## Setting Research Priorities

the outline of activities of CRDS

(Center for Research and Development Strategy)

15/Sep./ 2009

Shushi Ueta, Deputy DG for administration



## **CRDS**

- Established on 1, July 2003 in JST
- Main Activity

To prepare "Strategic Proposals" and present them to JST HQ and the relevant ministries of the Japanese Government.

- Strategic Proposals (55 proposals published )
  - Identify important R&D areas and subjects to be funded by the Japanese Government (=Research Priority Setting)
  - Proposals for S&T policy



## Organization

**Advisory Board** 

Pro. Hiroyuki Yoshikawa

> Deputy Director-General Tateo ARIMOTO Shushi UETA

Principal Fellow (Chair)

Pro. Ryoji NOYORI Pro. Hiroo IMURA

#### technology based units

Electronics, Information and Communication Technology Unit

Leader Dr.Kunihiko NIWA

Materials Science and Engineering Unit

Leader Dr.Kazunobu TANAKA

Nano-technology Unit

Leader Dr.Junichi Sone

**Environmental Technology unit** 

Leader Dr.Ken Ando

Life Science Unit

Leader Dr.Makoto Asashima

Clinical Medicine Unit

Leader Pro. Hiroo IMURA

#### other units

Policy & Research System Unit

Leader Mr. Tateo ARIMOTO

Oversea trends Unit

Leader Mr. Hiroshi NAGANO

G-TeC Unit

Leader Mr. Tateo ARIMOTO

## Research Grants in Japan

Curiosity Driven (bottom up)

Funds are distributed based on Science Community's activity.

All scientists are eligible. Funding Agency

**JSPS** 

Strategic/Policy Oriented (top down)

The Japanese Gov. decides priority areas/subjects.



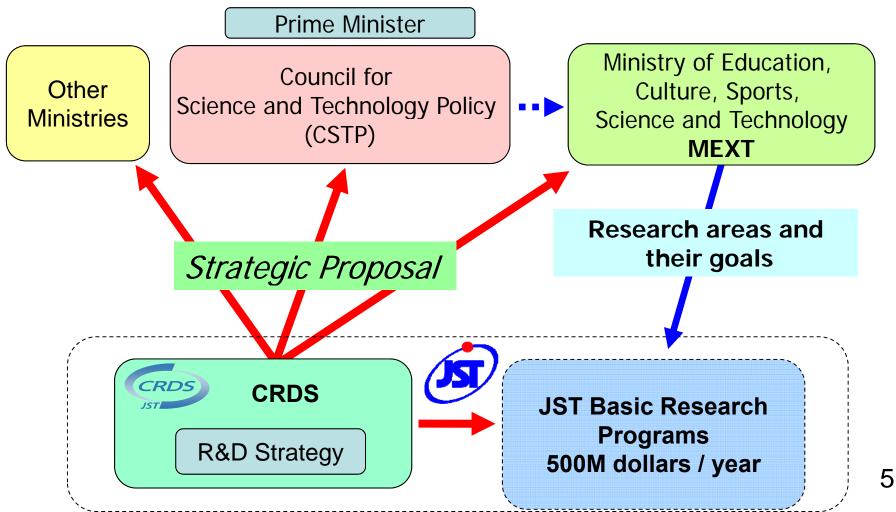
**JST NEDO** 

(basic) (industrial)  CRDS's proposals are neutral and evidence based.



 The Japanese Government decides research priorities taking various factors into consideration.

## Proposal to S&T Policymakers



## JST Basic Research Program

CRDS proposals

Other factors

MEXT research area and goals



JST implementation



### (example)

CSTP (the chairperson is the prime minister.)
 4 priority promotion areas of S&T

IT, Life science, Environmental science, Nanotech & materials



CRDS's proposals in the field of IT

Dependability (Dependable OS, Dependable VLSI etc)
Integration of IT and Robotics technology
Ultra Low Power Technology
Knowledge creation support etc



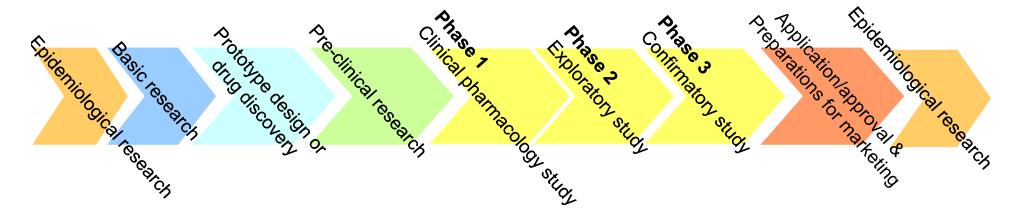
## CRDS proposals on S&T policy

S&T based Innovation Policy

National Innovation Ecosystem

- Innovation of Health and Medical Care Integrated Celerity Research (ICR)
- Promotion of Interdisciplinary Research

## CONCEPT OF ICR — FROM TR TO ICR



**Broadly-defined TR** 

Narrowly-defined TR

**FDA Critical Path Research** 

**NIH Roadmap Plan** 

Integrative Celerity Research (ICR)

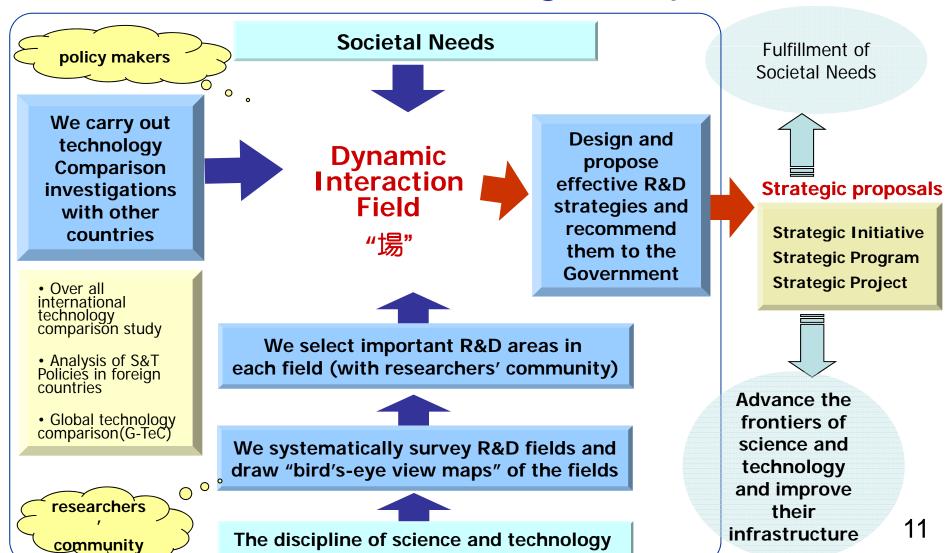


## How CRDS makes proposals

- 1. Promote dialogue between S&T policymakers and academia.
- 2. Survey S&T fields and draw their "bird's eye view maps".
- Select important R&D subjects to be funded by the Government, and investigate effective methods for performing R&D on the selected subject.
- 4. Compare research activities of Japan with those of other countries.
- 5. Propose R&D strategy that can contribute to fulfillment of societal needs and expansion of research frontier.



## How to make Strategic Proposal?





## "Bird's-eye view map" of ICT field

**Human/Society/Globe** 

#### Service Enabling Platform

# **-**Juman Social

#### System

Robotics

Real world application

Integration (SW/Architecture)

Manipulation

Locomotion

Communication

Autonomous Distributed Control

Control theory/tech

Sensor

Actuator/Mechanism/Power source

#### Computing

Human Interface

Web information system

Basic theory

DB & Data mining Multimedia

Infrastructure software

Software development tools

Supercomputer

Dependable information system

Parallel/cluster computing

Reconfigurable system

Multi processing

Low power computing system

#### Emergent IntelligentetWOrk

Green network

Cognitive radio

Network environment

Network service

NW architecture

NW system

**Control Management Operation** 

Terminal technology

Human interaction

Element technologies

Basic theory (graph theory etc)



#### Device

#### **Electronics**

Power device IC (Digital)

VLSI system architecture

IC (Memory)

Organic Material/device

Design assistance (CAD)

Sensor tech Display tech IC (HF/analogue)

Packaging tech Inorganic new device

#### Quantum tech

Optical communication Simulation/analysis tools Solid-state illumination/LED Optical metrology Optical material/component

Photonic crystal/meta material



# Biology

**Photonics** 

## International comparison of S&T

- Comparison of research activities
  - International Technology comparison (broad areas)
  - G-TeC report (detailed study )
- Science and Technology policy in foreign ountries



## International Technology Comparison

#### S&T Fields

- Electronics, Information and Communication technology (6 areas, 58 Sub-areas)
- Nanotechnology and Material technology (15 Areas, 71 Sub-areas)
- Advanced Measurement and Analysis technology (7 Areas, 41 Sub-areas)
- Life science (7 Areas, 50 Sub-areas)
- Clinical Medicine(6Areas, 11Sub-areas)
- Environment technology (4 Areas, 43 Sub-areas)
- Each field is divided into Areas and Sub-areas.
  - Field > Area > Sub-area total 274 Sub-areas
- Comparison in each "Sub-area" (A, B, C, D)
  - Japanese Experts' subjective evaluation
- Phases
  - Research : Research level at universities
  - Development: Research level at industries
  - Industrial Technology: Production level at industries
- Countries/region
  - Japan, EU, US, Korea, China



# ternational Technology Sesults (Example 2008 version) Comparison Nanotechnology / Materials

Field L											Na	not	echr	nolo,	gy /	Ma	teria	als									
Field S		Nano-structured Materials, New function materials													Nano-Fabrication												
Area		Carbon nanomaterials		Nanocomposite materials		Nanosurface modification		Functional gel		Supermoleculars, Dendrimer		Mesoporous Materials		New molecules and molecular assembly		Strongly- correlated electronic		Semiconductor micro fabrication technologies		Nanoimprinting Nano-graphic technologies		Self-organization, Self-assembly		nano-processing		MEMS.NEMS	
	Phase	LVL	Trend	LVL	Trend	١	Trend	LVL	Trend	LVL	Trend	LVL	Trend	LVL	Trend	LVL	Trend	LVL	Trend	LVL	Trend	LVL	Trend	LVL	Trend	LVL	Trend
J	Research	Α	$\rightarrow$	Α	$\rightarrow$	Α	7	Α	7	Α	7	Α	/	Α	$\rightarrow$	Α	$\rightarrow$	В	$\rightarrow$	В	$\rightarrow$	В	7	В	7	Α	$\rightarrow$
P	Development	В	$\rightarrow$	Α	$\rightarrow$	Α	$\rightarrow$	Α	7	В	7	В	$\rightarrow$	В	$\rightarrow$	Α	7	В	7	В	7	В	7	Α	$\rightarrow$	В	$\rightarrow$
N	Industrial Tech	С	7	В	$\rightarrow$	Α	$\rightarrow$	В	7	С	$\rightarrow$	Α	$\rightarrow$	Α	7	D	7	В	7	С	7	D	$\rightarrow$	В	7	Α	$\rightarrow$
U	Research	Α	7	Α	$\rightarrow$	Α	7	В	$\rightarrow$	Α	7	Α	7	Α	$\rightarrow$	В	7	В	7	В	7	Α	7	В	7	Α	7
S	Development	Α	7	Α	$\rightarrow$	Α	$\rightarrow$	Α	$\rightarrow$	Α	$\rightarrow$	В	$\rightarrow$	Α	$\rightarrow$	Α	7	В	7	В	7	В	7	Α	$\rightarrow$	Α	7
A	Industrial Tech	С	7	Α	$\rightarrow$	Α	7	Α	7	В	7	В	$\rightarrow$	Α	$\rightarrow$	D	$\rightarrow$	В	$\rightarrow$	С	7	D	$\rightarrow$	С	$\rightarrow$	Α	7
Е	Research	Α	7	Α	7	Α	7	В	$\rightarrow$	Α	$\rightarrow$	В	7	Α	7	Α	7	Α	7	Α	$\rightarrow$	Α	7	Α	$\rightarrow$	В	7
Ü	Development	В	7	В	7	Α	7	В	$\rightarrow$	В	7	В	$\rightarrow$	В	7	В	7	В	7	В	7	В	7	Α	7	Α	7
	Industrial Tech	0	7	В	$\rightarrow$	Α		С	$\rightarrow$	В	$\rightarrow$	С	$\rightarrow$	В	7	D	$\rightarrow$	С	$\rightarrow$	С	7	D	$\rightarrow$	С	7	Α	$\rightarrow$
С	Research	В	7	В	7	В	7	С	7	В	7	С	$\rightarrow$	В	7	С	7	С	7	D	$\rightarrow$	В	7	D	$\rightarrow$	D	7
Н	Development	С	7	В	7	В	7	С	$\rightarrow$	С	7	С	$\rightarrow$	В	7	D	7	D	$\rightarrow$	D	$\rightarrow$	С	$\rightarrow$	D	7	D	$\rightarrow$
N	Industrial Tech	D	7	В	7	С	7	С	$\rightarrow$	C	7	С	$\rightarrow$	С	7	D	$\rightarrow$	С	7	D	$\rightarrow$	D	$\rightarrow$	D	7	D	$\rightarrow$
K	Research	Α	7	В	7	В	7	С	7	Α	7	В	$\rightarrow$	Α	7	В	7	С	$\rightarrow$	С	$\rightarrow$	С	$\rightarrow$	В	7	С	7
0	Development	В	7	В	7	В	7	С	$\rightarrow$	В	7	В	$\rightarrow$	В	7	Α	7	Α	7	В	7	С	$\rightarrow$	В	7	9.	
R	Industrial Tech	С	7	В	7	В	7	С	$\rightarrow$	С	7	В	$\rightarrow$	В	7	D	7	В	7	С	7	D	$\rightarrow$	D	7	G,	$D_{Z}$

## Summary

- CRDS supports the Japanese Government's decision of research priority setting.
- CRDS's advices are neutral and evidence based.
- CRDS takes three factors into account.

bird's eye view maps of S&T

social needs

international comparison

CRDS also prepares proposals for S&T policy.