

# **Okinawa Open Laboratory Overview**

**July 2026**  
**Okinawa Open Laboratory**

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## 1. Organization Overview

### 1.1 Organization Profile

#### (1) Organization Name

- Okinawa Open Laboratory (OOL)

#### (2) Date of Establishment

- May 8, 2013

#### (3) Head Office

- 5F, NTT Docomo Business Naha Jitchaku Building  
4-19-3 Jitchaku, Urasoe City, Okinawa 901-2122, Japan  
Tel: +81-98-989-1940  
Fax: +81-98-989-1943

#### (4) Representative Director

- Yukio Ito

#### (5) Mission

Okinawa Open Laboratory (OOL) was established to create an advanced ICT research institute in Okinawa that contributes to the development of an international R&D hub in the heart of Asia. Through open collaboration among industry, academia, government, and technology communities, OOL promotes the practical application of advanced ICT and data-driven innovation while addressing real-world industrial and social challenges.

OOL's mission includes:

- Promoting the research, practical application, and widespread adoption of advanced ICT infrastructure technologies, including Software-Defined Networking (SDN), cloud computing, and related converged technologies.
- Advancing data utilization technologies to create new value for industry and society.
- Solving industrial and social challenges through innovative applications of advanced ICT and data analytics.
- Contributing to the sustainable growth of Okinawa's industries and communities while strengthening collaboration with organizations throughout Asia by leveraging Okinawa's strategic geographic location.



**OOL** is an international research institute in Urasoe City, Okinawa, **the Center of the Asian Dynamism**



## (6) Core Activities

OOL conducts the following three core activities:

### 1. **Research and Development (R&D)**

Conduct research on advanced ICT and data utilization technologies, with an emphasis on practical use cases and real-world implementation.

### 2. **Exchange Activities (EA)**

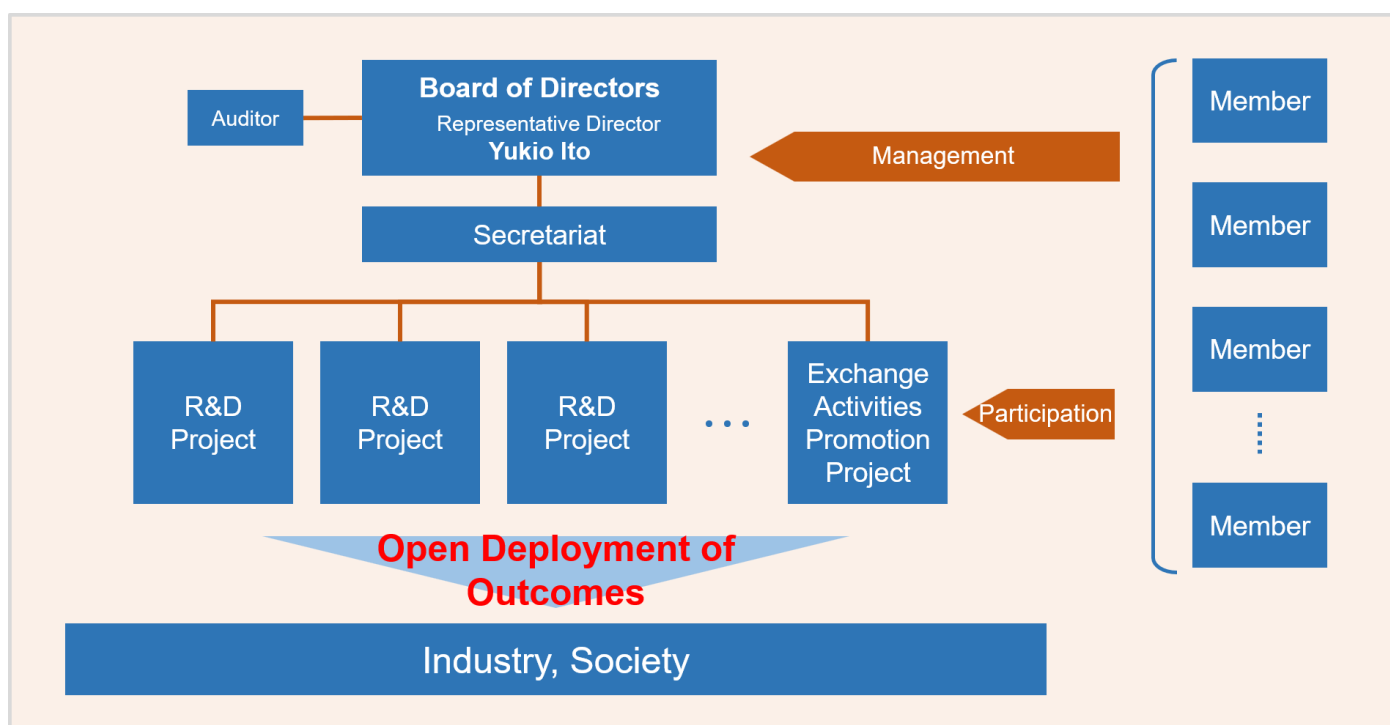
Promote open collaboration and knowledge exchange among member organizations, industry communities, academic institutions, government agencies, and international partners.

### 3. **Human Resource Development (HRD)**

Foster highly skilled engineers and researchers capable of developing, applying, and promoting advanced ICT and data utilization technologies.

## 1.2 Organization Structure and Governance

OOL operates under a membership-based structure in which its members play a central role in all organizational activities. The organization is governed by the Board of Directors and supported by the Secretariat, ensuring effective management, transparent governance, and efficient project execution.



### **OOL Members**

OOL adopts a membership-based model in which members actively participate in and support its activities. Research and development projects, exchange programs, and human resource development initiatives are driven by the expertise and collaboration of member organizations and individuals.

For details of the membership categories, please refer to **Section 1.3 Membership**.

## Board of Directors

The Board of Directors is responsible for the overall governance and strategic direction of OOL. It establishes organizational policies, approves major initiatives, and oversees the management and operation of the organization to ensure that its activities are aligned with OOL's mission and objectives.

## Auditor

The Auditor independently reviews OOL's financial management and operational activities to ensure appropriate governance, accountability, and compliance with applicable laws and regulations.

## Secretariat

The Secretariat is responsible for the day-to-day management and administration of OOL. Its primary responsibilities include:

- Coordinating and overseeing research projects and organizational activities.
- Facilitating collaboration among projects and member organizations.
- Managing relationships with external organizations and stakeholders.
- Preparing reports and proposals for the Board of Directors.
- Providing administrative, financial, and operational support for the organization.

## 1.3 Membership

OOL offers the following four membership categories to encourage participation from corporations, individuals, public organizations, educational institutions, and other stakeholders.

| Membership Category         | Eligibility                                                                                                                     | Annual Membership Fee                              | Benefits                                                                                                                                                                             |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Member (Corporate)  | Corporations and organizations                                                                                                  | JPY 300,000 per membership unit                    | Participate in R&D projects, Exchange Activities, and HRD programs.<br>Members subscribing to two or more membership units may participate in all projects and propose new projects. |
| General Member (Individual) | Individual professionals and researchers                                                                                        | JPY 10,000 per membership unit (Free for students) | Participate in all R&D projects, Exchange Activities, and HRD programs.                                                                                                              |
| Special Member              | Government agencies, public organizations, educational institutions, and other organizations approved by the Board of Directors | Free                                               | Participate in all activities and propose new projects.                                                                                                                              |
| Supporting Member           | Organizations or individuals approved by the Board of Directors                                                                 | Free                                               | Participate in designated projects as approved by the Board of Directors.                                                                                                            |

## Notes

1. Individuals affiliated with a corporation or organization are generally expected to participate through their organization as a **General Member (Corporate)**. Exceptions may be approved by the Board of Directors.
2. Individuals who have made outstanding contributions to Okinawa Open Laboratory may be admitted as **Special Members** upon approval by the Board of Directors.

### 1.4 Board of Directors

(As of July 2026)

The Board of Directors is composed of experienced leaders from member organizations and is responsible for providing strategic leadership and governance for OOL.

| Position                | Name                      | Affiliation               |
|-------------------------|---------------------------|---------------------------|
| Representative Director | <b>Yukio Ito</b>          | Okinawa Open Laboratory   |
| Director                | <b>Tatsuya Yamashita</b>  | NTT DOCOMO BUSINESS, Inc. |
| Director                | <b>Hiroyuki Tanahashi</b> | NTT DOCOMO BUSINESS, Inc. |
| Director                | <b>Nobuaki Iijima</b>     | NEC Corporation           |
| Director                | <b>Taku Yamazaki</b>      | NEC Corporation           |
| Director                | <b>Noritaka Abe</b>       | Okinawa Open Laboratory   |
| Director                | <b>Noriyoshi Yamazaki</b> | Okinawa Open Laboratory   |

## 1.5 Message from the Representative Director



**Yukio Ito**  
**Representative Director**  
**Okinawa Open Laboratory**

Since its establishment in 2013, Okinawa Open Laboratory has continued to commit to our founding vision of creating an international research and development hub in Okinawa while advancing the practical application of next-generation ICT infrastructure technologies.

Our activities began with a focus on the convergence of Software-Defined Networking (SDN) and cloud computing. Since then, the rapid evolution of technologies such as IoT, artificial intelligence (AI), 5G, robotics, and data-driven innovation has continually expanded the possibilities for digital transformation. Throughout these technological changes, OOL has evolved into a unique open innovation platform where companies, universities, public organizations, and engineers collaborate across organizational and industrial boundaries to address real-world challenges through open research and development.

None of these achievements would have been possible without the continued support, collaboration, and dedication of our member organizations, partners, and all those who have contributed to our activities over the years. On behalf of OOL, I would like to express my sincere appreciation to everyone who has supported our mission.

From the very beginning, OOL has served not only as a research institute but also as a collaborative platform where engineers, researchers, and organizations openly exchange ideas, develop practical use cases, and create new value through innovation. We believe that technological innovation delivers its greatest value when it contributes to society by addressing real-world needs and improving people's lives.

Today, as society faces increasingly complex challenges—including sustainability, resilience, digital transformation, and the responsible adoption of artificial intelligence—the role of ICT has become more important than ever. OOL will continue to promote open collaboration, encourage technological innovation, and create opportunities for engineers and organizations to work together in solving these challenges.

Looking ahead, we remain committed to contributing to industry and society through advanced ICT research, international collaboration, and the development of talented professionals. We sincerely appreciate your continued support and look forward to working with you to shape the future together.

## **2. Business Overview**

### **2.1 Core Activities**

Okinawa Open Laboratory (OOL) carries out the following three core activities to fulfill its mission of advancing ICT innovation and creating practical value for industry and society.

#### **(1) Research and Development (R&D)**

Research and Development (R&D) is OOL's primary activity.

Its objectives are to:

- Conduct research on advanced ICT infrastructure and data utilization technologies.
- Develop practical solutions based on real-world use cases.
- Carry out proof-of-concept (PoC) projects and technology demonstrations to validate research outcomes and accelerate their practical adoption.

#### **(2) Exchange Activities (EA)**

Exchange Activities promote open collaboration and knowledge sharing among member organizations and a broad range of external partners.

These activities aim to:

- Foster collaboration among industry, academia, government, technology communities, and international partners.
- Facilitate the exchange of technical knowledge, experience, and best practices.
- Create opportunities for co-creation, innovation, and the development of new research themes.

#### **(3) Human Resource Development (HRD)**

Human Resource Development focuses on cultivating engineers and researchers who can lead future ICT innovation.

The program provides:

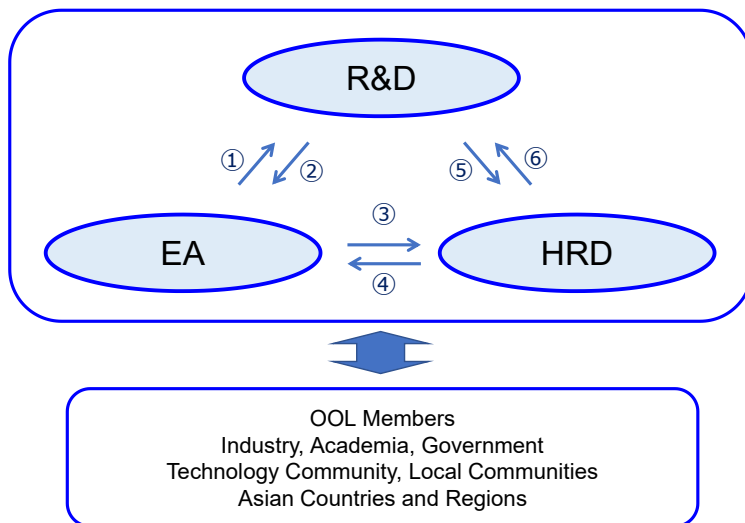
- Educational programs covering advanced ICT and data utilization technologies.
- Practical learning opportunities through participation in research projects, demonstrations, and technical exchange activities.
- Hands-on experience that enables participants to develop both technical expertise and practical problem-solving skills.

Research and Development serves as the foundation of OOL's activities. Exchange Activities strengthen collaboration and encourage the sharing of knowledge and ideas, while Human Resource Development cultivates the next generation of engineers and researchers. Together, these three activities create a continuous cycle that promotes innovation, collaboration, and sustainable technological advancement.



## 2.2 Relationship Among the Core Activities

The three core activities are closely integrated and reinforce one another, creating a sustainable cycle of innovation.



1. **Exchange Activities** identify emerging technological trends, industry needs, and social challenges, which are reflected in the selection of research themes and practical use cases.
2. **Research and Development** evaluates new technologies, practical solutions, and research outcomes that are shared with society through Exchange Activities.
3. **Exchange Activities** provide opportunities for engineers, researchers, and students to learn about emerging technologies and participate in collaborative initiatives.
4. Engineers and researchers who have completed HRD programs actively participate in Exchange Activities, expanding collaboration and strengthening the OOL community.
5. **Research and Development** provides opportunities for engineers and students to participate in a research project
6. These experienced participants also contribute to Research and Development projects, bringing new ideas, technical expertise, and practical experience that further enhance OOL's research capabilities.

Through this mutually reinforcing cycle, OOL continuously generates new knowledge, nurtures talented professionals, and promotes innovation that contributes to industry and society.

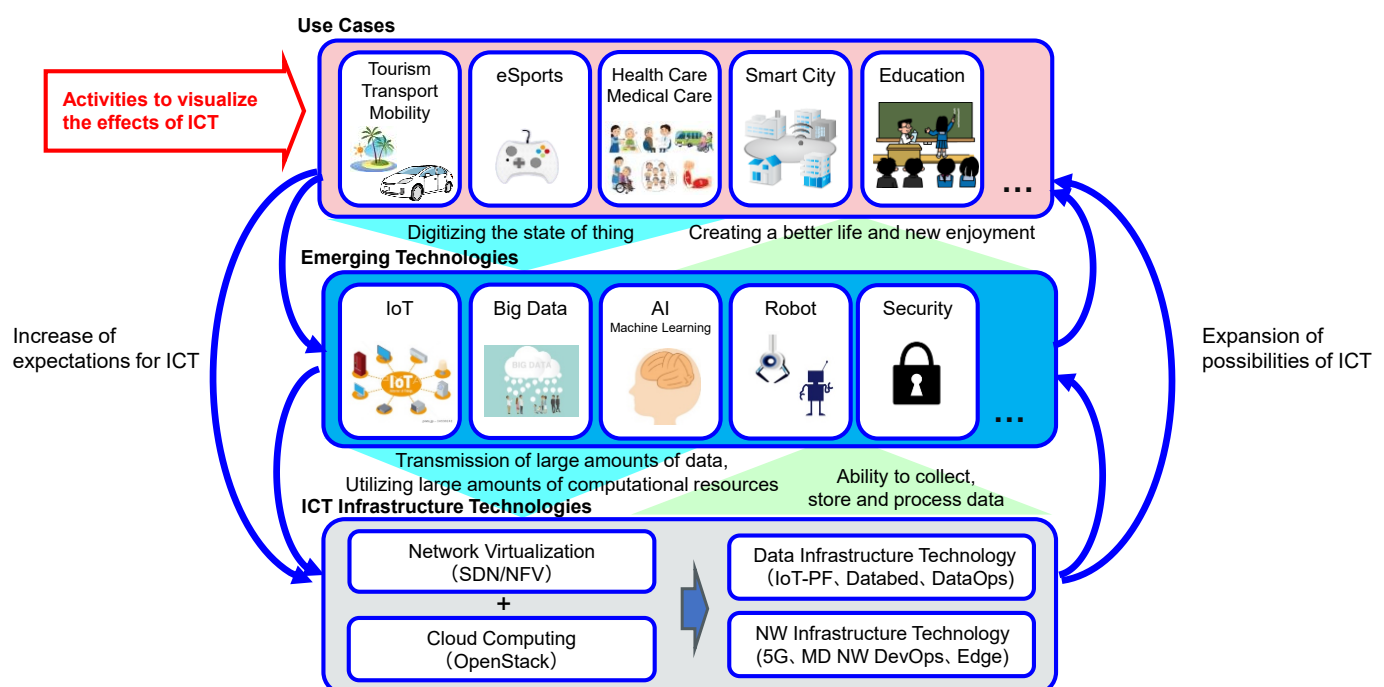
### 3. Research and Development (R&D)

#### 3.1 Overview

Research and Development (R&D) is the core activity of Okinawa Open Laboratory (OOL). Our research focuses on advanced ICT (Information and Communication Technology) infrastructure and data utilization technologies that create practical value for industry and society.

Rather than pursuing technology for its own sake, OOL emphasizes the development and validation of technologies through practical use cases that address real-world challenges. By integrating ICT infrastructure with emerging digital technologies, we aim to accelerate innovation and support the practical deployment of next-generation ICT solutions.

OOL's R&D activities are organized into the following three complementary layers.



#### ICT Infrastructure Technologies Layer

This layer forms the technological foundation of OOL's research activities.

Our research initially focused on Software-Defined Networking (SDN), network virtualization, and cloud computing. As digital transformation has progressed, our research scope has expanded to include data infrastructure technologies, next-generation network infrastructure, and distributed computing technologies that support data-intensive applications.

#### Emerging Technologies Layer

Rapid advances in digital technologies continue to create new opportunities for innovation.

OOL actively explores the integration of emerging technologies—including Artificial Intelligence (AI), machine learning, the Internet of Things (IoT), robotics, and big data analytics—with ICT infrastructure technologies. By combining these technologies, we seek to develop practical solutions that effectively address industrial and societal challenges.

## Use Cases Layer

Practical use cases drive every stage of OOL's research activities.

Rather than conducting technology research in isolation, OOL collaborates with industry, government, academia, and local communities to identify real-world issues and validate technologies in practical environments. These use cases guide research priorities while demonstrating how advanced ICT can create tangible value for society.

The interaction among these three layers enables OOL to continuously bridge advanced technologies with practical applications, transforming research outcomes into solutions that contribute to society while responding to evolving technological and social needs.

## 3.2 R&D Policy and Operating Principles

OOL selects and conducts its R&D activities based on the following principles:

1. **Align R&D themes with OOL's mission and objectives.**

R&D themes are selected in accordance with OOL's founding mission, while taking into account technological developments, industry trends, and emerging social challenges.

2. **Focus on practical use cases.**

When researching and validating technologies, OOL places a strong emphasis on identifying practical use cases that reflect real-world needs and challenges.

3. **Prioritize open technologies and data.**

To promote collaboration and co-creation across organizational boundaries, OOL prioritizes open technologies, including Open Source Software (OSS), as well as open data, wherever possible.

4. **Develop missing technologies as OSS when appropriate.**

When an expected use case cannot be realized using existing OSS, OOL may develop the required components as new OSS, thereby contributing the resulting technologies back to the broader community.

5. **Conduct R&D through project-based activities.**

OOL organizes and manages its R&D activities through dedicated projects, enabling members and partners to collaborate around specific research themes and objectives.

6. **Provide shared research infrastructure.**

OOL provides testbeds and databeds to facilitate and expand collaboration and co-creation among members, partners, and other stakeholders involved in R&D and related activities.

### **3.3 Ongoing R&D Projects**

OOL currently conducts the following nine R&D projects. Each project addresses a specific technological or societal challenge while contributing to OOL's broader mission of advancing ICT innovation through open collaboration and practical use cases.

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#### **3.3.1 Testbed Project (FY2014–)**

The Testbed Project provides a shared research infrastructure for OOL's R&D, Exchange Activities, and Human Resource Development programs. The platform incorporates research outcomes and Open Source Software (OSS) to support flexible and practical experimentation. It also enables interconnection with external test environments, allowing researchers and engineers to validate technologies across diverse environments. The project further explores the use of AI to improve the efficiency of operational tasks, including documentation, network configuration, security management, and incident response.

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#### **3.3.2 Databed Project (FY2018–)**

The Databed Project promotes the collection, integration, and practical use of open data to support regional innovation. The project focuses particularly on tourism and transportation data in Okinawa, including data provided through the Okinawa Transit and Tourism Open data Platform (OTTOP). By integrating datasets such as transportation schedules and GTFS data, the project aims to develop data-driven services and use cases that contribute to tourism, mobility, and the broader digital transformation of Okinawa.

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#### **3.3.3 Internet Karte Project (FY2021–)**

The Internet Karte Project continuously measures Internet connection quality across multiple locations throughout Japan. Originally launched as an e-sports-related initiative, the project has expanded into a broader effort to visualize and analyze the quality of Internet connectivity. Measurement data is collected continuously and analyzed using AI to identify patterns, anomalies, and potential causes of performance degradation. The project aims to provide an interactive platform for understanding Internet quality and supporting data-driven analysis of network performance.

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#### **3.3.4 Model Driven Network DevOps Project (FY2021–)**

The Model Driven Network DevOps Project develops technologies for managing network infrastructure through standardized data models and automation. The project uses IETF network topology model defined in RFC 8345, to represent and manage network configurations and topologies. It also explores the concept of a Network Digital Twin, enabling network environments to be modeled and synchronized with real-world infrastructure. These technologies support more efficient network design, operation, and troubleshooting.

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#### **3.3.5 Trusted Network Project (FY2022–)**

The Trusted Network Project explores technologies and frameworks for improving trust in transactions across global supply chains. The project brings together stakeholders from vendors, systems integrators, network operators, government, and industry organizations to examine how trust-related information should be managed

and exchanged. Activities include identifying requirements, developing and validating technologies, and promoting collaboration among stakeholders. The project also contributes to international standardization activities, including work related to ISO standards.

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### **3.3.6 Edge Project (FY2022–)**

The Edge Project investigates distributed computing and networking technologies that can support resilient digital infrastructure. As dependence on centralized cloud services continues to grow, large-scale disasters or disruptions to submarine cables could affect the availability of critical IT services. The project explores Edge Computing and related technologies to enable distributed processing and services closer to users and data sources. It also develops practical use cases for Okinawa, including disaster response, regional services, and V2X applications.

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### **3.3.7 Telepresence Project (FY2024–)**

The Telepresence Project explores technologies that enable people to remotely interact with physical environments through robots and other devices. The project focuses on the integration of telepresence robots, AI-based image analysis, and advanced communication technologies. One key area of research is the application of these technologies to medical environments, where remote interaction and AI-assisted analysis may help address operational challenges and improve access to specialized services. The project conducts demonstrations and proof-of-concept activities to evaluate practical applications.

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### **3.3.8 IOWN Project (FY2025–)**

The IOWN Project explores advanced networking technologies based on the Innovative Optical and Wireless Network (IOWN) concept. The project focuses on the use of the IOWN All-Photonics Network (APN) to establish high-performance, low-latency connections between Okinawa and other regions, including Tokyo. It also investigates distributed computing architectures using GPUs and technologies such as long-distance RDMA. Through these activities, the project aims to develop new use cases for high-performance distributed computing and advanced network infrastructure.

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### **3.3.9 Knowledge Graph Project (FY2025–)**

The Knowledge Graph Project investigates the use of knowledge graphs and GraphRAG to improve the accuracy, reliability, and explainability of generative AI systems. While conventional vector-based RAG can retrieve semantically similar information, it may have limitations when dealing with complex relationships and structured knowledge. The project explores methods for combining Large Language Models (LLMs) with knowledge graphs and develops practical use cases for industry and society. Through this research, OOL aims to contribute to the development of more trustworthy and useful AI systems.

## **4. Exchange Activities**

### **4.1 Overview**

Exchange Activities (EA) are an important part of Okinawa Open Laboratory's mission to promote collaboration and knowledge sharing across organizational and industry boundaries.

OOL organizes and participates in a wide range of activities that connect member organizations, industry, academia, government, technology communities, and international partners. These activities provide opportunities to share technical knowledge, exchange ideas, identify emerging technologies and industry needs, and develop new opportunities for collaboration.

Through these activities, OOL also contributes to the development of new R&D themes and practical use cases. The knowledge, relationships, and ideas generated through Exchange Activities are fed back into OOL's research and human resource development programs, creating a continuous cycle of collaboration and innovation.

### **Key Activities**

#### **Technical Seminars and Study Sessions**

OOL organizes seminars, study sessions, and workshops on emerging technologies and important ICT trends. These events provide opportunities for engineers, researchers, and other professionals to share knowledge and discuss practical applications.

#### **Industry and International Exchange**

OOL promotes exchanges with companies, universities, government organizations, industry associations, and technology communities in Japan and Asia. Through these activities, OOL builds collaborative relationships and promotes the exchange of knowledge and expertise.

#### **Participation in External Events**

OOL actively participates in major technology conferences, exhibitions, and industry events to share its research activities, promote collaboration, and identify new technologies and potential partners.

#### **Technology Demonstrations and Open Innovation**

OOL provides opportunities to demonstrate research outcomes and emerging technologies through proof-of-concept activities, exhibitions, and collaborative events. These activities help connect technological research with practical use cases and real-world challenges.

### **Representative Activities**

OOL has organized and participated in a wide range of exchange activities, including:

- Technical seminars and study sessions on emerging ICT technologies.
- Workshops and demonstrations involving OOL R&D projects.
- International exchange activities with organizations and technology communities in Asia and other regions.
- Participation in major technology events, conferences, and exhibitions.
- Joint events and collaborative activities with industry, academia, government, and other organizations.

Through these activities, OOL serves as a platform for connecting people, technologies, and organizations, helping to transform knowledge exchange into new opportunities for collaboration and innovation.

## **5. Human Resource Development**

### **5.1 Overview**

Human Resource Development (HRD) is one of the three core activities of Okinawa Open Laboratory (OOL), alongside Research and Development (R&D) and Exchange Activities (EA).

The rapid evolution of technologies such as cloud computing, artificial intelligence, data analytics, and advanced networking has created an increasing need for professionals with both specialized technical expertise and practical problem-solving skills. OOL develops and provides educational and hands-on learning opportunities to help engineers, researchers, students, and other professionals acquire the knowledge and skills required to apply advanced ICT technologies in real-world environments.

OOL's HRD activities are closely connected with its R&D and Exchange Activities. Participants can learn about emerging technologies through seminars and workshops, gain practical experience through participation in R&D projects, and exchange knowledge with engineers and researchers from diverse organizations. Through this integrated approach, OOL aims to cultivate professionals who can contribute to technological innovation and address complex challenges facing industry and society.

### **5.2 HRD Programs**

#### **Basic Program**

The Basic Program provides introductory education on emerging ICT technologies and promotes their understanding and adoption among a broad range of participants.

The program includes:

- Introductory seminars and study sessions on emerging technologies.
- Basic education on advanced ICT infrastructure and data utilization.
- Opportunities to learn from engineers, researchers, and experts in the field.

#### **Advanced Program**

The Advanced Program provides more specialized and practical learning opportunities for participants who seek to develop advanced technical expertise.

The program includes:

- Advanced technical seminars and hands-on workshops.
- Practical training using OOL's research infrastructure and testbeds.
- Opportunities to participate in R&D projects and technology demonstrations.
- Collaboration with experienced engineers and researchers from member organizations and partner institutions.

### **5.3 Practical Learning through R&D**

A key feature of OOL's HRD activities is the integration of education with practical research and development.

Participants can gain hands-on experience by taking part in activities such as:

- Research and development projects.
- Proof-of-concept activities and technology demonstrations.
- Testbed construction and operation.
- Data collection, analysis, and utilization.
- Technical seminars, workshops, and collaborative events.

Through these opportunities, participants develop not only technical knowledge but also the ability to identify real-world challenges, design practical solutions, and collaborate effectively across organizational boundaries. OOL will continue to strengthen its HRD activities by providing opportunities for people to learn, collaborate, and grow through advanced ICT research and practical experience.