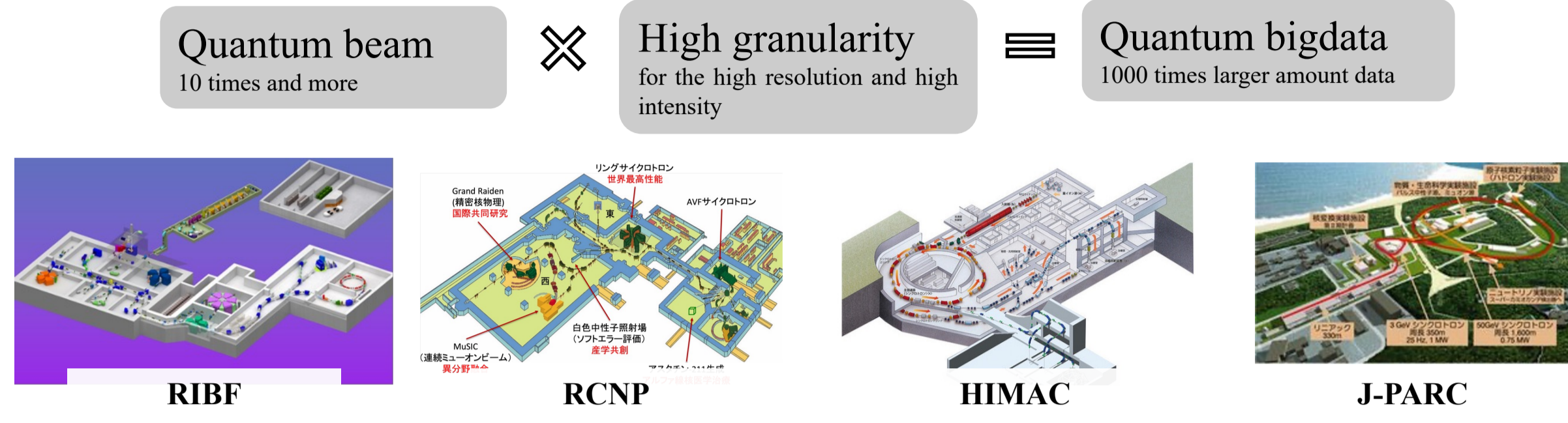


A Packaged Streaming-Readout Data Acquisition System by the SPADI Alliance for Nuclear and Particle Physics Experiments

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 ARCNP, Osaka University, ^BBIPNS, KEK

Research Background

Explosive increase of the data flow (e.g., in Japan)



What is smart solution?

Beyond the limitation of the present data acquisition and processing

SPADI Alliance

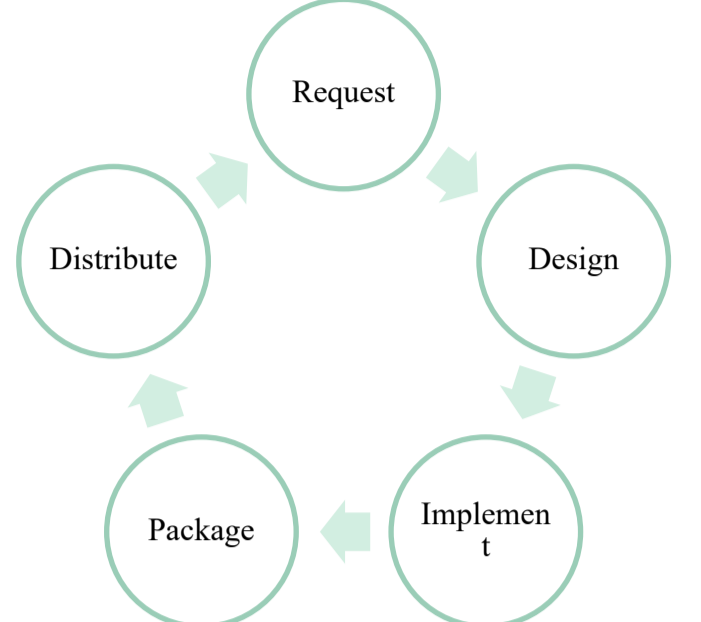
Signal processing and data acquisition infrastructure alliance toward the standardization for sustainable developments

>190 researchers (23 institute)



Strategy committee
 Chair: Shinsuke Ota
 Vice-Chair: Ryotaro Honda and Hidetada Baba

Process for standardization



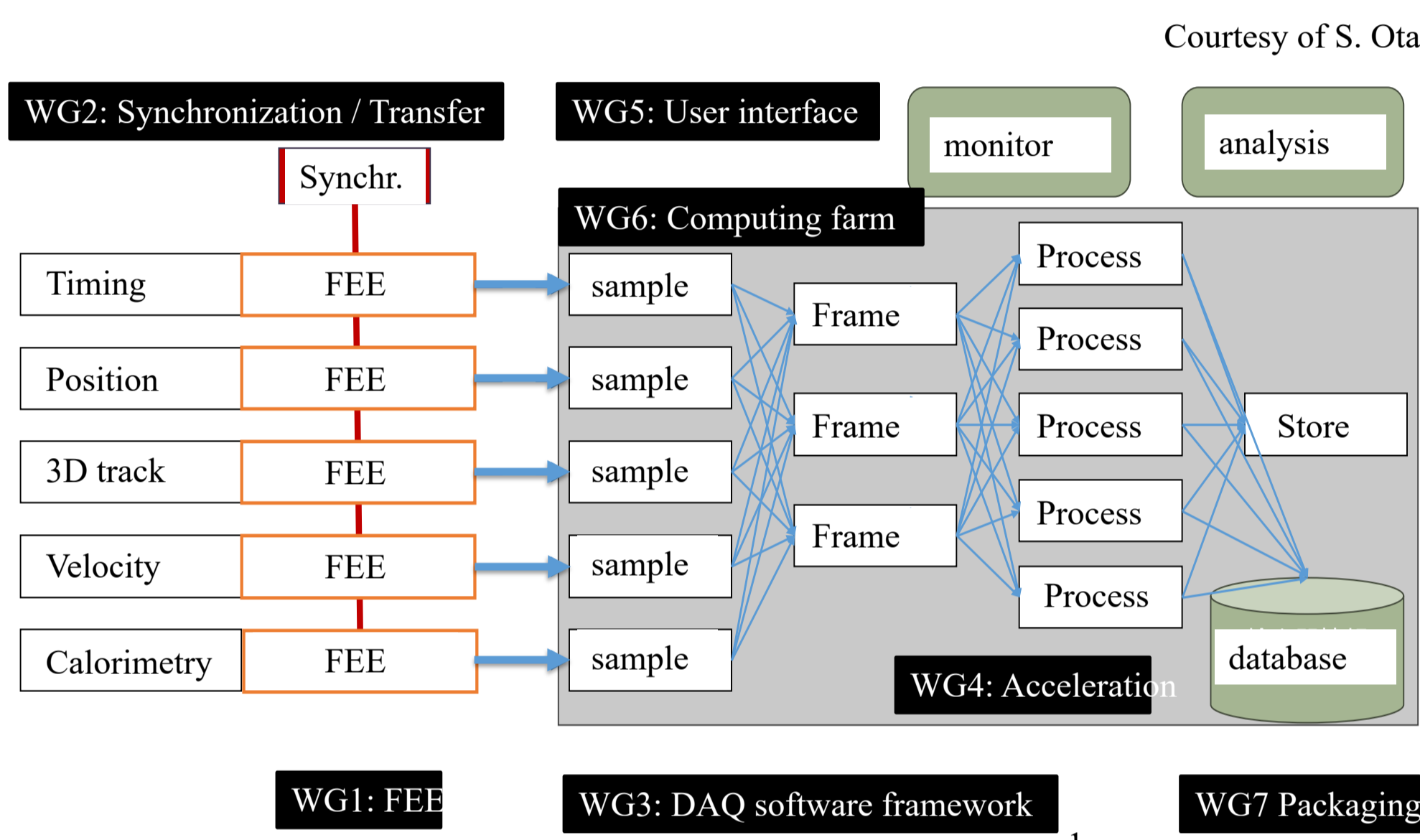
Goals:

- Common system
- Standardization
- ➔ Reducing costs to develop and construct the DAQ system

Our strategy

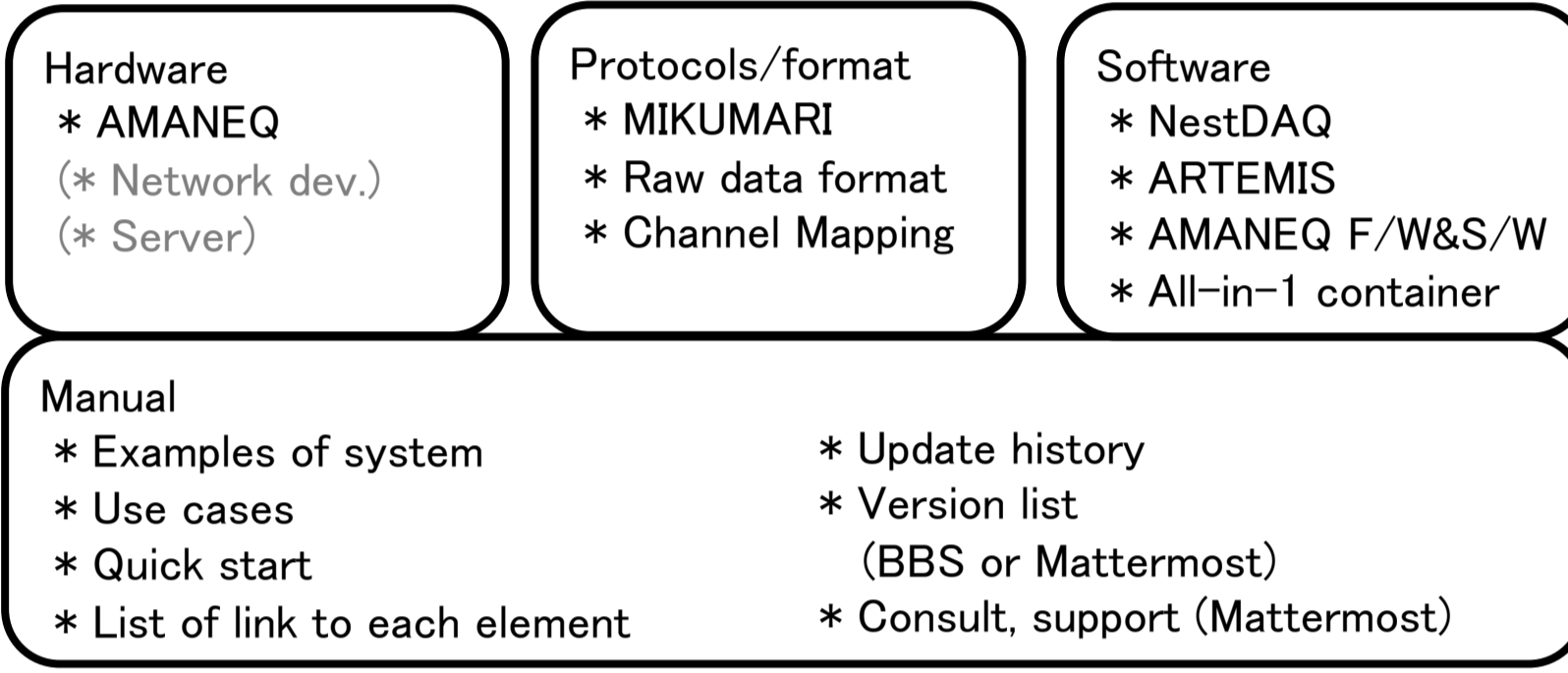
Developing common components and system by involving the DAQ and computing community

Each component by SPADI Alliance



Make it easy to use?

SPADI Alliance DAQ package



- Our goal
 - DAQ system package including all the components
 - Manual, support and discussion forum
 - A Graduate student can complete the construction of the DAQ system
 - ➔ "De facto" standard in our community
- Issues, concerns, problems
 - Tradeoff between common vs. specific system
 - Performances?
 - Cost?
 - Scalability?
 - Overhead of human resources of organization and management?

SPADI-A DAQ package

= AMANEQ + MUKUMARI + NestDAQ + ARTEMIS

- AMANEQ: Streaming TDC w/ High Resolution & Low Resolution (R. Honda)
- MIKUMARI: Time synchronization and data transfer protocol (R. Honda)
- NestDAQ: Streaming DAQ Software framework (Y. Igarashi, T. N. Takahashi)
- ARTEMIS: Offline (and online) data analysis frame work (S. Ota)

Implementations of our package

Implementations

Star: the number of tests or experiments using the package

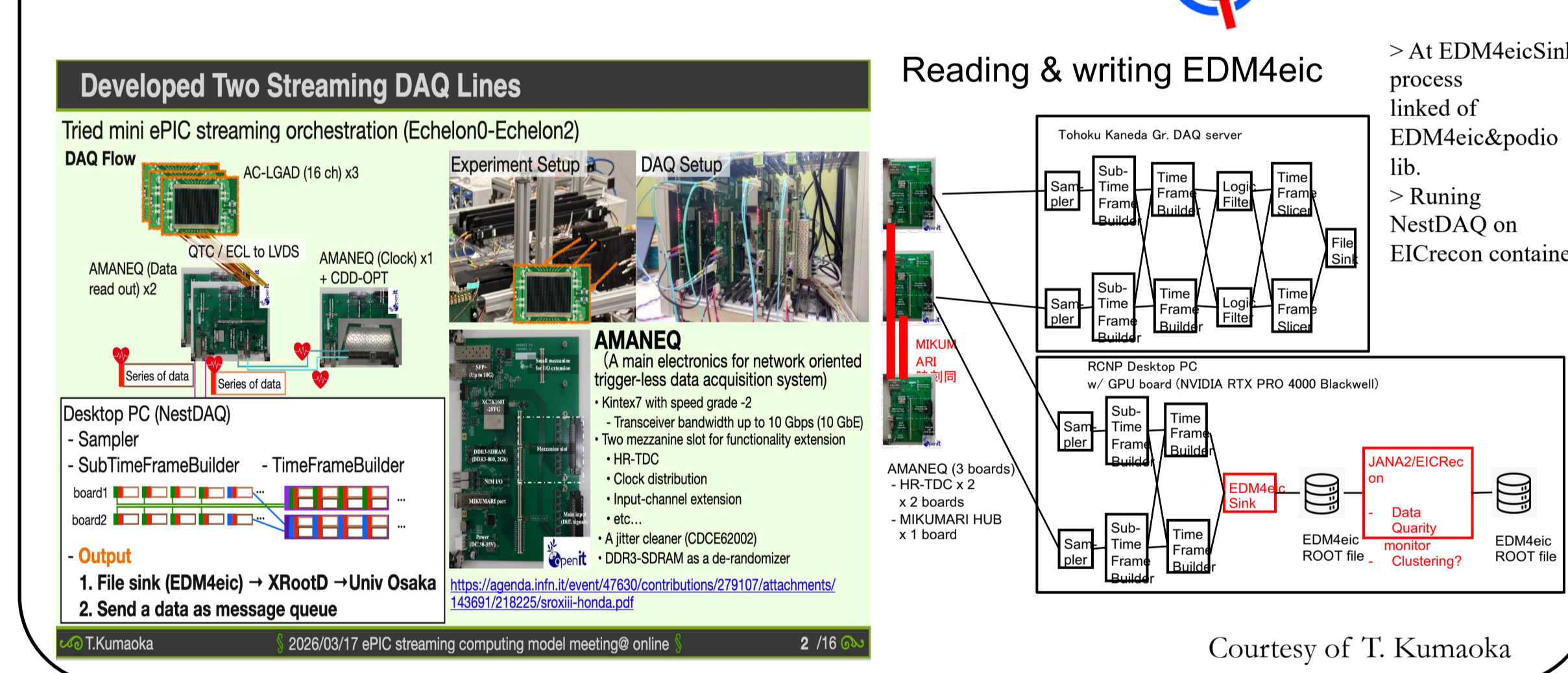
- ★ Before FY2023
- ★ After FY2024



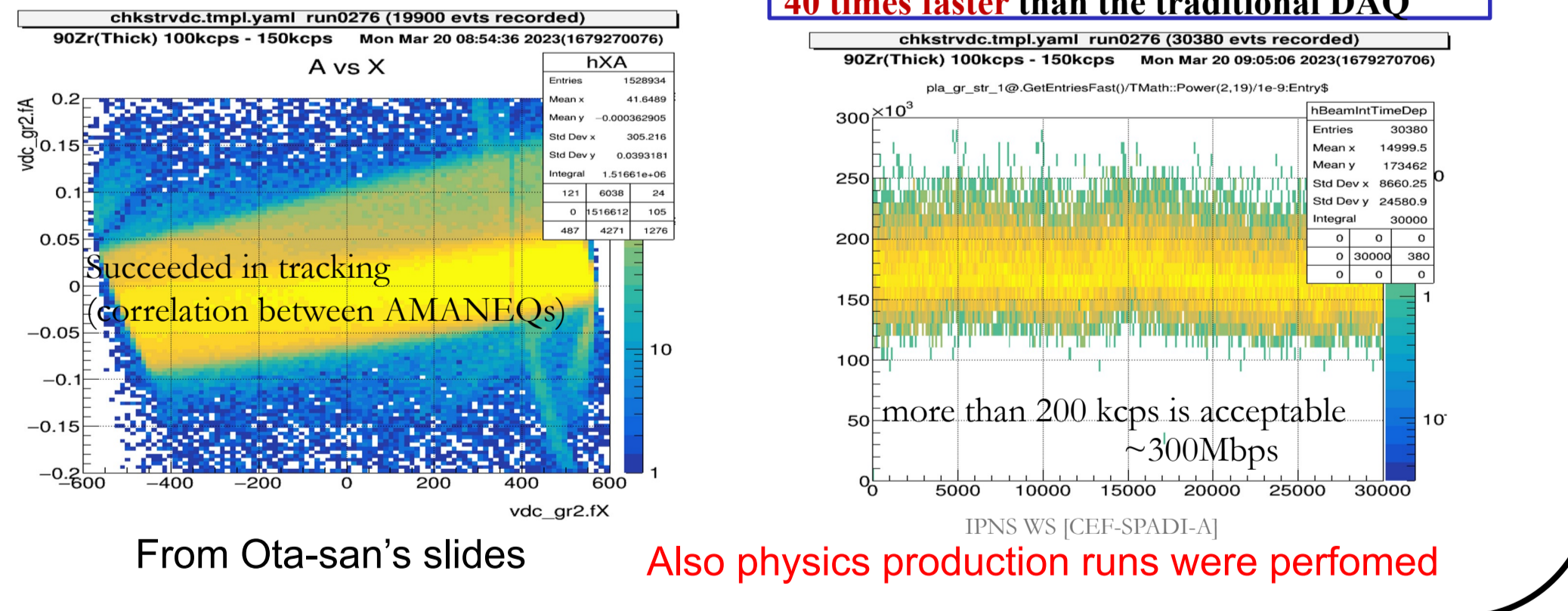
Stand alone AMANEQ implementation

- Wakasa Gr. from Kyushu Univ.
 - Stand alone HR-TDC test (w/o MIKUMARI)
 - Now operational
 - Writing manual
 - Communication in RCNP Mattermost
- J. K. Ahn Gr. from Korea U., KIST Tandem acc. in Korea
 - Two doctor course students involved
 - RCNP DAQ div. S.Y. Ryu, N. Kobayashi 2023/6/8-10, 10/6, 12/17-20
- J-PARC beam loss monitor
 - RCNP Hadron Gr. K. Shirotori et al.
 - Spill time structure
 - StrTDC is very powerful to see time dependence of beam structure
- TRIUMF Kojima-san

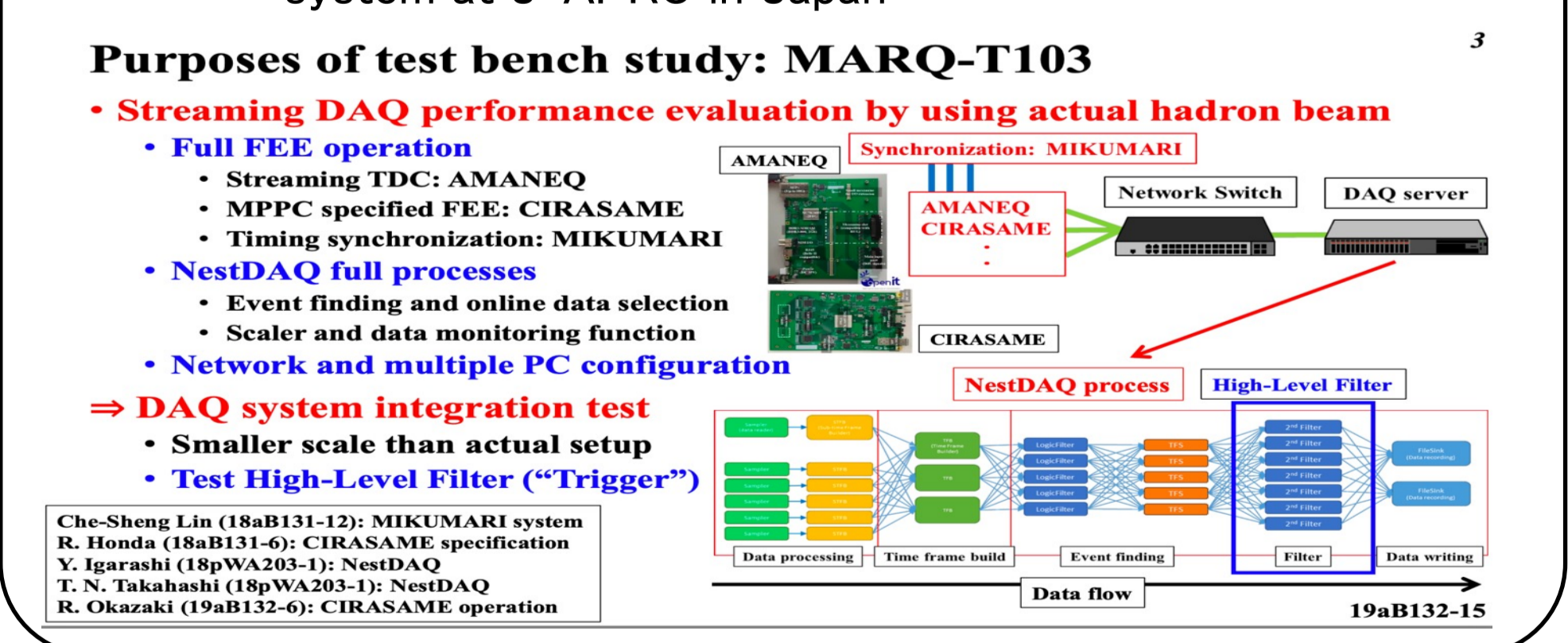
NestDAQ at EIC-Japan collaboration for ePIC



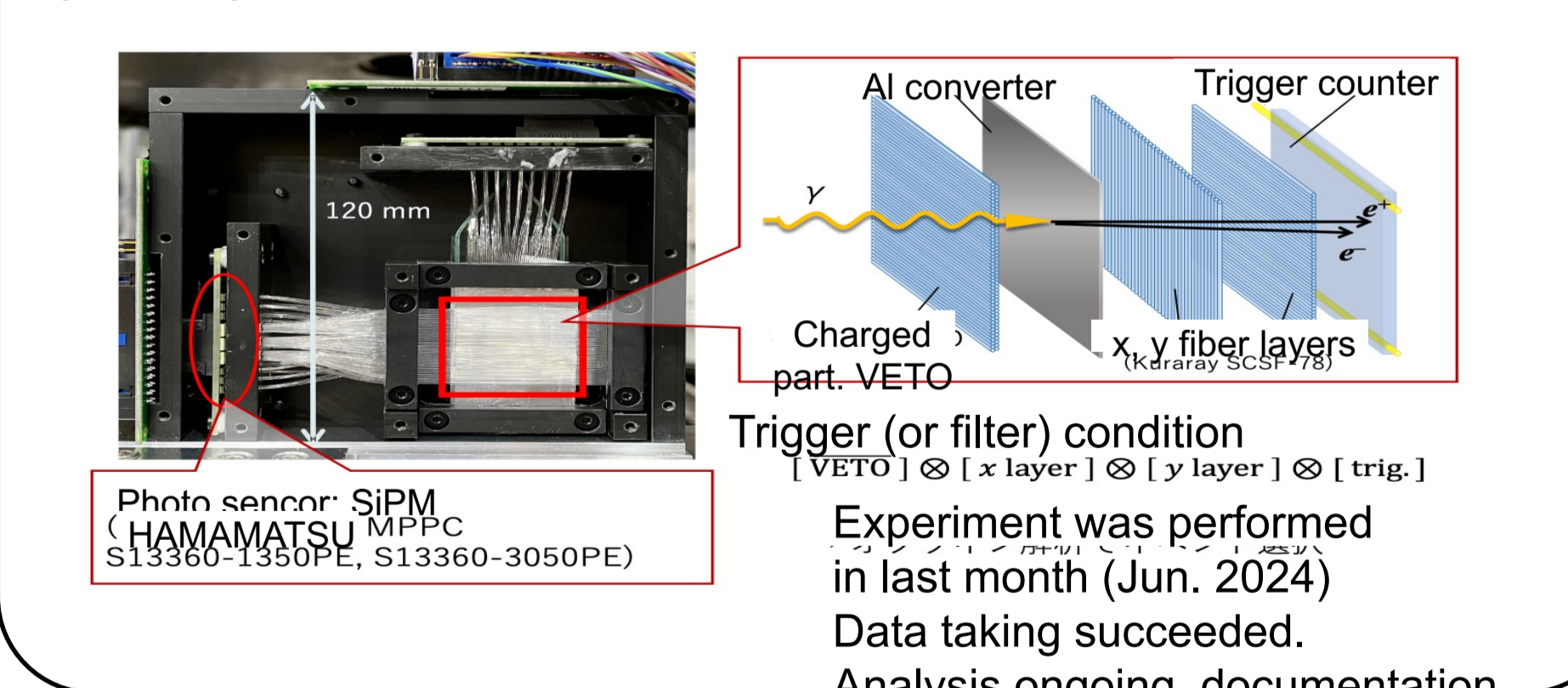
Grand Raiden & LAS @ RCNP Higher throughput is achieved



Evaluation of Streaming Readout DAQ system using the MARQ testbench system at J-APRC in Japan



Upgrading DAQ of Beam Profile Monitor (BPM) for NKS2 exp. at RARIS, Tohoku Univ.



Our future is bright?

Depending on your understanding, support, and contributions...

