Basic Framework for Robot Technology Components
- Request for Proposal -

Tetsuo KOTOKU

National Institute of Advanced Industrial Science and Technology (AIST);
Co-chair of Robotics-DSIG and SDO-DSIG, OMG

Objectives

Activity Promotion

Recruit Challengers

Introduction (AIST)

The National Research Institute

an Independent Administrative Institution (IAI) under the Ministry of Economy, Trade and Industry (METI)

Researchers: **~2,400**
- Tenured: ~2,000
- Fixed-term: ~400
Administrative Staff: ~700

AIST Hokkaido

AIST Tohoku

AIST Tsukuba
つくばセンター

AIST Chugoku

AIST Kyushu

AIST TokyoHeadquarters

AIST Tokyo Waterfront

AIST Chubu

AIST Kansai

AIST Shikoku

http://www.aist.go.jp/index_en.html

Introduction (ISRI)

Intelligent Systems Research Institute

The objective of the Intelligent Systems Institute is to conduct researches on fundamental and component technologies, system integration technologies for the computer-oriented intelligent systems, and also physical systems which support human activities in the real world.
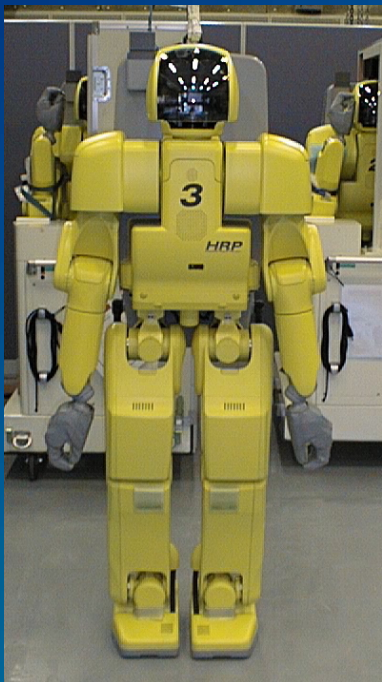
Researchers ~60

Information Science, Robotics, Mechatronics

http://unit.aist.go.jp/is/index_e.html

AIST

Humanoid Robot Project (HRP) (1998-2002)
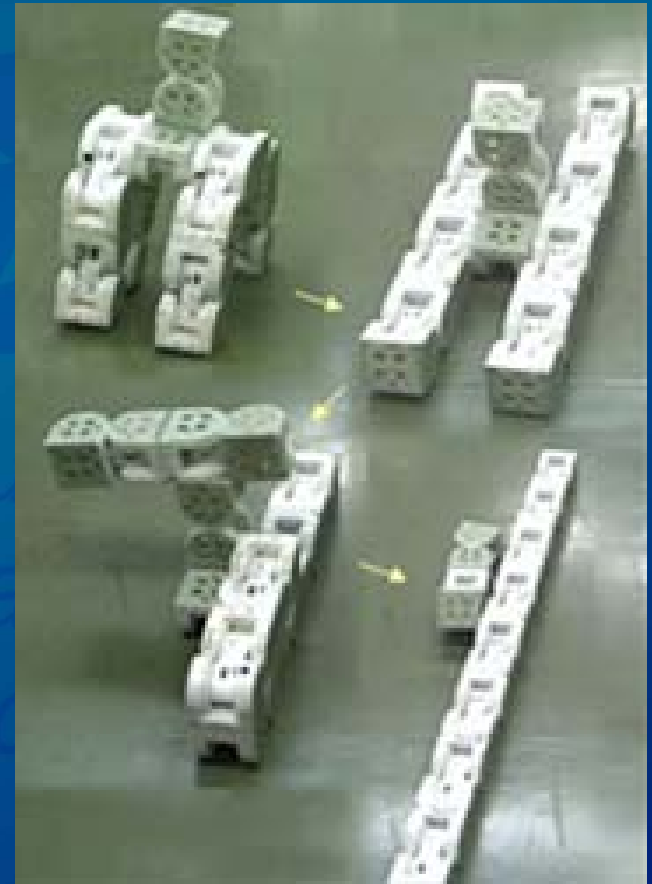

HRP-1

Remote Operation

Robot Assistant

HRP-2

Contact : Humanoid Research Group
http://www.is.aist.go.jp/humanoid/index.html
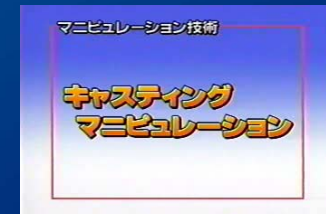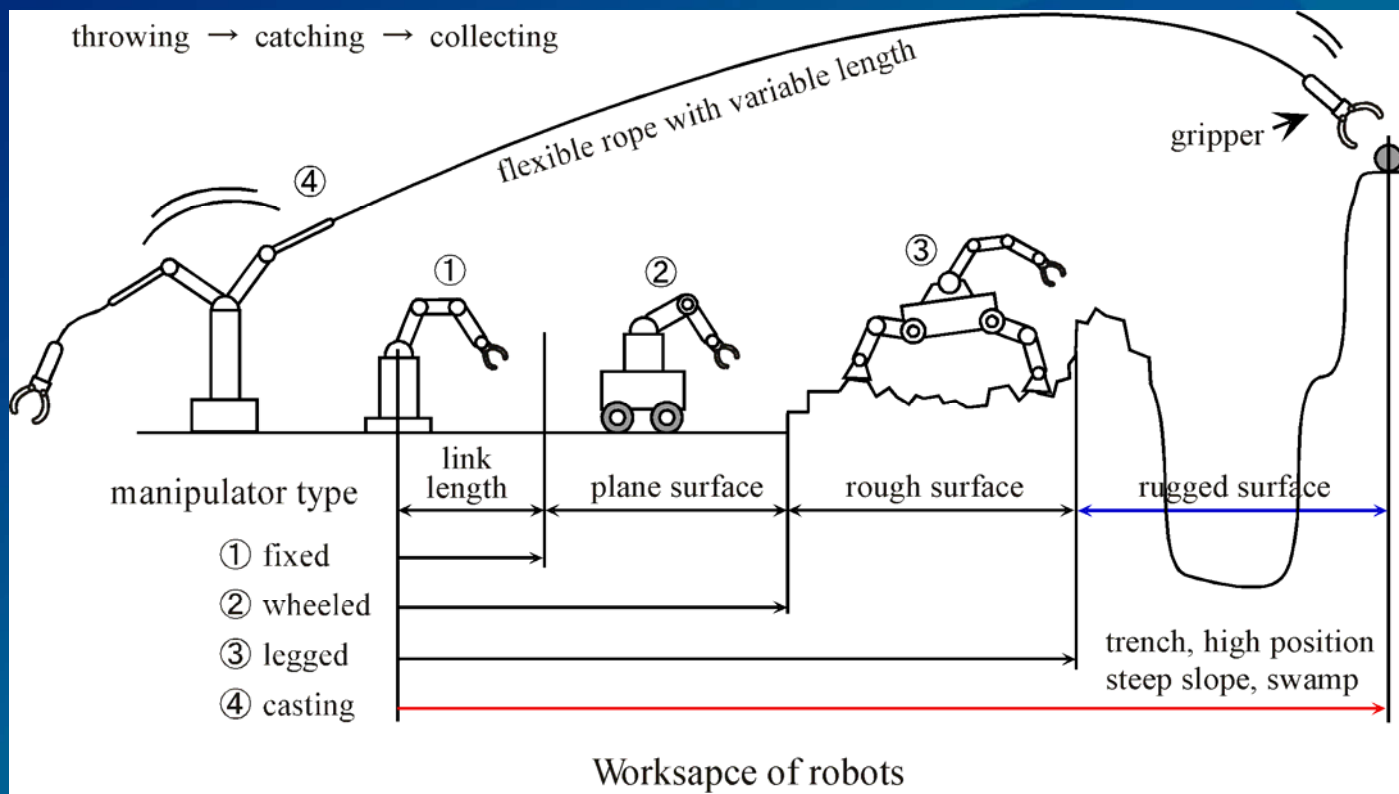
Research Activities

Distributed Modular Robot (M-TRAN) travels by transforming itself between an quadruped walker, H-shape, and a caterpillar.

Contact : Distributed System Design Group
http://unit.aist.go.jp/is/dsysd/index.html

OMG
OBJECT MANAGEMENT GROUP

Casting Manipulation

throwing → catching → collecting

flexible rope with variable length

gripper

④

① ② ③

manipulator type

link length | plane surface | rough surface | rugged surface

① fixed
② wheeled
③ legged
④ casting

trench, high position steep slope, swamp

Worksapce of robots

マニピュレーション技術

キャスティング マニピュレーション

Contact：**Dr. Hitoshi ARISUMI**
http://staff.aist.go.jp/h-arisumi/english.index.html.htm

AIST

Human Interactive Robot

for Psychological Enrichment and Robot Therapy

人間共存型ロボット技術

人の心を豊かにする
メンタルコミットロボット

Contact : Dr. Takanori SHIBATA
http://staff.aist.go.jp/h-arisumi/english.index.html.htm

AIST

Micro Manipulation
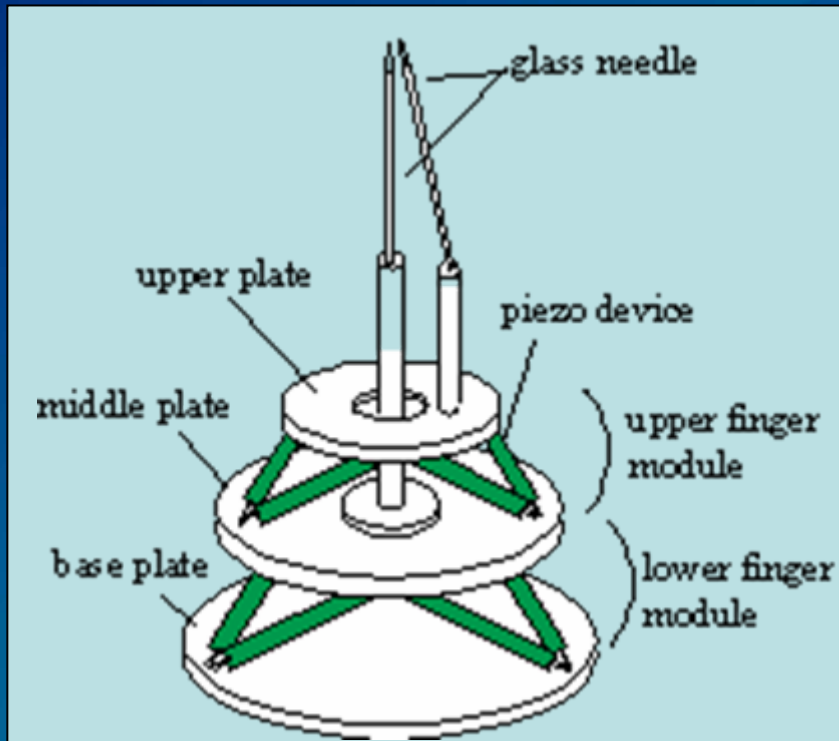
two fingered micro-hand
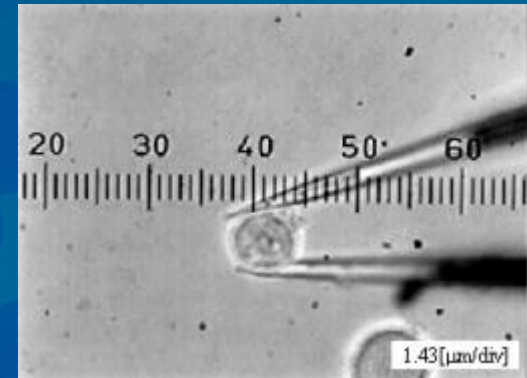
white blood cell manipulation

Contact : Dr. Tamio TANIKAWA
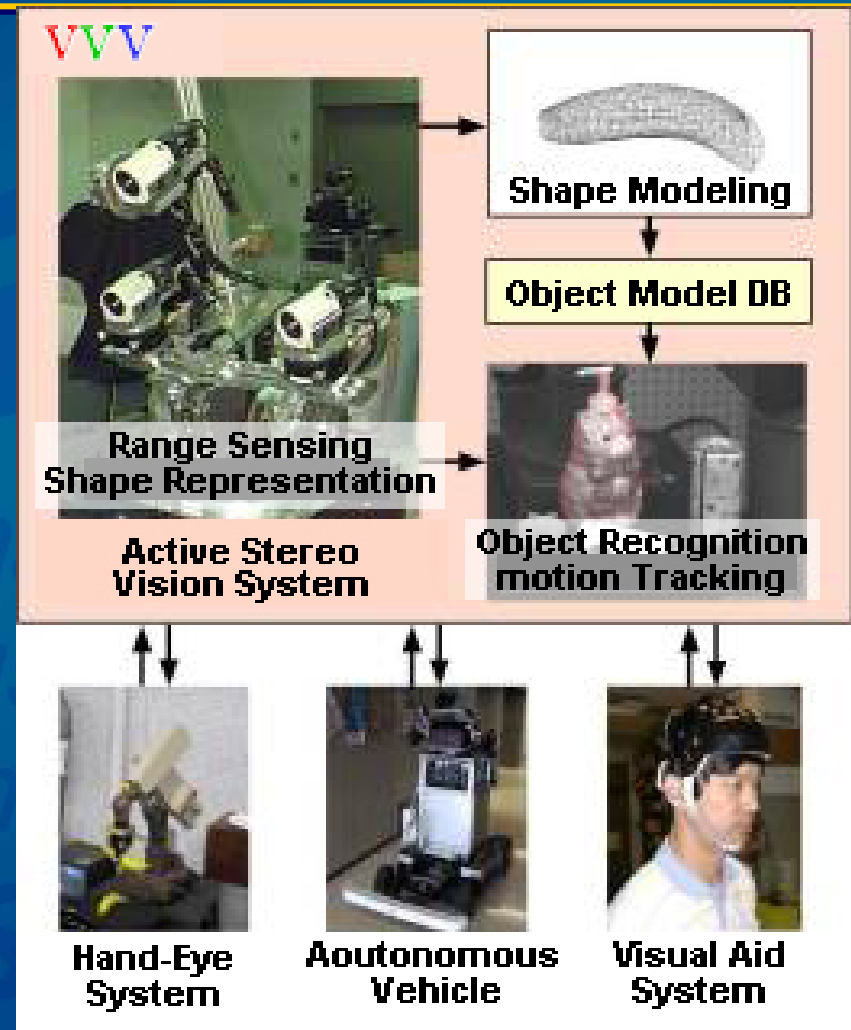**http://staff.aist.go.jp/tamio.tanikawa/**

OMG
OBJECT MANAGEMENT GROUP

AIST

3D Vision System

Versatile **V**olumetric **V**ision (VVV)
- Range sensing
- Shape modeling
- Object Model DB
- Object Recognition
- Motion Tracking

Real-time 3D Vision System

OMG
OBJECT MANAGEMENT GROUP

Research Activities

For the efficient research activities in Robotics

- Rapid prototyping for experiments

- Easy to transfer the technology developed

- Easy to modify the system for comparison

**Needs for sharing results and increasing specialization**

interoperability

Expectation for standardization

Common research platform

Technology Trends

With the rapid progress in computer and communication technology, the robot systems are fast becoming larger and more complicated. Therefore, there is a real need for the software technologies for efficient developments. Now various software technologies are proposed and implemented respectively.
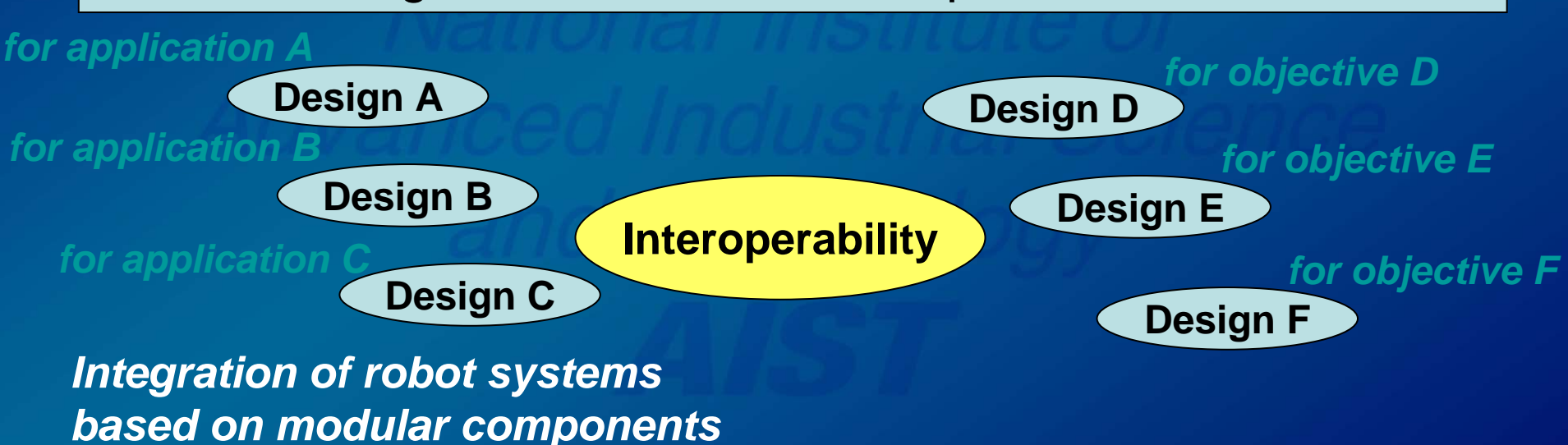
Rapid progress:

Computer Technology

Network Technology

Robot Systems

- larger
- more complicated

Single robot

Networked robot
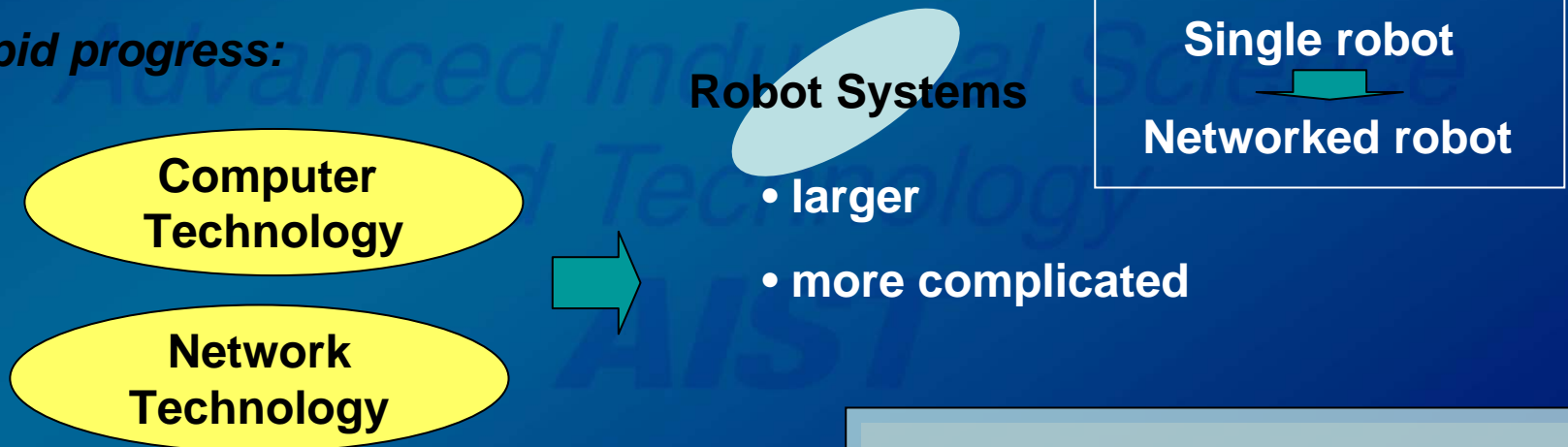
Efficient Development

Technology Trends

Unfortunately, most of these pioneering initiatives are developed independently of the others, driven by specific applications and objectives. In order to settle this state of chaos, we would like to contribute to the promotion of standardization in the field of robotics based on the mutual understanding between the relevant parties.

for application A

Design A

for objective D

Design D

for application B

Design B

for objective E

Interoperability

Design E

for application C

Design C

for objective F

Design F

Integration of robot systems based on modular components

Robotics standards based on the MDA

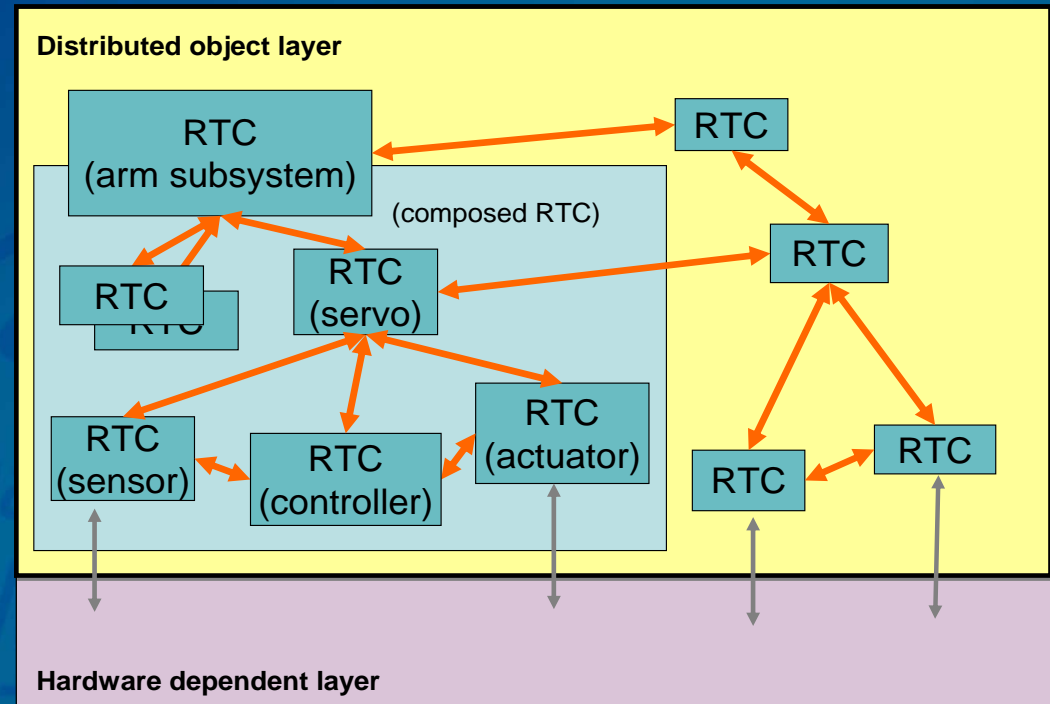# *Robot Technology Component RFP*

- Robotics based on MDA
- Basic framework for modular components
  - interoperability
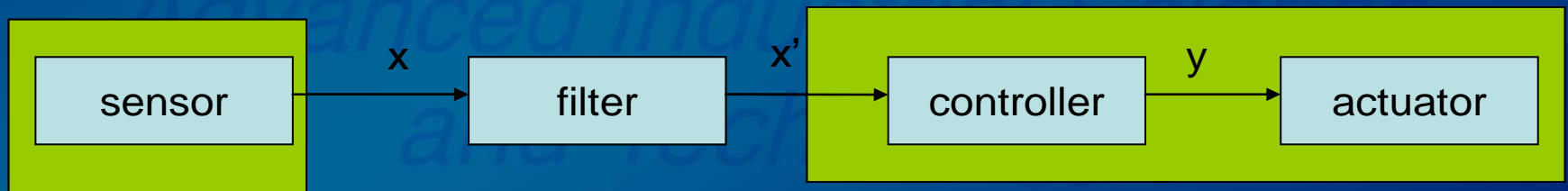 - composability
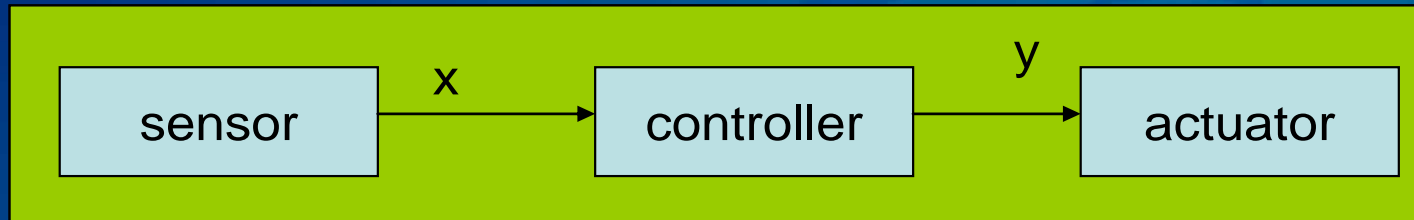 - Simple

Robot Technology Component RFP

Robot System :
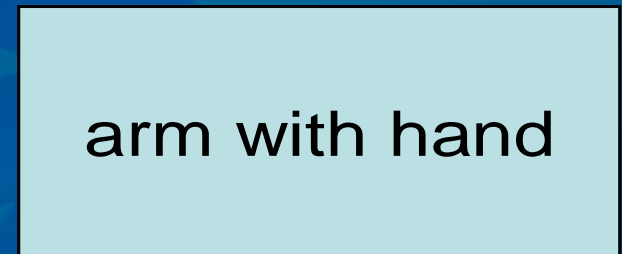
- **Data flow IF**

- **Command IF**

- **Internal state**

- **composable**

Simple specification for Interoperability
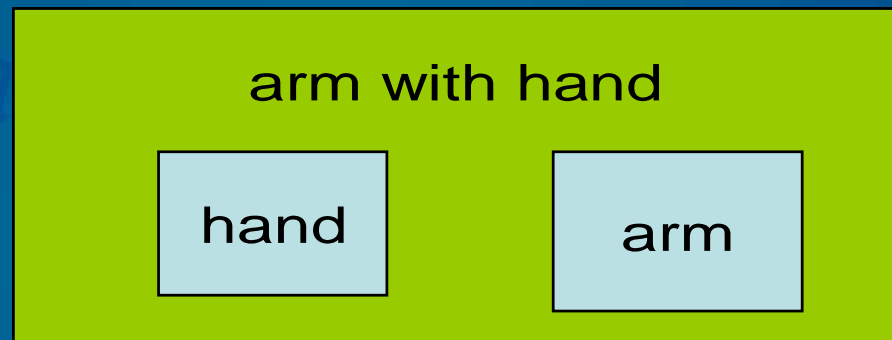
Interoperability of data flow

Interoperability in Composition

hand

arm

arm with hand

(a) Hand and Arm RTCs

(b) Arm with Hand RTC

arm with hand

hand

arm

(c) Composed Arm with Hand RTC

Robot Technology Component RFP

cooperation:

- **Proposal Submission**
  provide discussion base model
  (Platform member or higher)

- **Meeting Participation**
  technical discussion
  to find better, or, best model
  (Influencing member or higher)

Robot Technology Component RFP

Schedule:

- Sept. 15,2005 RFP issued
- Dec. 15,2005   LOI due
- Jan. 23, 2006 Initial submission
- Jun. 5, 2006 Revised submission
- Jun. 30, 2006 PTC vote for recommendation
- Sept., 2006 Adopt Specification

Call for Participation

OMG Technical Meeting in Burlingame

December 5-9, 2005

Hyatt Regency San Francisco Airport

http://www.omg.org/registration/

RFI responders will be invited as guest presenters

Next Meeting Agenda

December 5-9, 2005 (Burlingame, CA, USA)

Monday :

Steering Committee **[Dec.5]**

Tuesday :

Robotics-DSIG Plenary Meeting [Dec.6]
- RFP promotion (SDO-DSIG joint meeting)
- RFI response presentation
- guest & participants presentation
- co-chairs election

Conclusions

- We've just started the robotics-related activities in OMG.
- Call for participation
- Call for volunteers

Steering Committee, Robotics-DSIG

Monday, Dec. 5   15:00-17:00

http://robotics.omg.org/