Robotics Domain Task Force Final Agenda ver1.0.5 robotics/2008-06-01

OMG Technical Meeting - Ottawa, Canada -- June 23-27, 2008

http://robotics.omg.org/

		TF/SIG				
		Host	Joint (Invited)	Agenda Item	Purpose	Room
Monday: Robotics Plenary(am) and WG activites(pm)						
9:00	9:45	Robotics		Robotics Steering Committee	Arrangement	Albert, Lower Lvl
9:45	10:00	Robotics		Robotics-DTF Plenary Opening Session	Robotics plenary openning	
10:00	11:40			Robotic Localization Service - Revised Submission Presentation - Kyuseo Han (ETRI), Yeon Ho Kim (Samsung), Itsuki Noda(AIST) and Shuichi Nishio (JARA/ATR)	presentation, discussion, Vote-to-vote and Voting	
12:00	13:00					Victoria Ballroom North, 2nd FL
13:00	18:00			Architecture Board Plenary		**Wellington, 3rd FL**
14:00	18:00	Robotics		Robotic User Recoginition RFP 1st Review - Su-Young Chi(ETRI), Hyunsoo Kim(Sansung), and Toshio Hori(AIST)	discussion	Alta Vista, 2nd FL
Tuesday: WG activities (am) and Robotics Plenary (pm)						
9:00	12:00	Robotics		Robotic Localization Services WG (3h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	Sussex, 27th FL
				Services WG(3h): Human Robot Interaction RFP draft Meeting - Su-Young Chi, Hyunsoo Kim, and Toshio Hori	discussion	Capital, 2nd FL
12:00	13:00			**LUNCH**		Victoria Ballroom North, 2nd FL
13:00	14:00	Robotics		**Special Talk:** University of Auckland research in robotic software development environments - Bruce MacDonald (Univ. of Auckland, New Zealand)	presentation and discussion	Albert, Lower Lvl
14:00	15:00	Robotics		**Special Talk:** RoboCup - Itsuki Noda (AIST)	presentation and discussion	
				Break (30min)		
15:30	16:30	Robotics		Robotic User Recoginition RFP 1st Review - Su-Young Chi(ETRI), Hyunsoo Kim(Sansung), and Toshio Hori(AIST)	presentation and discussion	
16:30	17:10	Robotics		WG Reports and Contact Reports: (Service WG, Profile WG, Robotic Localization Service WG) - Makoto Mizukawa(Shibaura-IT)	Information Exchange	
17:10	17:40	Robotics		Roadmap and Next meeting Agenda Discussion	Robotics plenary closing	
17:40				Adjourn joint plenary meeting		
17:40	18:00	Robotics		Robotics WG Co-chairs Planning Session (Preliminary Agenda for next TM, Draft report for Friday'	planning for next meeting	Albert, Lower Lvl
Wednesday						
12:00	14:00			**LUNCH and OMG Plenary**		Victoria Ballroom North, 2nd FL
18:00	20:00			**OMG Reception**		Victoria Ballroom South, 2nd FL
Thursday						
12:00	13:00			**LUNCH**		Victoria Ballroom North, 2nd FL
13:00	18:00			Architecture Board Plenary		Wellington, 3rd FL
Friday						
8:30	12:00			AB, DTC, PTC		Victoria Ballroom North, 2nd FL
12:00	13:00			**LUNCH**		Victoria Ballroom South, 2nd FL

Other Meetings of Interest

Monday						
8:00	8:45	OMG		New Attendee Orientation		Laurier, Lower Lvl
9:00	12:00	OMG		Tutorial - Introduction to OMG's Modeling and Middlewere Specifications		Laurier, Lower Lvl
13:00	17:00	OMG		Tutorial - An Introduction to the OMG System Modeling Language (OMG SysML)		Laurier, Lower Lvl
18:00	19:00	OMG		New Attendee Reception (by invitation only)		Mackenzie, 27th FL
Tuesday						
7:30	9:00	OMG		Liaison ABSC		Room 621, 6th FL
17:00	18:00	OMG		RTF-FTF Chair's Workshop		Capital, 2nd FL
Wednesday						
9:00	17:00	OMG		Symposium on Eclipse Open Source Software and OMG Open Specifications		Laurier, Lower Lvl
9:00	17:00	OMG		Open Standards for Naval Combat Systems		Wellington, 3rd FL
9:00	17:15	OMG		SOA Consortium Quarterly Meeting		Cartier 1, Lower Lvl
Thursday						
9:00	16:30	OMG		MARTE Information Day		Laurier, Lower Lvl
9:00	17:00	OMG		Emergency Management Systems Interoperability Information Day		Victria Ballroom South, 2nd FL
9:00	16:30	OMG		SOA Consortium Quarterly Meeting		Cartier 1, Lower Lvl

Please get the up-to-date version from http://staff.aist.go.jp/t.kotoku/omg/RoboticsAgenda.pdf

Minutes of the Robotics DTF Plenary Meeting

March 10-12, 2008
Arlington, VA, USA
(robotics/2008-06-02)

Minutes Highlights

- Robotic Localization Service Progress Report by Dr. Nishio
- Joint Plenary with MARS and RTESS - Robotic Localization Service
- 2 WG reports (Functional services WG, Localization service WG)
- 1 Contact reports (Yun Koo Chung)

List of Generated documents

robotics/2008-03-01 Final Agenda (Tetsuo Kotoku)
robotics/2008-03-02 Burlingame Meeting Minutes [approved] (Yun-Koo Chung and Geoffrey Biggs)
robotics/2008-03-03 Steering Committee Presentation (Tetsuo Kotoku)
robotics/2008-03-04 Roadmap for Robotics Activities (Tetsuo Kotoku)
robotics/2008-03-05 Opening Presentation (Tetsuo Kotoku)
robotics/2008-03-06 Recent Progress toward RLS revised submission (Shuichi Nishio)
robotics/2008-03-07 Issues in RLS revised submission (Shuichi Nishio)
robotics/2008-03-08 Presentation of the joint plenary with MARS: Overview of the Robotic Localization Service Revised Submission [mars/2008-03-05]
robotics/2008-03-09 Functional Services WG Presentation (Su-Young Chi)
robotics/2008-03-10 HRI in OMG Robotics (Su-Young Chi)
robotics/2008-03-11 Position and Orientation (Itsuki Noda)
robotics/2008-03-12 Robotic Functional Services WG Meeting Report (Su-Young Chi)
robotics/2008-03-13 Robotic Localization Service WG Meeting Report (Kyuseo Han)
robotics/2008-03-14 KIRSF - Contact Report (Yun-Koo Chung)
robotics/2008-03-15 Closing Presentation (Tetsuo Kotoku)
robotics/2008-03-16 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)
robotics/2008-03-17 Query Conditions (Itsuki Noda)
robotics/2008-03-18 Model: RLS-UML-Mar.11 (Takeshi Sakamoto)
robotics/2008-03-19 Model: RLS-UML-Mar.12 (Takeshi Sakamoto)
robotics/2008-03-20 Model: RLS-UML-Mar.13 (Shuichi Nishio)
robotics/2008-03-21 DTC Report Presentation (Yun-Koo Chung)
robotics/2008-03-22 Washington DC Meeting Minutes - DRAFT (Toshio Hori and Hyun-Soo Kim)

MINUTES

Monday, March 10, 2008, Lincoln, 3rd Floor
10:00-10:15 Plenary Opening, Chair: Dr. Kotoku, (Quorum: 3)
Joined Organization: AIST, ETRI, JARA, KAIRA, Samsung, Shibaura IT, Technologic Arts

- Washington D.C. meeting Minutes takers: Dr. Hori and Dr. Kim
- Approval of the Burlingame minutes
  - Burlingame minutes (Dr. Biggs and Dr. Chung)
  - **Approved**: ETRI(motion), Shibaura-IT(second), Technologic Arts(white ballot)
- Agenda Review:
  - We have no special talk in this meeting.

10:15-12:10 Robotic Localization Service Progress Report and Discussion (Lincoln, 3rd Floor)

- 2 Workshops were held in January (at Seoul) and February (at Tsukuba)
  - Summary of Conclusions of workshops
- Issues in RLS revised submission
  - Issues to be discussed
    1. RoLo format
    2. How to define/manage various data formats
    3. Implementation of the push data passing
    4. Details on RLS specifications
    5. Mathematical foundation for Coordinate system definition
    6. Database interface

13:00-13:40 Joint Plenary with MARS (Jefferson, 3rd Floor)
- Introduction of RLS by Dr. Nishio

Tuesday, March 11, 2008, Prince William, 3rd Floor
13:10- WG Reports and Roadmap Discussion, Chair: Dr. Chung
WG Report
- **Functional Services WG Report by Dr. Chi**
  - Candidate title for HRI RFP revised
  - Mandatory requirements revised
  - Optional requirements revised
  - Candidate new co-chair: Dr. Hori
    Approved: Samsung(motion), Shibaura-IT(second), AIST(white ballot)
  - Issues to be discussed for next meeting decided
  - Roadmap decided
    - June, 2008: Ottawa: 1st draft of RFP discussion
    - (Sept. 2008: Orlando: canceled)
    - Dec. 2008: Santa Clara: 2nd draft of RFP
- **Localization Service WG Report by Dr. Han**
  - 3 candidate names for RoLo Data Format introduced
    - "RoLo Common Data Format" chosen
  - 3 types of RoLo data format defined
    - Cartesian
    - Polar
    - Geodetic (GPS)
  - The parameters in all three RoLo data format defined
    - Position: 3-dimensional position
    - Orientation: 3-dimensional orientation
    - Timestamp: POSIX time
    - ID
  - Interface and UML should be defined
  - Roadmap decided
    - June, 2008: Ottawa: Revised submission of proposal
    - (Sept. 2008: Orlando: canceled)
    - Dec. 2008: Santa Clara: FTF starts
- **No report from Infrastructure WG & Profile WG**

Contact Report by Dr. Chung
- KIRSF Contact Report
- 1st stage of URC project has been conducted from Feb. 2004 to Feb. 2008.
- RUPI 2.0 introduced

Closing presentation and Next Meeting Agenda by Dr. Kotoku
- Organization changed

- New co-chair for Functional Services WG: Dr. Hori

- Next Meeting Agenda
  - Monday
    - Steering Committee meeting (morning)
    - Revised submission presentation (AM)
    - WG activity [parallel sessions] (PM)
  - Tuesday
    - WG activity [parallel sessions] (AM)
    - Robotics-DTF Plenary meeting (PM)
      - Guest and Member presentation
      - Contact Reports
  - Wednesday
    - WG activity follow-up [if necessary]
  - Thursday
    - Revised Submission Recommendation (AM)

Adjourned joint plenary meeting at 14:10

Attendee: 18 participants
Fumio Ozaki (Toshiba)
Heung-Jae Cho (KAIRA)
Hyun-Soo Kim (Samsung)
Itsuki Noda (AIST)
Jeong-Seok Kang (Kangwon Univ.)
Kyuseo Han (ETRI)
Makoto Mizukawa (Shibaura-IT)
Noriaki Ando (AIST)
Shuichi Nishio (JARA/ATR)
Sunhee Choe (Kangwon Univ.)
Su-Young Chi (ETRI)
Takashi Suehiro (AIST)
Takashi Tubouchi (Univ. of Tsukuba)
Takeshi Sakamoto (Technologic Arts)
Tetsuo Kotoku (AIST)
Toshio Hori (AIST)
Yeon-Ho Kim (Samsung)
Yun-Koo Chung (ETRI)

Prepared and submitted by Toshio Hori (AIST) and Hyun-Soo Kim(Samsung).

Robotics Domain Task Force
Steering Committee Meeting

June 23rd, 2008

Ottawa, Ontario, Canada

Ottawa Marriott Hotel

Washington DC Meeting Summary

Joint Plenary with MARS and RTESS - Robotic Localization: **[robotics/2008-03-08]**

Robotics Plenary: **(18 participants)**

- **Robotic Localization Service Progress Report**
  [robotics/2008-03-06]
- **2 WG reports**
  [robotics/2008-03-12,-13]
- **1 Contact Reports**
  [robotics/2008-03-14]
- **Preliminary Agenda for Ottawa TM**
  [robotics/2008-03-16]

Agenda

- Agenda Review
- Minutes and Minutes Taker
- Publicity
- Roadmap Discussion
- Next meeting Schedule

Agenda Review

Mon(June 23):

Steering Committee,
RLS-RFP Revised Submission Presentation & Voting(AM)
WG activities(PM)

Tue(June 24):

WG activities(AM)
Robotics-DTF Plenary(PM)

Wed(June 25):

WG activities

Thu(June 26):

RLS-RFP Voting (AM)
WG activities(PM)

please check our up-to-date agenda
http://staff.aist.go.jp/t.kotoku/omg/RoboticsAgenda.pdf

Minutes and Minutes Taker

- Process:
  - Make a draft with in 5days
  - Send the initial draft to robotics-chairs@omg.org
  - Post the draft to the OMG server within a week
  - Make an announcement to robotics@omg.org
  - Send comments to robotics@omg.org
  - Approve the revised minutes at the Next meeting

- Volunteers for this Meeting
  - Geoffrey BIGGS
  - Su-Young Chi

We have to post our meeting minutes within a week!

AIST

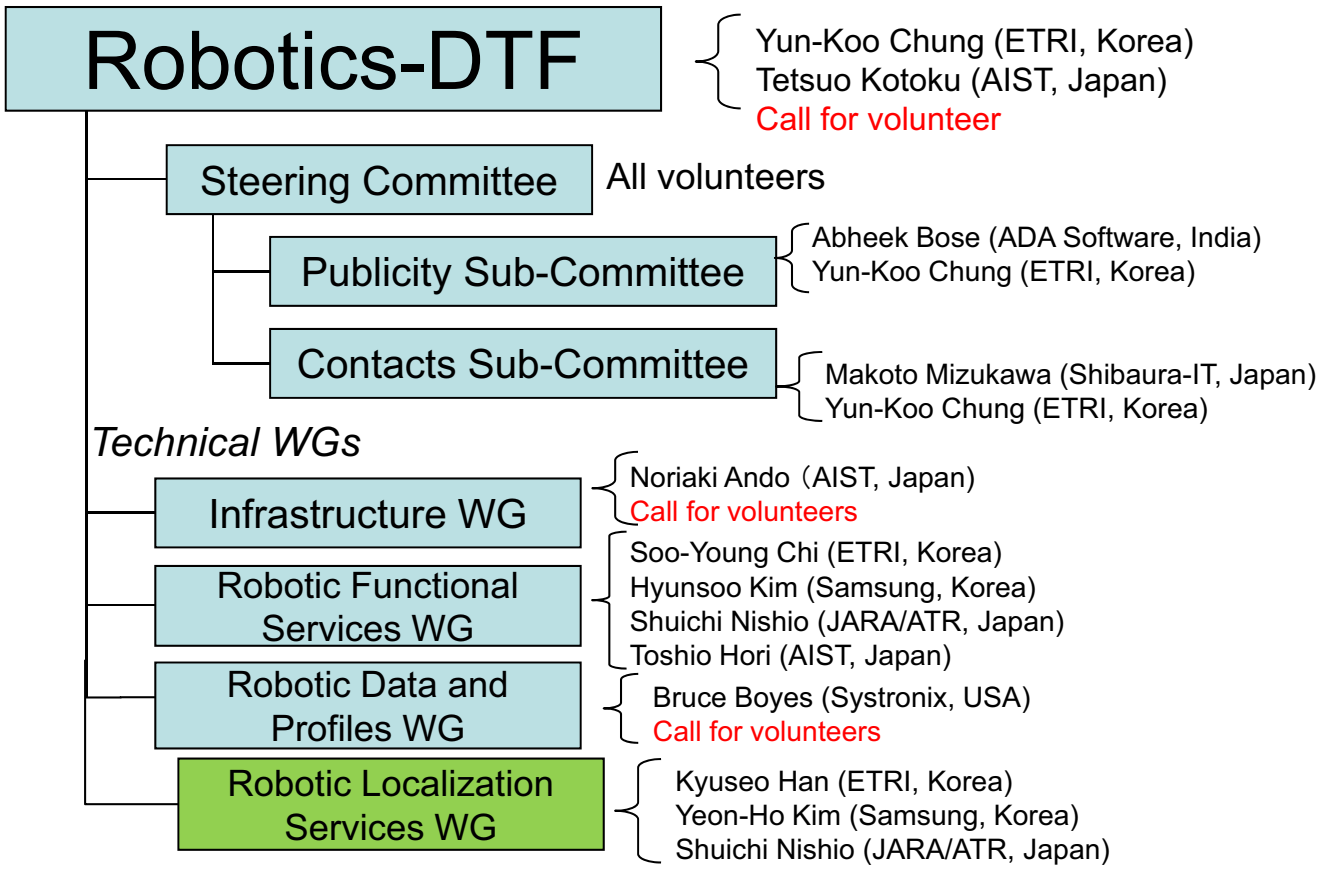
Roadmap Discussion

- Confirm the process of working items
- Create new items
  (we need volunteers)

- Cancel 2008 Orlando TM
  - IROS2008 (Nice, France)

NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

Organization



AIST

Call for volunteer

- Robotics-DTF Co-chair
  - Not from Japan and Korea
  - Election will be held upcoming Ottawa Technical Meeting
- Robotic Infrastructure WG Co-Chair
- Robotic Data and Profiles WG Co-Chair

No volunteer

Next Meeting Agenda

December 8-12 (Santa Clara, CA, USA)

Tuesday:

Steering Committee (morning)
WG activity [Parallel WG Session] (am)
Robotics-DTF Plenary Meeting (pm)
- •Guest and Member Presentation
- •Contact reports

Wednesday:

RLS-FTF Meeting
WG activity follow-up [if necessary]

Because IROS2008 in Nice will be held in September,
OMG Orlando TM is canceled

AIST

Special Talk Candidates

- **Tsukuba Challenge 2008 Report**
  by Prof. Tsubouchi (Tsukuba Univ.)

Call for Presentation

Roadmap for Robotics Activities

robotics/2008-06-04

Item	Status	Washington DC Mar-2008	Ottawa Jun-2008	Orlando (CANCEL) Sep-2008	Santa Clara Dec-2008	Washington DC Mar-2009	TBD Jun-2009	San Antonio Sep-2009	POC / Comment
Flyer of Robotics-DTF [Publicity Sub-Committee]	In Process		issue ver.1.0						Abheek(ADA Software)
Robotic Localization Service RFP [Robotic Localization Service WG]	In Process	Pre-review	Revised Submittion & Voting						Shuichi Nishio (JARA/ATR) Kyuseo Han (ETRI) Yeon-Ho Kim (Samsung)
Human Robot Interaction RFP [Robotic Functional Services WG]	In Process		1st review RFP		2nd Review & RFP issue		Initial Submittion		Su-Young Chi (ETRI)
Hardware-level Resources: define resource profiles RFP [Profile WG]	Planned		discussion		1st review RFP	2nd Review & RFP issue		Initial Submittion	Bruce Boyes (Systronix)
etc…	Future								to be discussed
Robotics Information Day [Technology Showcase]	Future		Seminar (CANCEL)						
RLS Finalization Task Force	Planned		Chartering FTF						Noriaki(AIST) and Rick(RTI)
Related Events				IROS2008					

Robotics-DTF Plenary Meeting
Opening Session

June 23rd, 2008

Ottawa, Ontario, Canada

Ottawa Marriott Hotel

Approval of the Burlingame Minutes

Meeting Quorum : 3

AIST, ETRI, JARA, Samsung, Shibaura-IT, Tsukuba Univ., Technologic Arts,

Minutes taker(s):

- Geoffrey BIGGS
- Su-Young Chi

Minutes review

- **Joint Plenary with MARS and RTESS**
  - Robotic Localization Service
- **Robotics Plenary: (18 participants)**
  - **No Special Talks:**
  - **2 WG Reports**
  - **2 Contact Reports**

Agenda Review

Mon(June 23):

Steering Committee,
RLS-RFP Revised Submission Presentation & Voting(AM)
WG activities(PM)

Tue(June 24):

WG activities(AM)
Robotics-DTF Plenary(PM)

Wed(June 25):

WG activities

Thu(June 26):

RLS-RFP Voting (AM)
WG activities(PM)

please check our up-to-date agenda
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Agenda Review

Mon:

09:45-10:00 Opening Session
10:00-12:00 RLS Revised Submission Presentation & Voting

Tue:

13:00-15:00 Special Talk
15:30-16:30 WG Reports and Roadmap Discussion
16:30-17:10 Contact Reports
17:10-17:40 DTF Co-Chair election, Publicity,
Next meeting Agenda Discussion
17:40 Adjourn joint plenary meeting

17:40-18:00 WG Co-chairs Planning Session

Thu:

11:00-12:00 RLS Voting

please check our up-to-date agenda
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NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

JARA/ETRI/Samsung Joint Revised Submission for the Robotic Localization Service RFP

23 June, 2008

NISHIO Shuichi
Japan Robot Association (JARA) /
ATR Intelligent Robotics and Communication Laboratories

Contents

- RFP overview
- Revised specification overview
  - Concept
  - Extensions for Robotic usage
  - Architecture for representing localization data
  - Functions for exchanging data
  - Interface for accessing localization data
- Resolution of RFP requirements

Overview of Robotic Localization Service RFP

(robotics/2007-06-25)

Robotic Localization Service RFP

Purpose:

Specification of Localization Service that provide

- A set of common information to represent location
- Common interfaces for Localization Service to transfer data and commands

Background / Scope of RLS-RFP

- Localization Service independent to specific sensors or algorithms
- Robots may use info from equipped sensors as well as those from other robots or sensors in the environment (Network Robot)
- Robots may perform services to people (Service Robot, not just industrial robots)
- Treat location information of people or objects (not just the robot itself)

Overview of Robotic Localization Service Revised Submission

(robotics/2008-05-02)
(robotics/2008-05-03)
(robotics/2008-05-04)

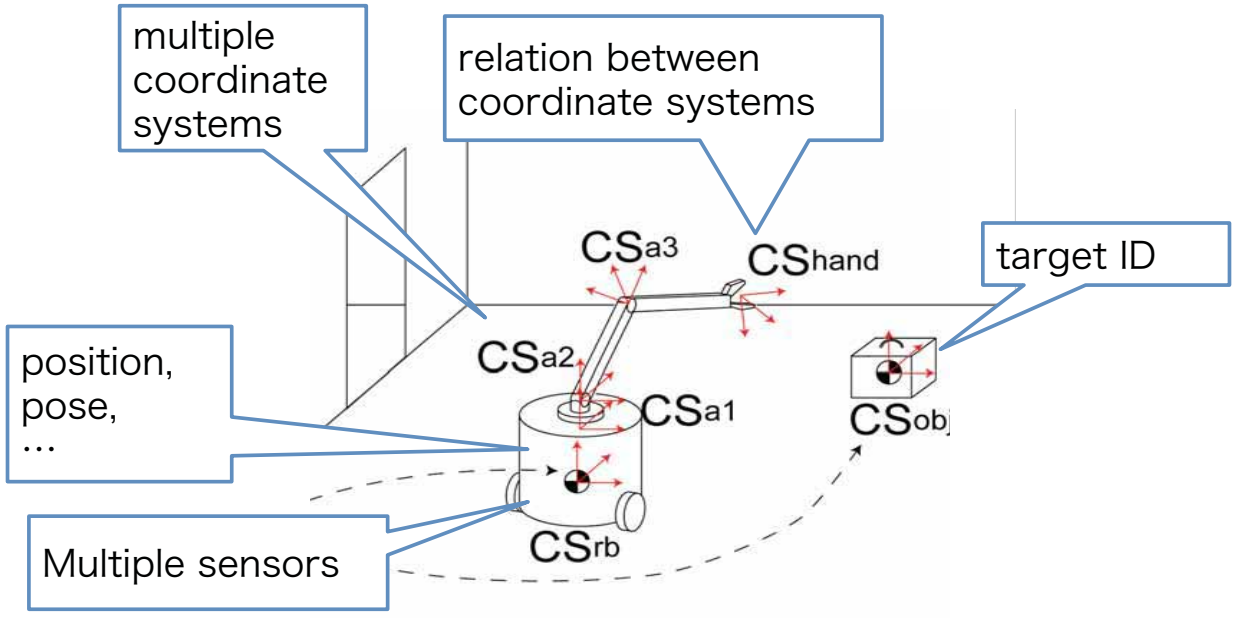
GIS standards

- Many standards established (mainly in ISO)
- Widely used
- Important for robots in outdoor use

But

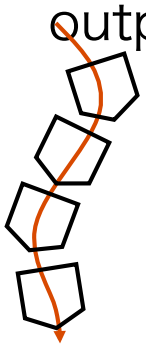
- no explicit relative/mobile coordinate system
- no explicit target ID representation
- no error representation
- sensor = single sensor, only GPS considered

Requirements in Robotics (1)



Requirements in Robotics (2)

- Navigation or Manipulation requires High-Precision localization
  - Measurement Time and Error Information is Essential
  - Especially when mixing multiple sensor outputs



Robot position

time	x	y	θ
10	2	6	10
12	0	4	-10
14	-4	2	-9
16	-3	0	1

Sensory data

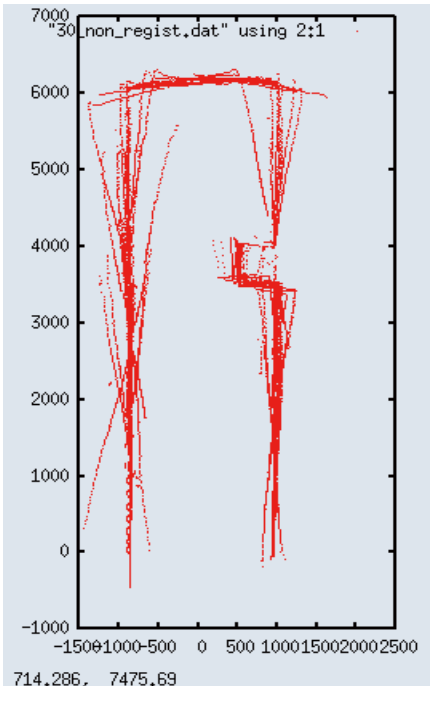
time	d
10	5
13	10
15	12

Takeuchi, Tsubouchi, Yuta 2005

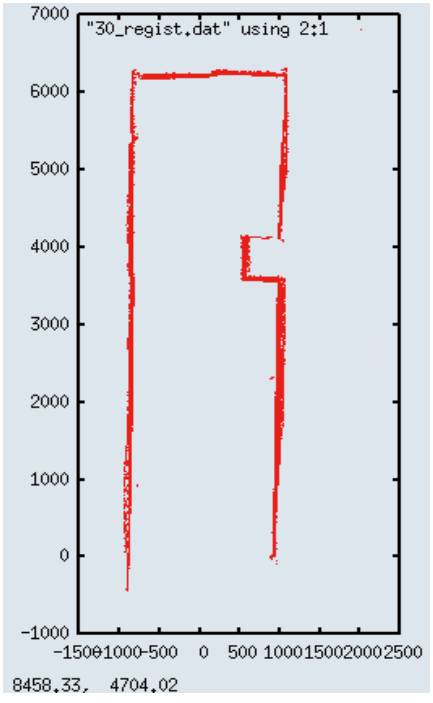
Example: Effect of Time Error

Ueda, Kawata, Tomizawa, Ooya, Yuta, 2005

A robot measures its surroundings using 2 sensors: LRF and odometer. Map is created by fusing two observations.



No Synchronization

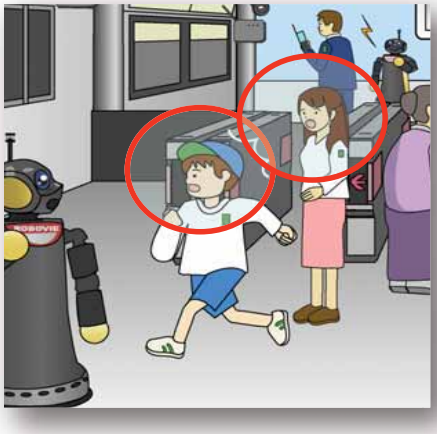


With Synchronization

Requirements in Robotics (3)

Interaction with people require:

- **Positioning** and **Identification** of people
- Robotic behaviors based on people position
  - approach, eye contact, …



Revised specification: Concept

- Maintain interoperability with GIS
  - Extensions for robotic usage within GIS framework
- Probabilistic (error) data representation
- Architecture for representing complex localization data
- Ability representation & exchange
  - Accelerate robot development
  - Prepare for robotic plug-and-play

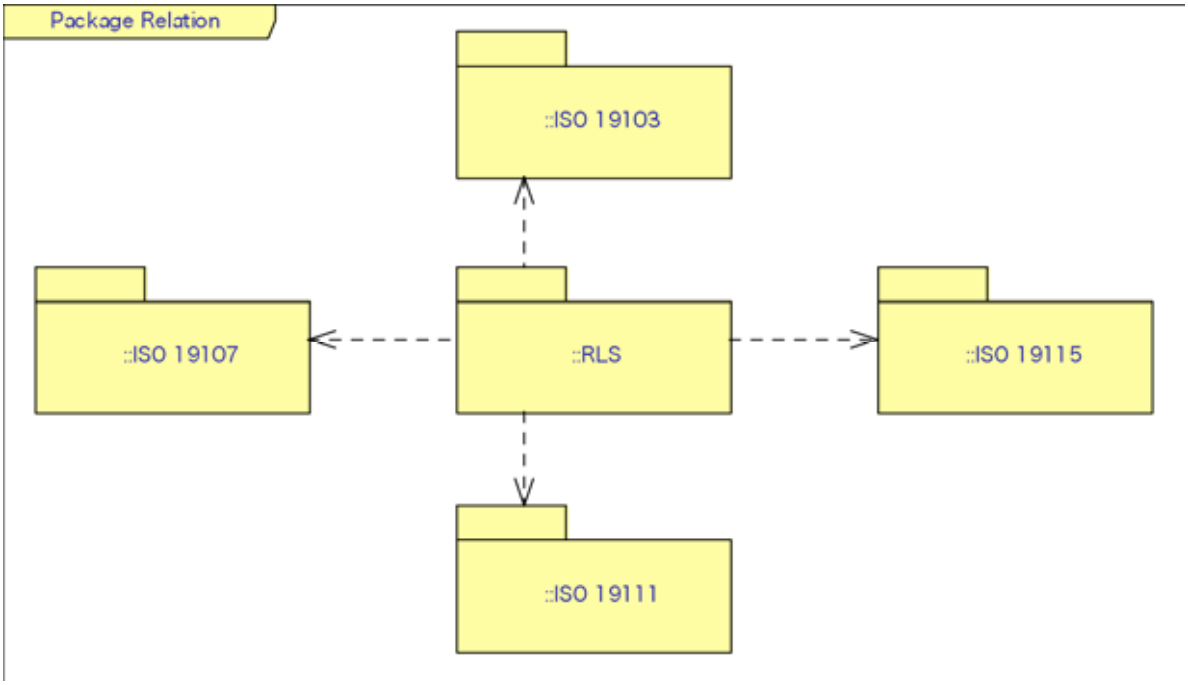
Interoperability with GIS

- Robots needs GIS
  - when operating outdoor
  - for utilizing GIS resources (maps, store info, …)
- In the revised specification,
  - basic location representation is handled under GIS specification
  - complex architecture 'wraps' GIS framework

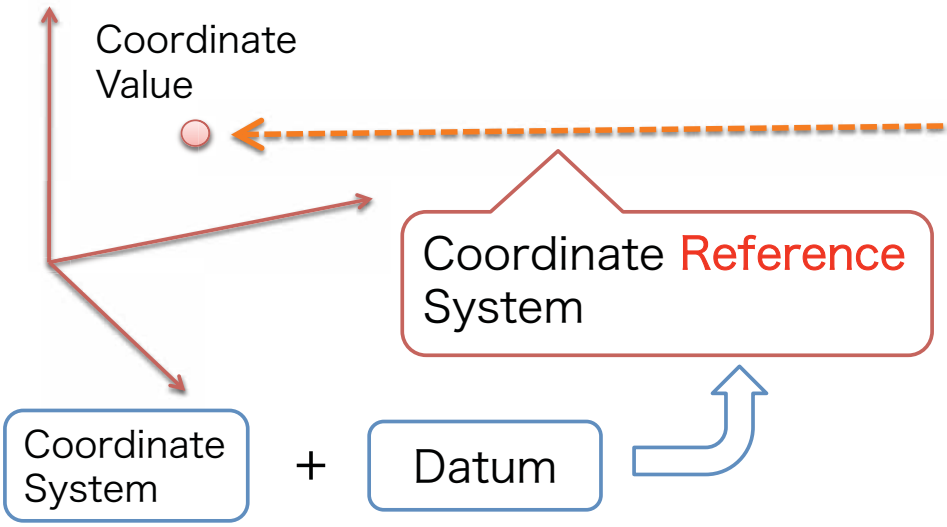
  → robots can use GIS data

  → GIS *may* use (downgraded) robotic data

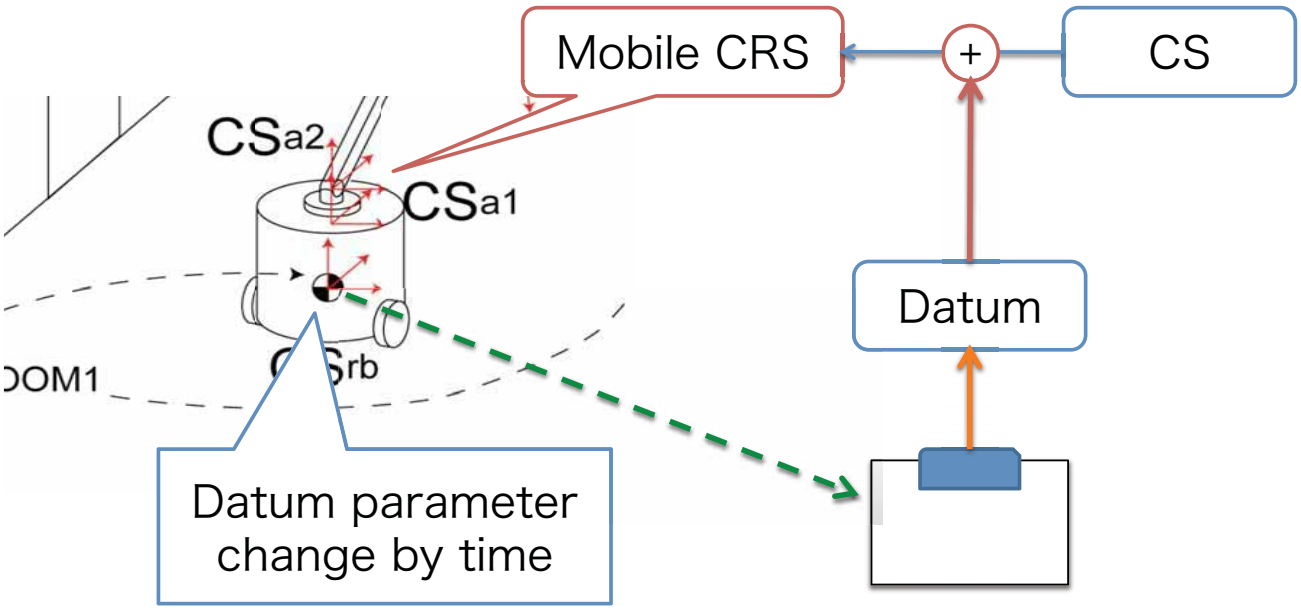
Related GIS standards

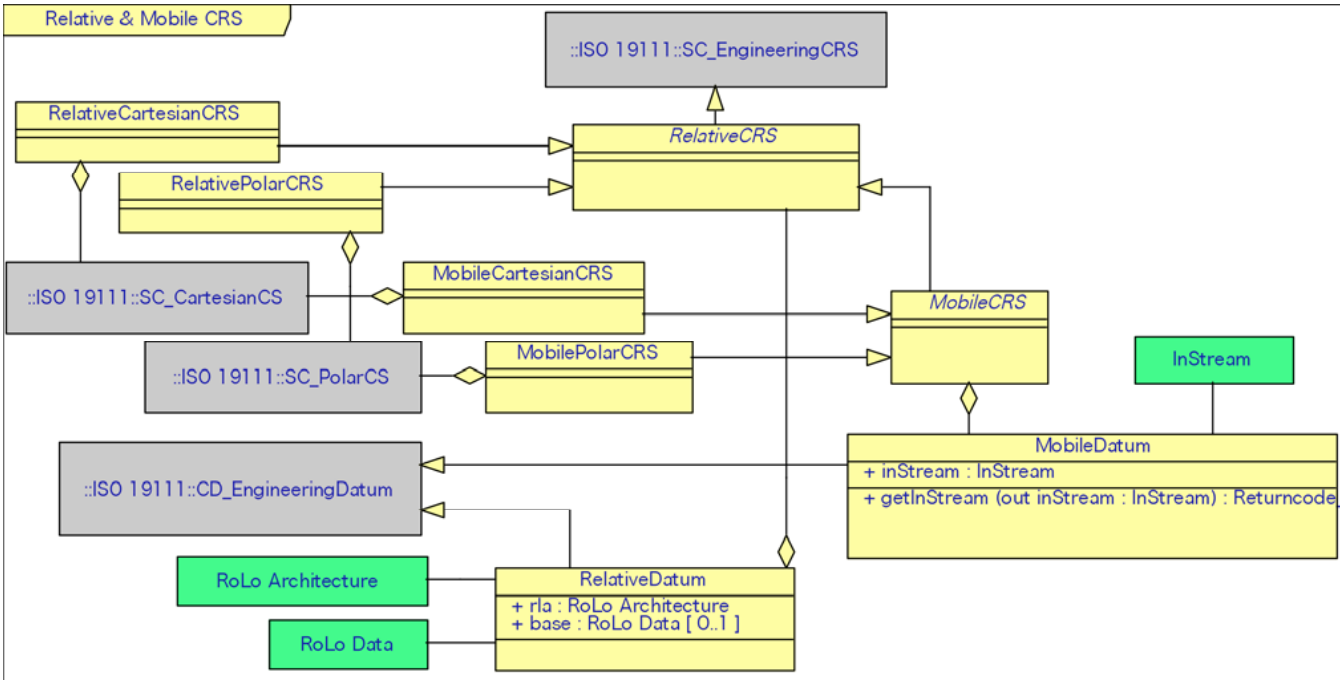


Location in GIS



Mobile CRS

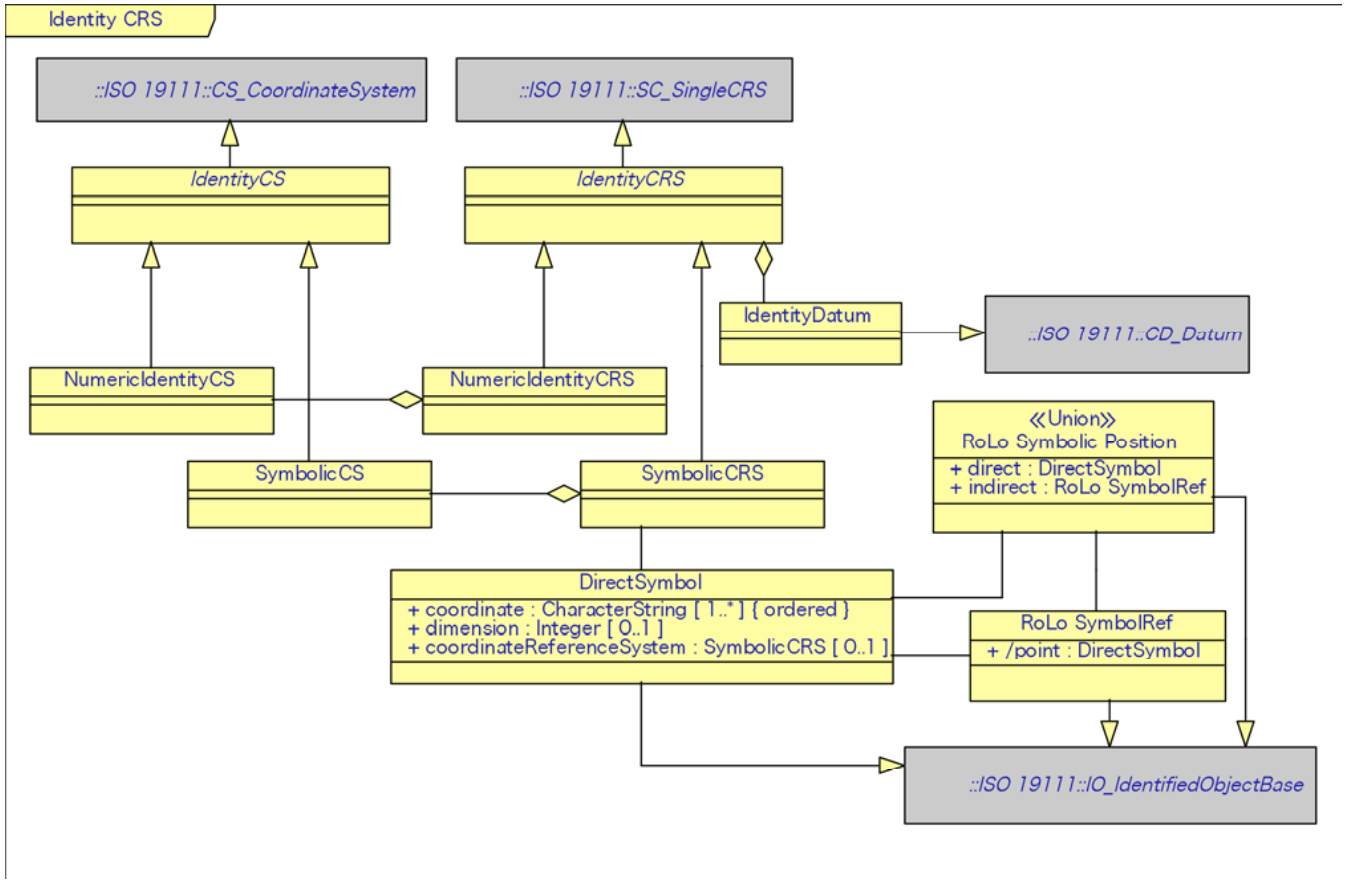




Identity information (ID)

- Required for specifying target from multiple measurements
- IDs are also commonly described using multi-dimensional space

  ex) MAC address, IP address
- Can be defined under GIS framework
  - Extension for allowing symbolic information
  - Define coordinate systems / coordinate reference systems for IDs

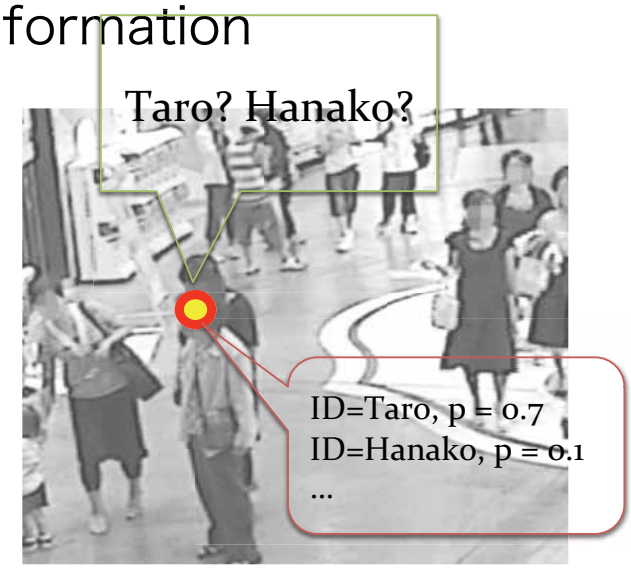


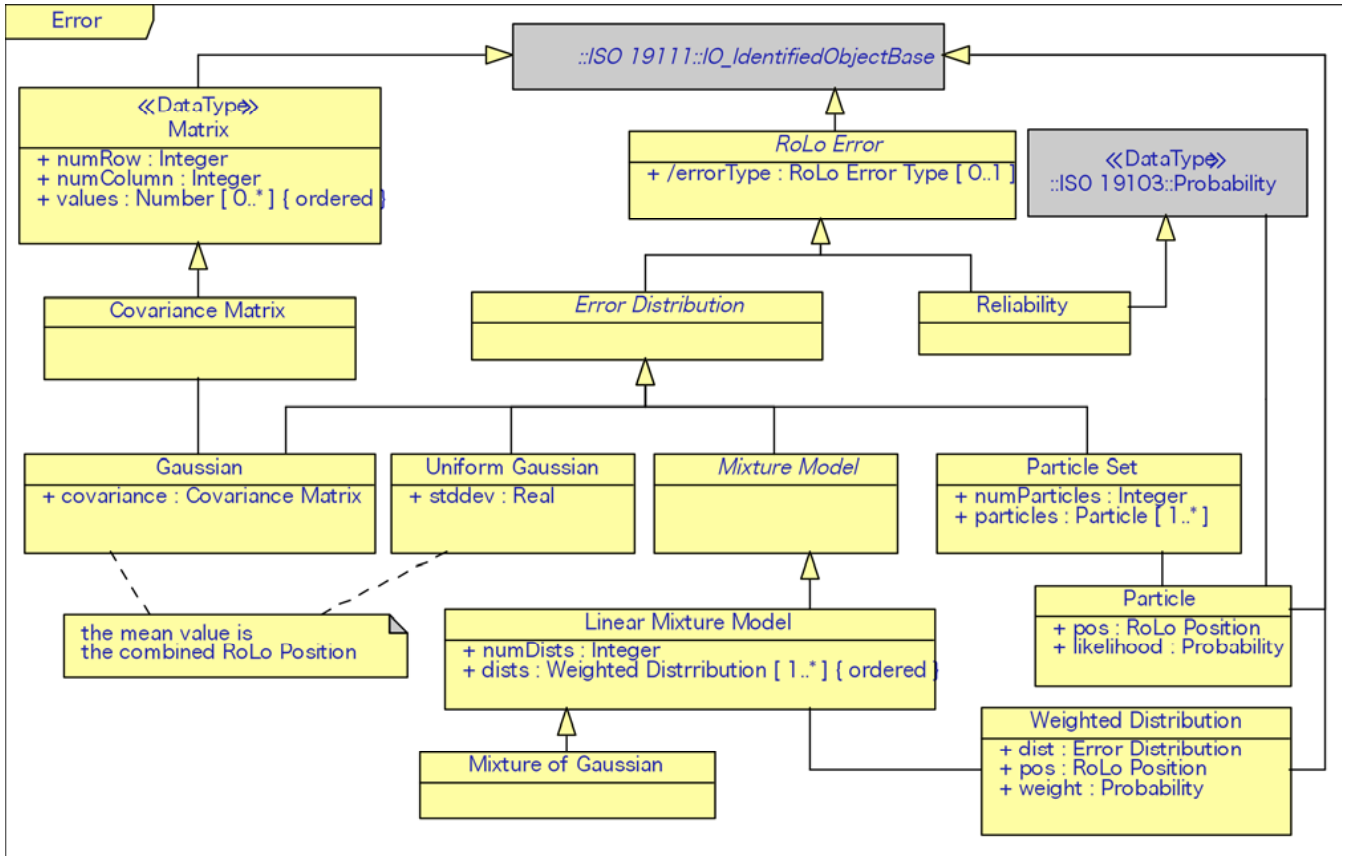
Error information

- Measured localization results are *always* probabilistic
  - error information required
- Define Error data in versatile forms
  - Reliability
  - Gaussian Distribution
  - MoG
  - Particles
  - …

ID is also probabilistic

- ambiguity in identity information may exist
- Identity information shall be treated just like other location-related information

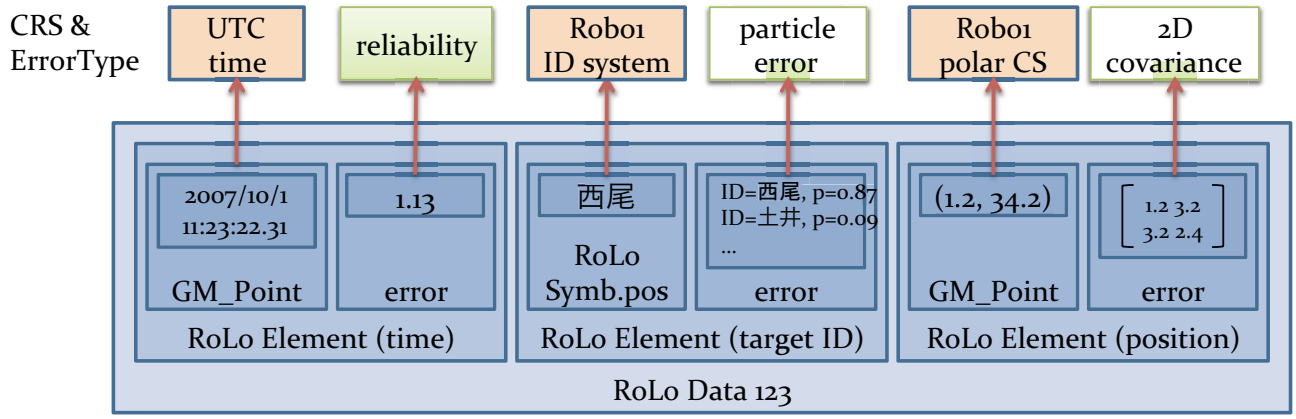




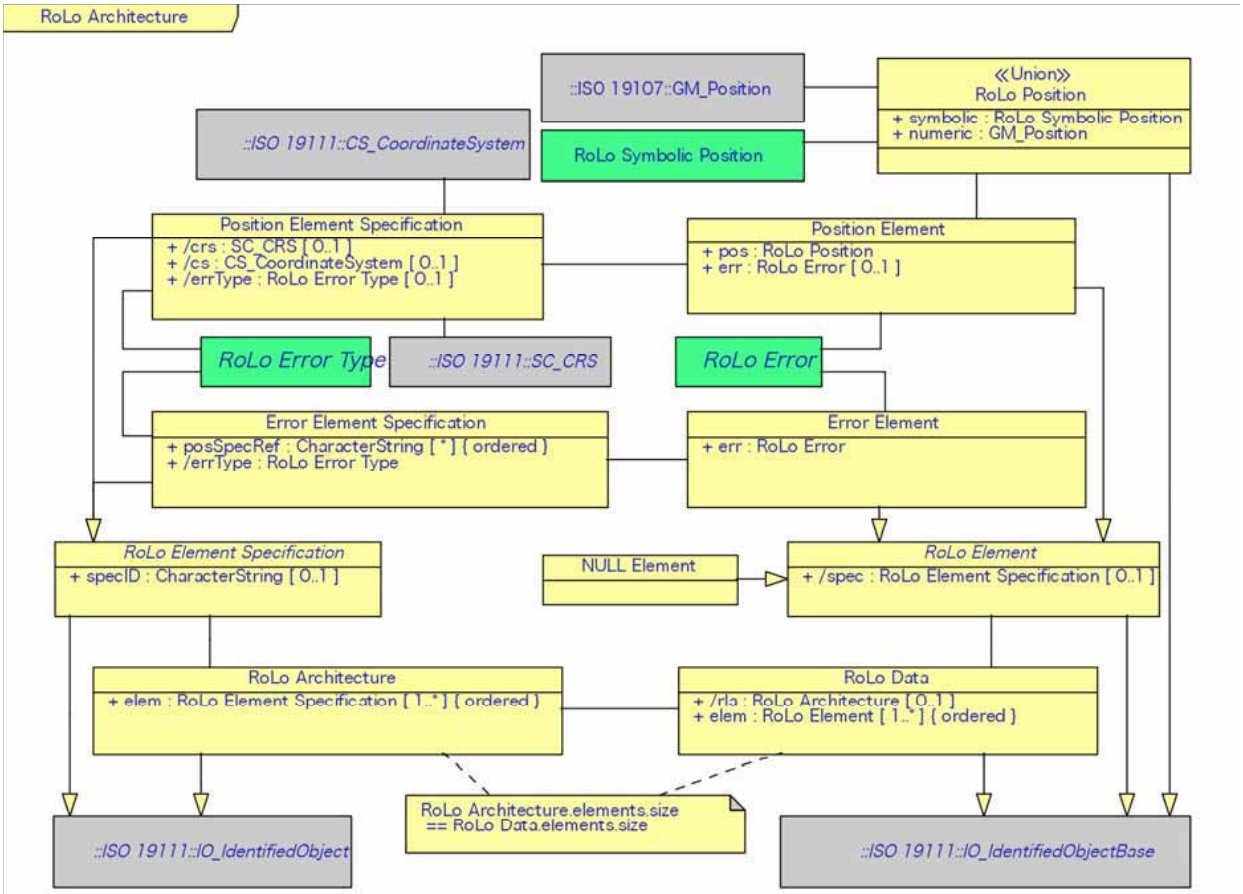
Representing relations

- Prepare a generic framework for representing relation among various robotic location information
  - measurement time, position, orientation, ID, …
- Architecture for defining information structure

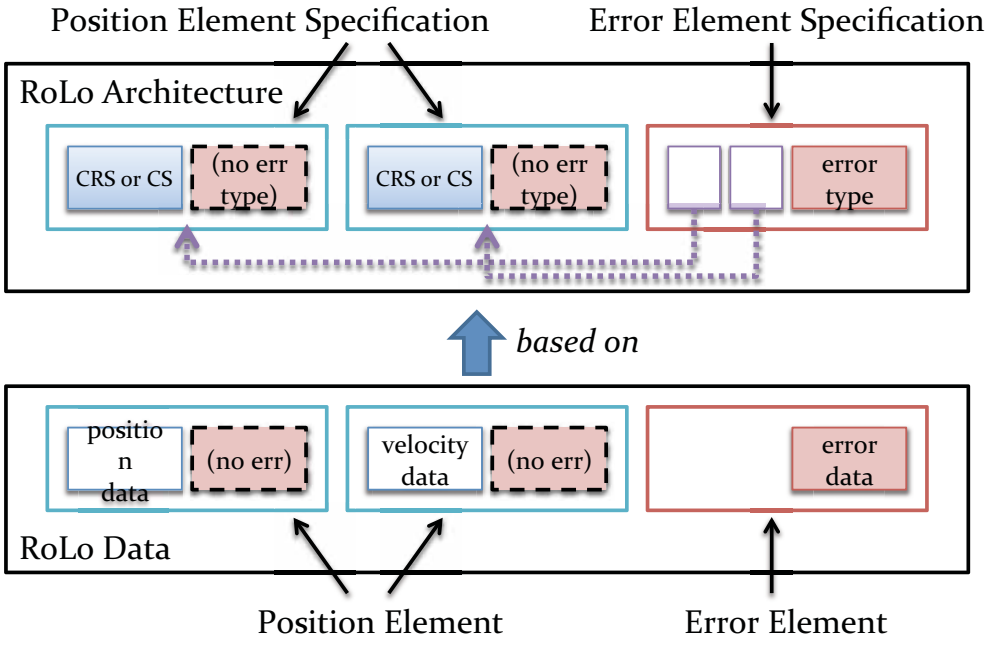
RoLo Architecture



Treat various types of location-related information in *a uniform manner*



Error Element



Common data formats

1	64
X (meter)	
Y (meter)	
Z (meter)	
Roll (degree)	
Pitch (degree)	
Yaw (degree)	
Time (miliseconds)	
ID (integer)	

RoLo Format type I (Cartesian)

1	64
γ (meter)	
α (degree)	
β (degree)	
Roll (degree)	
Pitch (degree)	
Yaw (degree)	
Time (miliseconds)	
ID (integer)	

RoLo Format type II (Polar)

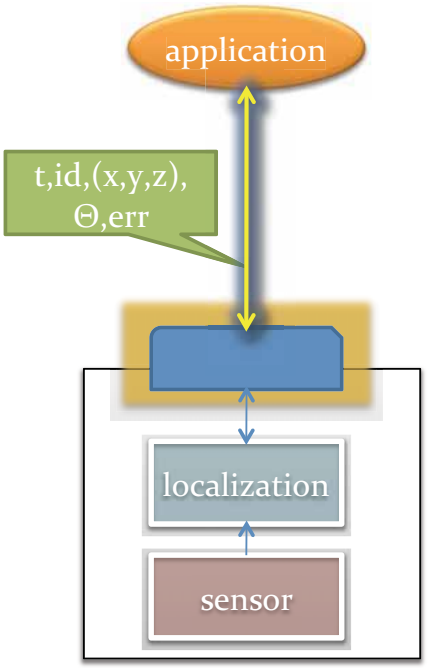
1	64
Latitude (degree)	
Longitude (degree)	
Height (meter)	
Roll (degree)	
Pitch (degree)	
Yaw (degree)	
Time (miliseconds)	
ID (integer)	

RoLo Format type III (Geodetic)

Filter Condition

- When the amount of sensor output is huge, robots cannot handle them all
  - CPU or network overload
- Function for choosing data from Localization Service outputs
  - Condition described using GIS feature of the same purpose (WFS)

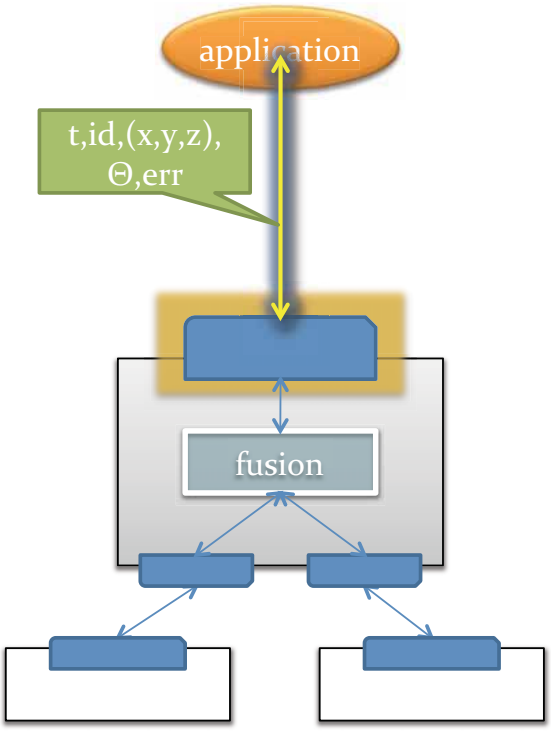
Basic Component: Measurement



Localization Module

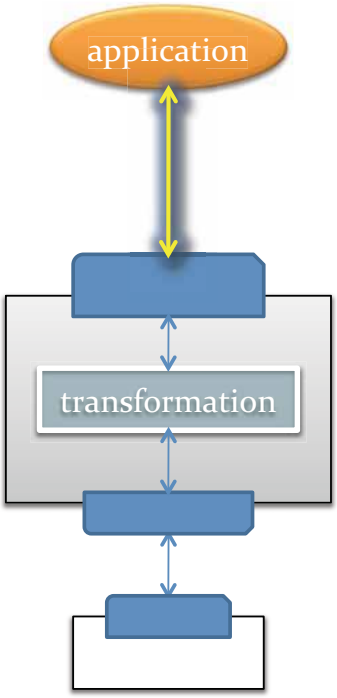
- native sensors, maps, etc. hidden inside the component
- treated as a 'black-box'

Aggregation



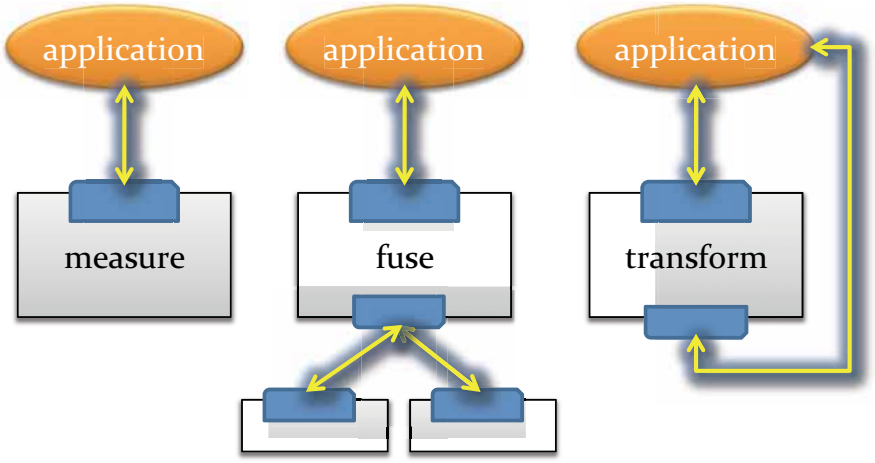
- the aggregator appears as basic localization component
  - what's happening inside is not important for users
- use the same interface as basic component
  - detailed aggregation parameters set by vendor interface
- holds also input interfaces

Coordinate Transformation



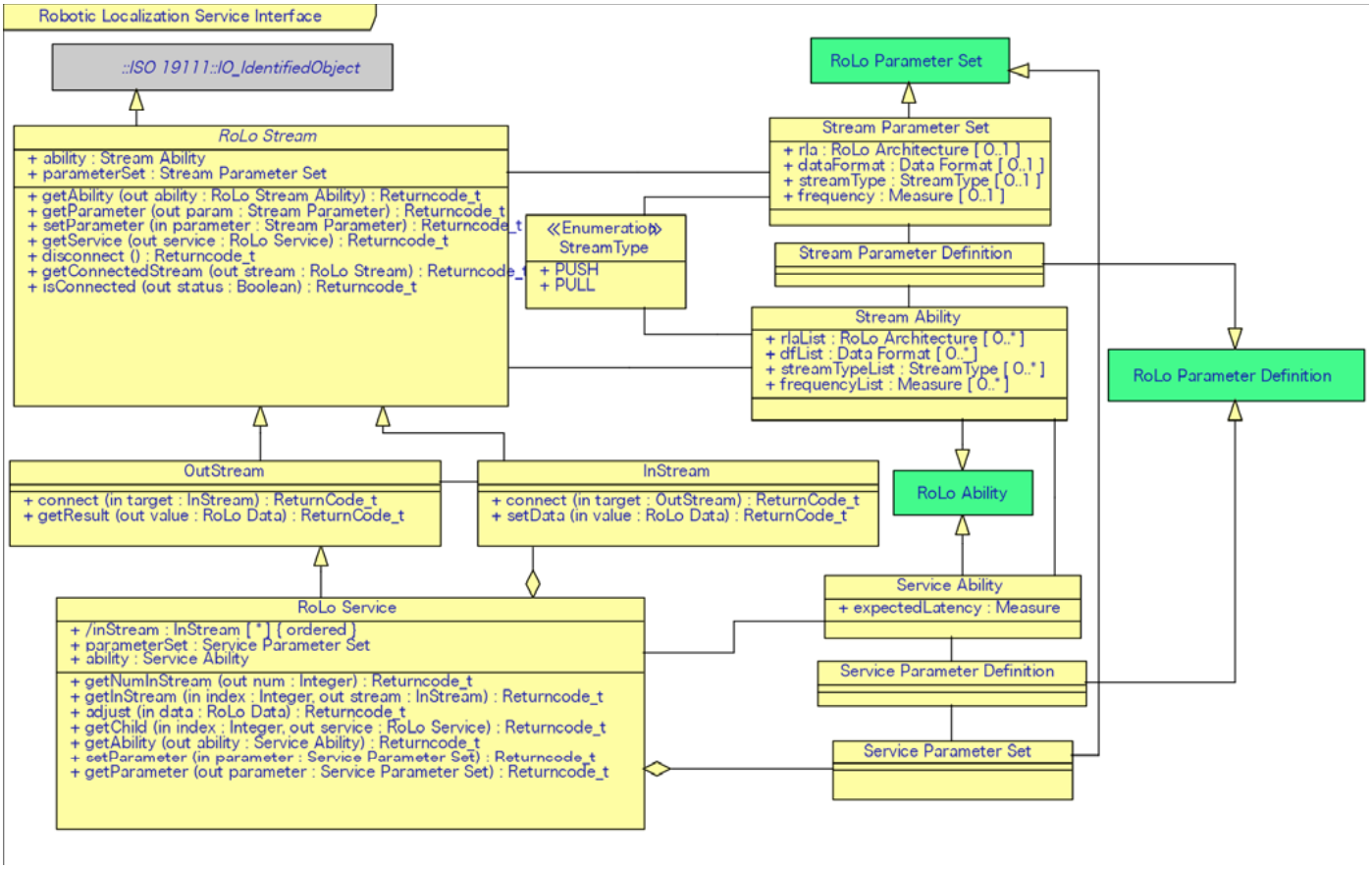
- the transform module also appears as basic localization component (to application)
  - what's happening inside is not important for users
- use the same interface as basic component
  - detailed transformation parameters set by similar configuration interface
- holds also input interfaces

uniform architecture



Homogeneous n-input, 1-output interface

- High reusability
- Allow recursive or cascading connection



Typical Steps in localization

1. Exchange module abilities
2. Configure module inputs / outputs
   - specify formats, parameters
3. Setup initial location information values
4. Data passing
   - receive localization outputs
   - place localization inputs
5. Modify location information values

Stream Ability

- Provide description on RLS modules
  - what it does (**functionality**)
  - how well can it operate (**capability**)
  - how it can be configured (**parameters**)
  - **input / output RoLo** structure it can handle
  - **data formats** it can handle
- Formal description of module specification
  - machine readable description
  - for plug-n-play and dynamic configuration

Resolution of RFP requirements

RFP mandatory requirements

1. *Proposals shall specify a general mechanism for accessing location information of physical entities to be localized.*
   - *Proposals shall specify a set of data and/or their structures necessary to **represent location information** of entities.*
   - *Proposals shall specify a set of methods and/or their parameters to **access location information** of entities.*
2. *Proposals shall specify **interfaces for modules** that perform location calculation.*
   - *Proposals shall specify the interface for **accepting localization request**.*
   - *Proposals shall specify the interface for **publishing the localization result.***
3. *Proposals shall specify the interface of a facility that provides functionalities related to:*
   - ***Conversion of location information** from one coordinate system to another.*
   - ***Aggregation of multiple location information** outputs into one final location.*

Resolution of Mandatory Requirements(0/3)

Proposals shall provide a Platform Independent Model (PIM) and at least one CORBA-specific model of Localization Service (LS) or C++ - specific model of LS.

- PIM is described in Section 6. Section 7 (and the additional C++ header files) describes the Platform Specific Model in C++.

Resolution of Mandatory Requirements(1/3)

1. *Proposals shall specify a general mechanism for accessing location information of physical entities to be localized.*
   a) *Proposals shall specify a set of data and/or their structures necessary to represent location information of entities.*
      - Section 6.3 "*Representing Robotic Localization Results*" describes the data and their structures to represent location information of entities.
   b) *Proposals shall specify a set of methods and/or their parameters to access location information of entities.*
      - Section 6.6 "*Service Interface*" describes the methods to access location information of entities.

Resolution of Mandatory Requirements(2/3)

2. *Proposals shall specify interfaces for modules that perform location calculation.*
   a) *Proposals shall specify the interface for accepting localization request.*
      - Section 6.6 describes the interface for accepting localization results.
   b) *Proposals shall specify the interface for publishing the localization result.*
      - Section 6.6 describes the interface for publishing localization results.

Resolution of Mandatory Requirements(3/3)

3. Proposals shall specify the interface of a facility that provides functionalities related to:

a) Conversion of location information from one coordinate system to another.

b) Aggregation of multiple location information outputs into one final location.

– Conversion and aggregation functionality are integrated as an uniform localization module, as described in Section 6.6.

Object Management Group

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Request For Proposal

User recognition API for Human Robot Interaction

OMG Document: robotics/2008-06-07

Letters of Intent due: 2008
Submissions due: 2008

Objective of this RFP

This RFP solicits proposals for a Platform Independent Model (PIM) and at least one CORBA Platform Specific Model (PSM) or C++ PSM of User Recognition API for Human Robot Interaction that specify

- common interfaces for user recognition service to transfer data and commands
- a set of common information to represent user I.D

For further details see Chapter 6 of this document.

1.0 Introduction

1.1 Goals of OMG

The Object Management Group (OMG) is the world's largest software consortium with an international membership of vendors, developers, and end

users. Established in 1989, its mission is to help computer users solve enterprise integration problems by supplying open, vendor-neutral portability, interoperability and reusability specifications based on Model Driven Architecture (MDA). MDA defines an approach to IT system specification that separates the specification of system functionality from the specification of the implementation of that functionality on a specific technology platform, and provides a set of guidelines for structuring specifications expressed as models. OMG has established numerous widely used standards such as OMG IDL[IDL], CORBA[CORBA], Realtime CORBA [CORBA], GIOP/IIOP[CORBA], UML[UML], MOF[MOF], XMI[XMI] and CWM[CWM] to name a few significant ones.

1.2 Organization of this document

The remainder of this document is organized as follows:

Chapter 2 - *Architectural Context* - background information on OMG's Model Driven Architecture.

Chapter 3 - *Adoption Process* - background information on the OMG specification adoption process.

Chapter 4 - *Instructions for Submitters* - explanation of how to make a submission to this RFP.

Chapter 5 - *General Requirements on Proposals* - requirements and evaluation criteria that apply to all proposals submitted to OMG.

Chapter 6 - *Specific Requirements on Proposals* - problem statement, scope of proposals sought, requirements and optional features, issues to be discussed, evaluation criteria, and timetable that apply specifically to this RFP.

Appendix A – *References and Glossary Specific to this RFP*

Appendix B – General References and Glossary

1.3 Conventions

The key words "**must**", "**must not**", "**required**", "**shall**", "**shall not**", "**should**", "**should not**", "**recommended**", "**may**", and "**optional**" in this document are to be interpreted as described in RFC 2119 [RFC2119].

1.4 Contact Information

Questions related to the OMG's technology adoption process may be directed to *omg-process@omg.org*. General questions about this RFP may be sent to *responses@omg.org*.

OMG documents (and information about the OMG in general) can be obtained from the OMG's web site *(http://www.omg.org/*). OMG documents may also be obtained by contacting OMG at *documents@omg.org*. Templates for RFPs (this document) and other standard OMG documents can be found at the OMG *Template Downloads Page*
at *http://www.omg.org/technology/template_download.htm*

2.0 Architectural Context

MDA provides a set of guidelines for structuring specifications expressed as models and the mappings between those models. The MDA initiative and the standards that support it allow the same model specifying business system or application functionality and behavior to be realized on multiple platforms. MDA enables different applications to be integrated by explicitly relating their models; this facilitates integration and interoperability and supports system evolution (deployment choices) as platform technologies change. The three primary goals of MDA are portability, interoperability and reusability.

Portability of any subsystem is relative to the subsystems on which it depends. The collection of subsystems that a given subsystem depends upon is often loosely called the *platform*, which supports that subsystem. Portability – and reusability - of such a subsystem is enabled if all the subsystems that it depends upon use standardized interfaces (APIs) and usage patterns.

MDA provides a pattern comprising a portable subsystem that is able to use any one of multiple specific implementations of a platform. This pattern is repeatedly usable in the specification of systems. The five important concepts related to this pattern are:

1. *Model* - A model is a representation of a part of the function, structure and/or behavior of an application or system. A *representation* is said to be *formal* when it is based on a language that has a well-defined form ("syntax"), meaning ("semantics"), and possibly rules of analysis, inference, or proof for its constructs. The syntax may be graphical or textual. The semantics might be defined, more or less formally, in terms of things observed in the world being described (e.g. message sends and replies, object states and state changes, etc.), or by translating higher-level language constructs into other constructs that have a well-defined meaning. The

optional rules of inference define what unstated properties you can deduce from the explicit statements in the model. In MDA, a *representation* that is not *formal* in this sense is not a model. Thus, a diagram with boxes and lines and arrows that is not supported by a definition of the meaning of a box, and the meaning of a line and of an arrow is not a model—it is just an informal diagram.

2. *Platform* – A set of subsystems/technologies that provide a coherent set of functionality through interfaces and specified usage patterns that any subsystem that depends on the platform can use without concern for the details of how the functionality provided by the platform is implemented.

3. *Platform Independent Model (PIM)* – A model of a subsystem that contains no information specific to the platform, or the technology that is used to realize it.

4. *Platform Specific Model (PSM)* – A model of a subsystem that includes information about the specific technology that is used in the realization of that subsystem on a specific platform, and hence possibly contains elements that are specific to the platform.

5. *Mapping* – Specification of a mechanism for transforming the elements of a model conforming to a particular metamodel into elements of another model that conforms to another (possibly the same) metamodel. A mapping may be expressed as associations, constraints, rules, templates with parameters that must be assigned during the mapping, or other forms yet to be determined.

For example, in case of CORBA the platform is specified by a set of interfaces and usage patterns that constitute the CORBA Core Specification [CORBA]. The CORBA platform is independent of operating systems and programming languages. The OMG Trading Object Service specification [TOS] (consisting of interface specifications in OMG Interface Definition Language (OMG IDL)) can be considered to be a PIM from the viewpoint of CORBA, because it is independent of operating systems and programming languages. When the IDL to C++ Language Mapping specification is applied to the Trading Service PIM, the C++-specific result can be considered to be a PSM for the Trading Service, where the platform is the C++ language and the C++ ORB implementation. Thus the IDL to C++ Language Mapping specification [IDLC++] determines the mapping from the Trading Service PIM to the Trading Service PSM.

Note that the Trading Service model expressed in IDL is a PSM relative to the CORBA platform too. This highlights the fact that platform-independence and platform-specificity are relative concepts.

The UML Profile for EDOC specification [EDOC] is another example of the application of various aspects of MDA. It defines a set of modeling constructs that are independent of middleware platforms such as EJB [EJB], CCM [CCM], MQSeries [MQS], etc. A PIM based on the EDOC profile uses the middleware-independent constructs defined by the profile and thus is middleware-independent. In addition, the specification defines formal metamodels for some specific middleware platforms such as EJB, supplementing the already-existing OMG metamodel of CCM (CORBA Component Model). The specification also defines mappings from the EDOC profile to the middleware metamodels. For example, it defines a mapping from the EDOC profile to EJB. The mapping specifications facilitate the transformation of any EDOC-based PIM into a corresponding PSM for any of the specific platforms for which a mapping is specified.

Continuing with this example, one of the PSMs corresponding to the EDOC PIM could be for the CORBA platform. This PSM then potentially constitutes a PIM, corresponding to which there would be implementation language specific PSMs derived via the CORBA language mappings, thus illustrating recursive use of the Platform-PIM-PSM-Mapping pattern.

Note that the EDOC profile can also be considered to be a platform in its own right. Thus, a model expressed via the profile is a PSM relative to the EDOC platform.

An analogous set of concepts apply to Interoperability Protocols wherein there is a PIM of the payload data and a PIM of the interactions that cause the data to find its way from one place to another. These then are realized in specific ways for specific platforms in the corresponding PSMs.

Analogously, in case of databases there could be a PIM of the data (say using the Relational Data Model), and corresponding PSMs specifying how the data is actually represented on a storage medium based on some particular data storage paradigm etc., and a mapping from the PIM to each PSM.

OMG adopts standard specifications of models that exploit the MDA pattern to facilitate portability, interoperability and reusability, either through ab initio development of standards or by reference to existing standards. Some examples of OMG adopted specifications are:

1. *Languages* – e.g. IDL for interface specification, UML for model specification, OCL for constraint specification, etc.

2. *Mappings* – e.g. Mapping of OMG IDL to specific implementation languages (CORBA PIM to Implementation Language PSMs), UML

Profile for EDOC (PIM) to CCM (CORBA PSM) and EJB (Java PSM), CORBA (PSM) to COM (PSM) etc.

3. *Services* – e.g. Naming Service [NS], Transaction Service [OTS], Security Service [SEC], Trading Object Service [TOS] etc.

4. *Platforms* – e.g. CORBA [CORBA].

5. *Protocols* – e.g. GIOP/IIOP [CORBA] (both structure and exchange protocol), [XMI] (structure specification usable as payload on multiple exchange protocols).

6. *Domain Specific Standards* – e.g. Data Acquisition from Industrial Systems (Manufacturing) [DAIS], General Ledger Specification (Finance) [GLS], Air Traffic Control (Transportation) [ATC], Gene Expression (Life Science Research) [GE], Personal Identification Service (Healthcare) [PIDS], etc.

For an introduction to MDA, see [MDAa]. For a discourse on the details of MDA please refer to [MDAc]. To see an example of the application of MDA see [MDAb]. For general information on MDA, see [MDAd].

Object Management Architecture (OMA) is a distributed object computing platform architecture within MDA that is related to ISO's Reference Model of Open Distributed Processing RM-ODP[RM-ODP]. CORBA and any extensions to it are based on OMA. For information on OMA see [OMA].

3.0 Adoption Process

3.1 Introduction

OMG adopts specifications by explicit vote on a technology-by-technology basis. The specifications selected each satisfy the architectural vision of MDA. OMG bases its decisions on both business and technical considerations. Once a specification adoption is finalized by OMG, it is made available for use by both OMG members and non-members alike.

Request for Proposals (RFP) are issued by a *Technology Committee* (TC), typically upon the recommendation of a *Task Force* (TF) and duly endorsed by the *Architecture Board* (AB).

Submissions to RFPs are evaluated by the TF that initiated the RFP. Selected specifications are *recommended* to the parent TC after being *reviewed* for technical merit and consistency with MDA and other adopted specifications and

endorsed by the AB. The parent TC of the initiating TF then votes to *recommend adoption* to the OMG Board of Directors (BoD). The BoD acts on the recommendation to complete the adoption process.

For more detailed information on the adoption process see the *Policies and Procedures of the OMG Technical Process* [P&P] and the *OMG Hitchhiker's Guide* [Guide]. In case of any inconsistency between this document and the [P&P] in all cases the [P&P] shall prevail.

3.2 Steps in the Adoption Process

A TF, its parent TC, the AB and the Board of Directors participate in a collaborative process, which typically takes the following form:

- *Development and Issuance of RFP*

  RFPs are drafted by one or more OMG members who are interested in the adoption of a standard in some specific area. The draft RFP is presented to an appropriate TF, based on its subject area, for approval and recommendation to issue. The TF and the AB provide guidance to the drafters of the RFP. When the TF and the AB are satisfied that the RFP is appropriate and ready for issuance, the TF recommends issuance to its parent TC, and the AB endorses the recommendation. The TC then acts on the recommendation and issues the RFP.

- *Letter of Intent (LOI)*

  A Letter of Intent (LOI) must be submitted to the OMG signed by an officer of the member organization, which intends to respond to the RFP, confirming the organization's willingness to comply with OMG's terms and conditions, and commercial availability requirements. (See section 4.3 for more information.). In order to respond to an RFP the respondent must be a member of the TC that issued the RFP.

- *Voter Registration*

  Interested OMG members, other than Trial, Press and Analyst members may participate in specification selection votes in the TF for an RFP. They may need to register to do so, if so stated in the RFP. Registration ends on a specified date, 6 or more weeks after the announcement of the registration period. The registration closure date is typically around the time of initial submissions. Member organizations that have submitted an LOI are automatically registered to vote.

- *Initial Submissions*

Initial Submissions are due by a specified deadline. Submitters normally present their proposals at the first meeting of the TF after the deadline. Initial Submissions are expected to be complete enough to provide insight on the technical directions and content of the proposals.

- *Revision Phase*

  During this time submitters have the opportunity to revise their Submissions, if they so choose.

- *Revised Submissions*

  Revised Submissions are due by a specified deadline. Submitters again normally present their proposals at the next meeting of the TF after the deadline. (Note that there may be more than one Revised Submission deadline. The decision to extend this deadline is made by the registered voters for that RFP.)

- *Selection Votes*

  When the registered voters for the RFP believe that they sufficiently understand the relative merits of the Revised Submissions, a selection vote is taken. The result of this selection vote is a recommendation for adoption to the TC. The AB reviews the proposal for MDA compliance and technical merit. An endorsement from the AB moves the voting process into the issuing Technology Committee. An eight-week voting period ensues in which the TC votes to recommend adoption to the OMG Board of Directors (BoD). The final vote, the vote to adopt, is taken by the BoD and is based on technical merit as well as business qualifications. The resulting draft standard is called the *Adopted Specification*.

- *Business Committee Questionnaire*

  The submitting members whose proposal is recommended for adoption need to submit their response to the BoD Business Committee Questionnaire [BCQ] detailing how they plan to make use of and/or make the resulting standard available in products. If no organization commits to make use of the standard, then the BoD will typically not act on the recommendation to adopt the standard. So it is very important to fulfill this requirement.

- *Finalization*

  A Finalization Task Force (FTF) is chartered by the TC that issued the RFP, to prepare an *adopted* submission for publishing as a formal, publicly available specification. Its responsibility includes production of one or more prototype implementations and fixing any problems that are discovered in the process. This ensures that the final available standard is actually

implementable and has no show-stopping bugs. Upon completion of its activity the FTF recommends adoption of the resulting draft standard called the *Available Specification*. The FTF must also provide evidence of the existence of one or more prototype implementations. The parent TC acts on the recommendation and recommends adoption to the BoD. OMG Technical Editors produce the *Formal Published Specification* document based on this *Available Specification*.

- *Revision*

  A Revision Task Force (RTF) is normally chartered by a TC, after the FTF completes its work, to manage issues filed against the *Available Specification* by implementers and users. The output of the RTF is a revised specification reflecting minor technical changes.

3.3 Goals of the evaluation

The primary goals of the TF evaluation are to:

- Provide a fair and open process
- Facilitate critical review of the submissions by members of OMG
- Provide feedback to submitters enabling them to address concerns in their revised submissions
- Build consensus on acceptable solutions
- Enable voting members to make an informed selection decision

Submitters are expected to actively contribute to the evaluation process.

4.0 Instructions for Submitters

4.1 OMG Membership

To submit to an RFP issued by the Platform Technology Committee the submitter or submitters must be either Platform or Contributing members on the date of the submission deadline, while for Domain Technology RFPs the submitter or submitters must be either Contributing or Domain members. Submitters sometimes choose to name other organizations that support a submission in some way; however, this has no formal status within the OMG process, and for OMG's purposes confers neither duties nor privileges on the organizations thus named.

4.2 Submission Effort

An RFP submission may require significant effort in terms of document preparation, presentations to the issuing TF, and participation in the TF evaluation process. Several staff months of effort might be necessary. OMG is unable to reimburse submitters for any costs in conjunction with their submissions to this RFP.

4.3 Letter of Intent

A Letter of Intent (LOI) must be submitted to the OMG Business Committee signed by an officer of the submitting organization signifying its intent to respond to the RFP and confirming the organization's willingness to comply with OMG's terms and conditions, and commercial availability requirements. These terms, conditions, and requirements are defined in the *Business Committee RFP Attachment* and are reproduced verbatim in section 4.4 below.

The LOI should designate a single contact point within the submitting organization for receipt of all subsequent information regarding this RFP and the submission. The name of this contact will be made available to all OMG members. The LOI is typically due 60 days before the deadline for initial submissions. LOIs must be sent by fax or paper mail to the "RFP Submissions Desk" at the main OMG address shown on the first page of this RFP.

Here is a suggested template for the Letter of Intent:

This letter confirms the intent of <___organization required___> (the organization) to submit a response to the OMG <___RFP name required___> RFP. We will grant OMG and its members the right to copy our response for review purposes as specified in section 4.7 of the RFP. Should our response be adopted by OMG we will comply with the OMG Business Committee terms set out in section 4.4 of the RFP and in document omg/06-03-02.

<____contact name and details required____> will be responsible for liaison with OMG regarding this RFP response.

The signatory below is an officer of the organization and has the approval and authority to make this commitment on behalf of the organization.

<___signature required____>

4.4 Business Committee RFP Attachment

This section contains the text of the Business Committee RFP attachment concerning commercial availability requirements placed on submissions. This attachment is available separately as an OMG document omg/06-03-02.

Commercial considerations in OMG technology adoption

A1 Introduction

OMG wishes to encourage rapid commercial adoption of the specifications it publishes. To this end, there must be neither technical, legal nor commercial obstacles to their implementation. Freedom from the first is largely judged through technical review by the relevant OMG Technology Committees; the second two are the responsibility of the OMG Business Committee. The BC also looks for evidence of a commitment by a submitter to the commercial success of products based on the submission.

A2 Business Committee evaluation criteria

A2.1 Viable to implement across platforms

While it is understood that final candidate OMG submissions often combine technologies before they have all been implemented in one system, the Business Committee nevertheless wishes to see evidence that each major feature has been implemented, preferably more than once, and by separate organisations. Pre-product implementations are acceptable. Since use of OMG specifications should not be dependant on any one platform, cross-platform availability and interoperability of implementations should be also be demonstrated.

A2.2 Commercial availability

In addition to demonstrating the existence of implementations of the specification, the submitter must also show that products based on the specification are commercially available, or will be within 12 months of the date when the specification was recommended for adoption by the appropriate Task Force. Proof of intent to ship product within 12 months might include:

- *A public product announcement with a shipping date within the time limit.*
- *Demonstration of a prototype implementation and accompanying draft user documentation.*

Alternatively, and at the Business Committee's discretion, submissions may be adopted where the submitter is not a commercial software provider, and therefore will not make implementations commercially available. However, in this case the BC will require concrete evidence of two or more independent implementations of the specification being used by end- user organisations as part of their businesses. Regardless of which requirement is in use, the submitter must inform the OMG of completion of the implementations when commercially available.

A2.3 Access to Intellectual Property Rights

OMG will not adopt a specification if OMG is aware of any submitter, member or third party which holds a patent, copyright or other intellectual property right (collectively referred to in this policy statement as "IPR") which might be infringed by implementation or recommendation of such specification, unless OMG believes that such IPR owner will grant a license to organisations (whether OMG members or not) on non-discriminatory and commercially reasonable terms which wish to make use of the specification. Accordingly, the submitter must certify that it is not aware of any claim that the specification infringes any IPR of a third party or that it is aware and believes that an appropriate non-discriminatory license is available from that third party. Except for this certification, the submitter will not be required to make any other warranty, and specifications will be offered by OMG for use "as is". If the submitter owns IPR to which an use of a specification based upon its submission would necessarily be subject, it must certify to the Business Committee that it will make a suitable license available to any user on non- discriminatory and commercially reasonable terms, to permit development and commercialisation of an implementation that includes such IPR.

It is the goal of the OMG to make all of its technology available with as few impediments and disincentives to adoption as possible, and therefore OMG strongly encourages the submission of technology as to which royalty-free licenses will be available. However, in all events, the submitter shall also certify that any necessary licence will be made available on commercially reasonable, non-discriminatory terms. The submitter is responsible for disclosing in detail all known restrictions, placed either by the submitter or, if known, others, on technology necessary for any use of the specification.

A2.4 Publication of the specification

Should the submission be adopted, the submitter must grant OMG (and its sublicensees) a world- wide, royalty-free licence to edit, store, duplicate and distribute both the specification and works derived from it (such as revisions and teaching materials). This requirement applies only to the written specification, not to any implementation of it.

A2.5 Continuing support

The submitter must show a commitment to continue supporting the technology underlying the specification after OMG adoption, for instance by showing the BC development plans for future revisions, enhancement or maintenance.

4.5 Responding to RFP items

4.5.1 Complete proposals

A submission must propose full specifications for all of the relevant requirements detailed in Chapter 6 of this RFP. Submissions that do not present complete proposals may be at a disadvantage.

Submitters are highly encouraged to propose solutions to any optional requirements enumerated in Chapter 6.

4.5.2 Additional specifications

Submissions may include additional specifications for items not covered by the RFP that they believe to be necessary and integral to their proposal. Information on these additional items should be clearly distinguished.

Submitters must give a detailed rationale as to why these specifications should also be considered for adoption. However submitters should note that a TF is unlikely to consider additional items that are already on the roadmap of an OMG TF, since this would pre-empt the normal adoption process.

4.5.3 Alternative approaches

Submitters may provide alternative RFP item definitions, categorizations, and groupings so long as the rationale for doing so is clearly stated. Equally, submitters may provide alternative models for how items are provided if there are compelling technological reasons for a different approach.

4.6 Confidential and Proprietary Information

The OMG specification adoption process is an open process. Responses to this RFP become public documents of the OMG and are available to members and non-members alike for perusal. No confidential or proprietary information of any kind will be accepted in a submission to this RFP.

4.7 Copyright Waiver

Every submission document must contain: (i) a waiver of copyright for unlimited duplication by the OMG, and (ii) a limited waiver of copyright that allows each OMG member to make up to fifty (50) copies of the document forreview purposes only. See Section 4.9.2 for recommended language.

4.8 Proof of Concept

Submissions must include a “proof of concept” statement, explaining how the submitted specifications have been demonstrated to be technically viable. The technical viability has to do with the state of development and maturity of the technology on which a submission is based. This is not the same as commercial availability. Proof of concept statements can contain any information deemed relevant by the submitter; for example:

> “This specification has completed the design phase and is in the process of being prototyped.”
>
> “An implementation of this specification has been in beta-test for 4 months.”
>
> “A named product (with a specified customer base) is a realization of this specification.”

It is incumbent upon submitters to demonstrate to the satisfaction of the TF managing the evaluation process, the technical viability of their proposal. OMG will favor proposals based on technology for which sufficient relevant experience has been gained.

4.9 Format of RFP Submissions

This section presents the structure of a submission in response to an RFP. *All submissions* must contain the elements itemized in section 4.9.2 below before they can be accepted as a valid response for evaluation or a vote can be taken to recommend for adoption.

4.9.1 General

- Submissions that are concise and easy to read will inevitably receive more consideration.
- Submitted documentation should be confined to that directly relevant to the items requested in the RFP. If this is not practical, submitters must make clear what portion of the documentation pertains directly to the RFP and what portion does not.
- The key words "**must**", "**must not**", "**required**", "**shall**", "**shall not**", "**should**", "**should not**", "**recommended**", "**may**", and "**optional**" shall be used in the submissions with the meanings as described in RFC 2119 [RFC2119].

4.9.2 Required Outline

A three-part structure for submissions is required. Parts I is non-normative, providing information relevant to the evaluation of the proposed specification. Part II is normative, representing the proposed specification. Specific sections like Appendices may be explicitly identified as non-normative in Part II. Part III is normative specifying changes that must be made to previously adopted specifications in order to be able to implement the specification proposed in Part II.

PART I

- The name of the RFP that the submission is responding to.
- List of OMG members making the submission (see 4.1) listing exactly which members are making the submission, so that submitters can be matched with LOI responders and their current eligibility can be verified.
- Copyright waiver (see 4.7), in a form acceptable to the OMG.

  One acceptable form is:

  "Each of the entities listed above: (i) grants to the Object Management Group, Inc. (OMG) a nonexclusive, royalty-free, paid up, worldwide license to copy and distribute this document and to modify this document and distribute copies of the modified version, and (ii) grants to each member of the OMG a nonexclusive, royalty-free, paid up, worldwide license to make up to fifty (50) copies of this document for internal review purposes only and not for distribution, and (iii) has agreed that no person shall be deemed to have infringed the copyright in the included material of any such copyright holder by reason of having used any OMG specification that may be based hereon or having conformed any computer software to such specification."

  If you wish to use some other form you must get it approved by the OMG legal counsel before using it in a submission.

- For each member making the submission, an individual contact point who is authorized by the member to officially state the member's position relative to the submission, including matters related to copyright ownership, etc. (see 4.3)
- Overview or guide to the material in the submission
- Overall design rationale (if appropriate)
- Statement of proof of concept (see 4.8)
- Resolution of RFP requirements and requests

Explain how the proposal satisfies the specific requirements and (if applicable) requests stated in Chapter 6. References to supporting material in Part II should be given.

In addition, if the proposal does not satisfy any of the general requirements stated in Chapter 5, provide a detailed rationale.

- Responses to RFP issues to be discussed

  Discuss each of the "Issues To Be Discussed" identified in Chapter 6.

PART II

The contents of this part should be structured based on the template found in [FORMS] and should contain the following elements as per the instructions in the template document cited above:

- Scope of the proposed specification
- Proposed conformance criteria

  Submissions should propose appropriate conformance criteria for implementations.

- Proposed normative references

  Submissions should provide a list of the normative references that are used by the proposed specification

- Proposed list of terms and definitions

  Submissions should provide a list of terms that are used in the proposed specification with their definitions.

- Proposed list of symbols

  Submissions should provide a list of special symbols that are used in the proposed specification together with their significance

- Proposed specification.

PART III

- Changes or extensions required to adopted OMG specifications

Submissions must include a full specification of any changes or extensions required to existing OMG specifications. This should be in a form that enables "mechanical" section-by-section revision of the existing specification.

4.10 How to Submit

Submitters should send an electronic version of their submission to the *RFP Submissions Desk* (*omg-documents@omg.org*) at OMG Headquarters by 5:00 PM U.S. Eastern Standard Time (22:00 GMT) on the day of the Initial and Revised Submission deadlines. Acceptable formats are Postscript, ASCII, PDF, Adobe FrameMaker, Microsoft Word, and WordPerfect. However, it should be noted that a successful (adopted) submission must be supplied to OMG's technical editors in FrameMaker source format, using the most recent available OMG submission template (see [FORMS]). The AB will not endorse adoption of any submission for which appropriately formatted FrameMaker sources are not submitted to OMG; it may therefore be convenient to prepare all stages of a submission using this template.

Submitters should make sure they receive electronic or voice confirmation of the successful receipt of their submission. Submitters should be prepared to send a single hardcopy version of their submission, if requested by OMG staff, to the attention of the "RFP Submissions Desk" at the main OMG address shown on the first page of this RFP.

5.0 General Requirements on Proposals

5.1 Requirements

5.1.1 Submitters are encouraged to express models using OMG modeling languages such as UML, MOF, CWM and SPEM (subject to any further constraints on the types of the models and modeling technologies specified in Chapter 6 of this RFP). Submissions containing models expressed via OMG modeling languages shall be accompanied by an OMG XMI [XMI] representation of the models (including a machine-readable copy). A best effort should be made to provide an OMG XMI representation even in those cases where models are expressed via non-OMG modeling languages.

5.1.2 Chapter 6 of this RFP specifies whether PIM(s), PSM(s), or both are being solicited. If proposals specify a PIM and corresponding PSM(s), then the rules specifying the mapping(s) between the PIM and PSM(s) shall either be identified by reference to a standard mapping or specified in the proposal. In order to allow possible inconsistencies in a proposal to be resolved later,

proposals shall identify whether the mapping technique or the resulting PSM(s) are to be considered normative.

5.1.3 Proposals shall be *precise* and *functionally complete*. All relevant assumptions and context required for implementing the specification shall be provided.

5.1.4 Proposals shall specify *conformance criteria* that clearly state what features all implementations must support and which features (if any) may *optionally* be supported.

5.1.5 Proposals shall *reuse* existing OMG and other standard specifications in preference to defining new models to specify similar functionality.

5.1.6 Proposals shall justify and fully specify any *changes or extensions* required to existing OMG specifications. In general, OMG favors proposals that are *upwards compatible* with existing standards and that minimize changes and extensions to existing specifications.

5.1.7 Proposals shall factor out functionality that could be used in different contexts and specify their models, interfaces, etc. separately. Such *minimalism* fosters re-use and avoids functional duplication.

5.1.8 Proposals shall use or depend on other specifications only where it is actually necessary. While re-use of existing specifications to avoid duplication will be encouraged, proposals should avoid gratuitous use.

5.1.9 Proposals shall be *compatible* with and *usable* with existing specifications from OMG and other standards bodies, as appropriate. Separate specifications offering distinct functionality should be usable together where it makes sense to do so.

5.1.10 Proposals shall preserve maximum *implementation flexibility*. Implementation descriptions should not be included and proposals shall not constrain implementations any more than is necessary to promote interoperability.

5.1.11 Proposals shall allow *independent implementations* that are *substitutable* and *interoperable*. An implementation should be replaceable by an alternative implementation without requiring changes to any client.

5.1.12 Proposals shall be compatible with the architecture for system distribution defined in ISO's Reference Model of Open Distributed Processing [RM-ODP]. Where such compatibility is not achieved, or is not appropriate, the response to

5.1.13 In order to demonstrate that the specification proposed in response to this RFP can be made secure in environments requiring security, answers to the following questions shall be provided:

- What, if any, are the security sensitive elements that are introduced by the proposal?
- Which accesses to security-sensitive elements must be subject to security policy control?
- Does the proposed service or facility need to be security aware?
- What default policies (e.g., for authentication, audit, authorization, message protection etc.) should be applied to the security sensitive elements introduced by the proposal? Of what security considerations must the implementers of your proposal be aware?

The OMG has adopted several specifications, which cover different aspects of security and provide useful resources in formulating responses. [CSIV2] [SEC] [RAD].

5.1.14 Proposals shall specify the degree of internationalization support that they provide. The degrees of support are as follows:

a) Uncategorized: Internationalization has not been considered.

b) Specific to <region name>: The proposal supports the customs of the specified region only, and is not guaranteed to support the customs of any other region. Any fault or error caused by requesting the services outside of a context in which the customs of the specified region are being consistently followed is the responsibility of the requester.

c) Specific to <multiple region names>: The proposal supports the customs of the specified regions only, and is not guaranteed to support the customs of any other regions. Any fault or error caused by requesting the services outside of a context in which the customs of at least one of the specified regions are being consistently followed is the responsibility of the requester.

d) Explicitly not specific to <region(s) name>: The proposal does not support the customs of the specified region(s). Any fault or error caused by requesting the services in a context in which the customs of the specified region(s) are being followed is the responsibility of the requester.

5.2 Evaluation criteria

Although the OMG adopts model-based specifications and not implementations of those specifications, the technical viability of implementations will be taken into account during the evaluation process. The following criteria will be used:

5.2.1 Performance

Potential implementation trade-offs for performance will be considered.

5.2.2 Portability

The ease of implementation on a variety of systems and software platforms will be considered.

5.2.3 Securability

The answer to questions in section 5.1.13 shall be taken into consideration to ascertain that an implementation of the proposal is securable in an environment requiring security.

5.2.4 Conformance: Inspectability and Testability

The adequacy of proposed specifications for the purposes of conformance inspection and testing will be considered. Specifications should provide sufficient constraints on interfaces and implementation characteristics to ensure that conformance can be unambiguously assessed through both manual inspection and automated testing.

5.2.5 Standardized Metadata

Where proposals incorporate metadata specifications, usage of OMG standard XMI metadata [XMI] representations must be provided as this allows specifications to be easily interchanged between XMI compliant tools and applications. Since use of XML (including XMI and XML/Value [XML/Value]) is evolving rapidly, the use of industry specific XML vocabularies (which may not be XMI compliant) is acceptable where justified.

6.0 Specific Requirements on Proposals

6.1 Problem Statement

For intelligent service robots, it is essential to recognize users in order to provide appropriate services to a correctly recognized user. However, in robot environments in which users freely move around the robot, it is difficult to force users to cooperate for recognition as in traditional biometric security systems. This proposal introduces a user recognition service interface that is designed to recognize users who are unconscious of a robot or of cameras. In the proposed proposal, vision based recognition method and audio based recognition method are incorporated to cope with the limited applicability of traditional user recognition techniques.

Traditional Security Application	Robot Application
Singular Operation User identification is a one-time event. Once a user is authorized, the intended transaction starts, and the authentication module no longer intervenes.	Continuous Operation Interacting user change continuously. Thus the process should be able to track the users appropriately.
Single User Recognize single user	Multi-user In many cases, more than one user exists for which the robot should be aware
Controlled Environment The capturing process is strictly regulated and the users are extremely cooperative because the failure in authentication results in inconvenience or even a danger for that user.	Uncontrolled Environment The robot must recognize the users continuously. Thus, it is unrealistic to expect users to cooperate constantly for the robots.
User ID Answer the question “Who is the person?”	User ID and Position Answer not only “Who is the person?” but also “Where is that person?”
Passive The authentication function is called when it is needed.	Active The authentication function should be running continuously. The function not only responds to the request of the application to identify a certain user, but also raises events when a new user appears or disappears.

User recognition is one of the most fundamental ingredients for truly useful robot systems. Many useful services require the recognition of the user as a premise. With information regarding users, the robot can provide services customized to specific users, and services can be delivered to appropriate users.

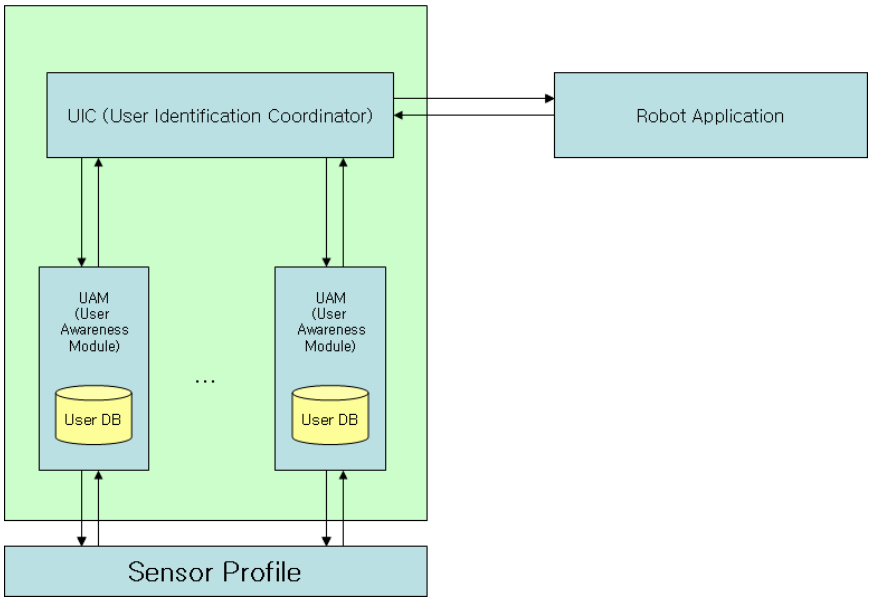


Figure 1. The structure of the proposed system

UAM(User Awareness Module) is the basic module that performs user identification, such as face recognizer, speaker recognizer, user recognizer or human tracker based on biometric information and sound source localization.

UIC(User Identification Coordinator) integrates the information from UAM and transmits the user data to robot applications.

In this model, the information exchange protocols (1. between UIC and UAM, 2. between UIC and Robot Application) are to be standardized.

6.2 Scope of Proposals Sought

This RFP seeks proposals that specify a user recognition service, on top of which various robotic applications are developed.

It is necessary to consider the followings in the specification of a user recognition service interface.

(1) The UR-API specification shall provide a framework for supporting flexible configuration of its own functionalities.

(2) The UR-API specification must be general enough to incorporate various user recognition sensors and algorithms.

(3) The UR-API specification shall provide the data representation for its external application interface as well as its internal functionalities

- The data representation may includes elements for specifying user such as user I.D format, multi-modal data format , input data type, etc.
- The user I.D format may include auxiliary information, such as identification, gender, age, etc.

(4) The UR-API specification shall satisfy interoperability and reusability. An UR-API implemented by one vendor should be able to be replaced with UR-APIs provided by other vendors with little efforts.

(5) The UR-API specification shall provide a minimum set of functionalities to satisfy the following:

- Providing an interface in order to accept requests and to publish user recognition results.
- Providing a mean for initialization or adjustment of the user recognition service.
- Providing a mean for specifying the data format, such as the data type for the user I.D, the identification system for the identification data, or the format for the error data.

(6) Real-time operations are especially important for the user recognition service. The UR-API specification shall be able to demonstrate its real-time support.

6.3 Relationship to Existing OMG Specifications

Submitters shall examine the following OMG specifications for possible benefit:

- Platform Independent Model (PIM) and Platform Specific Model (PSM) for super Distributed Objects (SDO) Specification version 1.0 [formal/2004-11-01]
- Unified Modeling Language: Infrastructure version 2.0 [ptc/2004-10-14]
- Unified Modeling Language: Superstructure version 2.0 [formal/ 2005-07-04]

- Lightweight CORBA Component Model [ptc/2004-06-10]
- Robotic Technology Component specification version 1.0 [ptc/2005-09-01]

6.4 Related Activities, Documents and Standards

Proposals may include existing systems, documents, UR-API, and standards that are relevant to the problems discussed in this RFP. They can be used as background information for the proposal.

Example:

- IEEE Robotics and Automation Society, Technical Committee on Network Robot
- IEEE Robotics and Automation Society, Technical Committee on Programming Environment in Robotics and Automation
- URC(Ubiquitous Robotic Companion) Project
- ISO/ SC 37 Projects relate to ISO/IEC 19784-1(BioAPI Ver 2.0)

6.5 Mandatory Requirements

Proposals shall provide a Platform Independent Model (PIM) and at least one CORBA-specific model of User recognition service interface (UR-API) or C++ -specific model of UR-API. The models shall meet the following requirements.

1. Proposals shall specify a general mechanism for accessing user I.D information of entities to be recognized.
   - Architecture for User Recognition shall be defined (diagram or description for overview)
   - The process of User Recognition Service shall be clearly defined.
   - The function of each stage shall be clearly defined.
   - Basic data structure shall be defined
   - Each API shall handle Basic Data structure and provide Basic error handling

- PIM using UML shall be defined.
- Proposals shall specify a set of necessary parameters and data structure to represent the user I.D of user.

2. Proposals shall specify modules that perform user I.D recognition and their generic interfaces;
   - Proposals shall specify each module that performs user I.D recognition.
   - Proposals shall specify the interface being able to register new user I.D.
   - Proposals shall specify the interface being able to accept user I.D request.
   - Proposals shall specify the interface being able to publish the user recognition process result.
   - Proposals shall specify the interface being able to advertise what kind of sensor data can be used and/or what sensors are used.

6.6 Optional Requirements

Proposals may specify interfaces for the functionalities listed below.

- Identification of additional information of user (such as gender or age).
- Choice of input data type or data format (including multi-modal).
- Consideration of additional sensors(RFID, BIO sensors).
- Implementation example for each APIs.

6.7 Issues to be discussed

These issues will be considered during submission evaluation. They should not be part of the proposed normative specification. (Place them in Part I of the submission.)

- Proposals shall demonstrate its feasibility by using a specific application based on the proposed model.
- Proposals shall demonstrate its applicability to existing technology such as URS (User Recognition System).

- Proposals shall discuss simplicity of implementation.
- Proposals shall discuss the possibility to apply the proposed model to other fields of interest such as URC (Ubiquitous Robot Companion).
- Proposals shall specify on-the-wire protocol communication technology independent.

6.8 Evaluation Criteria

Proposals will be evaluated in terms of consistency in their specifications, feasibility and versatility across a wide range of different robot applications.

6.9 Other information unique to this RFP

None

6.10 RFP Timetable

The timetable for this RFP is given below. Note that the TF or its parent TC may, in certain circumstances, extend deadlines while the RFP is running, or may elect to have more than one Revised Submission step. The latest timetable can always be found at the OMG *Work In Progress* page at http://www.omg.org/schedules/ under the item identified by the name of this RFP. Note that "<month>" and "<approximate month>" is the name of the month spelled out; e.g., January.

Event or Activity	Actual Date
Preparation of RFP by TF	
RFP placed on OMG document server	
Approval of RFP by Architecture Board *Review by TC*	
TC votes to issue RFP	
LOI to submit to RFP due	
Initial Submissions due and placed on OMG document server ("Three week rule")	
Voter registration closes	
Initial Submission presentations	
Preliminary evaluation by TF	
Revised Submissions due and placed on OMG document server ("Three week	

rule")	
Revised Submission presentations	
Final evaluation and selection by TF *Recommendation to AB and TC*	
Approval by Architecture Board *Review by TC*	
TC votes to recommend specification	
BoD votes to adopt specification	

Appendix A References and Glossary Specific to this RFP

A.1 References Specific to this RFP

None

A.2 Glossary Specific to this RFP

None

Appendix B General Reference and Glossary

B.1 General References

The following documents are referenced in this document:

[ATC] Air Traffic Control Specification, *http://www.omg.org/technology/documents/formal/air_traffic_control.htm*

[BCQ] OMG Board of Directors Business Committee Questionnaire, *http://www.omg.org/cgi-bin/doc?bc/02-02-01*

[CCM] CORBA Core Components Specification, *http://www.omg.org/technology/documents/formal/components.htm*

[CORBA] Common Object Request Broker Architecture (CORBA/IIOP), *http://www.omg.org/technology/documents/formal/corba_iiop.htm*

[CSIV2] [CORBA] Chapter 26

[CWM] Common Warehouse Metamodel Specification, *http://www.omg.org/technology/documents/formal/cwm.htm*

[DAIS] Data Acquisition from Industrial Systems, *http://www.omg.org/technology/documents/formal/dais.htm*

[EDOC] UML Profile for EDOC Specification, *http://www.omg.org/techprocess/meetings/schedule/UML_Profile_for_EDOC_FTF.html*

[EJB] “Enterprise JavaBeans™”, *http://java.sun.com/products/ejb/docs.html*

[FORMS] “ISO PAS Compatible Submission Template”. *http://www.omg.org/cgi-bin/doc?pas/2003-08-02*

[GE] Gene Expression, *http://www.omg.org/technology/documents/formal/gene_expression.htm*

[GLS] General Ledger Specification , *http://www.omg.org/technology/documents/formal/gen_ledger.htm*

[Guide] The OMG Hitchhiker's Guide,, *http://www.omg.org/cgi-bin/doc?hh*

[IDL] ISO/IEC 14750 also see [CORBA] Chapter 3.

[IDLC++] IDL to C++ Language Mapping, *http://www.omg.org/technology/documents/formal/c++.htm*

[MDAa] OMG Architecture Board, "Model Driven Architecture - A Technical Perspective”, *http://www.omg.org/mda/papers.htm*

[MDAb] “Developing in OMG's Model Driven Architecture (MDA),” *http://www.omg.org/docs/omg/01-12-01.pdf*

[MDAc] “MDA Guide” (*http://www.omg.org/docs/omg/03-06-01.pdf*)

[MDAd] “MDA "The Architecture of Choice for a Changing World™"”, *http://www.omg.org/mda*

[MOF] Meta Object Facility Specification, *http://www.omg.org/technology/documents/formal/mof.htm*

[MQS] "MQSeries Primer", *http://www.redbooks.ibm.com/redpapers/pdfs/redp0021.pdf*

[NS] Naming Service, *http://www.omg.org/technology/documents/formal/naming_service.htm*

[OMA] "Object Management Architecture™", *http://www.omg.org/oma/*

[OTS] Transaction Service, *http://www.omg.org/technology/documents/formal/transaction_service.htm*

[P&P] Policies and Procedures of the OMG Technical Process, *http://www.omg.org/cgi-bin/doc?pp*

[PIDS] Personal Identification Service, *http://www.omg.org/technology/documents/formal/person_identification_service.htm*

[RAD] Resource Access Decision Facility, *http://www.omg.org/technology/documents/formal/resource_access_decision.htm*

[RFC2119] IETF Best Practices: Key words for use in RFCs to Indicate Requirement Levels, (*http://www.ietf.org/rfc/rfc2119.txt*).

[RM-ODP] ISO/IEC 10746

[SEC] CORBA Security Service, *http://www.omg.org/technology/documents/formal/security_service.htm*

[TOS] Trading Object Service, *http://www.omg.org/technology/documents/formal/trading_object_service.htm*

[UML] Unified Modeling Language Specification, *http://www.omg.org/technology/documents/formal/uml.htm*

[UMLC] UML Profile for CORBA, *http://www.omg.org/technology/documents/formal/profile_corba.htm*

[XMI] XML Metadata Interchange Specification, *http://www.omg.org/technology/documents/formal/xmi.htm*

[XML/Value] XML Value Type Specification, *http://www.omg.org/technology/documents/formal/xmlvalue.htm*

B.2 General Glossary

Architecture Board (AB) - The OMG plenary that is responsible for ensuring the technical merit and MDA-compliance of RFPs and their submissions.

Board of Directors (BoD) - The OMG body that is responsible for adopting technology.

Common Object Request Broker Architecture (CORBA) - An OMG distributed computing platform specification that is independent of implementation languages.

Common Warehouse Metamodel (CWM) - An OMG specification for data repository integration.

CORBA Component Model (CCM) - An OMG specification for an implementation language independent distributed component model.

Interface Definition Language (IDL) - An OMG and ISO standard language for specifying interfaces and associated data structures.

Letter of Intent (LOI) - A letter submitted to the OMG BoD's Business Committee signed by an officer of an organization signifying its intent to respond to the RFP and confirming the organization's willingness to comply with OMG's terms and conditions, and commercial availability requirements.

Mapping - Specification of a mechanism for transforming the elements of a model conforming to a particular metamodel into elements of another model that conforms to another (possibly the same) metamodel.

Metadata - Data that represents models. For example, a UML model; a CORBA object model expressed in IDL; and a relational database schema expressed using CWM.

Metamodel - A model of models.

Meta Object Facility (MOF) - An OMG standard, closely related to UML, that enables metadata management and language definition.

Model - A formal specification of the function, structure and/or behavior of an application or system.

Model Driven Architecture (MDA) - An approach to IT system specification that separates the specification of functionality from the specification of the implementation of that functionality on a specific technology platform.

Normative – Provisions that one must conform to in order to claim compliance with the standard. (as opposed to non-normative or informative which is explanatory material that is included in order to assist in understanding the standard and does not contain any provisions that must be conformed to in order to claim compliance).

Normative Reference – References that contain provisions that one must conform to in order to claim compliance with the standard that contains said normative reference.

Platform - A set of subsystems/technologies that provide a coherent set of functionality through interfaces and specified usage patterns that any subsystem that depends on the platform can use without concern for the details of how the functionality provided by the platform is implemented.

Platform Independent Model (PIM) - A model of a subsystem that contains no information specific to the platform, or the technology that is used to realize it.

Platform Specific Model (PSM) - A model of a subsystem that includes information about the specific technology that is used in the realization of it on a specific platform, and hence possibly contains elements that are specific to the platform.

Request for Information (RFI) - A general request to industry, academia, and any other interested parties to submit information about a particular technology area to one of the OMG's Technology Committee subgroups.

Request for Proposal (RFP) - A document requesting OMG members to submit proposals to the OMG's Technology Committee. Such proposals must be received by a certain deadline and are evaluated by the issuing task force.

Task Force (TF) - The OMG Technology Committee subgroup responsible for issuing a RFP and evaluating submission(s).

Technology Committee (TC) - The body responsible for recommending technologies for adoption to the BoD. There are two TCs in OMG – *Platform TC* (PTC), that focuses on IT and modeling infrastructure related standards; and *Domain TC* (DTC), that focus on domain specific standards.

Unified Modeling Language (UML) - An OMG standard language for specifying the structure and behavior of systems. The standard defines an abstract syntax and a graphical concrete syntax.

UML Profile - A standardized set of extensions and constraints that tailors UML to particular use.

XML Metadata Interchange (XMI) - An OMG standard that facilitates interchange of models via XML documents.

User Recognition Service Interface RFP - 1st review

SuYoung , Chi(ETRI), Hyunsoo Kim(Samsung),
Toshio Hori(AIST)

OMG Robotic DTF

Functional Services WG

2008. 06.23

SPECIFICATION OVERVIEW

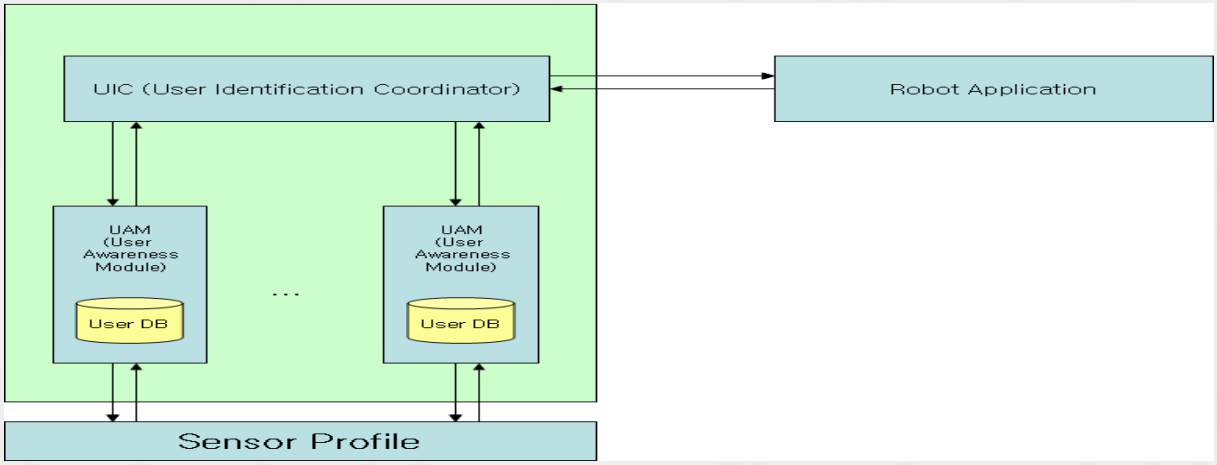
▪ PURPOSE

This RFP solicits proposals for a Platform Independent Model (PIM) and at least one CORBA Platform Specific Model (PSM) or C++ PSM of User Recognition API for Human Robot Interaction that specify

- ✓ **Common interfaces for user recognition service to transfer data and commands**
- ✓ **A set of common information to represent user I.D**

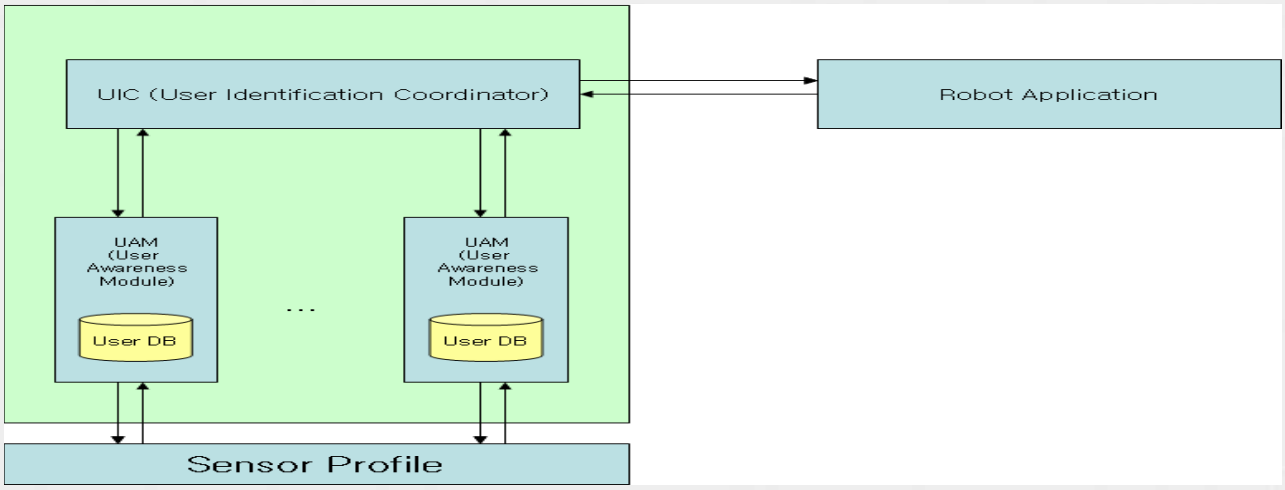
User recognition is one of the most fundamental ingredients for truly useful robot systems.

The structure of the proposed system (1)



- UAM (User Awareness Module) is the basic module that performs user identification, such as face recognizer, speaker recognizer, user recognizer or human tracker based on biometric information and sound source localization.
- UIC (User Identification Coordinator) integrates the information from UAM and transmits the user data to robot applications.
- In this model, the information exchange protocols (1. between UIC and UAM, 2. between UIC and Robot Application) are to be standardized.

The structure of the proposed system (2)



- UAC (User Awareness Component) may be defined that represents the function of both the UAM and the UIC.
  - –similar to what we did with the recent localization standard submission

In this model, the information exchange protocols (1. between the two UACs, 2. between UAC and Robot Application) are to be standardized.

SPECIFICATION OVERVIEW

- For intelligent service robots, it is essential to recognize users in order to provide appropriate services to a correctly recognized user.
- However, in robot environments in which users freely move around the robot, it is difficult to force users to cooperate for recognition as in traditional biometric security systems.
- This proposal introduces a user recognition service interface that is designed to recognize users who are unconscious of a robot or of cameras.
- In the proposed proposal, vision based recognition method and audio based recognition method are incorporated to cope with the limited applicability of traditional user recognition techniques.

Traditional Security Application	Robot Application
Singular Operation User identification is a one-time event. Once a user is authorized, the intended transaction starts, and the authentication module no longer intervenes.	**Continuous Operation** Interacting user change continuously. Thus the process should be able to track the users appropriately.
Single User Recognize single user	**Multi-user** In many cases, more than one user exists for which the robot should be aware
Controlled Environment The capturing process is strictly regulated and the users are extremely cooperative because the failure in authentication results in inconvenience or even a danger for that user.	**Uncontrolled Environment** The robot must recognize the users continuously. Thus, it is unrealistic to expect users to cooperate constantly for the robots.
User ID Answer the question “Who is the person?”	**User ID and Position** Answer not only “Who is the person?” but also “Where is that person?”
Passive The authentication function is called when it is needed.	**Active** The authentication function should be running continuously. The function not only responds to the request of the application to identify a certain user, but also raises events when a new user appears or disappears.

Scope of Proposals Sought (1)

This RFP seeks proposals that specify a user recognition service, on top of which various robotic applications are developed.

It is necessary to consider the followings in the specification of a user recognition service interface.

(1) The UR-API specification shall provide a framework for supporting flexible configuration of its own functionalities.

(2) The UR-API specification must be general enough to incorporate various user recognition sensors and algorithms.

(3) The UR-API specification shall provide the data representation for its external application interface as well as its internal functionalities

- The data representation may includes elements for specifying user such as user I.D format, multi-modal data format , input data type, etc.
- The user I.D format may include auxiliary information, such as identification, gender, age, etc.

Scope of Proposals Sought (2)

(4) The UR-API specification shall satisfy interoperability and reusability. An UR-API implemented by one vendor should be able to be replaced with UR-APIs provided by other vendors with little efforts.

(5) The UR-API specification shall provide a minimum set of functionalities to satisfy the following:

- Providing an interface in order to accept requests and to publish user recognition results.
- Providing a mean for initialization or adjustment of the user recognition service.
- Providing a mean for specifying the data format, such as the data type for the user I.D, the identification system for the ide ntification data, or the format for the error data.

(6) Real-time operations are especially important for the user recognition service. The UR-API specification shall be able to demonstrate its real-time support.

Relationship to Existing OMG Specification

- **Platform Independent Model (PIM) and Platform Specific Model (PSM) for super Distributed Objects (SDO) Specification version 1.0 [formal/2004-11-01]**
- **Unified Modeling Language: Infrastructure version 2.0 [ptc/2004-10-14]**
- **Unified Modeling Language: Superstructure version 2.0 [formal/ 2005-07-04]**
- **Lightweight CORBA Component Model [ptc/2004-06-10]**
- **Robotic Technology Component specification version 1.0 [ptc/2005-09-01]**

Related Activities, Documents and Standards

- IEEE Robotics and Automation Society, Technical Committee on Network Robot
- IEEE Robotics and Automation Society, Technical Committee on Programming Environment in Robotics and Automation
- URC(Ubiquitous Robotic Companion) Project
- ISO/ SC 37 Projects relate to ISO/IEC 19784-1(BioAPI Ver 2.0)

Mandatory Requirements (1)

- Proposals shall provide a Platform Independent Model (PIM) and at least one CORBA-specific model of User recognition service interface (UR-API) or C++ -specific model of UR-API. The models shall meet the following requirements.

1. Proposals shall specify a general mechanism for accessing user I.D information of entities to be recognized.

- Architecture for User Recognition shall be defined (diagram or description for overview)
- The process of User Recognition Service shall be clearly defined.
- The function of each stage shall be clearly defined.
- Basic data structure shall be defined
- Each API shall handle Basic Data structure and provide Basic error handling
- PIM using UML shall be defined.
- Proposals shall specify a set of necessary parameters and data structure to represent the user I.D of user.

Mandatory Requirements (2)

2. Proposals shall specify modules that perform user I.D recognition and their generic interfaces;

- Proposals shall specify each module that performs user I.D recognition.
- Proposals shall specify the interface being able to register new user I.D.
- Proposals shall specify the interface being able to accept user I.D request.
- Proposals shall specify the interface being able to publish the user recognition process result.
- Proposals shall specify the interface being able to advertise what kind of sensor data can be used and/or what sensors are used.

Optional Requirements

- Proposals may specify interfaces for the functionalities listed b elow.
- Identification of additional information of user (such as gender or age).
- Choice of input data type or data format (including multi-modal).
- Consideration of additional sensors(RFID, BIO sensors).
- Implementation example for each APIs.

Issues to be discussed

- These issues will be considered during submission evaluation. They should not be part of the proposed normative specification. (Place them in Part I of the submission.)
- Proposals shall demonstrate its feasibility by using a specific application based on the proposed model.
- Proposals shall demonstrate its applicability to existing technology such as URS (User Recognition System).
- Proposals shall discuss simplicity of implementation.
- Proposals shall discuss the possibility to apply the proposed model to other fields of interest such as URC (Ubiquitous Robot Companion).
- Proposals shall specify on-the-wire protocol communication technology independent.

Timetable

Event or Activity	Actual Date
Preparation of RFP by TF	7. Nov. 2008
RFP placed on OMG document server	Before 11. Nov.2008
Approval of RFP by Architecture Board *Review by TC*	11. Dec. 2008
TC votes to issue RFP	12. Dec.2008
LOI to submit to RFP due	12. Jan. 2009
Initial Submissions due and placed on OMG document server ("Four week rule")	By 25. May.2009
Voter registration closes	
Initial Submission presentations	22. June.2009
Preliminary evaluation by TF	
Revised Submissions due and placed on OMG document server ("Four week rule")	9. Nov.2009
Revised Submission presentations	7. Dec.2009
Final evaluation and selection by TF *Recommendation to AB and TC*	11. Dec.2009
Approval by Architecture Board *Review by TC*	
TC votes to **recommend specification**	
BoD votes to adopt specification	

Q/A

User Recognition Service Interface API examples

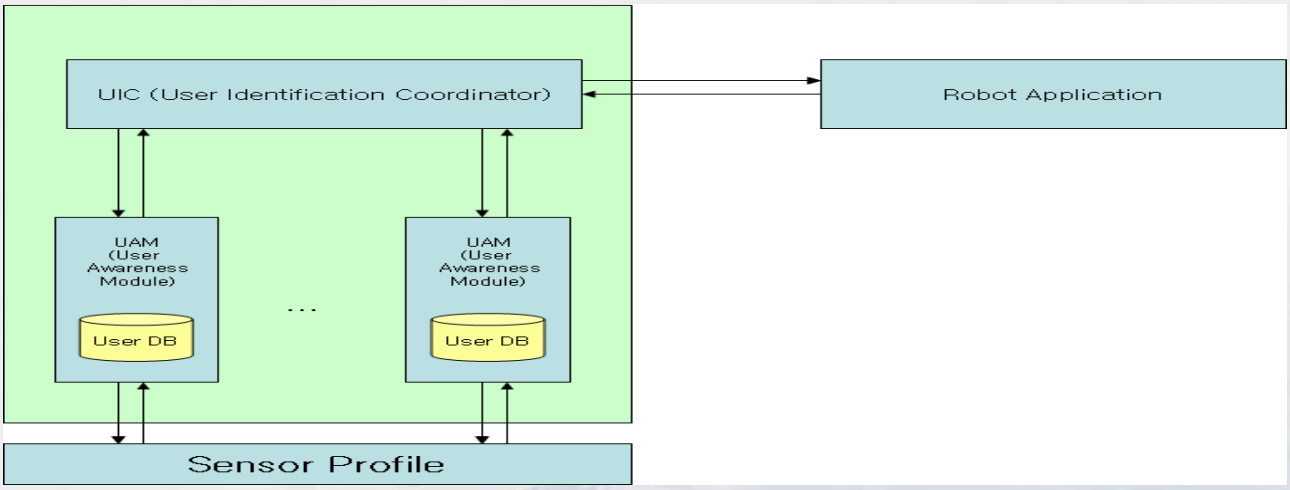
SuYoung , Chi(ETRI), Hyunsoo Kim(Samsung), Toshio Hori(AIST)

OMG Robotic DTF

Functional Services WG

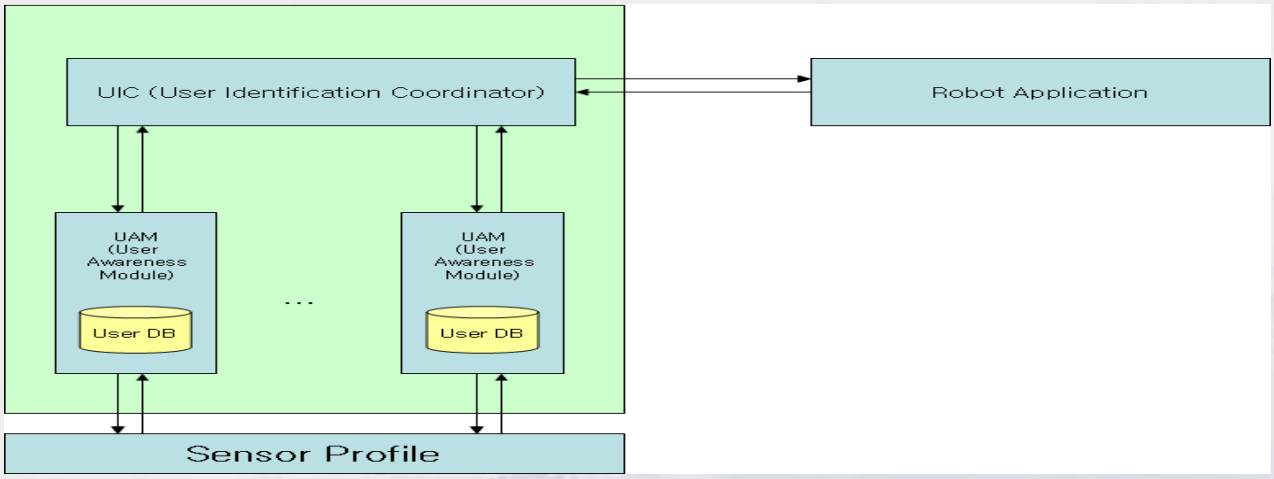
2008. 06.23

The structure of the proposed system (1)



- UAM (User Awareness Module) is the basic module that performs user identification, such as face recognizer, speaker recognizer, user recognizer or human tracker based on biometric information and sound source localization.
- UIC (User Identification Coordinator) integrates the information from UAM and transmits the user data to robot applications.
- In this model, the information exchange protocols (1. between UIC and UAM, 2. between UIC and Robot Application) are to be standardized.

The structure of the proposed system (2)



▪ UAC (User Awareness Component) may be defined that represents the function of both the UAM and the UIC.

–similar to what we did with the recent localization standard submission

▪ *In this model, the information exchange protocols (1. between the two UACs, 2. between UAC and Robot Application) are to be standardized.*

When the UR-API is used?

- Command from Application to HRI Demon
  - "Identify the person who have just asked to play a music"
  - "Where is your mother?"
  - "Who is calling me from the right hand side?"
  - "Who is that person visible from the camera image?"
- Event from HRI Demon to Application
  - "We have found (possible person's ID with likelihood list) from the 60 degree direction"
  - "(possible person's ID with likelihood list) is calling you from 130 degree direction"
  - "(possible person's ID with likelihood list) has disappeared from our camera view"

Application to UAC (1)

Enumeration

- int GetNumberOfUAM();
- UAMInfo GetUAMInfo(int nth);
  - Function for UAM Enumeration in the HRI Demon System
- UAMInfo {
  - Int UAMID;
  - Int Media; (such as image, sound, distance, human sensor)
  - BOOL NeedEnrollment;
  - };
- BOOL Initialize()
- BOOL Destroy()
- Void SetProperties(UAMID, Properties p)
  - Property is used when certain information is to be set for a specific UAM
- Properties GetProperties(UAMID)
  - Get property information assigned for a specific UAM.

Application to UAC (2)

Enrollment

- BOOL EnrollUser(UAMID, UserInfo);
  - Enrol process is assigned to the UAM, including user interface for enrollment.
  - The result indicates success or fail, using BOOL.
  - The registered data is managed by the UAM itself.
- EnrollInfo GetEnrollmentData(UAMID, UserInfo);
- EnrollInfoArray GetEnrollmentData(UAMID);
  - These two functions are used when the registered data is needed for backup etc.
  - The first one is used for separate data, and the second one is used for all user's data registered at the UAM.
- BOOL DeleteEnrollment(UAMID, UserInfo);
  - This is used to delete the registered data.

Application to UAC (3)

Matching

- BOOL AddCandidate(UserInfoArray);
  - To pre-set the specific users as the matching candidate. In this case, the users need to be pre-registered.
- BOOL RemoveCandidate(UserInfoArray);
  - To remove the specific user from the matching candidate list.
- UserInfoArray GetCandidateList();
  - To get the user list, registered as the matching candidate.
- UserInfoArray MatchUser(UAMID);
- UserInfoArray MatchUser();
  - To perform the user identification.
  - This can give command for user identification to a specific UAM.
  - This can also give command to all UAM available to UIC, and get the combined results.
  - When the user is more than one person, the return value is UserInfoArray (User ID with likelihood list and the position information may be transmitted.).

Application to UAC (4)

- PositionInfo FindUser(UserInfo);
  - To find the specific user (if the user can be found, the position of that user can be returned) – even if the user is not found, the system may return the previous history of that user, such as “your mother has moved into the main bedroom five minutes ago”.
- UserInfoArray GetUserMap();
  - This returns the list of visible users, including the position info.

Event Control

- Void SetEvent(UAMID, EventInfo, CallBack, OnOff);
  - This set or reset a certain Event.
  - This is the self-controlled Event of UIC to Application, without the request of Application.
  - It should be noted that only the pre-set Event may happen
    (pre-set Event : Events that was set by Application by “SetEvent”.)
- Void RaiseEvent(EventInfo);

UAC to Application (1)

Event List

- SoundDetected
  - The direction of the sound is detected
- MotionDetected
  - The position of the motion is detected
- PersonFound
  - A user is found, but not identified
- UserIdentified
  - The user is identified
- UserProbabilityChanged
  - The likelihood of the user ID has been changed
- SpecificUserAppeared
  - The specific user that Applciaton has requested, has appeared.

UAC to Application (2)

- HRI Demon needs events for user disappearance, since it has the user tracking feature.

- PersonDisappeared
  - A user has disappeared (including multiple user cases)
- SpecificUserDisappeared
  - Specific user that Application requested, has disappeared.

- Separate Event may be needed according to the relative position between the user and the robot
- PersonInsideArea
  - When somebody approached within certain distance from the robot.

UAC to Application (3)

Events more specific than “PersonFound”, may be needed.

- FaceDetected
  - The user’s face is detected, but not identified (including the position information)
- VoiceDetected
  - The user’s voice is detected, but not identified (including the position information) – this is when the speech/non-speech discrimination is possible.

Auxiliary information of the user recognition

- UserGenderClassified
  - User is not identified, but the gender is classified.
- UserAgeClassified
  - User is not identified, but the age is classified.

Q/A

Filter Condition

Itsuki Noda
AIST

NATIONAL INSTITUTE OF
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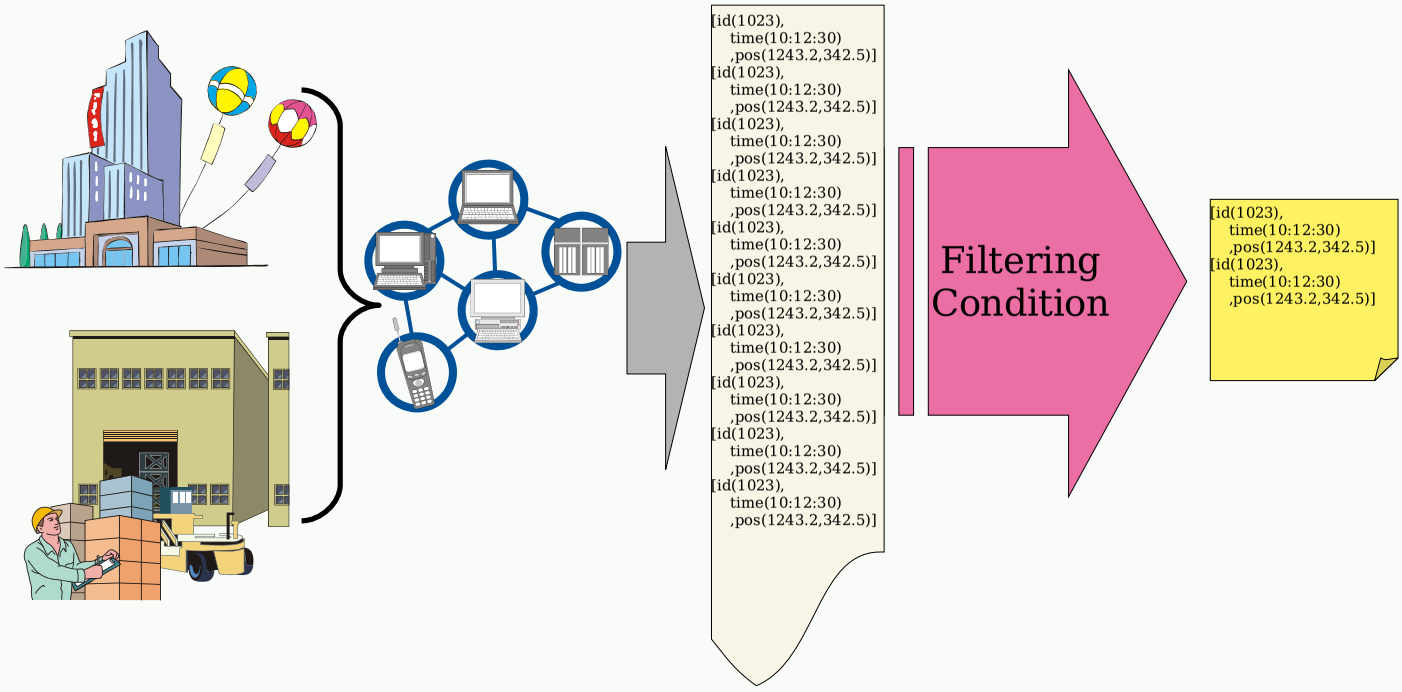
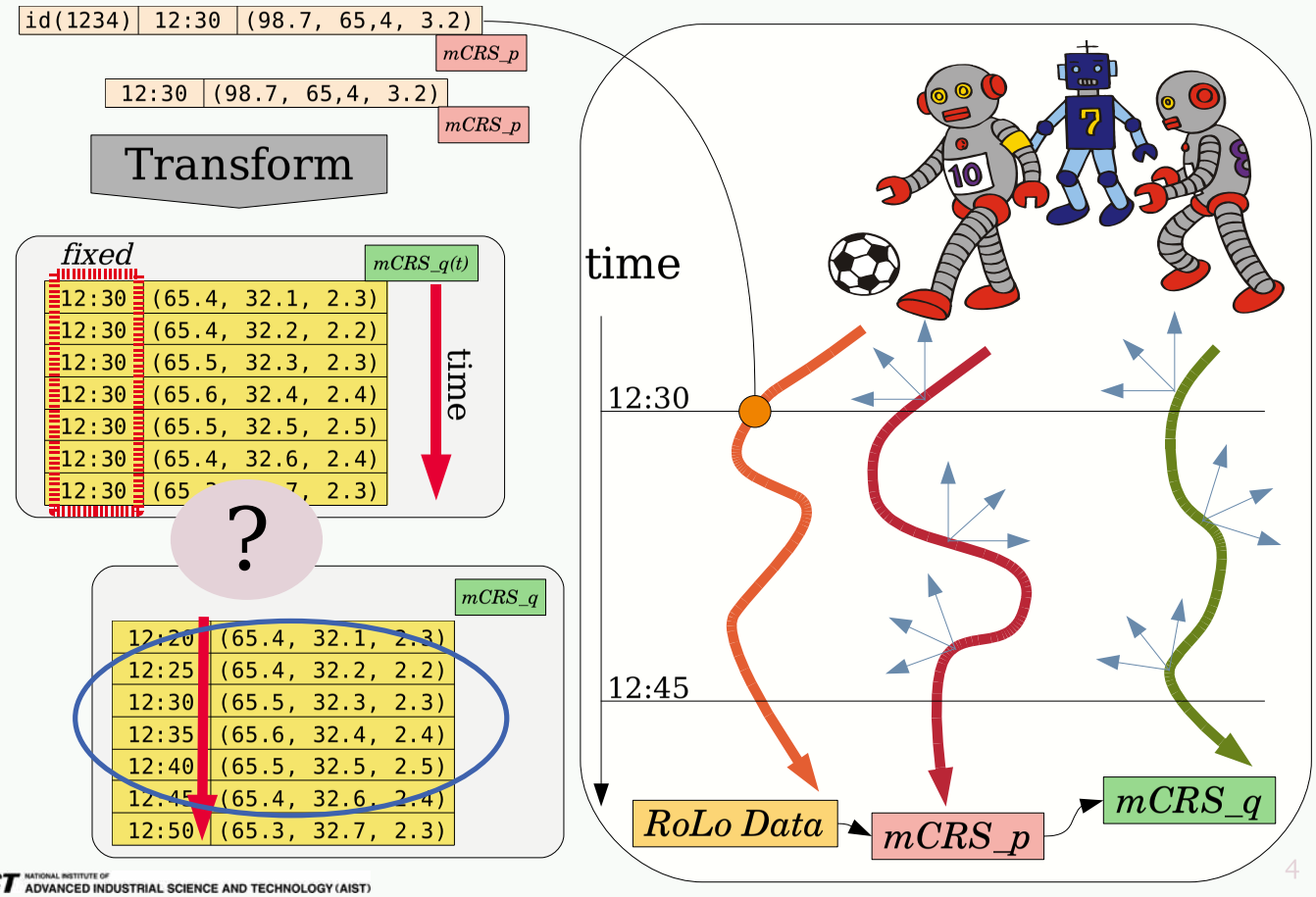
When we need FC

- When scale-up sensor networks,
  - sensors detect a large number of target objects.
  - A service-user module is interested only in objects in a certain area.
- When a location is transformed from/to a mobile CRS (when the transformation module returns multiple RoLo Data)
  - A service-user module is interested only in a certain time-frame.

Sensor Network Situation



Trans. from/to Mobile CRS



Flexibility of Filter Condition

- to provide logical primitives
  - AND, OR, NOT, TRUE/FALSE
  - necessary and sufficient for general purpose
- to provide generic predicates
  - comparison: <,>,=,between,like (matching)
  - geometry: include, overlap, and so on
- easy to introduce new predicates and expressions
  - similar to functional language like LISP
  - “function” node for generic functional expression

Current Filter Condition

- Logical Op.
  - AND, OR, NOT, TRUE, FALSE
- Geometry Comparison Op.
  - intersects, include, overlap, touch, bbox, ...
- Generic Comparison Op.
  - <, >, <=, >=, ==, !=, between, like (=~)
- Expression
  - reference to an element of each RoLo data.
  - +, - , * , /
  - function (“apply” and #' in LISP)

Features of Filter Condition

- easy to construct a complex condition
  - ➤like SQL's select condition
- systematic and simple syntax
  - ➤like LISP's S-expression

More Functionality than Filter?

- “Filter” means a generic functionality to select data from (a large number of) localization results.
  - ➤for this purpose, the current proposal provides enough platform.
    - Of course, we will add some predicates/expression in future.
- Do we need additional functionalities?
  - fusion of multiple RoLo Data?
    - should realize in aggregation module.
  - dynamic condition?
    - should be explained in a mobile CRS.

University of Auckland Research in Robotic Software Engineering Environments

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June 2008

http://robotics.ece.auckland.ac.nz

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau

Outline

Introduction to University of Auckland Robotics Group

Creating robotic software: some issues

Improving the programming process

Overview of our joint NZ-Korea robotics project for aged care

Multidisciplinary team

Bruce MacDonald,ECE	Robotics and Intelligent Systems
George Coghill,ECE	Artificial neural networks
Catherine Watson,ECE	Robotic Speech
Waleed Abdulla,ECE	Speech recognition
Michael Neve,ECE	Wireless propagation
Karl Stol,Mech	Robot Navigation
Burkhard Wuensche,CS	Graphics and Visualisation
Liz Broadbent,Psych Med	Psychology in healthcare
Jim Warren,NIHI	Health Informatics
Karen Day,NIHI	Health Informatics
Martin Orr,NIHI	Health Informatics
Martin Connolly,Ger Med	Gerontology
Ngaire Kerse,Gen Practice	Gerontology
Mark Fisher,Middlemore	Geriatric Psychology
Gary Putt,UniServices	Business development
Andrew Palairet,UniServices	Business development
Malcolm Pollock,NIHI	Business development
Jim McMillan,Research Office	Grant applications

Vacuuming robot

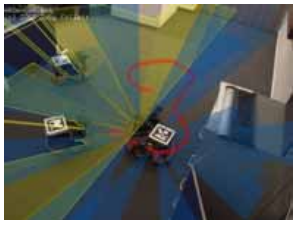
Capabilities

Robot face

- Mobile robot software engineering and control
- Robotic software engineering systems
  - development environments
  - distributed programming
  - programming languages
- Programming by demonstration
- Emotional dimension of robotics (for speech and face)
- Perception augmentation using AR
- Visualisation
- Speech
- Navigation and coverage algorithms
- How are people's thoughts and feelings about robots influenced by the robot's behaviour? (Psychological studies)
- Evaluating robots in healthcare scenarios
- Applications in healthcare and agriculture

Facilities

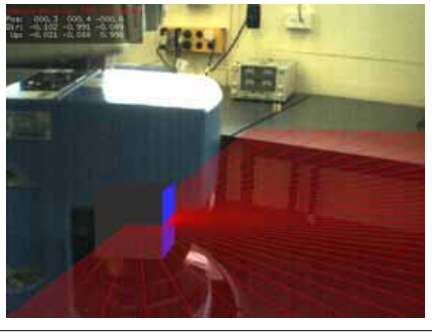
- 2 large mobile robots
- 7 indoor pioneer robots
- 1 outdoor pioneer robot
- Helicopter robot
- Fiducial tracking system
- Debugging space
- Mechatronics testbed (Valeriy)



Some Recent and Current Projects

- Emotional robot face synchronized to emotional speech
- Human facial expression recognition
- Psychological evaluation of human reactions to robots
- Augmented reality for robot developers
- Robot localisation and coverage
- Robot programming systems and Eclipse-based IDE
- Distributed robotic software frameworks & architectures
- Agricultural robot assistant
- Contributions to playerstage.sf.net
- Vacuuming robot
- Helicoptor control
- Robot air hockey player
- Wireless robot charging
- Speech recognition
- Security and system performance analysis
- Inhouse robots for research
- DARPA Grand Challenge
- Portable DNA analyser prototype

AR and visualisation



Issues about robotic software engineering

- Researchers are working on:
  - Tools, libraries, models, architectures, standardization
- Also important:
  - Tools targeted at ***needs and typical skills*** of robotic software engineers, nature of ***robotic*** software, and ***human-robot interaction***
  - Human software engineers are in an ***immersive robot environment***
  - The ***robot's interaction with the environment*** is a challenge
  - The ***programmer's lack of understanding of the robot's world view*** makes software creation and debugging difficult
  - The ***process*** of robotic software engineering needs improvement

Research context for robot programming issues

- In the future
  - Robots will be part of our everyday life
  - They will perform many, varied tasks
- Pre-programming at the factory is impossible
  - Programming will be left to end-users
- Traditional programming unacceptable for a broad consumer market
  - For end-users "Programming" must be an intuitive process

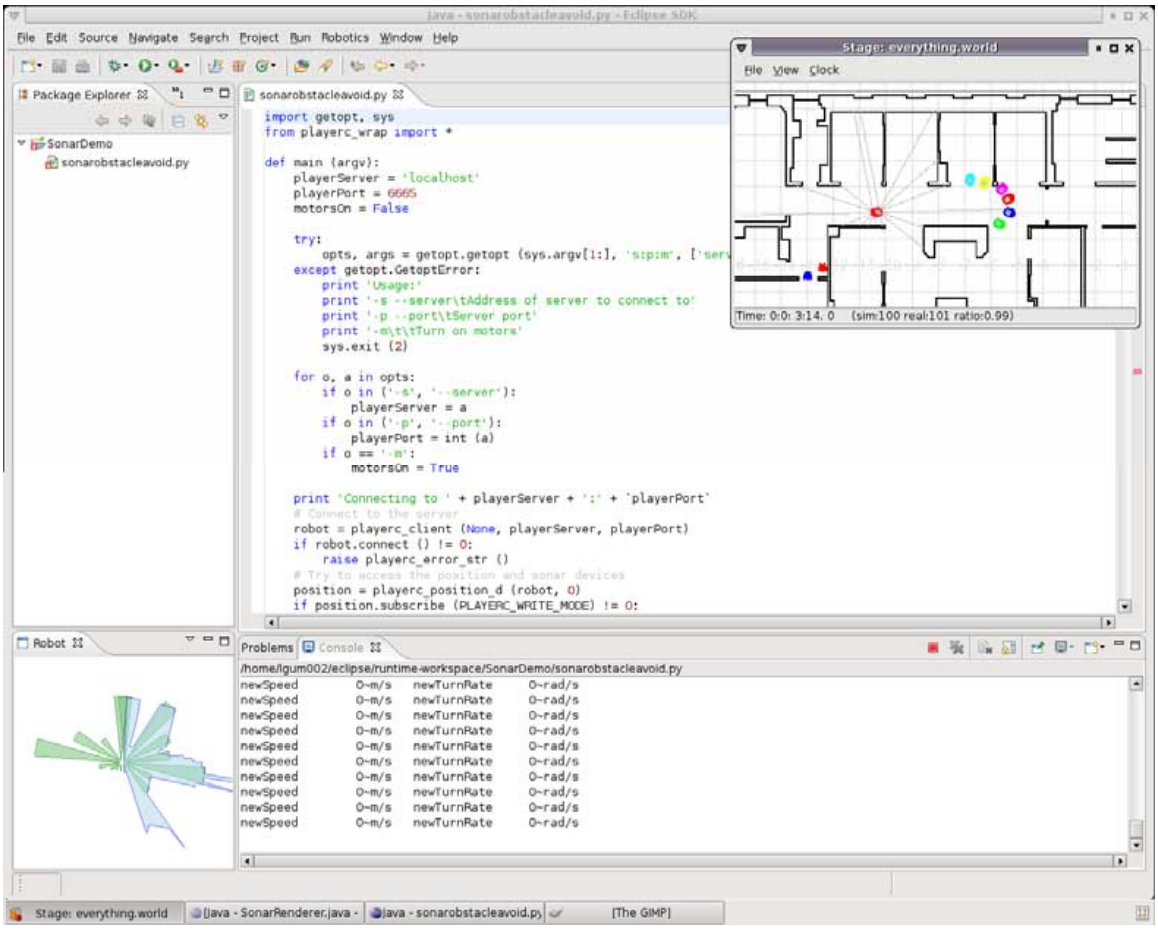
End user robotic software engineering

- Possible solution: Help non-expert & expert software engineers:
  - Language
  - Libraries/architectures/frameworks/middleware
    - Player/Stage, RT-middleware, ORCA, ...
  - Tools
  - Understanding

- Possible solution: Programming by Demonstration
  - The user demonstrates the task, the robot repeats it

The process is important

Tools: Eclipse based robotic software IDE (Luke Gumbley, Steve Hsiao)



Programming language: (Geoff Biggs)

```
1  from time import sleep
2
3  event NearWall (sonar):
4    for range in sonar.ranges:
5      if range < 0.25~m:
6        returnVal = range.index
7        trigger
8
9  event HitWall (bumpers):
10   for bumper in bumpers:
11     if bumper == 1:
12       trigger
13
```

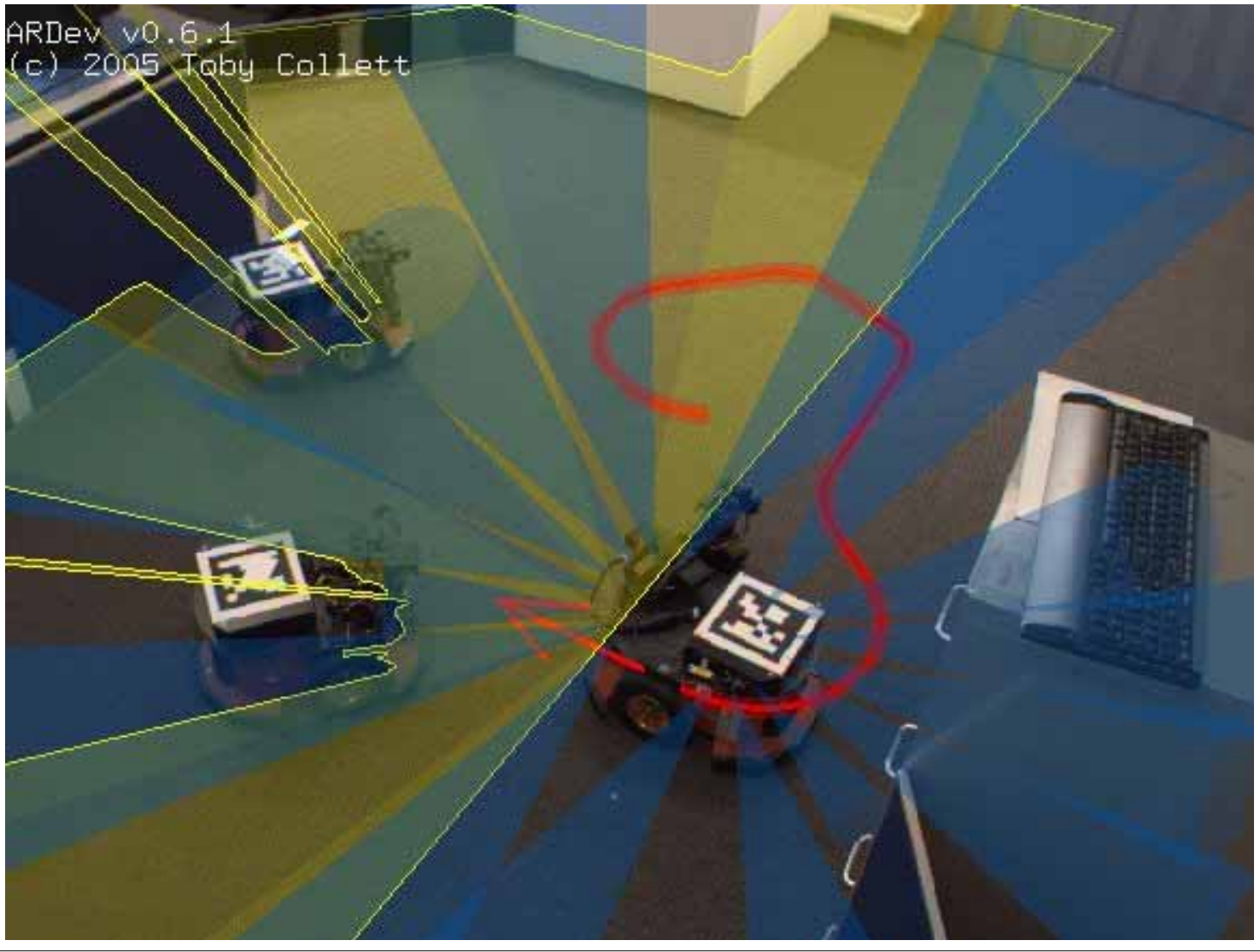
Reactive programming

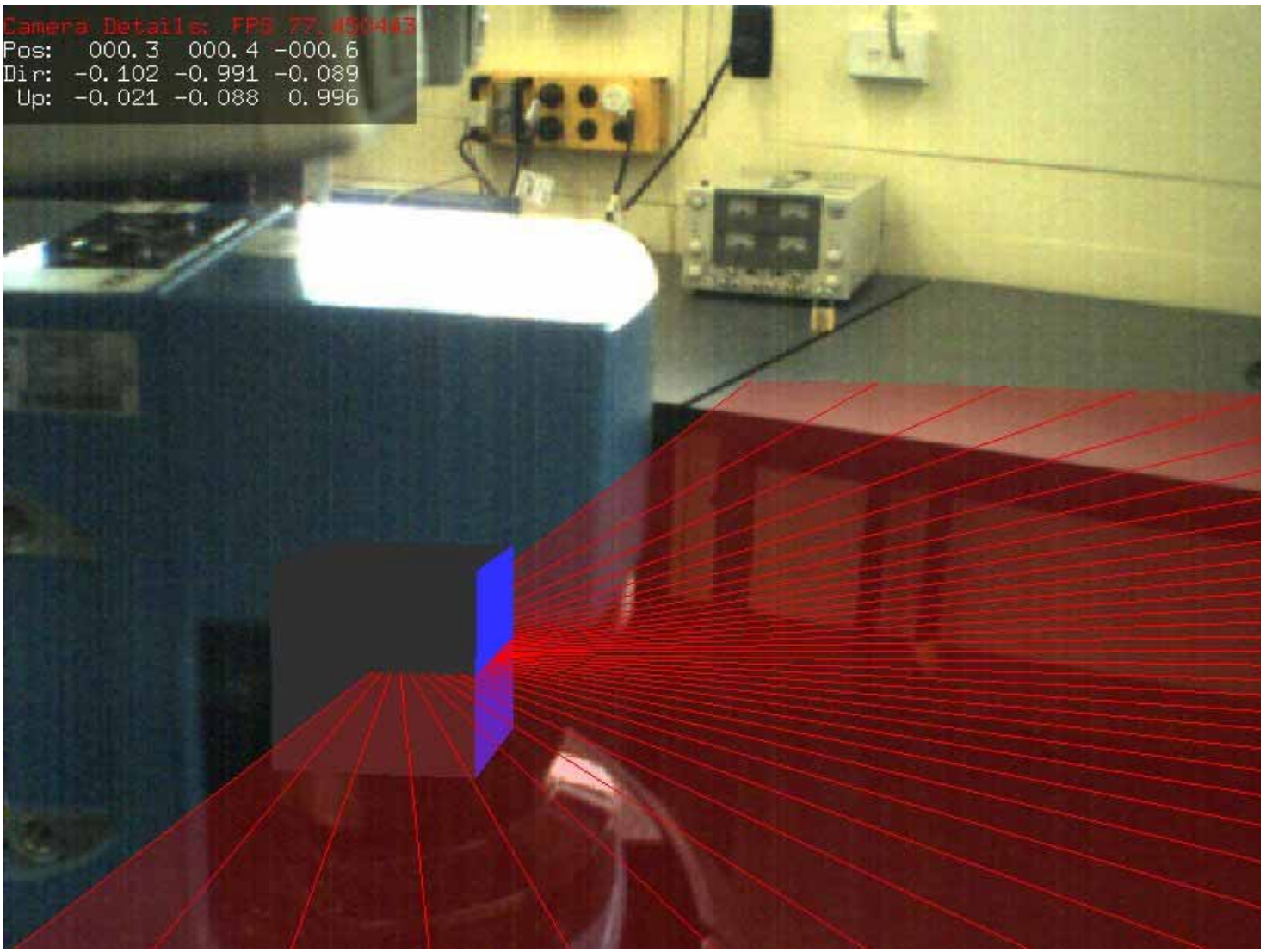
Dimensional analysis

```
14 response UpdatePlayer (setSpeedFunc, speed):
15   while True:
16     setSpeedFunc (speed.getval ()[0], ¥
17                   speed.getval ()[1])
18     sleep (0.05~s)
19
20 response Drive (speed):
21   speed.setval (0.5~m/s, 0~rad/s)
22   while True:
23     sleep (0.5~s)
24     interrupt      # Check for interrupt @ 2Hz
25
.............
```

Tools & understanding (debugging): Augmented Reality (Toby Collett)

- Augmented reality for interacting with robots
- Targeted at developers
- Head mounted display OR large plasma display
- Increase the perceptual overlap between the programmer/user and the robot

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Up: -0.021 -0.088 0.996


Pos: -000.3 -000.3 000.5
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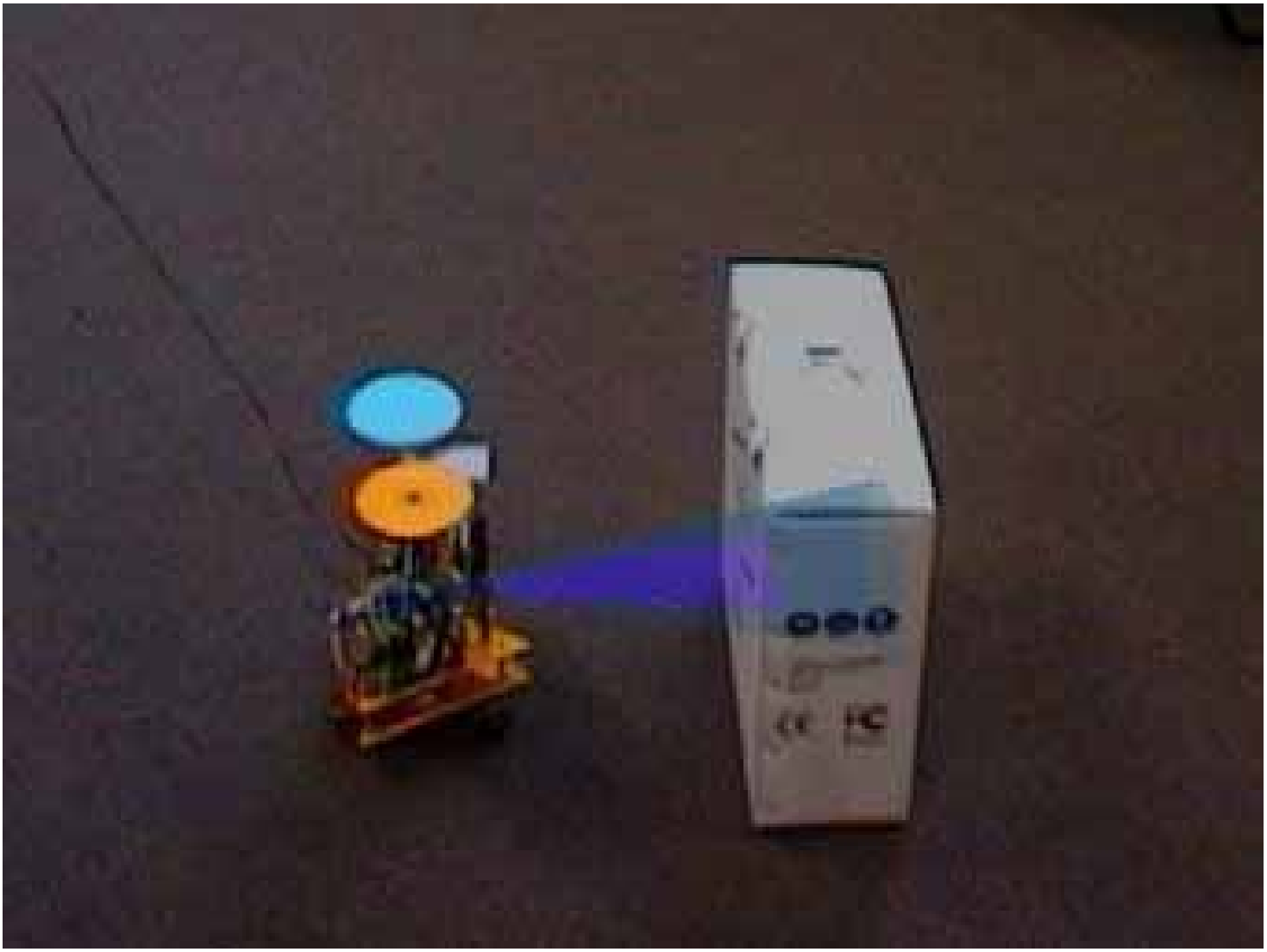
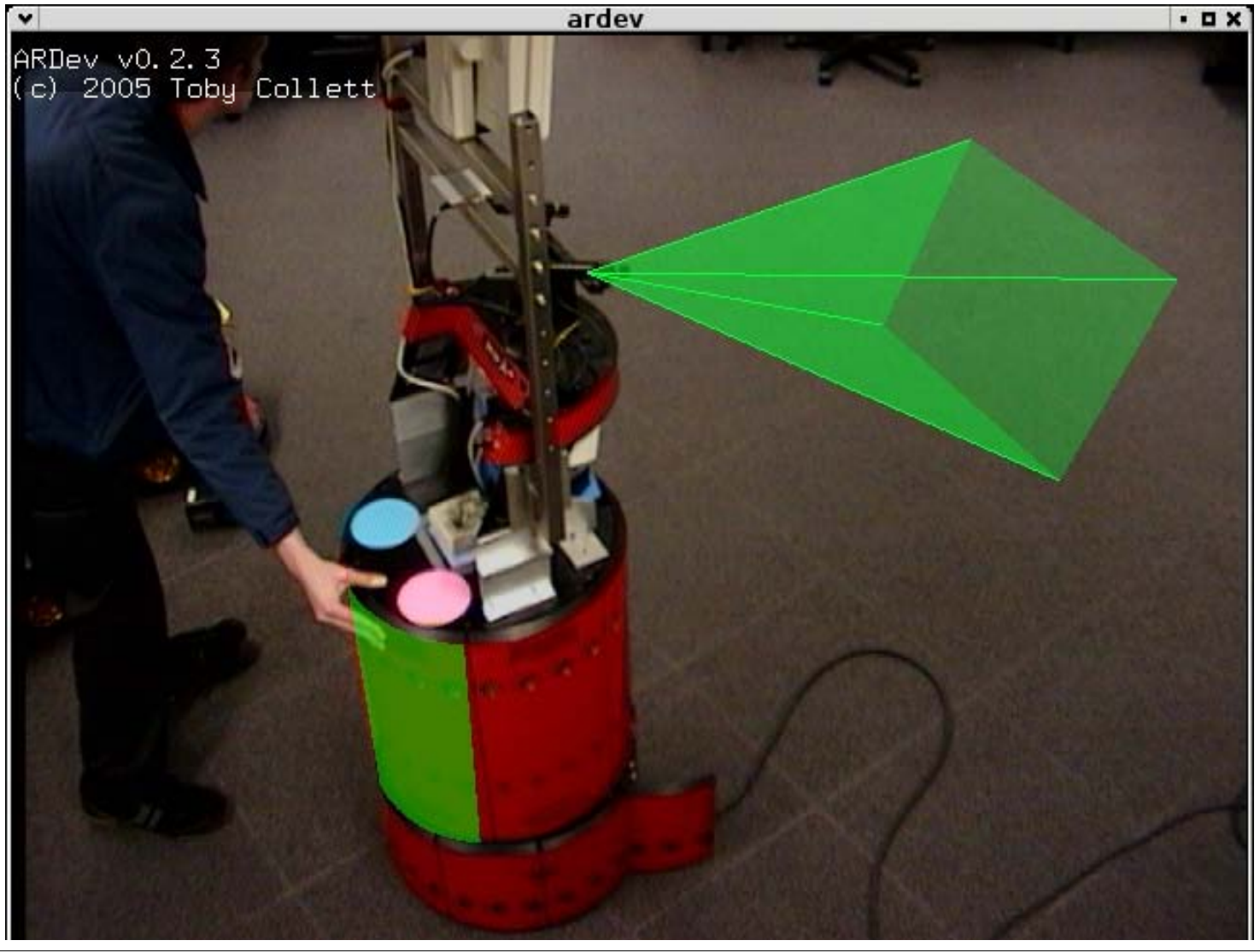
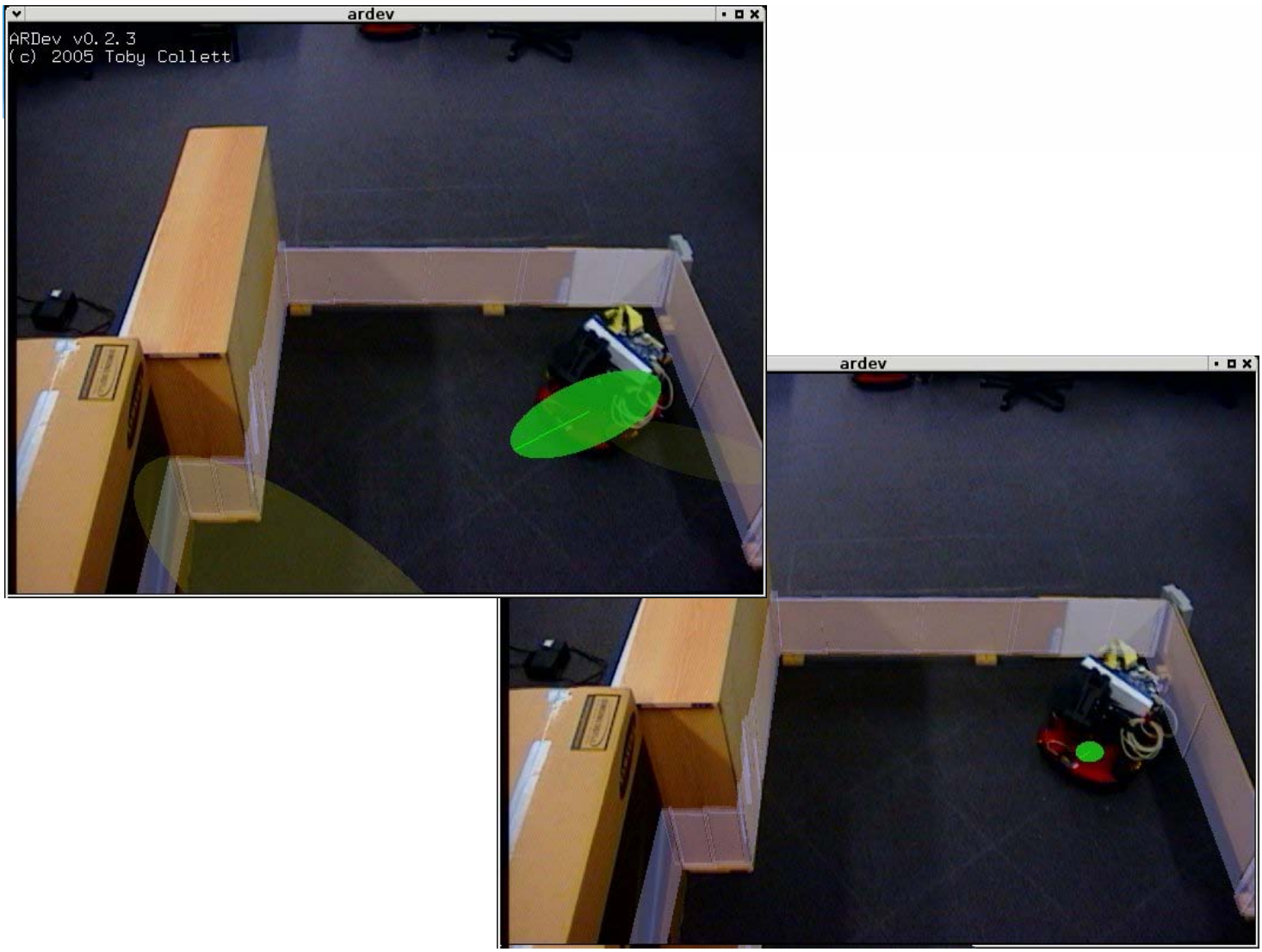


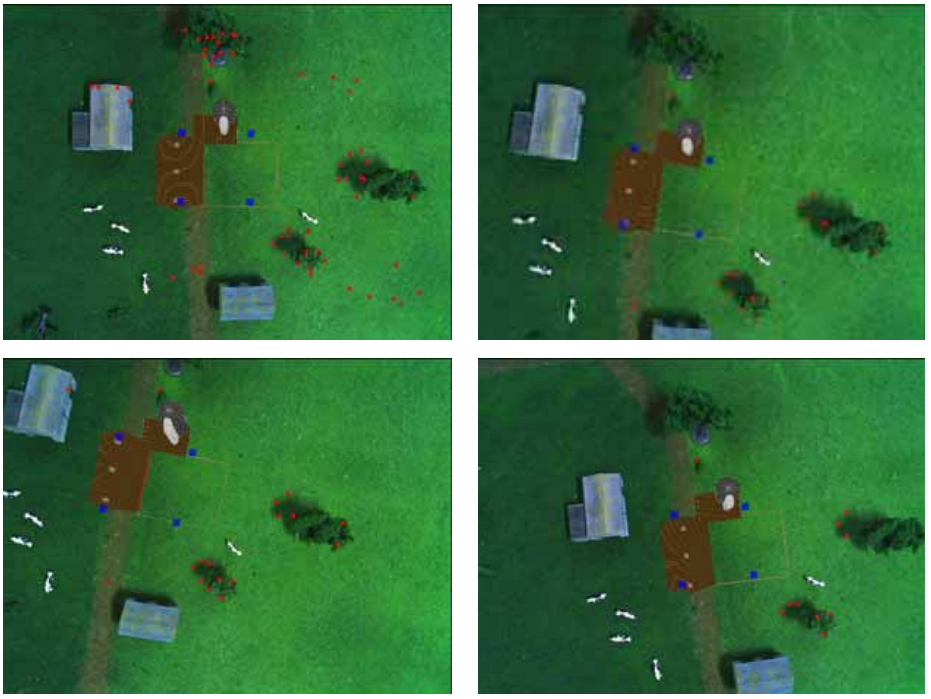

ardev
ARDev v0.2.3
(c) 2005 Toby Collett



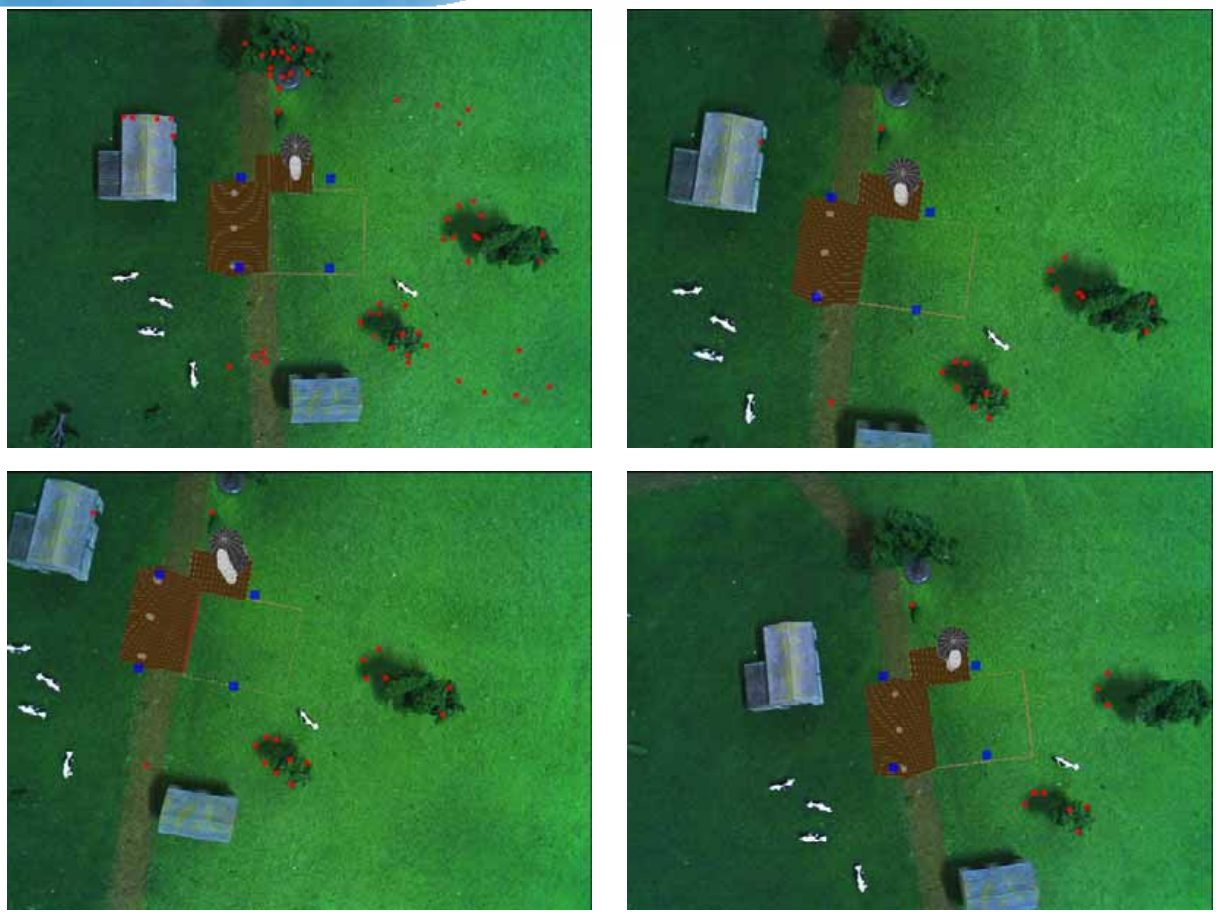
Tools & understanding: Mixed Reality Simulation for UAVs in Agriculture (Ian Chen)

Objectives

- Provide a 3D environment for real time visualisation and simulation.
- Effectively communicate useful feedback to robot application developers.



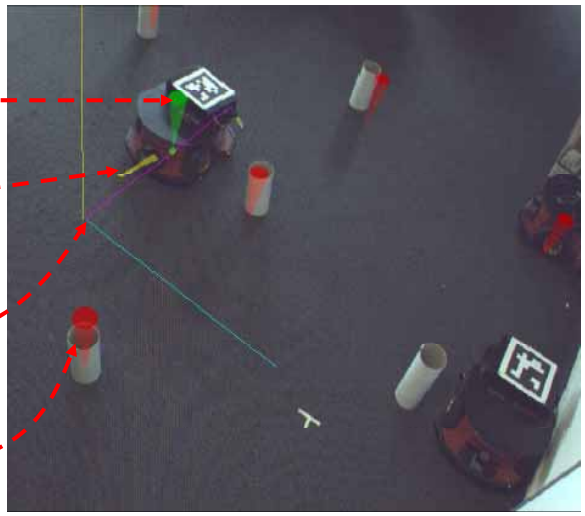
Prototype – Registration



Tools & understanding (debugging): Augmented Reality for Simultaneous Localisation and Mapping (Alex Kozlov)

SLAM implementation: Alan Yang

- Operation
  - Green marker – robot position
  - Yellow marker – robot orientation
  - The axes - origin of the map
  - Red marker – feature position



Augmented Reality for Simultaneous Localisation and Mapping (Alex Kozlov)

Preliminary Results - *Prototype*

- Expected behaviour
  - Green ellipse - robot position covariance
  - Yellow sector - robot orientation covariance
  - No features
    - High uncertainty

Programming by Demonstration

- The user's performance of the task, when recorded, is enough to automatically generate a program to perform the task
  - No need to learn a low-level programming language
- Two main phases: demonstration and playback
- Demonstration methods:
  - Robot observes human

    (human may wear data gloves or other sensors)
  - Human controls robot via joystick, pendant, user interface
- In robotics, mainly grasping and navigational tasks

PbD (Cont'd)

- Main challenge: robustness to changes in the environment (e.g. fetching objects)
- A key point is to identify the **user's intention** from the demonstration:
  - to distinguish relevant versus irrelevant input
  - to distinguish importance of actions
  - in order to generate a task description that is robust against changes to the task environment
- Possible solutions
  - Multiple demonstrations (but many would be needed)
  - Good user interaction

PbD (David Brageul & Slobodan Vukanovic)

- Focuses on capturing the user's intention for navigational tasks
- 3 phases:
  - Demonstration of the task
  - *Identification of intentions, assisted by augmented reality (AR), which is new*
  - Playback of the task

  Note: Representation is important
- Possibility to manually combine tasks together
- (related work: See ICRA'08 paper)

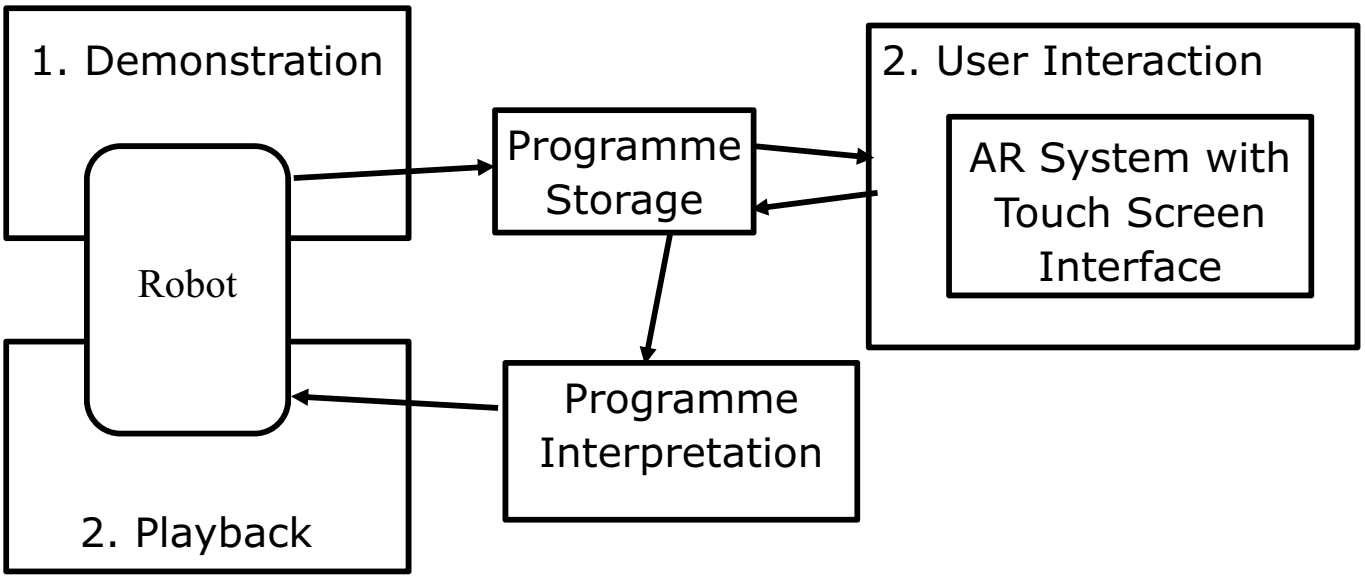
Overview of SPbD

- Developed in the Univ of Auckland robotics lab
- Navigational tasks
- Uses AR
- Complex tasks formed by combining simpler subtasks

Overview

Three stages:

- Demonstration
- User Interaction for identification of intentions
- Playback



The demonstration

- The user guides the robot

- Spbd records the robot's perception of the environment and transforms it into **predicates**

  Environment>sensors>filters>predicates

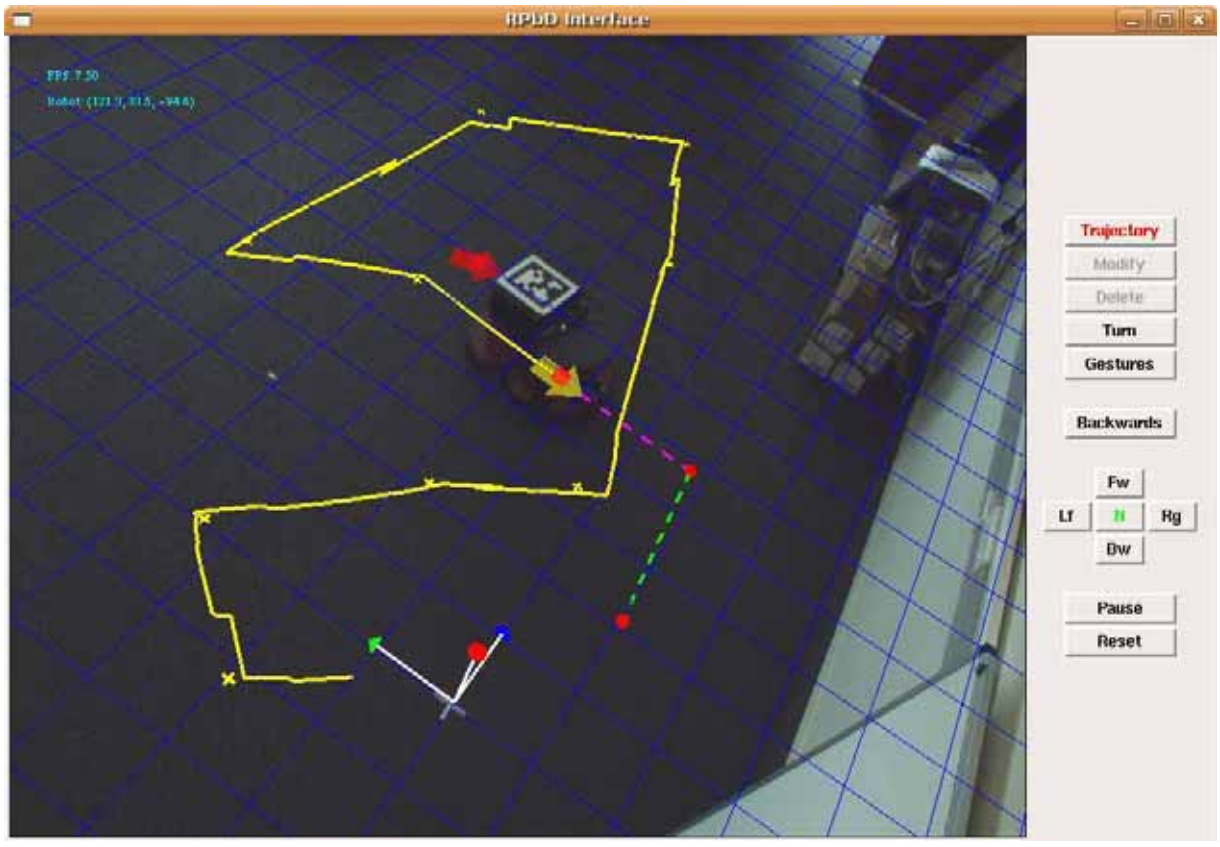
  Ex: **far(object, right)**

  moved_by(forward, 20cm)

  object_spotted(front, box)

- Only the predicates recorded during a change of motor states (**transitions**) are kept.

The control interface



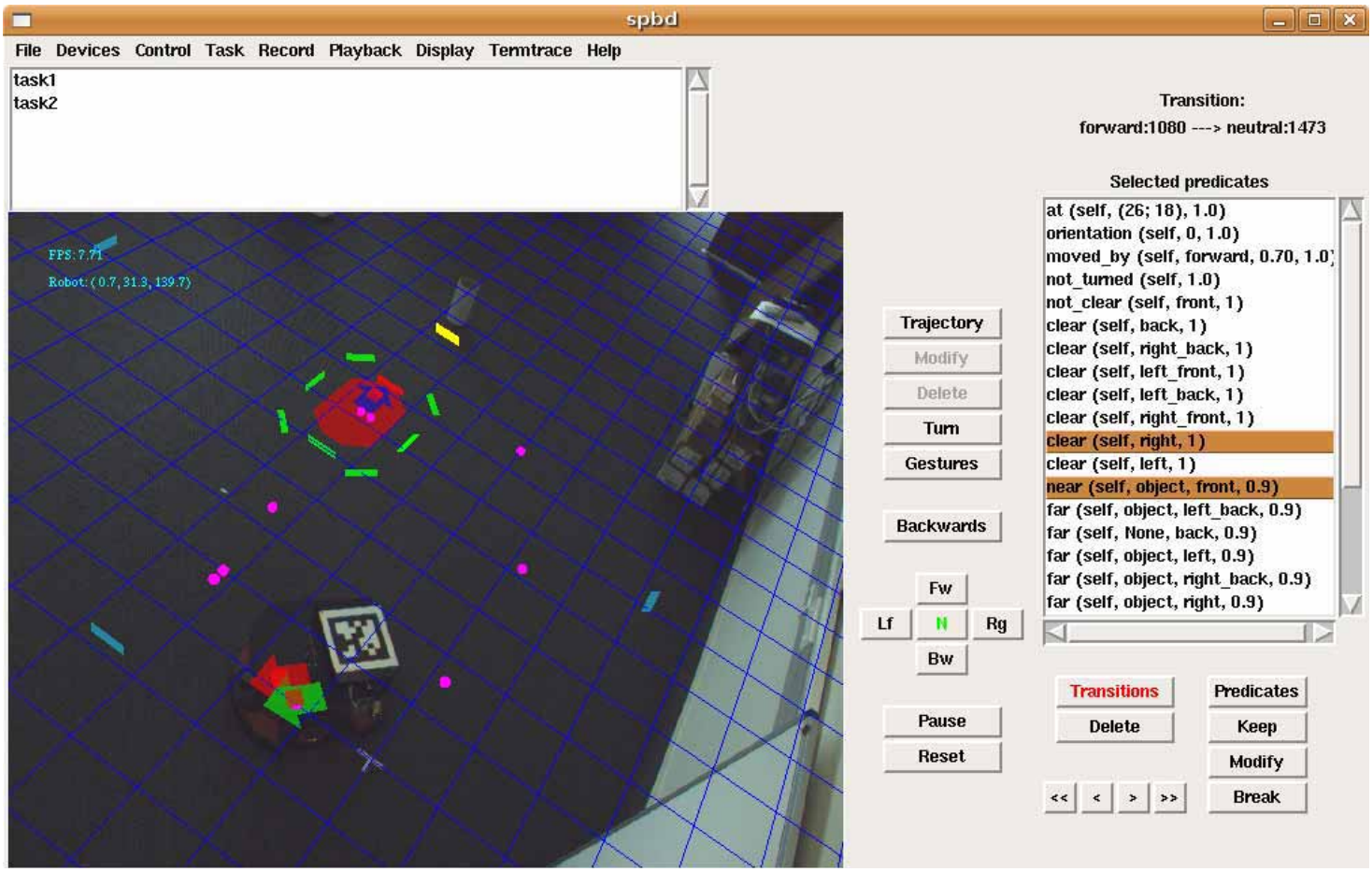
The user interaction

- 3D representation of the information recorded during the demonstration
- Each transition is visually represented where it happened
- For each transition, the user is shown a visual and textual representation of the predicates recorded for this transition
- Flexibility: possibility to delete non relevant transitions and manually modify predicates

The user interaction (Cont'd)

- For each transition the user must select what predicates are relevant to the task
- These are the predicates that correspond to the user's intention
- E.g.: "why did the robot stop moving here"?
  - Because it is at the correct location (x,y)?
  - Because it is close to the object of interest?
  - Because another event happened
- Helps the system build a task representation

The user interaction (Cont'd)



Complex Tasks

- Manual construction via the GUI
- Advantages of manual construction
  - Tighter communication between users and the robot
  - Manually segmented tasks potentially more intuitive
  - Reuse of existing tasks
- Disadvantages of manual construction
  - More work required by the user
  - More training needed
  - For larger tasks, degenerates to traditional kinds of programming, defeating the purpose of PbD
- Future: careful composition of subtasks

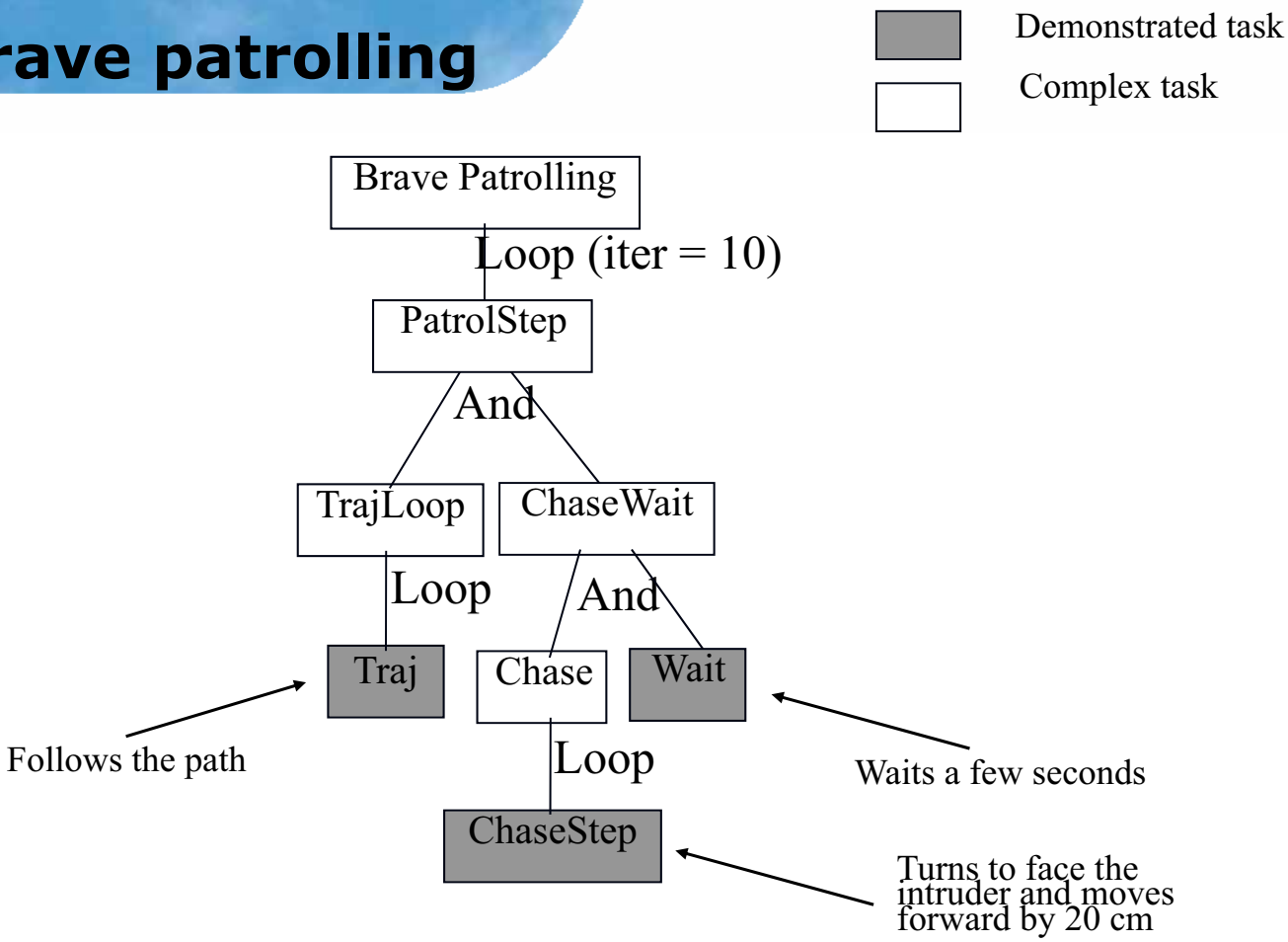
Experiment: Brave patrolling

- Repeatedly follows a path
- Stops when it sees an intruder
- Chases the intruder
- Go back to patrolling
- Stops once 10 intruders have been caught

- Intruder played by another Pioneer robot with ARToolkitPlus markers on its sides

  [Gerkey, Vaughan, and Howard, 2003]

Brave patrolling



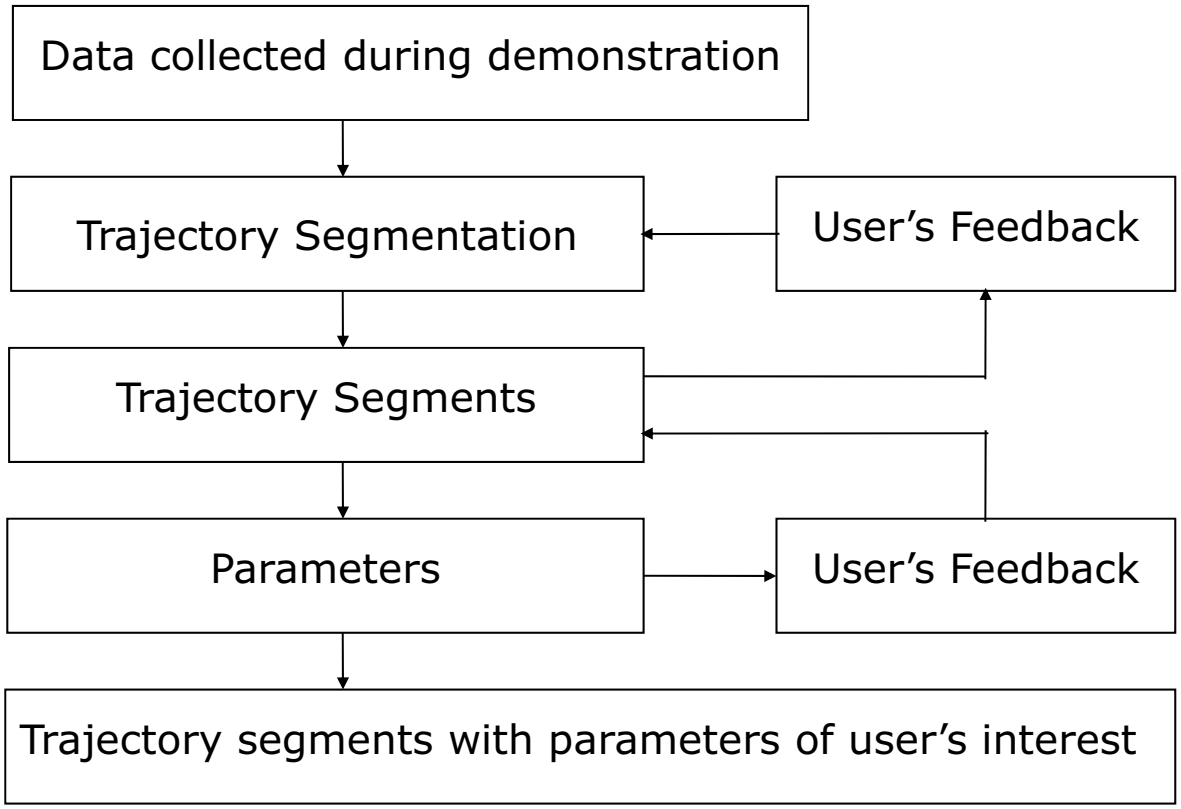
Strengths

- The control interface
  - —eases the demonstration
  - —Leads naturally to the interaction phase
- The interaction phase provides:
  - —A concrete and flexible task representation
  - —The possibility to build the programme step by step
- The playback process is flexible because it focuses on sensory data matches

Weaknesses

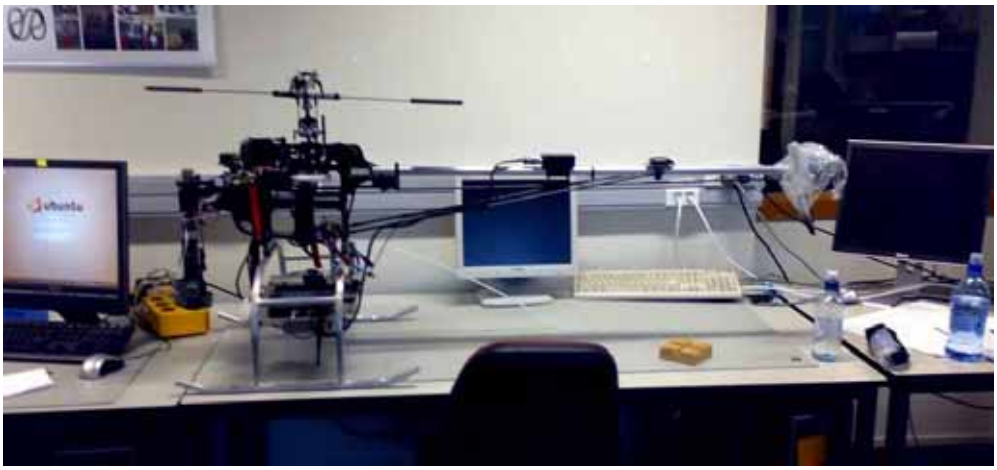
- Not enough control for the user
- The task visualisation is insufficient
- Not enough reusability
- No obstacle avoidance

Programming by demonstration (Tanveer Abbas)



Robotics in agriculture (Rick Chen)

- Helicopter project
- Tracking animals
- Monitoring fields and animals
- Interest from NZ IT companies in agriculture
- Mixed reality simulation and programming by demonstration



Rotomotion SR20 unmanned helicopter

UoA Healthcare Robotics Project (Tony Kuo)

- With Dr Liz Broadbent in Psychological Medicine
- Human reactions to good/bad robots: IROS 2007
- Student project in 2007, now a new PhD project
- Initially:
  - Taking blood pressure
  - Taking pulse
  - Taking temperature
  - Reminder service for medication
  - Networked communications to health services
- Shortly: taking blood samples, psychological evaluation

NZ-Korean joint robotics centre for elderly care

ETRI 한국전자통신연구원
Electronics and Telecommunications Research Institute

UniServices
Auckland UniServices Limited

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau

Outline

- Robotics in aged care
  - Increase in the aged population
  - Increasing capabilities and market for service robots
  - Benefits of robots in health care
- Joint NZ-Korea project

Aged population growth

- Dramatic growth in aged numbers in NZ
- One in 8 people are over 65, one in 5 by 2025
- One in 4 >85's are in residential care, one in 3 by 2021

- Already staffing and quality are challenges in aged care
- Each year 50% of residents have falls
- Care staff turnover is high
- Staff are too busy for close monitoring of older people

- Situation is worldwide, NZ, Korea, Japan, US, etc

- Increased funding cannot solve it: GDP per capita for aged care is increasing rapidly
- Robotics is one of the potential technology solutions

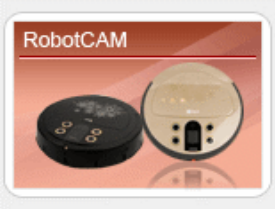
Market potential

- Personal robot growth from US$40B to US$50B by 2025
- Healthcare and medical robot market of US$2.7B by 2015
- Medical devices market US$80B in US, US$75B in Asia-Pacific, growing 12.5% pa
- Japanese service robot industry could grow from $5.2B in 2006 to $26B in 2010 and nearly $70B by 2025.

Personal robots

iRobot.com: Vacuuming, Cleaning, Connecting

South Korea Microrobot, Dasarobot, Yujin Robot, and others



Hanson Robotics, USA

The News is variable ...

- Japanese seniors prefer teddies to robots *(Stuff, Sep07)*
- Lonely robots ignored by elderly luddites *(Herald, Sep07)*
- Bill Gates predicts "the future is robots", and introduces MS Robotics Studio *(Scientific American, Jan07)*
- Robotic Dog Makes Nursing Home Residents Less Lonely *(Saint Louis University study, Jan08)*

Healthcare robots

- Surgery robots already established
- Remote doctor (InTouch, Santa Barbara)

- Nursebot Florence (CMU, U Pitt)
- IWARD (EU project): *It may not be long before swarms of tiny mobile robots will be giving a hand to the nurses and medical orderlies in hospitals.*

- Paro the therapeutic baby seal robot companion

Robot walkers

University of Virginia

Veterans Affairs

Stanford

Benefits of robots in aged care

- Vacuuming
- Delivery of food and laundry
- Vital signs monitoring: frequent, accurate, recorded
- Intelligent walkers extend the ability to walk independently
- Medication reminding, compliance checking, and perhaps dispensing, eg to improve outcomes for diabetics
- Physio, rehab, behaviour coach and reminder
- Companionship
- Video and audio service link to family and carers
- Remote telemedicine in rural areas, communities, prisons
- Support and relief for care staff (lifting, moving patients)

- *Extend aged peoples' time at home, and lower levels of care*

Who will benefit?

- Aged
- Families
  - With older family living in the home
  - Remote family contact
- Care staff
  - Laundry and kitchen staff
  - Nurses
  - Doctors
- Insurers and funders

Project outline

- 3/4 year project, up to US $5.5M, start July '08
- Between 2 major research organizations – ETRI and UoA
- Research components
  - Robot Programming tools for end users, Wifi propagation, speech, vital signs monitoring, automated clinical practice guidelines
- Commercialisation components
  - Health Informatics – collecting & disseminating data; integrating with Health IT systems
  - Healthcare services – medical, lifestyle, entertainment, psychological evaluation, evaluation of robots in healthcare
- Has a range of support: NZ Health IT companies, NZ and Korean Governments, Korean Robotics companies

Current status

- **Market and legal analyses** completed (good results)
- Main **funding** proposal approved by NZ government (IIOF, NZ$1.8M + ETRI funding). NERF submitted (NZ$4.5M)
- UoA **study of human reactions** to good and bad robot presented at IROS in Oct/Nov, San Diego
- UoA project to **take blood pressure with a robot**; initial study completed.
- UoA **focus group with nurses** completed
- Planned project studying **acceptability of robots** to aged
- **Korean companion robot technologies** already established over four years, trialed in homes
- NZ/Korean **negotiations** since early 2006
- **NZ health IT companies** engaged, one funding a project, currently scoping projects.
- Two **Korean robots** and software acquired
- **Korean Robotic Companies**: we are having discussions

Legal analysis

Marie Bismark, Buddle Findlay

- ***No significant impediments to our research plans***
- Patients must be fully informed and have choice
- Research staff, nurses, doctors must be trained and meet responsibilities to patients
- Commercial robots must be notified as medical devices. The new Trans-Tasman Joint Therapeutics Agency may be more stringent.
- Medicines: administering can use technology, prescribing can be done remotely (after face to face)
- Ethics approvals are required
- Needs of Maori must be considered
- Health information must be managed properly
- Trials for commercial companies must have professional indemnity insurance
- Plan to see MoH Compliance Team and Medicines Control Team

Voice of Market analysis

- **One day Expert Forum (Boston, October 2007)**
- Funded by UniServices with support from a TEC GIPI
- 8 Commercial and Academic Experts in Robotics, Aged & Health Care from the United States
- To provide market information and potential applications for our research, NZ companies, FRST funding proposals
- Results:
  - No direct competition
  - Appeal to 3rd party funders (insurers, govt agencies, families)
  - Potential use of robots for care in correctional facilities
  - Supported robots for: nurse's assistant, rehabilitation, entertainment & companionship, vital signs & behaviour monitoring, mobility, ageing in place

Nurse focus group results: summary of identified uses for robots:

- Home assistant, falls monitoring, companionship, communication, meals, hydration, medication, pain management, vital signs monitoring
- Remote access to help district nurse
- Hospital robot: wound care assistant, watch duty, track/escort patients, isolation assistant, identity management

Reasons why robots may fail in nursing

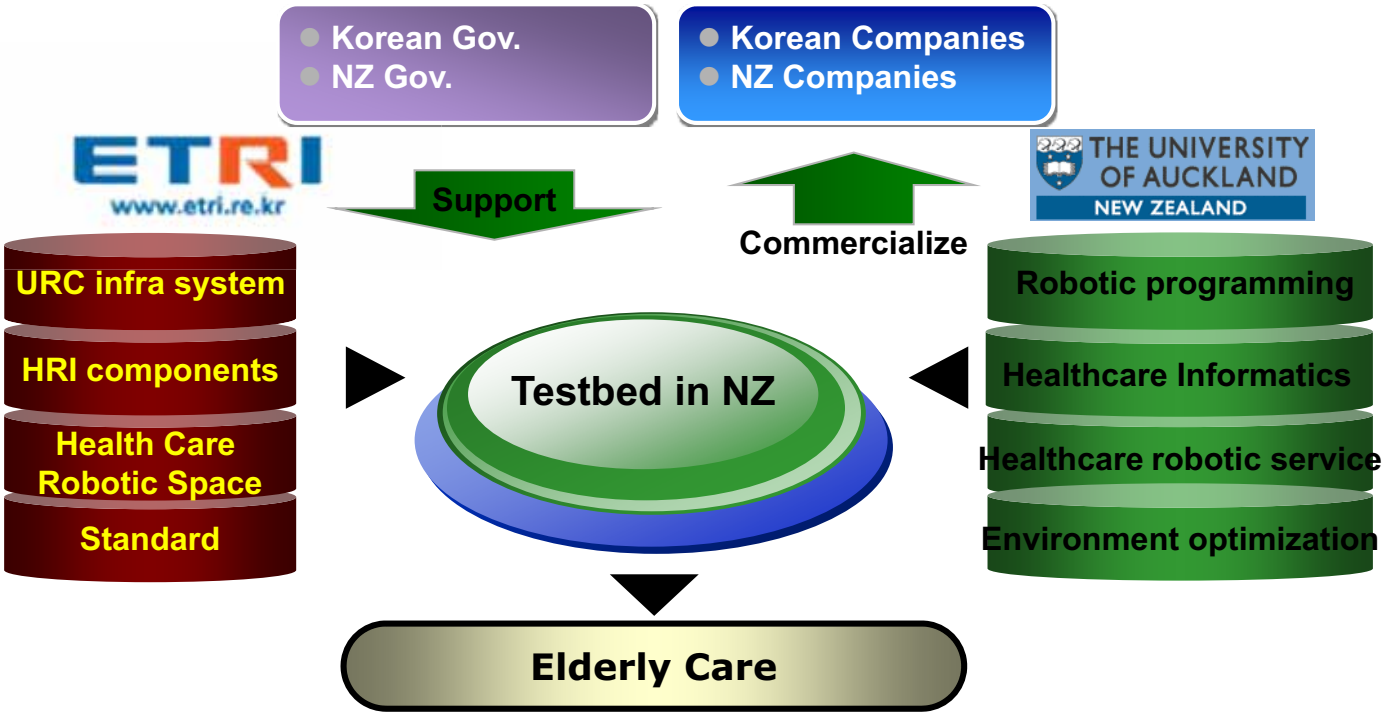
- Inadequate *funding*
- *Culture* and change management
- Disparate health *information systems*
- *Security* issues
  - Theft of robots
  - Patient information security (via robots)
- Protocols and guidelines must be *up to date* and relevant
- "*Big brother*" issues (watching nurses)
- Patients must *see the value* of a robot

Our plans mitigate all the issues, especially by acceptability studies

Developing a healthcare robot platform

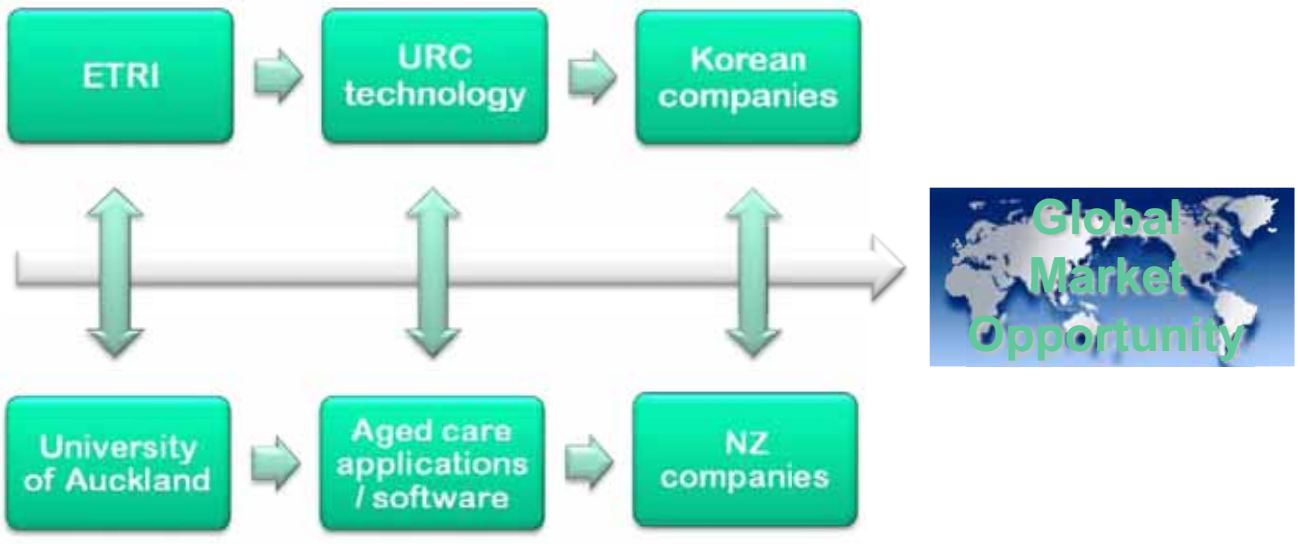
Psychological and healthcare studies:
acceptability, feasibility, benefits, risks

Project outline



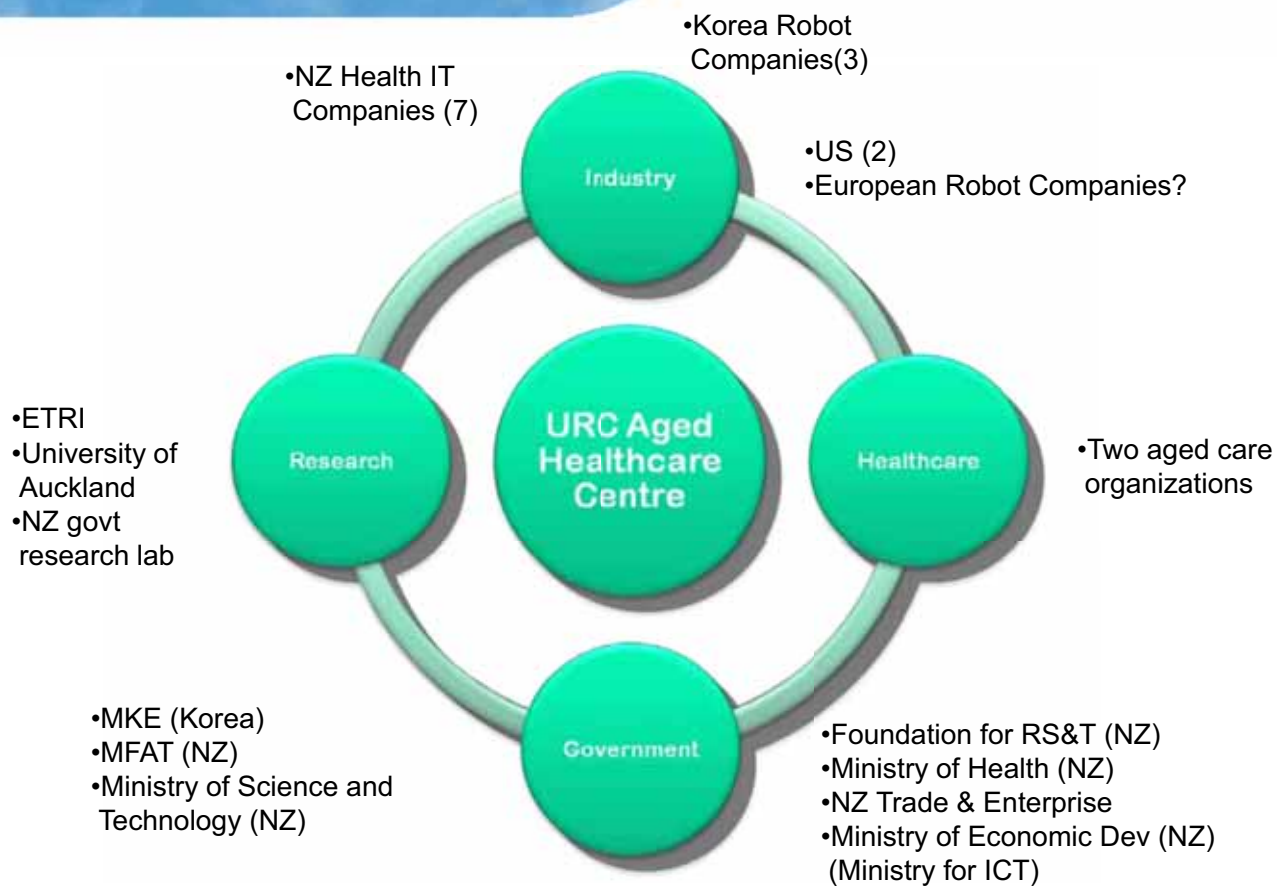
by ETRI

URC Aged Care Centre Vision



by Phil Shepherd, Medialab

URC Healthcare Research Centre



by Phil Shepherd, Medialab

Acknowledgements for Aged care project

- Anne French
- Phil Shepherd
- FRST
- Gary Putt, John Corey, Sarah Haydon, UniServices
- Jim McMillan, Research office
- Academic Colleagues at University of Auckland
- MFAT and NZTE in Seoul
- ETRI. Esp Dr Cho YoungJo, Dr Sohn Joochan, Dr Chi SuYoung, Dr Yoon HoSub, Mr Lee Ickchan

Summary

- University of Auckland Robotics Group
- Focus on programming for robot users
- Robotics in aged care collaboration with South Korea's ETRI

RoboCup

Itsuki Noda

Information Technology Research Institute
AIST
Japan

NATIONAL INSTITUTE OF
ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

What is RoboCup

http://www.robocup.org

Leagues in RoboCup

- Soccer
  - Simulation
  - Middle-/Small Size Robot
  - Legged / Humanoid Robot
- Rescue
  - Simulation
  - Robot
- Junior
  - Soccer
  - Rescue
  - Dance
- @Home, @Space, Nano







RoboCup 2007 Atlanta

- (Video)

How Progress in 10 Years

- a game of RoboCup 2007
- a game of RoboCup 1997
- a game of human vs robots in 2007...

History of RoboCup

- 1995: RoboCup Federation
- 1996: pre-RoboCup @ Osaka
- 1997: @ Nagoya
- 1998: @ Paris
- 1999: @ Stockholm
- 2000: @ Melbourn
- 2001: @ Seatlle
- 2002: @ Fukuoka
- 2003: @ Padova
- 2004: @Lisbon
- 2005: @Osaka
- 2006: @ Bremen
- 2007: @ Atlanta
- 2008: @ Suzhou, China
- (2009: @Graz, Austria)

321 teams from
39 countries/regions

440 teams from
35 countries/regions

RoboCup 2008 Suzhou

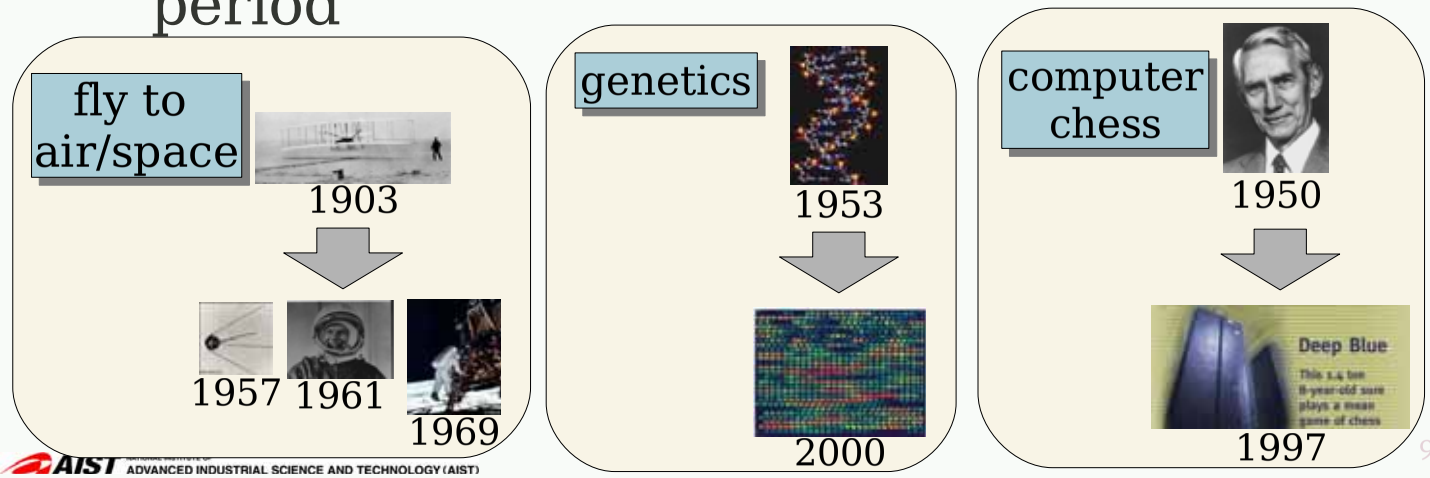
Why Soccer?

Chess vs Soccer

	Chess	Soccer
environment	static	dynamic
thinking time	turn-based	realtime
information	complete	incomplete
sensing	discrete/no noise	analog, noisy
control	centralized	distributes/cooperative

Why 2050?

- Landmark Project
  - a project for many researchers to work for a certain attractive goal that contains many issues.
  - The results influence wide research fields.
- For a landmark project, 50 years is a period



Issues of Soccer on Robotics

- traditional robotics
  - ➤in factories or laboratories
    - completely controlled environments
    - only for speed and accuracy
    - human take care for robots
- future robotics
  - ➤for care/welfare, entertainment
    - normal human environment
    - for robustness/adaptability
    - robots take care for human

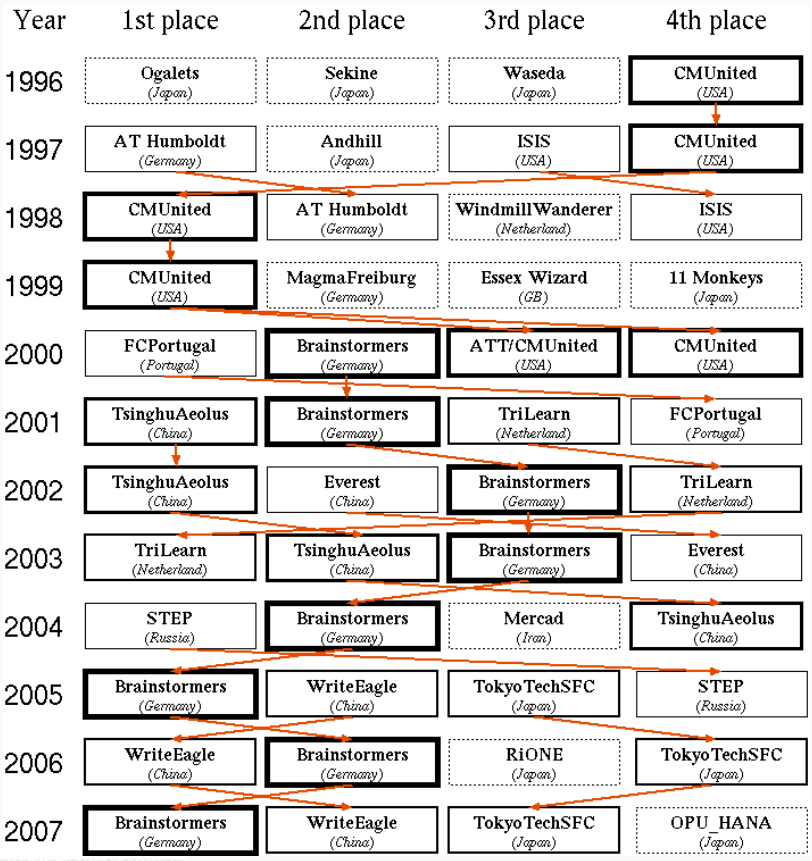
Issues of Soccer on AI

- Machine Learning
  - learning under dynamic and multi-agent environments
  - learning from very few examples
- Teamwork
  - notation and planning of cooperative actions
  - communication
- Agent Modeling
  - recognition of intentions
  - meta-level inference

Is soccer suitable for a landmark project?

- chess vs soccer
  - ➤new target, new issues
- long history of soccer
  - ➤Human players still can not find an optimal strategy.
    - rich-enough to research
- match game
  - ➤Opponents are also improved step by step.

Champions of Simulation League



Year	1st place	2nd place	3rd place	4th place
1996	Ogalets (Japan)	Sekine (Japan)	Waseda (Japan)	CMUnited (USA)
1997	AT Humboldt (Germany)	Andhill (Japan)	ISIS (USA)	CMUnited (USA)
1998	CMUnited (USA)	AT Humboldt (Germany)	WindmillWanderer (Netherland)	ISIS (USA)
1999	CMUnited (USA)	MagmaFreiburg (Germany)	Essex Wizard (GB)	11 Monkeys (Japan)
2000	FCPortugal (Portugal)	Brainstormers (Germany)	ATT/CMUnited (USA)	CMUnited (USA)
2001	TsinghuAeolus (China)	Brainstormers (Germany)	TriLearn (Netherland)	FCPortugal (Portugal)
2002	TsinghuAeolus (China)	Everest (China)	Brainstormers (Germany)	TriLearn (Netherland)
2003	TriLearn (Netherland)	TsinghuAeolus (China)	Brainstormers (Germany)	Everest (China)
2004	STEP (Russia)	Brainstormers (Germany)	Mercad (Iran)	TsinghuAeolus (China)
2005	Brainstormers (Germany)	WriteEagle (China)	TokyoTechSFC (Japan)	STEP (Russia)
2006	WriteEagle (China)	Brainstormers (Germany)	RiONE (Japan)	TokyoTechSFC (Japan)
2007	Brainstormers (Germany)	WriteEagle (China)	TokyoTechSFC (Japan)	OPU_HANA (Japan)

Recent Changes on RoboCup

- New Domains
  - Rescue, @Home, @Space, Nano
- AIBO to NAO
  - standard platform league
    - competition of software
- RoboCupJunior
  - for education

Lesson from RoboCup

- Importance of Open Demo
  - to build systems for real world problems
  - science vs engineering
- Importance of **match** rather than **challenge**
  - opponents are improved every year
  - new issues come up continuously.

Importance of Standardization on RoboCup

- Why standard platform (AIBO, NAO) league?
  - Progress of the simulation league is remarkable!!
    - because we can share all of sourcecodes.
    - Now, three or four groups that share base codes.
  - We like to push the same effects on real-robots.
- Rescue
  - NIST manages the rules, because they like to apply the technologies immediately to real incidents.
    - rule: teams should output locations of victims that are found by robots.
      - currently, by paper.
- @Home

robotics/2008-06-13

- OMG Robotics DTF-
- Robotic Functional Services Working Group -

Meeting Report

- Ottawa TC Meeting –
Functional Services WG Report

Ottawa – Jun 24, 2008

Dr. Su Young Chi

Co-chairs : Su Young Chi / Hyun Soo Kim/ Toshio Hori

User Recognition Service API RFP First Review Comments

- Typical use cases are needed, and the common scenarios should be defined (with diagram).
- Specific functions and the sequence of API usage should be described with the common scenario.
- Robot application specific APIs should described, when comparing with other existing standards.
- Clear comparison with the BioAPI document should be explained, specially robotic nature.
- The relationship with the localization standard (regarding the position information) should be clearly described.
- The figure need better explanation at the RFP document.
- The definition of UR-API is needed at the RFP document.
- The description of UIC-UAM and UIC-application APIs should be explained in more details.
- Important issues should be cleared described (such as the coordinate system in the localization RFP).
- Information exchange protocols are not mentioned in the scope of the mandatory requirements.
- Distinguish the standard part and non-standard part in the system diagram.

Issues to be discussed at the next meeting

- RFP revision based the first review (and comments at the review)
  - Self-explanatory document is necessary with clear diagram for understanding.
  - The second RFP formal review and AB (aiming to issue the RFP at the December meeting)
- Presentation for RFP should include the feedback on the comments.
  - Among the possible scenarios, the common scenarios should be selected.
  - Examples should be based on the selected common scenario.

Schedule before the next meeting

- Prepare the revised RFP draft and presentation by early September and circulate through email.
- In September, make changes and improve the draft, based on the review and comments (by email)
- If needed, meet at the first week of November for final amendments.
- Submit the revised draft to OMG server, before 7th November.

Roadmap

Item	Status	Washing ton D.C March-2008	Ottawa June-2008	Orlando Sep.-2008	Santa Clara Dec.-2008	Washing ton D.C March-2009	??? June-2009
Human Robot Interaction Service	On-going	Discussion	1st review of RFP	cancel	2nd review of RFP and AB	Discussion between potential submitters	Initial submission

Robotic Localization Service WG Report - Ottawa Meeting

24 June 2008

Co-chairs: Shuichi Nishio
Kyuseo Han
Yeon-Ho Kim

Schedule

- Monday (6.23)
  - Revised Submission Presentation & Discussion
  - Vote-to-vote
  - Recommendation Vote → Passed
  - AB review → Accepted
- Tuesday (6.24)
  - Discussion towards FTF
- No more sessions

Topics in This Meeting

- Revised Submission was accepted
  - Recommendation voting members(6): AIST, ETRI, JARA, Samsung, Shibaura IT, Technologic Arts
- Discussion towards FTF
  - Reviewing draft of the proposal charter for FTF
  - Filter Condition was discussed → Not finished, further discussion will be continued after reviewing more real-world examples by emailing.
  - Discussion on modification of the UML diagrams and selection of the mandatory or optional items in the specification will be continued by emailing.

Roadmap

- Jun. 2008 (Orlando): Canceled
- Dec. 2008 (Santa Clara): FTF Meeting

Proposed Charter for Robotic Localization Service 1.0 (RLS) FTF.

TC Meeting Date: 27 June 2008
Presenter: Tetsuo KOTOKU, AIST
Group email: rls-ftf@omg.org
WIP page (URL):
http://www.omg.org/techprocess/meetings/schedule/RLS_FTF.html

- **Adopted Specification:**
  - robotics/2008-05-01
  - robotics/2008-05-02 (updated version)
  - robotics/2008-05-03 (C++ header files)
  - robotics/2008-05-04 (XMI files)
  - robotics/2008-05-05 (with change bars version)
  - robotics/2008-05-06 (Errata)

- **Members:**
  - Itsuki Noda, AIST
  - Makoto Mizukawa, Shibaura Institute of Technology
  - Shuichi Nishio, JARA
  - Saku Egawa, Hitachi
  - Takashi Tsubouchi, Univ. of Tsukuba
  - Takeshi Sakamoto, Technologic Arts Inc.
  - Wonpil Yu **(Chair)**, ETRI
  - Yeon-Ho Kim, Samsung
  -
  -
  -
  -

- **Deadlines:**
  - Beta Specification Publication: 31st July 2008
  - Comments Due: 23rd February, 2009
  - Report Due Date: 25th May, 2009
  - Report Deadline: 2nd July, 2009

Contact Report

Prof. Makoto Mizukawa
mizukawa@sic.shibaura-it.ac.jp
Shibaura Institute of Technology
Tokyo, Japan

ORiN: Current Status

- Offer from ISO/TC 184/SC 5 (24th, June,2007)

  Architecture, communications and integration frameworks, has drawn our attention to possible overlaps with their work item ISO 20242, Industrial automation systems and integration - Service interface for testing applications, and potentially other SC 5 projects. Also the former robot companion standard ISO 9606 may be relevant to the RAPI proposal.

- ORiN forum is under negotiation with the SC5 to add ORiN specification to ISO20242.

Coming Conferences

- 2008 IEEE/RSJ International Conference on Intelligent Robots and Systems (**2008 IROS**) **http://www.iros2008.org/**
  - Acropolis Conf. Center, Nice, France
  - Sep 22-Sep 26 2008
- 2008 International Conference on Control, Automation and Systems (**ICCAS 2008**) **www.iccas.org**
  - COEX in Seoul, Korea
  - October 14 - 17, 2008

RWRC (Real World Robot Challenge) Tsukuba Challenge, Nov 20-22, 2008

- 1km Navigation in Natural environment on the pedestrian road in Tsukuba City
- No traffic control to pedestrians and bicycles
- New features in 2008
  - Passing
  - bi-directional traffic

2007 Tsukuba challenge

http://www.robomedia.org/challenge/index.html

3rd Japan-China-Korea Joint Workshop on Robotics

Sept. 29 - Oct. 1, 2008 Toyama, Japan

Technical Session Program (Preliminary):

Sept. 30, 2008 Unazuki International Hall "Selene"

"Asian idea and Robotics"

09:00-09:45 Opening Session

- Welcome
- Openning Talk:

09:45-11:00 Natinal Projects (3 presentation)

- **"Common Platform Technology for Next Generation Robots",**
  Dr. Nobuto Matuhira (CSTP Coordination Program of Science and Technology Projects, Japan)
  Various research and development projects for robots have been carried out by a large number of research groups. To improve the efficiency of the development is to provide the basic infrastructure technology for robots. The application-independent common technology for any kind of robots, which can be used by most robot developers is defined as "common platform technology ". We introduce information-structured environments as an environmental platform and a robot world simulator as a software platform within the framework of the common robot platform technology for any robotics applications. They have been promoted by the Coordination Program of Science and Technology Projects in Japan.

- **"Chinese National Strategies and Programs for Robotics R&D"**
  Mr. Xuejun CAO (Ministry of Science and Technology, China)

- **"Korean Goverment policy and National R&D programs of Robotics"** (tentative)
  Mr. Young Jun Won (Ministry of Knowledge and Economics, Korea) and **Dr. Hongseok Kim** (KITECH, Korea) (tentative)

11:00-11:15 Break

11:15-12:30 Sponsor's presentation

- **"Next-Generation Robotics: Ushering in the Future"**
  Mr. Soya Takagi (TOYOTA MOTOR Corp., Japan)
- TBD
- TBD

12:30-14:30 Poster Session & Lunch

- **Research activities of Japanese/Chinese/Korean researchers in Japan (and those who were in Japan) for future collaboration** (**Call for Presentation**)
  Organaizer: **Prof. Ken'ichi Koyanagi** (Toyama Pref. Univ., Japan), **Prof. Shugen Ma** (Ritumei Univ., Japan) and **Prof. Nak-Young Chong** (JAIST, Japan)
- **Research activities of Students** (**Call for Presentation**)
  Organaizer: **Prof. Ken'ichi Koyanagi** (Toayma Pref. Univ., Japan), **Prof. Keisuke Sato** (Toyama National College of Technology, Japan) , and **Prof. Noboru Momose** (Toyama National College of Maritime Technnology, Japan)

14:30-16:30 Panel Discussion "Asian idea and Robotics"

Chair: Tomomasa Sato (Univ. of Tokyo, Japan)

- **Prof. Atsushi Takanishi (Waseda Univ., Japan)**
- **Prof. Tianmiao WANG (Beihang Univ., China)**
- **Dr. Sang-Rok Oh (KIST, Korea) (tentative)**

16:30-16:45 Break

16:45-18:00 Year's Topics (3 presentation)

- **"Foods and pharmaceuticals high-speed handling robot"**
  Dr. Shinsuke Sakakibara (FANUC Ltd., Japan)
  Robotization has not been common in the field of foods and pharmaceuticals handling because there have been two major problems. One is the handling speed was not enough and the other is the cleanness was not secured enough. This time high speed and continuous operation were achieved by "dual drive torque tandem control" that used two servo motors for three basic axes of the robot respectively, cleanness was secured in addition by adopting resin gears and a double seal structure. Thus these problems were solved.

- **"Cooking Robot"**
  Mr. Xiaoyoung LIU (Shenzhen Pansum Science and Technology Co., Ltd, China)

- **"Korean industry trends in robotics R&DB(Research & Development, Business)" (tentative)**
  Dr. Young-Jo Cho (ETRI, Korea) (tentative)

18:00-18:30 Closing

- Summary of workshop & Proposals of the nest step activities
- Award ceremony
- Invitation to the upcoming 4th China-Korea-Japan Joint Workshop in China

18:45-20:30 Felloship Banquet

International Conference on SIMULATION, MODELING and PROGRAMMING for AUTONOMOUS ROBOTS (SIMPAR 2008)

Venice(Italy)
November, 3-7
2008

Main Menu

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Welcome to SIMPAR 2008!

Submission deadline extended to June 12

Steady improvements in robot hardware have not been matched by corresponding advancements in robot software. Besides fundamental open problems still waiting for sound answers, the development of new robotics applications still suffers the lack of widely used tools, libraries, and algorithms ready to be incorporated into new projects.

Writing robot software continues to be a time-consuming and error-prone process, and software results already achieved within the community are not extensively capitalized or shared. Simulation environments are playing a role in reducing development time and cost of large scale systems, but their use is still regarded by many as suspicious.

Seamless migration of code from general purpose simulators to real world systems is still a rare circumstance, due to the complexity of robot, world, sensors, and actuators modeling. Novel robotics applications driven by society and industry call for the development of systems of ever increasing complexity: systems with sliding autonomy; humanoid robots; distributed robots; mobile sensor networks.
These challenges drive the quest for next generation development tools in robotics.

The International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIMPAR) has the objective to bring together researchers from academia and industry to identify and solve the key issues necessary to ease the development of robot software and boost a smooth shifting of results from simulated to real applications.

Topics of interests include, but are not limited to:

- 3D robot simulation
- reliability, scalability and validation of robot simulation
- simulated sensors and actuators
- offline simulation of robot design
- online simulation with realtime constraints
- simulation with software/hardware-in-the -loop
- middleware for robotics
- modeling framework for robots and environments
- testing and validation of robot control software
- standardization for robotic services
- communication infrastructures in distributed robotics
- interaction between sensor networks and robots

THALES

UML profile for Robotics / Unmanned Architecture Framework

L. Rioux

Research & Technology

SAE architecture Framework

SAE Technical Committee AS-4

« Unmanned Systems »

3 sub-committees

- AS-4A Architecture Framework
- AS-4B Network Environment
- AS-4C Information Modeling and Definition

Standards :

- AIR5665 Architecture Framework for Unmanned Systems
- AIR5645 JAUS Transport Considerations
- AS5669 JAUS Transport Specification
- AS5684 JAUS Service Interface Definition Language
- AS5710 JAUS Service Set

THALES

Use UML as a standard for architecture framework

- Like DODAF and MODAF

Use a well-known language for robotics

- Reuse OMG standards

Garantee interoperability between tools

- Share models and understanding

Call for RFP: « UML Profile for Unmanned systems/ robotics Architecture Framework »

People interested ? Roadmap ?

THALES

Robotics-DTF Plenary Meeting
Closing Session

June 24th, 2008

Ottawa, Ontario, Canada

Ottawa Marriott Hotel

Document Number

robotics/2008-06-01 Final Agenda (Tetsuo Kotoku)
robotics/2008-06-02 Washington DC Meeting Minutes [approved] (Toshio Hori and Hyun-Soo Kim)
robotics/2008-06-03 Steering Committee Presentation (Tetsuo Kotoku)
robotics/2008-06-04 Roadmap for Robotics Activities (Tetsuo Kotoku)
robotics/2008-06-05 Opening Presentation (Tetsuo Kotoku)
robotics/2008-06-06 RLS revised submission presentation (Shuichi Nishio)
robotics/2008-06-07 User Recognition Service Interface RFP - DRAFT (Su-Young Chi)
robotics/2008-06-08 User Recognition Service Interface RFP presentation (Su-Young Chi)
robotics/2008-06-09 User Recognition Service Interface API examples (Su-Young Chi)
robotics/2008-06-10 Filter Condition (Itsuki Noda)
robotics/2008-06-11 University of Auckland Research in Robotic Software Engineering Environment (Bruce MacDonald)
robotics/2008-06-12 RoboCup (Itsuki Noda)

Document Number (cont.)

robotics/2008-06-13 Robotic Functional Services WG Meeting Report (Hyunsoo Kim)

robotics/2008-06-14 Robotic Localization Service WG Meeting Report (Yeon-Ho Kim)

robotics/2008-06-15 Robotic Localization Service (RLS) FTF Charter - DRAFT (Shuichi Nishio)

robotics/2008-06-16 Contact Report (Makoto Mizukawa)

robotics/2008-06-17 Announcement of JCK2008 in Toyama, Japan (Tetsuo Kotoku)

robotics/2008-06-18 Announcement of SIMPAR2008 in Venice, Italy (Itsuki Noda)

robotics/2008-06-19 UML profile for Robotics / Unmanned Architecture Framework (Laurent Rioux)

robotics/2008-06-20 Closing Presentation (Tetsuo Kotoku)

robotics/2008-06-21 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)

robotics/2008-06-22 DTC Report Presentation (Tetsuo Kotoku)

robotics/2008-06-23 Ottawa Meeting Minutes - DRAFT (Su-Young Chi and Geoffrey Biggs))

Organization

Robotics-DTF
- Yun-Koo Chung (ETRI, Korea)
- Tetsuo Kotoku (AIST, Japan)
- Call for volunteer

Steering Committee — All volunteers

Publicity Sub-Committee
- Abheek Bose (ADA Software, India)
- Masayoshi Yokomachi (NEDO, Japan)
- Yun-Koo Chung (ETRI, Korea)

Contacts Sub-Committee
- Makoto Mizukawa (Shibaura-IT, Japan)
- Yun-Koo Chung (ETRI, Korea)

Technical WGs

Infrastructure WG
- Noriaki Ando (AIST, Japan)
- Call for volunteers

Robotic Functional Services WG
- Soo-Young Chi (ETRI, Korea)
- Hyunsoo Kim (Samsung, Korea)
- Shuichi Nishio (JARA/ATR, Japan)
- Toshio Hori (AIST, Japan)

Robotic Data and Profiles WG
- Bruce Boyes (Systronix, USA)
- Call for volunteers

Robotic Localization Services WG
- Kyuseo Han (ETRI, Korea)
- Yeon-Ho Kim (Samsung, Korea)
- Shuichi Nishio (JARA/ATR, Japan)

Call for volunteer

- Robotics-DTF Co-chair
  - Election will be held upcoming Santa Clara Technical Meeting

- Robotic Infrastructure WG Co-Chair
- Robotic Data and Profiles WG Co-Chair

Next Meeting Agenda

Dec. 8-12(Santa Clara, CA, USA)

IROS2008 will be held in September,
Orlando TM is canceled

Monday:

Steering Committee (morning)
User Recognition Service RFP 2nd Review and Voting(am)
WG activity (pm)

Tuesday:

WG activity (am)
Robotics-DTF Plenary Meeting (pm)
- **Guest and Member Presentation**
- **Contact reports**

Wednesday:

WG activity follow-up [if necessary]

Thursday:

User Recognition Service RFP 2nd Review and Voting(am)

Special Talk Candidates

- Architecture Framework for Unmaned System from SAE
  Dr. Laurent Rioux (Thales)
- Challenges for a UML Profile for Architecuture Framework for Robotics/Unmaned Systems
  Dr. Laurent Rioux (Thales)
- Tsukuba Challenge 2008 Report
  Prof. Takashi Tsubouchi (Tsukuba Univ.)
- Robotics Project in Japan
  Prof. Sato (University of Tokyo, Japan)
- RUPI Project
  Dr. Hyun Kim (ETRI)

Attendee (23 participants)

- Bruce MacDonald (Univ. of Auckland)
- Geoffrey Biggs (AIST)
- Hiroyuki Nakamoto (SEC)
- Hyunjin Min (Samsung)
- Hyun-Soo Kim (Samsung)
- Itsuki Noda (AIST)
- Kyuseo Han (ETRI)
- Laurent Rioux (Thales)
- Makoto Mizukawa (Shibaura-IT)
- Manfred Koethe (88solutions)
- Miwako Doi (Toshiba)
- Noriaki Ando (AIST)
- Omar Bahy (IBM/Univ. Ottawa)
- Seongho Choo (Kangwon National Univ.)
- Shuichi Nishio (JARA/ATR)
- Soohee Han (Kangwon National Univ.)
- Su-Young Chi (ETRI)
- Takashi Suehiro (AIST)
- Takashi Tubouchi (Univ. of Tsukuba)
- Takeshi Sakamoto (Technologic Arts)
- Tetsuo Kotoku (AIST)
- Toshio Hori (AIST)
- Yeon-Ho Kim (Samsung)

Robotics Domain Task Force Preliminary Agenda ver0.0.1 robotics/2008-06-21

OMG Technical Meeting - Santa Clara, CA, USA -- Dec.8-12, 2008

http://robotics.omg.org/

		TF/SIG				
		Host	Joint (Invited)	Agenda Item	Purpose	Room
Monday: Robotics Plenary(am) and WG activites(pm)						
9:00	9:45			Robotics Steering Committee	Arrangement	
10:00	10:20	Robotics		Robotics-DTF Plenary Opening Session	Robotics plenary openning	
10:20	12:00			User Recoginition Service RFP 2nd Review - Su-Young Chi(ETRI), Hyunsoo Kim(Sansung), and Toshio Hori(AIST)	presentation, discussion, **Voting**	
12:00	13:00					
13:00	18:00			Architecture Board Plenary		
13:00	18:00			Robotic Localization Services FTF (5h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	
				Services WG(5h): User Recognition Service RFP Meeting - Su-Young Chi, Hyunsoo Kim, and Toshio Hori	discussion	
Tuesday: WG activities and Robotics Plenary						
9:00	11:00			Robotic Localization Services FTF (2h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	
				Services WG(2h): User Recognition Service RFP Meeting - Su-Young Chi, Hyunsoo Kim, and Toshio Hori	discussion	
11:00	12:00	Robotics		**Special Talk:** Real World Robot Challenge in Tsukuba (RWRC2008) - Takashi Tsubouchi (Univ. of Tsukuba) and Makoto Mizukawa (Shibaura-IT)	presentation and discussion	
12:00	13:00	**LUNCH**				
13:00	14:00	Robotics		**Special Talk: <Call for Presentation>** **- TBA**	presentation and discussion	
14:00	15:00	Robotics		**Special Talk: <Call for Presentation>** - **TBA**	presentation and discussion	
				Break (30min)		
15:30	16:30	Robotics		**Special Talk:** Architecture Framework for Unmaned System from SAE - Laurent Rioux (Thales)	presentation and discussion	
16:30	17:00	Robotics		Challenges for a UML profile for Archtecture Framework for Robotics/Unmaned Systems	New work item proposal and	
17:00	17:20	Robotics		WG Reports and Discussion (Service WG, Profile WG, Robotic Localization Service WG)	presentation and discussion	
16:20	17:35	Robotics		Contact Reports: - Makoto Mizukawa(Shibaura-IT), and Yun-Koo Chung(ETRI)	Information Exchange	
17:35	17:45	Robotics		Roadmap and Next meeting Agenda Discussion **Robotics-DTF Co-Chair election**	Robotics plenary closing	
17:45				Adjourn plenary meeting		
17:45	18:00	Robotics		Robotics WG Co-chairs Planning Session (Preliminary Agenda for next TM, Draft report for Friday`	planning for next meeting	
Wednesday WG activity follow-up						
9:00	12:00			Services WG(3h): User Recognition Service Meeting - Su-Young Chi, Hyunsoo Kim, and Toshio Hori	discussion	
12:00	14:00	**LUNCH and OMG Plenary**				
14:00	18:00			Services WG(3h): User Recognition Service Meeting - Su-Young Chi, Hyunsoo Kim, and Toshio Hori	discussion	
18:00	20:00	**OMG Reception**				
Thursday WG activity follow-up						
9:00	10:00	Robotics		**Robotics-DTF Plenary** Voting of User Recognition Service RFP	**Voting**	
12:00	13:00	**LUNCH**				
13:00	18:00			Architecture Board Plenary		
Friday						
8:30	12:00			AB, DTC, PTC		
12:00	13:00	**LUNCH**				

Other Meetings of Interest

Monday						
8:00	8:45	OMG		New Attendee Orientation		
18:00	19:00	OMG		New Attendee Reception (by invitation only)		

Please get the up-to-date version from http://staff.aist.go.jp/t.kotoku/omg/RoboticsAgenda.pdf

robotics/2008-06-22

Robotics-DTF

Date: Friday, 27th June, 2008
Chair: Tetsuo Kotoku and Yun-Koo Chung
Group URL: http://robotics.omg.org/
Group email: robotics@omg.org

➢Highlights from this Meeting:

Recommend for Adaption of Robotic Localization Service (RLS) Specification: [robotics/2008-05-01,-02,-03,-04,-05,-06]

Robotics Plenary: (23 participants)

- **Review revised submission for RLS-RFP**
- **2 Special Talk:**
  - **Univ. of Auckland (Bruce MacDonald) [robotics/2008-06-11]**
  - **RoboCup (Tsuki Noda) [robotics/2008-06-12]**
- **2 WG Reports [robotics/2008-06-13,-14]**
- **1 Contact Report [robotics/2008-06-15]**
- **1 New Activity Proposal [robotics/2008-06-19]**
- **Preliminary Agenda for Santa Clara [robotics/2008-06-21]**

Robotics-DTF

Date: Friday, 27th June, 2008
Chair: Tetsuo Kotoku and Yun-Koo Chung
Group URL: http://robotics.omg.org/
Group email: robotics@omg.org

➢Deliverables from this Meeting:

- **Revised Submissions of Robotic Localization Service (RLS) RFP [robotics/2007-11-01,03]**

➢Future deliverables (In-Process):

- **User Recognition Service RFP**

➢Next Meeting (Orlando, USA):

N/A

➢December Meeting (Santa Clara, USA):

- **2nd review of User Recognition Service RFP**
- **Guest presentations**
- **Roadmap discussion**
- **Contact reports**
- **Robotics-DTF Co-chair election**