The European Coordination Hub for Open Robotics Development

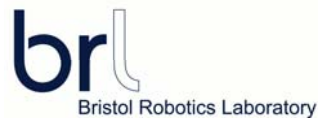**ECHORD++ Review Meeting
WP5 Reporting Period 3**

Prof. Alberto Sanfeliu

Luxembourg, February 14th 2017

WP5. PDTI Sewer

PDTI Sewer

PRODUCT INNOVATION LIFE CYCLE		
PDTI		
ACTIVITIES FOR PUBLIC DEMAND KNOWLEDGE	**ACTIVITIES FOR RESEARCH AND TECHNICAL DEVELOPMENT OF PRE-COMMERCIAL PRODUCTS**	PUBLIC PROCUREMENT FOR COMMERCIAL ROLL-OUT
PHASE 0	**PCP**	PPI

PDTI							
ACTIVITIES FOR PUBLIC DEMAND KNOWLEDGE				**CALL FOR RTD PROPOSALS**	**ACTIVITIES FOR RESEARCH AND TECHNICAL DEVELOPMENT OF PRE-COMMERCIAL PRODUCTS**		
BRAINST ORMING	**NARROW ING DOWN**	**RANKING**	CHALLENGE DESCRIPTION		**SOLUTION DESIGN**	**PROTOTYPING**	**SMALL TEST SERIES**

PDTI as a Pre Commercial Procurement Instrument

ECHORD++ PDTI URBAN

"UTILITY INFRASTRUCTURES AND CONDITION MONITORING FOR SEWER NETWORK. ROBOTS FOR INSPECTION AND CLEARANCE OF THE SEWER NETWORK IN CITIES"

THREE CONSORTIA SELECTED

ARSI – ROBODILLOS - SIAR

Three competitive phases

Phase I- Solution Design

- Runtime: 6 months

Phase II -Prototype Development

- Runtime: 12 months

Phase III - Small Scale Test Series

- Runtime: 12 months

PDTI Sewer. Phase I. January 1st – June 31st

Kick off Meeting. February 17th, 2016

AGENDA		PRESENTER
10:00	Welcome	
10:00-10:30	ECHORD++ ECHORD++ PDTI Sewer	Marie Luise Neitz / TUM Alberto Sanfeliu / UPC
10:30-10:45	Consortia Presentations.	ARSI / SIAR / ROBODILLOS
10:45-11:15	Phase I: Evaluation and Selection Criteria.	Lina Martinez / BCASA
11:15-11:30	Phase I: Questions addressed	Alberto Sanfeliu / UPC
11:30-12:15	Phase I: Monitoring Process	Private Sessions 15'
12:15-13:30	Lunch	
13:30-14:00	Administration	Marie-Luise Neitz / TUM
14:00-16:00	Visit to Barcelona Sewer	BCASA

Evaluation middle period. Telco. April, 5th, 6th or 7th

Final evaluation   Delivery of the final documentation: June 30th, 2016

Open tests at the sewer infrastructure: July 5th-7th, 2016

PDTI Official Tests (expert panel): July 7th – 8th, 2016

PDTI Sewer. Phase I. January 1st – June 31st

Evaluation Criteria. BCASA and UPC Team

The evaluation of the three technological proposals at the end of the Phase I was based on marks given according to three basic criteria:

- **Scientific and/or technological excellence (5 points)**

- **Quality and efficiency of the implementation and the management of the project (5 points)**

- **Potential Impact through the development, dissemination and use of the project (5 points)**

PDTI Sewer. Phase I. January 1st – June 31st

Evaluation Criteria. BCASA and UPC Team

Positive evaluation of the tasks and documentation required during the period

- **Deliverables and Milestones**

- **Dissemination Milestones**

Solution design

- **Detailed explanation of the solution design**

- **Logistics required and operational issues by using the solution**
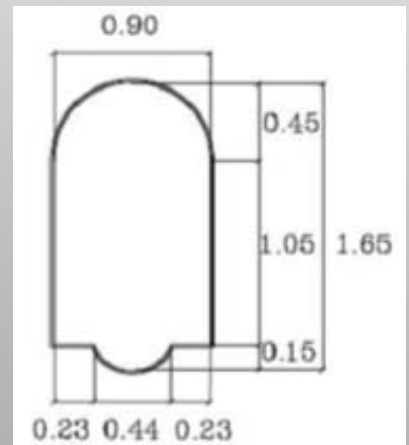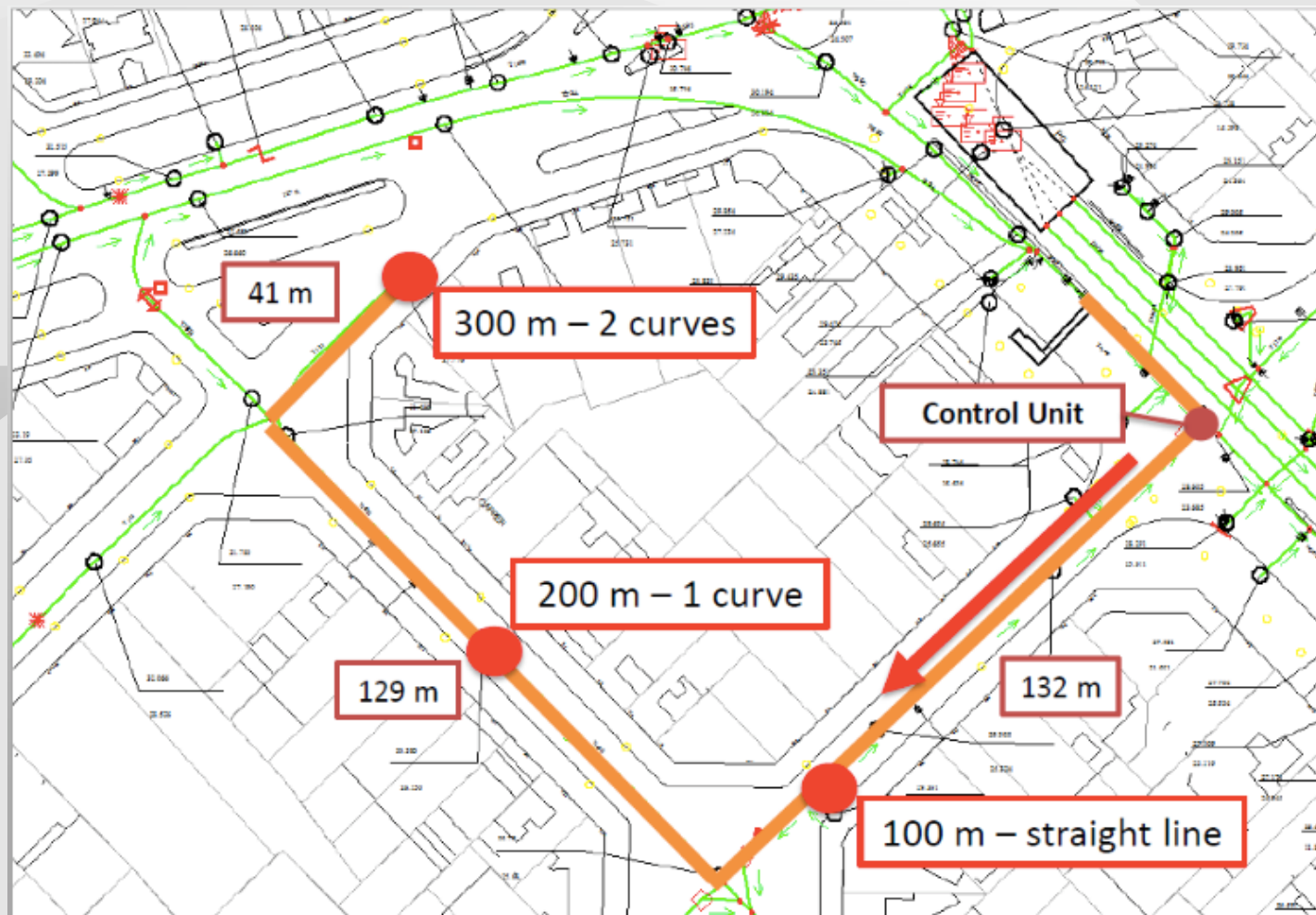
Test Series

- **Mobility**

- **Communications**

- **Autonomy**

Economic Viability of the proposal

PDTI Sewer. Phase I. January 1st – June 31st

Sewer map for the tests. BCASA and UPC Team

41 m

300 m – 2 curves

Control Unit

200 m – 1 curve

129 m

132 m

100 m – straight line

0.90

0.45

1.05 | 1.65

0.15

0.23 0.44 0.23

PDTI Sewer. Phase I. January 1st – June 31st

Evaluation Criteria. MOBILITY

MOBILITY TEST	Evaluation
Robot motion: **100 meters (autonomously) The word autonomously is not the appropriate one in this test, since the robot can be tele-operated, but it has to move without the help of the human operator in case of falling down.**	1) The maximum and minimum speed will be evaluated. 60 minutes is the maximum time to cover 100 meters 2) Recovery test: The evaluators will place the robot in the ground of the sewer at different inclinations. The robot has to recover from these positions
Conditions: • **The robot has to include the equivalent weight of the sensors and electronic drivers** • **One trial in straight line and another one with a 90º curve.** • **The trial will be done in Barcelona** • **The trial will be done at different illumination conditions**	

PDTI Sewer. Phase I. January 1st – June 31st

Evaluation Criteria. COMMUNICATIONS TEST

COMMUNICATION TEST Description and conditions	Evaluation
Send information from one point to another at different distances (100m, 200m, 300m). The robot can be without movement to make the test. **Conditions:** Trials in straight line and curve specifying the maximum transmission speed (Baudrate). 100m straight line 200m straight line with one curve (90º). Radius 300m straight line with two curves (90º+90º). Radius	1.- Communication bandwidth 2.- Signal/Noise rate 3.- Delay to send the information Note: The coordinators will provide to the Consortia the software that will be used for the evaluation.

PDTI Sewer. Phase I. January 1st – June 31st

Evaluation Criteria. AUTONOMY TEST

AUTONOMY (ENERGY) TEST Description and conditions	Evaluation
Demonstration that in 8 hours the robotic solution can arrive to 1 km away. The batteries can be charged or changed automatically or manually several times during the trial. Proposers have to specify the real autonomy and to indicate how the recharge will be done if it is the case.	The platforms should cover a distance of 400m with the equivalent weight of the sensors and electronic drivers and the velocity should be the adequate to perform the required inspection functions. The energy consumption could be measure. And the batteries could be changed "in situ".
Conditions: • **The results of the above test will be extrapolated considering the energy consumption in each case, and the performance in 8 hours will be forecasted.** • **The robot has to include the equivalent weight of the sensors and their electronic drivers** • **The trial will be done at different illumination conditions**	

ARSI

ROBODILLOS

SIAR

PDTI Sewer. Phase I. January 1st – June 31st

Expert Panel Meeting. July 7th, 2016

PDTI SEWER Evaluation PHASE I	ARSI	ROBODILLOS	SIAR
Scientific and / or technological excellence (relevant to the topics addressed by the call)	4.0	2.5	4.0
Quality and Efficiency of the implementation and the management	5.0	3.0	4.5
Potential Impact through the development, dissemination and use of Project results	4.0	2.0	3.0
	13.0	**7.5**	**11.5**

ECHORD++ PDTI URBAN

"UTILITY INFRASTRUCTURES AND CONDITION MONITORING FOR SEWER NETWORK. ROBOTS FOR INSPECTION AND CLEARANCE OF THE SEWER NETWORK IN CITIES"

ARSI – ROBODILLOS - SIAR

Three competitive phases

Phase I- Solution Design

- Runtime: 6 months

Two consortia selected for Phase II

ARSI - SIAR

Phase II -Prototype Development

- Runtime: 12 months

Phase III - Small Scale Test Series
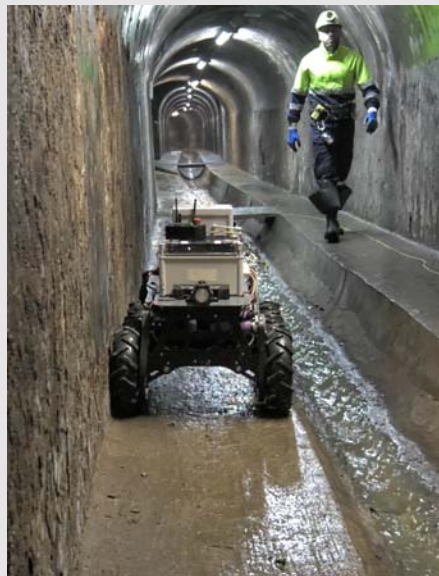
- Runtime: 12 months

ECH**O**RD++

Phase II- Prototype Development

ARSI

IBAK

SIMTECH DESIGN

UNIVERSIDAD DE SEVILLA

SIAR

UNIVERSIDAD PABLO DE OLAVIDE SEVILLA

Thanks

sanfeliu@iri.upc.edu