Robot-Era: Work Package 4

Domestic Robotic Platform

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Technical Aspects of Multimodal Systems

February 7, 2012

Outline

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Person Month

Participant number [10]	Participant short name [11]	Person-months per participant
1	SSSA	12.00
4	ORU	1.00
5	UHAM	44.00
6	UOP	20.00
7	MLAB	12.00
8	ST-I	3.00
	Total	92.00

Outline

Deliverables

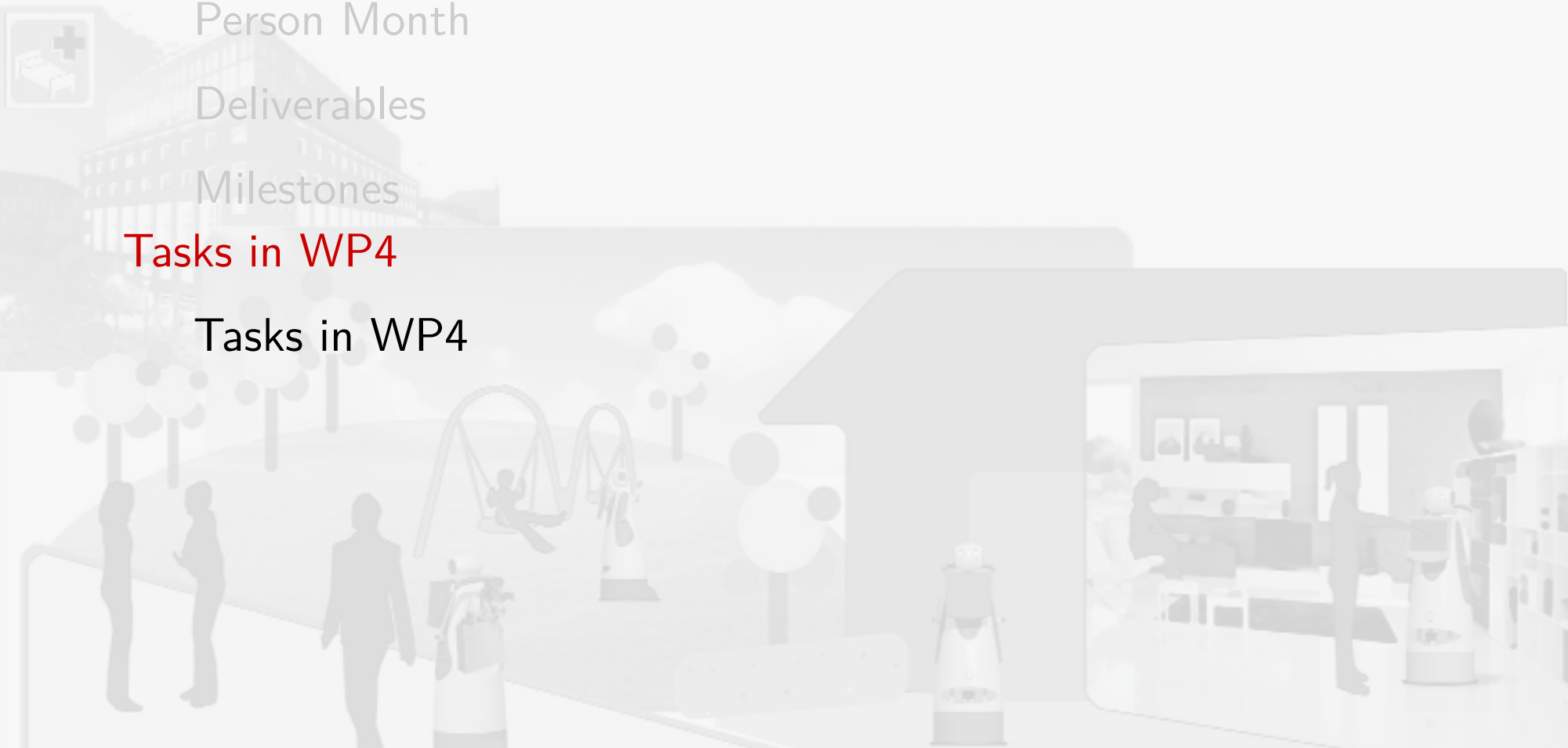
Delive-rable Number [61]	Deliverable Title	Lead benefi-ciary number	Estimated indicative person-months	Nature [62]	Dissemi-nation level [63]	Delivery date [64]
D4.1	Report on specifications and middleware architecture of the domestic robotic platform	7	8.00	R	CO	5
D4.2	First domestic robotic platform prototype for the first experimental loop	5	42.00	P	PU	15
D4.3	Final domestic robotic platform prototype for the second experimental loop	5	38.00	P	PU	32
D4.4	Report on the final domestic robotic platform and documentation about usage	5	4.00	R	PU	44
		Total	92.00			

Outline

Milestones

Milestone number [59]	Milestone name	Lead beneficiary number	Delivery date from Annex I [60]	Comments
MS2	Delivery of robotic platforms and AmI infrastructure prototype for the first experimental loop	1	15	
MS5	Delivery of robotic platforms and AmI infrastructure prototype for the second experimental loop	1	35	

Outline



Tasks

Nome attività	2012		2013		2014		2015		2016
	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1
WP 4 - Domestic robotic platform (UHAM)										
T 4.1 Set-up of the robotic platform for domestic environments										
T 4.2 Design of control strategies for navigation										
T 4.3 Design of control strategies for grasping and manipulation										
T 4.4 Design of interfaces for Human Robot Interaction										
T 4.5 Early prototype integration and implementation of functionalities										
T 4.6 Preparation of the domestic robotic platform for the first experimental loop										
T 4.7 Refinement and development for the second experimental loop										

T4.1 Set-up of the robotic platform for domestic environments

UHAM, SSSA, MLAB, UOP, STM, M3-44

- integrate mobile platform, robotic arms and end-effectors (payload etc. according to WP2 criterias)
- integrate communication module (for connectivity with *AmI*)
- integrate additional sensors (stereo cameras, infra-red?)
- integrate HRI (touch screen, microphone, speakers, LED (see T4.4)
- integrate additional HW (handle, case, tray?)
- integrate security mechanisms (security buttons, bumbers)
- implement friendly, acceptable cover (see WP2)
- define middleware architecture

T4.2 Design of control strategies for navigation

MLAB, RT, SSSA, M3-44

- measure and integrate robot characteristics (shape, dynamics) into the navigation stack *(CogniDrive)*
- design people tracking and following
- object trajectory prediction

T4.3 Design of control strategies for grasping and manipulation

UHAM, UOP, M3-44

- object detection via stereo-vision, SIFT-feature, 3D laser ranger
- learning manipulation strategies (object ontology), handle unknown objects
- use results of hierarchical task network (HTN) planning algorithm
- image processing and detecting offline-trained common objects
- apply offline-learned grasps (later also online)
- integrate online learning manipulation and linguistic architecture (*UOP*)

T4.4 Design of interfaces for Human Robot Interaction

UOP, RT, M3-44

- investigate sophisticated HRI (via screen, e.g. emotional state, language)
- investigate natural language interaction
- explore Julius speech recognition system

T4.5 Early prototype integration and implementation of functionalities

UHAM, SSSA, UOP, MLAB, RT, M7-9

- integrate outcomes of previous tasks into robotic platform (navigation, manipulation, interaction, learning)
  - SW and firmware integration for different parts
  - Control strategy (high-level)

T4.6 Preparation of the domestic robotic platfrom for the first experimental loop

UHAM, MLAB, UOP, M10-12

- prepare robotic platform for experiments in Italy and Sweden
- shipping
- testing

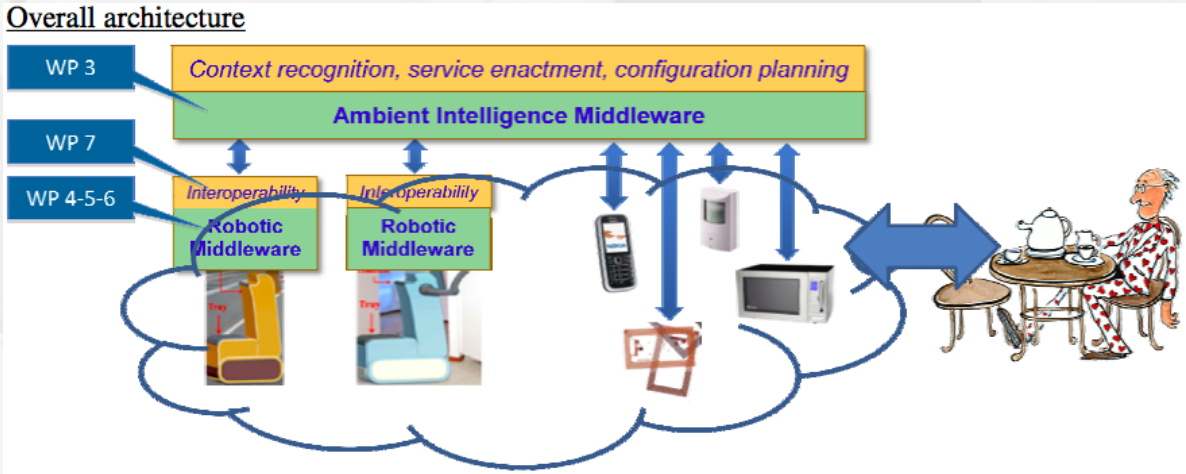
T4.7 Refinement and development for the second experimental loop

UHAM, UOP, M30-32

- integrate results of first experimental loop for improvments (T4.1-4.5)

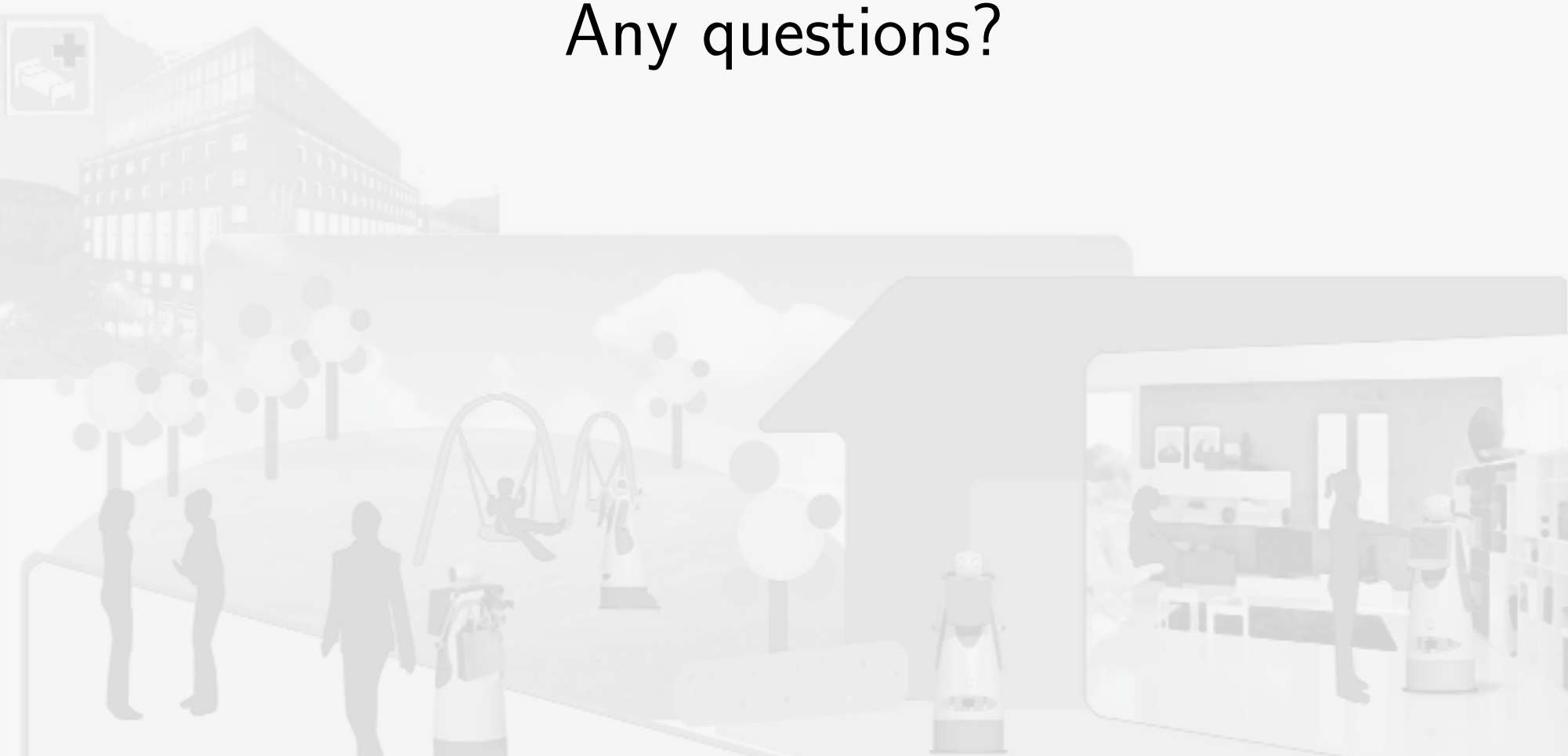
Issues

- Robot mounts: handle, tray, case?
- Scenario (room organization, furniture) for real test and simulation
  - input environment from Örebro, Peccioli?
- What sensors are needed?
- Interfaces to CogniDrive and AmI?



Thank You!

Any questions?



Further Reading

Work Package Participation UHAM

Work Package	Person Month
1	1
2	2
3	2
4	44
5	2
6	2
7	6
8	6
9	2
10	5