

Cruise Report

MR16-01

Sagami Bay, Oomurodashi

Proposal title

Sea Trail of performance of ASV

R/V Mirai

29 Jan. 2016- 7 Feb 2016

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1.Cruise summary of MR16-01 cruise

Cruise information

Cruise number	MR16-01
Name of the cruise	R/V Mirai
Chief scientist 1	Tadahiro Hyakudome (MARITEC, JAMSTEC)
Representative of the Science Party	Tadahiro Hyakudome (MARITEC, JAMSTEC)
Title of the cruise	Sea Trail of performance of ASV

Cruise period	29 Jan. 2016 – 7 Feb. 2016
Ports of call	Yokohama– Shimizu
Sea Trial Area	Sagami bay, Oomurodashi, Suruga Bay

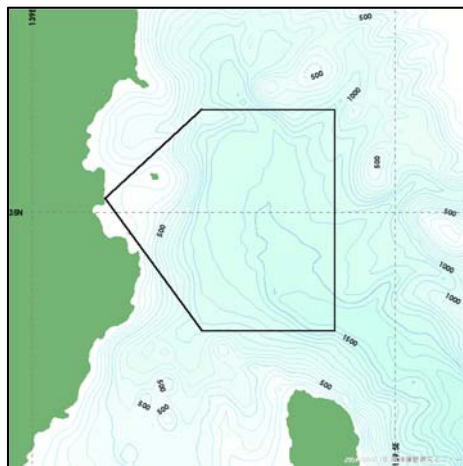


Fig.1a Suruga Bay

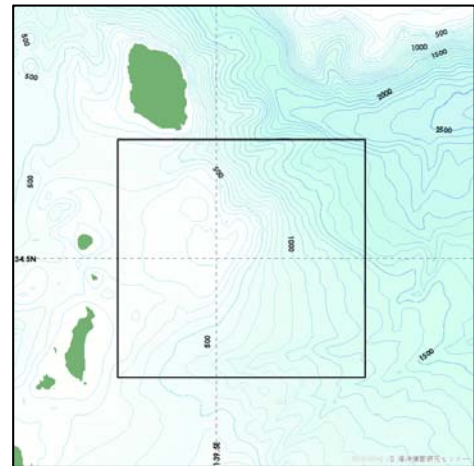


Fig.1b Oomurodashi

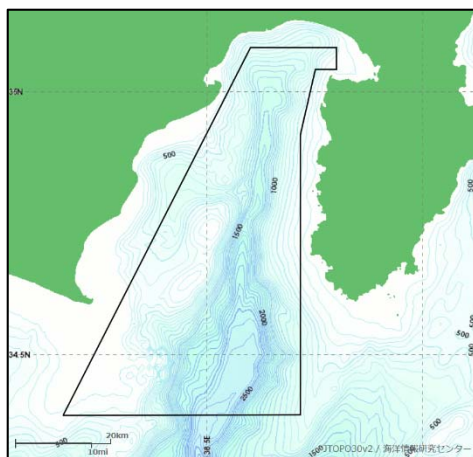


Fig.1c Suruga Bay

Fig.1 Sea Tial area of this cruise.

Cruise Summary

Cruise proposal Sea Trail of performance of ASV

We took place performance tests for the ASV such as launch and recovery, wireless LAN communication, satellite communication and function of AUV following test. And we confirmed every functions of the ASV. And also we measured acoustic propagation data under oscillation condition of ASV, and environmental noise of the vehicle during system running.

2. List of Participants

MR16-01 list of participants (2016/01/29-2016/02/07)

Scientists

HYAKUDOME TADAHIRO

YOSHIDA HIROSHI

SAWA TAKAO

NAKANO YOSHIYUKI

FUKUDA TATSUYA

NAKATANI TAKESHI

MATSUMOTO HIROSHI

SUGA RYOTARO

OCHI HIRODHI

SHIMURA TAKUYA

MEGURO KOJI

DEGUCHI MITUYASU

KASAYA TAKAFUMI

URA TAMAKI

TAMURA KENKICHI

SASANO MASAHIKO

IMASATO MOTONOBU

SETA TAKAHIRO

OKAMOTO AKIHIRO
INABA SHOGO
YOKOTA SAORI
KOJIMA JUNICHI
ITO YODO
KONDO SATOSHI
HAYASI HIROYUKI
UCHIROMURA DAIKI
OKUMURA SHINYA
MORIOKA MIKI
UCHIYAMA JUN
TOTSUKA NARUMI
KIMOTO YUKINAO
DOSAKA JYUNYA
YODA TAKASHI
HONDA HIDETAKA
AKASHI AKIRA
KATAYAMA NORIHIKO
YAMAUCHI YOSHIDAKI
KANEKO YOSHIMI
KANAYAMA KAZUHIRO
KAWAMOTO RYUJI
NAGATA YUSUKE
EGUCHI KAZUKI
MIYAKE HIROYUKI
YAHANO HAJIME

3. Ship Logs

Date	Local Time	Description	Position/Weather/Wind/Sea condition
29-Jan-16	08:30	Departure from Yokohama port	1/29 12:00 (UTC+9h)
	10:00	All crew meating	
	14:00	Precruise check	Stormy weather
	18:00	Post Meating	
30-Jan-16	06:00	Researcher meating	1/30 12:00 (UTC+9h)
	06:10-11:30	Prediver check for AUV, Precruise check for ASV	Stormy, Seastate 4
	13:00	AUV Observation Test	Fine, Seastate 4
	18:00	Post Meating	
31-Jan-16	07:00	Researcher meating	1/31 12:00 (UTC+9h)
	07:10	Prediver check for AUV, Precruise check for ASV	Fine, Seastate 4
	09:00	ASV Lunch	
	10:20	AUV Lunch	
	11:05	Start ASV follow AUV	
	12:35	End of test cruising	
	13:15	AUV on Deck	
	14:00	ASV on Deck	
	18:00	Post Meating	
01-Feb-16	07:50	Researcher Meating	2/1 12:00 (UTC+9h)
	08:00	Towed Vehicle Lunch	Fine, Seastate 3
	08:45	Start Survey	
	10:45	End Survey	
	11:00	Towed Vehicle on Deck	
	14:00	Towed Vehicle Lunch	
	14:30	Start Survey	
	16:00	End Survey	
	16:10	Towed Vehicle on Deck	
	18:00	Post Meating	
02-Feb-16	05:50	Researcher Meating	2/2 12:00(UTC+9h)

	06:00	Precruise check for ASV	Cloudy, Seastate 3
	07:20	ASV Lunch	
	08:10	Towed Vehicle Lunch	
	09:10	Start Towing	
	09:10	Start ASV follow Towed Vechile	
	09:50	End of following test	
	10:00	Start Cinario cruising test	
	10:15	Towed Vechile on Deck	
	10:30	End cruising test	
	11:11	ASV on Deck	
	15:00	Researcher change	
	18:00	Post Meationg	
03-Feb-16	06:00	Researcher Meating	2/3 12:00(UTC+9)
	07:05	Precruise check for ASV	Fine, Seastate 3
	09:40	ASV Lunch	
		Acoustic Propagation Test	
	14:50	ASV on Deck	
	18:00	Post Meating	
04:Feb-16	06:00	Researcher Meating	2/4 12:00(UTC+9)
		Cancel of test	
05-Feb-16	07:00	Researcher Meating	2/5 12:00(UTC+9)
	07:05	Precruise check for ASV	Fine, Seastate 2
	09:-	ASV Lunch	
		Acoustic Propagation Test	
	15:00	ASV on Deck	
	18:00	Post Meating	
06-Feb-16	06:50	Researcher Meating	2/6 12:00(UTC+9)
	07:00	Precruise check for ASV	Cloudy, Seastate 3
	09:-	ASV Lunch	
		Acoustic Propagation Test	

	15:00	ASV on Deck	
	18:00	Post Meating	

4. Instruments

4.1. ASV



Fig.4.1 ASV

Specifications of the ASV

Type	:	Autonomous Surface Vehicle
Size	:	6 x 2.6 x 3.2 m
Weight	:	3,000 kg
Maximum Depth	:	3,000m
Cruising Speed	:	2-5 knots
Endurance	:	48 hours (@ 2 knots)
Power system	:	Deisel Engine (4kW)
Actuatours	:	Thruster x 2, Rudder x 1
Communication	:	Acoustic for AUV Satellite & Wireless LAN for support vessel
Navigation System	:	Sattelite compus, SSBL, AIS

4.2.AUV”HOBARIN”

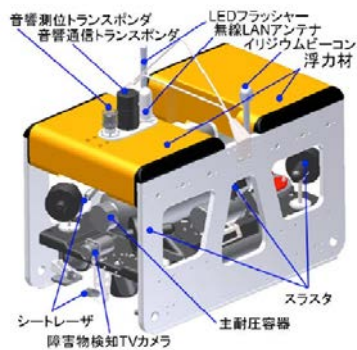


Fig.4.2 AUV”HOBARIN”

Specifications of the AUV

Type	: Autonomous Underwater Vehicle
Size	: 1.2 x 0.7 x 0.76 m
Weight	: 250 kg
Maximum Depth	: 2,000m
Speed	: 1.5 knots
Endurance	: 10 hours (@ 0.4 knots)
Power system	: Li-ion Battery
Actuators	: Horizontal Thruster x 2, Vertical Thruster x 2
Communication	: Acoustic communication Wireless LAN
Navigation System	: DVL

4.3.ABA



Fig.4.3 ABA

Specifications of the ABA

Size	: 3.2 xφ1.5m
Weight	: 270 kg
Maximum Speed	: 2.2 knots

4.4. ASV



Fig.4.4 Towed Vechile

Specifications of the Towed Vechile

Size	:	2.5 x 1.0 x 1.5 m
Weight	:	300 kg
Maximum Depth	:	3,000m
Equipments	:	Transpoder, DVL Electric surveying instruments

5. Operation report and preliminary results

5.1 ASV experiments

2016 January 29

Test Point: Sagami bay

- Functional test for ASV and AUV on board

2016 January 30

Test Point: Teishi knoll, Sagami bay

- Survey performance test of AUV

- Functionsl test for ASV on board

2016 January 31

Test Point: Oomurodashi

- Performance test for ASV follows AUV

AUV survey with cinario. Cruising speed is 0.4knot. AUV depth is 200m. ASV cathces AUV by acoustic positioning. ASV automatically follows AUV.

2016 February 1

Test Point: Oomurodashi

- Survey performance test for Electric surveying instreuments by using Towed vehicle

- Functionsl test for ASV on board

2016 February 2

Test Point: Suruga Bay

- Performance test for ASV follows Towed vehicle

Towed vehicle depth is 900m. Towing speed is 1.5 to 2.0knot. ASV catches Towed vehicle by acoustic positioning. ASV automatically follows Towed vehicle.

2016 February 3

Test Point: Suruga Bay

- Acoustic propagation test from underwater part to ASV

Underwater part of Acoustic instrument set 1,700m depth. Acoustic signal send from underwater part, and ASV receive duraing turnig at 200m. radius. In the test, spped of vehicle is changed several step.

2016 February 4

Test Point: Suruga Bay

- Functionsl test for ASV on board

2016 February 5

Test Point: Suruga Bay

- Acoustic propagation test from underwater part to ASV

Underwater part of Acoustic instrument set 1,700m depth. Acoustic signal send from underwater part, and ASV receive duraing turnig at 200m. radius. In the test, spped of vehicle is changed several step.

2016 February 3

Test Point: Suruga Bay

- Acoustic propagation test from ASV to Underwater part

Underwater part of Acoustic instrument set 1,700m depth. Acoustic signal send from ASV duraing turnig at 200m. radius, and Underwater part receive. In the test, spped of vehicle is changed several step.

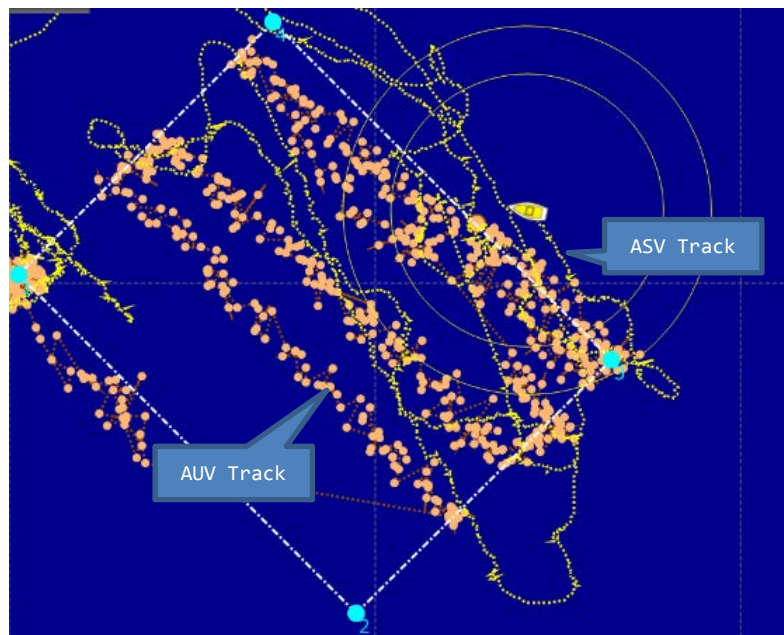


Fig.5.1 Track of ASV and AUV at 31 Jan

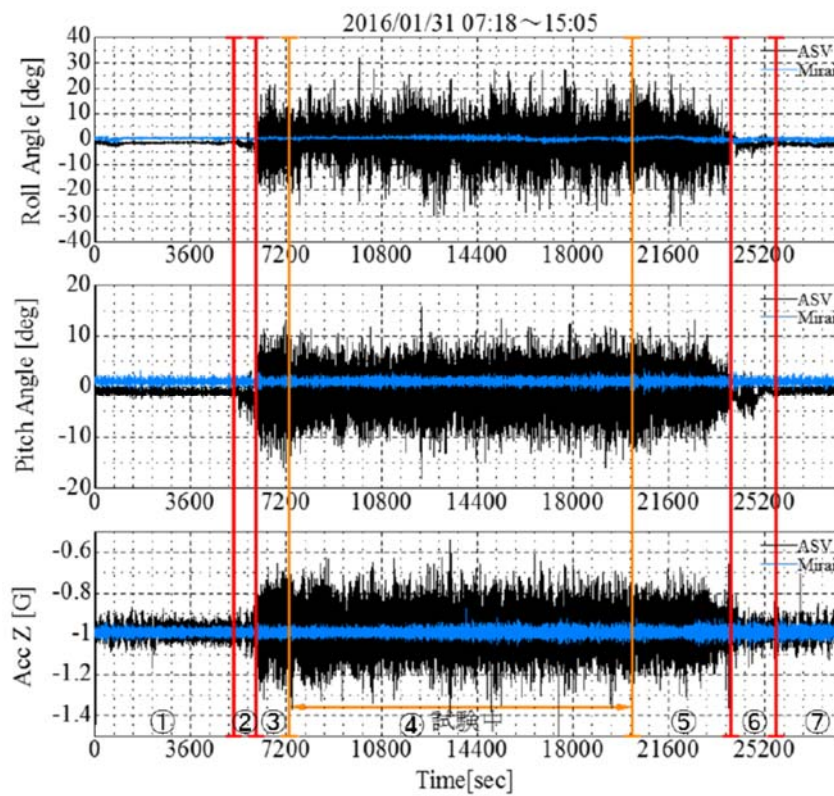


Fig.5.2 Roll, Pitch and Heave acceleration of ASV at 31 Jan.

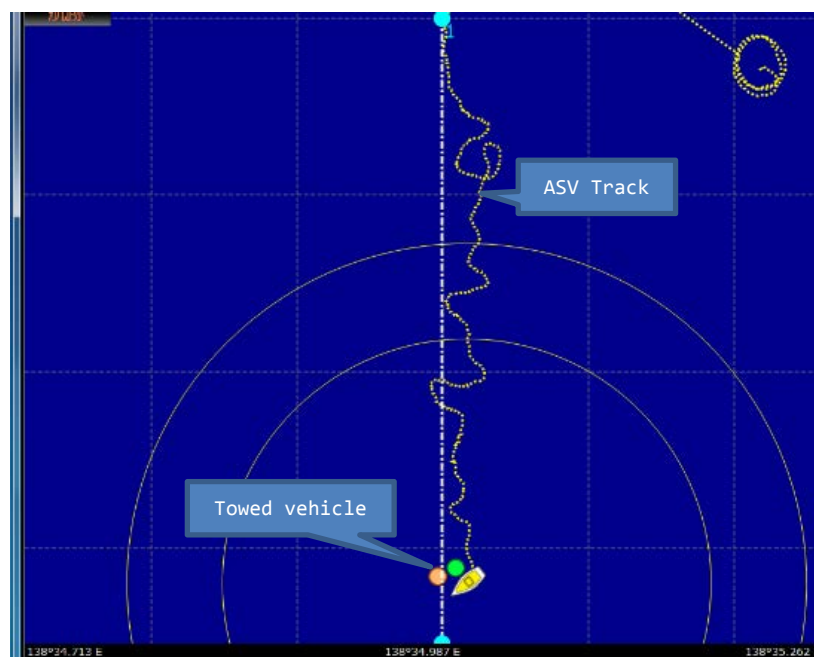


Fig.5.3Track of ASV and AUV at 2 Feb.

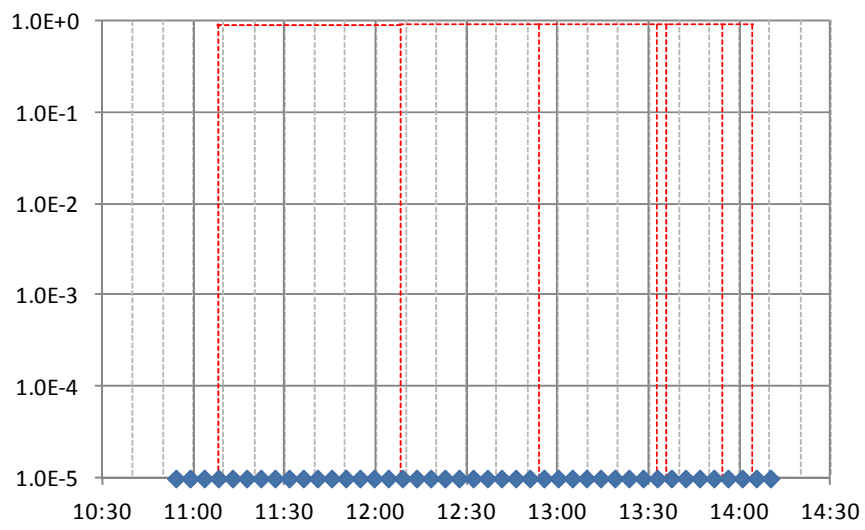


Fig.5.4 Result of Acoustic propagation test