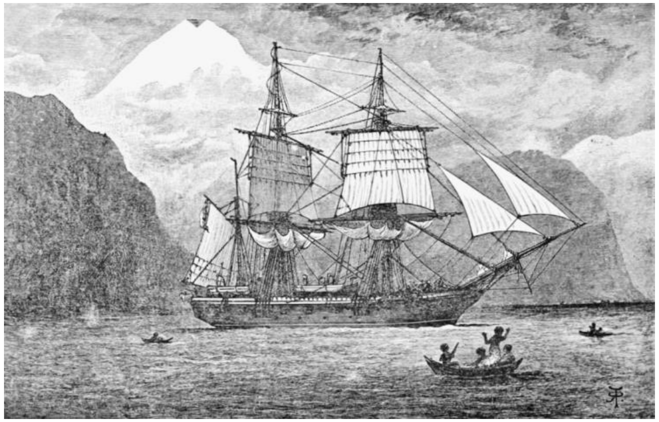
1. Age of Discovery



- 15^{th} century to early 17th century
- Bartholomew Dias, Columbus, Magellan
- Spain and Portugal; colonization

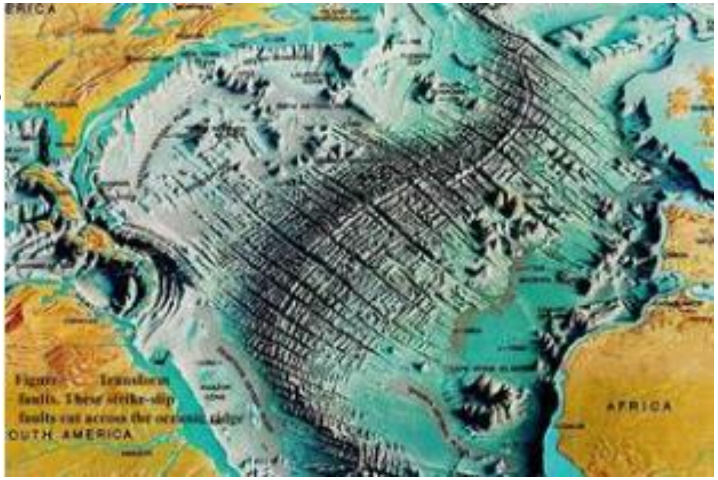
2. Age of Enlightenment

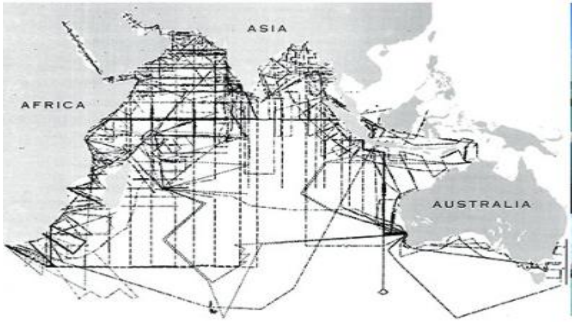
- mid-18^{th} century to 19th century
- England, France, Russia, Spain, Netherlands, U.S., Italia, Austria, Belgium, Germany …
- Scientific Voyages
- HMS Beagle (1831-36), HMS Challenger (1873-76) …



3. Age of Understanding

- 1950s to 1960s (after the 2^{nd} world war),
- prompted by International Geophysical Year (1957-58)
- Discovery of mid-Ocean Ridges, plate tectonics…
- Deep tow system, multibeam ecosounder, deep sea submersibles…
- International collaboration programs
  * Indian Ocean Expedition (1962-65)
  * Cooperative Study of the Kuroshio and adjacent regions (1965-77)
  * Deep Sea Drilling Program (1968~)





4. A New Era of Ocean Exploration

- 21st century
- Smart Large Research Vessels, Satellites, Autonomous Underwater Vehicles…
- Exploration for marine minerals, oil and gas, and bio-resources.
- Global scale measurement of ocean processes to understand the climate change

president clinton launches a new era of ocean exploration
www.noaanews.noaa.gov/stories/s442.htm ▾ 이 페이지 번역하기
PRESIDENT CLINTON LAUNCHES A NEW ERA OF OCEAN EXPLORATION. Coral Reef June 12, 2000 — At a White House Millennium Council matinee ...

Construction of global/ocean class R/V

Nation	Total number of GOC R/V	New built(after 2015) Global/Ocean class R/V
U.S.	18	■ Sally Ride (2016), Neil Armstrong (2015)
Japan	23	■ Kaimei (2016)
China	15	■ Xiang Yang Hong 1 (‘15), Xiang Yang Hong 3 (‘16), Xiang Yang Hong 10 (‘15), Xiang Yang Hong 18 (‘15) ■ Zhang Jian (2016)
Brazil	-	■ Vital de Oliveira (2015)
Australia	-	■ Investigator (2017 expected)
Peru	2	■ Carrasco (2016)

Trends of Ocean Explorations

	주요연구기관	최신 연구동향
U.S.	스크립스해양연구원 우즈홀해양연구원 해양대기청	■ 서태평양 마리아나해구 해저자원, 생물다양성 탐사 ■ 해산의 정밀측량과 자원 연구 ■ 적도해역 해양환경변화, 기후변화, 허리케인 정밀 탐사
Japan	해양연구개발기구 동경대해양연구소	■ 지각형성과 이동, 지진, 쓰나미 등 지구조연구 ■ 해양·대기 상호작용과 엘리뇨 관측, 기후변동 예측 ■ 심해 생물자원 탐사와 수산자원량 변화 연구
China	제1, 2, 3 해양연구소	■ 대양 해양환경 조사와 해양순환, 태풍, 기후변동 예측 ■ 해산 측량과 심해 광물자원과 생물자원 탐사: '투명바다' 사업 ■ 심해탐사장비 개발: '투명바다' 사업
Australia	호주과학원(CSIRO) 호주해양연(AIMS)	■ 기후변동, 수산자원관리, 해양영유권확대

ISABU, Korea’s first global class R/V

Specification

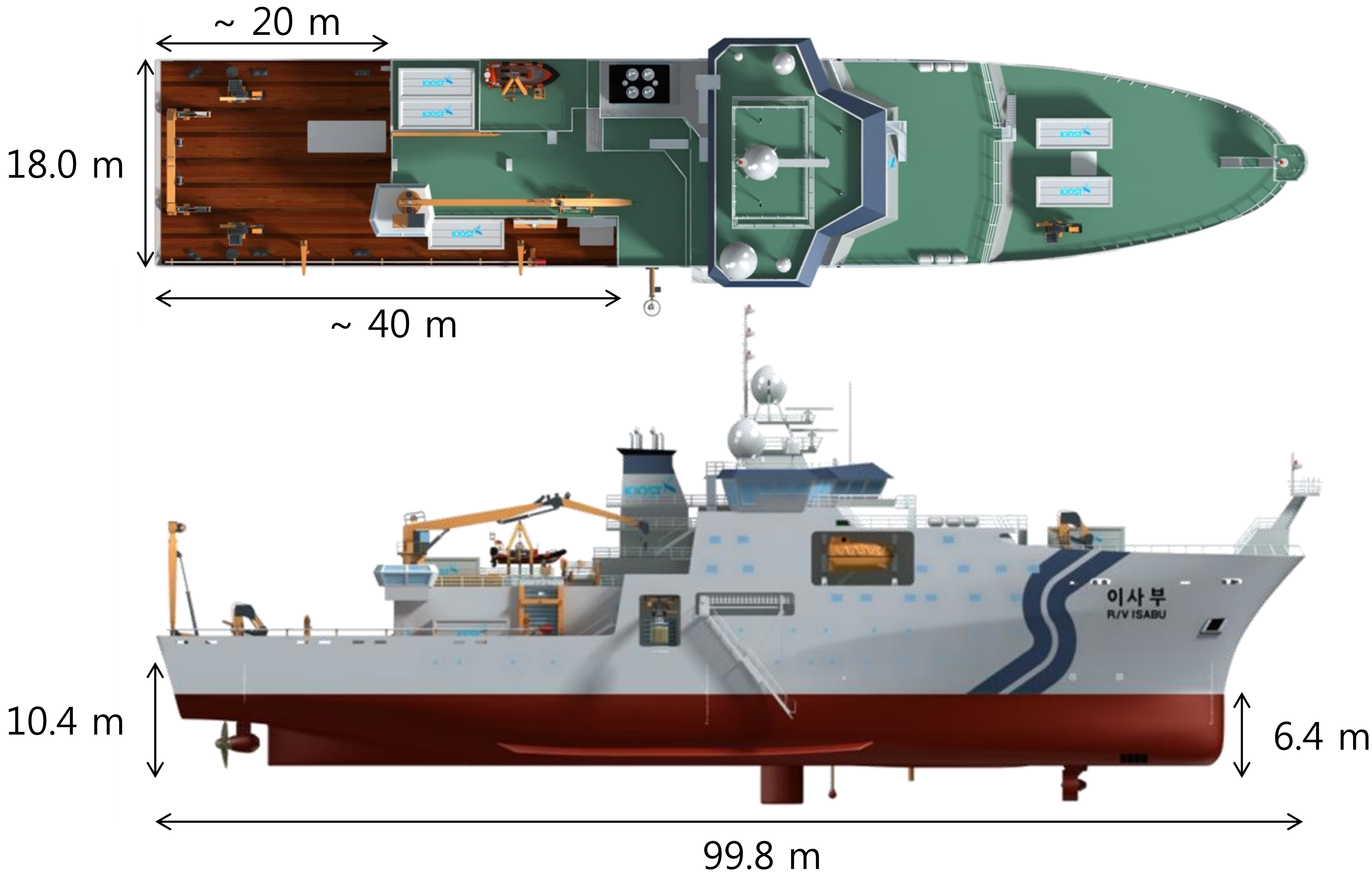
Length	99.8 m	Gross Tonnage	Approx. 5,900 Ton
Breadth	18.0 m	Depth	10.3 m
Speed	12/15 kts (cruising/max.)	Endurance	10,000 N.M (at cruising speed)
Propulsion Unit	2,500 kW motor x 2	Propeller	Azimuth thruster x 2
Main Generator	1,881kW x 4	Capacity	60(Crew 22, Scientist 38)

stx Offshore & Shipbuilding

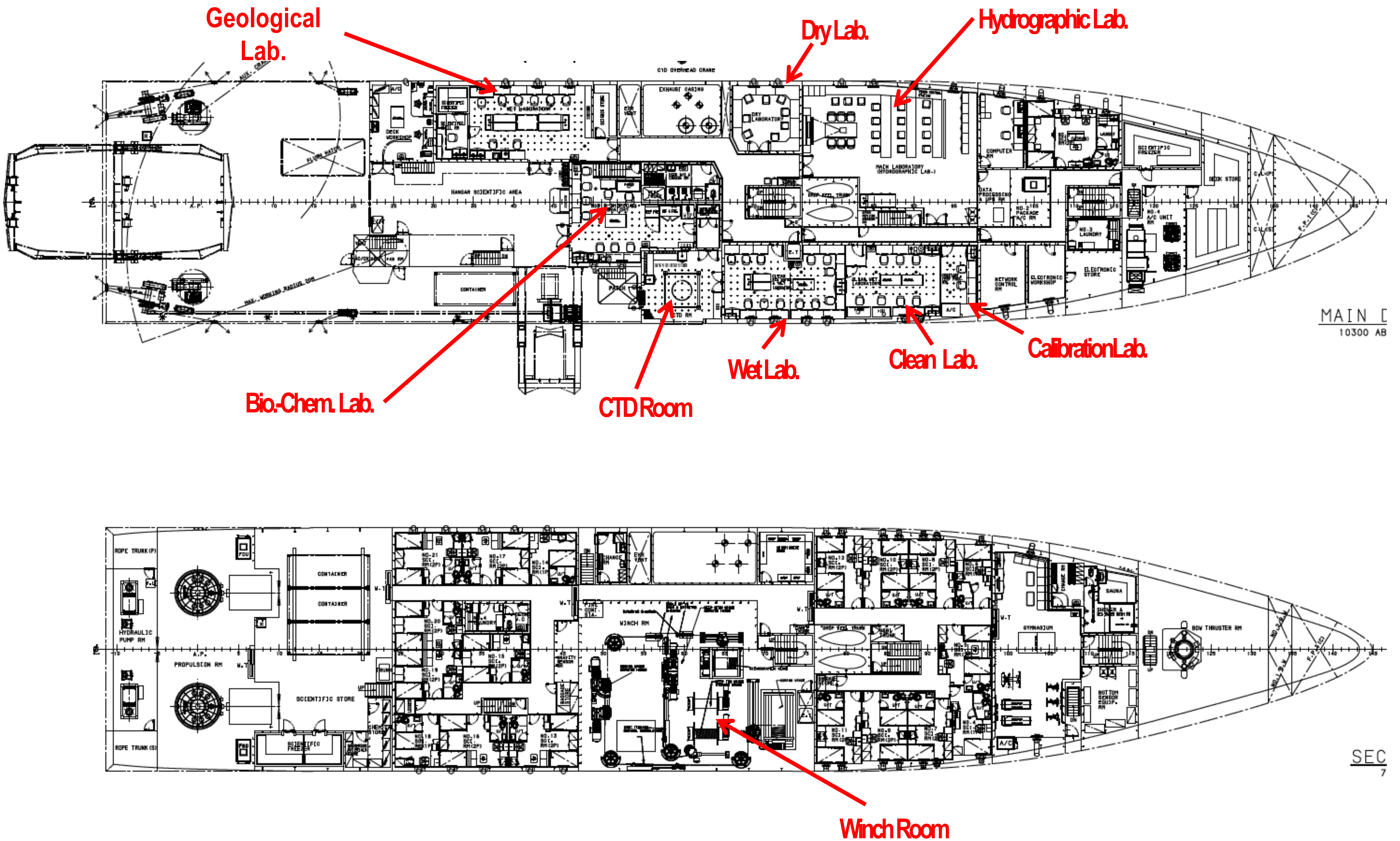
Milestones

Contract	Steel Cutting	Keel Laying	Launching	Delivery	Deep-sea Trial	Commissioning
Dec. 2012	Apr. 2014	Oct. 2014	May 2015	April. 2016	August. 2016	Nov. 2016

Specification

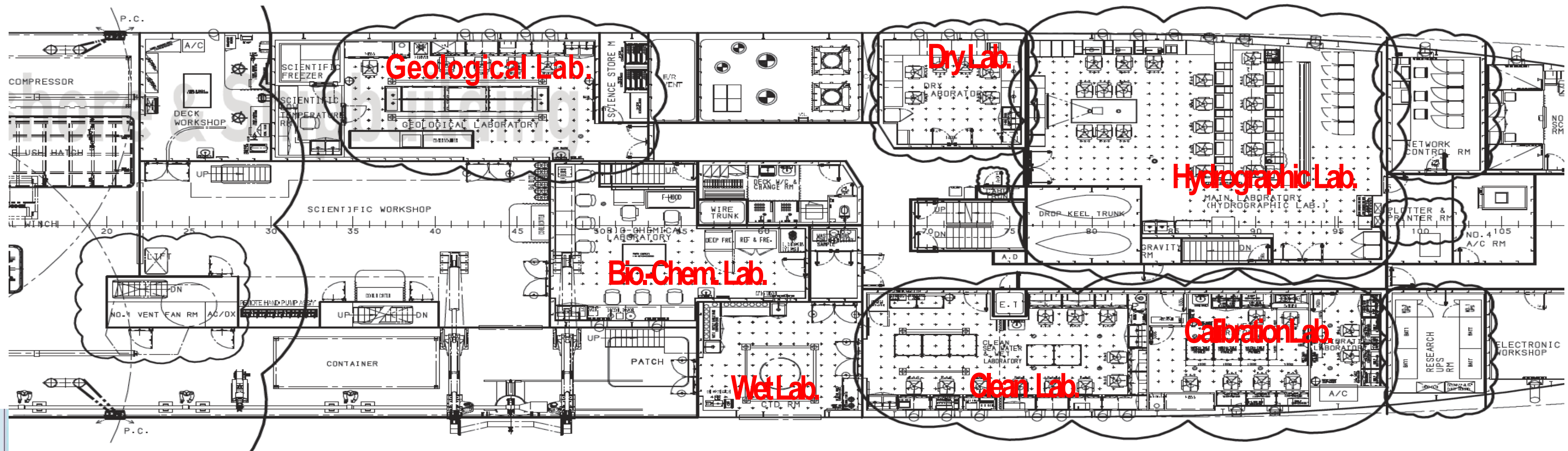


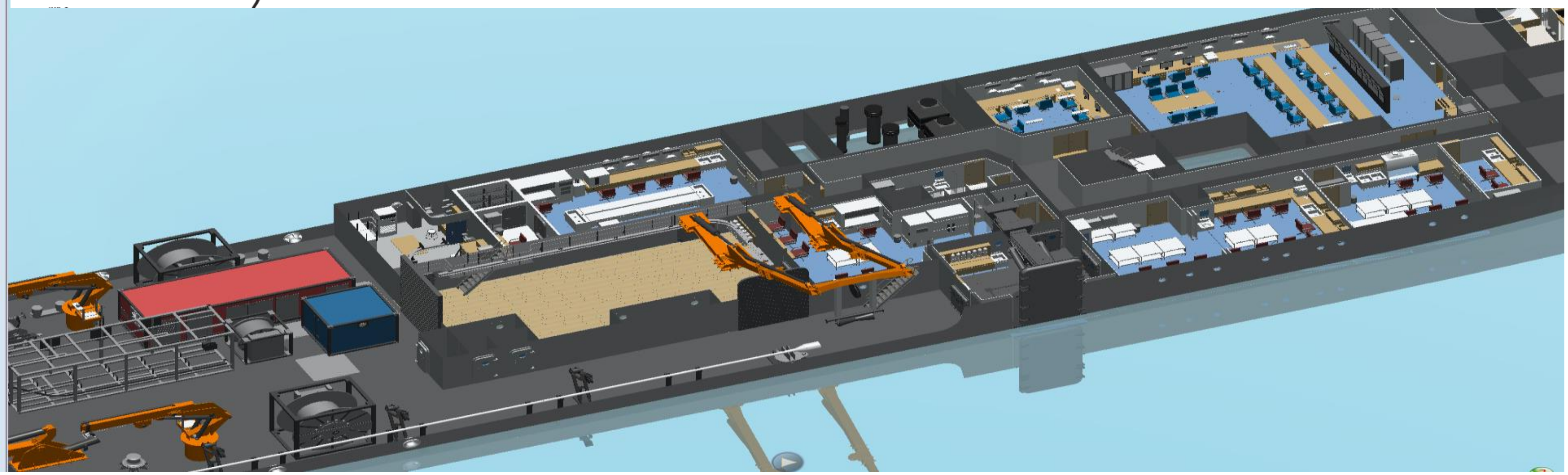
Main Deck


Geological Lab.
Dry Lab.
Hydrographic Lab.
Bio.-Chem. Lab.
CTD Room
Wet Lab.
Clean Lab.
Calibration Lab.
Winch Room
MAIN D
SEC

Laboratory Arrangement

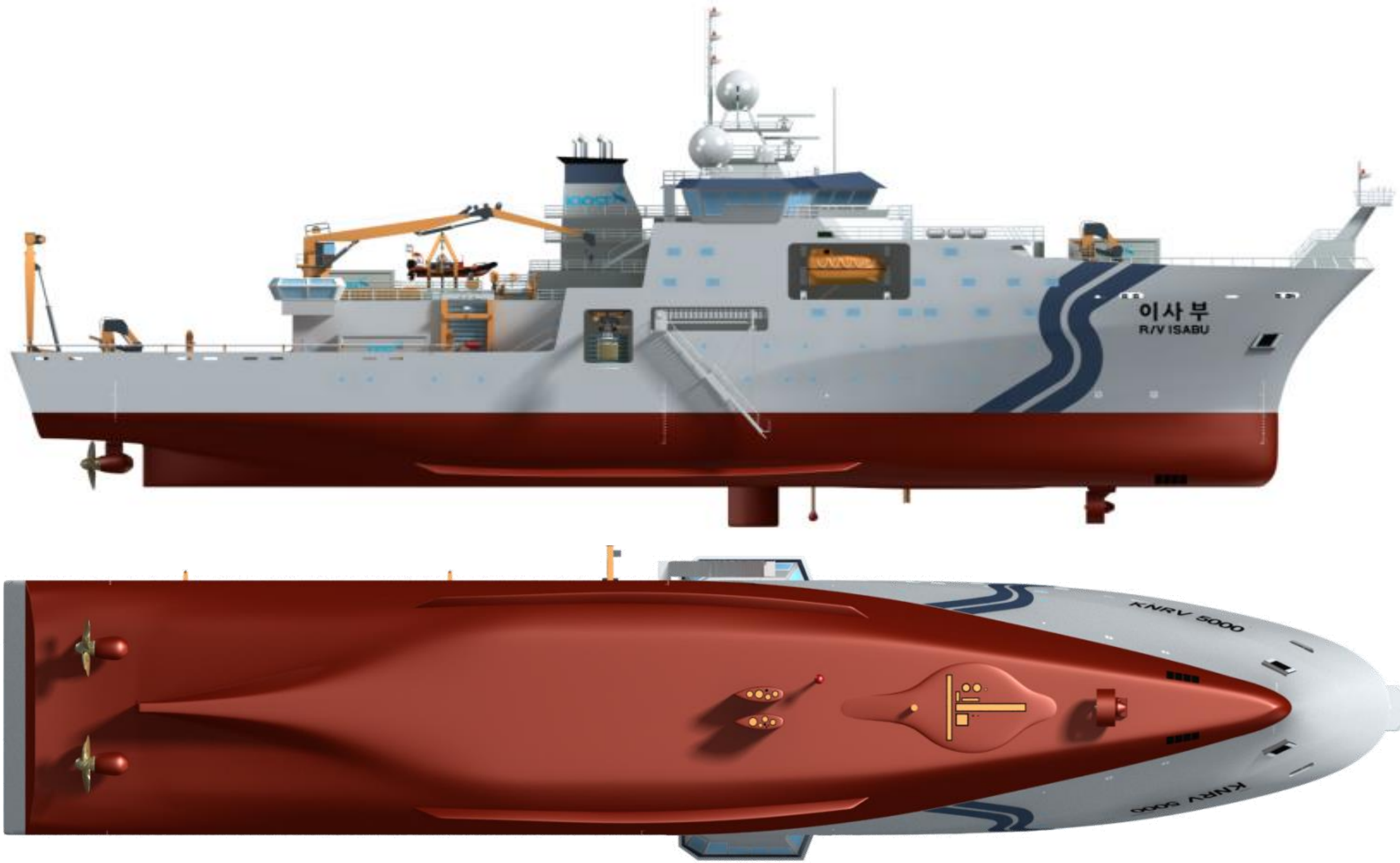
Wet Lab. : 276m^2 / Dry Lab. : 175 m^2





Dynamic Positioning System

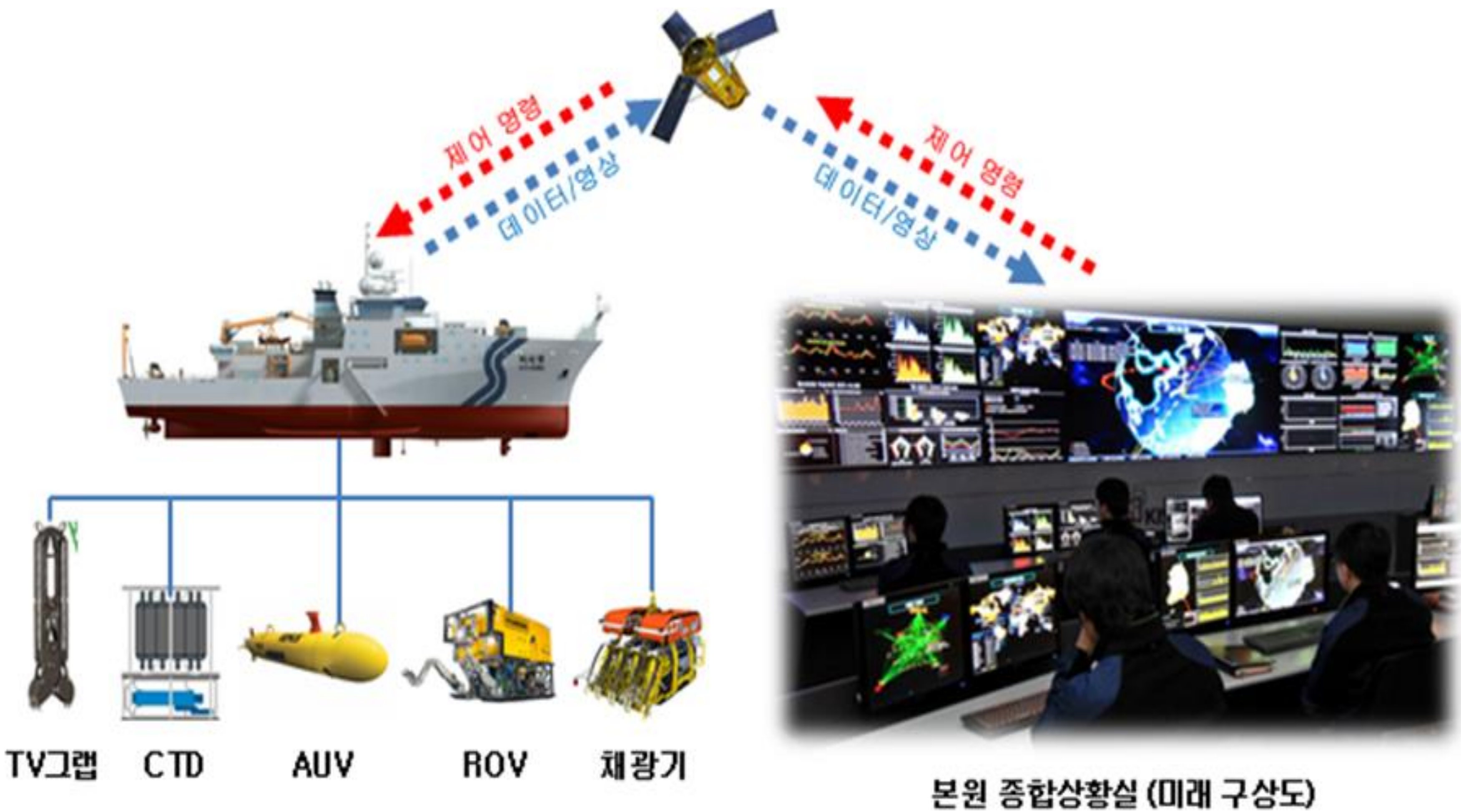
- DP 2 System



Equipments

Category	Equipment	Remarks
Acoustic Equipment	**Scientific Fish Finder**	15,000 m
	Multibeam Echo Sounder	70 ~ 120 kHz
	High Frequency Omni Directional Sonar	114kHz, 2000m
	Precision Depth Recorder	12, 38, 200 kHz
	Shallow Water Multi-beam Echo Sounder	70~100 kHz, 2000m
	Deep Sea Multi-beam Echo Sounder	12kHzm 11,000m
	Sub-Bottom Profiler	11,000m
	Acoustic Doppler Current Profiler	38, 150kHz
Sound Velocity	**Sound Velocity Probe**	±0.05 m/s
	Sound Velocity Sensor	6,000m, ±0.05 m/s
T/S	**XBT**	10Hz
	Thermosalinograph	T : 0.003 deg , Cond.: 0.003 mS/cm
	Salinometer	
Gravity	**Marine Gravitimeter**	0.01 mGal
Meteorology	**Meteorological Observation system**	

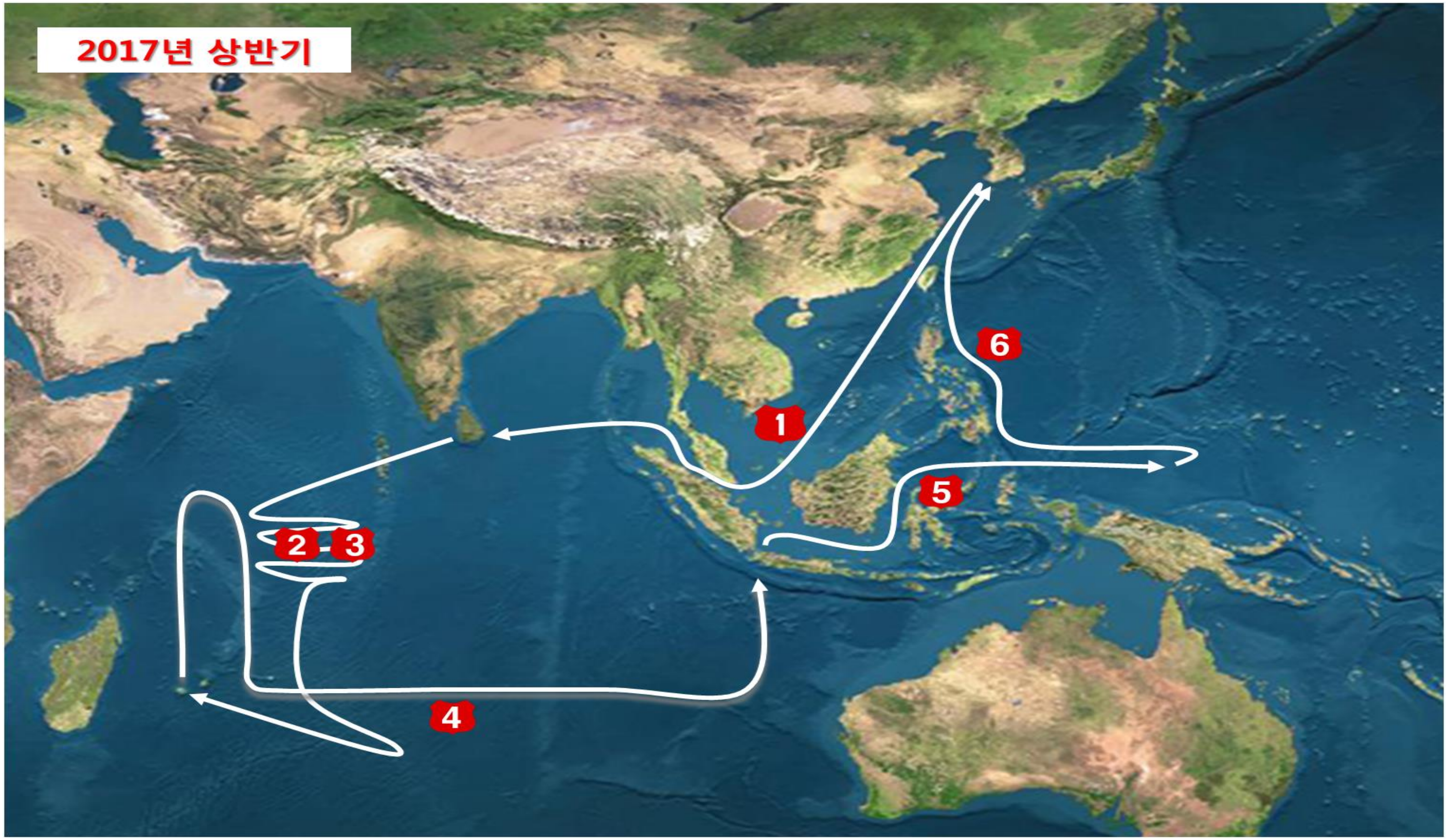
Real-time data transmission/Control



ISABU Ocean Exploration, 2017

Indian Ocean Expedition: 1st half of 2017

- Mid-Indian Ocean Ridge, Hydrothermal vent
- Physiochemical/ecological processes, Indo-Pacific linkage



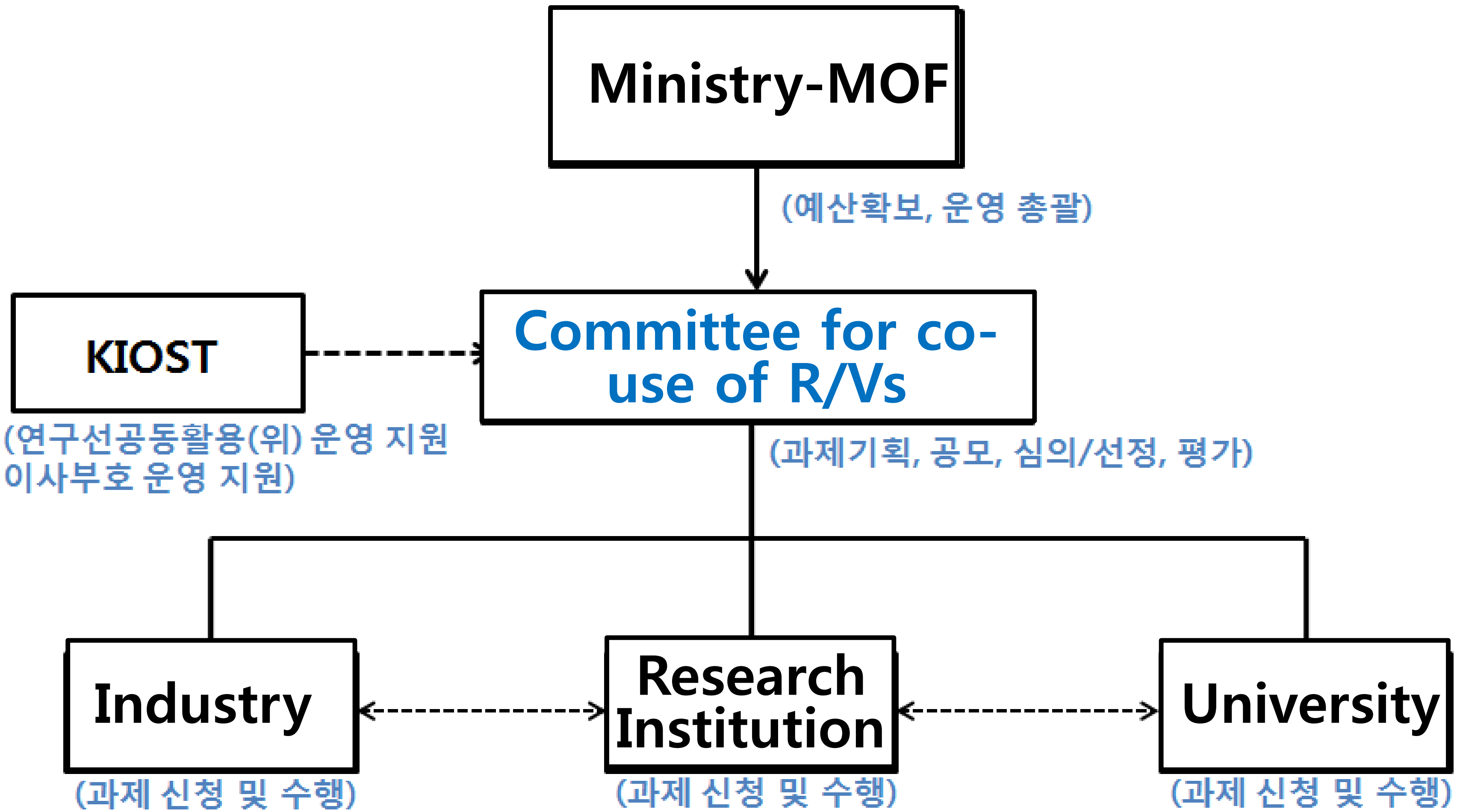
Northwest Pacific Expedition: 2nd half of 2017

- Kuroshio current, Typhoon (ocean-air interaction)
- El Nino/La Nina, Sea mounts, Kuroshio extension, East Sea

Expedition schedule(draft), 2017

구분	일자	소요 기간(일)	항차	연구조사 내용	운항구간
인도양탐사	03.21~04.04	14	1	**아시아항로 해양환경 조사**	**한국 → 스리랑카**
	04.05~04.06	2		(Port call)	(콜롬보)
	04.07~05.12	35	2	**심해광물자원 탐사**	**스리랑카 → 모리셔스**
	05.13~05.14	2		(Port call)	(모리셔스)
	05.15~06.19	35	3	**해저열수구 탐사-생물자원 확보**	**모리셔스 → 모리셔스**
	06.20~06.23	4	(JPA)	RAMA부이 점검 및 교체	
	06.24~06.25	2		(Port call)	(모리셔스)
	06.25~07.19	25	4	**열대인도양의 이지화학적 프로세스**	**모리셔스 → 인도네시아***
	07.20~07.21	2		(Port call)	(자카르타)
	07.22~07.30	9	5	**인도양-태평양간 물질교환과 기후변화**	**인도네시아 → 축**
	07.31~08.01	2		(Port call)	(축)
	08.02~08.16	15	6	**산학연 협력 탐사 I**	**축 → 필리핀 → 한국**
(소계)		(147)			
선박 점검				(08.17~08.20)	
북서 태평양 탐사	08.21~08.27	7	7	**쿠로시오편 열대생물 이송**	**한국 → 필리핀**
	08.28~10.06	40	8	**해양-태풍 상호작용**	
	10.07~10.08	2		(Port call)	(필리핀)
	10.09~10.17	8	9	**북서태평양 Warm pool**	**필리핀 → 축**
	10.18~10.23	5	10	**적도 서태평양 탐사**	
	10.24~10.25	2		(Port call)	(축)
	10.26~11.12	18	11	**산학연 협력 탐사 II**	**축 → 북태평양 → 일본**
	11.13~11.14	2		(Port call)	(삿포로)
	11.13~11.18	6	12	NEAR-GOOS/동해물질수지	**일본 → 동해 → 한국**
(소계)		(90)			
합계		237			

Participation of Industry and Univ.



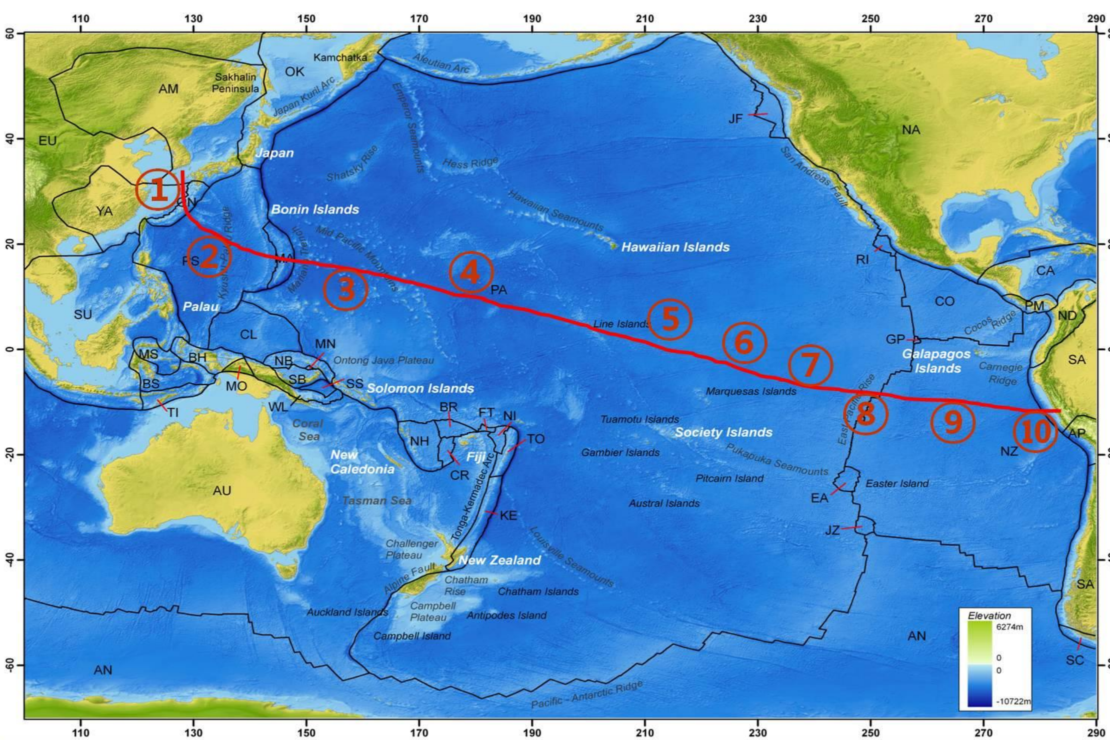
*** Budget for Industry and Univ. secured: ~1.5 M**

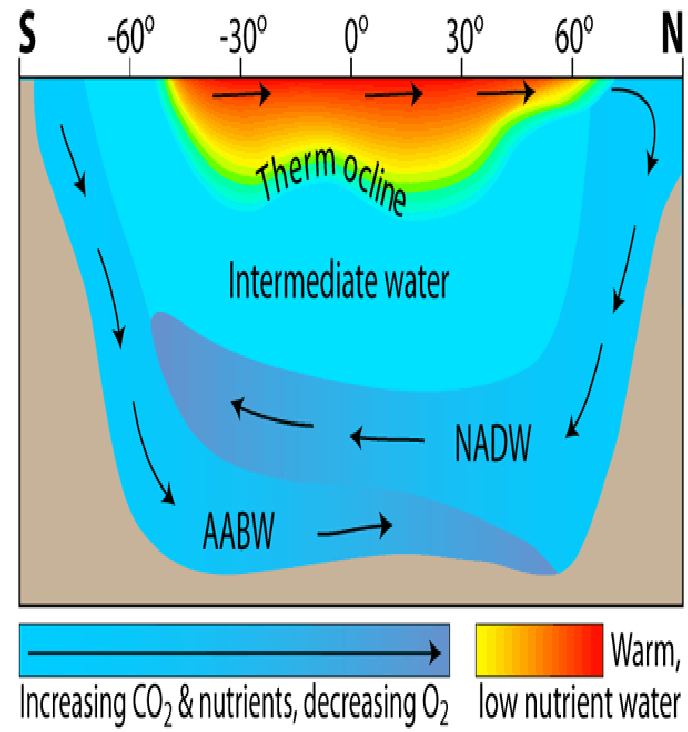
- Project solicitation: November 2016

Future Explorations by ISABU

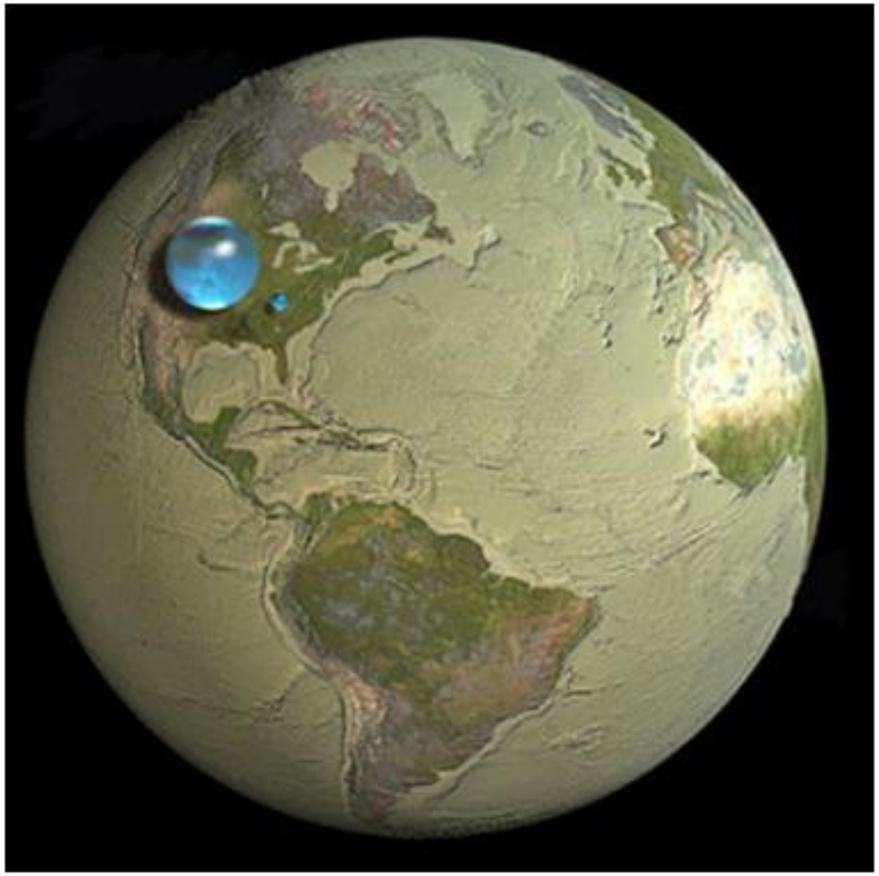
Tropical and entire Pacific Expedition:

- El Nino/La Nina and Pacific ecosystem change
- East Pacific Rise and Pacific plate evolution
- Genetic resources of micro-organisms
- Formation of Pacific intermediate water and circulation…





The volume of all Earth's water



* The blue sphere of ~1,385km in diameter

(from USGS)

The Ocean is not immense, but limited!

- So, it is tractable and easily got explored!
- But, it is vulnerable, demanding conservation!


이사부
R/V ISABU
Thank you for your attention!