Robotics Domain Task Force Final Agenda ver1.2.0 robotics/2008-03-01

OMG Technical Meeting - Washington DC, USA -- Mar. 10-14 , 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	Lincoln, 3rd FL
9:45	10:00	Robotics		Robotics-DTF Plenary Opening Session	Robotics plenary openning	Lincoln, 3rd FL
10:00	12:00			Robotic Localization Service - Revised Submission Presentation - Kyuseo Han (ETRI) and Yeon Ho Kim (Samsung)	presentation and discussion	
12:00	13:00	**LUNCH**				Regency CD, Ballroom Lv1
13:00	18:00			Architecture Board Plenary		**Kennedy, 3rd FL**
13:00	14:00	Robotics	MARS, (RTESS)	Joint Plenary with MARS and RTESS - Robotic Localization Service - Kyuseo Han (ETRI) , Yeon Ho Kim (Samsung) and Shuich Nishio (JARA/ATR)	discussion	**Jefferson, 3rd FL**
14:00	18:00	Robotics		Robotic Localization Services WG (4h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	Lincoln, 3rd FL
				Services WG(4h): Human Robot Interaction RFP draft Meeting - Su-Young Chi and Hyunsoo Kim	discussion	Room 1801, 18th 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	Training Suite, Ballroom Lv1
				Services WG(3h): Human Robot Interaction RFP draft Meeting - Su-Young Chi and Hyunsoo Kim	discussion	Room1801, 18th FL
12:00	13:00	**LUNCH**				Regency CD, Ballroom Lv1
13:00	14:00	Robotics		WG Reports and Roadmap Discussion (Service WG, Profile WG, Robotic Localization Service WG)	presentation and discussion	Prince William, 3rd FL
14:00	14:30	Robotics		Contact Reports: - Makoto Mizukawa(Shibaura-IT), and Yun-Koo Chung(ETRI)	Information Exchange	
14:30	15:00	Robotics		**DTF Co-Chair election** and Next meeting Agenda Discussion	Robotics plenary closing	
15:00				Adjourn joint plenary meeting		
15:00	18:00	Robotics		Robotic Localization Services WG (3h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishi	discussion	Prince William, 3rd FL
Wednesday WG activity follow-up						
9:00	12:00	Robotics		Robotic Localization Services WG (3h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	Regency Suite 408, 4th FL
12:00	14:00	**LUNCH and OMG Plenary**				Regency BCD, Ballroom Lv
14:00	18:00	Robotics		Robotic Localization Services WG (3h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	Regency Suite 408, 4th FL
18:00	20:00	**OMG Reception**				Regency Foyer, Ballroom
Thursday WG activity follow-up						
9:00	12:00	Robotics		Robotic Localization Services WG (3h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	Potomac 1, Ballroom Lv1
12:00	13:00	**LUNCH**				Regency CD, Ballroom Lv1
13:00	18:00			Architecture Board Plenary		Kennedy, 3rd FL
Friday						
8:30	12:00			AB, DTC, PTC		Regency AB, Ballroom
12:00	13:00	**LUNCH**				Tidewater, 2nd FL

Other Meetings of Interest

Monday						
8:00	8:45	OMG		New Attendee Orientation		Prince William, 3rd FL
18:00	19:00	OMG		New Attendee Reception (by invitation only)		Chesapeake Grill,
Tuesday						
7:30	9:00	OMG		Liaison ABSC		Training Suite, Ballroom Lv1
9:00	12:00	OMG		OMG Tutorial - UML Profile for DODAF/MODAF (UPDM)		Roosevelt, 3rd FL
13:00	17:00	OMG		OMG Tutorial - Application of Patterns to Capture Best Practices for Real-time, Data-centric, Distributed Systems		Roosevelt, 3rd FL
17:00	18:00	OMG		RTF-FTF Chair's Workshop		Roosevelt, 3rd FL
Thursday						
9:00	12:00	OMG		OMG Tutorial - Model Driven Service Oriented Architecture		Washington A, Ballroom Lv1
13:00	18:00	OMG		Future Complex Event Processing Standards		Washington A, Ballroom Lv1

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
December 10-14, 2008, Burlingame, USA
(robotics/2008-03-02)

Minutes Highlights

. Initial submission presentation of Robotic Localization Service RFP by ETRI /Samsung and JARA
. 2 WG reports
. 3 Special talks:
- RTC Specification and OpenRTM-aist by Noriaki Ando and Introduction to RTC by Takeshi Sakamoto
- Willow Garage by Eric Berger
- Real World Robot Challenge in Tsukuba (RWRC2007) by Takashi Tsubouchi

. 3 Contact report (ISO/TC184/SC2, conferences, KIRSF)

List of Generated documents

document number:

- robotics/2007-12-01 Final Agenda (Tetsuo Kotoku)
- robotics/2007-12-02 Jacksonville Meeting Minutes [approved] (Su-Young, Chi and Shuichi Nishio)
- robotics/2007-12-03 Steering Committee Presentation (Tetsuo Kotoku)
- robotics/2007-12-04 Roadmap for Robotics Activities (Tetsuo Kotoku)
- robotics/2007-12-05 Robotics DTF Opening Presentation (Tetsuo Kotoku)
- robotics/2007-12-06 Robotic Localization Service - OMG Initial Submission (Kyuseo Han)
- robotics/2007-12-07 JARA Initial Submission to Robotic Localization Service RFP (Shuichi Nishio)
- robotics/2007-12-08 Robotic Localization Service - ETRI&SAMSUNG vs. JARA (Yeon-Ho Kim)
- robotics/2007-12-09 Considerations for revised submission (Kyuseo Han)
- robotics/2007-12-10 Real World Robot Challenge in Tsukuba (RWRC2007) - Tsukuba Challenge 2007 (Takashi Tsubouchi)
- robotics/2007-12-11 Robotic Functional Services WG Report (Hyunsoo Kim)
- robotics/2007-12-12 Robotic Localization Service WG Report (Shuichi Nishio)
- robotics/2007-12-13 OMG Robotic Technology Component Specification and OpenRTM-aist (Noriaki Ando)
- robotics/2007-12-14 Introduction to Robotic Technology Component (Takashi Sakamoto)
- robotics/2007-12-15 Willow Garage (Eric Berger)
- robotics/2007-12-16 Contact Report (Makoto Mizukawa)
- robotics/2007-12-17 KIRSF - Contact Report (Yun-Koo Chung)
- robotics/2007-12-18 Robotics-DTF flier - DRAFT (Yun-Koo Chung)
- robotics/2007-12-19 ISO TC184/SC2/AG1 Meeting Report (Tetsuo Kotoku)
- robotics/2007-12-20 Robotics DTF Burlingame Closing Presentation (Tetsuo Kotoku)
- robotics/2007-12-21 Next Meeting Preliminary Agenda - DRAFT (Tetsuo Kotoku)
- robotics/2007-12-22 Supplementary Info on Composite Robotic Coordinate - Information Set (CRCS) (Shuichi Nishio)
- robotics/2007-12-23 DTC Report Presentation (Tetsuo Kotoku)
- robotics/2007-12-24 Burlingame Meeting Minutes - DRAFT (Yun-Koo Chung and Geffrey Biggs)

MINUTES

Monday, December 10, 2007, Sandpebble B, Lobby Lvl

09:50-10:10 Plenary Opening, Chair: Dr Kotoku, (Quorum: 4)

- Joined organizations: AIST, ETRI, JARA, Samsung, Shibaura IT, Technologic Arts, John Deere
- Burlingame Meeting Minute takers: Dr Biggs and Dr Yun Koo Chung
- Approval of the Jacksonville minutes

  Jacksonville minutes (Dr Nishio and Dr Chi) was approved.

AIST (motion), Shibauru IT (second), Technologic Arts (white ballot)
- Bruce Boyes presentation not possible, replaced with presentation by Willow Garage
- University of Tsukuba scheduled to give presentation on Real World Robot Challenge in Tsukuba

10:15-12:00 Robotics Localisation Service RFP submissions. (2 submissions)

1) Joint submission of ETRI and Samsung (Kyuseo Han)
   . Simple structure proposed: Localization object, Localization Aggregator, Localization sensor, Coordinate Manager
   . Coordinate system was proposed.
2) JARA submission (Shuichi Nishio)
   . A set of common information to represent location
   . Common interface for localization service to transfer data and commands.
   . Robotic service scenario

. Requirements and structure for RLS

Tuesday, December 11, 2007, Sandpebble B, Lobby Lvl

11:00-12:00 Real World Robot Challenge in Tsukuba (RWRC2007) by Takashi Tsubochi

- Presentation of introduction Autonomous navigation contest of robots in real world, Tsukuba
- Experiments on public street
- Test running days (several days, final test on Nov. 17)
- Introduction of robot system, strategy of obstacle avoidance

13:00 – 17:30 Plenary meeting continued

WG Reports and Roadmap Discussion

- Functional services WG Report by Hyun Soo Kim

. **Candidate title for HRI RFP:** "User Recognition Service Interface (URSI)"
. Mandatory requirements decided
. Optional requirements decided
. Schedule:
  1st RFP draft (unofficial): 18/01/2008
  2nd RFP draft (unofficial): 08/02/2008
  1st RFP draft (official): March 2008 OMG Meeting
  2nd RFP draft (official): June 2008 OMG Meeting
  Initial submission: December 2008 OMG Meeting

- Localization Service WG Report by Nishio

. Two presentations for initial submissions: ETRI + Samsung, and JARA
. Discussion towards revised submission
. Splitting of localization object
. Sensor module/localisation module (relation with Profile WG).
  . Naming issue (of data format)
  . Data abstraction format issue
  . Necessity for meta-level information (RLML)
  . Roadmap
    - Washington DC: Revised submission discussion (submit first version of revised submission to OMG server)
    - 26/05/2008: Revised submission due
    - 23/06/2008: Revised submission presentations

- No report from Infrastructure WG

- Special Talk: Introduction of RTC specifications and implementation OpenRTC_AIST by Ando and Sakamoto

. Introducing the RTC and RT middleware.
. Introducing the Features of OpenRTM-aist which is RT Middleware of AIST complying RTC specification.
. Presenting the Implementation of RTC and its demonstration
. Introducing the RTC specifications.

- Special Talk: Willow Garage by Eric Berger

. Hardware and software development framework for personal robotics
. Modular architecture, distributed computing, Open source, flexible tools are introduced
. ROS: Infrastructure, communications architecture, development tools, Robotic libraries, Robotic-specific functionality were demonstrated.

- Contact report by Makoto Mizukawa:

. Conference: 2007 IEEE IN San Diego, Oct 29- Nov 2, 2007. http://www.iros2007.org
Topic: Network robots, Ubiquitous robots, Ubiquitous robotic space design and applications
. Conference: ICCAS 2007, Seoul, Oct.19,2007, 6 papers presented.
. Coming conference: ICRA 2008, Pasadena, CA, http://www.icra2008.org/
IROS 2008, Nice, France, Sept. 22-26,2008, http://www.iros2008.org/

- Contact report by Yun Koo Chung

. KIRSF Standardization activities in Korea were reports.
. The second stage of URC project planned to start in early 2008.

- Publicity report:

. Diagram and picture was changed
. Robot picture will be selected and will be voted for selection.

- Contact report of ISO/TC184/SC2/AG1 by Kotoku:

. Meeting held in Tokyo on Nov. 26th,2007, Attendee (15 people and 5 countries (Korea, Japan, UK, France, Sweden)
. Topics:
- Definition and scope of PT1 and PT2
- Performance / Safety Standards for Intelligent Robots in Korea
- OMG Activity report
. Next meetings:
- Feb. 19, 2008 in Wellington, New Zealand, June 23 ~ 26, 2008 in Paris, Oct 13 ~ 15 in Seoul, Korea

- Closing presentation and Next meeting agenda by Kotoku

. Calling for volunteers for Robotics DTF co-chair, Robotic Infrastructure WG Co-chair, Robotic Functional Service WG Co-chair, Robotic Data and Profiles WG Co-chair,
. Next meeting Agenda: March 10-14 (Washington DC, USA)

- Adjourned joint plenary meeting at 17:00

Attendee : 20 participants

Anthony Tarlano(DoCoMo)
Eric Berger (Willow Garage)
Geoffrey Biggs (AIST)
Hiroyuki Fukano (TSB Information)
Hyun-SeoKim (Samsung)
Itsuki Noda (AIST)
John Rodell(OIS)
KwangKoog Lee (Kaungwon National Univ.)
Kyuseo Han (ETRI)

Makoto Mizukawa (Shibaura-IT)
Miwako Doi (Toshiba)
Noriaki Ando (AIST)
Roger Burkhart (John Deere)
Shuichi Nishio (JARA/ATR)
Su-Young Chi (ETRI)
Takashi Sakamoto (Technologic Arts)
Takashi Tubouchi (Univ. of Tsukuba)
Tetsuo Kotoku (AIST)
Yeon-Ho Kim (Samsung)
YunKoo Chung(ETRI)

Prepared and submitted by Yun Koo Chung (ETRI) and Geoffrey Biggs (AIST)

Robotics Domain Task Force
Steering Committee Meeting

March 10th, 2008

Arlington, VA, USA

Hyatt Regency Cristal City

at Reagan National Airport

Burlingame Meeting Summary

Initial Submission Presentation of Robotic Localization Service RFP:

- **ETRI & Samsung Joint Submission** [robotics/2007-12-06]
- **JARA Submission** [robotics/2007-12-07]

Robotics Plenary: (20 participants)

- **3 Special Talk:**
  - **RTC Specification and OpenRTM-aist** [robotics/2007-12-13,14]
  - **Willow Garage (Eric Berger)** [robotics/2007-12-15]
  - **Real World Robot Challenge in Tsukuba (RWRC2007)** [robotics/2007-12-10]
- **2 WG Reports** [robotics/2007-12-11,12]
- **3 Contact Reports** [robotics/2007-12-16,17,19]
- **Preliminary Agenda for Washington DC** [robotics/2007-12-21]

Agenda

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

Agenda Review

Mon(Mar. 10):

Steering Committee,
RLS-RFP progress report (AM)
Joint Meeting with MARS (13:00-14:00)
WG activities(PM)

Tue(Mar. 11):

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

Wed(Mar. 12) and Thu(Mar.13):

WG activities

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
  - Toshio Hori (AIST)
  - Hyun-Soo Kim (Samsung)

We have to post our meeting minutes within a week!

AIST

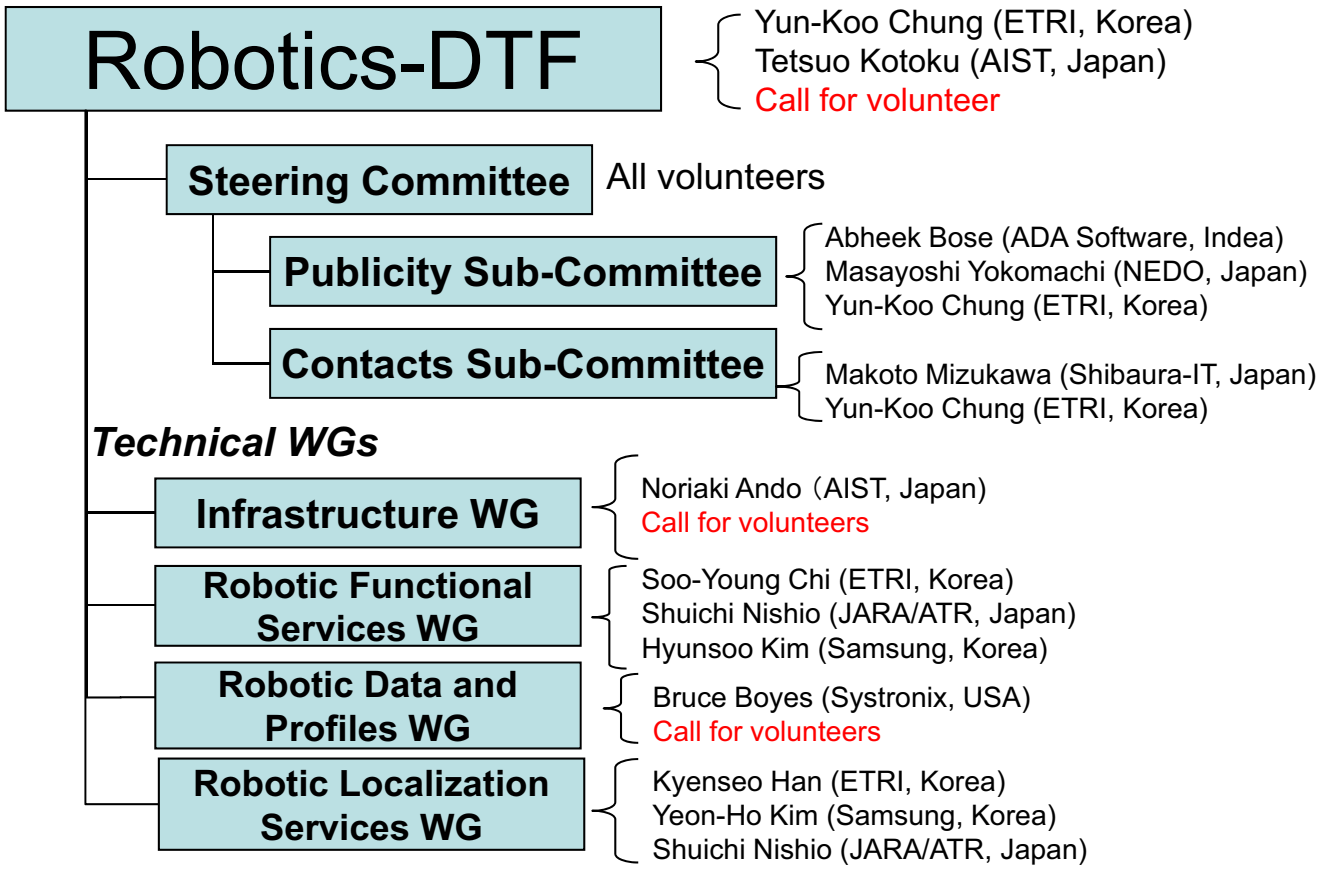
Roadmap Discussion

- 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



Next Meeting Agenda

June 23-27(Ottawa, Canada)

Monday:

Steering Committee (morning)
Revised Submission presentation (am)
WG activity [Parallel WG Session] (pm)

Tuesday:

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

Wednesday:

WG activity follow-up [if necessary]

Thursday:

Revised Submission Recommendation (am)

Special Talk Candidates

- Robotics Project in Japan
  Prof. Sato (University of Tokyo, Japan)
- RUPI Project
  Dr. Hyun Kim (ETRI)
- Someone from local area

Roadmap for Robotics Activities

robotics/2008-03-04

Item	Status	Burlingame Dec-2007	Washington DC Mar-2008	Ottawa Jun-2008	Orlando (CANCEL) Sep-2008	Santa Clara Dec-2008	Washington DC Mar-2009	TBD Jun-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	Initial Submittion	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	discussion	1st Draft	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)					
RTC Finalization Task Force	done Sep-2007								Noriaki(AIST) and Rick(RTI)
Related Events					IROS2008				

Robotics-DTF Plenary Meeting
Opening Session

March 10th, 2008

Arlington, VA, USA

Hyatt Regency Cristal City

at Reagan National Airport

Approval of the Burlingame Minutes

Meeting Quorum : 3

AIST, ETRI, JARA, KAIRA, Samsung, Shibaura-IT, Technologic Arts,

Minutes taker(s):

- Toshio Hori (AIST)
- Hyun-Soo Kim (Samsung)

Minutes review

- **Initial Submission Presentation of Robotic Localization Service RFP:**
- **Robotics Plenary: (20 participants)**
  - **3 Special Talk:**
    - **RTC Specification and OpenRTM-aist [robotics/2007-12-13,14]**
    - **Willow Garage (Eric Berger) [robotics/2007-12-15]**
    - **Real World Robot Challenge in Tsukuba (RWRC2007) [robotics/2007-12-10]**
  - **2 WG Reports [robotics/2007-12-11,12]**
  - **3 Contact Reports [robotics/2007-12-16,17,19]**

Agenda Review

Mon:

09:45-10:00 Opening Session
10:00-12:00 RLS Progress Report and Discussion
13:00-14:00 Joint Plenary with MARS

Tue:

13:00-14:00 WG Reports and Roadmap Discussion
14:00-15:00 Contact Reports
15:00-15:30 DTF Co-Chair election, Publicity,
Next meeting Agenda Discussion
15:30 Adjourn joint plenary meeting

15:30-16:00 WG Co-chairs Planning Session

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

Recent progress toward RLS revised submission

2008.3.10

NISHIO Shuichi (JARA/ATR)

Korea-Japan workshop on RLS

Two workshops on RLS specification were held to resolve the conflicts between the two initial submissions

1. Jan 31 (at Seoul, Korea)
2. Feb 14-15 (at Tsukuba, Japan)

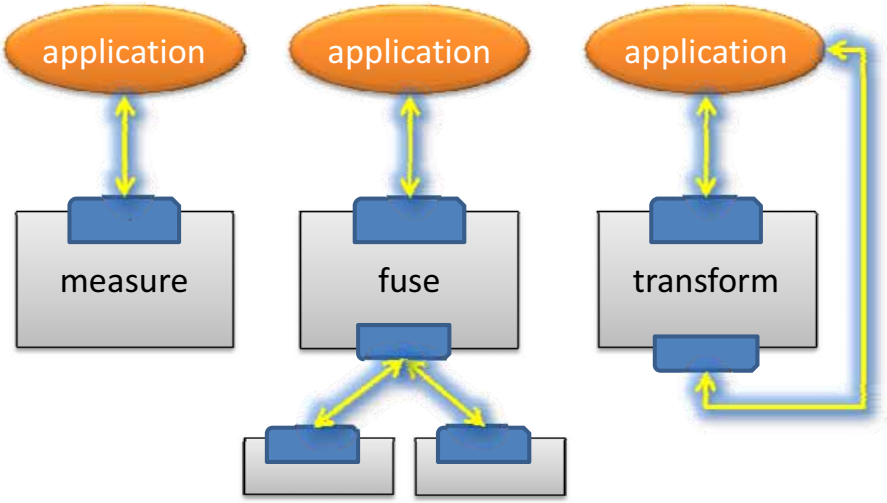
Summary of Conclusion

- Use RoLo architecture (was: CRCS) as basic structure definition method
- Sensor interface to be discussed in Profile WG
- Use uniform module architecture
- Define 3 primitive data formats
- Use RoLo (Robotic Localization) as naming prefix

Issues discussed (1/3)

- Using RoLo architecture (former CRCS) as a basic RLS data structure descriptor
  - Result: Use RoLo arch. for representing structure
- Whether to define sensor component
  - Result: Not in RLS, sensor interface delegated to Profilie WG
- Whether to define several function-based interfaces or single interface
  - Result: One basic component to be standard

uniform architecture



Homogeneous n-input, 1-output interface

- High reusability
- Allow recursive or cascading connection

Issues discussed (2/3)

- Preparation of *Primitive Data Format*
  - Define a data format for preserving minimum connectability between each module

  Result:
  - Define 3 primitive data formats (RoLo formats)
    - Cartesian coordinate (position + orientation)
    - Polar coordinate (position)
    - Geodetic coordinate (lat/lng/height, WGS-84)
  - Every RLS module *must* support at least one of these 3 formats

RoLo Data Formats

RoLo Format type I (Cartesian)

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

RoLo Format type II (Polar)

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

RoLo Format type III (Geodetic)

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

Issues discussed (3/3)

- Naming

  Result:

  – Use "**RoLo**" (**Ro**botic **Lo**calization) as prefix
    - CRCS -> RoLo architecture
    - CBRL -> RoLo format

Issues in RLS revised submission

2008.3.10

NISHIO Shuichi (JARA/ATR)

Issues to be discussed

1. RoLo format
   - shall orientation be included in type II / III?
2. How to define / manage various data formats?
3. Implementation of the *push* data passing
4. Details on RLS specifications (Tomorrow)
5. Mathematical foundation for Coordinate system definition (Tomorrow)
6. Database Interface (Later, Dr. Noda)

1. RoLo Data Formats

RoLo Format type I (Cartesian)

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

RoLo Format type II (Polar)

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

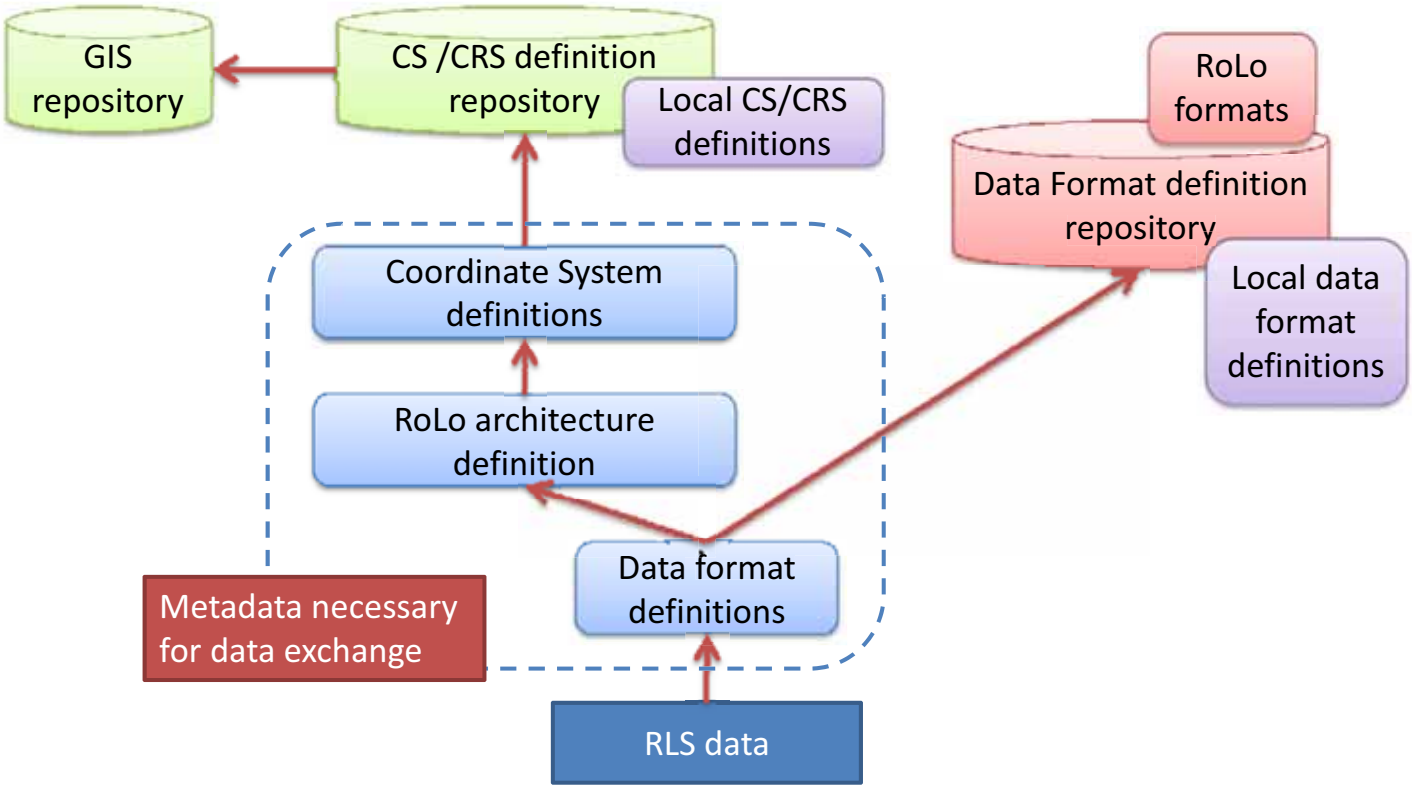
RoLo Format type III (Geodetic)

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

2. Formal description of data formats

- We shall have some standard mean to define various data representation formats formally
  - in a machine understandable way
  - better, if they can be treated dynamically
    - prepare conversion systems on the fly
- Is there any (standard) way to formally describe data representation formats, in a machine-understandable way?

Overview of RLS architecture



ASN.1

- **Abstract Syntax Notation One** (**ASN.1**) is a standard and flexible notation that describes data structures for representing, encoding, transmitting, and decoding data.
- It provides a set of formal rules for describing the structure of objects that are independent of machine-specific encoding techniques and is a precise, formal notation that removes ambiguities.
- ASN.1 is a joint ISO/IEC and ITU-T standard, originally defined in 1984 as part of CCITT X.409:1984. ASN.1 moved to its own standard, **X.208**, in 1988 due to wide applicability. The substantially revised 1995 version is covered by the **X.680** series. The latest available version is dated 2002, and is backward compatible with the 1995 version.

(source: *Wikipedia*)

ASN.1

- ASN.1 defines the abstract syntax of information but does not restrict the way the information is encoded. Various ASN.1 encoding rules provide the transfer syntax (a concrete representation) of the data values whose abstract syntax is described in ASN.1.
- ASN.1 together with specific ASN.1 encoding rules facilitates the exchange of structured data especially between application programs over networks by describing data structures in a way that is independent of machine architecture and implementation language.

(source: *Wikipedia*)

ASN.1

- Application layer protocols such as X.400 electronic mail, X.500 and LDAP directory services, H.323 (VoIP), BACnet and SNMP use ASN.1 to describe the protocol data units (PDUs) they exchange. It is also extensively used in the Access and Non-Access Strata of UMTS. There are many other application domains of ASN.1 [1].

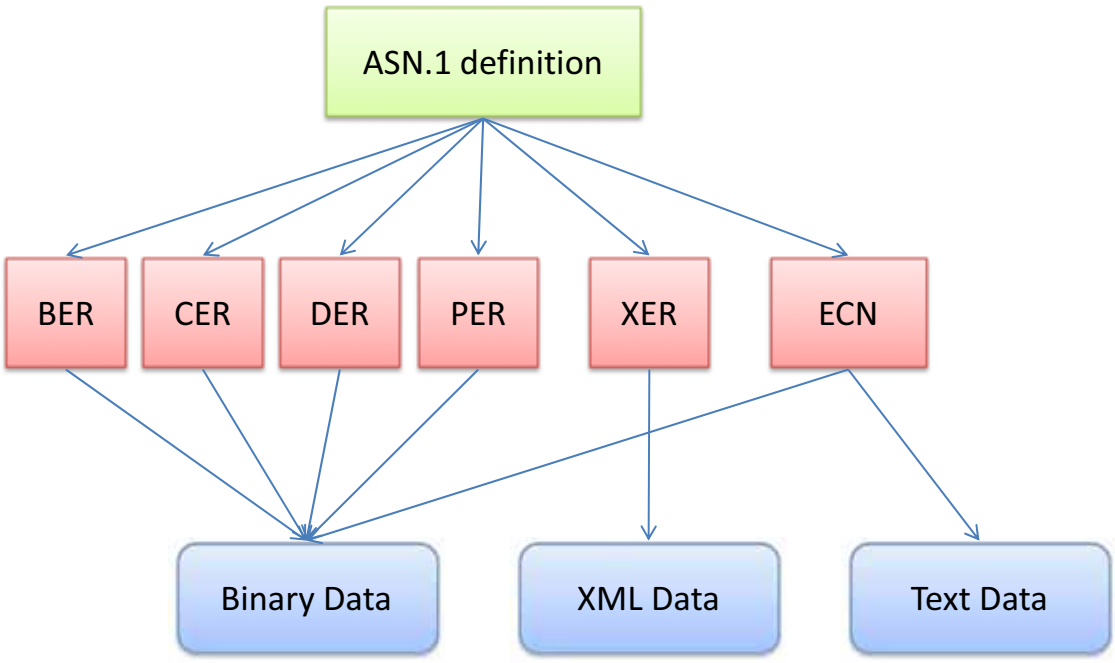
(source: *Wikipedia*)

ASN.1 example

```
FooProtocol DEFINITIONS ::= BEGIN
   FooQuestion ::= SEQUENCE {
      trackingNumber INTEGER,
      question       IA5String
   }
   FooAnswer ::= SEQUENCE {
      questionNumber INTEGER,
      answer         BOOLEAN
   }
END
```

(source: *Wikipedia*)

Encoding rules for ASN.1



Encoding Control Notation (ECN)

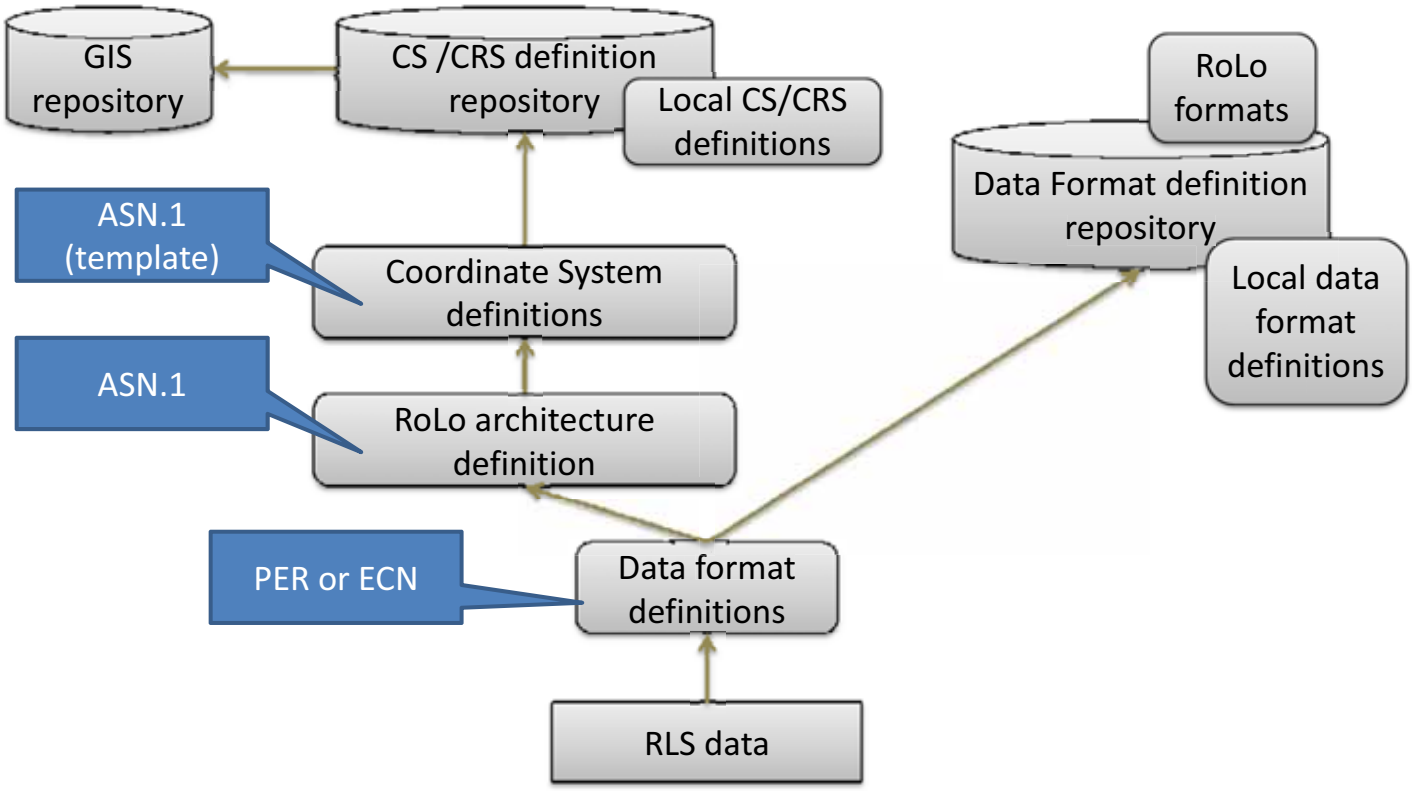
- ECN is a notation to specify specific encodings of ASN.1 types. ECN is useful to describe in ASN.1 legacy protocols. It is possible to specify only the encoding of some types and then complete with a standard encoding rules (usually unaligned PER). An ECN specification uses two kinds of module:
  - Encoding definition modules which describes encodings as sets of encoding objects;
  - Encoding link modules which associate ASN.1 types and encoding object sets
- ECN is defined in ITU-T Rec. X.692 | ISO/IEC 8825-3 (2002)

(source: *Wikipedia*)

Using ASN.1 in RLS (1)

- Describe RoLo architecture definitions in ASN.1
  - Two approaches (next slide)
- Basically, ASN.1 descriptions are encoded as data using standard packet encoding rule
  - PER (Packet Encoding Rule)
- Use of ECN or XER shall be also permitted for supporting existing data formats

Using ASN.1 in RLS (2)



Using ASN.1 in RLS (3)

- Pros
  - Provide standard way for describing data formats
  - ASN.1 / ECN are commonly used, mature standards
  - Software modules for parsing/encoding/decoding ASN.1 / ECN already exists
- Cons
  - Yet another language for defining
  - Against recent trends for describing everything in XML
  - Not common in robotics / GIS community

Using ASN.1 in RLS (4)

Two approaches

1. Use XML variant (RoLoML) for defining and storing RoLo architecture
   - convert definitions to ASN.1 automatically only for data format conversions
   - high similarity with GIS specifications
2. Use ASN.1 for defining RoLo architecture

Which is better?

3. Implementing the *push* interface

- In C++ PSM, this can be implemented using *callbacks*
  - callback registration interface

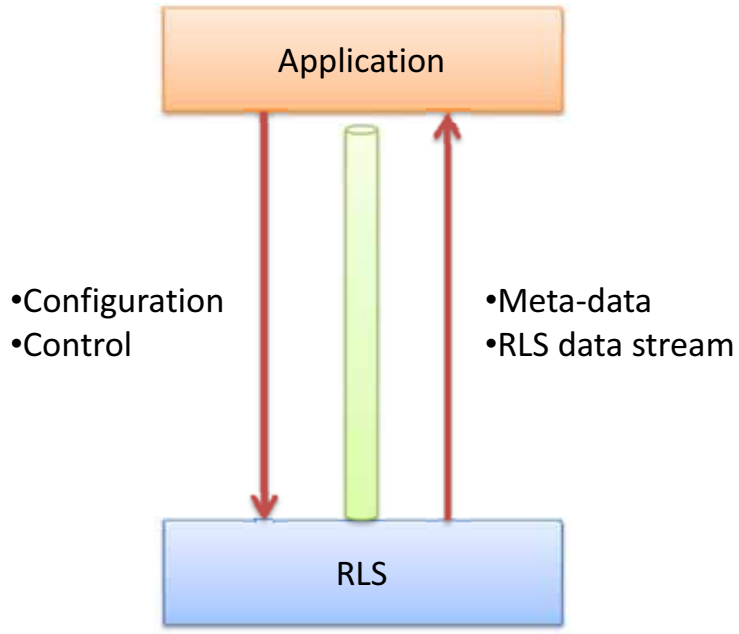
    register_callback(&*callback_func*, void **optional_param*);
  - callback interface prototype

    void *callback_func*(RLS_Module *caller, RLS_val* value,
    void *optional_param);
- But in traditional use (such as GPS), a more simple approach shall be convinient
  - Define another PSM based on *stream*

The *Stream* PSM

- Assume a full-duplex stream
  - connection, authorization, etc. is assumed to be maintained by some underlying middleware
  - example: serial connection, TCP, CORBA, …
- Define a set of commands for controlling the RLS module
- Commands and data are sent in the same single stream
- Similar to current GPS receivers

The *Stream* PSM



Commands in the *Stream* PSM

- C(onfigure)
  - (re) configure RLS by sending configuration document
- A (djust)
  - set initial/adjustment location datas
- GA (Get Ability)
  - obtain ability document from RLS
- G1 (Get 1 location data)
  - *pull* interface
- G0 (Get Location data)
  - *push* interface
- P (Pause data stream)
  - pause data pushing
- Q (uit)
  - terminate connection

Overview of the Robotic Localization Service Revised submission

10 Mar, 2008

NISHIO Shuichi

Japan Robot Association (JARA) /

ATR Intelligent Robotics and Communication Laboratories

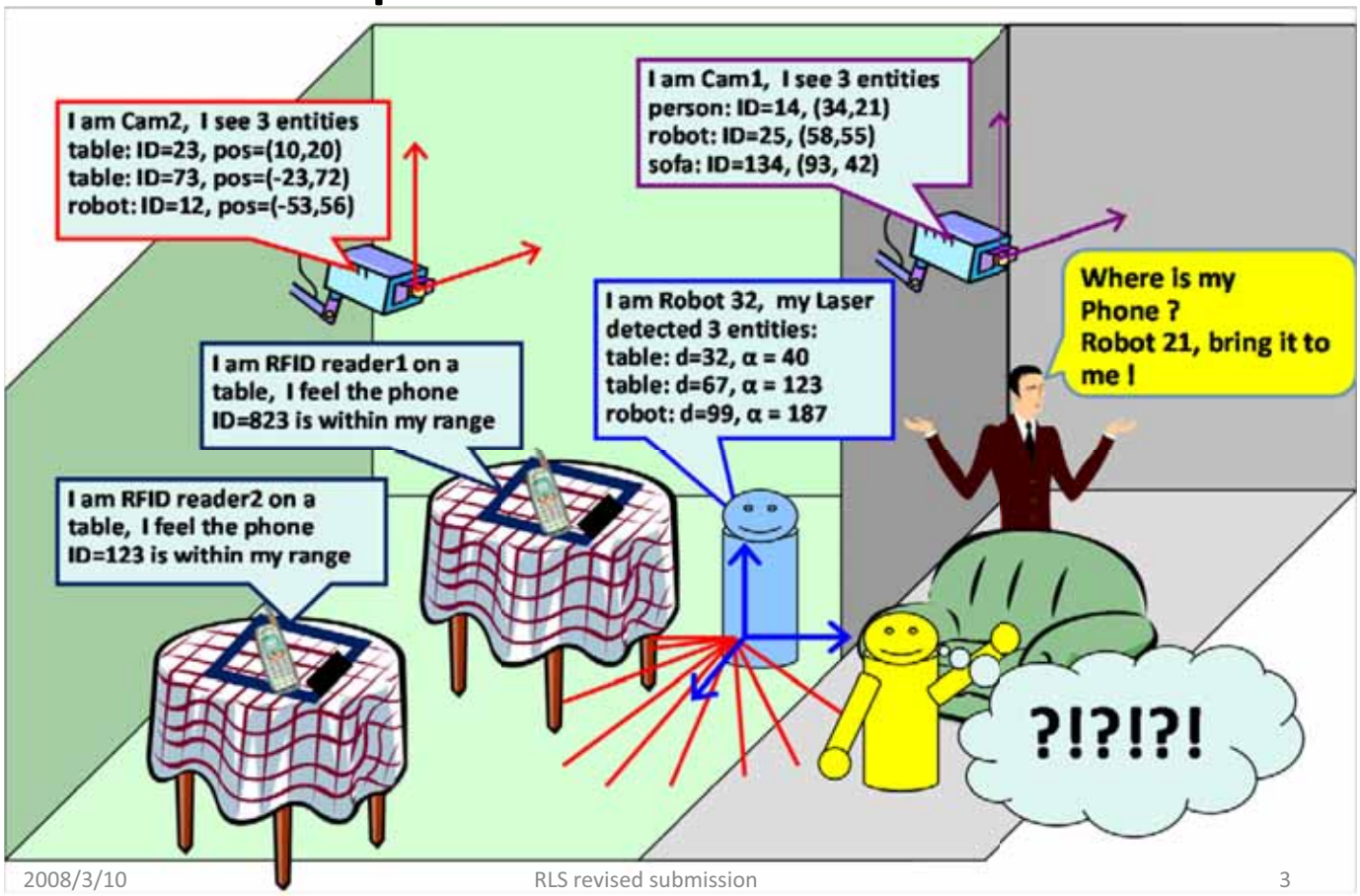
Robotic Localization Service RFP

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

RFP example of Robotic Service



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)

Key issues in the proposed specification

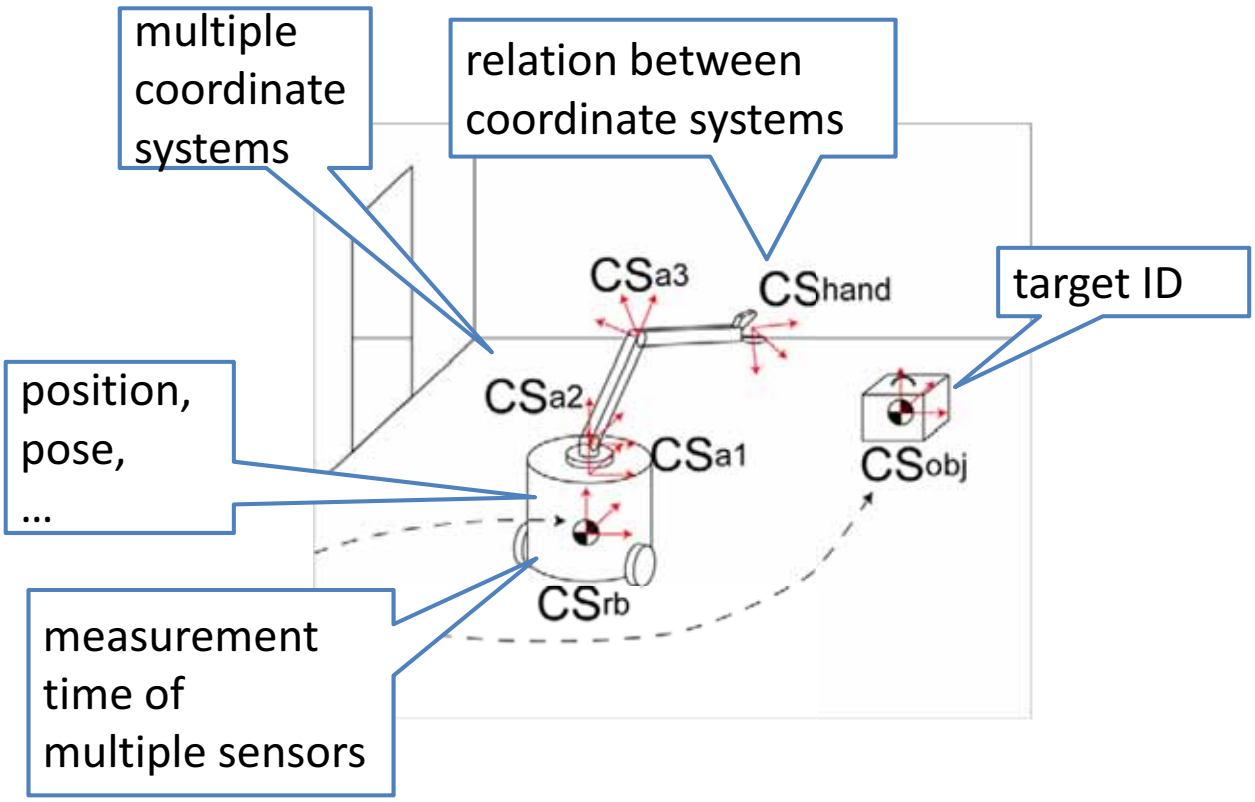
A) Generic and flexible representation for robot-related localization information

- independent to specific sensors / algorithms
- capable of representing information specific in robotic use

B) Framework for high reusability / easy development

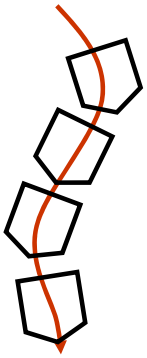
- Interoperability with existing systems
- meta-level information for exchanging module capability
- prepare for plug-and-play composition

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

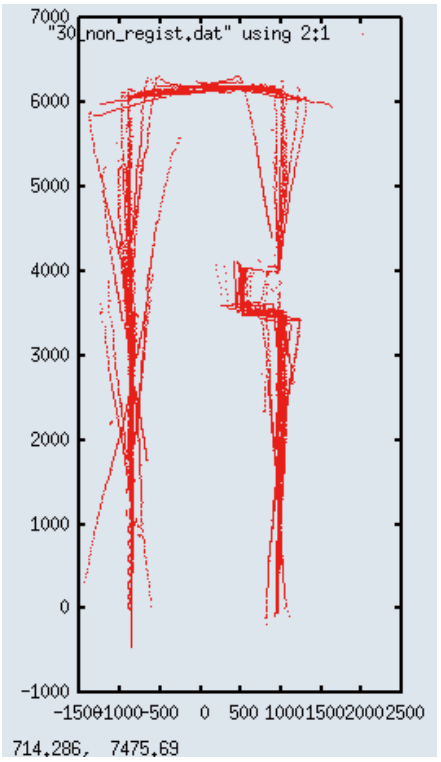
time	d
10	5
13	10
15	12

Takeuchi, Tsubouchi, Yuta 2005

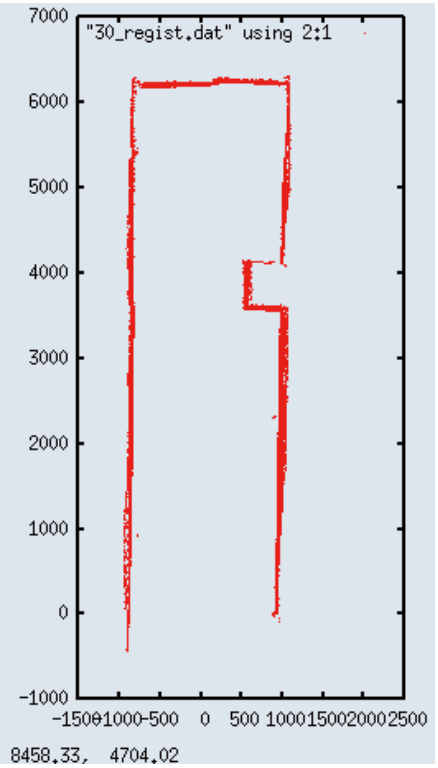
Example: Effect of Time Error

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, …

Related Standards

- OpenGIS standards
  - Standards for Geographic Information Systems
  - Define position / shape representation on earth
- ISO 9283:1998 “Manipulating industrial robots - Performance criteria and related test methods”
  - *pose* = position (3D) + orientation (3D)
- ISO 9787:1999 “Manipulating industrial robots - Coordinate systems and motion”
  - define a few coordinate system representation (world coordinate system, etc.)

OpenGIS coordinate systems

- basically "***referenced***"
  … can only treat absolutely defined positions on earth
- limited to 1D/2D/3D coordinates
- no relative/mobile coordinate system
- no error representation
- no explicit target ID representation
- repository of definitions
  – allows automatic inter-coordinate translation

Requirements in robotics

- Extend OpenGIS framework to
  – allow relative/mobile coordinate systems
  – allow incomplete location
  – allow arbitrary dimensions
  – allow uniform representation of related infos
- Provide means to treat various information semantically clearly
  – coordinate systems, combination of coordinate systems, data formats, …

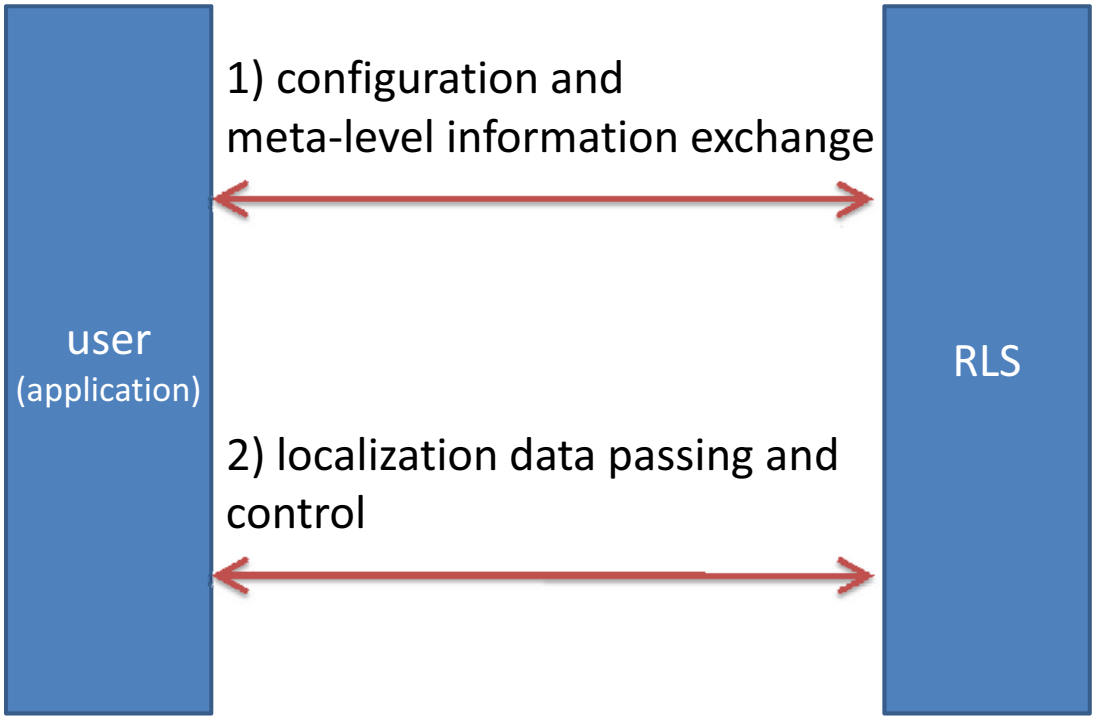
Extensions for Robotics

- Definition of Information Structures
  - ***RoLo (Robotic Localization) architecture***
- Representation of Error information and IDs
- Allow Mobile & Relative Coordinate Systems
  - Coordinate Systems are defined by *transforms*
  - Transformation Parameters can be *dynamic*
- Allow flexible Data Formats
  - meta-level structure for describing data formats
- Require modules to provide *capability information*
  - for plug-n-play and easy development

Typical Steps in Robotic 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

Basic data exchange steps



Contents of the RLS specification

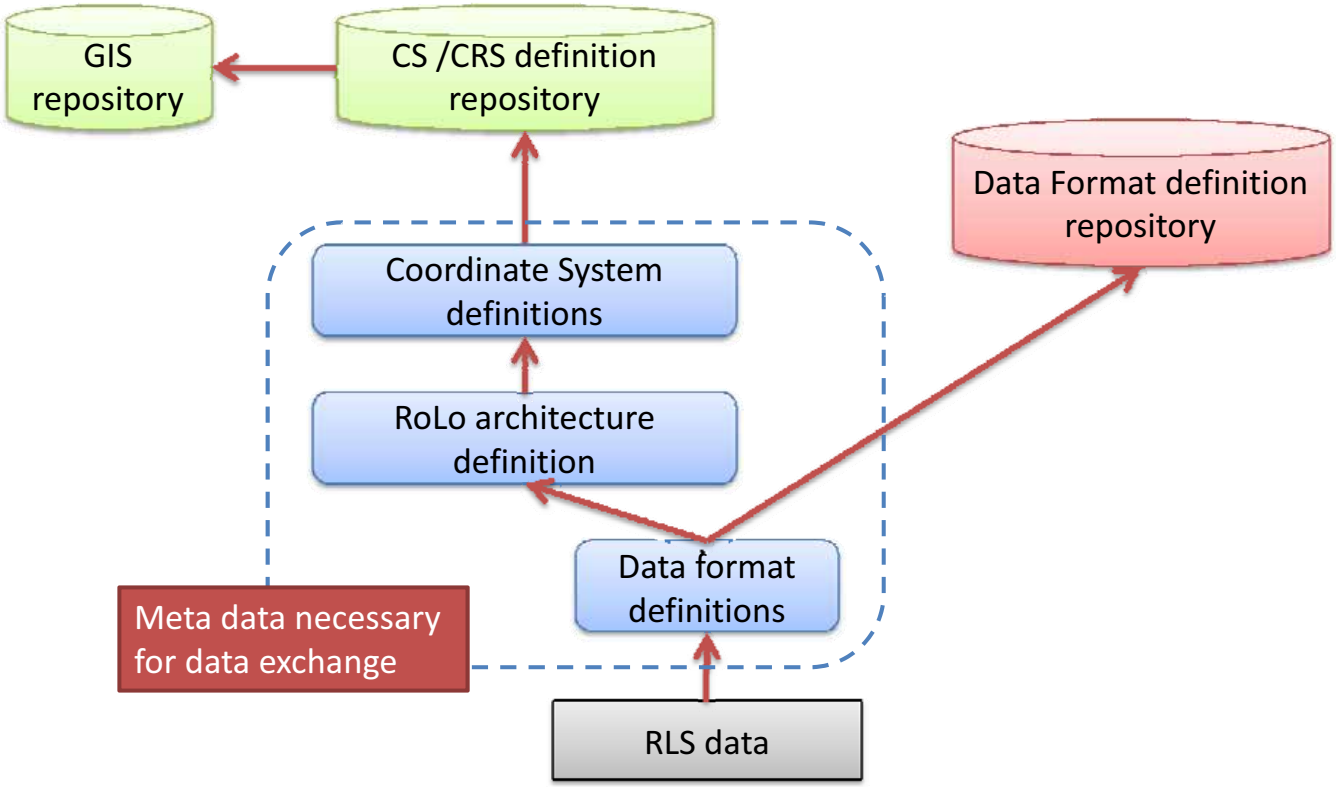
- Model on how the localization data can be described / represented
- How the localization module can be configured / accessed

Meta-information exchange

Exchange information and negotiate on

- What kind of information the RLS module can provide
  - localization data semantics
  - data formats
- How the RLS module can provide information
  - ability information
  - data passing / controlling methods

Information used in RLS specification



Semantics of Location Information

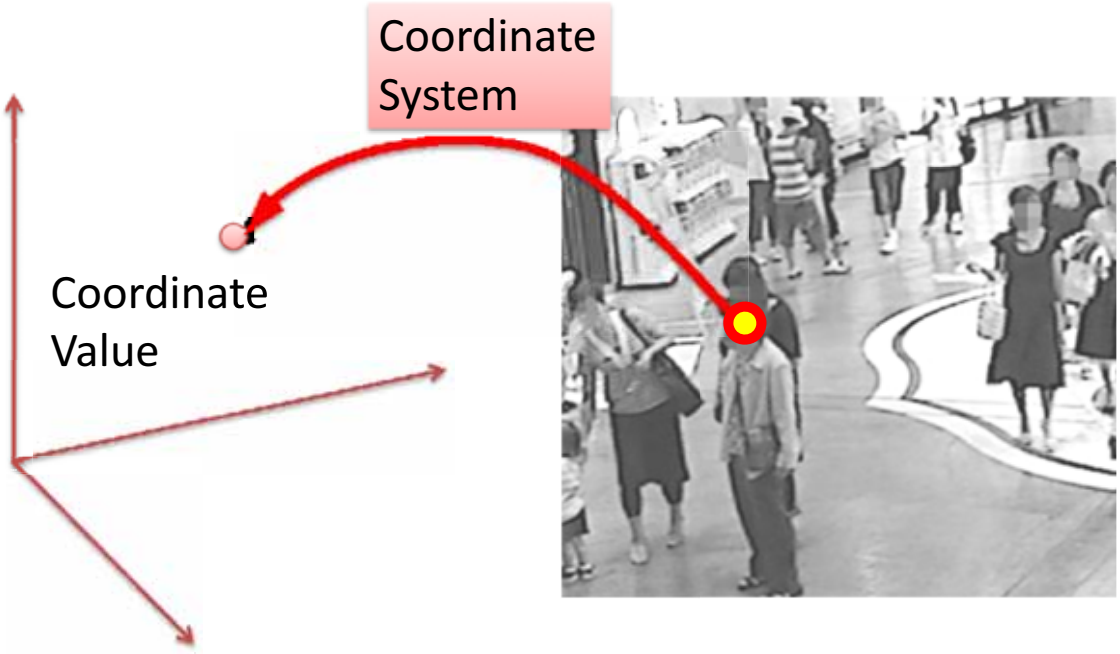
- Location information

  = coordinate system + coordinate value

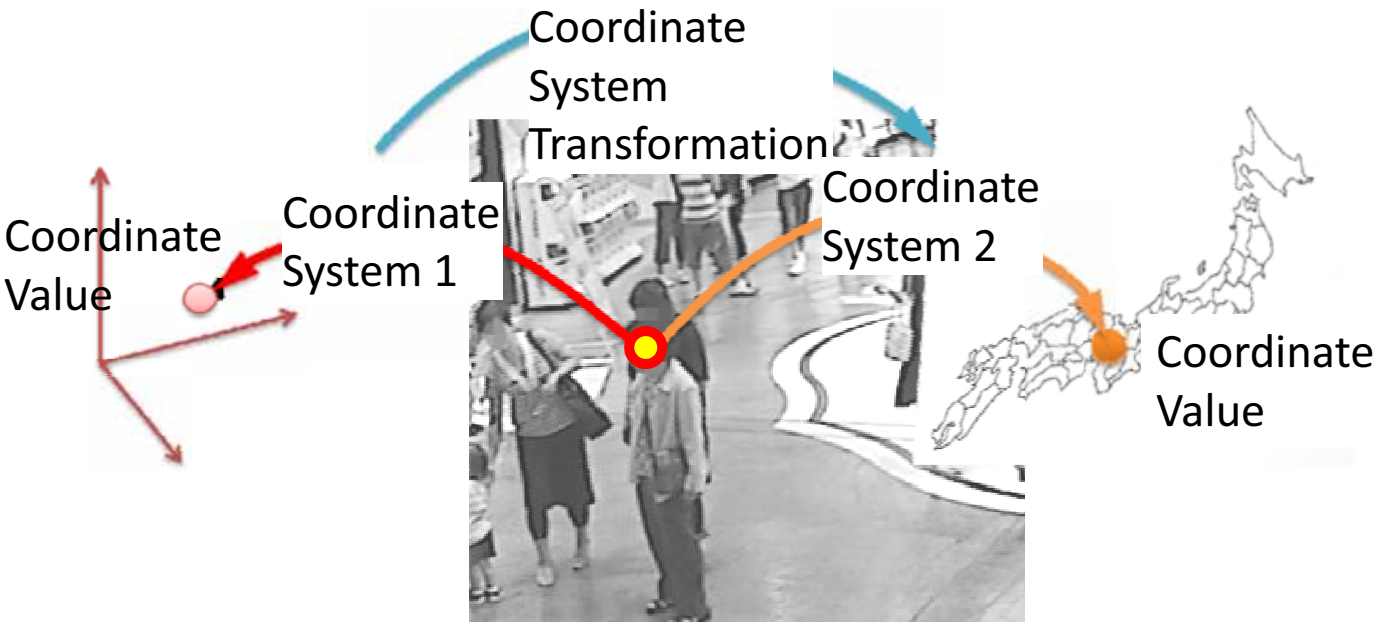
  – *a coordinate system* defines *how* information is represented and may define *what* it means
- Coordinate System:

  – map real-world features to *some* representations

Coordinate System



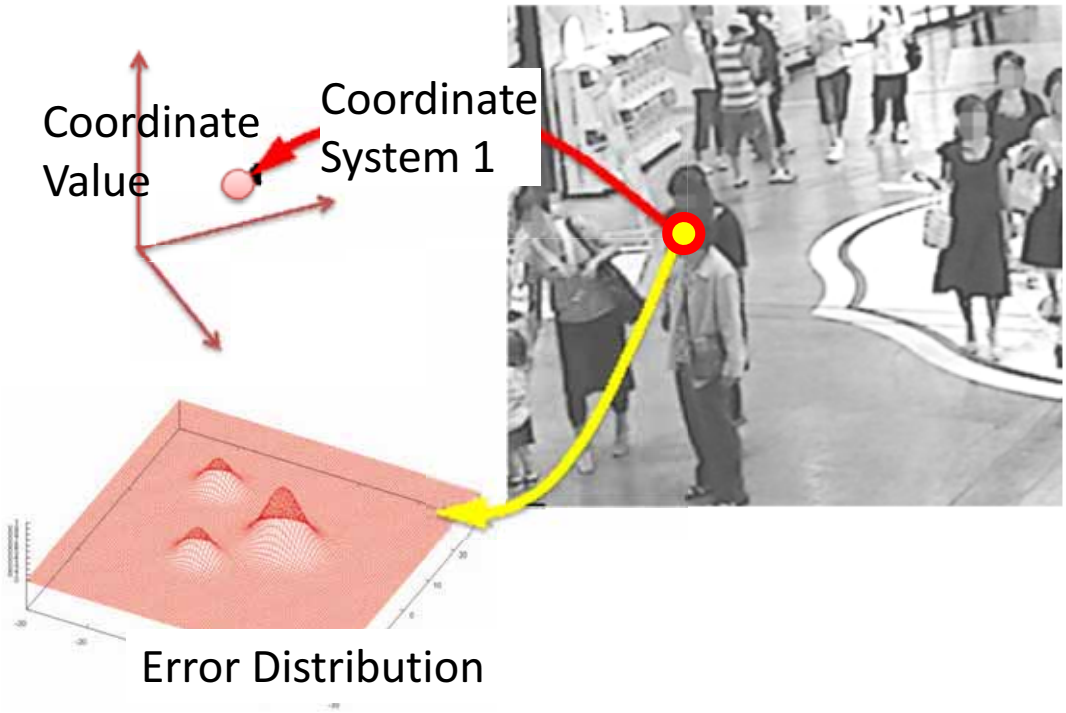
Coordinate System transformation



“Location” is probabilistic

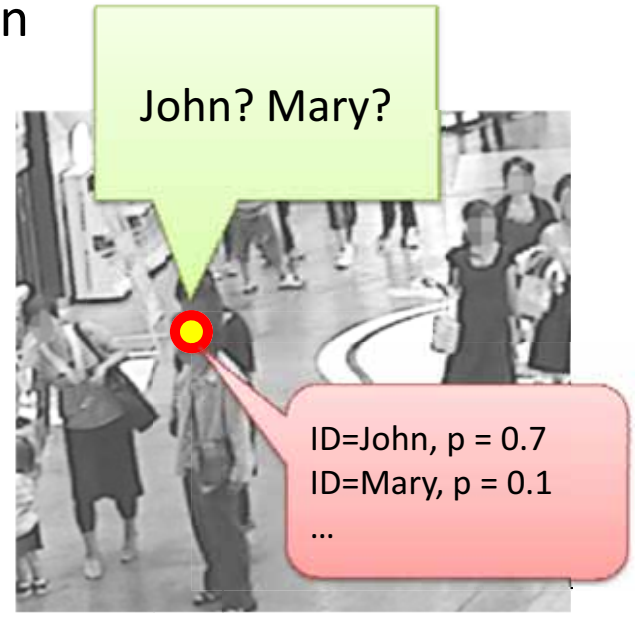
- Measured localization results are *always* probabilistic
  - error information required
- flexible, extendable framework for error representation required
  - reliability / covariance matrix / MoG / particles…

Error / reliability of measurement



ID is probabilistic

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

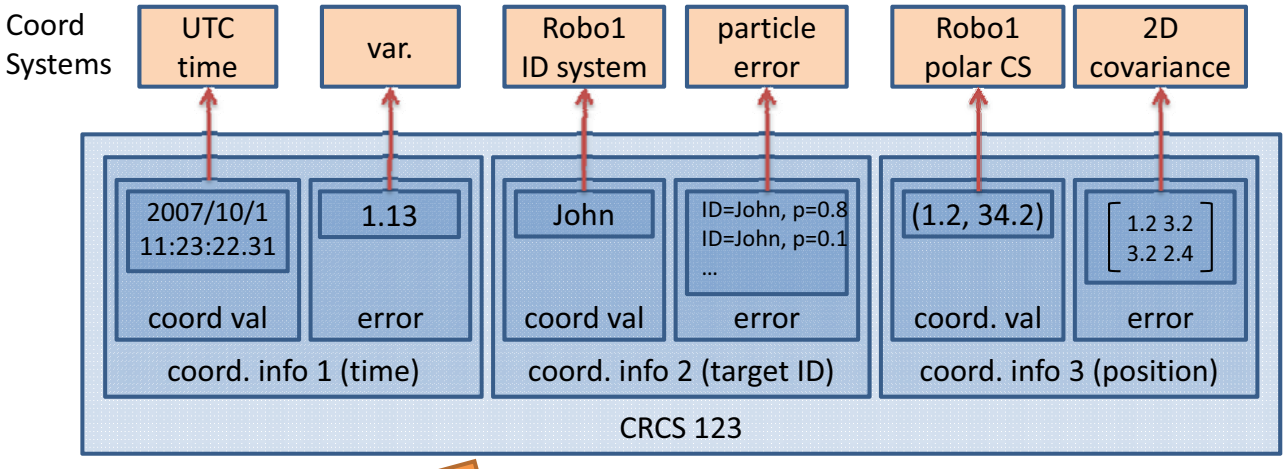


Structure of Robotic Localization Info

- Prepare a generic framework for representing various robotic location information
  - measurement time, position, orientation, ID, …
- Explicit representation of information structure
  - ***Coordinate Values*** are related to a ***Coordinate System***
  - ***Coordinate Values*** may be combined with ***Error Information***: ***Coordinate Information***
  - Set of related Coordinate Information:

    RoLo architecture

RoLo Architecture



Treat various types of location-related information in

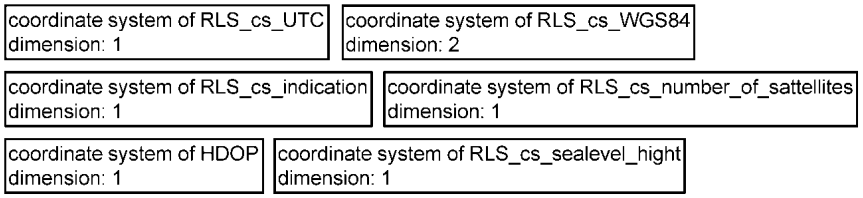
a uniform manner

Example: GPS receiver output

- Sample NMEA output

  $GPGGA,123519.00,3601.038247,N,13631.324523,E,1,08,1.2,68.42,M,46.93,M,, *42

  <data type>, <time in UTC>, <latitude>, <north>, <longitude>, <east>, <GPS quality indication>,<number of satellites>, <HDOP>, <height from average sea level>, <unit (meter)>,<height from WGS-84ellipsode>, <unit(meter)>



Ability Exchange

- Provide description on RLS modules
  - what it can do (**functionality**)
  - how well can it operate (**capability**)
  - how it can be configured (**parameters**)
  - input / output RoLo architecture or Coordinate systems it can handle
  - data formats it can handle

Ability exchange

Request:

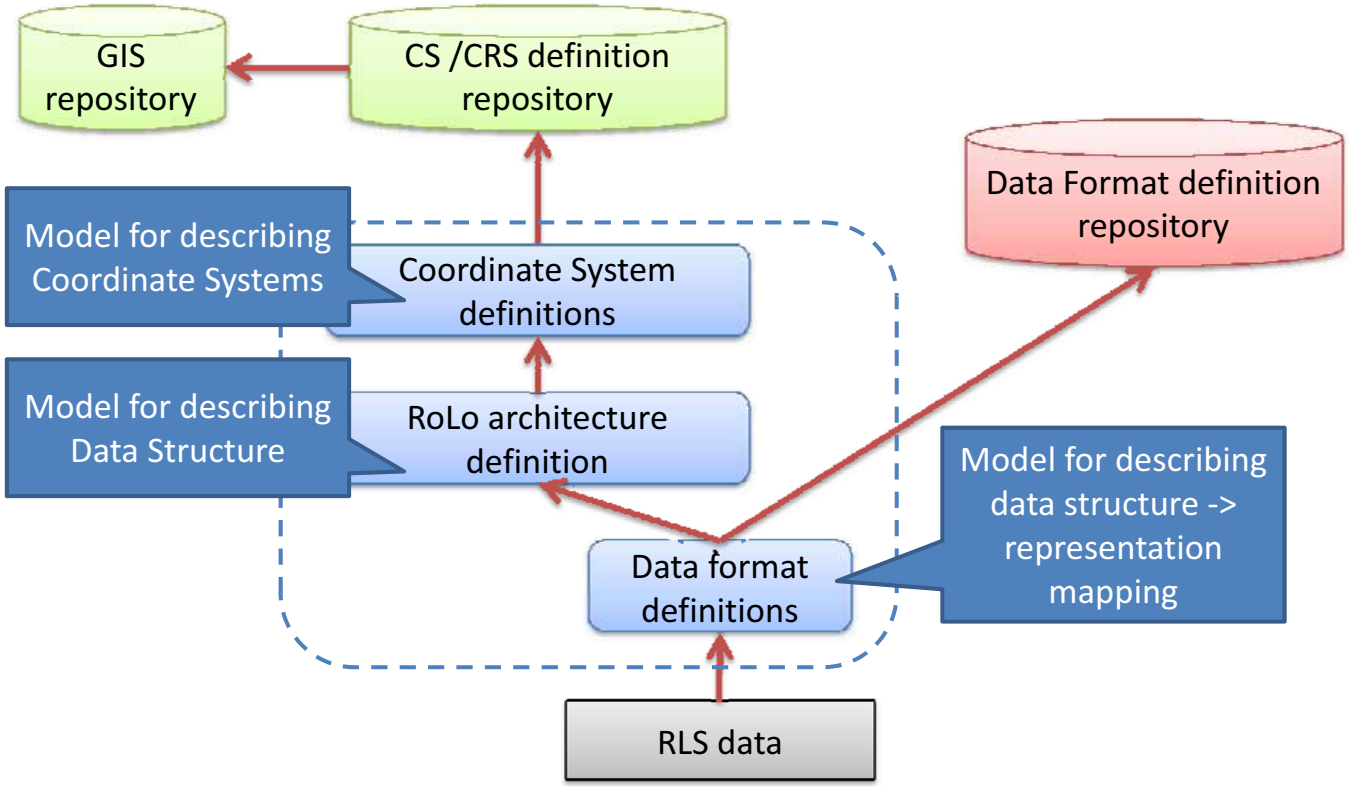
```
<?xml version="1.0" encoding="UTF-8"?>
<GetCapabilities xmlns="http://www.hoge.org/rls/1.0">
  <Sections Section="All">
</GetCapabilities>
```

Response:

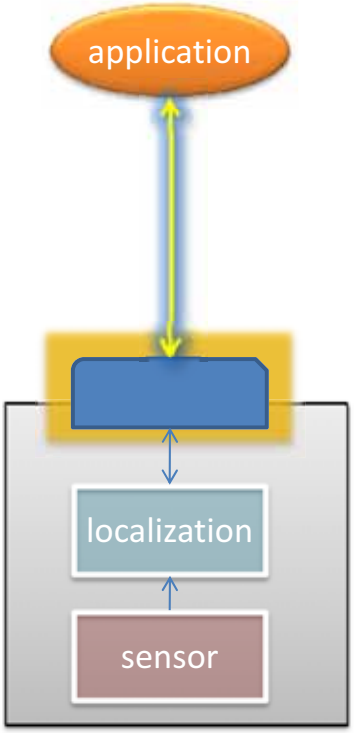
```
<?xml version="1.0" encoding="UTF-8"?>
<Capabilities xmlns="http://www.hoge.net/rls/1.0" xmlns:rls="http://www.hoge.net/rls/1.0"
        xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://www.hoge.net/rls/1.0 fragmentGetCapabilitiesResponse.xsd">

  <ServiceIdentification>
    <Title xml:lang="ja">SICK LRF output module</Title>
    <Abstract xml:lang="en">
      output module for Laser Range finder xxxx series
      Contact: webmaster@hoge.co.jp
    </Abstract>
    <ServiceType>OMG:RLS</ServiceType>
    <ServiceTypeVersion>1.0.0</ServiceTypeVersion>
    <NumInputs value="1" />
    <NumOutputs><max-value>3</max-value></NumOutputs>
  </ServiceIdentification>
  <ServiceProvider>
    <ProviderName>foobar corporation</ProviderName>
    <ProviderSite xlink:href="http://www.hoge.co.jp/"/>
  </ServiceProvider>
</Capabilities>
```


What is specified in the RLS specification



What is specified in the RLS specification



- Candidate title for HRI RFP
  - User recognition API for Human Robot Interaction (new)
- Mandatory Requirements
  - 1. Architecture of URSI should be defined (diagram or description for overview)
  - 2. Classify the process of URS
  - 3. Define the function of each stage
  - 4. Define each API
    - Description of function
    - Name of API
    - Basic Data structure
    - Basic error handling
  - 5. Define PIM using UML
  - 6. example of using APIs

- Optional Requirements
  - 1. Identify additional information of user (such as gender or age)
  - 2. choice of input date type or data format (including multi-modal)
  - 3. consideration of additional sensors (RFID, Bio sensors)
  - 4.

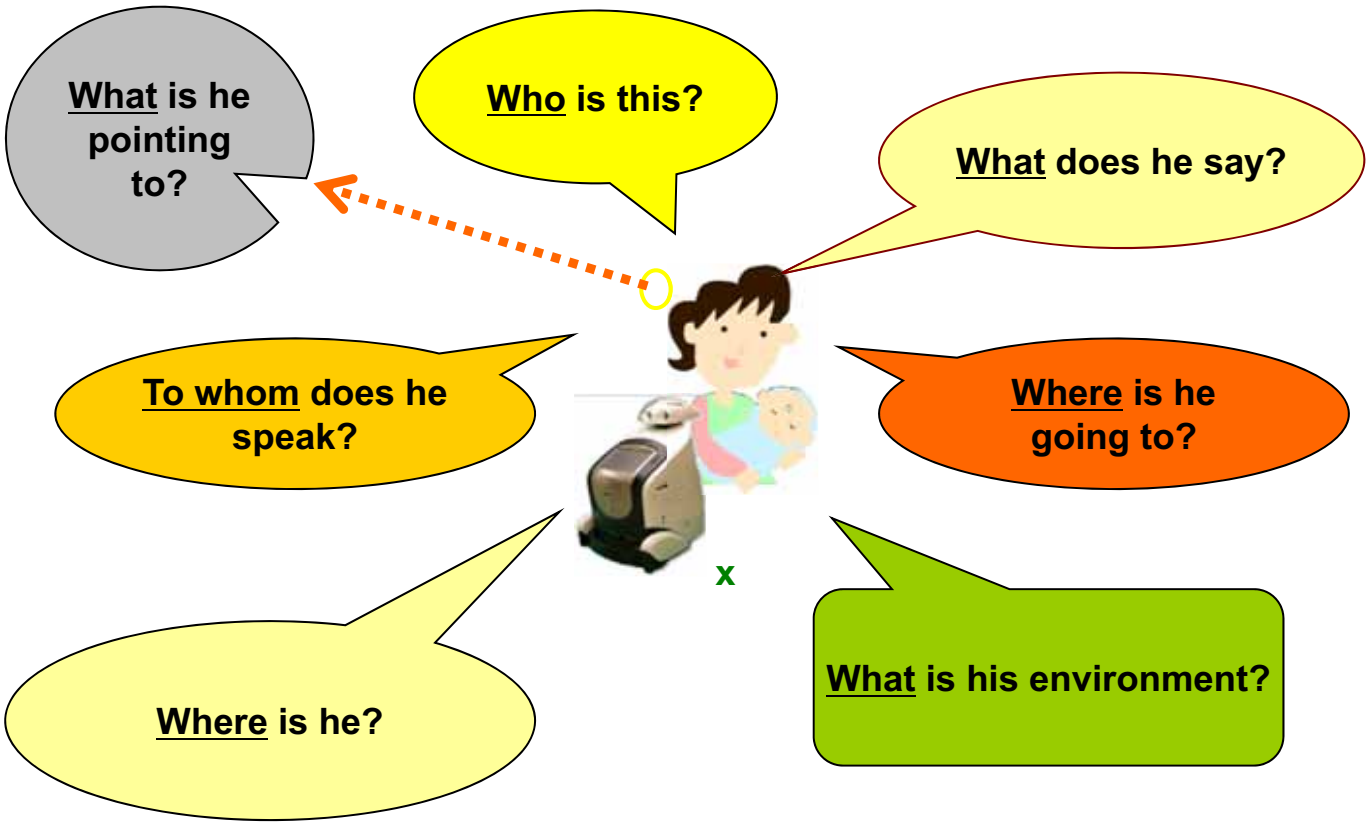
Functional Services WG schedule

- Unofficial 1st RFP draft and discussion on March OMG meeting (Washington DC)
- Submission of RFP draft on 05-26-2008.
- Official RFP draft and review on June OMG meeting (Ottawa, June 23 2008)
- Initial submission on 11-10-2008.
- Discussion of Initial submission on December OMG meeting in Santa Clara.
- Revised submission on May 2009
- Discussion and AB approval on June 2009
- Approval of official OMG standard on June 2010

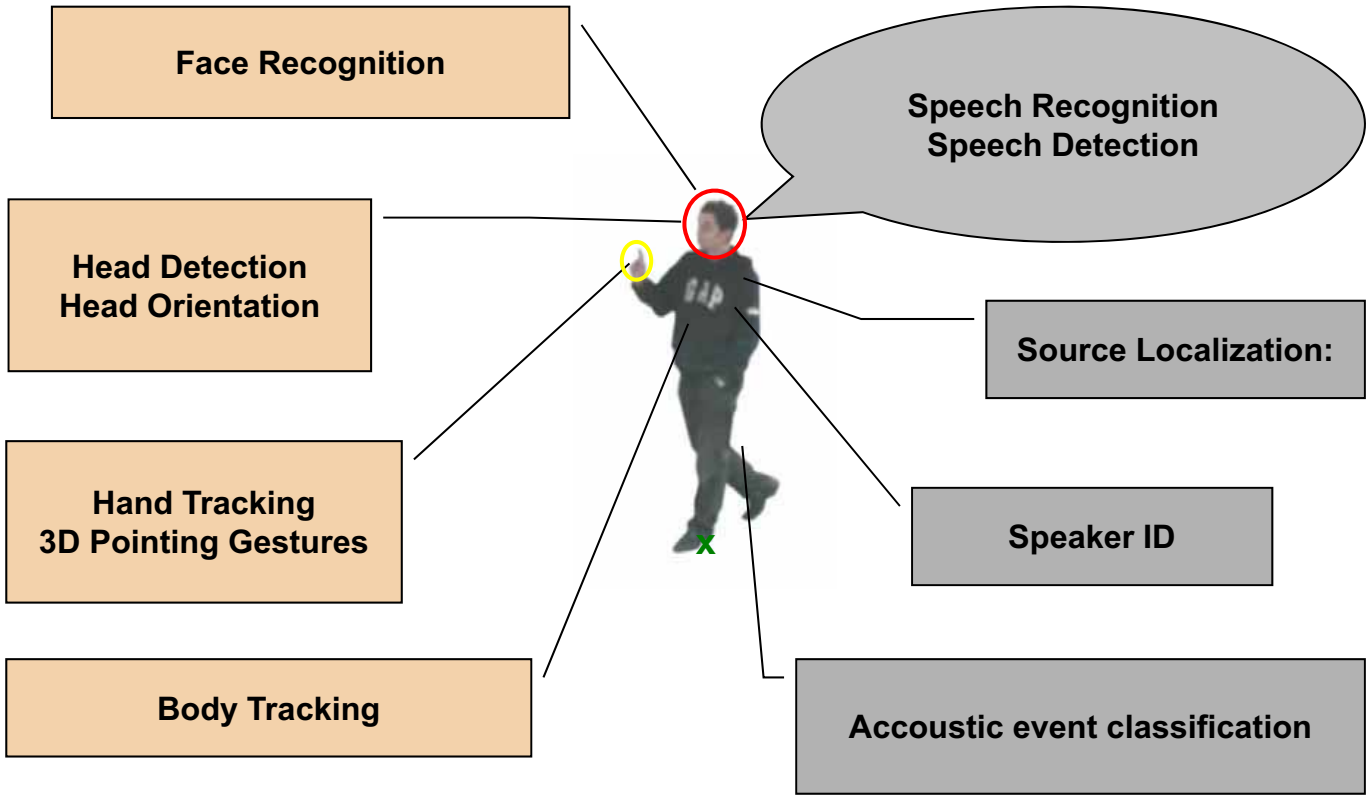
Categorization of user identification technology

- Who & Where ?
  - Audio-Visual Person Tracking
  - Tracking Hands and Faces
  - AV Person Identification
  - Head Pose / Focus of Attention
  - Pointing Gestures
  - Audio Activity Detection
- What ? (Input)
  - Far-field Speech Recognition
  - Far-field Audio-Visual Speech Recognition
  - Acoustic Event Classification
    - Door slam, object dropping,...
- What ? (Output)
  - Animated Social Agents
  - Steerable targeted Sound
  - Q&A Systems
  - Summarization
- Why & How ?
  - Classification of Activities
  - Emotion Recognition
  - Interaction & Context Modelling
  - Vision-based posture recognition
  - Topical Segmentation

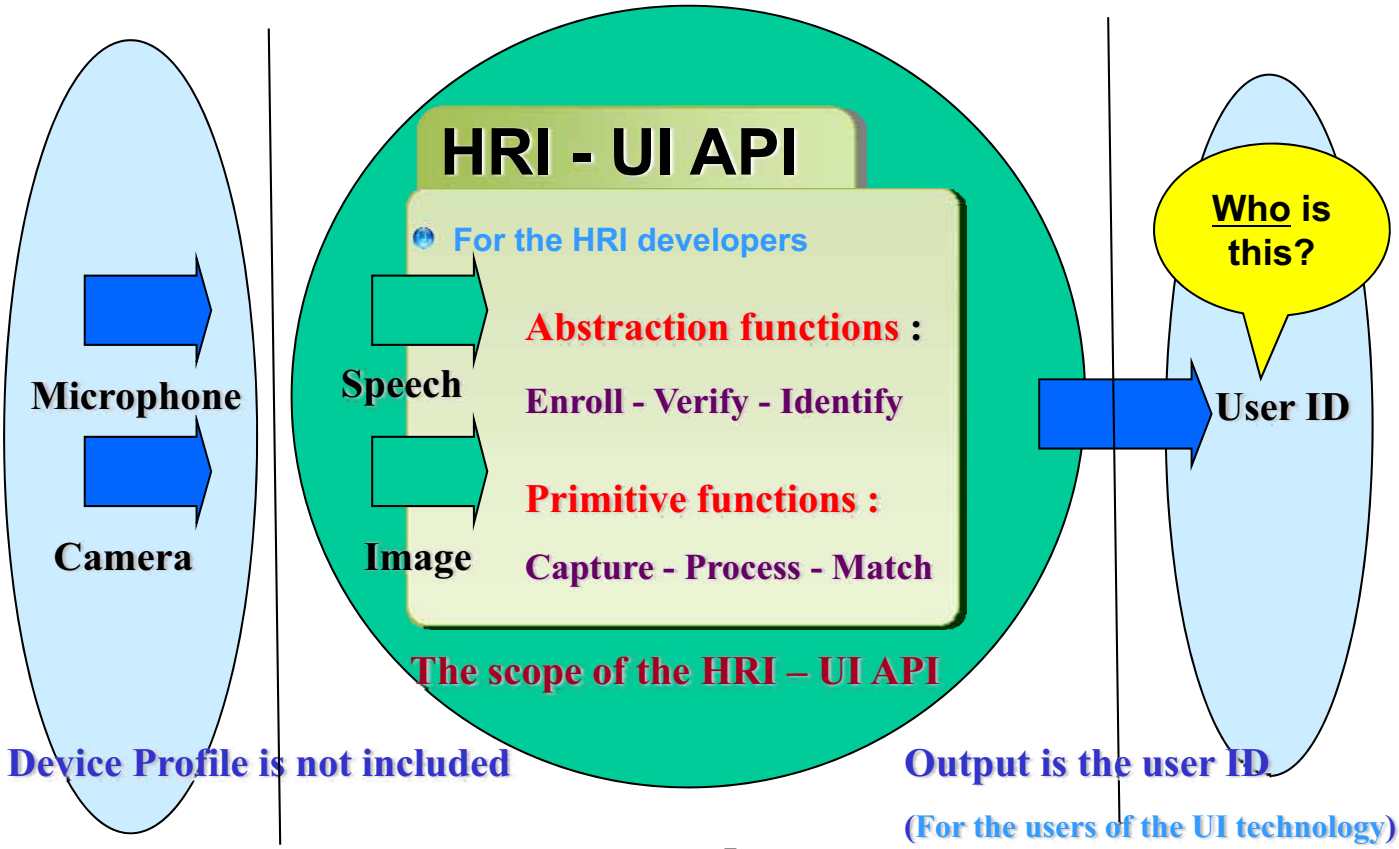
User identification technology



UI technology



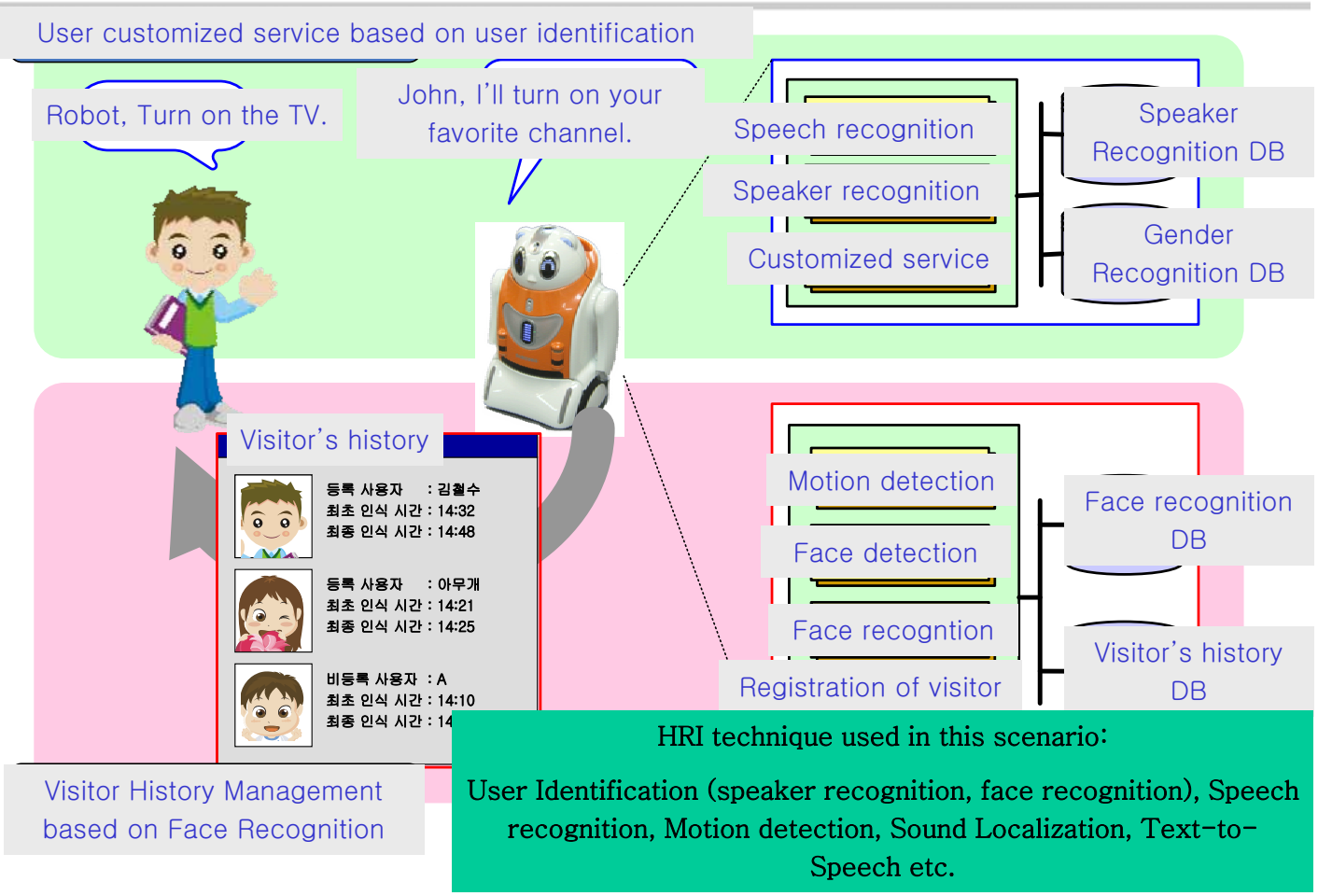
The scope of the HRI – UI (User Identification) API



What is the HRI – UI API?

- To be used by the HRI developers
  - Users of the HRI technologies will only use the output (User ID).
  - Identification of the user is the crucial starting point for the Human-Robot Interaction.
- As a first step, multi-modality of voice and image will be considered.
  - Speaker identification and user identification based on image are the first candidates to be considered.
  - The device profiles of microphone and camera could be added later. (not for the initial submission)
- HRI-UI API will define the new robot-specific API sets.
  - BioAPI does not contain the characteristic features of the mobile robots.
  - The API sets specially defined for the robot environments are required.
- The state-of-art HRI technologies can be easily applied to any robot platform.
  - This will significantly contribute to the growth of the robot industry.

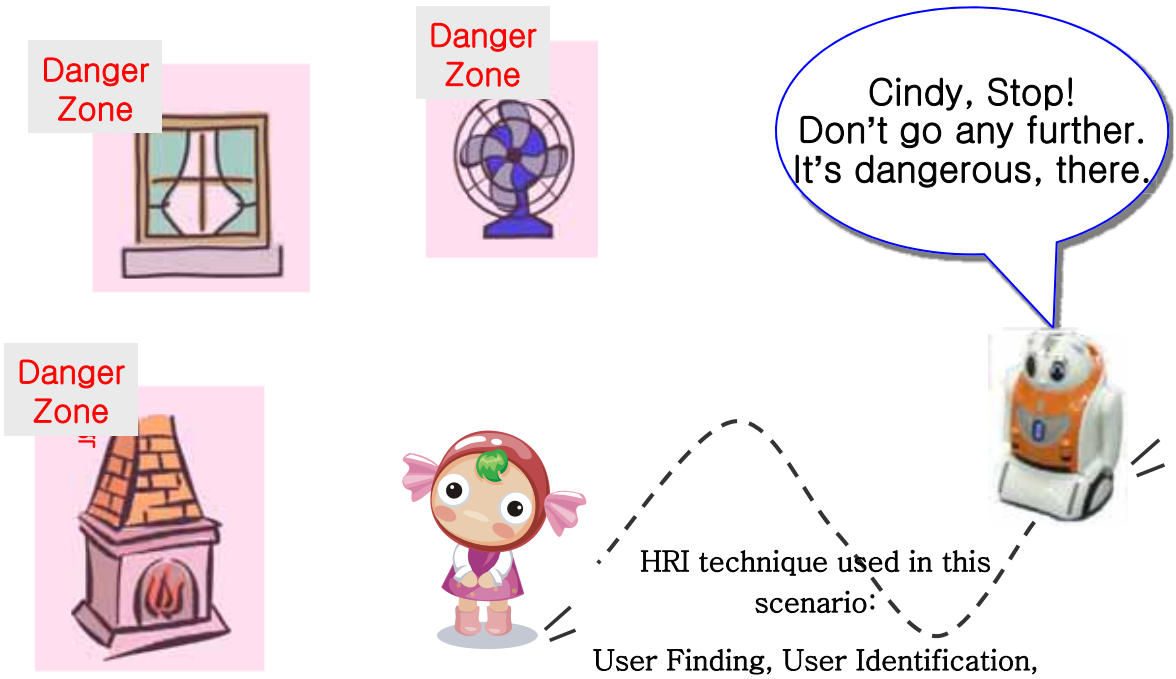
Typical Scenario based on User Identification



HRI technique used in this scenario:

User Identification (speaker recognition, face recognition), Speech recognition, Motion detection, Sound Localization, Text-to-Speech etc.

Kid protection service based on User Identification



HRI technique used in this scenario:

User Finding, User Identification, User following

Difference between Bio API and HRI API

Bio API	HRI API
Human adapts to Bio sensors (camera, FPS, Iris etc.)	Robot adapts to human.
Voice is not considered.	Vision + Voice
Static environments (Fixed sensing environments)	Dynamic environments (Varying sensing environments)
Insensitive to real time processing	Sensitive to real time processing
Robustness to environmental noise is less important.	Robustness to environmental noise is more important.

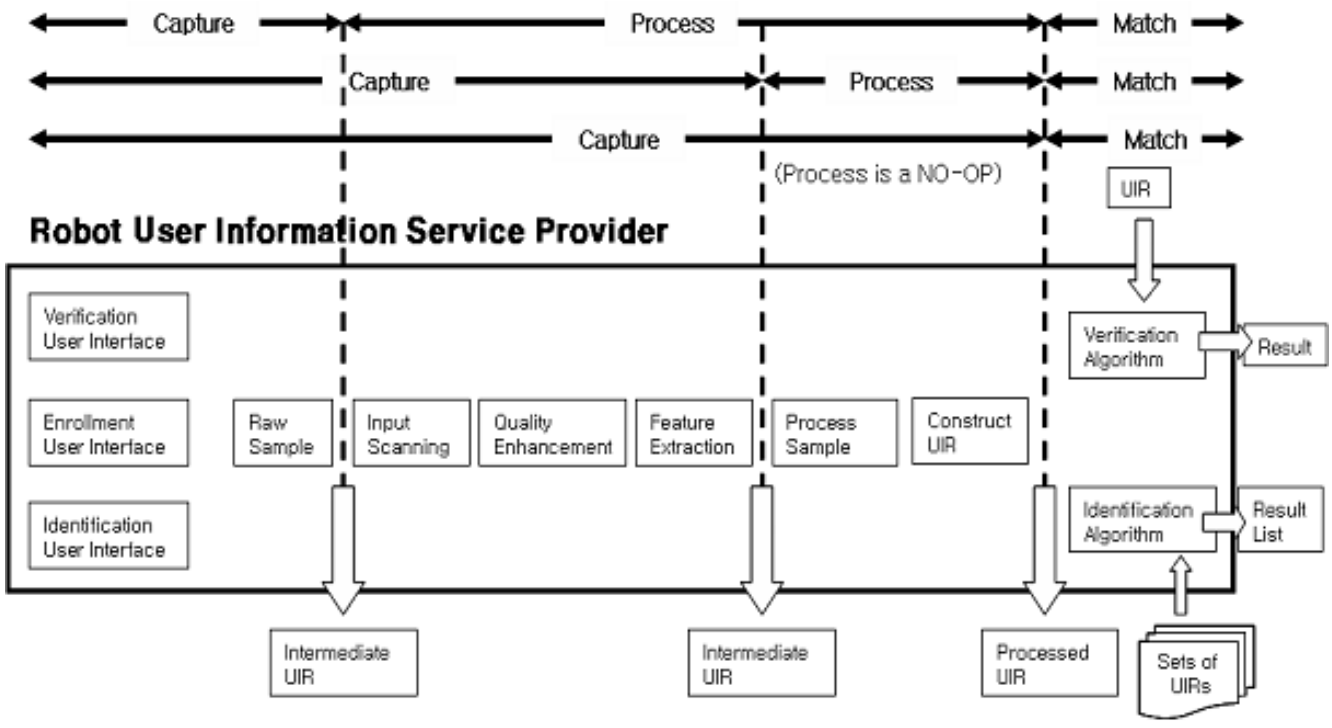
Comparison of Characteristics in Environments

Static environments (Bio API)	Dynamic environments (HRI API)
Face recognition in optimal environment	Face recognition in various environments
Fixed distance	Varying distance
Human following is not considered.	Human following is considered.
Single-modal	Multi-modal
Single person	Multi person

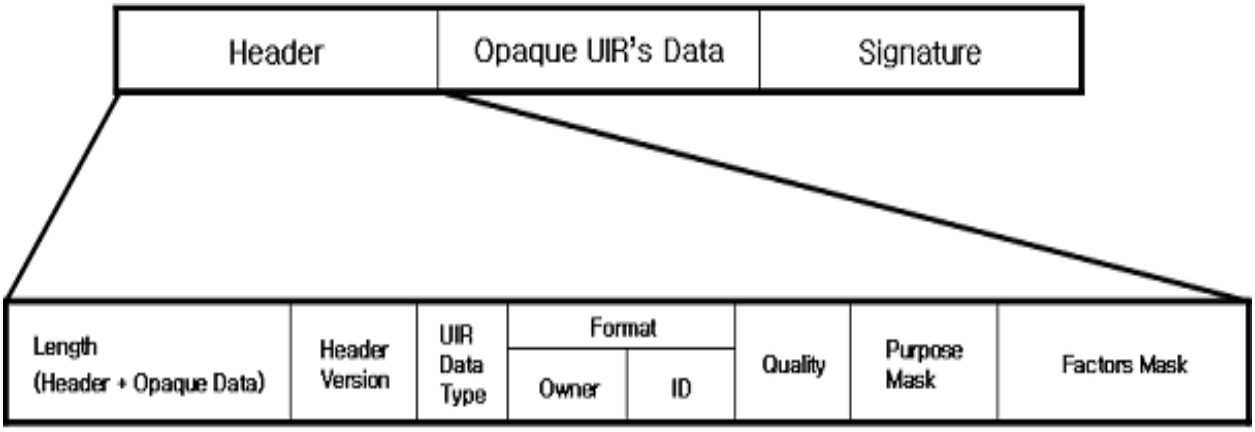
The purpose of user identification standard

This standard specifies the User Identification S/W Component API for mobile robotics Specification that provides one suited for any form of user identification for mobile technology used by user identification system and defines the application interface to cover the basic functions of Enrollment, Verification and Identification.

Propose(1): The Methodology of UI Interface Development



Propose(2):
The Structure of UIR(User Identification Recoder)



[Reference] CBEFF Patron Format

The Applicable fields of industry and its effect

This standard contributes to minimize complications during the application development of User Identification S/W Component for mobile Robots. It also helps to activate application service technologies related to Enrollment, Verification and Identification of users

Conclusions

User identification S/W Component API for mobile robotics is the standard for application program interface. It includes the standard interface of basic functions - Enrollment, Verification and Identification - and the interfaces of user-friendly programs employing User Identification programs for mobile robotics

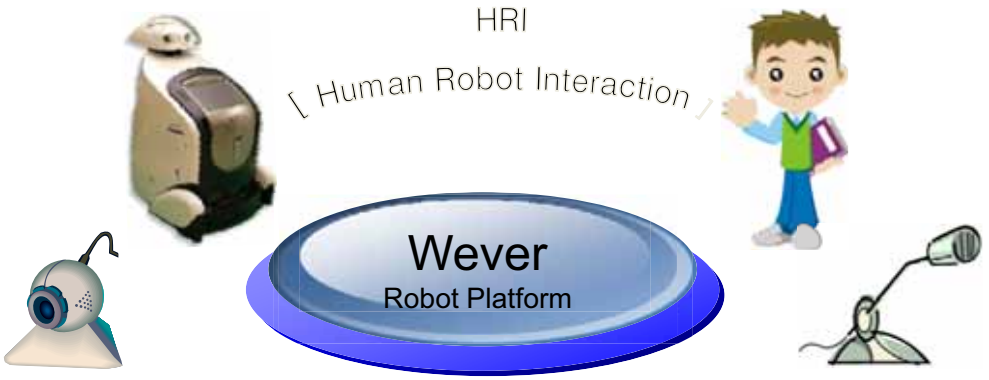
HRI in OMG Robotics

Dr. Su Young, Chi

2008-03-11

HRI Technologies

The advanced technology for natural ways that robot can communicate and cooperate with people



Vision-based Components

- Face recognition/verification
- Semi-Biometrics for user identification
- Gesture recognition
- Caller detection
- Human following
- Behavior analyzer

Auditory-based Components

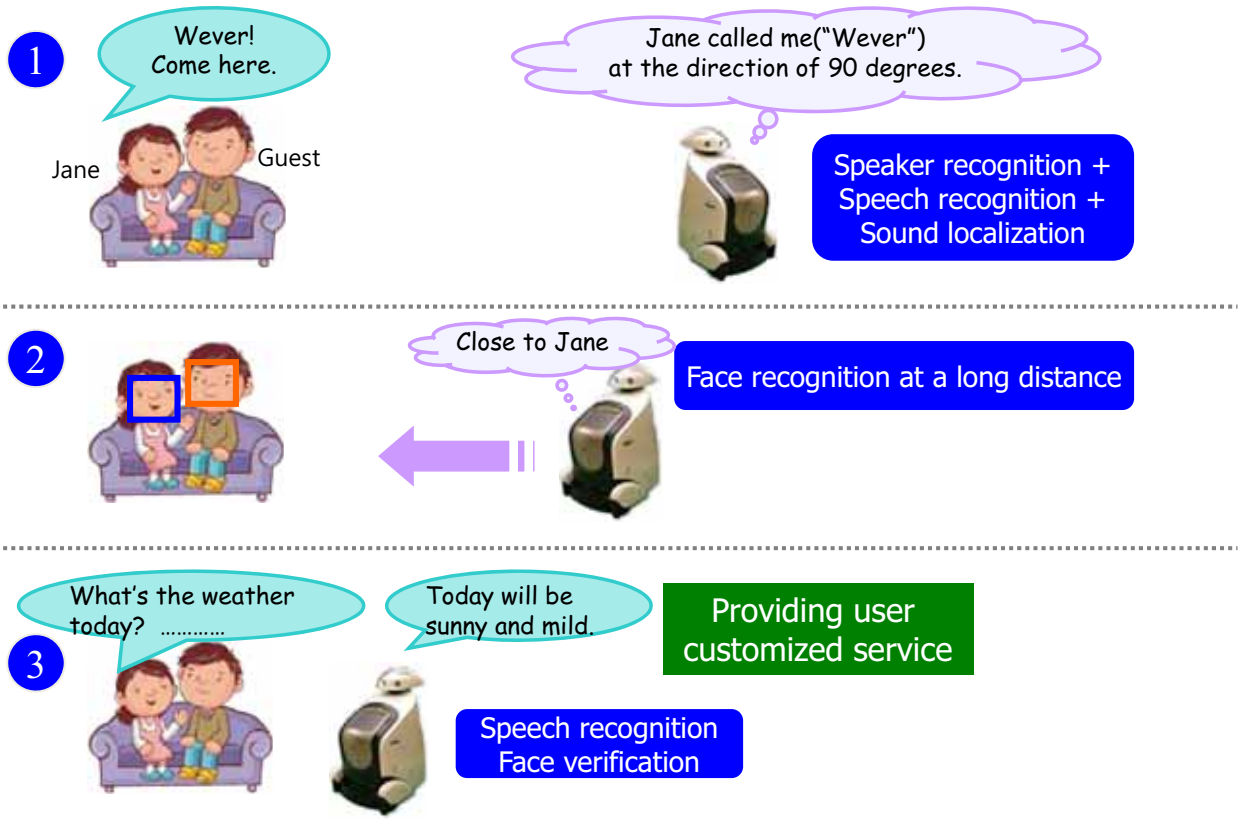
- Text-independent speaker recognition/verification
- Speech recognition
- Sound Localization
- TTS (Text To Speech)

HRI Components

- **User identification**
  - : Recognition of specific user among several people at a long distance
  - – Face recognition (vision-based)
  - – Speaker recognition (auditory-based)
- **Caller identification**
  - : Detection of a specific caller at a long distance
  - – Gesture recognition (vision-based)
  - – Sound localization (auditory-based)
- **Human following**
  - : Recognition of the back of the head as well as the human face even in the case temporal occlusion of other human (vision-based)

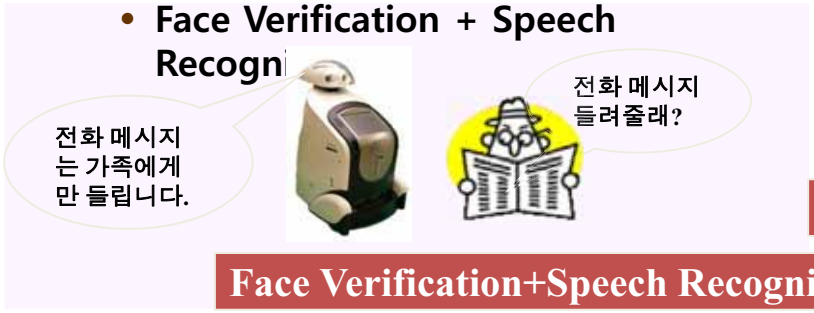
Demo scenario 1

- Intelligent robot "Wever" with HRI technology at home



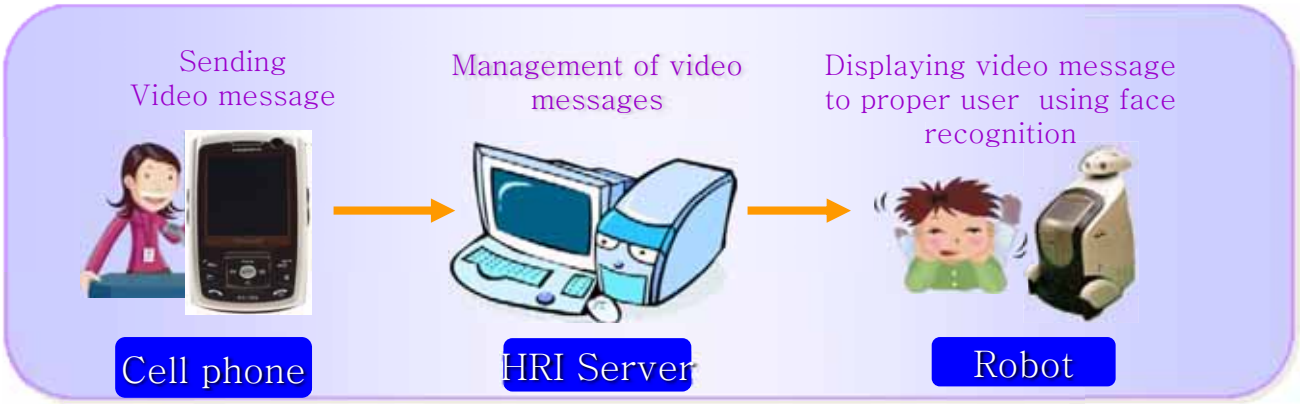
Demo scenario 2

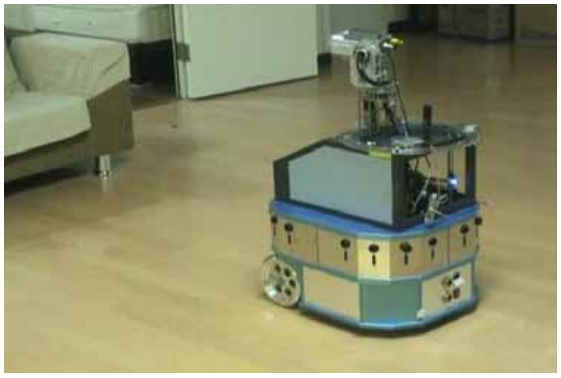
- **Scenario**
  - **People**
    - A: Non Family Member, B: Family Member
  - **Noise Environment**
    - 10dB noise and lighting condition under home
  - **Purpose**
    - Speech recognition + Sound Localization
    - Multi-modal User Recognition(Face + Speaker)
    - Face Verification + Speech Recogn



Demo scenario 3

- Video Messenger using Cell Phone





Position and Orientation

Itsuki Noda
ITRI
AIST

NATIONAL INSTITUTE OF
ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

Relation Between Position Format

- Cartesian

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix}$$

- Polar

$$\begin{pmatrix} r \\ \phi \\ \theta \end{pmatrix}$$

- Geo

$$\begin{pmatrix} lat \\ lon \\ h \end{pmatrix}$$

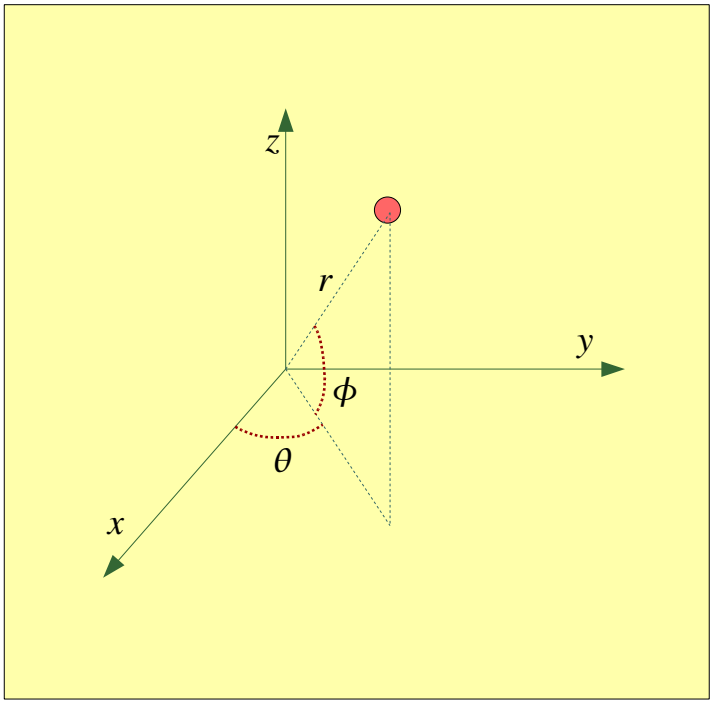
natural cartesian

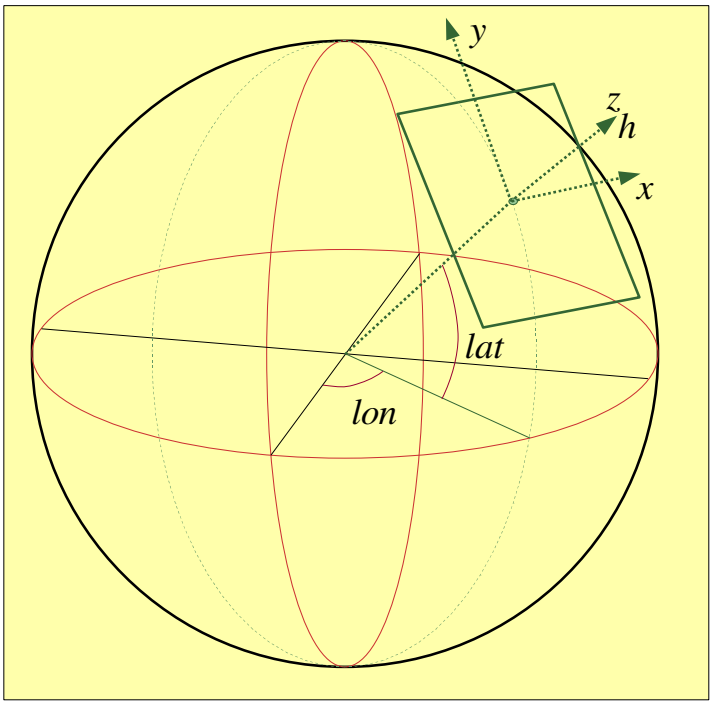
$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} r\cos\phi\cos\theta \\ r\cos\phi\sin\theta \\ r\sin\phi \end{pmatrix} + \begin{pmatrix} x_0 \\ y_0 \\ z_0 \end{pmatrix}$$

natural cartesian

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} K_{lon}\cos(lat)(lon - lon_0) \\ K_{lat}(lat - lat_0) \\ h - h_0 \end{pmatrix}$$

Natural Cartesian





Definition of Orientation

- orientation

$$\begin{pmatrix} roll: & \xi \\ pitch: & \eta \\ yaw: & \zeta \end{pmatrix}$$

  - ➤ transformation of unit vectors

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \rightarrow \begin{pmatrix} \cos\zeta & -\sin\zeta & 0 \\ \sin\zeta & \cos\zeta & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \cos\eta & 0 & \sin\eta \\ 0 & 1 & 0 \\ -\sin\eta & 0 & \cos\eta \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos\xi & -\sin\xi \\ 0 & \sin\xi & \cos\xi \end{pmatrix}$$

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

Meeting Report

- Washington TC Meeting -

Washington (Virginia, USA) – March 11, 2008

Dr. Su Young Chi

Co-chairs : Su Young Chi / Hyun Soo Kim/ Shuichi Nishio

Functional Services WG Report 1

- Candidate title for HRI RFP
  - **User recognition API for Human Robot Interaction (new)**
- Mandatory Requirements
  - 1. Architecture of User Recognition should be defined (diagram or description for overview)
  - 2. Classify the process of User Recognition Service
  - 3. Define the function of each stage
  - 4. Define each API
    - Description of function
    - Name of API
    - Basic Data structure
    - Basic error handling
  - 5. Define PIM using UML

Functional Services WG Report 2

- Optional Requirements
  - 1. Identify additional information of user (such as gender or age)
  - 2. choice of input date type or data format (including multi-modal)
  - 3. consideration of additional sensors (RFID, Bio sensors)
  - 4. example of using APIs

Functional Services WG Report 3

- Candidate New co-chair volunteer is Dr. Hori

Issues to be discussed for next meeting

- Make detailed comparisons between BioApi and UR – API
- Pre-meeting using e-mail for followings by May 2, 2008
  - Scenarios of API needs.
  - Examples of real BioApi sets and UR Api sets in HRI
- Discussion of RFP between May 2 and May 26, 2008, using e-mail.
- Submit initial RFP draft on May 26, 2008
- First review on RFP draft at DTF meeting
- Survey ISO standard of Image processing Api

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	Europe 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

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

Meeting Report

- Washington TC Meeting -

Washington D.C. – March 11, 2008

Schedule

- **Monday**
- AM 10:00 - 12:00 : Discussion of revised submission
- PM 13:00 – 14:00 : Joint Plenary meeting with MARS
- PM 14:00 – 17:00 : Postponing the original meeting
- **Tuesday**
- AM 09:00 – 12:00 : Discussion about revised submission
  - Proper name for RoLo data format
  - Defining parameters for three RoLo data format
- PM 13:00 – 14:00 : WG report and roadmap discussion
- **Wednesday**
- AM 9:00 – 12:00 : Discussion about revised submission
- AM 13:00 – 17:00 : Continuing discussion
- **Thursday**
- AM 9:00 – 12:00 : Discussion about revised submission

Naming RoLo Data Format

- There are 3 candidate names for RoLo Data Format
  - RoLo Common Data Format
  - RoLo Basic Data Foramt
  - RoLo Essential Data Format

  Note: Meaning of each candidate in the english-english dictionary

  Common: *shared by two or more parties*

  Basic: *reduced to the simplest and most significant form possible without loss of generality*

  Essential: *Basic and fundamental; of the greatest importance*

- Choose one proper word in this session !!

RoLo Data Format

- We define three types of RoLo data format
  - Based on coordinate system
    - Cartesian
    - Polar
    - Geodetic (GPS)
- The parameters in all three RoLo data format
  - Position : 3-dimensional position
  - Orientation : 3-dimensional orientation (e.g., roll, pitch, yaw)
  - Timestamp : POSIX time
  - ID

Interface and UML

- Mr. Nishio and Mr. Sakamoto suggest one example of UML diagram for Robotic Localization Service
  - We will discuss it Wednesday meeting
- We will try to write down revised submission until Thursday meeting

Roadmap

Item	Status	Washington D.C Mar-2008	Ottawa June-2008	Orlando Sep-2008	Santa Clara Dec-2008	Washington D.C Mar-2009	Europe June-2009
Localization Service	On-going	Discussion for revised submission	Revised Submssion & AB	Cancel	Finalization Task	Finalization Task	Finalizatio n Task

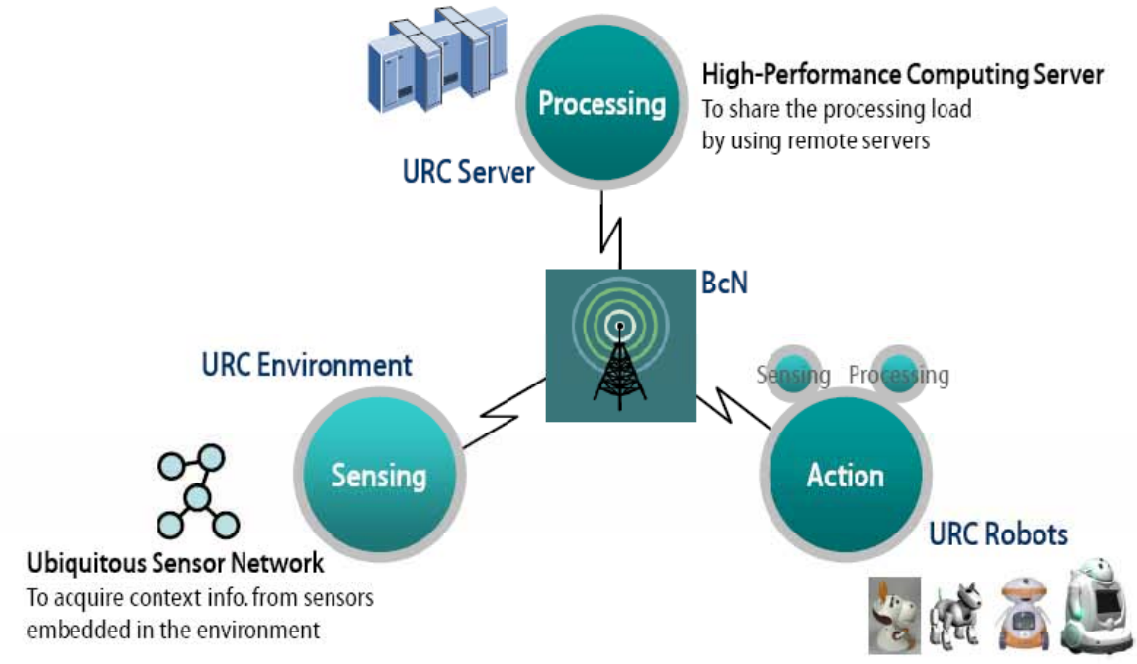
KIRSF – Contact Report

Robotics DTF (Washington DC Meeting)
Date: March 11, 2008
Reporter: Yun Koo Chung

1. 1st stage of URC (Ubiquitous Robotic Companion) project has been conducted from Feb. 2004 to Feb. 2008.
   - URC concepted technology has been developed for 4 years and its reference business model has been implemented for the last 2 years.
   - It provided RUPIver1.0, RUPI ver1.2 and RUPI ver 2.0 for URC standard specifications.
   - RUPI ver 2.0 consists of 27 specifications.
   - URC Project contributed to developing many network robot technologies and standard specifications.
   - It established the standard testing processes with certification process of robotic performance for quality verification of network robot products.

※ KIRSF: Korean Intelligent Robot Standardization Forum

Basic Concept of URC (Ubiquitous Robotic Companion)



1st 4 years stage of URC project and business

Robotics/2008-3-

KIRSF – Contact Report

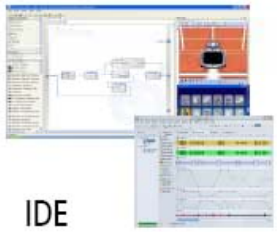
Robotics DTF (Washington DC Meeting)
Date: March 11, 2008
Reporter: Yun Koo Chung

2. RUPI 2.0 – Background

- Background of Defining Specifications
  - Implement Reference Models by 2008
  - Consider Urgent Requirements of Robot Companies
  - Actually Helpful to Robot Companies

- Scope
  - Rich-Client Robots + Thin-Client Robots
  - Robot S/W Platform
  - URC Server S/W
  - Communication Protocol
  - Robot Contents
  - Integrated Development Environment
  - Application Components

Scope of RUPI



IDE
(Integrated Development Environment)

Robot Contents
Management Server

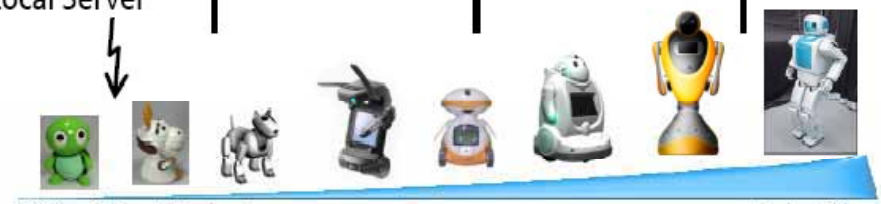
URC Server

Robot Contents
Provide Server

Network

Local Server

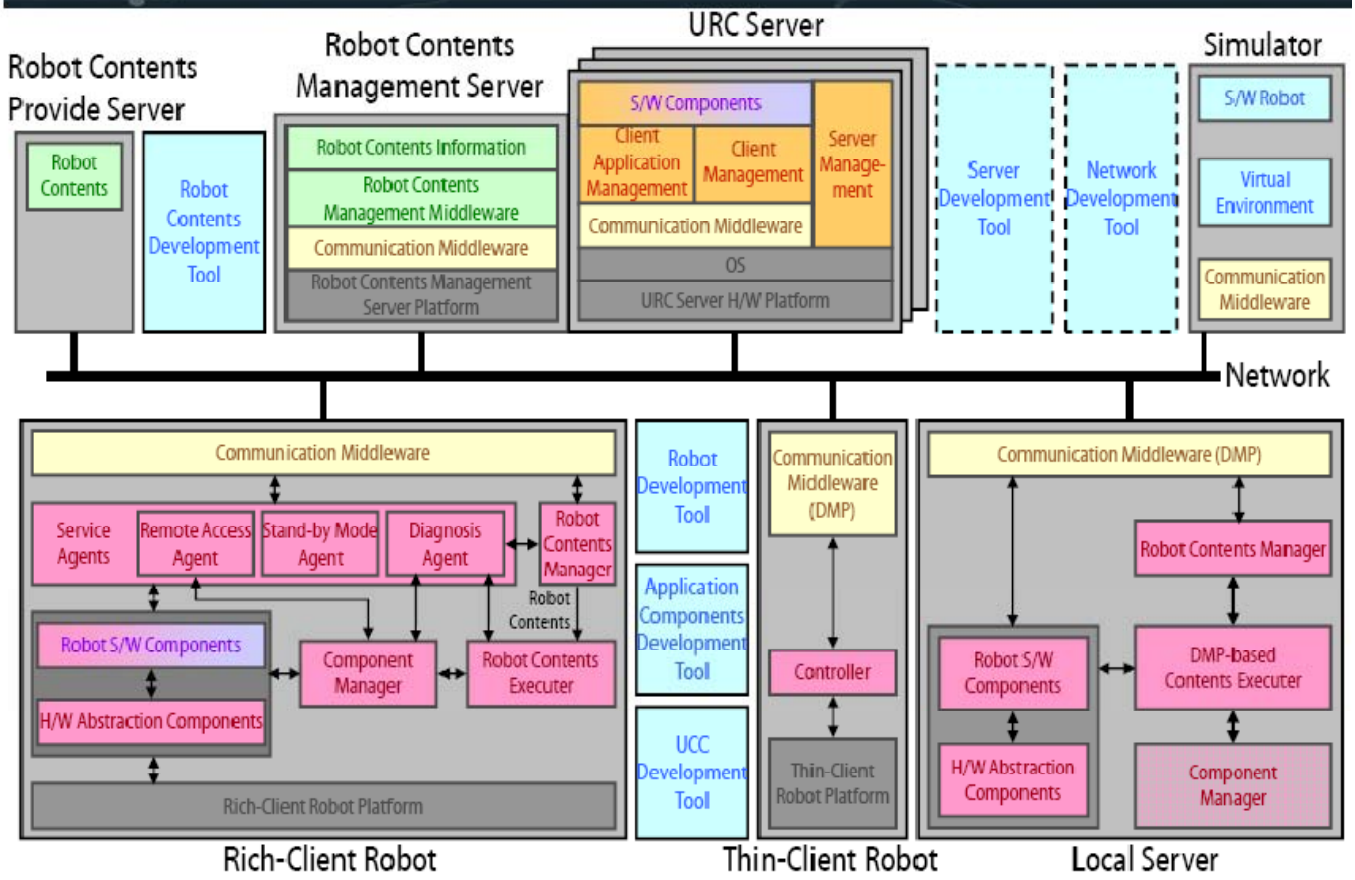
Simulator



Thin-Client Robot

Rich-Client Robot

Overall Configuration of RUPI 2.0



Robotics-DTF Plenary Meeting
Closing Session

March 10th, 2008

Arlington, VA, USA

Hyatt Regency Cristal City

at Reagan National Airport

Document Number

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)

Document Number

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 Hyunsoo Kim)

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
  - Not from Japan and Korea
  - Election will be held upcoming Washington DC Technical Meeting

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

Next Meeting Agenda

June 23-27(Ottawa, Canada)

Monday:

Steering Committee (morning)
Revised Submission presentation (am)
WG activity [Parallel WG Session] (pm)

Tuesday:

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

Wednesday:

WG activity follow-up [if necessary]

Thursday:

Revised Submission Recommendation (am)

Special Talk Candidates

- Robotics Project in Japan
  Prof. Sato (University of Tokyo, Japan)
- RUPI Project
  Dr. Hyun Kim (ETRI)
- Someone from local area

Attendee

- Fumio Ozaki (Toshiba)
- Heung-Jae Cho (KAIRA)
- Hyun-Seo 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)

Robotics Domain Task Force Preliminary Agenda ver0.0.1 robotics/2008-03-16

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	
9:45	10:00	Robotics		Robotics-DTF Plenary Opening Session	Robotics plenary openning	
10:00	11:00			Robotic Localization Service - Revised Submission Presentation - Kyuseo Han (ETRI) and Yeon Ho Kim (Samsung)	presentation, discussion, Vote-to-vote and Voting	
11:00	12:00			Robotic User Recoginition RFP 1st Review	presentation and discussion	
12:00	13:00					
13:00	18:00			Architecture Board Plenary		
13:00	18:00	Robotics		Robotic Localization Services WG (5h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	
				Services WG(5h): Human Robot Interaction RFP draft Meeting - Su-Young Chi and Hyunsoo Kim	discussion	
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	
				Services WG(3h): Human Robot Interaction RFP draft Meeting - Su-Young Chi and Hyunsoo Kim	discussion	
12:00	13:00			**LUNCH**		
13:00	14:00	Robotics		Special Talk: RUPI Project Report [tentative] - Hyun Kim (ETRI) [candidate]	presentation and discussion	
14:00	15:00	Robotics		Special Talk: Robotics Project in Japan [tentative] - Tomomasa SATO (Univ. of Tokyo) [candidate]	presentation and discussion	
				Break (30min)		
15:30	16:30	Robotics		WG Reports and Roadmap Discussion (Service WG, Profile WG, Robotic Localization Service WG)	presentation and discussion	
16:30	17:10	Robotics		Contact Reports: - Makoto Mizukawa(Shibaura-IT), and Yun-Koo Chung(ETRI)	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	
Wednesday WG activity follow-up						
9:00	12:00	Robotics		Robotic Localization Services WG (3h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	
				Services WG(3h): Human Robot Interaction RFP draft Meeting - Su-Young Chi and Hyunsoo Kim	discussion	
12:00	14:00			**LUNCH and OMG Plenary**		
14:00	18:00	Robotics		Robotic Localization Services WG (3h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	
				Services WG(3h): Human Robot Interaction RFP draft Meeting - Su-Young Chi and Hyunsoo Kim	discussion	
18:00	20:00			**OMG Reception**		
Thursday WG activity follow-up						
9:00	11:00	Robotics		Robotic Localization Services WG (2h) - Kyuseo Han, Yeon-Ho Kim and Shuichi Nishio	discussion	
11:00	12:00	Robotics		Robotics-DTF Plenary Voting of Robotic Localization Service	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

Query Conditions

Itsuki Noda
ITRI
AIST

AIST
NATIONAL INSTITUTE OF
ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY (AIST)

Necessity of Query Condition

- Suppose that a wide-range sensor detect hundreds of object in a timeshot.
  - ➤When a robot is interested in a certain area, it likes to get only location information of objects in the area.
- Suppose that a location database aggregates and store a large number of location information over time.
  - ➤A robot like to get information about interesting location and time.

getLocationByFilter

- getLocationByFilter(
  in Filter filter,
  out RoLoValueList roloValueList)
  - filter ::= filter condition
    - Filter: a DOM element class of Filter XML encoding used in WFS.
  - roloValueList ::= list of results of location information.

Filter Encoding in WFS

- WFS: Web Feature Service
  - a protocol to access geographic database as a web service.
- Filter Encoding
  - a (only) way to specify query condition in WFS.
  - includes
    - general comparison operators
    - spacial condition operators
    - logical operators (and/or/not)

Filter Encoding in WFS(1)

```
Filter ::= SpatialForm | ComparisonForm | LogicalForm


LogicalForm ::= LogicalAtom | LogUnaryForm
                | LogBinaryForm

LogicalAtom ::= <True/> | <False/>

LogUnaryForm ::= <Not> Filter </Not>

LogBinAryForm ::= <And> Filter* </And>
                | <Or> Filter* </Or>
```


Filter Encoding in WFS(2)

```
SpatialForm ::=   <Equal> PropAndGeo </Equal>
                | <Disjoint> PropAndGeo </Disjoint>
                | <Touch> PropAndGeo </Touch>
                | <Within> PropAndGeo </Within>
                | <Overlaps> PropAndGeo </Overlaps>
                | <Crosses> PropAndGeo </Crosses>
                | <Intersects> PropAndGeo </Intersects>
                | <Contans> PropAndGeo </Contains>
                | <DWithin> PropAndGeo </DWithin>
                | <BBox> PropAndGeo </BBox>
                | <DWithin> PropAndGeo </DWithin>
                | <BBox> PropAndGeo </BBox>

PropAndGeo ::= <PropertyName> XPath </PropertyName>
                 Geometry
```

Filter Encoding in WFS(3)

```
ComparisonForm ::=
    <PropertyIsEqualTo> PropAndValue </PropertyIsEqualTo>
    <PropertyIsNotEqualTo> PropAndValue </PropertyIsNotEqualTo>
    <PropertyIsLessThan> PropAndValue </PropertyIsLessThan>
    <PropertyIsGreaterThan> PropAndValue </PropertyGreaterThan>
    <PropertyIsLessThanOrEqualTo> PropAndValue </PropertyIsLessThan
    <PropertyIsGreaterThanOrEqualTo> PropAndValue </PropertyGreater
    <PropertyIsLike>PropAndValue</PropertyIsLike>
    <PropertyIsNull>PropAndValue</PropertyIsNull>
    <PropertyIsBetween> PropAndValue2 </PropertyIs Between>

PropAndValue ::= <PropertyName> XPath </PropertyName>
                 ValueForm
PropAndValue2 ::= <PropertyName> XPath </PropertyName>
                 ValueForm ValueForm
ValueForm ::= <Literal> literal-string </Literal>
            | <Add> ValueForm ValueForm </Add>
            | <Sub> ... </Sub>
```


Filter Sample

filter data whose ID is 572785

```
<Filter>
  <PropertyIsEqualTo>
    <PropertyName>ID</PropertyName>
    <Literal>572785</Literal>
  </PropertyIsEqualTo>
</Filter>
```

filter data whose Time is before 12:20 (EST) on March 12th, 2008

```
<Filter>
  <PropertyIsLessThan>
    <PropertyName>Time</PropertyName>
    <Literal>2008-03-12T12:20:00-04:00</Literal>
  </PropertyIsLessThan>
</Filter>
```

Filter Sample (2)

filter data whose Position within (13.09,31.58)-(25.54,42.81)

```
<Filter>
  <Within>
    <PropertyName>Position</PropertyName>
    <gml:Envelope srsName="urn:RoLo:myCoordSystem1234">
      <gml:lowerCorner>13.09 31.58</gml:lowerCorner>
      <gml:upperCorner>35.54 42.81</gml:upperCorner>
    </gml:Envelope>
  </Within>
</Filter>
```


Filter Sample (3)

filter data whose Position within (13.09,31.58)-(25.54,42.81)
and whose Time is before 12:20 (EST) on March 12th, 2008.

```
<Filter>
  <And>
    <Within>
      <PropertyName>Position</PropertyName>
      <gml:Envelope srsName="urn:RoLo:myCoordinateSystem12345">
        <gml:lowerCorner>13.09 31.58</gml:lowerCorner>
        <gml:upperCorner>35.54 42.81</gml:upperCorner>
      </gml:Envelope>
    </Within>
    <PropertyIsLessThan>
      <PropertyName>Time</PropertyName>
      <Literal>2008-03-12T12:20:00-04:00</Literal>
  </And>
</Filter>
```

Mapping from Previous APIs

- getLocalizationResult(out numOfObjects,
  out roLoInfoSequence)
  - → getLocationByFilter("<Filter><True/></Filter>",
    out roLoInfoSequence)
- getTargetLocalizatoinResult(in targetID,
  out numOfObjects,
  out roLoInfoSequence)
  - → getLocationByFilter(
    "<Filter><EqualTo>
    <PropertyName>ID</PropertyName>
    <Literal> ***targetID*** </Literal>
    </EqualTo></Filter>",
    out roLoInfoSequence)

Pros and Cons of Introduction of Filter

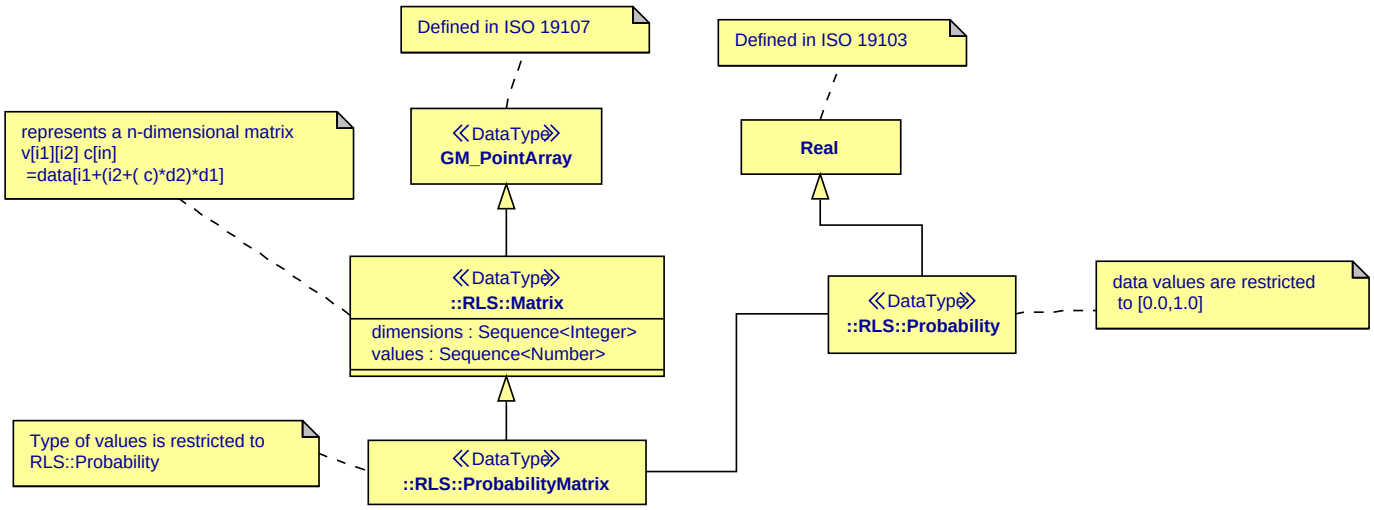
- Pros
  - flexible API that will cover various situation of localization service
- Cons
  - too complex for small devices?
    - Such devices can restricts the capabilities in the negotiation.
    - This can be optional specification rather than mandatory.

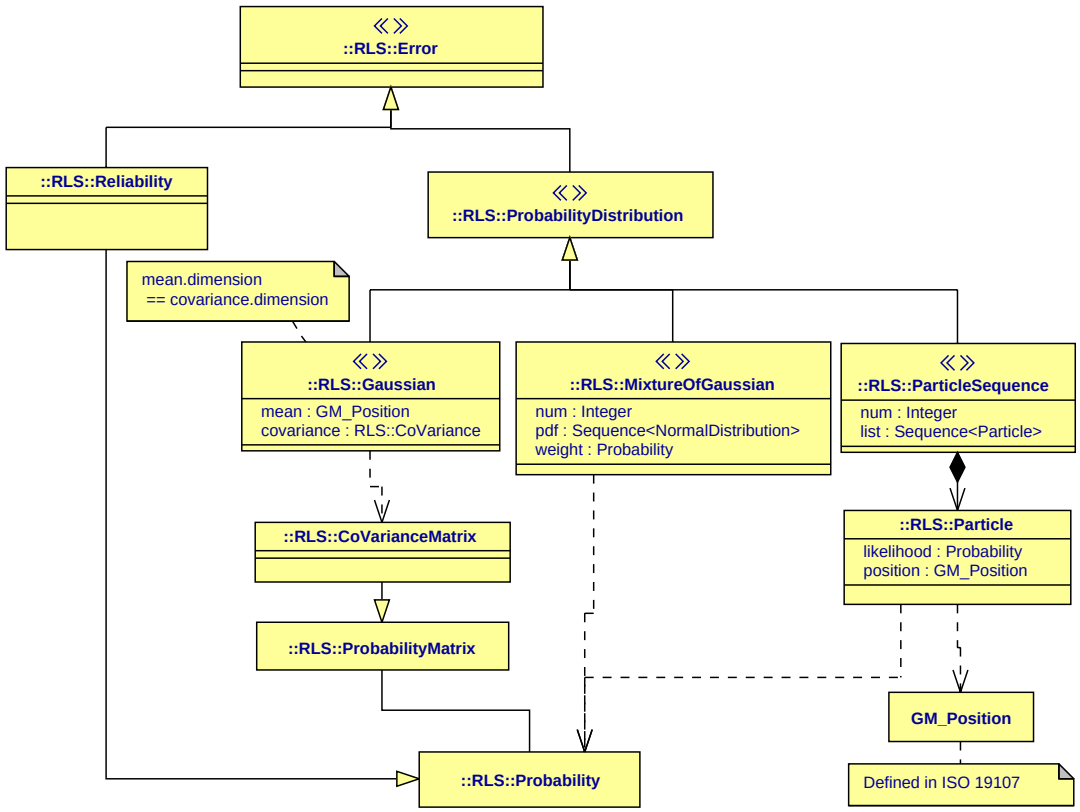
Capability Expression

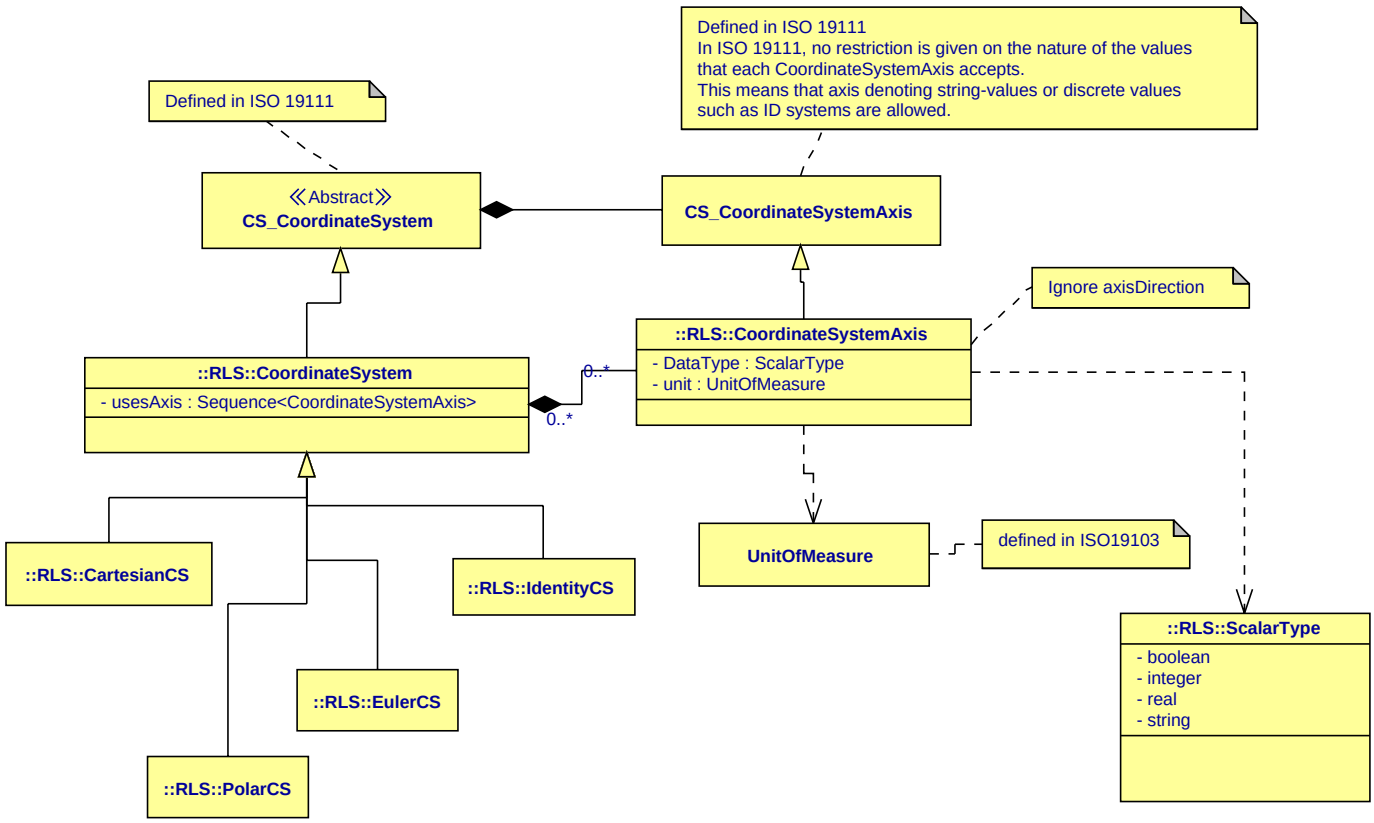
- In WFS's Filter-Encoding specification, OGC defines how to inform capabilities of expression for a certain service.

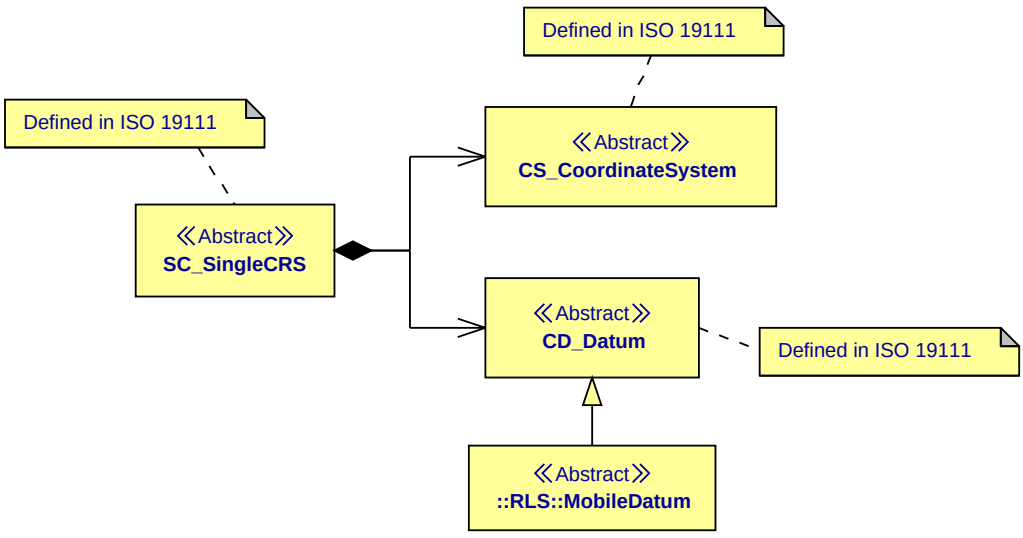
```
<ogc:Filter_Capabilities>
  <ogc:Spatial_Capabilities>
    <ogc:GeometryOperands>
      <ogc:GeometryOperand>gml:Envelope</ogc:GeometryOperand>
    </ogc:GeometryOperands>
    <ogc:SpatialOperators>
      <ogc:SpatialOperator name="Within"/>
    </ogc:SpatialOperators>
  </ogc:Spatial_Capabilities>
  <ogc:Scalar_Capabilities>
    <ogc:LogicalOperators/>
    <ogc:ComparisonOperators>
      <ogc:ComparisonOperator>LessThan</ogc:ComparisonOperator>
      <ogc:ComparisonOperator>GreaterThan</ogc:ComparisonOperator>
      <ogc:ComparisonOperator>LessThanEqualTo</ogc:ComparisonOperator>
      <ogc:ComparisonOperator>GreaterThanEqualTo</ogc:ComparisonOperator>
      <ogc:ComparisonOperator>EqualTo</ogc:ComparisonOperator>
   </ogc:ComparisonOperators>
  </ogc:Scalar_Capabilities>
</ogc:Filter_Capabilities>
```

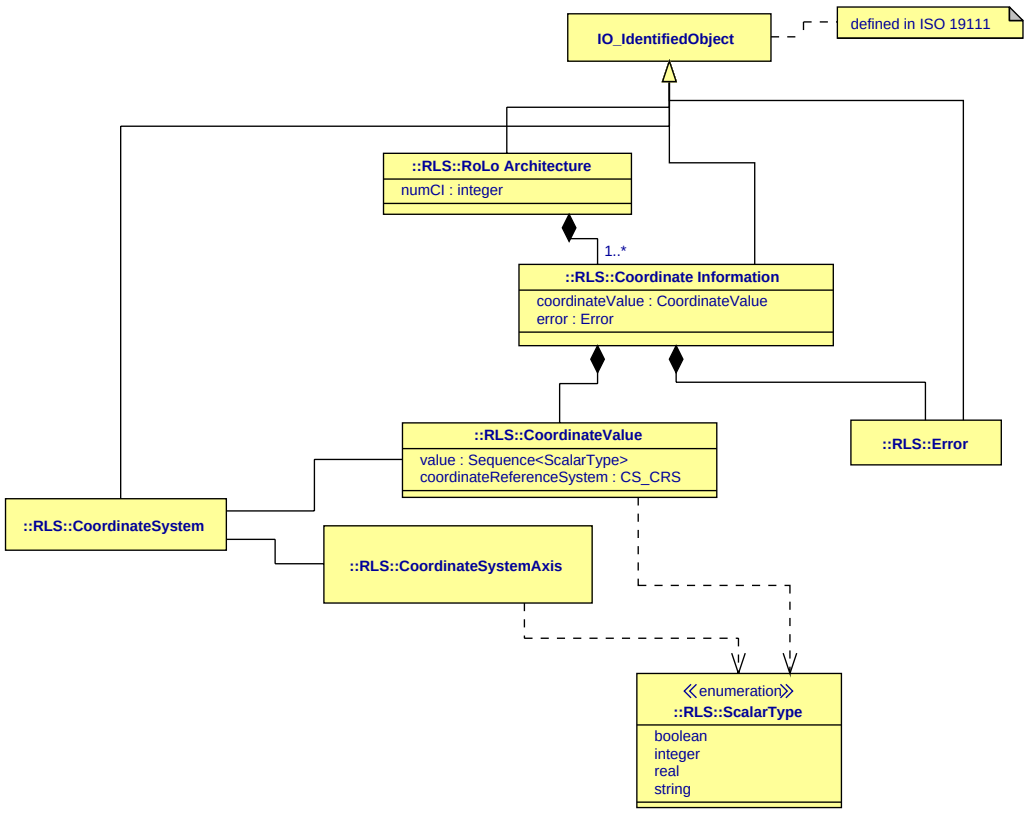
robotics/2008-03-18

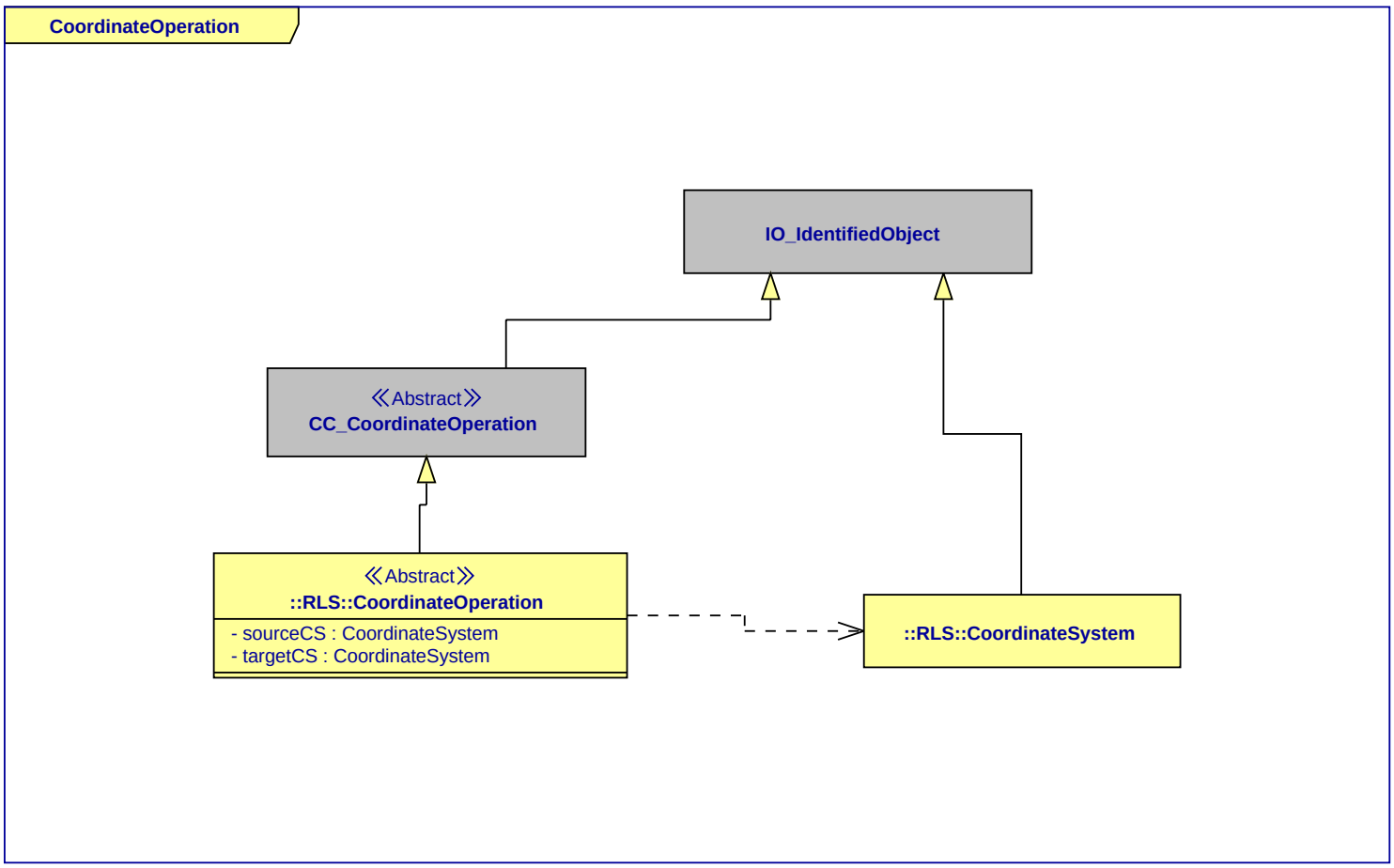


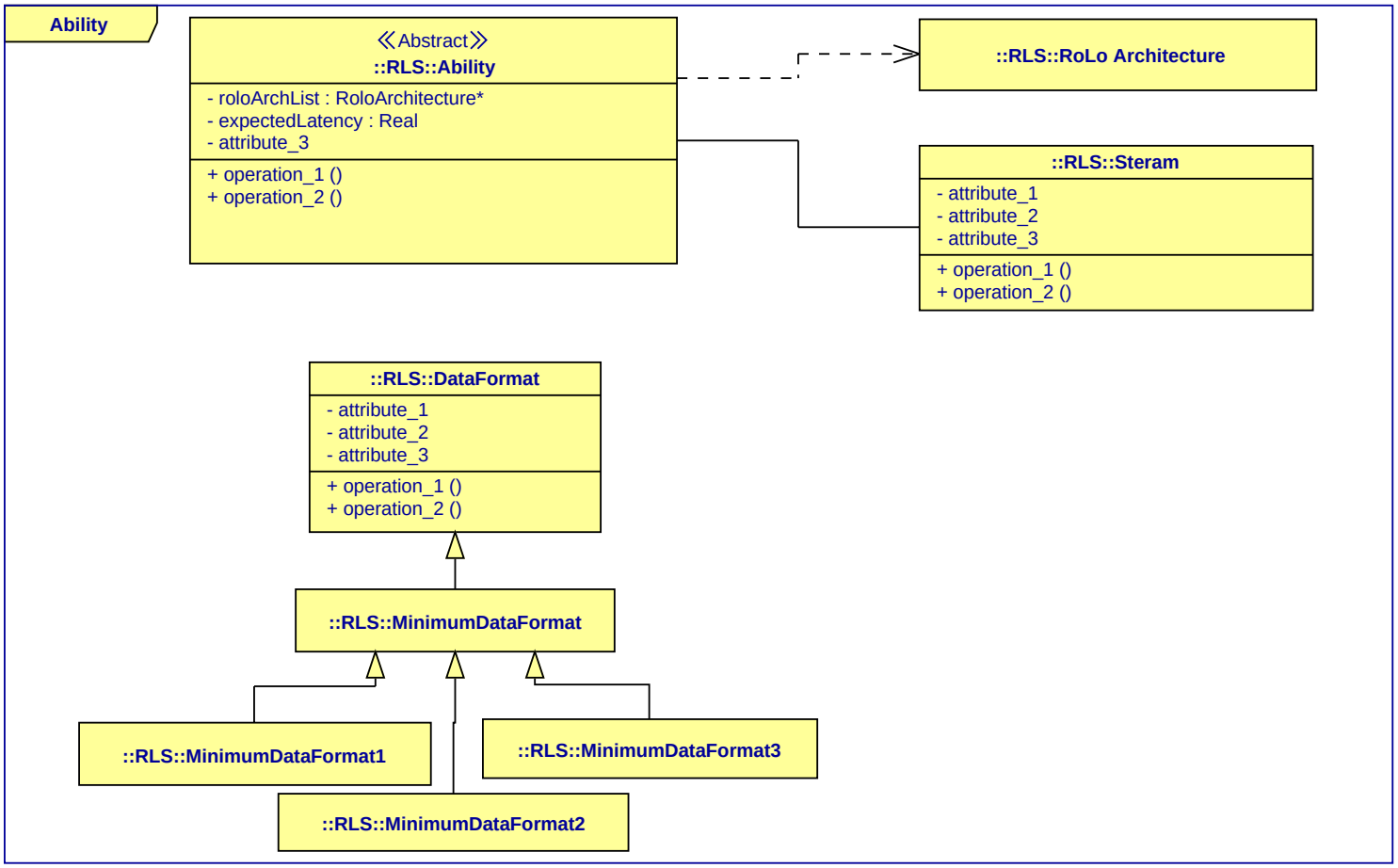


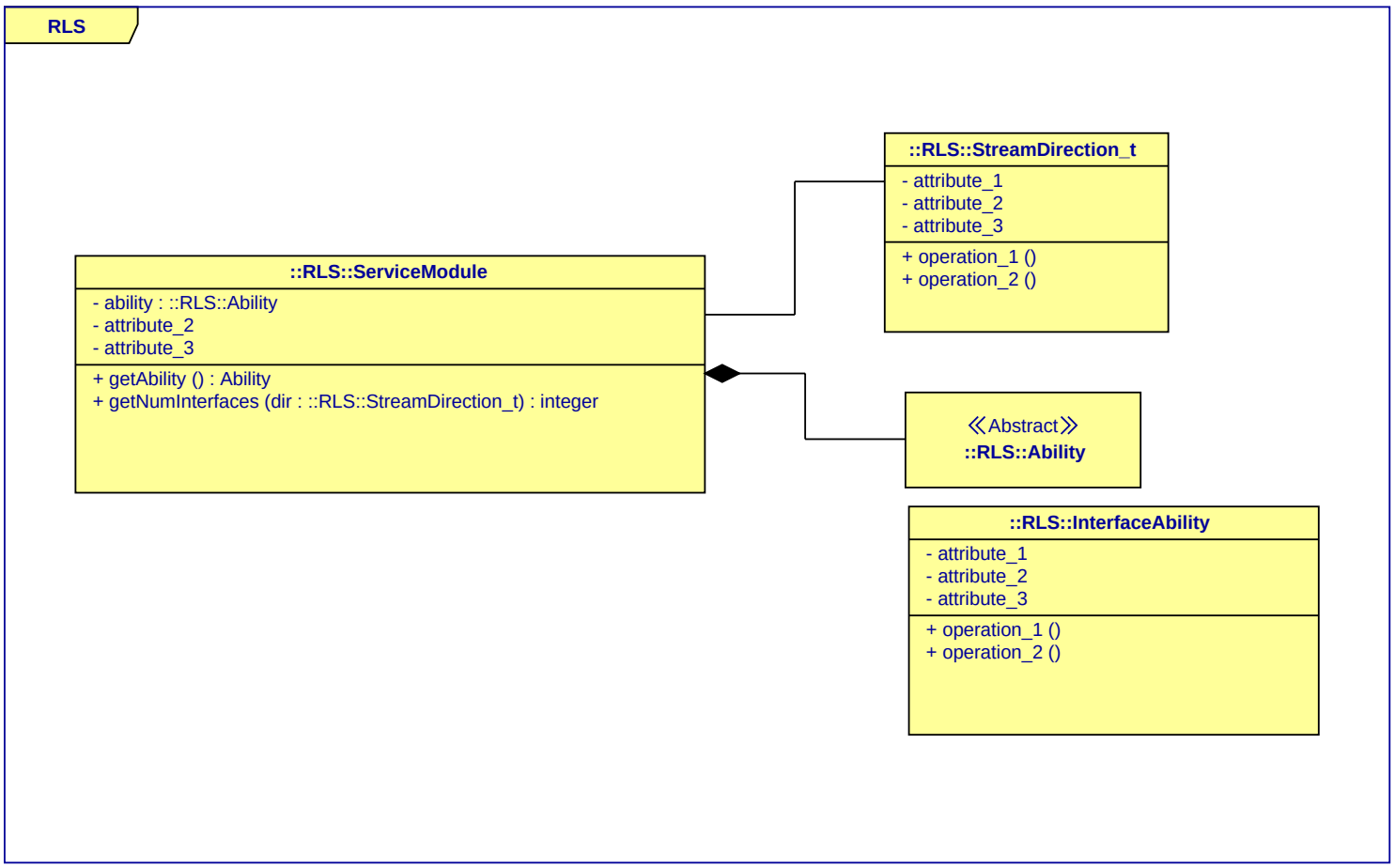

Defined in ISO 19111
In ISO 19111, no restriction is given on the nature of the values
that each CoordinateSystemAxis accepts.
This means that axis denoting string-values or discrete values
such as ID systems are allowed.
Defined in ISO 19111
«Abstract»
CS_CoordinateSystem
CS_CoordinateSystemAxis
Ignore axisDirection
::RLS::CoordinateSystemAxis
- DataType : ScalarType
- unit : UnitOfMeasure
::RLS::CoordinateSystem
- usesAxis : Sequence<CoordinateSystemAxis>
0..*
0..*
::RLS::CartesianCS
::RLS::IdentityCS
UnitOfMeasure
defined in ISO19103
::RLS::ScalarType
- boolean
- integer
- real
- string
::RLS::EulerCS
::RLS::PolarCS

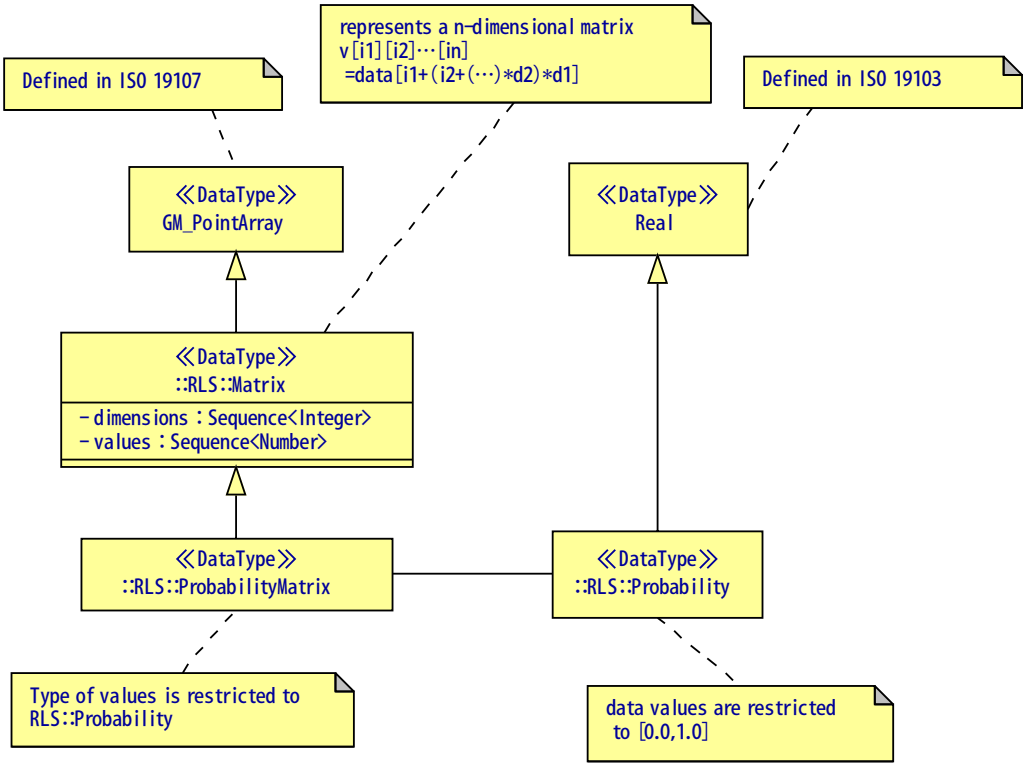

Defined in ISO 19111
Defined in ISO 19111
«Abstract»
CS_CoordinateSystem
«Abstract»
SC_SingleCRS
«Abstract»
CD_Datum
Defined in ISO 19111
«Abstract»
::RLS::MobileDatum

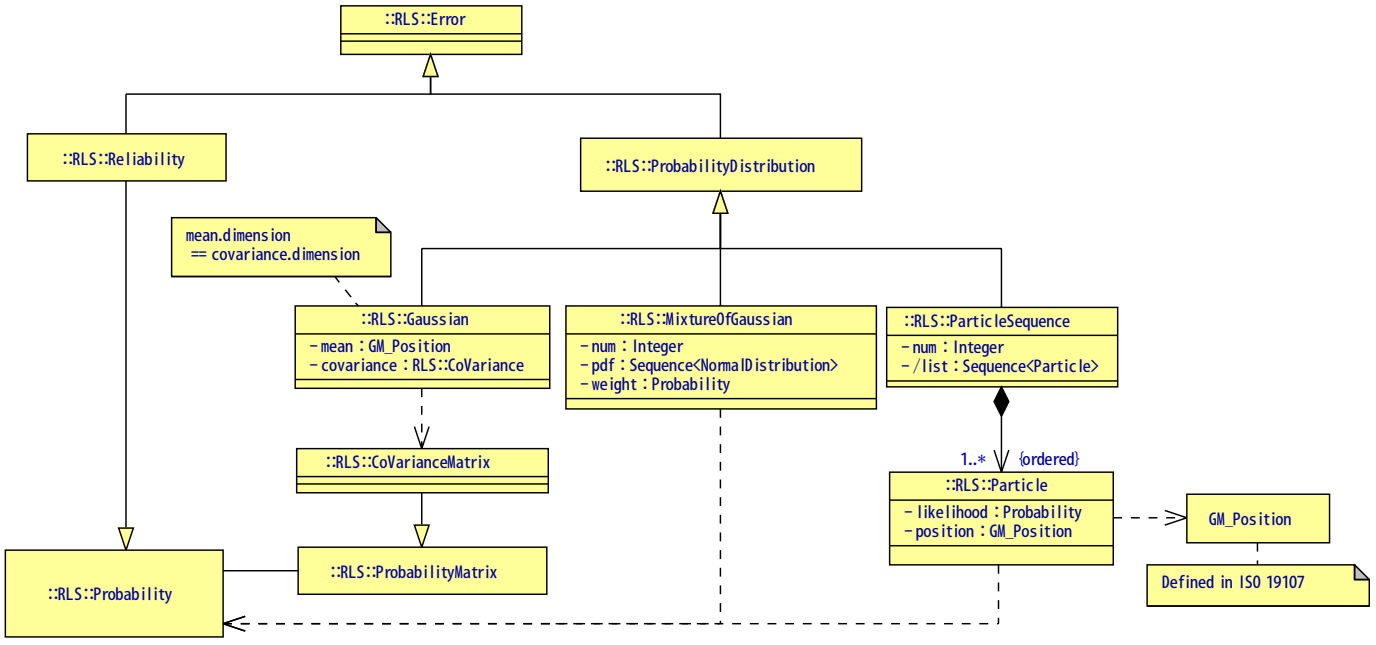

IO_IdentifiedObject
defined in ISO 19111
::RLS::RoLo Architecture
numCI : integer
1..*
::RLS::Coordinate Information
coordinateValue : CoordinateValue
error : Error
::RLS::CoordinateValue
value : Sequence<ScalarType>
coordinateReferenceSystem : CS_CRS
::RLS::Error
::RLS::CoordinateSystem
::RLS::CoordinateSystemAxis
≪enumeration≫
::RLS::ScalarType
boolean
integer
real
string

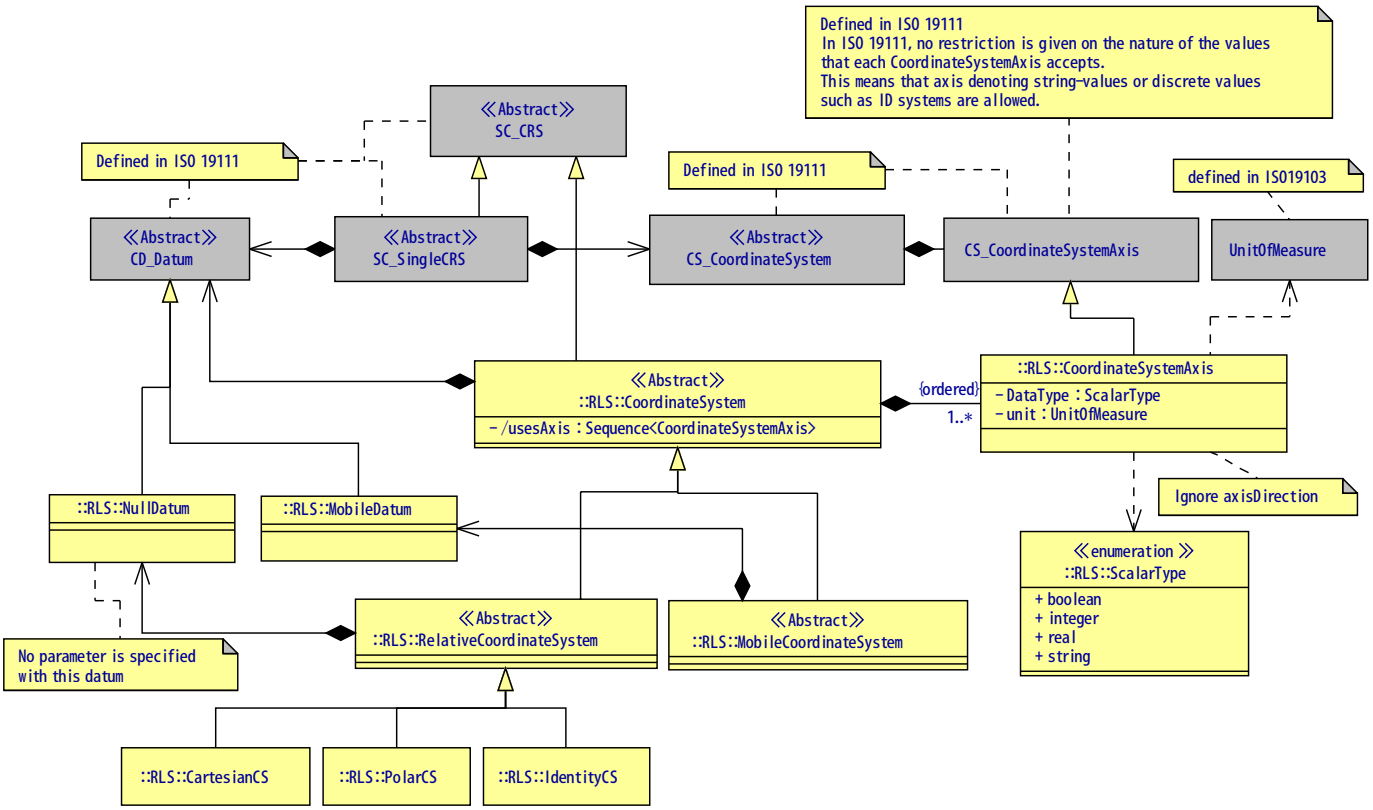

CoordinateOperation
IO_IdentifiedObject
≪Abstract≫
CC_CoordinateOperation
≪Abstract≫
::RLS::CoordinateOperation
- sourceCS : CoordinateSystem
- targetCS : CoordinateSystem
::RLS::CoordinateSystem

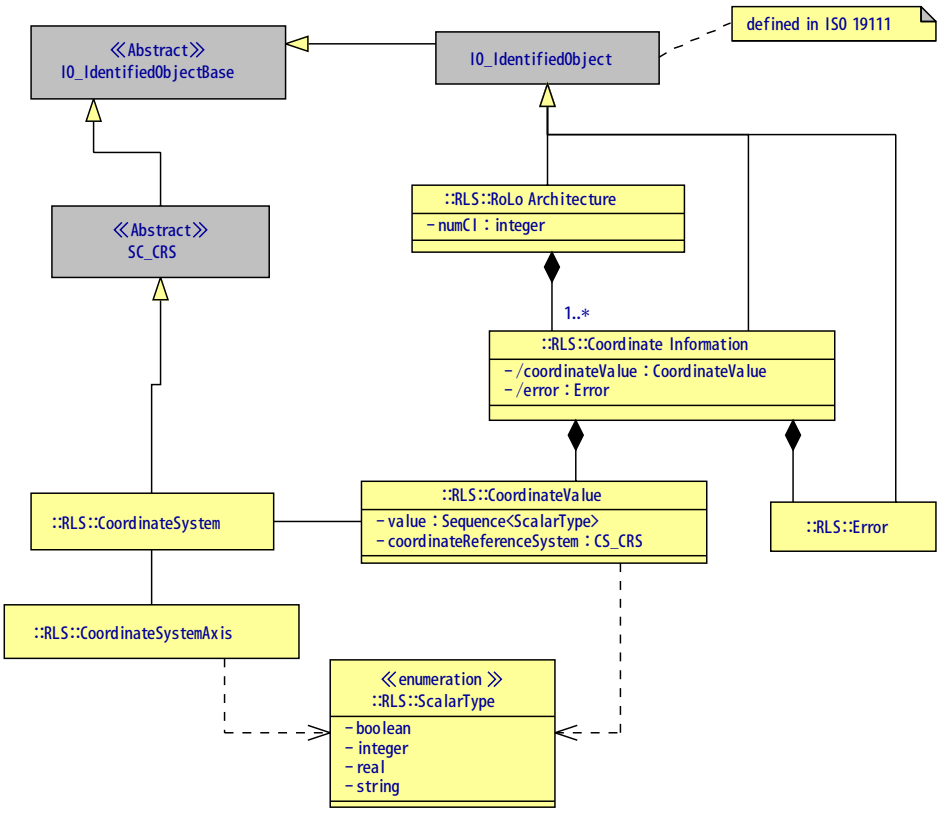

Ability
≪Abstract≫
::RLS::Ability
- roloArchList : RoloArchitecture*
- expectedLatency : Real
- attribute_3
+ operation_1 ()
+ operation_2 ()
::RLS::RoLo Architecture
::RLS::Steram
- attribute_1
- attribute_2
- attribute_3
+ operation_1 ()
+ operation_2 ()
::RLS::DataFormat
- attribute_1
- attribute_2
- attribute_3
+ operation_1 ()
+ operation_2 ()
::RLS::MinimumDataFormat
::RLS::MinimumDataFormat1
::RLS::MinimumDataFormat3
::RLS::MinimumDataFormat2

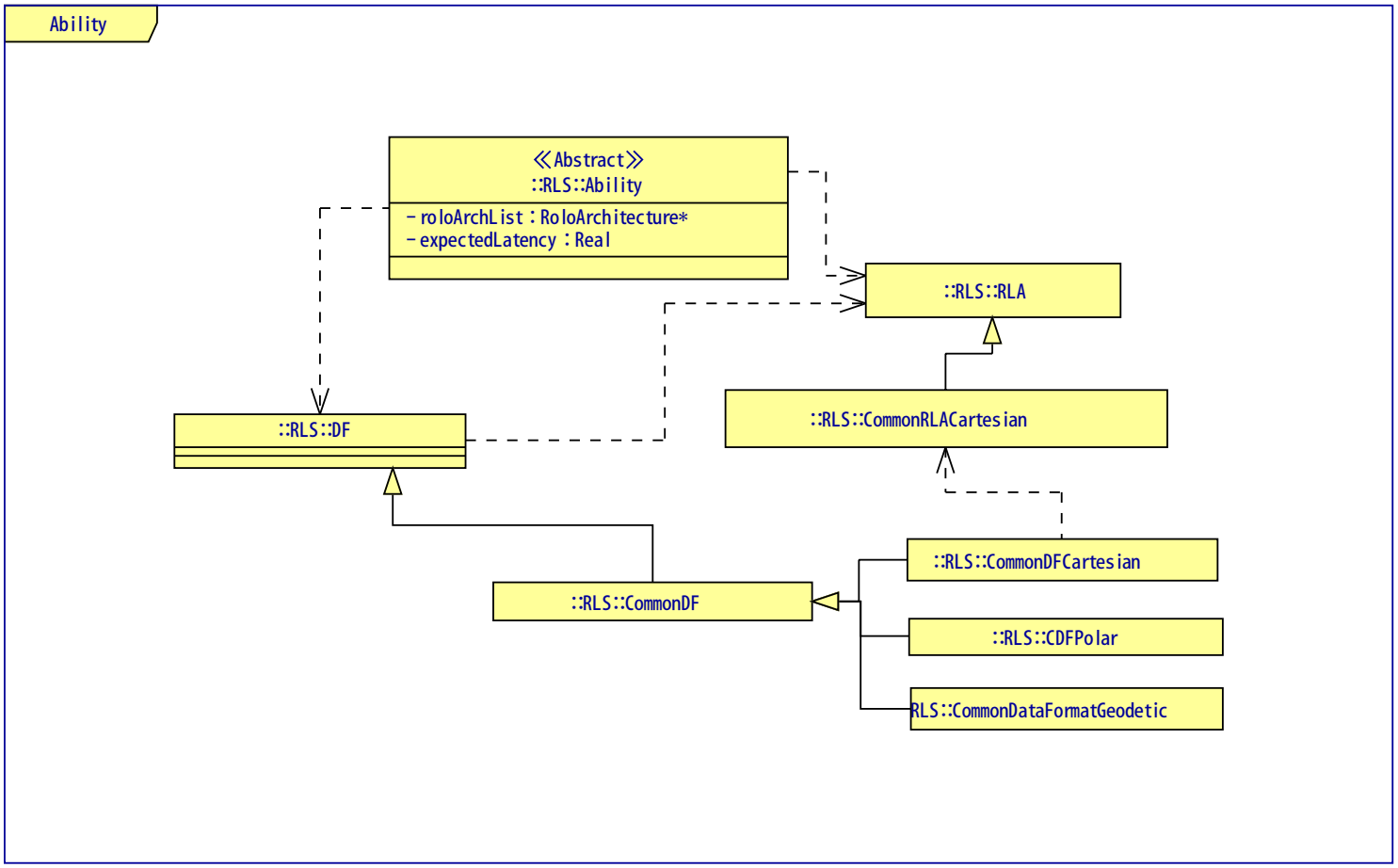

RLS
::RLS::StreamDirection_t
- attribute_1
- attribute_2
- attribute_3
+ operation_1 ()
+ operation_2 ()
::RLS::ServiceModule
- ability : ::RLS::Ability
- attribute_2
- attribute_3
+ getAbility () : Ability
+ getNumInterfaces (dir : ::RLS::StreamDirection_t) : integer
≪Abstract≫
::RLS::Ability
::RLS::InterfaceAbility
- attribute_1
- attribute_2
- attribute_3
+ operation_1 ()
+ operation_2 ()

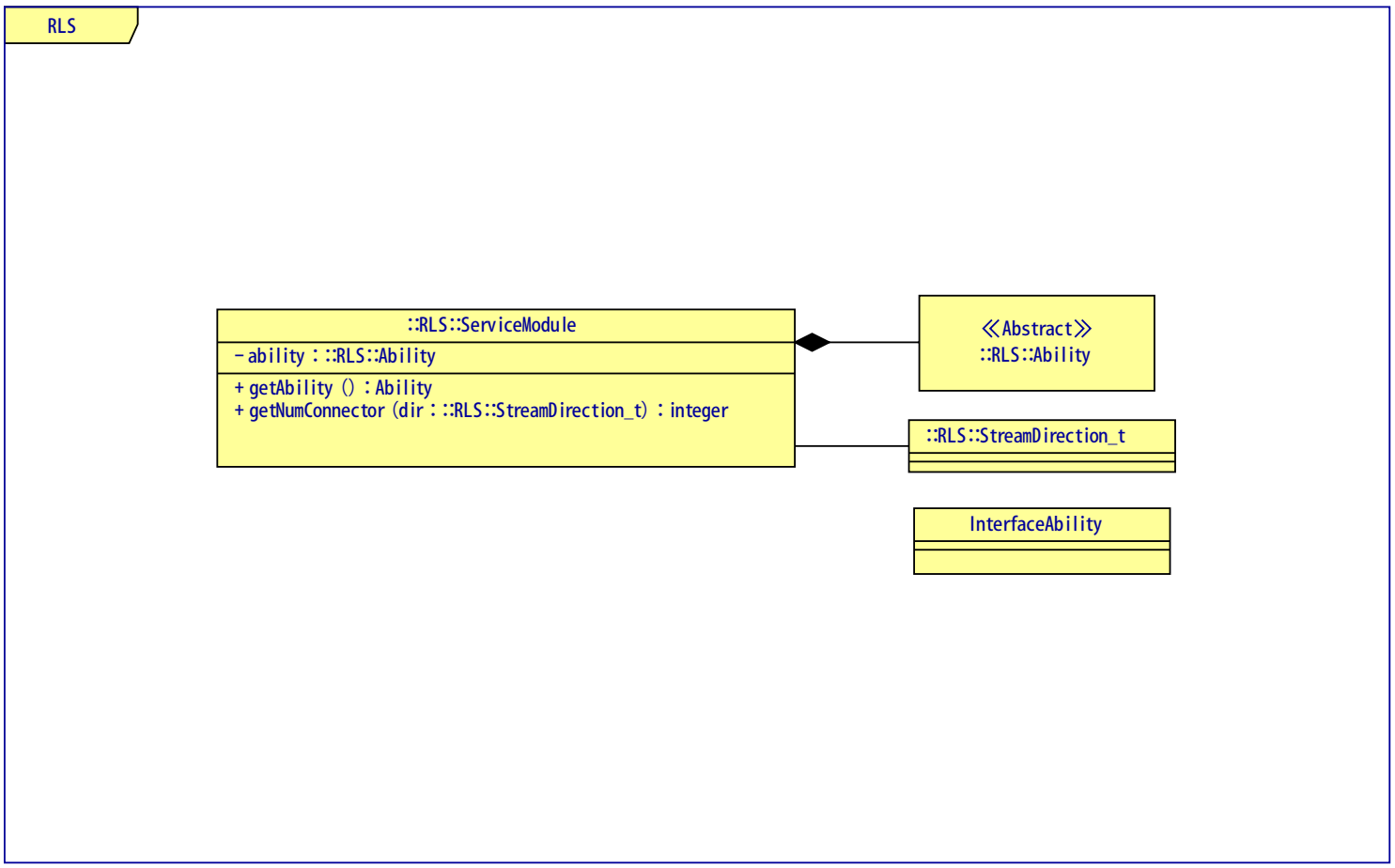

represents a n-dimensional matrix
v[i1][i2]…[in]
=data[i1+(i2+(…)*d2)*d1]
Defined in ISO 19107
Defined in ISO 19103
≪DataType≫
GM_PointArray
≪DataType≫
Real
≪DataType≫
::RLS::Matrix
-dimensions : Sequence<Integer>
-values : Sequence<Number>
≪DataType≫
::RLS::ProbabilityMatrix
≪DataType≫
::RLS::Probability
Type of values is restricted to
RLS::Probability
data values are restricted
to [0.0,1.0]

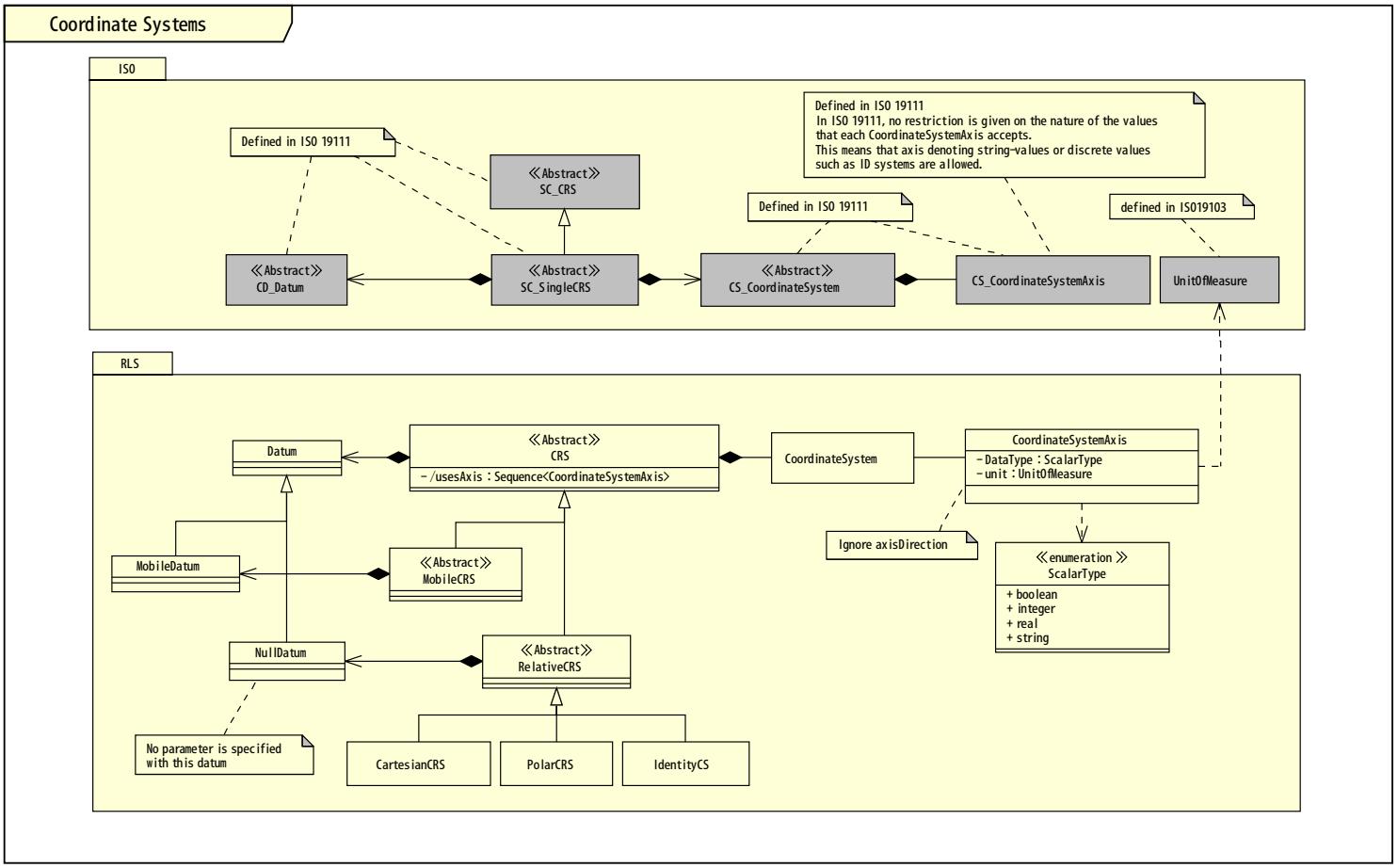

::RLS::Error
::RLS::Reliability
::RLS::ProbabilityDistribution
mean.dimension
== covariance.dimension
::RLS::Gaussian
-mean : GM_Position
-covariance : RLS::CoVariance
::RLS::MixtureOfGaussian
-num : Integer
-pdf : Sequence<NormalDistribution>
-weight : Probability
::RLS::ParticleSequence
-num : Integer
-/list : Sequence<Particle>
::RLS::CoVarianceMatrix
1..*
{ordered}
::RLS::Particle
-likelihood : Probability
-position : GM_Position
GM_Position
Defined in ISO 19107
::RLS::Probability
::RLS::ProbabilityMatrix

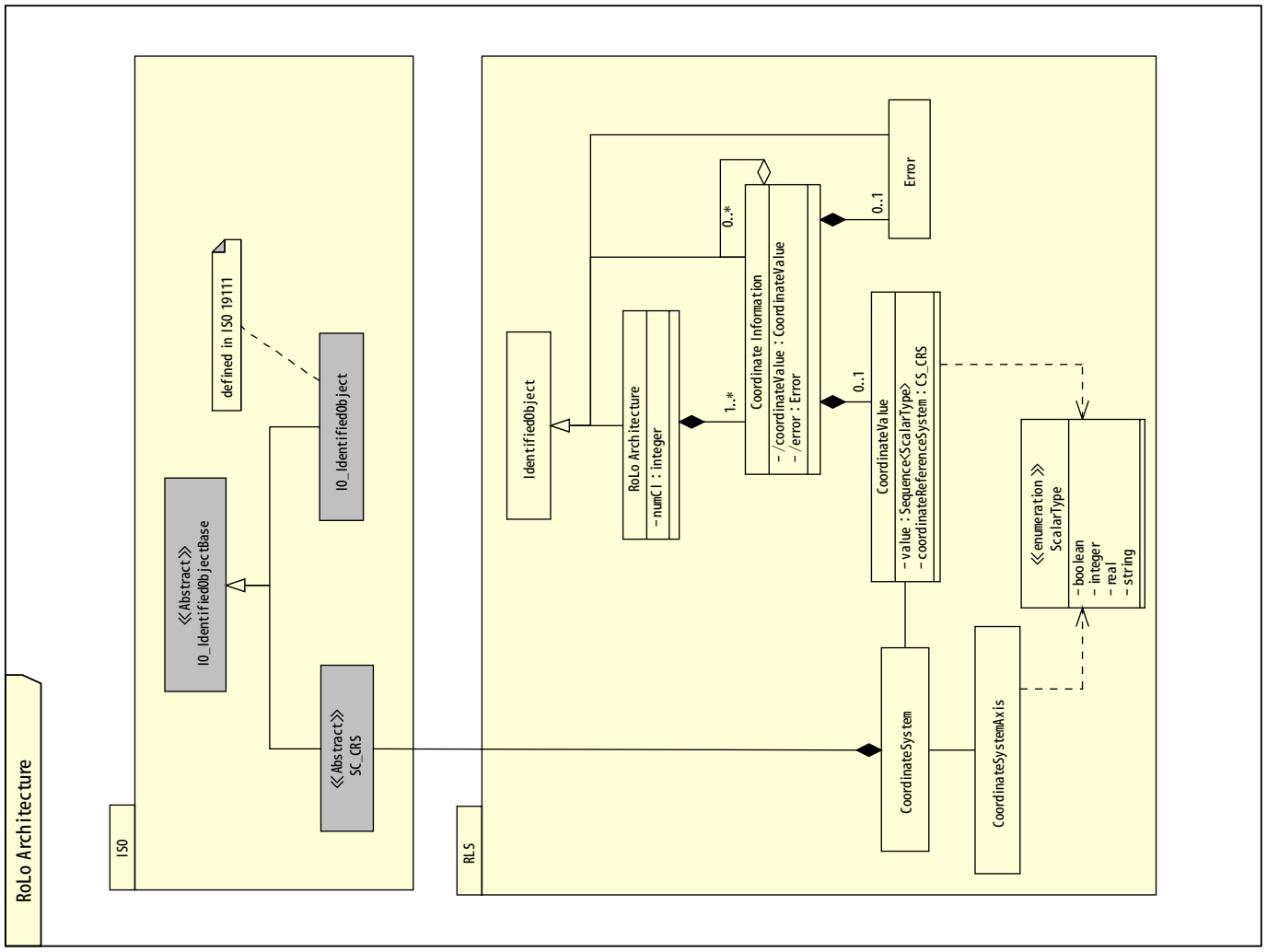

Defined in ISO 19111
In ISO 19111, no restriction is given on the nature of the values that each CoordinateSystemAxis accepts.
This means that axis denoting string-values or discrete values such as ID systems are allowed.
≪Abstract≫ SC_CRS
Defined in ISO 19111
Defined in ISO 19111
defined in ISO19103
≪Abstract≫ CD_Datum
≪Abstract≫ SC_SingleCRS
≪Abstract≫ CS_CoordinateSystem
CS_CoordinateSystemAxis
UnitOfMeasure
≪Abstract≫ ::RLS::CoordinateSystem
- /usesAxis : Sequence<CoordinateSystemAxis>
{ordered}
1..*
::RLS::CoordinateSystemAxis
- DataType : ScalarType
- unit : UnitOfMeasure
Ignore axisDirection
::RLS::NullDatum
::RLS::MobileDatum
≪enumeration ≫ ::RLS::ScalarType
+ boolean
+ integer
+ real
+ string
≪Abstract≫ ::RLS::RelativeCoordinateSystem
≪Abstract≫ ::RLS::MobileCoordinateSystem
No parameter is specified with this datum
::RLS::CartesianCS
::RLS::PolarCS
::RLS::IdentityCS

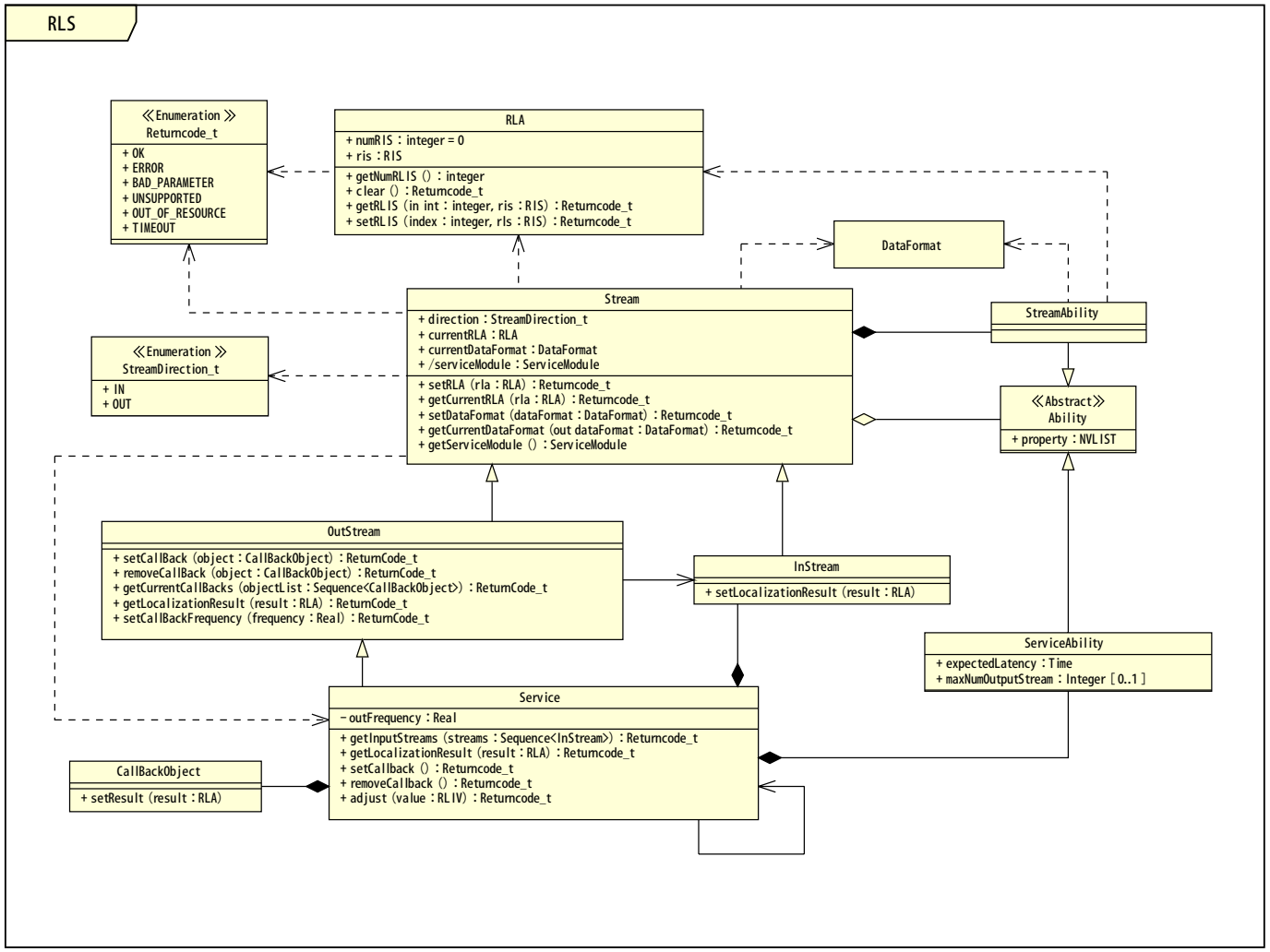

≪Abstract≫ IO_IdentifiedObjectBase
IO_IdentifiedObject
defined in ISO 19111
::RLS::RoLo Architecture
- numCI : integer
≪Abstract≫ SC_CRS
1..*
::RLS::Coordinate Information
- /coordinateValue : CoordinateValue
- /error : Error
::RLS::CoordinateValue
- value : Sequence<ScalarType>
- coordinateReferenceSystem : CS_CRS
::RLS::Error
::RLS::CoordinateSystem
::RLS::CoordinateSystemAxis
≪enumeration ≫ ::RLS::ScalarType
- boolean
- integer
- real
- string

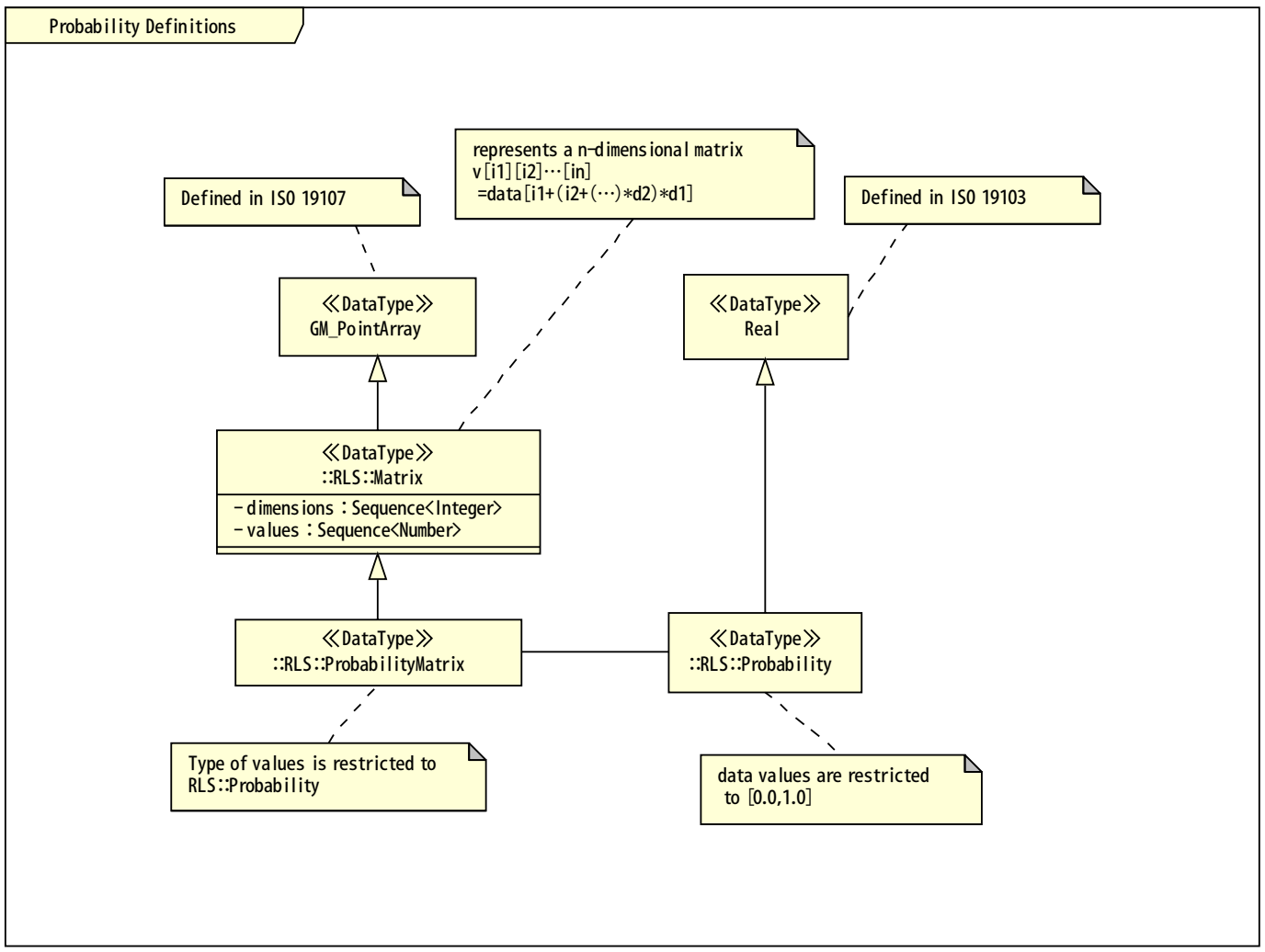

Ability
≪Abstract≫
::RLS::Ability
- roloArchList : RoloArchitecture*
- expectedLatency : Real
::RLS::RLA
::RLS::DF
::RLS::CommonRLACartesian
::RLS::CommonDFCartesian
::RLS::CommonDF
::RLS::CDFPolar
RLS::CommonDataFormatGeodetic

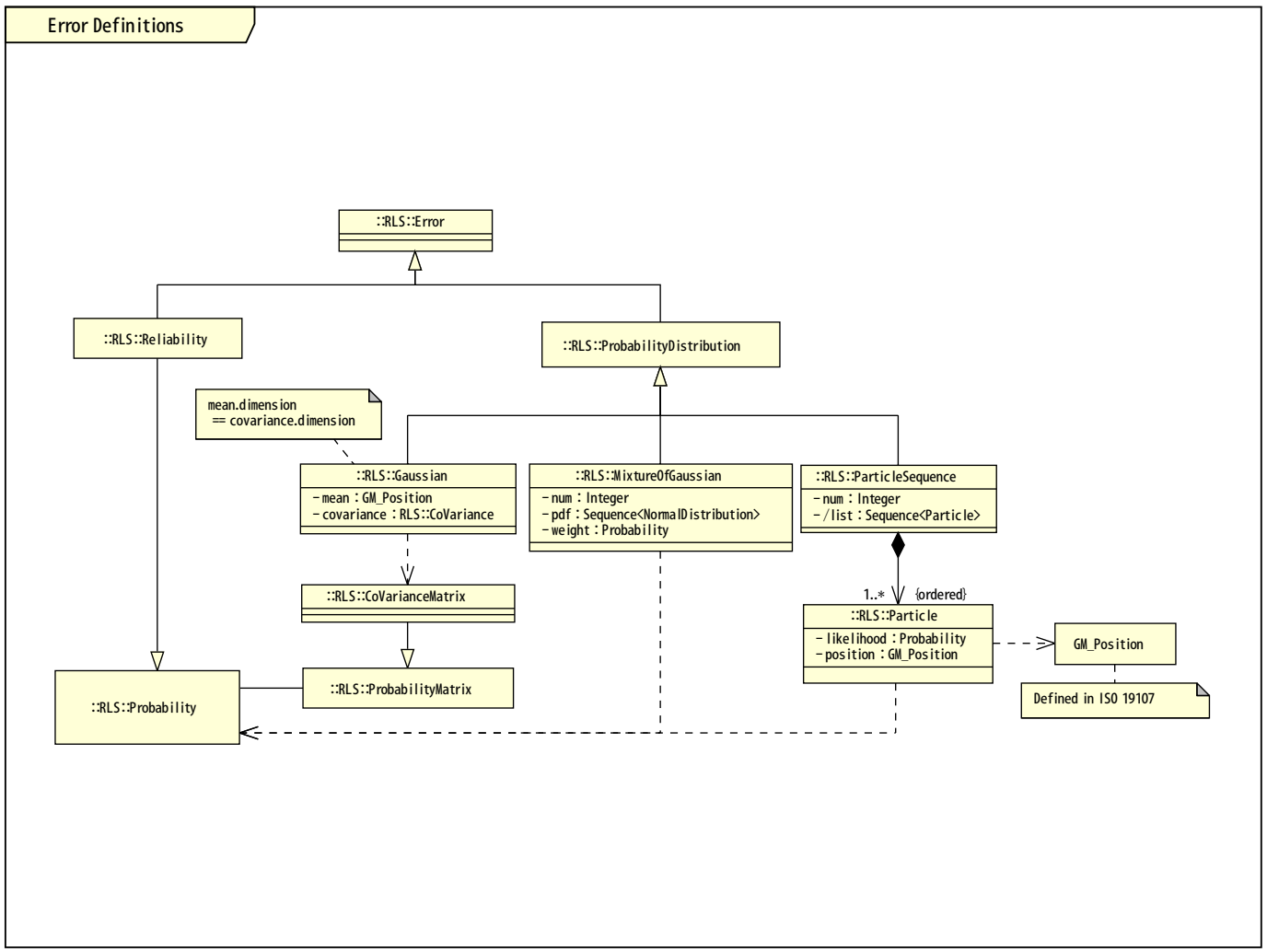

RLS
::RLS::ServiceModule
- ability : ::RLS::Ability
+ getAbility () : Ability
+ getNumConnector (dir : ::RLS::StreamDirection_t) : integer
≪Abstract≫
::RLS::Ability
::RLS::StreamDirection_t
InterfaceAbility


Coordinate Systems
ISO
Defined in ISO 19111
≪Abstract≫
SC_CRS
Defined in ISO 19111
In ISO 19111, no restriction is given on the nature of the values
that each CoordinateSystemAxis accepts.
This means that axis denoting string-values or discrete values
such as ID systems are allowed.
Defined in ISO 19111
defined in ISO19103
≪Abstract≫
CD_Datum
≪Abstract≫
SC_SingleCRS
≪Abstract≫
CS_CoordinateSystem
CS_CoordinateSystemAxis
UnitOfMeasure
RLS
Datum
≪Abstract≫
CRS
-/usesAxis : Sequence<CoordinateSystemAxis>
CoordinateSystem
CoordinateSystemAxis
-DataType : ScalarType
-unit : UnitOfMeasure
Ignore axisDirection
≪enumeration≫
ScalarType
+ boolean
+ integer
+ real
+ string
MobileDatum
≪Abstract≫
MobileCRS
NullDatum
≪Abstract≫
RelativeCRS
No parameter is specified
with this datum
CartesianCRS
PolarCRS
IdentityCS


RoLo Architecture
ISO
defined in ISO 19111
IO_IdentifiedObject
≪Abstract≫
IO_IdentifiedObjectBase
≪Abstract≫
SC_CRS
RLS
IdentifiedObject
RoLo Architecture
-numCI : integer
1..*
Coordinate Information
-/coordinateValue : CoordinateValue
-/error : Error
0..*
Error
0..1
CoordinateValue
-value : Sequence<ScalarType>
-coordinateReferenceSystem : CS_CRS
0..1
≪enumeration≫
ScalarType
- boolean
- integer
- real
- string
CoordinateSystem
CoordinateSystemAxis


RLS
≪Enumeration≫
Returncode_t
+ OK
+ ERROR
+ BAD_PARAMETER
+ UNSUPPORTED
+ OUT_OF_RESOURCE
+ TIMEOUT
RLA
+ numRIS : integer = 0
+ ris : RIS
+ getNumRLIS () : integer
+ clear () : Returncode_t
+ getRLIS (in int : integer, ris : RIS) : Returncode_t
+ setRLIS (index : integer, rls : RIS) : Returncode_t
DataFormat
Stream
+ direction : StreamDirection_t
+ currentRLA : RLA
+ currentDataFormat : DataFormat
+ /serviceModule : ServiceModule
+ setRLA (rla : RLA) : Returncode_t
+ getCurrentRLA (rla : RLA) : Returncode_t
+ setDataFormat (dataFormat : DataFormat) : Returncode_t
+ getCurrentDataFormat (out dataFormat : DataFormat) : Returncode_t
+ getServiceModule () : ServiceModule
StreamAbility
≪Enumeration≫
StreamDirection_t
+ IN
+ OUT
≪Abstract≫
Ability
+ property : NVLIST
OutStream
+ setCallBack (object : CallBackObject) : ReturnCode_t
+ removeCallBack (object : CallBackObject) : ReturnCode_t
+ getCurrentCallBacks (objectList : Sequence<CallBackObject>) : ReturnCode_t
+ getLocalizationResult (result : RLA) : ReturnCode_t
+ setCallBackFrequency (frequency : Real) : ReturnCode_t
InStream
+ setLocalizationResult (result : RLA)
ServiceAbility
+ expectedLatency : Time
+ maxNumOutputStream : Integer [0..1]
Service
- outFrequency : Real
+ getInputStreams (streams : Sequence<InStream>) : Returncode_t
+ getLocalizationResult (result : RLA) : Returncode_t
+ setCallback () : Returncode_t
+ removeCallback () : Returncode_t
+ adjust (value : RLIV) : Returncode_t
CallBackObject
+ setResult (result : RLA)


Probability Definitions
represents a n-dimensional matrix
v[i1][i2]…[in]
=data[i1+(i2+(…)*d2)*d1]
Defined in ISO 19107
Defined in ISO 19103
≪DataType≫
GM_PointArray
≪DataType≫
Real
≪DataType≫
::RLS::Matrix
- dimensions : Sequence<Integer>
- values : Sequence<Number>
≪DataType≫
::RLS::ProbabilityMatrix
≪DataType≫
::RLS::Probability
Type of values is restricted to
RLS::Probability
data values are restricted
to [0.0,1.0]


Error Definitions
::RLS::Error
::RLS::Reliability
::RLS::ProbabilityDistribution
mean.dimension
== covariance.dimension
::RLS::Gaussian
- mean : GM_Position
- covariance : RLS::CoVariance
::RLS::MixtureOfGaussian
- num : Integer
- pdf : Sequence<NormalDistribution>
- weight : Probability
::RLS::ParticleSequence
- num : Integer
- /list : Sequence<Particle>
::RLS::CoVarianceMatrix
1..*
{ordered}
::RLS::Particle
- likelihood : Probability
- position : GM_Position
GM_Position
Defined in ISO 19107
::RLS::Probability
::RLS::ProbabilityMatrix

Minutes of the Robotics DTF Plenary Meeting – DRAFT

March 10-12, 2008
Arlington, VA, USA
(robotics/2008-03-22)

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 Hyunsoo 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).