

International Activities and Projects of NICT

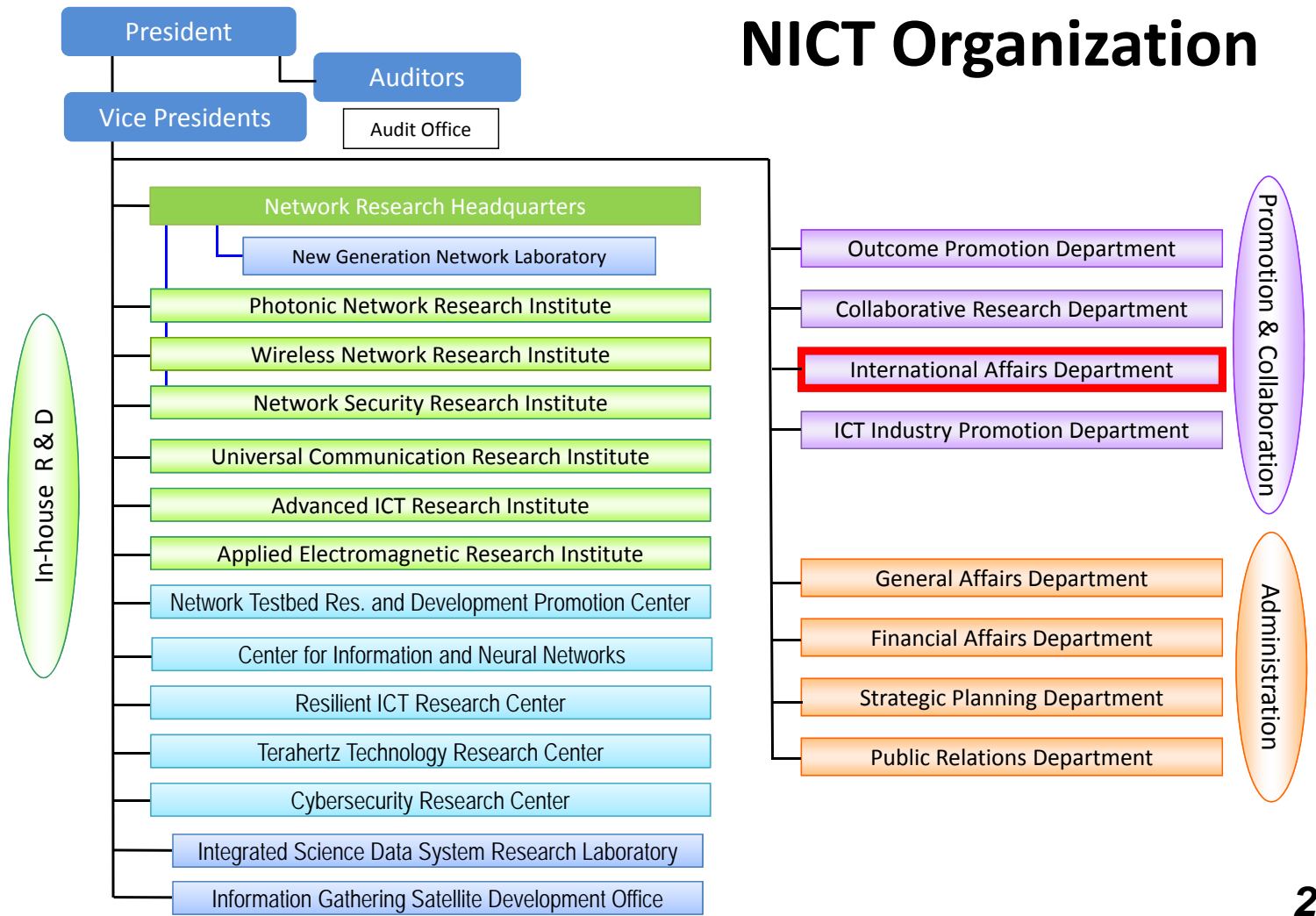
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**Executive Director, International Affairs Department
NICT, Japan**

Contents

- I. Overview of International Affairs Department**
- II. International Collaborative Projects Examples**

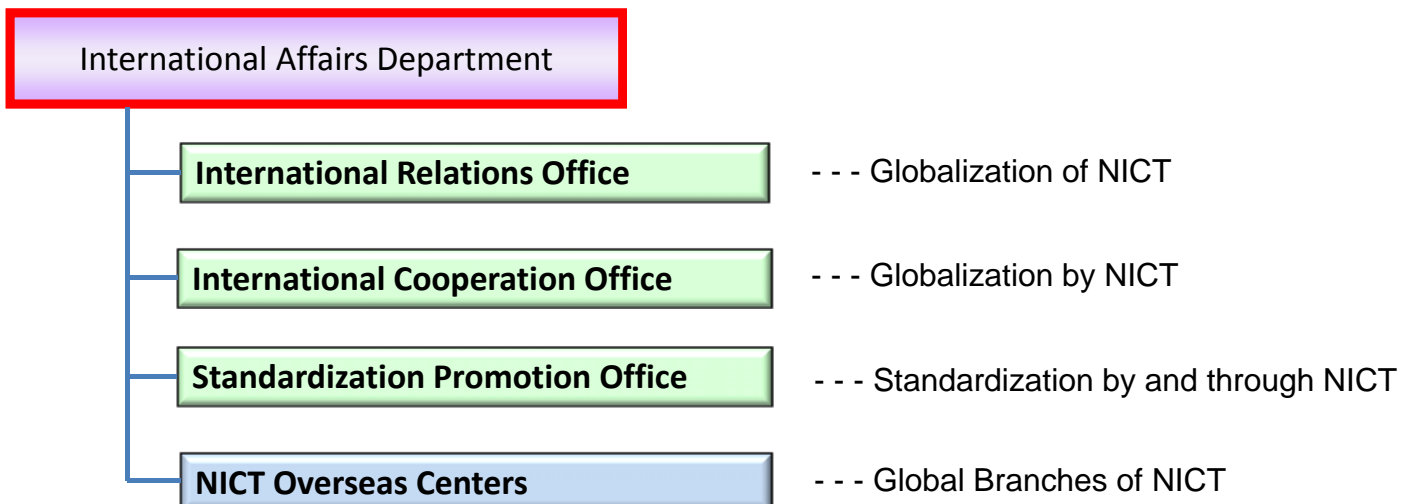
NICT Organization



International Affairs Department

Our mission is to accelerate the globalization of NICT's research environment, to support researchers both inside and outside of NICT to contribute to the globalization of Japan's ICT, and to strengthen global competitiveness of Japan through promoting international standardization.

- Promoting NICT's collaboration with overseas research institutes,
- Supporting global R&D activities in Japanese industry and academia,
- Conducting strategic standardization focusing on global market



(Washington DC, Paris, and Bangkok)

Mission

To accelerate the globalization of NICT's research environment by

- promoting research cooperation and researcher exchange with overseas research organizations
- gathering and distributing information on global research trends and findings in the field of ICT R&D

Action Items

1. Promoting international research cooperation
 - Concluding of MoU (Memorandum of Understanding)
 - International collaboration promotion program within NICT
2. Exchange of Information and Researchers
 - Holding joint seminars or workshops
 - Receiving internship trainees and supporting foreign researchers in NICT
3. Research on R&D trends and promotion of NICT's R&D findings

Recent MoUs

- ITRI (Taiwan) in Oct. 2012
- Chulalongkorn Uni. (Thailand) in Oct. 2012
- Chiang Mai Uni. (Thailand) in Nov. 2012
- CNES (France) in Nov. 2012
- SIMIT (China) in Jan. 2013
- JPL (US) in Mar. 2013
- UNITEC (NZ) in Jul. 2013
- MCIT (Indonesia) in Oct. 2013, etc.



MOU Signing with Chengmai Uni.



MoU Signing with UNITEC



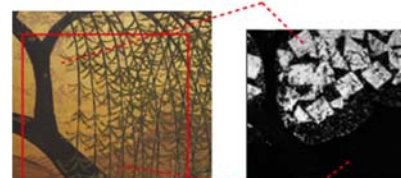
MoU Signing with MCIT

Coordinated Call for R&D fund on New Generation Network

- NSF (US)
- EU (FP7, Horizon2020)

International Collaboration Promotion Program

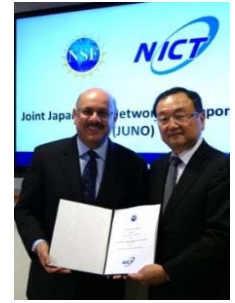
- Terahertz Imaging with Metropolitan Museum
- SAR radar with NASA/JPL, etc.



Research using Terahertz with Metropolitan Museum

Cooperation with NSF in US

- Concluding of a comprehensive cooperation memorandum (MOU) in May 2013.
- Joint call for R&D proposal on New Generation Network in July 2013, on 3 themes.
 1. Network Design and Modeling
 2. Mobility
 3. Optical Network Architectures
- Proposal Due Date: 8 Nov. 2013



MOU signing

Cooperation with EU

- Joint call for R&D proposal in Oct. 2013 on 3 themes.
 1. Extending the cloud paradigm to the Internet of Things
 2. Green & content centric networks
 3. Global scale experiments over federated testbeds
- Commencement of MIC, NICT, and EU joint sponsorship of "Japan-EU Collaborative Research" at a conference held in July 2013.



Declaration of tripartite cooperation MIC, EU, and NICT

International Relations Office (3)

Joint workshops and Forum

- NICT-NIST International Workshop : Cyber Physical Data Cloud and Security (Oct. 2012 @Kyoto)
- NICT-ETRI WS: Network (Nov. 2012 @Tokyo)
- NICT R&D Forum in Washington D.C: Neural Communications (Jan. 2013)
- NICT-I2R WS: Wireless and Future Net (Jul. 2013 @Osaka)
- NICT-ITRI WS: Wireless Comm. (Oct. 2013@Shinchi)



NICT-NIST WS



NICT-I2R WS

Accepting internship trainees to NICT

- 13 researchers from 10 institutes in Fy 2012
- More than 15 researchers in Fy 2013

Supporting foreign researchers in NICT

- Japanese language lesson is held in NICT (35 researchers attended in Fy 2012)

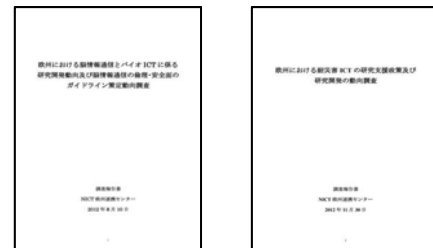


NICT-ITRI WS

Research on up-to-date R&D

Based on laboratories request, NICT Overseas Center conduct research on up-to-date global R&D trends and findings and feedback to NICT laboratories

- Resilient ICT and Bio ICT, and were the topics in 2012.
- Terahertz Technology and Big Data are the themes in 2013



Research Report on Resilient ICT and Bio ICT

International PR activities

To gain publicity for NICT, we participate in International Exhibitions abroad

- Press Conference in London just before the Olympics Games. (Jun. 2012)
- National Science and Technology Fair in Thailand (Aug. 2013)
- ITU World Telecom in Bangkok (Nov. 2013)



U-STAR WS & Press Conference 2012/6/27

Publishing monthly NICT News in English



Mission

We support researchers in Japanese industry and academia to contribute to the globalization of Japan's ICT R&D by funding for invitation program and international conference grant.

Action Items

- (1) Inviting overseas researchers to domestic R&D organizations in the field of ICT.
- (2) Sponsoring international conferences held in Japan on advanced communications and broadcasting technologies.

Invitation programs for foreign researchers to R&D institutes in Japan

NICT provides invitation programs for foreign-based researchers in support of collaborative R&D activities of Japanese research institutes in telecommunication and broadcasting technologies.

The programs will support direct expenses necessary to invite the researchers.



Invitation Programs of Foreign-based Researchers

Results (number of researchers)

Program	Fy2011	Fy2012	Fy2013
International Exchange Program	5	12	10
JAPAN TRUST	2	2	1

International Conference Support Program

NICT supports to hold international conferences on advanced telecommunications and broadcasting technologies in Japan by taking a part of the role of conference organizer.

Legal entities in Japan such as universities, academic society, private research institute etc., hosting the conferences can apply for the program.

Results (number of conferences)

Program	Fy2011	Fy2012	Fy2013
International Exchange Program	6	7	10

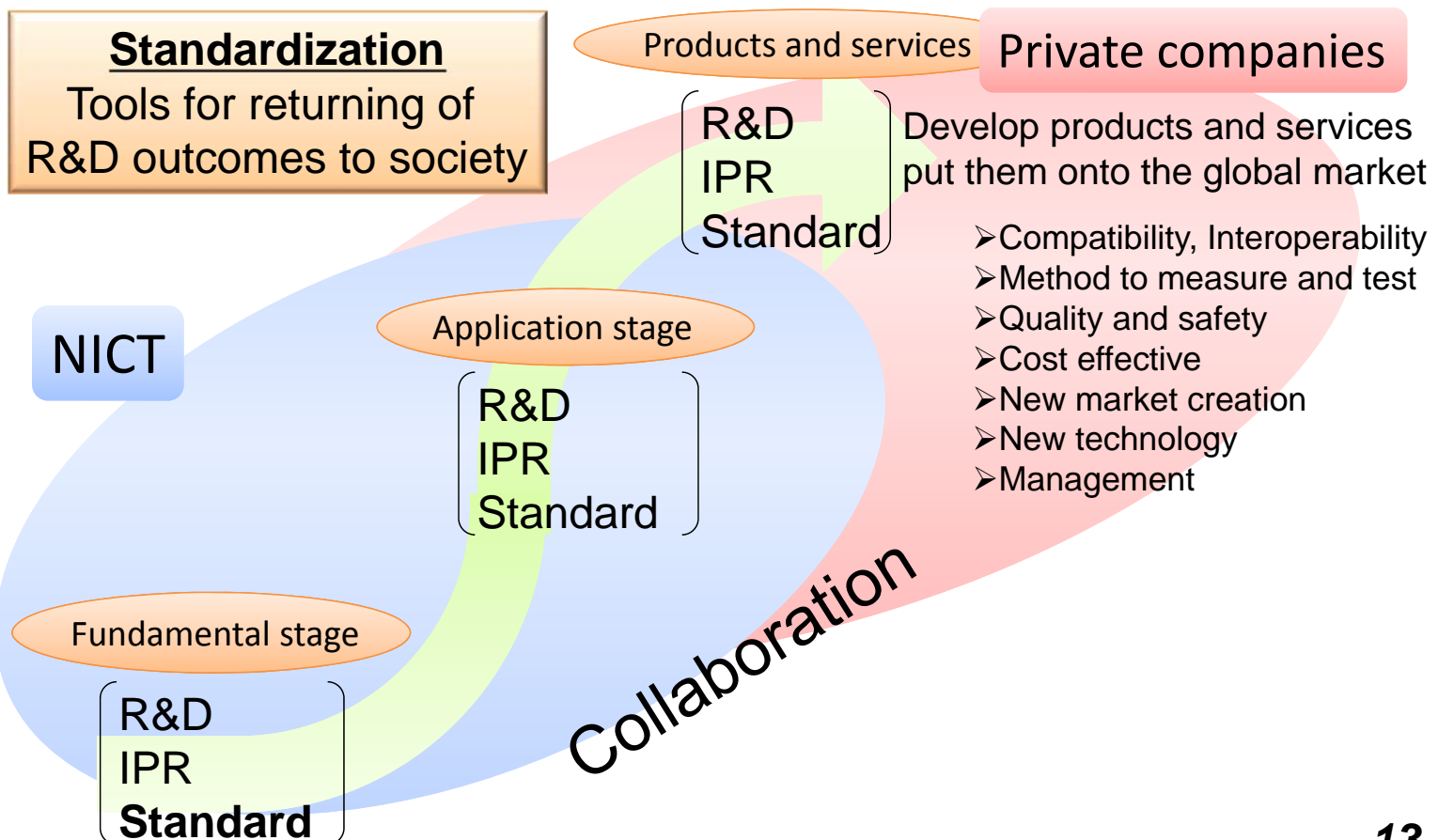
Mission

To strengthen global competitiveness of Japan, we promote standardization of the products produced as results of NICT research activities in collaboration with industries.

Action Items

- (1) Plan and promote international standardization activities in NICT
- (2) Capacity building of standardization activities for young researchers.
- (3) Support forum activities and hosting international standardization meetings in Japan.

NICT's Standardization Policy



Fact analysis on NICT's standardization activities

- Contributions to International Standardization Organizations
- International Standards based on NICT's R&D findings

Research on cross-sectional standardization activities

- Resilient ICT,
- Climate Change,
- M2M,
- Medical ICT, etc

Supporting researchers' standardization activities

- Information on Government Standardization Policy
- Handbook for standardization
- Holding internal seminars on standardization activities

Relevant Standardization Organizations

ITU	ITU-T: SG13, SG15, SG17, --- ITU-R: SG1, SG5, SG6, ---
IEEE	802.11af, 802.11aj, 802.15.4, 802.15.8, 802.16, 802.19, 802.22, 1900, ---
ISO/IEC	JTC1/SC27, JTC1/SC29, ---
Other	IETF, APT/ASTAP, APT/AWF, ---

Contributions in Fy 2012

Total Number of Attendants	255 persons
Total Number of Input Document	411 inputs
Total number of Chairpersons, Rapporteurs, Editors and Secretaries	41 posts

Examples of NICT origin standards in Fy 2012

ITU-T Y.3031	Identification Framework in Future Networks
IEEE802.15.4g	LR-WPANs Amendment 3 (PHY)
ISO/IEC 29192-1	Information technology – Security techniques – Lightweight cryptography
ITU-T K.91	Guidance for assessment, evaluation and monitoring of human exposure to radio frequency electromagnetic fields

Inviting International Standardization Meetings or Fora to Japan

- ITU-T 4th Meeting of FG-DR&NRR (Feb. 2013, @Tokyo)
- ITU Kaleidoscope Conference (Apr. 2013, @Kyoto)
- ITU-T SG16 (Nov. 2014)



ITU-T FG-DR&NRR @ Tokyo

Information Exchange with International Standardization Organizations

- ITU Deputy Secretary General, Mr. Houlin Zhao visited NICT (Feb. 2013)
- IEEE-SA Secretary, Dr. Konstantinos Karachalios visited NICT (Apr. 2013)



Mr. Houlin Zhao

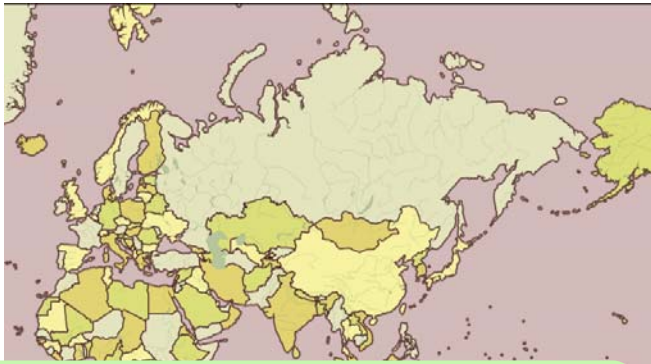
Mission

The centers promote and support collaborative R&D activities with foreign institutes, conducting PR activities, and supporting international standardization activities.

Action Items

- (1) Promote and support collaborative research projects with MoU partners.
- (2) Organize seminars and workshops.
- (3) Research on R&D news and topics in the Region.
- (4) PR activities to gain acknowledgement of NICT
- (5) Support NICT's standardization activities





South and Southeast Asia

【Singapore】

- Institute for Infocomm Research (I2R)
- Singapore Advanced Research and Education Network (SingAREN)
- Nanyang Technological University (NTU)

【Malaysia】

- Multimedia University (MMU)
- Malaysian Institute of Microelectronic Systems (MIMOS)

【Thailand】

- Office of Information Technology Administration for Educational Development (UniNet), Commission on Higher Education of Thailand
- National Institute of Metrology (NIMT)
- National Electronics and Computer Technology Center (NECTEC)
- Thai-Nichi Institute of Technology (TNI)
- King Mongkut's Institute of Technology Ladkrabang (KMITL)
- Chiang Mai University (CMU)
- Chulalongkorn University

【Indonesia】

- MCIT

4 Countries • 13 Institutes

East Asia

【South Korea】

- Kyung Hee University
- Korea Advanced Institute of Science and Technology (KAIST-ICC)
- Korea Institute of Science and Technology Information (KISTI)
- National Geographic Information Institute (NGII)
- Electronics and Telecommunications Research Institute (ETRI)
- Korea Research Institute of Standards and Science (KRISS)
- National Information Society Agency (NIA)
- School of Computer Science and Engineering, Seoul National University (SNUSCE)

【Taiwan】

- Academia Sinica
- National Sun Yat-Sen University (NSYSU)
- Industrial Technology Research Institute (ITRI)
- Telecommunication Laboratories, Chunghwa Telecom Co., Ltd (CHT TL)
- Institute for Information Industry (III)

【China】

- Asia Pacific Advanced Network Ltd. (APAN)
- Tsinghua University
- China Academy of Telecommunication Research (CATR)
- National Institute of Metrology, People's Republic of China (NIM)
- Harbin Institute of Technology (HIT)
- Beijing University of Posts and Telecommunications (BUPT)
- Shanghai Jiao Tong University (SJTU)
- Beijing Jiaotong University (BJTU)
- Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences (SIMIT)

3 Countries (Regions) • 22 Institutes

Europe

【Norway】

- Oslo University Hospital HF (OUS)

【Italy】

- Istituto Superiore delle Comunicazioni e delle Tecnologie dell'Informazione (ISCOM)
- Fondazione Bruno Kessler (FBK)
- Roma Tre University

【UK】

- Heriot-Watt University
- Delivery of Advanced Network Technology to Europe (DANTE)
- University of Bristol

【France】

- Grenoble Institute of Technology (ENSERG)
- Institut Mines-Télécom
- Le Centre National d'Etudes Spatiales (CNES)

【Sweden】

- Chalmers University of Technology

【Denmark】

- Aalborg University CTIF (AAU CTIF)

【Finland】

- VTT Technical Research Centre of Finland (VTT)

【Hungary】

- Budapest University of Technology and Economics (BME)

【Austria】

- Institute of Telecommunications, Vienna University of Technology (IOT)

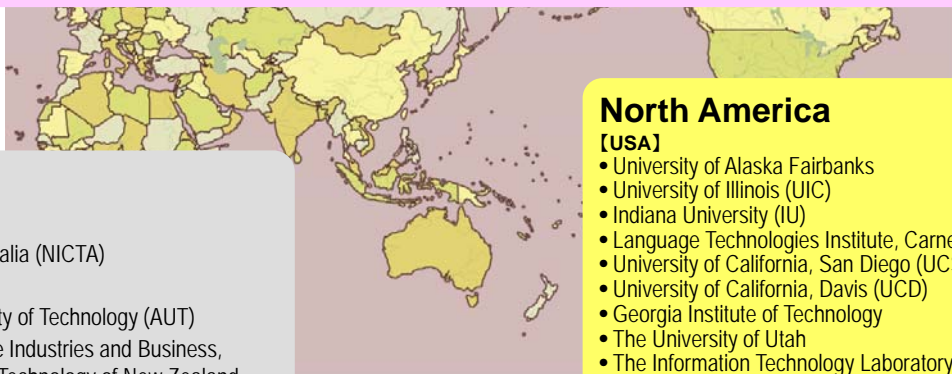
【Germany】

- University of Ulm (UULM)
- University of Duisburg-Essen (UDE)

【Russia】

- The Institute of Cosmophysical Research and Radio Wave Propagation, Far Eastern Branch, Russian Academy of Sciences (IKIR)

12 Countries • 18 Institutes



North America

【USA】

- University of Alaska Fairbanks
- University of Illinois (UIC)
- Indiana University (IU)
- Language Technologies Institute, Carnegie Mellon University (CMU LTI)
- University of California, San Diego (UCSD)
- University of California, Davis (UCD)
- Georgia Institute of Technology
- The University of Utah
- The Information Technology Laboratory (ITL) of the National Institute of Standards and Technology (NIST)
- Jet Propulsion Laboratory (JPL)
- National Science Foundation (NSF)

11 Institutes

Oceania

【Australia】

- National ICT Australia (NICTA)

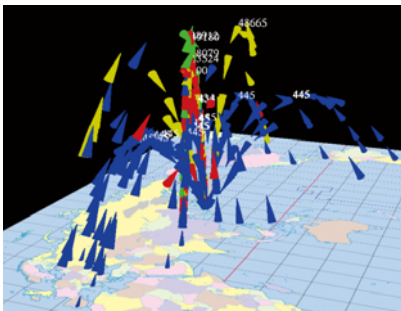
【New Zealand】

- Auckland University of Technology (AUT)
- Faculty of Creative Industries and Business, Unitec Institute of Technology of New Zealand

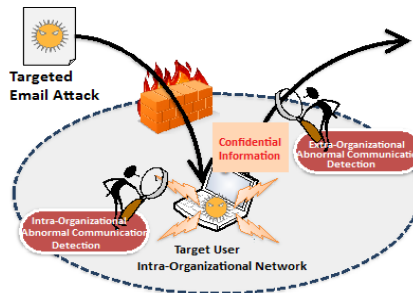
2 Countries • 3 Institutes

Cybersecurity

- Expansion of darknet's (unallocated IP space) observation scale to 210,000 addresses. Promoting overseas installation of "nicter" sensors through international cooperation.
- Development of targeted attack countermeasures that detect intra-organizational communication abnormalities and communication abnormalities originating from the inside, spreading to the outside of an organization.
- Development of new monitoring system prototypes that dynamically switch between blackhole sensors (passive sensors) and high-interactive sensors (active sensors) according to the type of cyber attack.



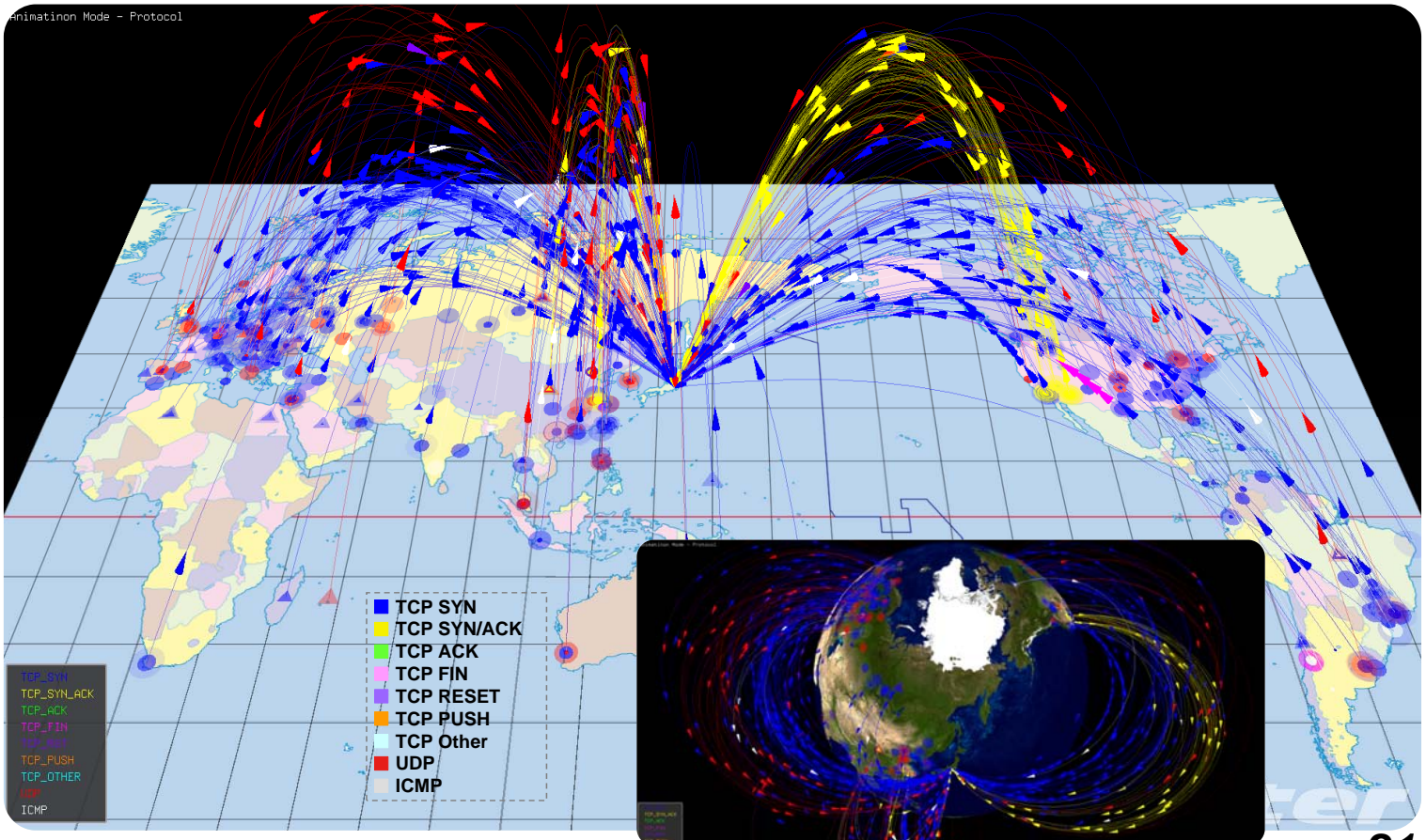
Cyber attack observed on darknet

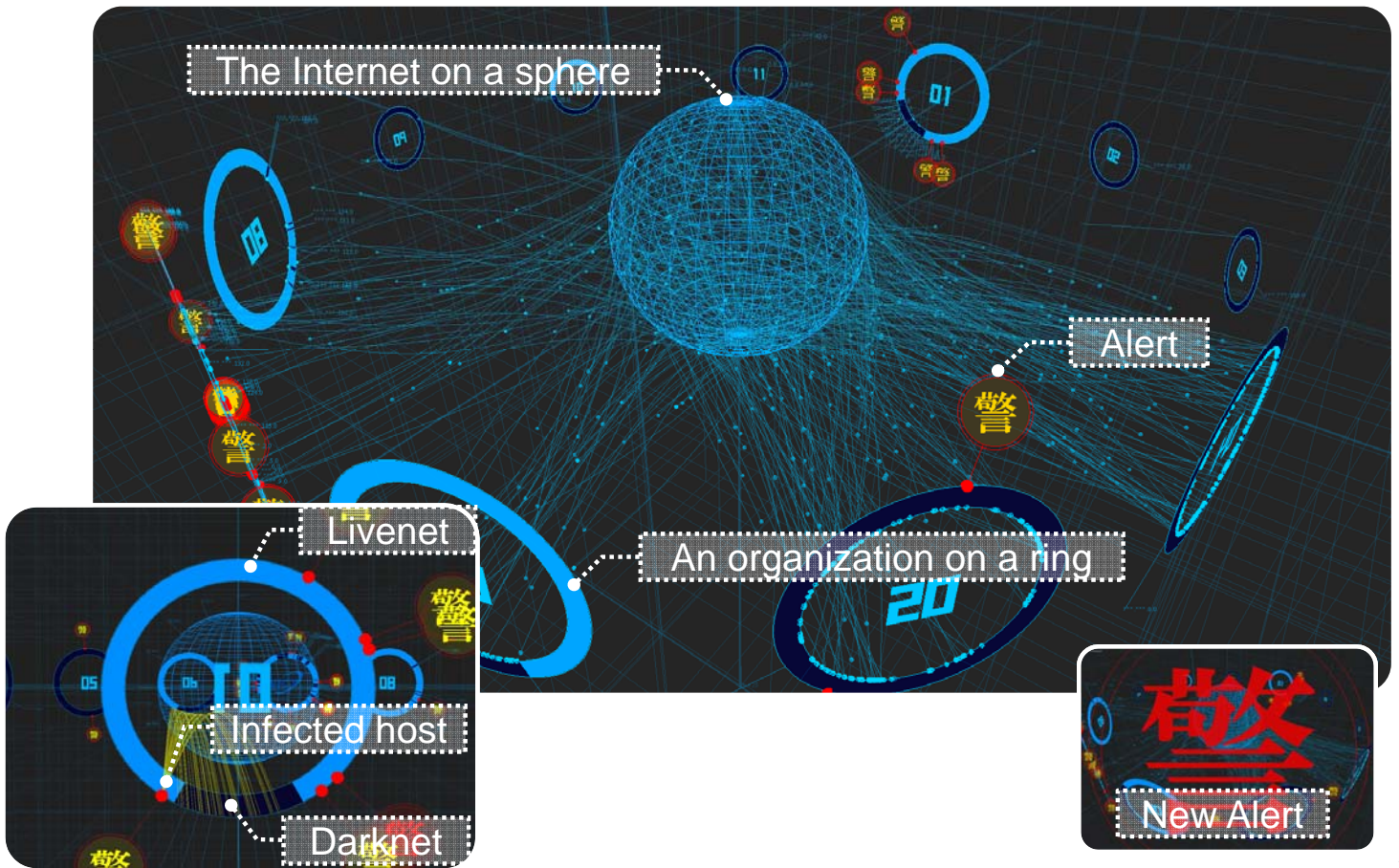


Targeted attack countermeasures that detect and alert intra-organizational communication abnormalities



NICTER - Network Incident analysis Center for Tactical Emergency Response -





Multilingual Communication

Human Communication

- Improving accuracy by 30% while maintaining recognition speed and long sentence speech recognition while incorporating 10 times the previous vocabulary recognition size.
- Achieving expansion of the international research community, U-STAR, to a 23 country/26 institute organization making conversation with 95% of the world's population possible with the speech translation application VoiceTra4U-M.
- Achievement exceeding 80-85% highly precise translation from conventional methods used in Chinese to Japanese, English to Japanese translations of long sentences characteristically found in patents. The technology of the automatic translation system for patent abstracts has been transferred to two private companies.

Leading collaborative research with 23 countries, 26 institutes.

• Speech translation technology transfer: total of 5 companies
• Patent translation technology transfer: total of 2 companies

Practical use by companies

Public opening of SDK and API

Expanding the world's languages with U-STAR



International Research Consortium "U-STAR"



Spoken Language Translation Application "VoiceTra4U-M"

Awarded 1st Place at The International Workshop on Spoken Language Translation (IWSLT 2012)

- Speech Translation (17 languages)
- Text Translation (26 languages)
- Up to 5 people able to converse simultaneously

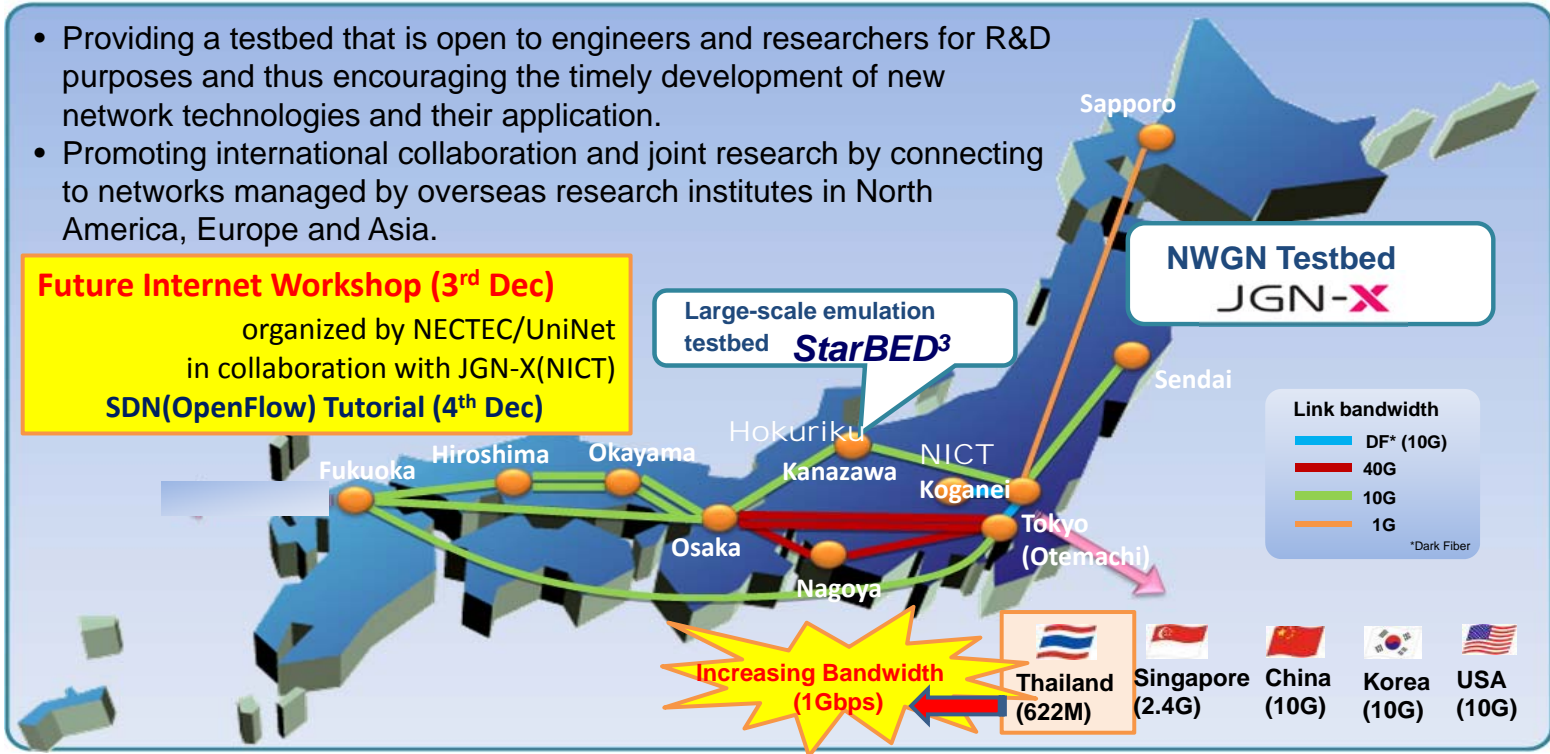
 BPPT Agency for the Assessment and Application of Technology (BPPT), Indonesia	 Institute of Automation, Chinese Academy of Sciences (CASIA), China	 Center for Development of Advanced Computing (CDAC), India	 ETRI Electronics and Telecommunications Research Institute (ETRI), Korea	 Institute for Infocomm Research (IER), Singapore
 Institute of Information Technology (IOIT), Vietnam	 National Electronics and Computer Technology Center (NECTEC), Thailand	 National Institute of Information and Communications Technology (NICT), Japan	 Department of Information Technology and Telecom (DITT), Bhutan	 Al-Khwarizmi Institute of Computer Science, UET (KICS-UET), Pakistan
 Language Technology Kendra (LTk), Nepal	 Mongolian University of Science and Technology (MUST), Mongolia	 National University of Mongolia (NUM), Mongolia	 University of Colombo School of Computing (UCSC), Sri Lanka	 University of the Philippines Diliman (UPD), Philippines
 Budapest University of Technology and Economics Dept. of Telecommunications and Media Informatics (BME-TMIT), Hungary	 National Center of Scientific Research (CNRS-LIMSI), France	 Institute of Systems and Computer Engineering - Research and Development in Lisbon, (INESC-ID), Portugal	 Polish-Japanese Institute of Information Technology, (PJIT), Poland	 Pázmány Péter Catholic University, (PPKE), Hungary
 University of Sheffield, Department of Computer Science, Speech and Hearing Group, (SpandH), UK	 KU Leuven, Dept. Electrical Engineering, division PSI-Speech, (ESAT), Belgium	 Technische Universität München, (TUM), Germany	 Trinity College Dublin, (TCD), Ireland	 Center of Research for Advanced Technologies of Informatics and Information Security, (TUBITAK), Turkey
 Ulm University - Institute of Communications Engineering, (UUI) Germany	<p>“U-STAR” is an international research collaboration formed to develop a network-based speech-to-speech translation (S2ST) with the aim of breaking language barriers around the world and to implement vocal communication between different languages. Members: 26 research Institutes in 23 countries</p>			

Network Testbed JGN-X and StarBED³

Large-scale experimental testbed environment to support demonstrations and verifications of advanced network technologies for the development of the New Generation Network.

- Providing a testbed that is open to engineers and researchers for R&D purposes and thus encouraging the timely development of new network technologies and their application.
- Promoting international collaboration and joint research by connecting to networks managed by overseas research institutes in North America, Europe and Asia.

Future Internet Workshop (3rd Dec)
 organized by NECTEC/UniNet
 in collaboration with JGN-X(NICT)
SDN(OpenFlow) Tutorial (4th Dec)

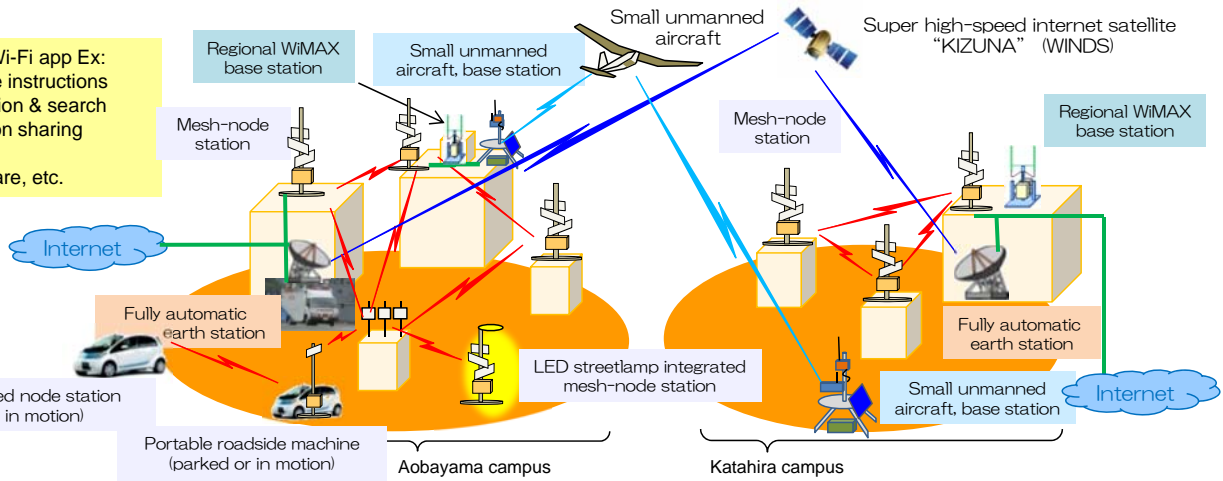


Field-Harmonized ICT

- Construction of a mesh-type multilayered network, resilient in times of disasters.
- Conducting a public demo evaluation experiment at Tohoku University testbed.

Non-server type Wi-Fi app Ex:

- Evacuation route instructions
- Safety confirmation & search
- Group information sharing
- SOS dispatch
- Remote healthcare, etc.



※the area of each node station/base station forms a Wi-Fi zone

Wireless Mesh Testbed Equipment Configuration (Tohoku University)



Takeoff of a small unmanned aircraft



LED streetlamp signage integrated mesh-node station



Vehicle-adapted earth station

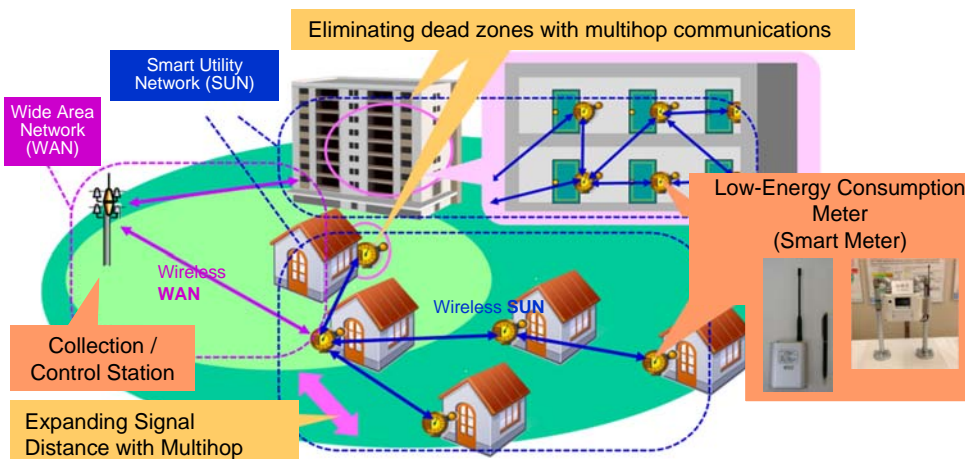


Fully automatic portable earth station

NICT Scalable Wireless Network and Wi-SUN Alliance

Big data/Sensor/M to M

- Development of power-saving multihop communication technology for smart utility networks.
- Expanding service areas and reaching previously dead zones by solving the problem of weak signal areas with a low-energy consumption multistage broadcast radio wave (multihop communication).
- Formal startup of the industrial standard group Wi-SUN Alliance between 7 domestic and international corporations. Currently 31 businesses in the alliance and its standards are established.



Foundation of the Wi-SUN Alliance

- Each chip vendor has embarked on chip development. (More than 10 companies)
- Led by the members who conducted IEEE802.15.4g specifications development, Wi-SUN Alliance pioneered system conformity by enforcing certification.
- Analog Devices, Fuji Electric, Murata, Omron, Osaki, Renesas, Silver Spring Networks, Cisco Systems, and NICT have joined.
- Conducting establishment of Alliance standards and joint-connection events
- NICT is positively contributing to these efforts.

Smart Utility Network (SUN):

SUN is a network that works to use gas, electricity, and water's automatic meter readings more efficiently.

It is a promising wireless communication standard for the smart grid.

Field-Harmonized ICT

- Development of a disaster response information analysis system that extracts appropriate information from the massive amount posted on Twitter after a disaster.
- Based on interviews at disaster-stricken areas, NICT composed an average of 300 hypothetical questions into an answer list where users who spent long hours searching from 1000 tweets were able to find their answer 76% of the time. The accuracy of all answers is roughly 56%.
- The answers are meaningfully categorized and it is possible to use a smartphone to show the displays and maps.

Q: What do people in Miyagi Prefecture need?

Request: Running out of powdered milk

Response: Powdered milk has arrived

Find demands/problems at disaster areas and discover matching countermeasures. Improve efficiency of rescue operations

Utilize the disaster response information analysis system on your smartphone

Thank you for your attention !

--- We're ready for more collaboration with you !! ---



<http://www.nict.go.jp/en/index.html>