Demonstration experiment of survey devices on Torus room wall investigation in R & D project "Developments in pinpoint leakage on reactor container and repairing"

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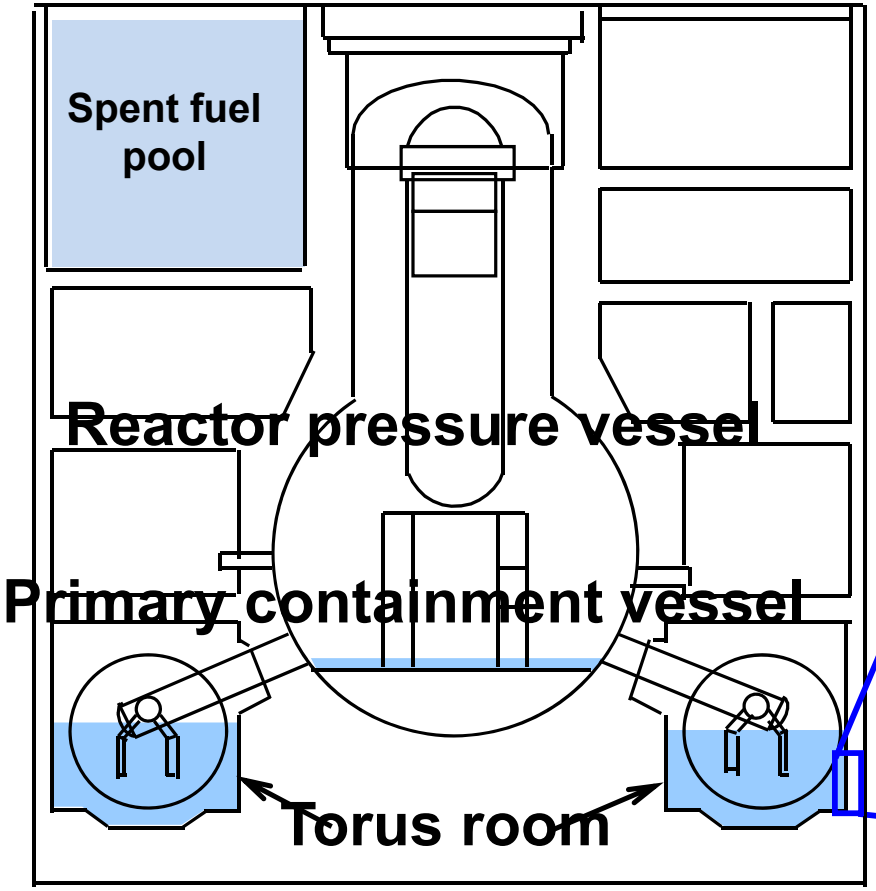
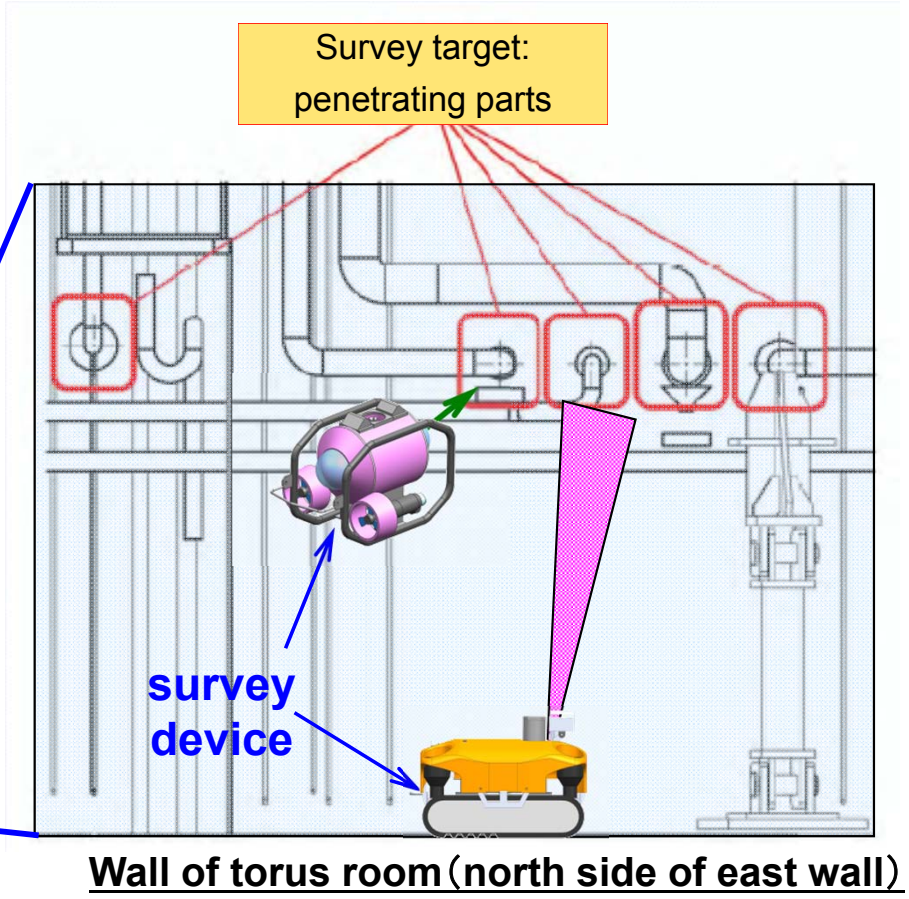
IRID

1. Outline

Under developing in Research and Development Project (with grant of Agency of Natural Resources and Energy) "Developments in pinpoint leakage on reactor container and repairing", survey devices will be introduced to investigate Torus room wall of Unit 2 (north side of east wall) as demonstration experiment .





Wall of torus room（north side of east wall）

Overview of test for survey devices operating on torus room wall

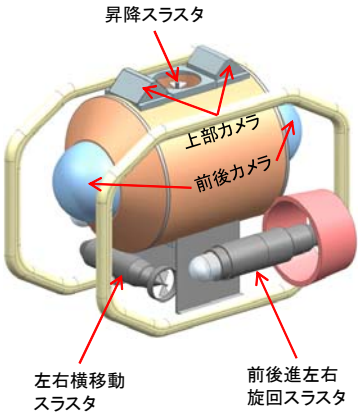
2. Survey targets and Robots for use

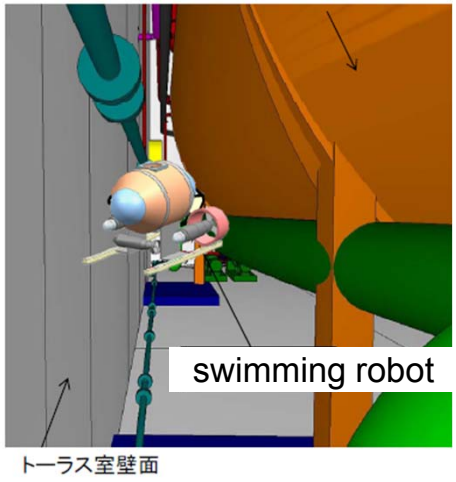
Scope: wall of reactor building connected to the next building

We will investigate wall of reactor building connected to the next building to grasp the leaking (damaged) situation on reactor building and adjoining turbine building and Rad waist building.

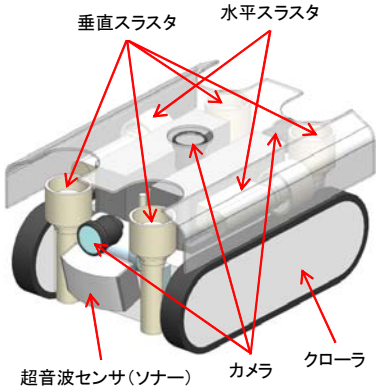
<robots used>

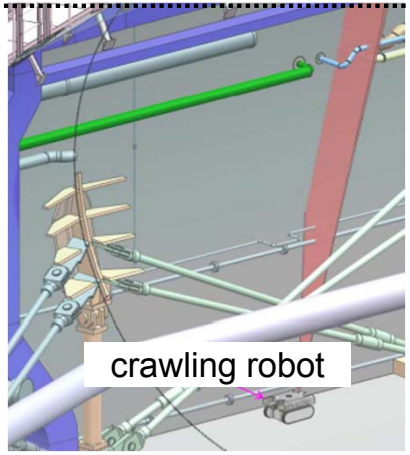
(1) swimming robot

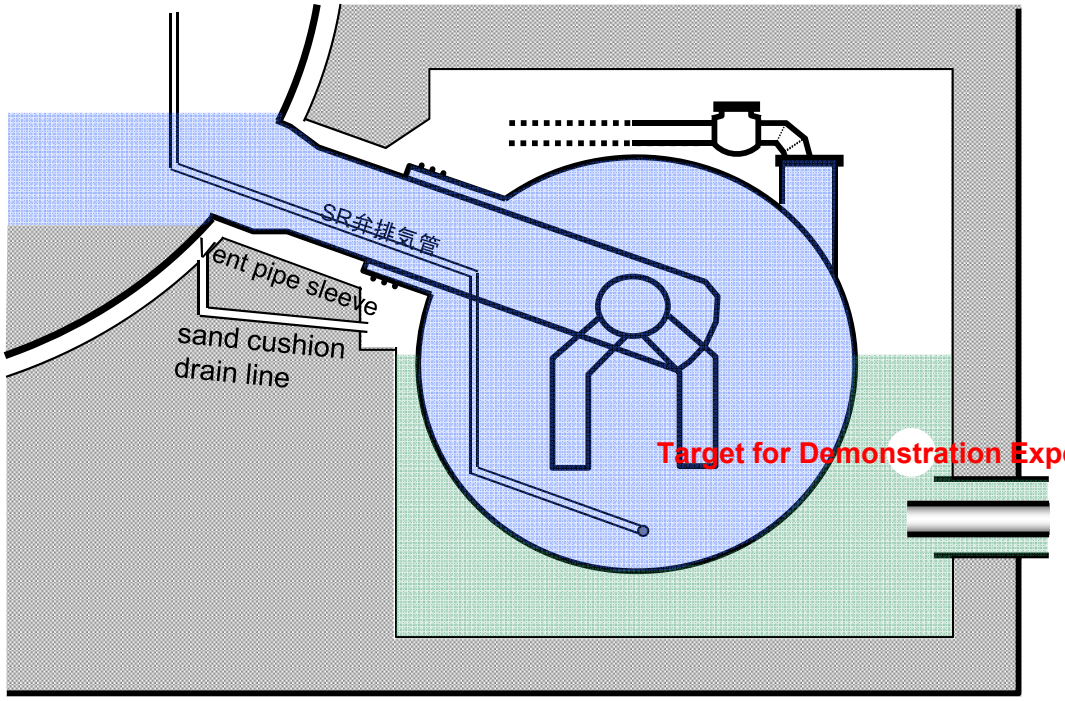




(2) crawling robot







Find out the leaking situation (or damage, etc.)

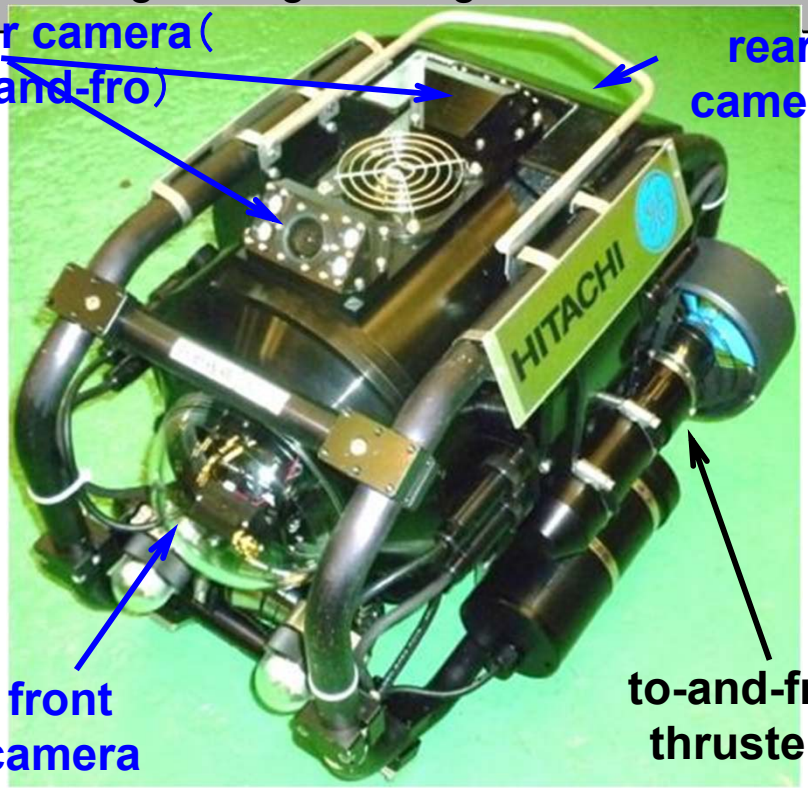
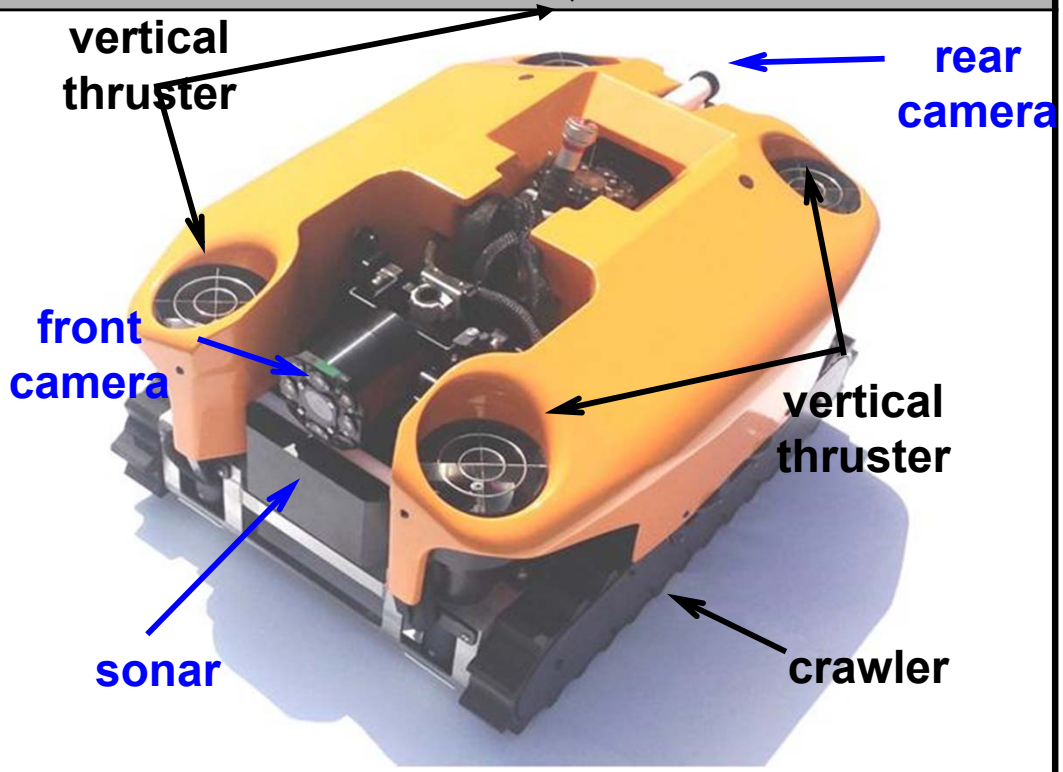
Add this result in the factual basis for deciding measure to stop water on wall (Grout undergrounding, Individual repair, etc.）

2. Survey targets and Robots for use

Function: (1) swimming robot（Gengo ROV）: get images by camera

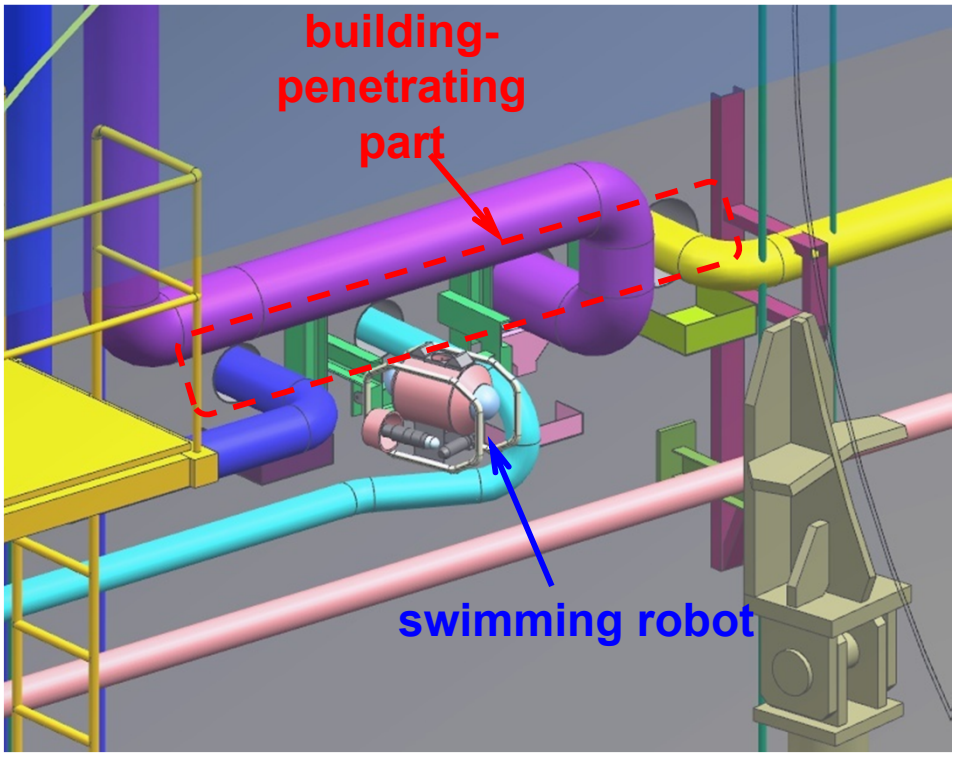
(2) crawling robot（Trydiver）: get images by supersonic sonar (Doppler-measured)

We will test their survey functions on the wall.

Swimming robot（Gengo ROV） （get images using camera）	crawling robot（Trydiver） （get Doppler-measured images using supersonic sonar）
	

2. Survey targets and Robots for use (1) swimming robot（camera）

From images by cameras loaded on swimming robot, we will investigate building-penetrating parts (5 points) on north side of east wall of torus room and pinpoint leaks after throwing cameras in at 1F floor surface.



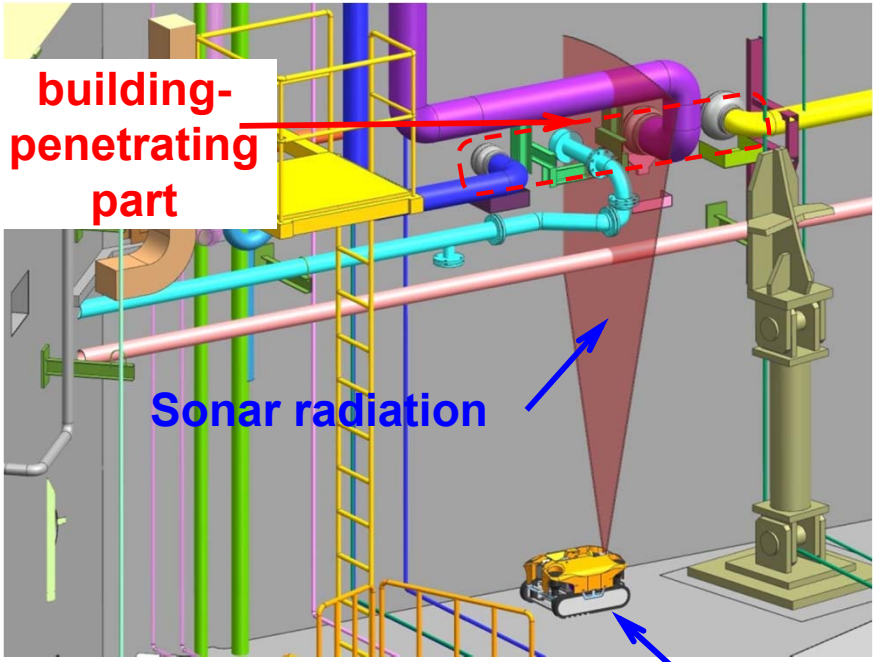
Survey on wall of Torus Room using swimming robot (camera)

scope	To examine
North side of east wall of torus room, building-penetrating part	- Examining penetrating part - Verifying Whether any accumulated water or not

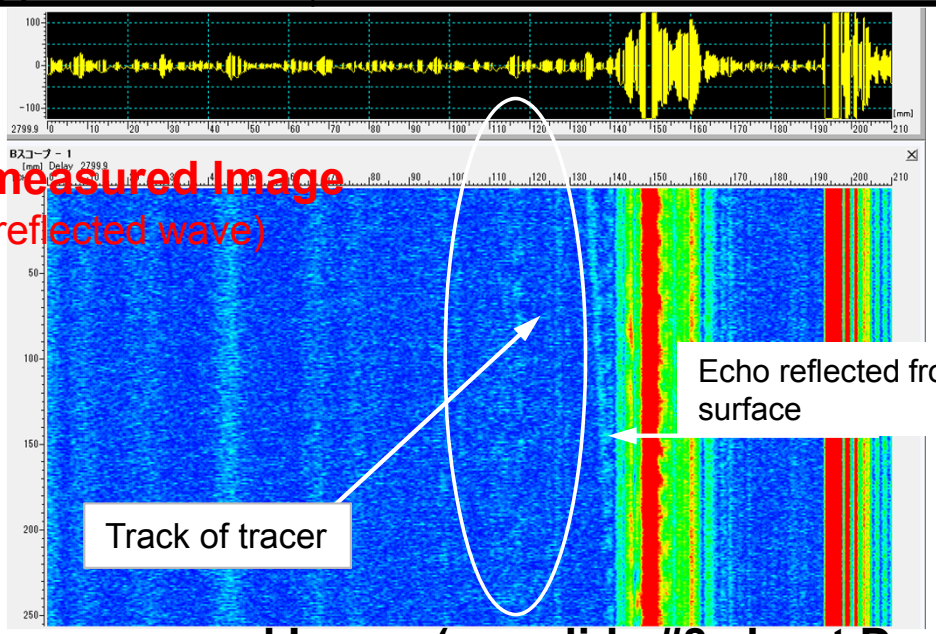
2. Survey targets and Robots for use
(2)crawling robot（supersonic sonar）

-Pick up each one point from building-penetrating parts on north side of east wall of torus room after examining images by camera loaded swimming robot, and see the flow of accumulating water or not

-By Doppler-measured Images acquired by supersonic sonar loaded crawling robot set on floor of torus room, we can see the flow of accumulating water.



Scope	To survey
North side of east wall of torus room, building-penetrating part	Verifying Whether any accumulated water or not



Investigation on wall using crawling robot（supersonic sonar）

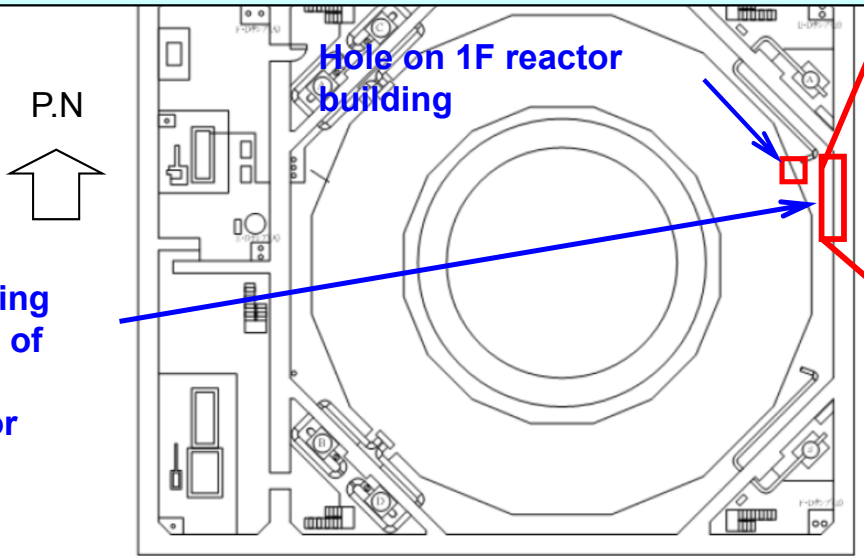
Doppler-measured Image (see slide #8 about Doppler measurement)

3. Disposing robots for survey

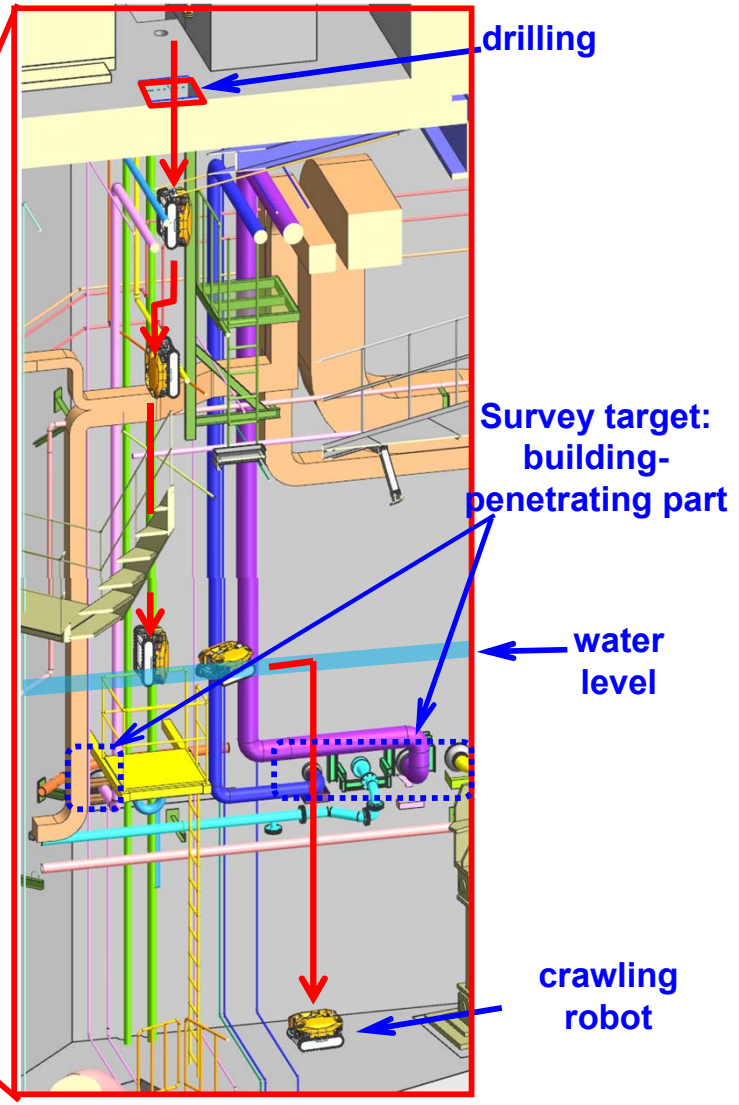
Hanging robots through 615mm × 615mm square hole drilled on 1F north-east floor of Unit 2 reactor building.

(1)swimming robot will swim to Survey target, building-penetrating part of north side of west wall.

(2)crawling robot will land on the underground floor and move to area reach supersonic wave to Survey target.



view of underground floor of reactor building

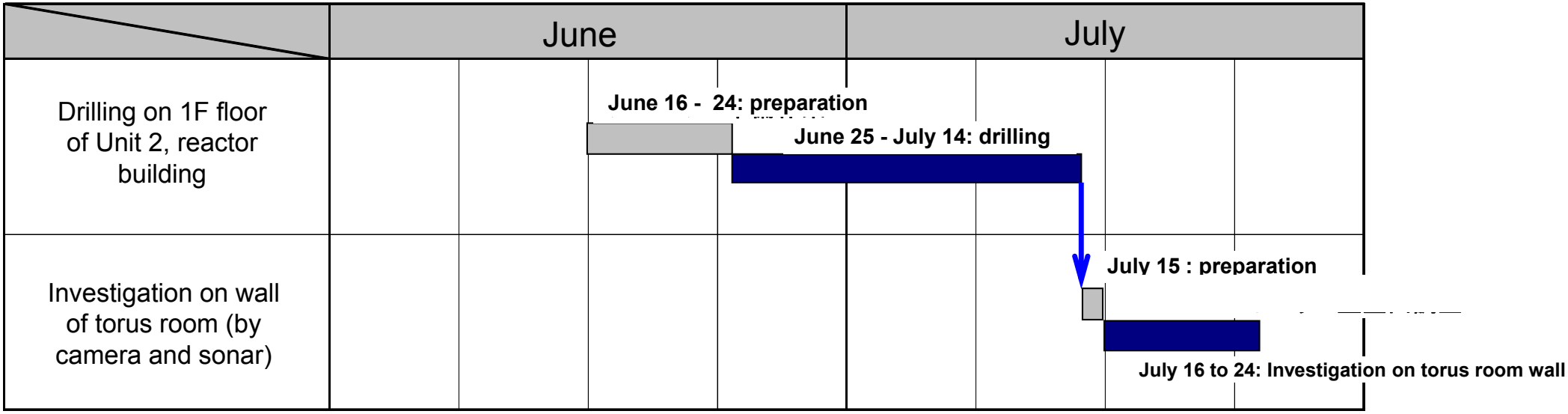


North side of east wall

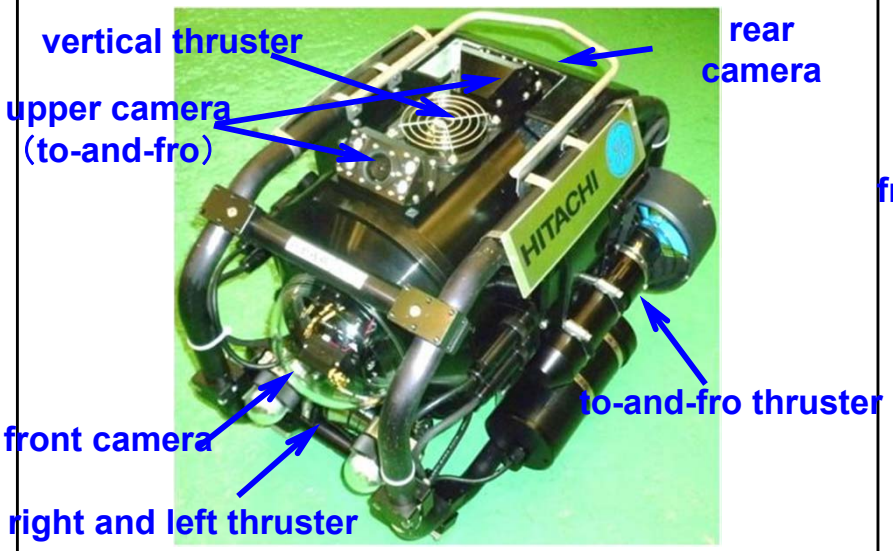
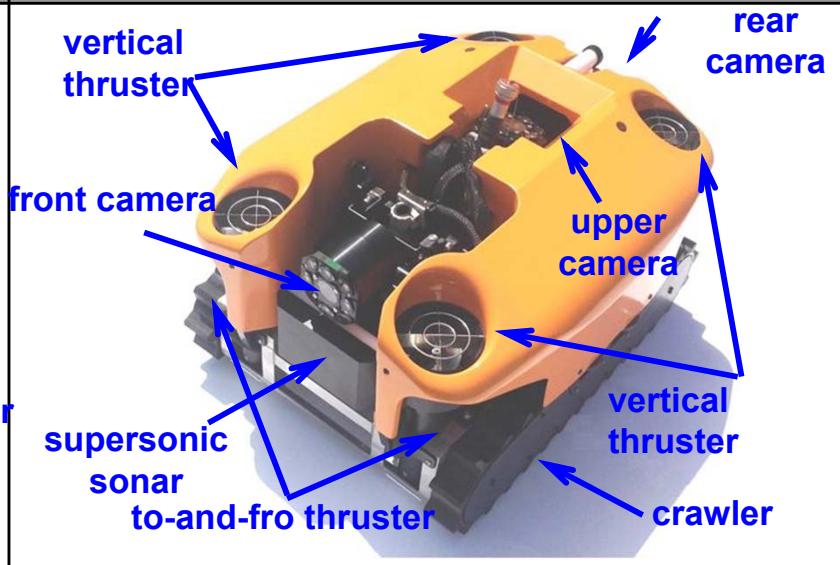
Hanging crawling robot

4. Schedule for Demonstration Experiment

After drilling at 1F floor of Unit 2 of the reactor building, we are going to operate demonstration experiment on torus room wall.



<Reference> Specifications

	(1) Swimming robot（camera）	(2) crawling robot（supersonic sonar）
appearance		
size	W420mm × L480mm × H375mm	W480mm × L628mm × H378mm
weight	air: approx. 22kg; underwater: neutral buoyancy	air: approx. 40kg; underwater: approx. 1.5kg
propulsion device（thruster）	to-and-fro：2 vertical：1 right and left：1	to-and-fro：2 vertical：4
running speed（crawler）	—	Maximum: 60mm/s
cable	length：100m; diameter outside:φ7.7; power line: 2 cores; optical fiber: 1 core	length：80m; diameter outside:φ14.5; power line: 2 core; communication line: 4 cores
Investigating device	Panning and tilting camera with digital zoom: 2（each 1 for front and rear）; Digital zoom camera:2（each 1 for front and rear upper)	supersonic sonar（angle of view: 30); upper to-and-fro camera（sum 3; front camera with tilt）