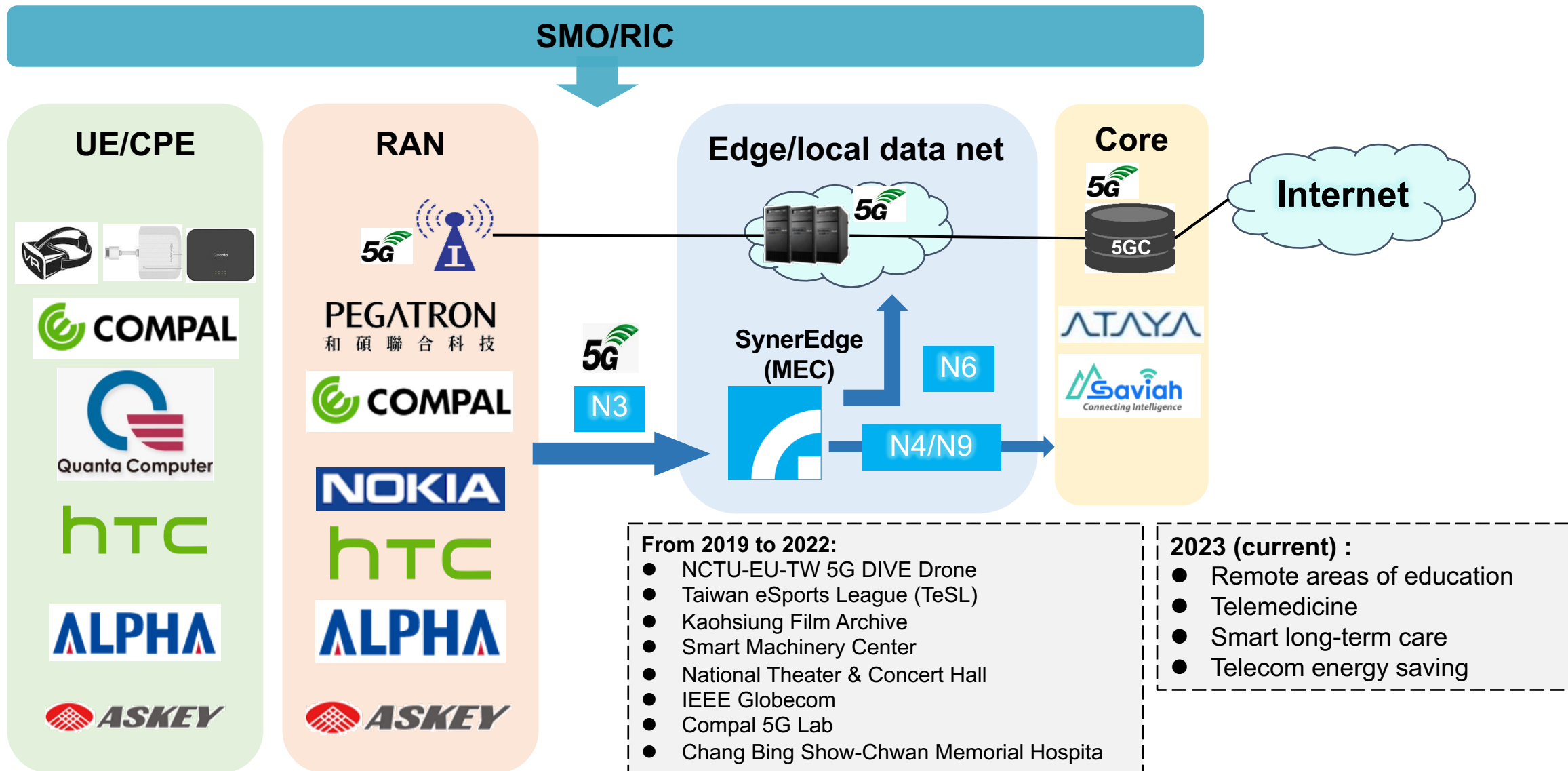# Building the Foundation for 6G Success: The Role of JCAS and Key Technical Enablers

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6G SNS ICE

Smart Networks and Services International and European Cooperation Ecosystem

5G Private Network Integration

SMO/RIC

UE/CPE

RAN

Edge/local data net

Core

Internet

PEGATRON 和碩聯合科技

SynerEdge (MEC)

N3

N6

N4/N9

From 2019 to 2022:
- NCTU-EU-TW 5G DIVE Drone
- Taiwan eSports League (TeSL)
- Kaohsiung Film Archive
- Smart Machinery Center
- National Theater & Concert Hall
- IEEE Globecom
- Compal 5G Lab
- Chang Bing Show-Chwan Memorial Hospita

2023 (current) :
- Remote areas of education
- Telemedicine
- Smart long-term care
- Telecom energy saving

Filling the Sensing Gap

- Research domain of allowing BS/UE enable the sensing capability in addition to communication
  - add a specialized radar receiver on the BS for receiving reflected waves
- Raw point cloud is not "advanced" enough
- Advanced sensing information is required for 6G use cases
  - Object classes/action recognition
 - Trajectory tracking/collision avoidance
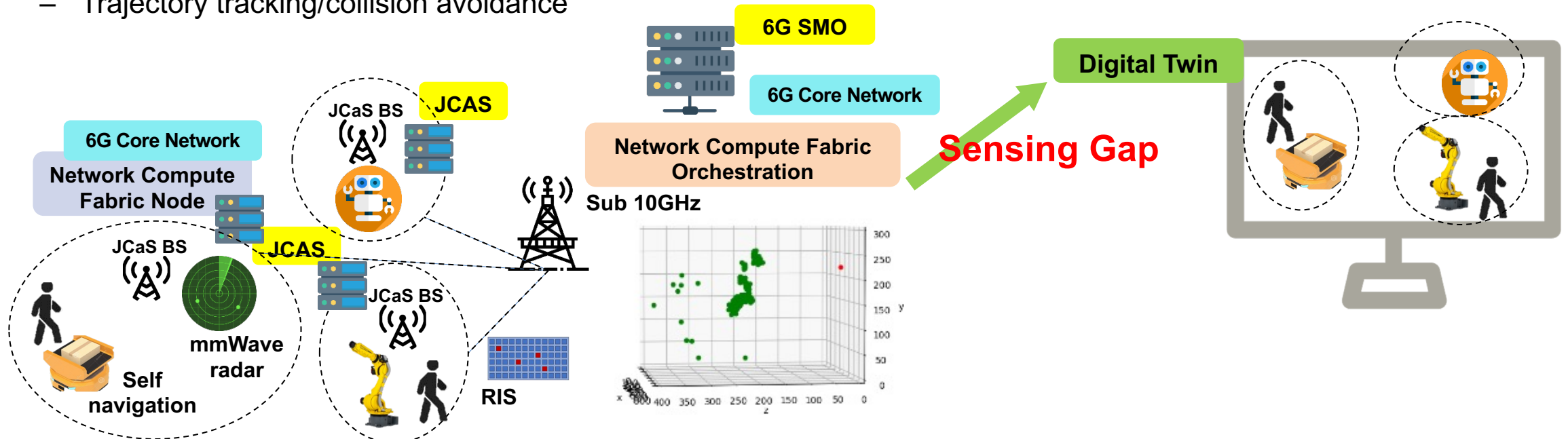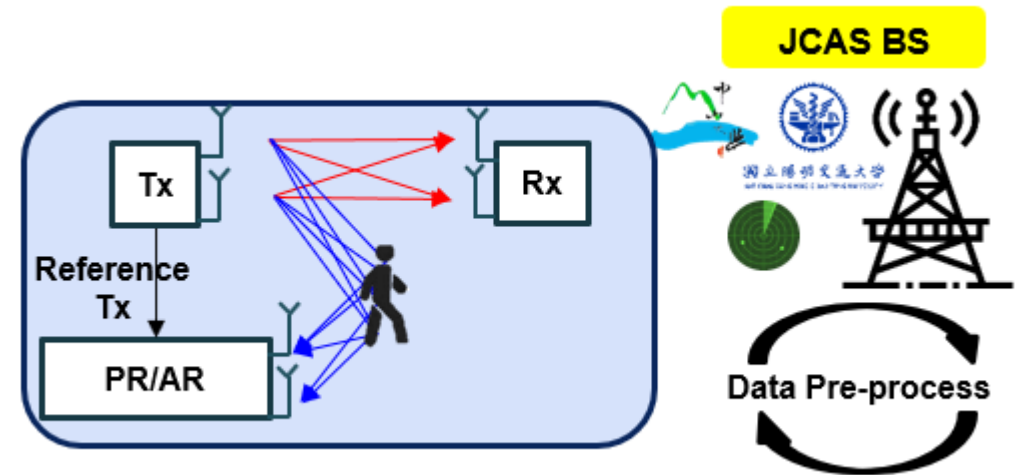
Key Competences

Integrate radar sensing technology to reach high accuracy positioning (3D and 10cm) for 6G services in Smart Factory.

- AI Positioning Module：Using the module to position objects which does not have communication or sensing methods and achieve 10cm positioning accuracy objects.

- AI Motion Sensing Module：Provide micro-motion detection ability such as gesture recognition and deviation of moving objects

- Data Collection and Management Module：Collect sensing data from different BS then build sensing topology and get object motion curve to achieve 5ms latency on single BS and 10ms latency on multi BS

- Object Tracking Module：Build sensing topology on multi base station to provide object location to enhance communication quality and support other 6G application requirements
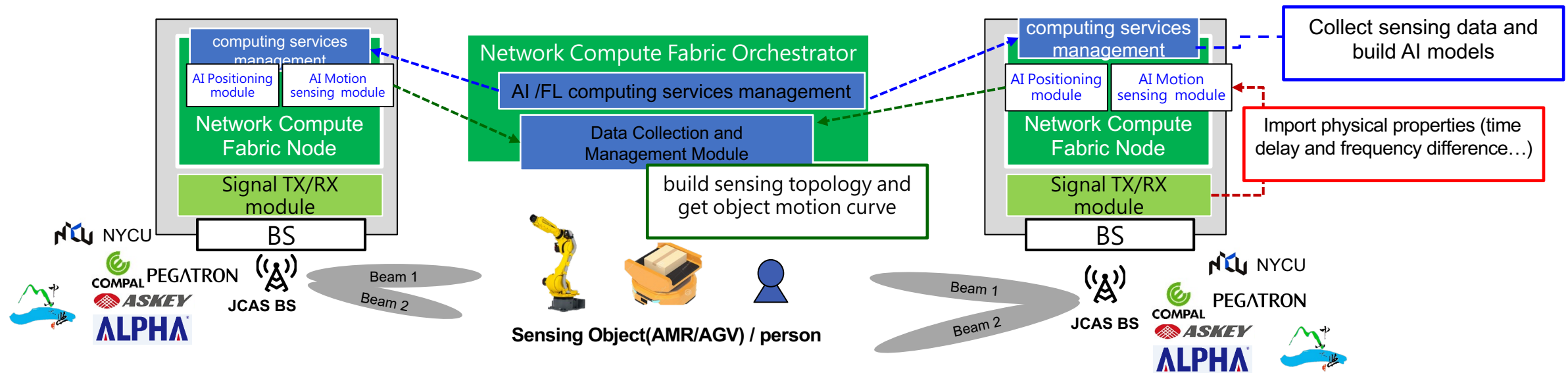
International Collaboration

- We may contribute
  - Sensors fusion AI framework
  - AI-based inference API
  - Specialized radar receiver enables BS's sensing capability
- Partners may bring
  - JCAS base station/Terminal Device
    - Radio resource management, mm-Wave RF integrated circuits.
- Collaboration goal
  - Join open future network services project's open call.
  - Jointly propose a new project.
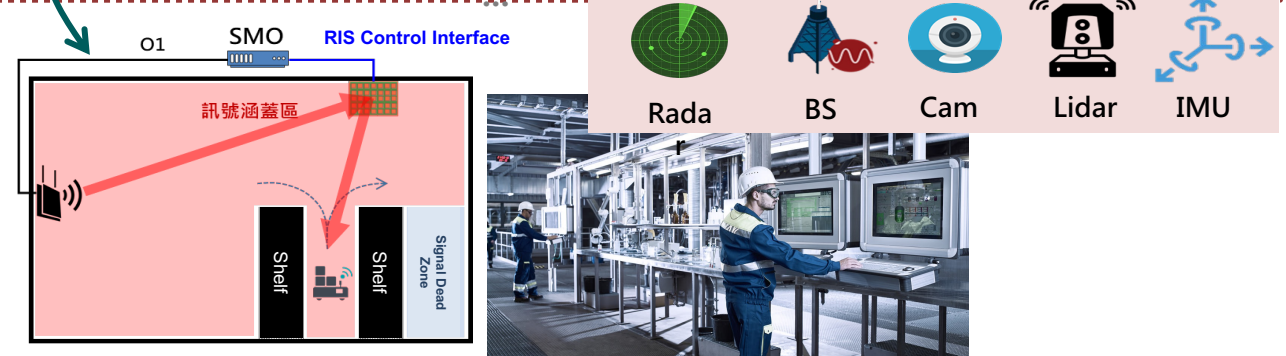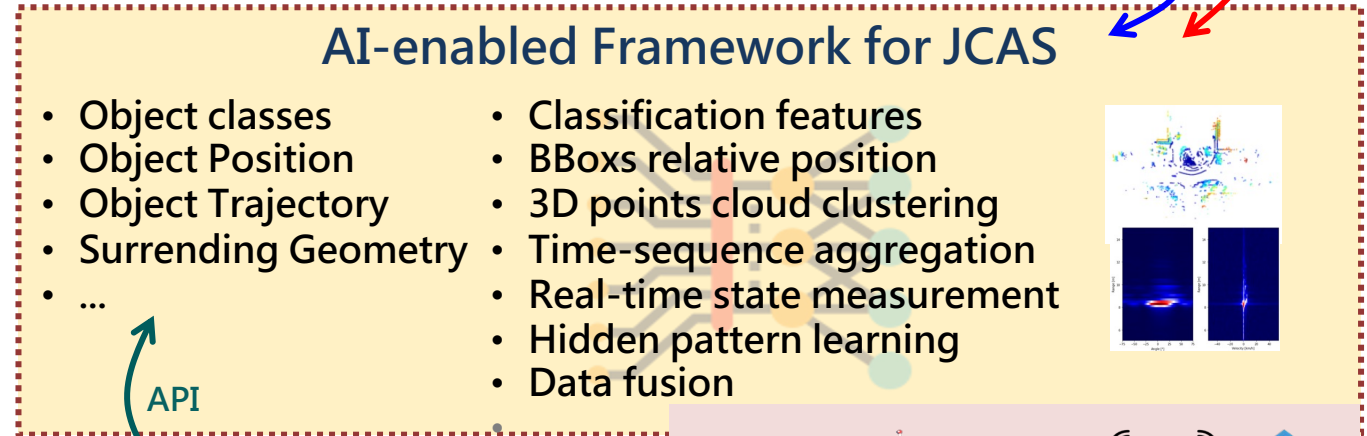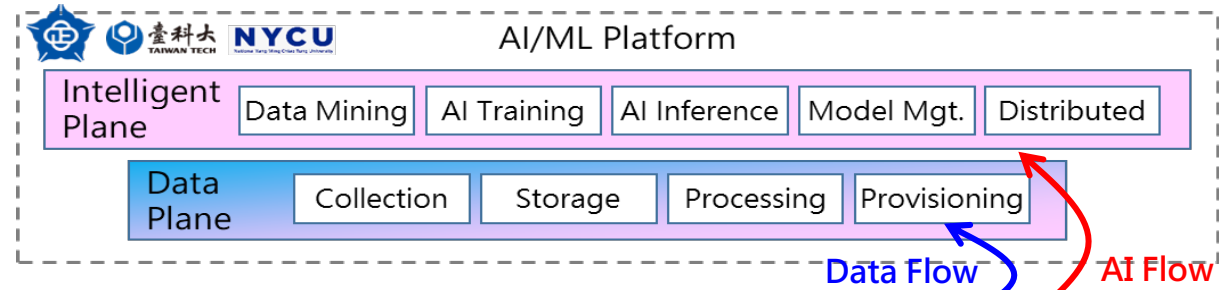
Topics of Interest for SNS 2024 Stream B

- **Architecture**
  - Digital Twinning to improve network management
  - Integrated and dependable sensing and actuation networks

- **Wireless Communications**
  - Energy efficient use of frequency spectrum for JCaS
  - Optimized radio with AI/ML empowerment

- **Service provision and Security**
  - Exploitation of distributed and trusted AI/ML for 6G networks