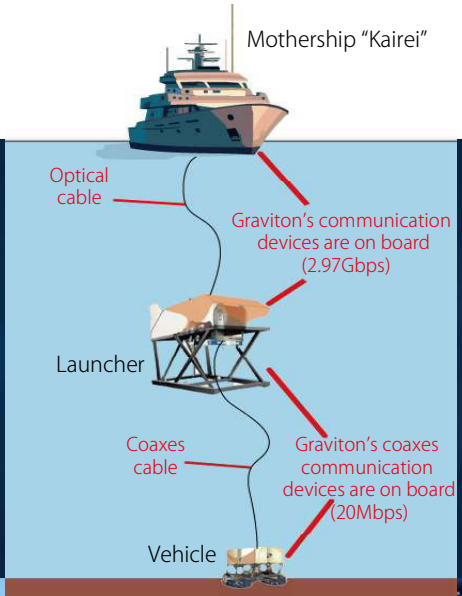
https : //www.graviton.co.jp

Graviton

Optical communication system for JAMSTEC*1

*1 JAMSTEC (The Japan Agency for Marine-Earth Science and Technology) is the organization which has been engaged in a variety of research and development activities as one of Japan's research institutes covering a broad spectrum of marine science and technology for the use of peace and welfare.

Graviton's optical communication system for ABISMO*2

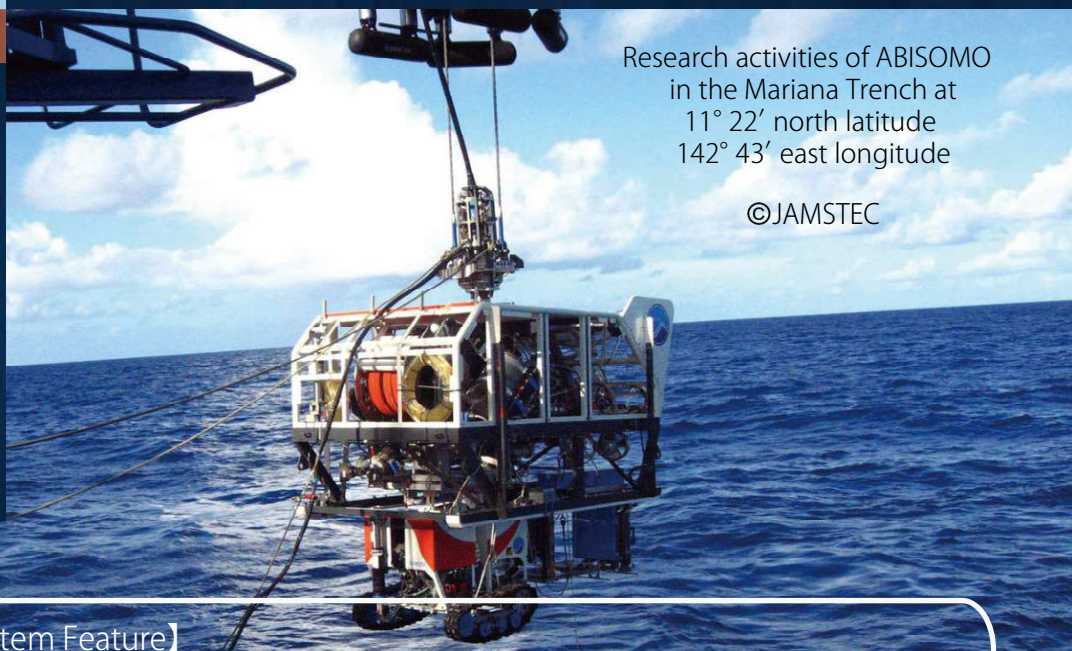


https://www.jamstec.go.jp/j/about/press_release/20080616/

■"ABISMO," Automatic Bottom Inspection and Sampling Mobile, succeeded in World's First Multiple Vertical Sampling from Challenger Deep in the Mariana Trench at the water depth about 11,000m in 2008. ABISMO accomplished this mission using the optical communication system developed by Graviton.
ABISMO consists of the launcher and the vehicle, both of which are controlled from the mother ship.

★Graviton's optical communication system realized:
the communications between the mothership and the launcher using one optical fiber, the communication between the launcher and the vehicle using one coaxes cable.

*2:The launcher of ABISMO (Automatic Bottom Inspection and Sampling Mobile), which is controlled through the communication console on the mothership "Kairei", dives into the deep sea to let the vehicle explore for collecting samples of the sea bottom in a reachable range of 160m cables connected to the launcher. The launcher can accommodate the vehicle and the samples when diving into the sea and rising to the surface. The vehicle equips the camera which can monitor the sea bottom.



Research activities of ABISOMO in the Mariana Trench at 11° 22′ north latitude 142° 43′ east longitude

©JAMSTEC

【Optical Communication System Feature】

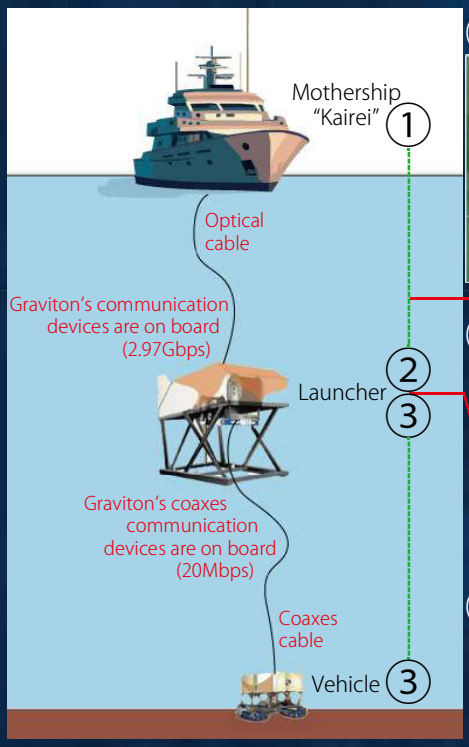
- Communication speed: 2.97Gbps for both uplink and downlink
  Wavelength for uplink: 1.3 μm
  Wavelength for downlink: 1.55 μm
- Light receiving sensitivity: -30dBm
- Multiplex system: Time-sharing
- Voltage monitor terminal proportionally responding to the intensity of receiving light (0-5V)

- Uplink(Underwater to Mothership)
  - HD-SDI 1CH
  - NTSC 3CH
  - RS232C 4CH
  - Logic Input/Output 8CH
  - RS485 2CH
- Downlink (Mothership to Underwater)
  - RS232C 4CH
  - Logic Input/Output 8CH
  - RS485 2CH

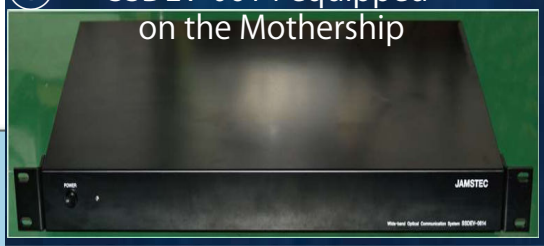
Graviton

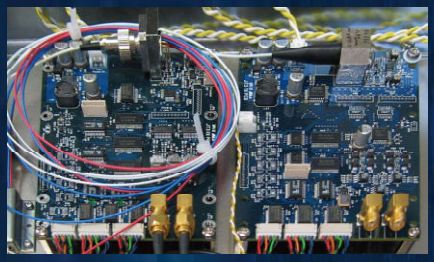
Graviton

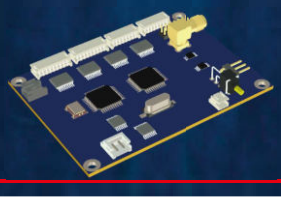
Wide-band Optical Communication System



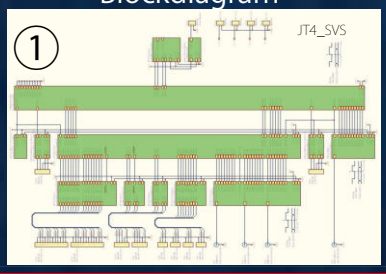
① SSDEV-0614 equipped on the Mothership

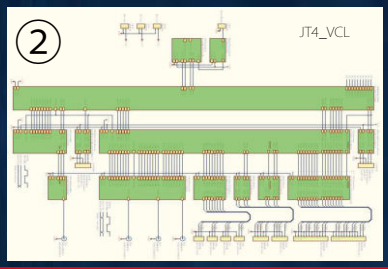


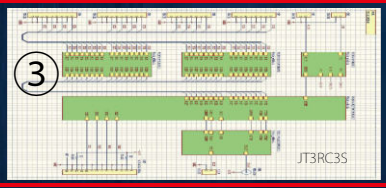
② 

③ 

Blockdiagram

① 

② 

③ 

① SSDEV-0614 equipped on the Mothership

Item	Min	Rated	Max	Unit	Remarks
Operating temperature	0		40	℃	
Operating humidity	10		85	%RH	
Power supply voltage					
Mothership		100		VAC	50/60Hz
Underwater		24		VDC	
Consumption power			20	W	at 24V
Uplink communication speed		2.97G		bps	
Uplink optical wavelength		1.3		μm	
Downlink communication speed		2.97G		bps	
Downlink optical wavelength		1.55		μm	
Optical output	-3			dBm	Secure the communication
Light receiving sensitivity			-30	dBm	distance of 10,000m
Optical fiber mode		Single			Quartz fiber
Multiplexing system		Time sharing			
Dimensions		TBW		mm	
Mass		TBW		g	

Uplink (Underwater to the mothership)

Item	Function	Number of chanel
1	HD-SDI	1
2	NTSC	3
3	RS232C (No handshaking, 1Mbps Max)	4
3	Prallel I/O Logic input/output	8
5	RS485	2

Downlink (The mothership to underwater)

Item	Function	Number of chanel
1	RS232C (No handshaking, 1Mbps Max)	4
2	Prallel I/O Logic input/output	8
3	RS485	2

②

Item	Min	Rated	Max	Unit	Remarks
Operating temperature	0		40	℃	
Operating humidity	10		85	%RH	
Power supply voltage		24		VDC	
Consumption power			20	W	at 24V
Uplink communication speed		2.97G		bps	
Uplink optical wavelength		1.3		μm	
Downlink communication speed		2.97G		bps	
Downlink optical wavelength		1.55		μm	
Optical output	-3			dBm	Secure the communication
Light receiving sensitivity			-30	dBm	distance of 10,000m
Optical fiber mode		Single			Quartz fiber
Multiplexing system	Time sharing				
Dimensions	80 X 120 or less			mm	
Mass	1000 or less			g	

③

Item	Min	Rated	Max	Unit	Remarks
Operating temperature	0		40	℃	
Operating humidity	10		85	%RH	
Power supply voltage	4.5	5	5.5	VDC	
Current consumption		300		mW	
Communication speed		9600 x 8		bps	
Frequency		20		MHz	Main robe
Attenuation cmpansation		30		dB	1.5D-2V per 160m, 20MHz
Dimensions	80 X 60			mm	Board
Mass			500	g	
Interface					
Connector on the communication device	SMA-R Coaxial connector				
Connector on the device	ZH or PH(JST) connector				
Power supply connector	PH or EH(JST) connector				
Interface on the device	RS232C compatible TX/RX full duplicated 8CH				

Other applications

PICASSO, Plankton Investigatory Collaborating Autonomous Survey System Operon, is an unmanned probe to investigate plankton and marine snow under the sea about 1,000 m deep.

PICASSO

OTOHIME

OTOHIME is a working-AUV (Autonomous Underwater Vehicle) designed for under-water chemical observation and visual observation as well as light-duty work.

Graviton

Graviton Incorporated E-mail : info@graviton.co.jp