Team name: SEBOT + OFF CYLE			
Referee I (Land):, Referee II (Land):	AM TO OF	M	
Referee I (Sea):, Referee II (Sea):	SCHOPL	- EN	
Date (DD/MM/YYYY): 19917, Time (2	4:00):	3:15	
Duration: (Max. 45 min) ☐ Timeout			
Achievements			
Set A1: Outdoors			
From the starting point of the building, a ground robot reaches WP5 L within	n a precision	of 3m.	A1.1 🗆
A ground robot reaches WP6 L within a precision of 3m with autonomous r	avigation.		A1.2 □
	0.41	1	
		damages (
The ground robots recognise the damages on the wall of the building.	D1 🗖	D2 🗆	D3 🗆
(Each damage can only be scored once).	A1.3	A1.4	A1.5
The ground robot(s) build(s) an outdoor map of the land pipes area.			A1.6 □
A ground robot detects the leak marker on the pipe.			A1.7
A ground robot reports the pipe that is leaking on land.			A1.8 🔽
A ground robot recognises the number on the leaking pipe on land.			A1.9 🔽
A ground robot localises the unobstructed entrance in real-time in automatic	way.		A1.10 🗆

A ground robot enters the building through the unblocked entrance.	A2.1 📈
A ground robot finds a safe and unobstructed path to the machine room from the building entrance. (The path is shown on the map).	A2.2 🔽
From the building entrance, a ground robot follows a safe path (collision free from obstacles and structures) to the machine room.	A2.3
A ground robot recognises the machine room sign in real-time in automatic way.	A2.4 □
A ground robot enters the machine room.	A2.5

	Indoor map	
The ground robot(s) builds a geometric indoor map of the building.	Area 1 🗆	Area 2 🗆
(Use the best map or a combination of ground robots maps).	A2.6	A2.7

A ground robot recognises the ID of the correct set of valves in the machine room.

A2.8

A ground robot closes the correct valve. The robot must close one valve of the set autonomously and the other one manually. The process must be recorded by the on board camera of the robot.

(Note: Each set of valves has two types: gate and lever)

Specify type valve: ______

Set A3: Underwater

	Type of images		
The underwater robot provides images of the gate.	Acoustic buoy-1 □ A3.1	Optical buoy-	1 □ A3.3
	Acoustic buoy-2 A3.2	Optical buoy-	2 □ A3.4
The underwater robot passes through the gate without touching it.			A3.5 □
The underwater robot passes through the gate within the first 30 minutes from the start of the run.			A3.6 □

ŧ	Buoys				
The underwater robot detects the plume buoys in real time.	B1□	B2□	В3□	B4□	B5□
Images are needed.	A3.7	A3.8	A3.9	A3.10	A3.11
2	Buoys n	umbers			4
The underwater robot recognises the number on the plume	В1□	B2□	В3□	B4□	B5□
buoys	A3.12	A3.13	A8.14	A3.15	A3.16

1 * * * *

The underwater robot produces a geometric map of the plume (Area: B1+B2).	A3.17 🗆
The underwater robot produces a geometric map of the plume (Area: B3+B4+B5).	A3.18 □
The underwater robot detects the leak marker on the pipe in real time.	A3.19 🗆
The underwater robot recognises and provides images of the black number stamped on the leaking pipe.	A3.20 □
The underwater robot reports which is the number of the leaking pipe by its geometric position.	A3.21□

Pipes underwater			
	2□	3□	4□
3.22	A3.23	A3.24	A3.25
	1		

Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>first half</u> of the leaking pipe.	A3.26
Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>second half</u> of the leaking pipe.	A3.27
The underwater robot provides a 3D reconstruction of the manipulation console where the correct underwater valve is.	A3.28
The underwater robot closes the correct valve with a rotation of the <u>first 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.29
The underwater robot closes the correct valve with a rotation of the <u>last 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.30

The underwater robot communicates through a surface robot or directly to the ground robot the	
leaking pipe.	A4.1 🗆
18 A	
The ground robot receives and decodes the message with the correct leaking pipe sent by directly	
by the underwater or through the surface robot.	A4.2 🗖
The ground robot communicates the correct land leaking pipe to the underwater robot (directly or	,
through the surface robot).	A4.3 🔽
	- 34
The underwater robot receives and decodes the message with the correct land leaking pipe sent by	
the aerial robot or the surface robot.	A4.4 🗖
The ground robot and the underwater robot close the correct valves in a synchronised process.	A4.5 □
	M4.3 L

Set A5: General

The ground robots return to the landing area once all the tasks have been done.	A5.1 □
The underwater robot surfaces in a controlled way once all the tasks have been done.	A5.2 □
The ground robot(s) transmits live position and images/video to the control station during the run.	A5.3
The marine robot(s) transmits live position and images/video to the control station during the run or the manipulation task.	A5.4 🗆

The robot needs manual interven	ntion during a run (e.g. the robot is stuck):
Marine robot	No permitted
Ground robot 1	PB1
Ground robot 2	PB2 □ □ (max. 2)

The ground robot leaves the operating area.	PB3 □ (max. 1)
The ground robot changes batteries or is refuelled.	PB4 □ (max. 1)
The ground robot-1 hits the obstacles.	PB5 VI VI 🗆 🗀

The ground robot-2 hits the obstacles.	PB6 □ □ □ □
The underwater robot changes batteries.	PB7 □ (max. 1)
The underwater robot surfaces at any point (GPS fix can be obtained) and re-submerges. (The surface for preparation of the manipulation task is not penalised)	PB8 □ □ (max. 2)
Disqualifying Behaviours	×
A robot damages competition arena (including the obstacles).	DB1 □
A robot does not conform to safety requirements for the competition.	DB2 🗆
A robot impacts the sensitive dune area.	DB3 🗆
A robot enters any of the upper floors of the building.	DB4 □
A marine robot is tele-operated (except for safety reasons agreed by the Technical Committee and the manipulation task).	DB5 🗆
The underwater robot closes the wrong valve underwater.	DB6 □
The ground robots close more than one wrong valve on land.	DB7 □
Comment:	only when it is
Benchmarking data delivered appropriately:	
(Time is 60 min after the end of the team's time-slot, formats as described in the TBM)	
Team leader signature: 1 2 2 Cheff	<i>M</i>
Referee signature:	

Team name: ENITH BRETAGNE			
Referee I (Land):, Referee II (Land):	WINF	ELD	
Referee I (Land):	ANDRE	A	
Date (DD/MM/YYYY):, Time			
Duration: (Max. 45 min) ☐ Timeout			
Achievements			
Set A1: Outdoors			
From the starting point of the building, a ground robot reaches WP5 L w	ithin a precision	n of 3m.	A1.1
A ground robot reaches WP6 L within a precision of 3m with autonomou	us navigation.		A1.2 🗆
	Outdoor	damages ((building)
The ground robots recognise the damages on the wall of the building.	D1 🗹	D2 🗆	D3 🗆
(Each damage can only be scored once).	A1.3	A1.4	A1.5
The ground robot(s) build(s) an outdoor map of the land pipes area.			A1.6 □
A ground robot detects the leak marker on the pipe.			A1.7 🗆
A ground robot reports the pipe that is leaking on land.	*		A1.8 🗆
A ground robot recognises the number on the leaking pipe on land.			A1.9 🗆
A ground robot localises the unobstructed entrance in real-time in autom	atic way.		A1.10 □

.4						
A ground robot enters the building through the unblocked entrance.				A	A2.1 □	
A ground robot finds a safe and unobstructed path to the entrance. (The path is shown on the map).	e machine roon	from the	building		A	A2.2 □
From the building entrance, a ground robot follows a sa	afe path (collision	on free fro	m obstacl	es		
and structures) to the machine room.					Α	\2.3 □
A ground robot recognises the machine room sign in re	al-time in auton	natic way.			A	A2.4 □
A ground robot enters the machine room.					A	A2.5 □
				Indoor	map	
The ground robot(s) builds a geometric indoor map of	the building.	lding. Area 1 A			Area	. 2 🗆
(Use the best map or a combination of ground robots maps). A2.6			A2.7	,		
A ground robot recognises the ID of the correct set of v	alves in the ma	chine roor	n.		A	A2.8 □
			Corre	ct Valv		
A ground robot closes the correct valve. The robot mus	t close one	Valve		Valve		
valve of the set autonomously and the other one manual	y. The	manual		autonomous		S
process must be recorded by the on board camera of the	robot.	□ A2.9		□ A2	.10	
(Note: Each set of valves has two types: gate and lever)						
		Specify	type			e
valve:			valve	_		
Set A3: Underwater						
	Type of images					
The underwater robot provides images of the gate.	Acoustic buoy-1 DA3.1 Optical buoy-		y-1 C	J A3.3		
	Acoustic buoy-2 A3.2 Optical buoy-2		у-2 [□ A3.4		

A3.5 □

A3.6 □

The underwater robot passes through the gate without touching it.

The underwater robot passes through the gate within the first 30 minutes from the start of the run.

*	Buoys				
The underwater robot detects the plume buoys in real time.	BIZ	В2□	В3□	B4□	B5□
Images are needed.	A3.7	A3.8	A3.9	A3.10	A3.11
	Buoys n	umbers			
The underwater robot recognises the number on the plume	B1□	B2□	В3□	В4□	B5□
buoys	A3.12	A3.13	A\$.14	A3.15	A3.16

The underwater robot produces a geometric map of the plume (Area: B1+B2).	A3.17 🗆
The underwater robot produces a geometric map of the plume (Area: B3+B4+B5).	A3.18 🗆
The underwater robot detects the leak marker on the pipe in real time.	A3.19 🗆
The underwater robot recognises and provides images of the black number stamped on the leaking pipe.	A3.20 □
The underwater robot reports which is the number of the leaking pipe by its geometric position.	A3.21□

	Pipes underwater			
The underwater robot inspects the four pipes underwater. Provide	10	2□	3 🗆	4□
images.	A3.22	A3.23	A3.24	A3.25

Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>first half</u> of the leaking pipe.	A3.26
Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>second half</u> of the leaking pipe.	A3.27
The underwater robot provides a 3D reconstruction of the manipulation console where the correct underwater valve is.	A3.28
The underwater robot closes the correct valve with a rotation of the <u>first 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.29
The underwater robot closes the correct valve with a rotation of the <u>last 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.30

The underwater robot communicates through a surface robot or directly to the ground robot the	
leaking pipe.	A4.1 □
lid:	
The ground robot receives and decodes the message with the correct leaking pipe sent by directly	
by the underwater or through the surface robot.	A4.2 □
The ground robot communicates the correct land leaking pipe to the underwater robot (directly or	
through the surface robot).	A4.3 🗖
The underwater robot receives and decodes the message with the correct land leaking pipe sent by	
the aerial robot or the surface robot.	A4.4 🗆
The ground robot and the underwater robot close the correct valves in a synchronised process.	A 4 5 🗖
	A4.5 🗖

Set A5: General

The ground robots return to the landing area once all the tasks have been done.	A5.1 □
The underwater robot surfaces in a controlled way once all the tasks have been done.	A5.2 □
The ground robot(s) transmits live position and images/video to the control station during the run.	A5.3.
The marine robot(s) transmits live position and images/video to the control station during the run or the manipulation task.	A5.4 □

The robot needs manual interver	ntion during a run (e.g. the robot is stuck):
Marine robot	No permitted
	,
Ground robot 1	PB1
Ground robot 2	PB2 □ □ (max. 2)

The ground robot leaves the operating area.	PB3 □ (max. 1)
The ground robot changes batteries or is refuelled.	PB4 □ (max. 1)
The ground robot-1 hits the obstacles.	PB5 🗆 🗆 🗅 🗓

The ground robot-2 hits the obstacles.	PB6 □	000
The underwater robot changes batteries.	PB7 □ ((max. 1)
The underwater robot surfaces at any point (GPS fix can be obtained) and re-submerges. (The surface for preparation of the manipulation task is not penalised)	PB8 □ □] (max. 2)
Disqualifying Behaviours	2	
A robot damages competition arena (including the obstacles).		DB1 🗖
A robot does not conform to safety requirements for the competition.		DB2 □
A robot impacts the sensitive dune area.		DB3 □
A robot enters any of the upper floors of the building.		DB4 □
A marine robot is tele-operated (except for safety reasons agreed by the Technical Committee and the manipulation task).		DB5 🗖
The underwater robot closes the wrong valve underwater.		DB6 □
The ground robots close more than one wrong valve on land.		DB7 □
2	15.	
WARNING: A disqualifying behaviour discards all other achievements in the current task. Use it o really necessary (e.g. cheating).	only when it i	s
Benchmarking data delivered appropriately:		
(Time is 60 min after the end of the team's time-slot, formats as described in the TBM)		
Team leader signature:		
N M.		

Referee signature: _

Team name:ENSTA A TEAM			
Referee I (Land): MICHAEL GUITMANN, Referee II (Land):			MANI
Referee I (Sea):, Referee II (Sea):	Scholi	-EY	
Date (DD/MM/YYYY):, Time (2	24:00);\	213	
Duration: (Max. 45 min) Timeout			
Achievements			
Set A1: Outdoors			15
From the starting point of the building, a ground robot reaches WP5 L with	in a precision	of 3m.	A1.1 □
A ground robot reaches WP6 L within a precision of 3m with autonomous	navigation.		A1.2 □
	Outdoor	damages (building)
The ground robots recognise the damages on the wall of the building.	DIV	D2 🔽	D3 🗆
(Each damage can only be scored once).	A1.3	A1.4	A1.5
The ground robot(s) build(s) an outdoor map of the land pipes area.		ř	,
The ground robot(s) bund(s) an outdoor map of the land pipes area.			A1.6 🔼
			A1.6 🗹
A ground robot detects the leak marker on the pipe. A ground robot reports the pipe that is leaking on land.			
A ground robot detects the leak marker on the pipe.			A1.7 🗆

A ground robot enters the building through the unblocked entrance.					A2.1 □
A ground robot finds a safe and unobstructed path to the machine room	from the	building			
entrance. (The path is shown on the map).		\$			A2.2 🗖
From the building entrance, a ground robot follows a safe path (collision	on free fro	m obstacl	es		
and structures) to the machine room.					A2.3 □
A ground robot recognises the machine room sign in real-time in auton	natic way.				A2.4 🗆
A ground robot enters the machine room.				+	
Trigo cana robbe enters the machine robbin					A2.5 □
		,			
			Indoor	ma	p
The ground robot(s) builds a geometric indoor map of the building.		Area 1 □ Ar		Are	ea 2 🗆
(Use the best map or a combination of ground robots maps).	A2.6 A		A2	7	
A ground robot recognises the ID of the correct set of valves in the made	chine roor	n.		Т	4000
					A2.8 □
		Corre	ct Valv	e	
A ground robot closes the correct valve. The robot must close one	Valve		Valve		
valve of the set autonomously and the other one manually. The	manual	autonomoi		ous	
process must be recorded by the on board camera of the robot.	□ A2.9 □ A2.10		.10		
(Note: Each set of valves has two types: gate and lever)					
	Specify type Specify ty		ype		
valve: valve:		_			
	,		L	_	

Set A3: Underwater

	Type of	images	
The underwater robot provides images of the gate.	Acoustic buoy-1 A3.1	Optical buoy-	1 □ A3.3
4	Acoustic buoy-2 🔼 A3.2	Optical buoy-2	2 □ A3.4
The underwater robot passes through the gate wit	hout touching it.		A3.5
The underwater robot passes through the gate within t	he first 30 minutes from the s	tart of the run.	A3.6 □

₹	Buoys				
The underwater robot detects the plume buoys in real time.	B1□	В2□	В3□	B4□	B5□
Images are needed.	A3.7	A3.8	A3.9	A3.10	A3.11
2	Buoys n	umbers			
The underwater robot recognises the number on the plume	B1□	B2□	В3□	B4□	B5□
buoys	A3.12	A3.13	A3.14	A3.15	A3.16

The underwater robot produces a geometric map of the plume (Area: B1+B2).	A3.17 □
The underwater robot produces a geometric map of the plume (Area: B3+B4+B5).	A3.18 🗆
The underwater robot detects the leak marker on the pipe in real time.	A3.19 🗖
The underwater robot recognises and provides images of the black number stamped on the leaking pipe.	A3.20 □
The underwater robot reports which is the number of the leaking pipe by its geometric position.	A3.21□

(i)	Pipes underwater			
The underwater robot inspects the four pipes underwater. Provide	10	2□	3□	4□
images.	A3.22	A3.23	A3.24	A3.25

Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>first half</u> of the leaking pipe.	A3.26
Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>second half</u> of the leaking pipe.	A3.27
The underwater robot provides a 3D reconstruction of the manipulation console where the correct underwater valve is.	A3.28
The underwater robot closes the correct valve with a rotation of the <u>first 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.29
The underwater robot closes the correct valve with a rotation of the <u>last 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.30

The underwater robot communicates through a surface robot or directly to the ground robot the leaking pipe.	A4.1 🗆
The ground robot receives and decodes the message with the correct leaking pipe sent by directly by the underwater or through the surface robot.	A4.2 □
The ground robot communicates the correct land leaking pipe to the underwater robot (directly or through the surface robot).	A4.3 🗆
The underwater robot receives and decodes the message with the correct land leaking pipe sent by the aerial robot or the surface robot.	A4.4 □
The ground robot and the underwater robot close the correct valves in a synchronised process.	A4.5 □

Set A5: General

The ground robots return to the landing area once all the tasks have been done.	A5.1 □
The underwater robot surfaces in a controlled way once all the tasks have been done.	A5.2 □
The ground robot(s) transmits live position and images/video to the control station during the run.	A5.31
The marine robot(s) transmits live position and images/video to the control station during the run	
or the manipulation task.	A5.4 □

The robot needs manual interven	ntion during a run (e.g. the robot is stuck):		
Marine robot	No permitted		
Ground robot 1	PB1 ☑ (max. 2)		
Ground robot 2	PB2 (max. 2)	já	

The ground robot leaves the operating area.	PB3 □ (max. 1)
The ground robot changes batteries or is refuelled.	PB4 □ (max. 1)
The ground robot-1 hits the obstacles.	PB5 🗆 🗆 🗅 🗅

The ground robot-2 hits the obstacles.	PB6 □	
The underwater robot changes batteries.	PB7 □ ((max. 1)
The underwater robot surfaces at any point (GPS fix can be obtained) and re-submerges. (The surface for preparation of the manipulation task is not penalised)	PB8 □ □] (max. 2)
Disqualifying Behaviours		
A robot damages competition arena (including the obstacles).		DB1 🗖
A robot does not conform to safety requirements for the competition.		DB2 🗖
A robot impacts the sensitive dune area.		DB3 □
A robot enters any of the upper floors of the building.		DB4 □
A marine robot is tele-operated (except for safety reasons agreed by the Technical Committee and the manipulation task).		DB5 🗆
The underwater robot closes the wrong valve underwater.		DB6 □
The ground robots close more than one wrong valve on land.		DB7 □
Comment: WARNING: A disqualifying behaviour discards all other achievements in the current task. Use it or really necessary (e.g. cheating).	only when it i	s
Benchmarking data delivered appropriately: □ yes / □ no		
(Time is 60 min after the end of the team's time-slot, formats as described in the TBM)		
Team leader signature:		i: 40

Referee signature: _

A ground robot recognises the number on the leaking pipe on land.

A ground robot localises the unobstructed entrance in real-time in automatic way.

Team name: ROBPOS IMM			
Referee I (Land): A.A. WINEEL Referee II (Land):	RERN	Q	
Referee I (Land): ALAN WINFELD, Referee II (Land): Referee I (Sea): Referee II (Sea):	VLA*O	7	
Date (DD/MM/YYYY): 19 9 17 , Time (2-	4:00): \7	2:15	
Duration: (Max. 45 min) ☐ Timeout			
Achievements			
Set A1: Outdoors			
9			
From the starting point of the building, a ground robot reaches WP5 L withi	n a precision	of 3m.	A1.1 🔽
A ground robot reaches WP6 L within a precision of 3m with autonomous n	avigation.		A1.2 🔽
	Outdoor	damages (building)
The ground robots recognise the damages on the wall of the building.	D1 🗆	D2 🗆	D3 🗆
(Each damage can only be scored once).	A1.3	A1.4	A1.5
The ground robot(s) build(s) an outdoor map of the land pipes area.			A1.6 🗹
A ground robot detects the leak marker on the pipe.			A1.7 🔽
A ground robot reports the pipe that is leaking on land.			A 1 0 🔽

A1.8 🔽

A1.9 🔽

A1.10 🖬

A ground robot enters the building through the unblocked entrance.					A2.1	
A ground robot finds a safe and unobstructed path to the machine room from the building entrance. (The path is shown on the map).					A2.2 🗖	
From the building entrance, a ground robot follows a sa and structures) to the machine room.	afe path (collisio	n free froi	n obstacl	es		A2.3 🗆
A ground robot recognises the machine room sign in re	al-time in auton	natic way.				A2.4 🗖
A ground robot enters the machine room.						A2.5 🗖
]	Indoor	map	,]
The ground robot(s) builds a geometric indoor map of	the building.		Area 1		Are	a 2 🗆
(Use the best map or a combination of ground robots me	_		A2.6		A2.	
ř						
A ground robot recognises the ID of the correct set of valves in the machine room.					A2.8 🗖	
			Corre	ect Val	ve	
A ground robot closes the correct valve. The robot must close one valve of the set autonomously and the other one manually. The process must be recorded by the on board camera of the robot. (Note: Each set of valves has two types: gate and lever) Specify valve:			Valve auton	iomore	pe	
Set A3: Underwater						
	Type of images					
The underwater robot provides images of the gate.	Acoustic buoy-1 □ A3.1 Optical buoy-1 □			□ A3.3		
	Acoustic buoy-2 □ A3.2 Optical buoy-2 □ A3			□ A3.4		
The underwater robot passes through the gate with	hout touching	t				
			A3.5 □			
The underwater robot passes through the gate within the first 30 minutes from the start of the run.			∧3.6 П			

è	Buoys				
The underwater robot detects the plume buoys in real time.	B1□	В2□	В3□	В4□	B5□
Images are needed.	A3.7	A3.8	A3.9	A3.10	A3.11
	Buoys numbers				
The underwater robot recognises the number on the plume	B1□	B2□	B3□	В4□	B5□
buoys	A3.12	A3.13	Æ3.14	A3.15	A3.16

The underwater robot produces a geometric map of the plume (Area: B1+B2).	A3.17 □
The underwater robot produces a geometric map of the plume (Area: B3+B4+B5).	A3.18 □
The underwater robot detects the leak marker on the pipe in real time.	A3.19 🗆
The underwater robot recognises and provides images of the black number stamped on the leaking pipe.	A3.20 □
The underwater robot reports which is the number of the leaking pipe by its geometric position.	A3.21□

	Pipes underwater			
The underwater robot inspects the four pipes underwater. Provide	10	2□	3□	4□
images.	A3.22	A3.23	A3.24	A3.25

Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>first half</u> of the leaking pipe.	A3.26
Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>second half</u> of the leaking pipe.	A3.27
The underwater robot provides a 3D reconstruction of the manipulation console where the correct underwater valve is.	A3.28 □
The underwater robot closes the correct valve with a rotation of the <u>first 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.29
The underwater robot closes the correct valve with a rotation of the <u>last 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.30

The underwater robot communicates through a surface robot or directly to the ground robot the leaking pipe.	A4.1 🗖
The ground robot receives and decodes the message with the correct leaking pipe sent by directly by the underwater or through the surface robot.	A4.2 □
The ground robot communicates the correct land leaking pipe to the underwater robot (directly or through the surface robot).	A4.3
The underwater robot receives and decodes the message with the correct land leaking pipe sent by the aerial robot or the surface robot.	A4.4 □
The ground robot and the underwater robot close the correct valves in a synchronised process.	A4.5 🗆

Set A5: General

The ground robots return to the landing area once all the tasks have been done.	A5.1 □
The underwater robot surfaces in a controlled way once all the tasks have been done.	A5.2 □
The ground robot(s) transmits live position and images/video to the control station during the run.	A5.3
The marine robot(s) transmits live position and images/video to the control station during the run or the manipulation task.	A5.4 □

The robot needs manual interven	ntion during a run (e.g. the robot is stuck):
Marine robot	No permitted
Ground robot 1	PB1 □ □ (max. 2)
Ground robot 2	PB2 □ □ (max. 2)

The ground robot leaves the operating area.	PB3 □ (max. 1)
The ground robot changes batteries or is refuelled.	PB4 □ (max. 1)
The ground robot-1 hits the obstacles.	PB5 🗆 🗆 🗆 🗖

The ground robot-2 hits the obstacles.	PB6 □ □ □ □
The underwater robot changes batteries.	PB7 □ (max. 1)
The underwater robot surfaces at any point (GPS fix can be obtained) and re-submerges. (The surface for preparation of the manipulation task is not penalised)	DD0 F F (2)
(The surface for preparation of the manipulation task is not penalised)	PB8 □ □ (max. 2)
	·
Disqualifying Behaviours	
A robot damages competition arena (including the obstacles).	DB1 🗆
	DDI L
A robot does not conform to safety requirements for the competition.	DB2 □
A robot impacts the sensitive dune area.	DB3 □
A robot enters any of the upper floors of the building.	DB4 □
A marine robot is tele-operated (except for safety reasons agreed by the	
Technical Committee and the manipulation task).	DB5 □
The underwater robot closes the wrong valve underwater.	DB6 □
The ground robots close more than one wrong valve on land.	DB7 □
	Į.
Comment:	
WARNING: A disqualifying behaviour discards all other achievements in the current task. Use it of	only when it is
really necessary (e.g. cheating).	
Benchmarking data delivered appropriately:	
(Time is 60 min after the end of the team's time-slot, formats as described in the TBM)	
Team leader signature: (Sea) Myth ([land]

Referee signature: _

Team name: KAYTOKS + OUBOT			
Referee I (Land):	BELLIN	O BRUGI	hurt
Referee I (Sea):, Referee II (Sea):	*		
Date (DD/MM/YYYY): 19917, Time (24	4:00):	o : 15	
Duration: (Max. 45 min) ☐ Timeout			
Achievements			
Set A1: Outdoors			
From the starting point of the building, a ground robot reaches WP5 L within		of 3m.	A1.1 🗆
A ground robot reaches WP6 L within a precision of 3m with autonomous n	avigation.		A1.2 🗆
	Outdoor	damages (building)
The ground robots recognise the damages on the wall of the building.	D1 🗾	D2 🗷	D3 🔼
(Each damage can only be scored once).	A1.3	A1.4	A1.5
The ground robot(s) build(s) an outdoor map of the land pipes area.			A1.6 🗹
A ground robot detects the leak marker on the pipe.			A1.7 🗹
A ground robot reports the pipe that is leaking on land.			A1.8 🗹
A ground robot recognises the number on the leaking pipe on land.			A1.9 🗹
A ground robot localises the unobstructed entrance in real-time in automatic	way.		A1.10 🗹

A ground robot enters the building through the unblocked entrance.	A2.1
A ground robot finds a safe and unobstructed path to the machine room from the building entrance. (The path is shown on the map).	A2.2 🗹
From the building entrance, a ground robot follows a safe path (collision free from obstacles and structures) to the machine room.	A2.3 🗹
A ground robot recognises the machine room sign in real-time in automatic way.	A2.4 M
A ground robot enters the machine room.	A2.5

	Indo	Indoor map	
The ground robot(s) builds a geometric indoor map of the building.	Area 1 □	Area 2	
(Use the best map or a combination of ground robots maps). Which I	A2.6	A2.7	
A ground robot recognises the ID of the correct set of valves in the machine	room		
A ground robot recognises the 1D of the correct set of valves in the machine	room.	A2.8 🔽	

	Corre	ct Valve
A ground robot closes the correct valve. The robot must close one	Valve	Valve
valve of the set autonomously and the other one manually. The	manual	autonomous
process must be recorded by the on board camera of the robot.	₩ A2.9	□ A2.10
(Note: Each set of valves has two types: gate and lever)		<u></u>
	Specify type	Specify type
	Specify type valve: Level	valve:

Set A3: Underwater

*	Type of	images	:1
The underwater robot provides images of the gate.	Acoustic buoy-1 ☐ A3.1	Optical buoy-	1 □ A3.3
	Acoustic buoy-2 A3.2	Optical buoy-	2 □ A3.4
The underwater robot passes through the gate without touching it.			A3.5 □
The underwater robot passes through the gate within the first 30 minutes from the start of the run.			A3.6 □

	Buoys				
The underwater robot detects the plume buoys in real time.	В1□	B2□	В3□	В4□	B5□
Images are needed.	A3.7	A3.8	A3.9	A3.10	A3.11
	Buoys n	umbers	•		
The underwater robot recognises the number on the plume	B1□	В2□	В3□	B4□	В5□
buoys	A3.12	A3.13	A3.14	A3.15	A3.16

The underwater robot produces a geometric map of the plume (Area: B1+B2).	A3.17 □
The underwater robot produces a geometric map of the plume (Area: B3+B4+B5).	A3.18 🗆
The underwater robot detects the leak marker on the pipe in real time.	A3.19 □
The underwater robot recognises and provides images of the black number stamped on the leaking pipe.	A3.20 □
The underwater robot reports which is the number of the leaking pipe by its geometric position.	A3.21□

	Pipes underwater			
The underwater robot inspects the four pipes underwater. Provide	10	2□	3□	4□
images.	A3.22	A3.23	A3.24	A3.25

Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>first half</u> of the leaking pipe.	A3.26
Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>second half</u> of the leaking pipe.	A3.27
The underwater robot provides a 3D reconstruction of the manipulation console where the correct underwater valve is.	A3.28
The underwater robot closes the correct valve with a rotation of the <u>first 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.29
The underwater robot closes the correct valve with a rotation of the <u>last 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.30

The underwater robot communicates through a surface robot or directly to the ground robot the	
leaking pipe.	A4.1 🗆
The ground robot receives and decodes the message with the correct leaking pipe sent by directly	
by the underwater or through the surface robot.	A4.2 🗖
\$	
The ground robot communicates the correct land leaking pipe to the underwater robot (directly or	
through the surface robot).	A4.3 🗖
The underwater robot receives and decodes the message with the correct land leaking pipe sent by	
the aerial robot or the surface robot.	A4.4 🗆
The ground robot and the underwater robot close the correct valves in a synchronised process.	A 4 C 🖂
	A4.5 🗖

Set A5: General

The ground robots return to the landing area once all the tasks have been done.	A5.1
The underwater robot surfaces in a controlled way once all the tasks have been done.	A5.2 □
The ground robot(s) transmits live position and images/video to the control station during the run.	A5.3 🗹
The marine robot(s) transmits live position and images/video to the control station during the run or the manipulation task.	A5.4 □

The robot needs manual interven	ntion during a run (e.g. the robot is stuck):
Marine robot	No permitted
Ground robot 1	PB1 □ □ (max. 2)
Ground robot 2	PB2 □ □ (max. 2)

The ground robot leaves the operating area.	PB3 □ (max. 1)
The ground robot changes batteries or is refuelled.	PB4 □ (max. 1)
The ground robot-1 hits the obstacles.	PB5 🗆 🗆 🗖

The ground robot-2 hits the obstacles.	PB6 □ □ □ □
The underwater robot changes batteries.	PB7 □ (max. 1)
The underwater robot surfaces at any point (GPS fix can be obtained) and re-submerges. (The surface for preparation of the manipulation task is not penalised)	PB8 □ □ (max. 2)
Disqualifying Behaviours	
A robot damages competition arena (including the obstacles).	DB1 🗆
A robot does not conform to safety requirements for the competition.	DB2 □
A robot impacts the sensitive dune area.	DB3 🗖
A robot enters any of the upper floors of the building.	DB4 🗆
A marine robot is tele-operated (except for safety reasons agreed by the Technical Committee and the manipulation task).	DB5
The underwater robot closes the wrong valve underwater.	DB6 🗆
The ground robots close more than one wrong valve on land.	DB7 □
Comment: WARNING: A disqualifying behaviour discards all other achievements in the current task. Use it o	nh, whom it is
really necessary (e.g. cheating).	my when it is
Benchmarking data delivered appropriately: □ yes / □ no	
(Time is 60 min after the end of the team's time-slot, formats as described in the TBM)	
Team leader signature:	(botto)

Team name: TELLOB + GIRONA			
Referee I (Land): HAND ARTHUR M., Referee II (Land):	BERN	10 B.	
Referee I (Land): K. COOPER, Referee II (Sea):	MIT	ESH	
Date (DD/MM/YYYY): 19 9 17 , Time (2	4:00):	:15	
Duration: (Max. 45 min)			
Achievements			
Set A1: Outdoors			
From the starting point of the building, a ground robot reaches WP5 L with	n a precision	of 3m.	A1.1
A ground robot reaches WP6 L within a precision of 3m with autonomous r	avigation.		A1.2 □
	Outdoor	damages (building)
The ground robots recognise the damages on the wall of the building.	D1 🗖	D2 🗖	D3 🗆
(Each damage can only be scored once).	A1.3	A1.4	A1.5
The ground robot(s) build(s) an outdoor map of the land pipes area.			A1.6
A ground robot detects the leak marker on the pipe.			A1.7 🗹
A ground robot reports the pipe that is leaking on land.			A1.8 🗹
A ground robot recognises the number on the leaking pipe on land.	7.7		A1.9
A ground robot localises the unobstructed entrance in real-time in automatic	way.		A1.10 🗆

A ground robot enters the building through the unblocked entrance.	A2.1 🗹
A ground robot finds a safe and unobstructed path to the machine room from the building entrance. (The path is shown on the map).	A2.2 🗹
From the building entrance, a ground robot follows a safe path (collision free from obstacles and structures) to the machine room.	A2.3
A ground robot recognises the machine room sign in real-time in automatic way.	A2.4 □
A ground robot enters the machine room,	A2.5

		Indoo	r map
The ground robot(s) builds a geometric indoor map of the bu	ilding.	Area 1 🗆	Area 2 🗆
(Use the best map or a combination of ground robots maps).	Manual)	A2.6	A2.7
	(a)		
A ground robot recognises the ID of the correct set of valves	in the machine roo	m.	A2.8

	Correct Valve	
A ground robot closes the correct valve. The robot must close one	Valve	Valve
valve of the set autonomously and the other one manually. The	manual	autonomous
process must be recorded by the on board camera of the robot.	A2.9	A2.10
(Note: Each set of valves has two types: gate and lever)		
	Specify type valve:	Specify type
	valve:	valve:
		1

Set A3: Underwater

	Type of images		
The underwater robot provides images of the gate.	Acoustic buoy-1 A3.1 Acoustic buoy-2 A3.2	Optical buoy-1 ☐ A3.3 Optical buoy-2 ☐ A3.4	
The underwater robot passes through the gate wi	thout touching it.	A3.5	

The **underwater robot** passes through the gate within the first 30 minutes from the start of the run.

	*	Buoys		111		
	The underwater robot detects the plume buoys in real time.	B1□	В2□	В3□	В4□	B5□
	Images are needed.	A3.7	A3.8	A3.9	A3.10	A3.11
х.		Buoys n	umbers			
	The underwater robot recognises the number on the plume	B1□	B2□	В3□	В4□	B5□
	buoys №0	A3.12	A3.13	A3.14	A3.15	A3.16

The underwater robot produces a geometric map of the plume (Area: B1+B2).	A3.17 □
The underwater robot produces a geometric map of the plume (Area: B3+B4+B5)	A3.18 🗆
The underwater robot detects the leak marker on the pipe in real time.	A3.19 □
The underwater robot recognises and provides images of the black number stamped on the leaking pipe.	A3.20 □
The underwater robot reports which is the number of the leaking pipe by its geometric position.	A3.21□

	Pipes underwater			
The underwater robot inspects the four pipes underwater. Provide	10	2□	3□	4□
images.	A3.22	A3.23	A3.24	A3.25

Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>first half</u> of the leaking pipe.	A3.26 □
Following the leaking pipe up to the assembly structure, the underwater robot provides an image mosaic of the <u>second half</u> of the leaking pipe.	A3.27 □
The underwater robot provides a 3D reconstruction of the manipulation console where the correct underwater valve is.	A3.28 □
The underwater robot closes the correct valve with a rotation of the <u>first 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.29
The underwater robot closes the correct valve with a rotation of the <u>last 45 degrees</u> . The process must be recorded by the on board camera of the robot.	A3.30

The underwater robot communicates through a surface robot or directly to the ground robot the	1
leaking pipe.	A4.147
12*	
The ground robot receives and decodes the message with the correct leaking pipe sent by directly	,
by the underwater or through the surface robot.	A4.2 🗹
The ground robot communicates the correct land leaking pipe to the underwater robot (directly or	,
through the surface robot).	A4.3 🗹
The underwater robot receives and decodes the message with the correct land leaking pipe sent by	/
the aerial robot or the surface robot.	A4.47
The ground robot and the underwater robot close the correct valves in a synchronised process.	
The ground robot and the under water robot close the correct varies in a synchronised process.	A4.5 🗆

Set A5: General

The ground robots return to the landing area once all the tasks have been done.	A5.1 🗹
The underwater robot surfaces in a controlled way once all the tasks have been done.	A5.2 □
The ground robot(s) transmits live position and images/video to the control station during the run.	A5.3 🗖
The marine robot(s) transmits live position and images/video to the control station during the run or the manipulation task.	A5.4 🗹

The robot needs manual interven	ntion during a run (e.g. the robot is stuck):
Marine robot	No permitted
Ground robot 1	PB1 □ □ (max. 2)
Ground robot 2	PB2 □ □ (max. 2)

The ground robot leaves the operating area.	PB3 □ (max. 1)
The ground robot changes batteries or is refuelled.	PB4 □ (max. 1)
The ground robot-1 hits the obstacles.	PB5 □ □ □ □

The ground robot-2 hits the obstacles.	PB6 □ □ □ □
The underwater robot changes batteries.	PB7 □ (max. 1)
The underwater robot surfaces at any point (GPS fix can be obtained) and re-submerges. (The surface for preparation of the manipulation task is not penalised)	PB8 □ □ (max. 2)
Disqualifying Behaviours	
A robot damages competition arena (including the obstacles).	DB1 🗆
A robot does not conform to safety requirements for the competition.	DB2 □
A robot impacts the sensitive dune area.	DB3 🗆
A robot enters any of the upper floors of the building.	DB4 □
A marine robot is tele-operated (except for safety reasons agreed by the Technical Committee and the manipulation task).	DB5 🗆
The underwater robot closes the wrong valve underwater.	DB6 □
The ground robots close more than one wrong valve on land.	DB7 🗆
Comment:	only when it is
Benchmarking data delivered appropriately:	
(Time is 60 min after the end of the team's time-slot, formats as described in the TBM)	
Team leader signature: has being and	(sea)
Referee signature:	