

GISC 2025

Global ICT Standards Conference 2025

Standardization Strategy (Quantum)

QuINSA Activities and Recent Development

Jaewan Kim
KRISS

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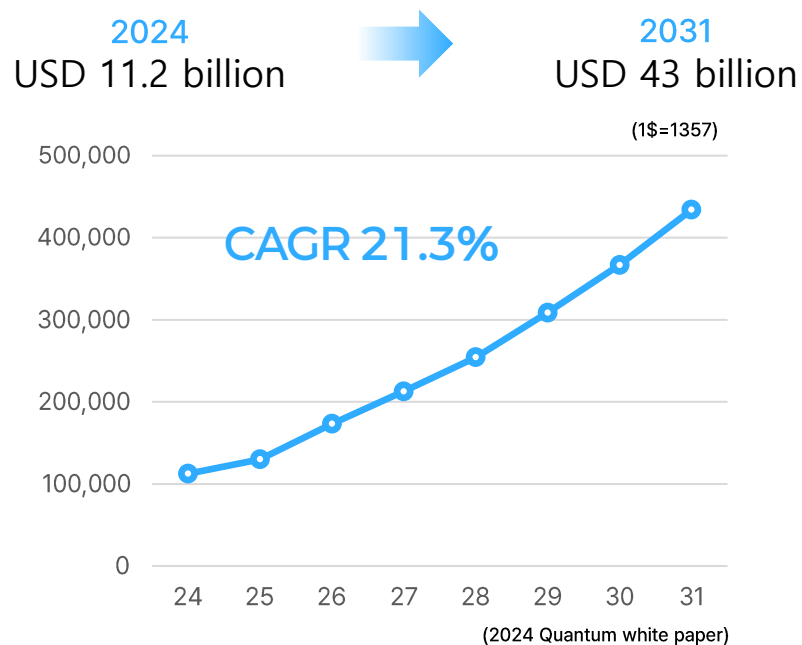
01 Quantum Overview

Background and Necessity of QuINSA

The global rise of the quantum industry

Quantum Trend

Worldwide Quantum Technology Market Trend



US

- Initiation of the NQI Reauthorization Act
- Quantum Network Strategic Vision
- NQI Commission Signs National Security Memorandum



UK

- Announcement of National Strategy for Quantum Technology
- Supporting Quantum Computing Commercialization



Europe

- Quantum Flagship Project
- 2030 Digital Compass
- Launch of the European Consortium of Quantum Companies (QulC)



Germany

- Quantum Technology Framework Program
- Approval of quantum technology implementation concept



China

- 13th and 14th National Science and Technology Plans
- Plans to establish the world's largest quantum information research institute



Australia

- Promotion of investment in quantum industry development
- National Quantum Strategy Announcement



Japan

- Quantum Innovation Strategy
- Moonshot Project
- Q-Leap Flagship Program



Korea

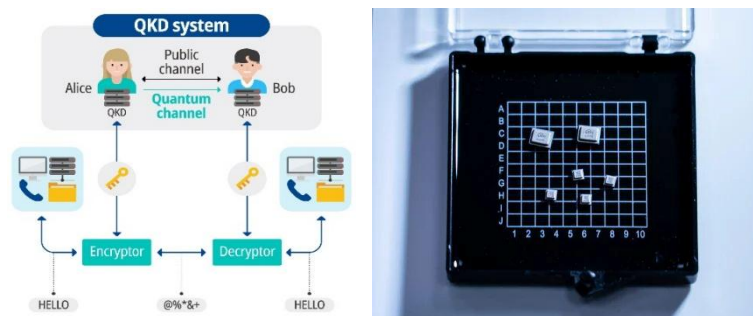
- Quantum Science and Technology Vision Announcement
- "Quantum Law" to be implemented in November 2024
- Quantum Flagship R&D

Background and Necessity of QuINSA

Quantum technologies are moving from lab to market

Quantum Technology

Quantum Communication



※ TTA, QKD

※ IDQ, QRNG chip

- Quantum Key Distribution(QKD)
- Quantum Random Number Generation(QRNG)
- Quantum Security technologies

Quantum Computing

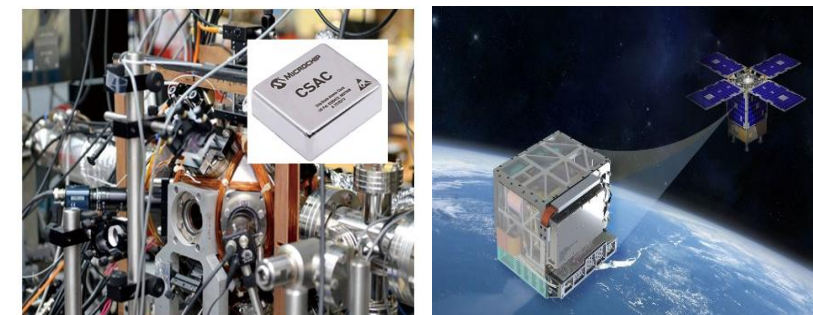


※ IBM Quantum Computer
(Yonsei Univ.)

※ Google Willow Chip

- Quantum Processor(QPU)
- Quantum Computing SW
- Quantum Computing HW
– Superconducting, Ion trapped...

Quantum Sensor



※ KRIS optical lattice clock

※ NASA quantum clock

- Quantum time sensor – Space, Defense...
- Quantum Electric-Magnetic, Sensor – Medical..
- Quantum Photon Sensor – Test and Measurement

Background and Necessity of QuINSA

Global standardization trend

Quantum SDOs

✓ ITU-T



- SG11 : QKD Interface & Protocol
- SG13 : QKDN Standard
- SG17 : QKDN Security Standard

✓ ETSI



- Capabilities for implementing QKD systems
- QKD Interface and Security Requirements

✓ IETF/IRTF



- Capabilities for implementing QKD systems
- QKD Interface and Security Requirements

✓ ISO/IEC JTC3

IEC/ISO JTC 3
Quantum technologies

- AHG3: Quantum sensors
- AHG4: Quantum secure communication
- AHG5: Quantum Computing Simulation
- AHG6: QRNG / AHG7 Quantum enabling

✓ CEN/CENELEC



- Development of Quantum Technology Standardization Roadmap

✓ IEEE SA



- Development of Quantum Technology Standardization Roadmap

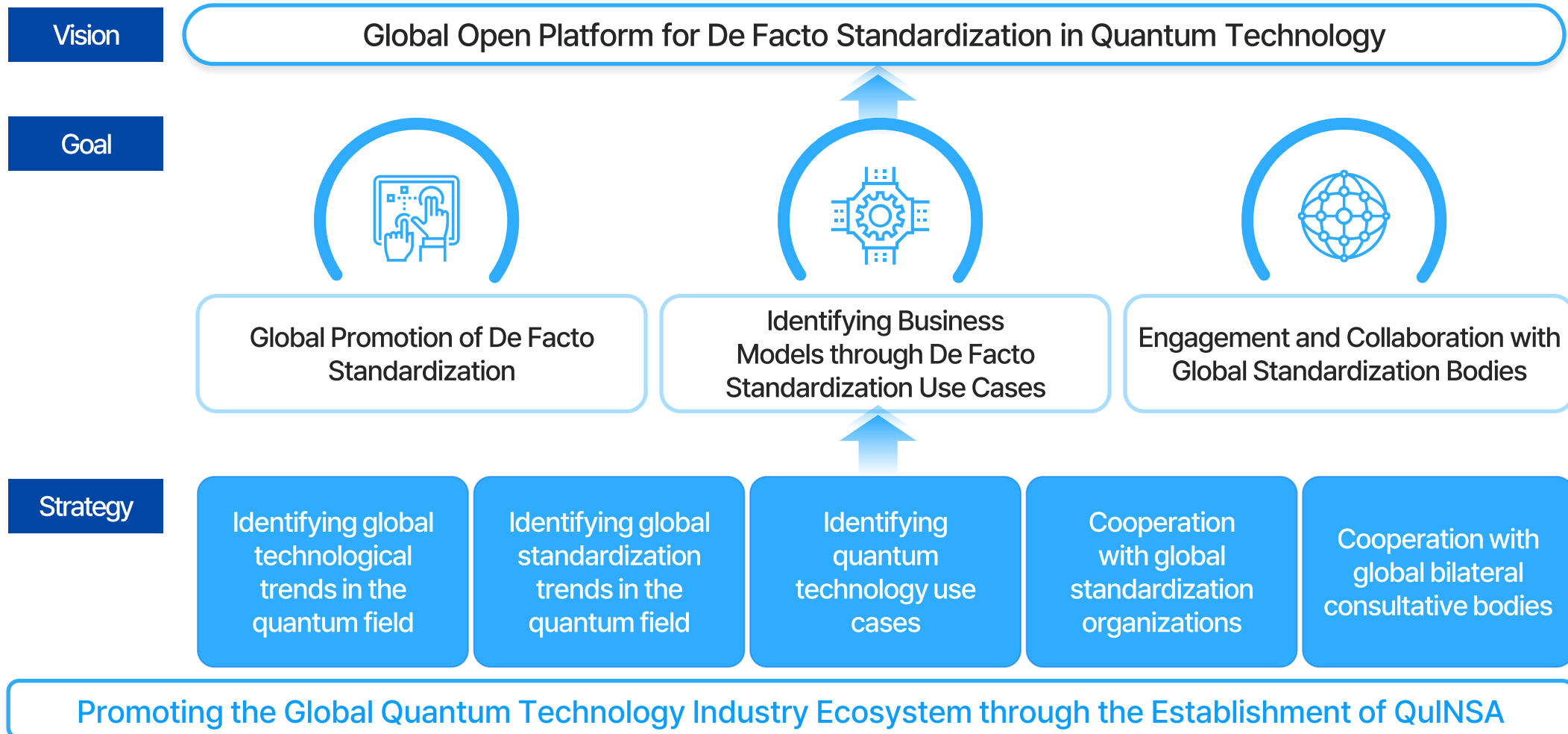
✓ The Need for QuINSA

Open standardization platform is essential to respond quickly to fast-evolving technologies, develop practical and industry-driven standards, and secure leadership in the global market.

- **Quantum**
 - Open platform allows rapid development and deployment of standards in line with emerging technologies like quantum computing, sensing, and communication.
- **Industrial**
 - Since private companies own most of the actual technologies, their leadership ensures standards are realistic, applicable, and closely aligned with market needs.
- **Standard**
 - Open platforms encourage participation from a wide range of stakeholders, reducing national or technological bias and fostering a balanced global ecosystem.
- **Association**
 - A private platform doesn't replace ISO/IEC or ITU—it complements them. De facto standards can be formalized later, allowing hybrid standardization strategies.

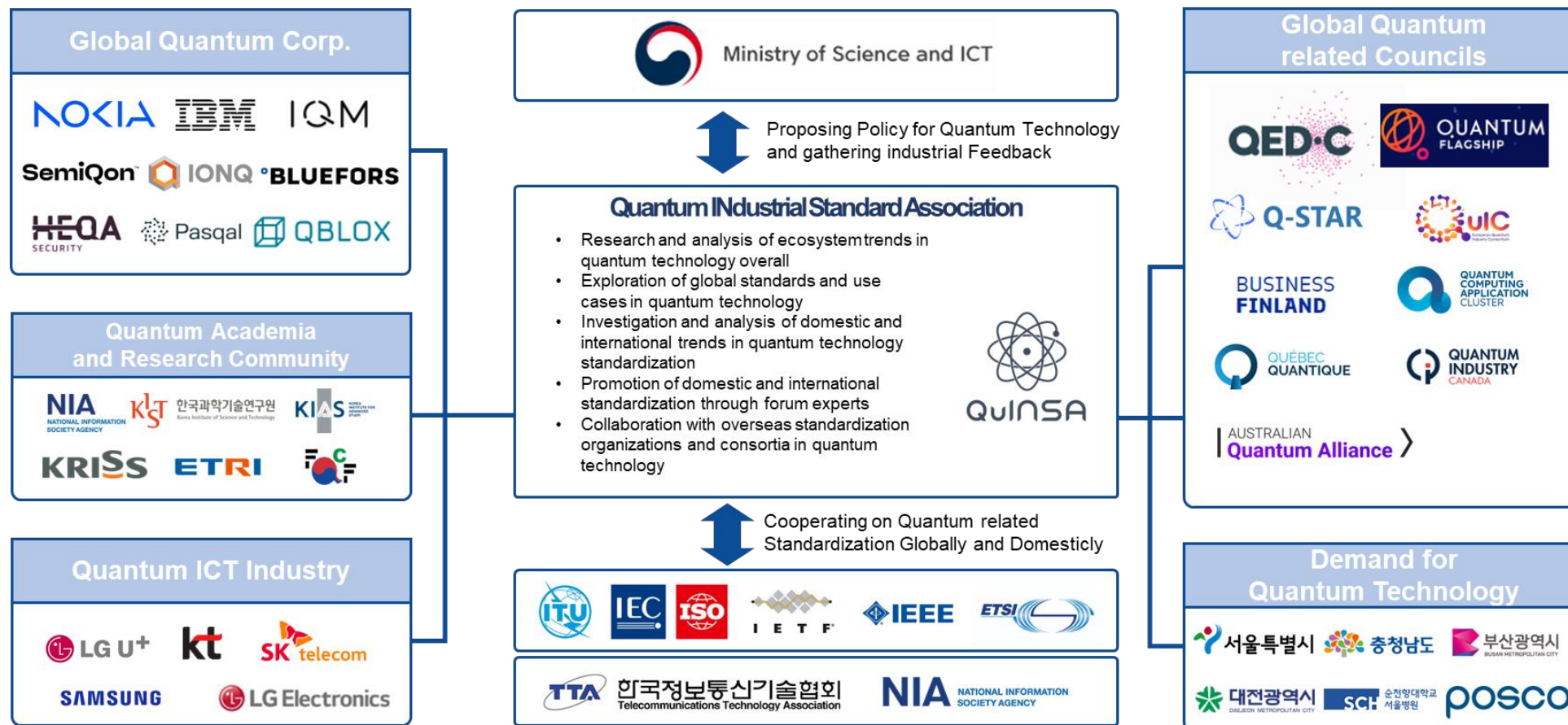
02 QuINSA Activities

Overview and Structure of QuINSA



Overview and Structure of QuINSA

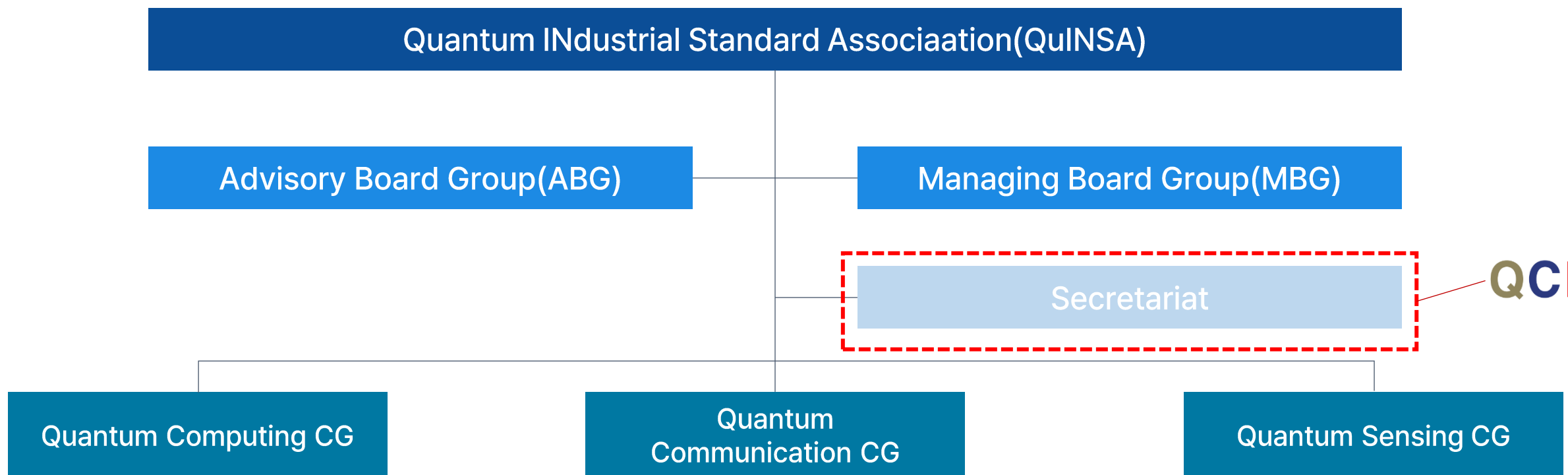
QuINSA's collaborated process



Background and Necessity of QuINSA

| Global standardization trend

Organization Structure



Overview and Structure of QuINSA

I Role of organization(1)



Managing Board Group (MBG)

- Adoption and approval of standardization projects, and distribution of projects to Committee Groups (CGs)
- Amendments and review of bylaws, membership fees, intellectual property rights, and other organizational operations
- *The initial Managing Board Group (MBG) shall include the Chair and Vice-Chair elected by the General Assembly (GA), the CG leaders, and the Secretariat-General, and shall be constituted based on their recommendations



Advisory Board Group (ABG)

- Convened by the MBG, providing advice for organizational development
- Developing operational roadmaps and collaborating with other organizations (consultative organizations, SDOs, etc.)

Overview and Structure of QuINSA

I Role of organization(2)



Committee Group (CG)

- Drafting, developing, and reviewing the feasibility of standards
- Proposing standard adoption to the MBG
- Establishment, operation, and review of WGs



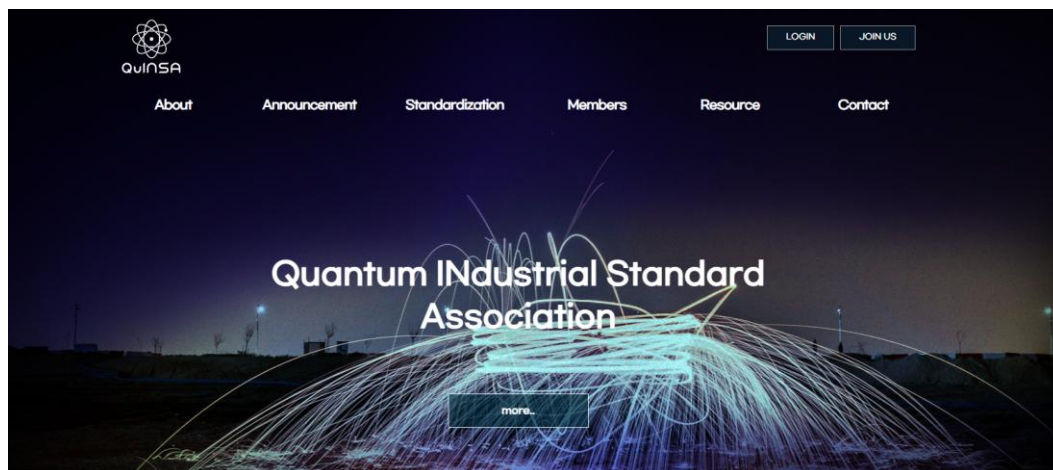
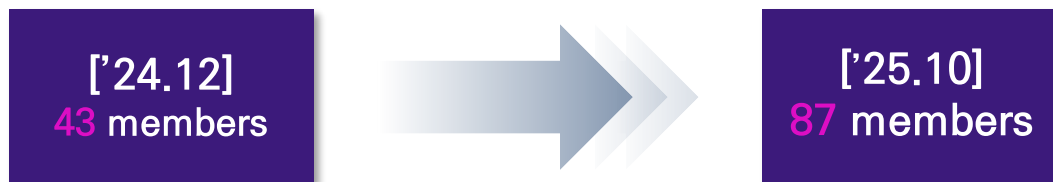
Secretariat-General

- Organizing and managing organizational meetings
- Managing membership enrollment and administration
- Operating the website and serving as the official external liaison

Overview and Structure of QuINSA

Members of QuINSA

Organization Structure



Updating: <http://www.quinsa-standards.org>

Key members

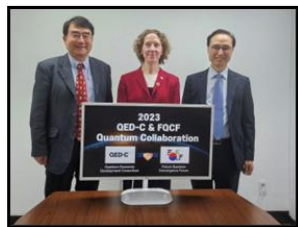


*Expanding member companies in cooperation with FQCF

Major Milestones about QuINSA

Global cooperation for relationship

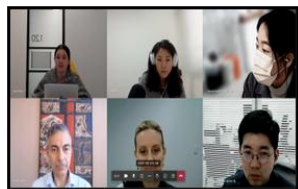
Global Promotion


US
QED-C

- A quantum council body comprised of over 230 industry-academic associations in the U.S. and around the world
- Exchanges and cooperation between the Korea-US quantum technology meetings were carried out (8 times)


Japan
Q-STAR

- A council body focused on quantum-related industries in Japan
- Promote exchange and cooperation by revitalizing quantum council bodies between Korea and Japan (May, 2022)
- Korea-Japan de-facto standard cooperation (July, 2023/Jan, 2024)


Australia
AUSTRALIAN Quantum Alliance

- Affiliated organization of The Tech Council of Australia
- Exploration of international exchange and cooperation measures in the Korea-Australia quantum field (Dec, 2022)

Canada
QUANTUM INDUSTRY CANADA

- FQCF-QIC International Cooperation Meeting held (Nov, 2023)
- Quantum Technology Innovation Forum (Nov, 2023)
- FQCF- Quebec Quantique, Quantum Information Technology Mutual Cooperation Conference (Jan, 2024)

Finland
BUSINESS FINLAND

- Joint quantum exchange and cooperation meeting held between Korea and Finland (Dec, 2022)
- Exchange and cooperation roundtable held (Jan, 2023)
- Korea-Finland Quantum Startup Innovation Exchange Webinar (Jan, 2024)


Europe
QUIC

- Quantum council body composed of 168 European industry, academia, and research institutes
- Cooperation meetings held (2 times)


UK
QUANTUM COMPUTING APPLICATION ASSOCIATION

- Promotion of global international cooperation and MoU (Feb, 2024)



Major Milestones about QuINSA

| Launch (2024), International Cooperation(QED-C, Q-STAR, NPL, ITU-T,..) (2025)

Key activities

2024



Launch Ceremony: August



General Assembly Preparatory Committee: From September

2025



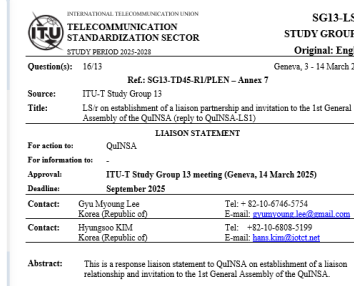
NPL(UK) Meeting: February



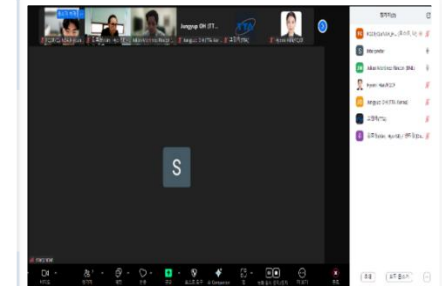
Q-STAR Meeting: February



Seoul-Finland Forum
Participation/Promotion:
April



Official Invitation from
ITU-T: April



QED-C Standardization
Team discussion: May

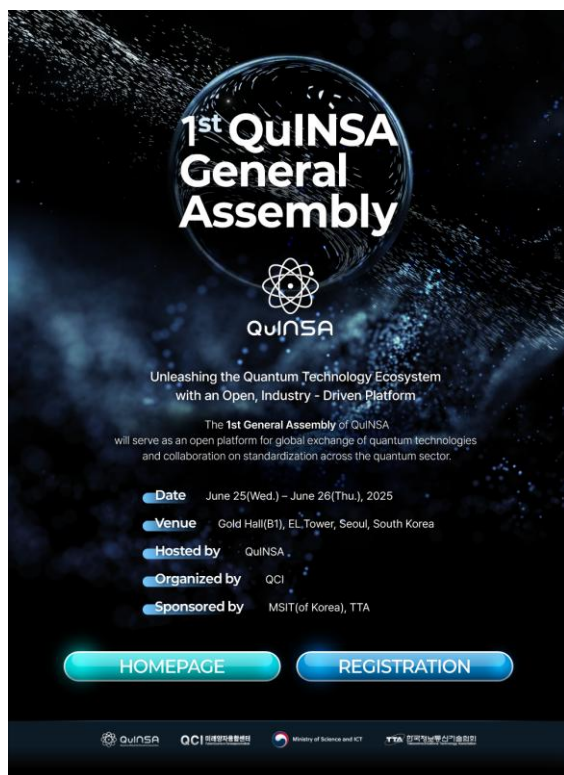
03 Recent Development

1st General Assembly

| Collaborated with the Quantum Korea 2025, 1st GA has held in Seoul, June

General Assembly

- Keynote speech
- QuINSA elected Chair and Vice Chair, CG leaders



Chair LG U+ Vice Chair NOKIA



QED-C



MSIT



EU DGCNET



Preparatory Chair



TTA



JTC3



LG U+(Chair) Umgae, Joo Vice president)



Nokia(Vice-Chair) James, Han (CTO)

1st General Assembly

| Global Open Platform: Quantum Seminar

Technical Seminar



[ITU-T SG13]



[Q-STAR, Japan Q-trend]



[Quantum Machines, Israel, Q-computing]



[ISO/IEC JTC3]



[QuEra, USA, Q-computing]



[SDT, KOR, Manufacturing]

- Technical Seminar in the 1st GA
- 1) Standard session (ITU-T & JTC3)
- 2) Global session (Japan Q-STAR)
- 3) Industry Session
 - Quantum Computing (QuEra, Quantum Machines)
 - Quantum Communication (KT, SKT, LGU+)
 - Quantum Sensing (GQT Korea)
 - Quantum Manufacturing (SDT)

[others]



Adopted Standardization by the GA

| QuINSA is engaged in the broad field of the quantum and related technologies

CGs Terms of Reference

Q-Computing

- Standardization of quantum-computing interfaces, algorithms, and performance criteria
- Benchmarking methodologies for both hardware and software
- Identification and prioritization of quantum-computing use cases

Q-Communication

- Standardization of QKD, QKDN, and broader quantum-network technologies
- Hybrid quantum-security technologies (PQC + QKD)
- Test-and-certification methods for quantum-communication systems

Q-Sensing

- Standardization of technologies for the development and deployment of quantum sensors
- Identification and prioritization of quantum-sensing use cases

Adopted Standardization by the GA

| Collaborated with the Quantum Korea 2025, 1st GA has held in Seoul, June

Standard Discussion

CG	Country	Title	Note
Q-Comp.	Israel	<i>Performance metrics for superconducting and trapped ion qubits based on error mitigation process</i>	TS (~Jun. 2026)
Q-Comm.	Korea	<i>Benchmarking methodology of QKD services</i>	TS (~Jun. 2026)
	France	<i>Classical communication using entangled photon</i>	TS (~Jun. 2026)
		<i>Passive photon router</i>	TS (~Jun. 2026)
		<i>Quantum secure signature</i>	TS (~Jun. 2026)
	Canada	<i>Quantum proof-of-work consensus Using Boson Sampling</i>	TS (~Jun. 2026)
Q-Sensing	USA	<i>Use case for quantum sensor in space</i>	-
	Korea	<i>Detection of Underground Facilities using Quantum Magnetic Field Sensing</i>	TR (~Jun. 2026)

- Total 8 items is discussed, and 7 is going to discuss new work item to standardization

- Quantum Communication: 5
- Quantum Computing: 1
- Quantum Sensing: 2

Adopted Standardization by the GA

QuINSA has 2 types of standard

Types of Standard

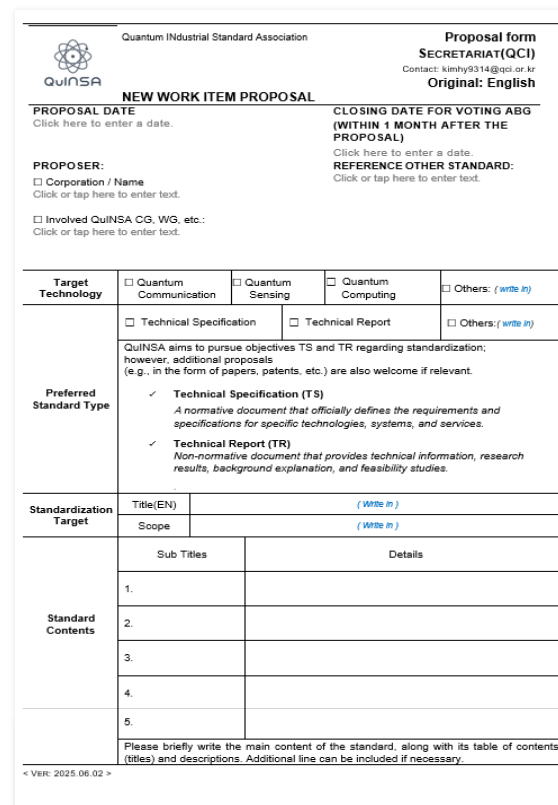
➤ Technical Specification (TS)

- A normative document that officially defines the requirements and specifications for specific technologies, systems, and services.

➤ Technical Report (TR)

- Non-normative document that provides technical information, research results, background explanation, and feasibility studies.

<http://www.quinsa-standards.org>



Quantum Industrial Standard Association

Proposal form
SECRETARIAT(QCI)
Contact: kimhy9314@qci.or.kr
Original: English

NEW WORK ITEM PROPOSAL

PROPOSAL DATE
Click here to enter a date.

CLOSING DATE FOR VOTING ABG (WITHIN 1 MONTH AFTER THE PROPOSAL)
Click here to enter a date.

PROPOSER:
☐ Corporation / Name
Click or tap here to enter text.

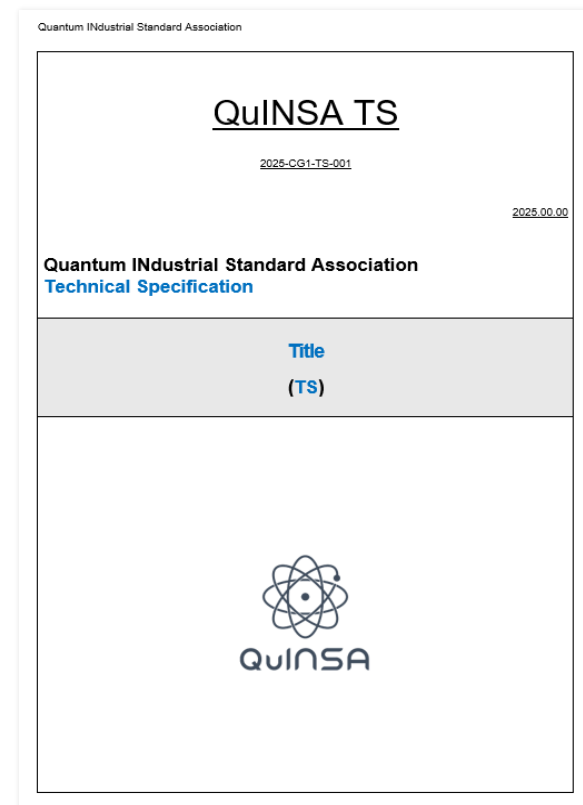
REFERENCE OTHER STANDARD:
Click or tap here to enter text.

☐ Involved QuINSA CG, WG, etc.:
Click or tap here to enter text.

Target Technology	☐ Quantum Communication	☐ Quantum Sensing	☐ Quantum Computing	☐ Others: (write in)												
Preferred Standard Type	☐ Technical Specification ☐ Technical Report ☐ Others: (write in) QuINSA aims to pursue objectives TS and TR regarding standardization; however, additional proposals (e.g., in the form of papers, patents, etc.) are also welcome if relevant. ☒ Technical Specification (TS) <i>A normative document that officially defines the requirements and specifications for specific technologies, systems, and services.</i> ☒ Technical Report (TR) <i>Non-normative document that provides technical information, research results, background explanation, and feasibility studies.</i>															
Standardization Target	Title(EN) (Write in) Scope (Write in)															
Standard Contents	<table border="1"> <thead> <tr> <th>Sub Titles</th> <th>Details</th> </tr> </thead> <tbody> <tr><td>1.</td><td></td></tr> <tr><td>2.</td><td></td></tr> <tr><td>3.</td><td></td></tr> <tr><td>4.</td><td></td></tr> <tr><td>5.</td><td></td></tr> </tbody> </table> Please briefly write the main content of the standard, along with its table of contents (titles) and descriptions. Additional line can be included if necessary.				Sub Titles	Details	1.		2.		3.		4.		5.	
Sub Titles	Details															
1.																
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3.																
4.																
5.																

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[Proposal Form]



Quantum Industrial Standard Association

QuINSA TS

2025-CG1-TS-001

2025.00.00

Quantum Industrial Standard Association
Technical Specification

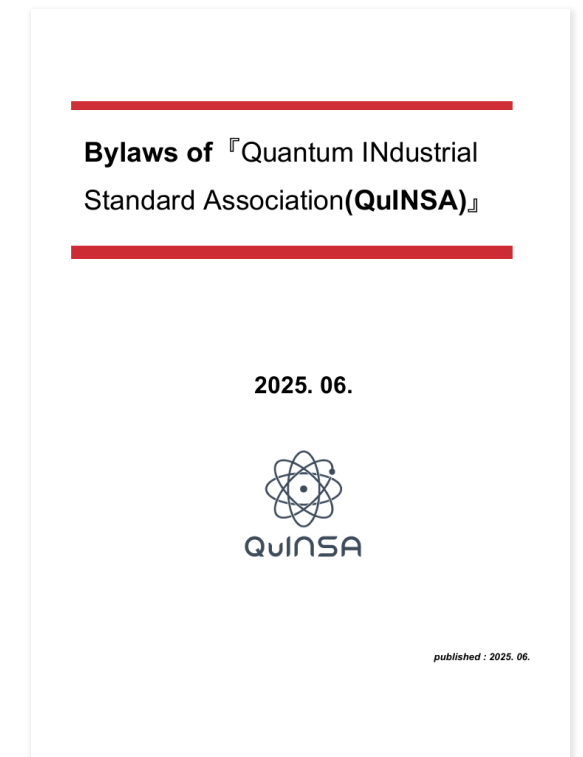
Title
(TS)


QuINSA

[Document Form(TS)]

| Collaborated with the Quantum Korea 2025, 1st GA has held in Seoul, June

- **Proposal: Members only**



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Adopted Standardization by the GA

| Collaborated with the Quantum Korea 2025, 1st GA has held in Seoul, June

Membership

- Any corporation, institution, organization, or individual (hereinafter referred to as the "Applicant") wishing to participate in the Organization's activities must apply for membership to the Secretariat. ✓ Contact : quinsa.official@qci.or.kr
- General Members shall be corporations, institutions, or organizations that fall under any of the following categories
 - For-profit corporations, institutions, and organizations
 - Non-profit incorporated associations and foundations
 - Other entities recognized by the Secretariat as capable of contributing to the Organization's activities
- Membership Fees
 - The standard for annual membership fees shall be determined by a Resolution of the General Assembly.

Application for Membership Form

*To ensure we have the correct contact details for you, please fill out this form and submit it via qicf@qci.or.kr.

COMPANY (Registered Name)			
COMPANY ADDRESS			
COMPANY CONTACT No.		COMPANY FAX No.	
SCOPE OF BUSINESS			
COMPANY TYPE (V, check) ☐ Large ☐ Mid-Sized ☐ SME ☐ Other ()			
PRIMARY FIELD ☐ Quantum Computing ☐ Quantum Communication ☐ Quantum Sensing ☐ Quantum Enabling Technology (Components, Equipment, Materials...) ☐ ETC() Please check the relevant box, multiple checks allowed)			
PERSON IN CHARGE (Contact Channel)	NAME		CONTACT No.
	DESIGNATION		
	EMAIL		MOBILE
JOB RESPONSIBILITIES			

***DECLARATION**
 By applying for corporate membership, we confirm the accuracy of the information provided and agree to comply with the decisions regarding our eligibility. Upon acceptance, we commit to abide by the Constitution, By-Laws, and Code of Ethics of the organization.

Your company's role and logo may be displayed on the website and used for marketing and promotional purposes. By becoming a member, you are considered to have agreed to this.

Signature of Principal Representative or Person in Charge :
 (Position) _____ / (Name) _____
 (Signature) _____

Date : 2025. . . .

Please send completed form and remittance to
 Future Quantum Convergence Forum(FQCF)/Quantum Industrial Standard Association(QuINSA)
 610, 47, Sejong-daero 23-gil, Jongno-gu, Seoul, Republic of Korea
 Tel : +82-2-734-9824 Fax : +82-2-737-2022 Email : qicf@qci.or.kr
 For more details visit : qicf.or.kr / qis.or.kr

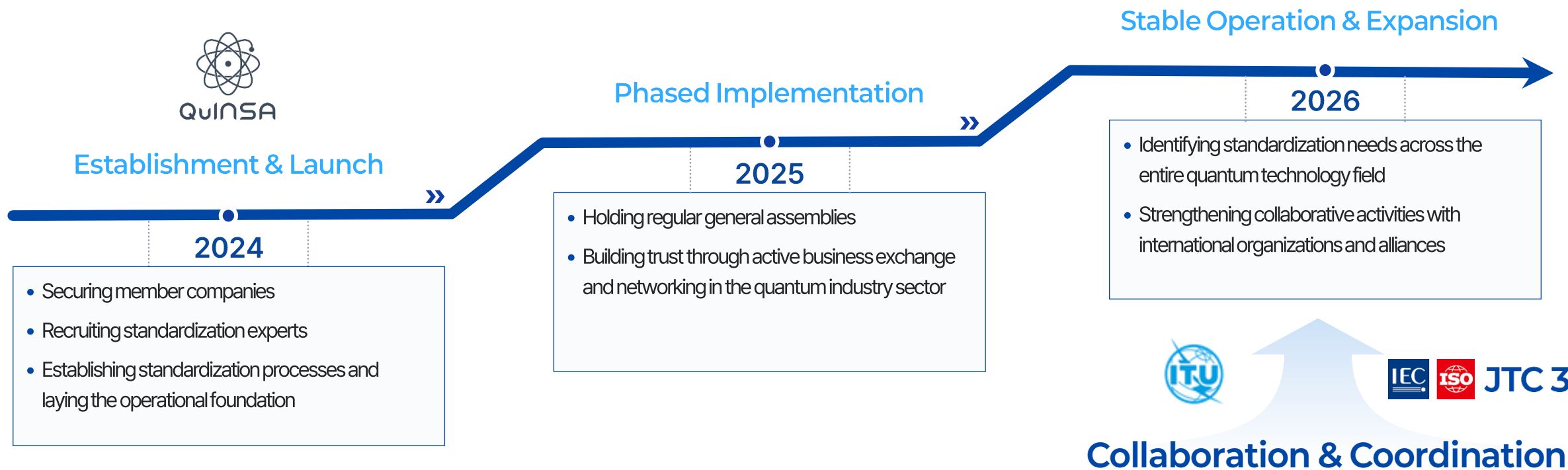
<http://www.quinsa-standards.org>

[Membership Form]

Future planning of the QuINSA

| Continuous Standardization activities by each CGs until the Next General Assembly

Future Operations



GLSC 2025

Global ICT Standards Conference 2025

- Thank you -

Jaewan Kim, KRISS

National Distinguished Research Fellow

Director of Strategic Research Center for
Hyper-Connected Scalable "Super-Quantum Computing"

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