

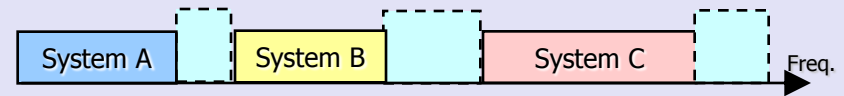
Current trend related to wireless network

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Current concerns for future wireless network

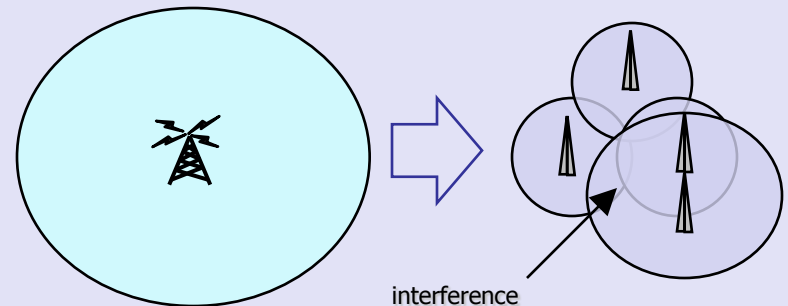
- **Concerns** in the policy of future frequency assignment
 - Many new wireless communication systems have been standardized, e.g. 3GPP, 3GPP2, IEEE802...
 - **New systems** need **broader** band width than conventional one –(a)
 - **Service area** for new broadband systems is **narrower** than conventional one –(b)
 - **For (a):**
 - There is **no frequency band** for future broadband wireless communication systems -> **new assignment methods are needed**
 - Several radio communication systems may **co-exist** in a common frequency band
 - **Reduction of contamination by interference** between radio communication systems is needed
 - **For (b):**
 - **Huge number of access points** (or base stations) are needed to cover same serviced area of conventional communication systems
 - **Some access points may be interfered** each other
 - **Reduction of contamination by interference** between radio communication systems is needed

Current frequency allocation



New standardized System

How to assign frequency band for new standardized wireless communication systems

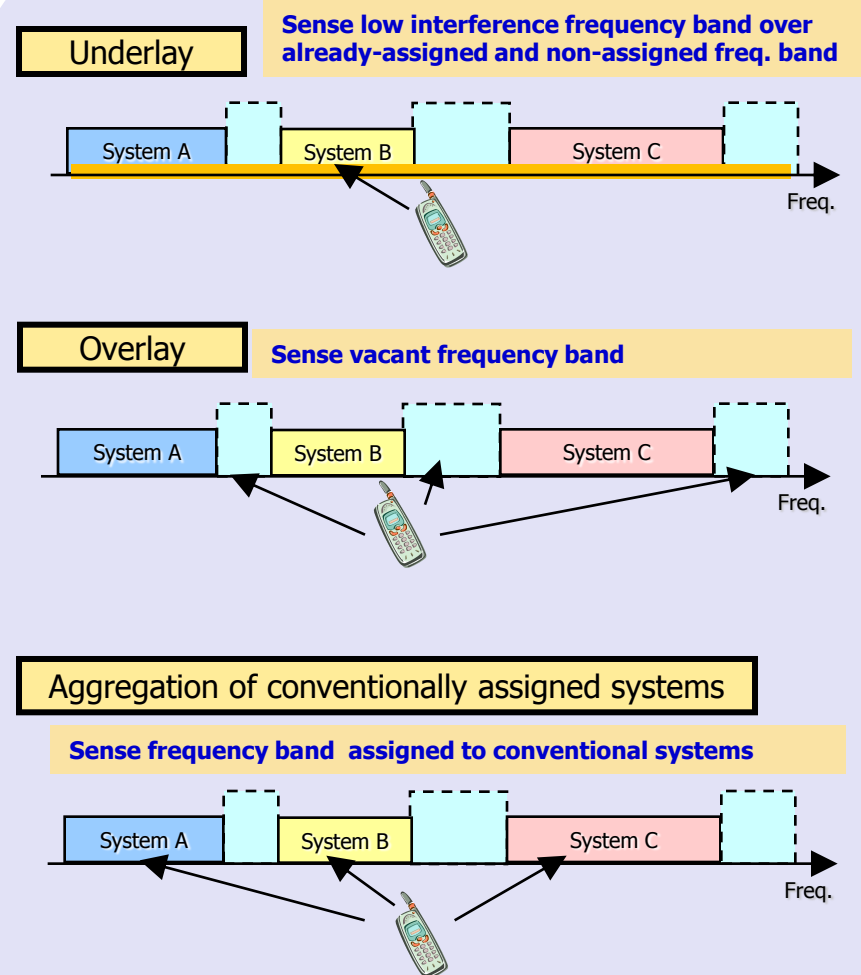


How to manage huge number of access points (base stations)

Solution

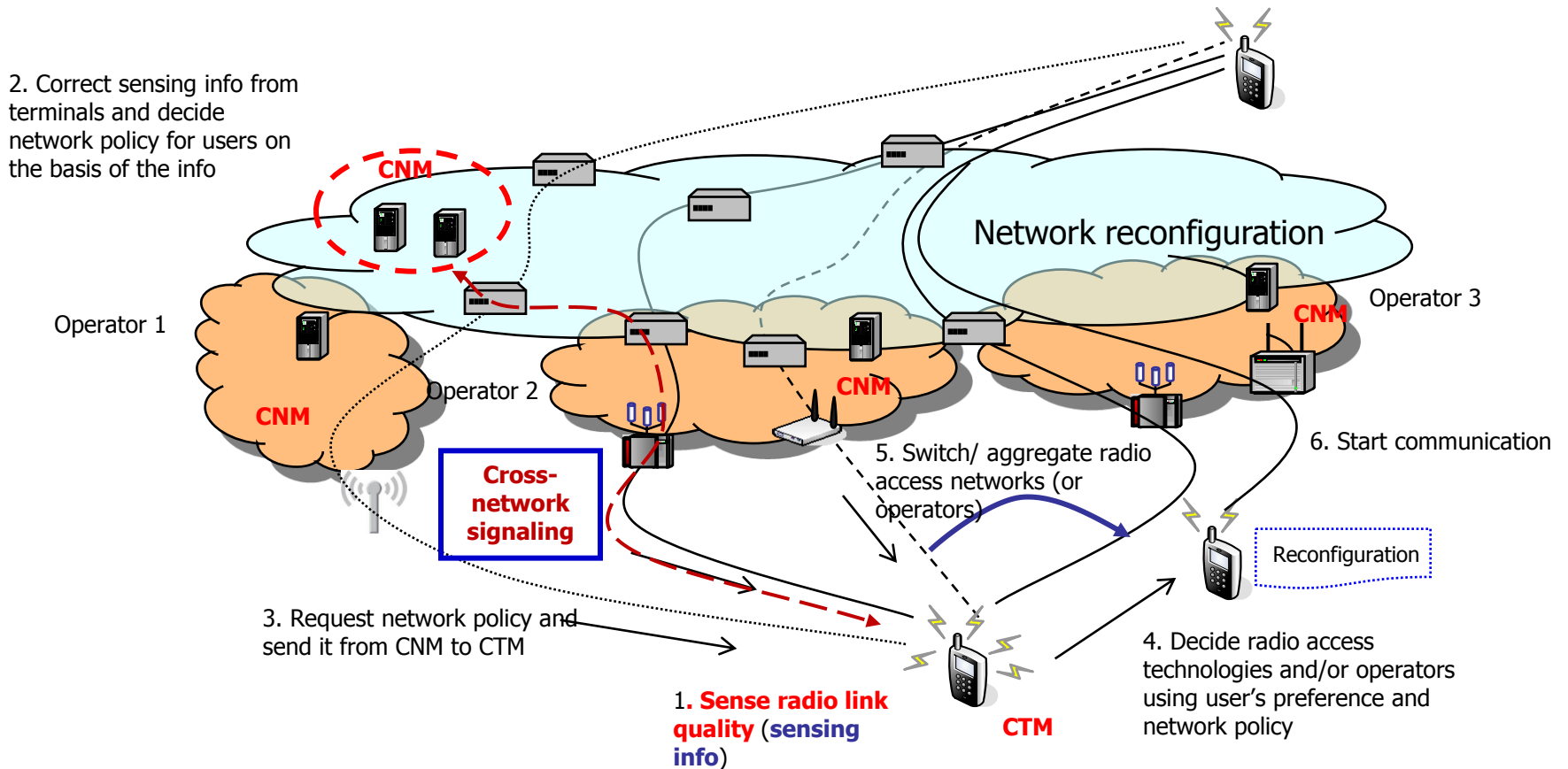
- One of solutions: Dynamic spectrum access network (Cognitive wireless Network)
 - Dynamic spectrum access is **a radio or system** that senses, and **is aware of, its operational environment** (link quality and so on) and can dynamically and autonomously adjust its radio operating parameters accordingly **by collaborating wireless and wired networks**
 - Dynamic spectrum access technology is used **to get a new frequency band** for new standardized wireless communication systems
 - Three types:
 - (1) Underlay
 - (2) Overlay
 - (3) Aggregation of conventionally assigned systems

How to sense link quality of radio operational environment in each user terminal and how to share the information between users over network



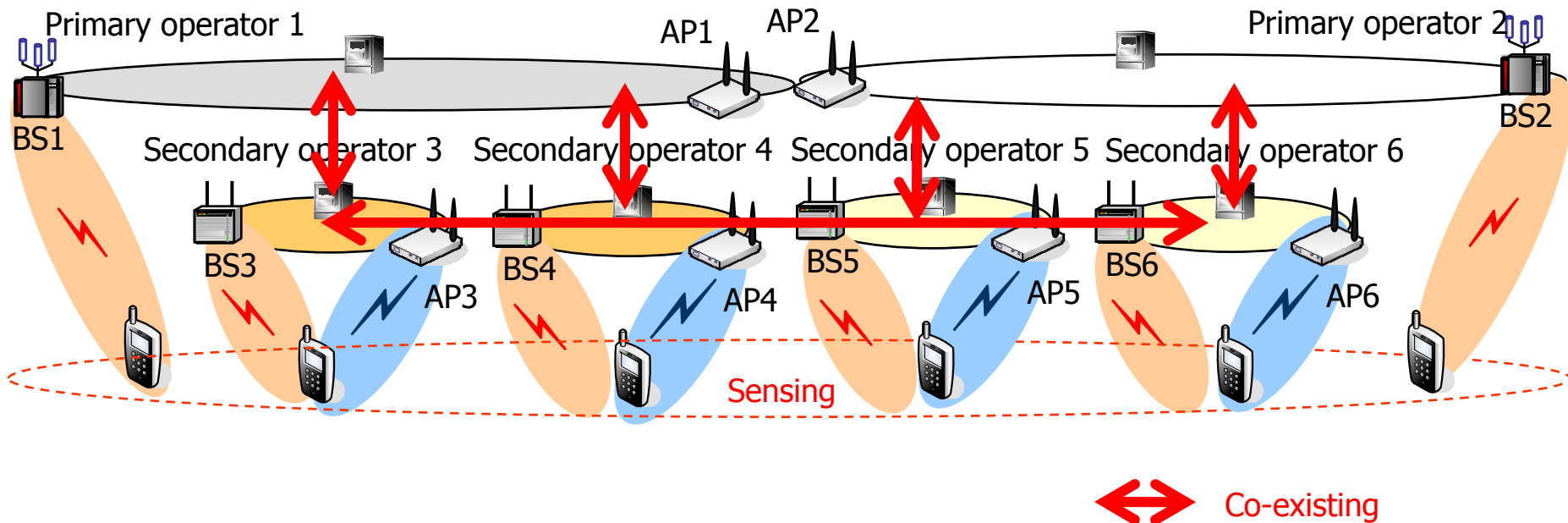
Dynamic Spectrum Access Network(Cognitive Wireless Network)

Cognitive Wireless Network: A cognitive wireless network that decides optimal radio access networks (or operators) and radio access technologies based on collaboration between **Cognitive Terminal Manager (CTM)** with and **Cognitive Network Managers (CNMs)** via **Cross-network (or common) signaling**



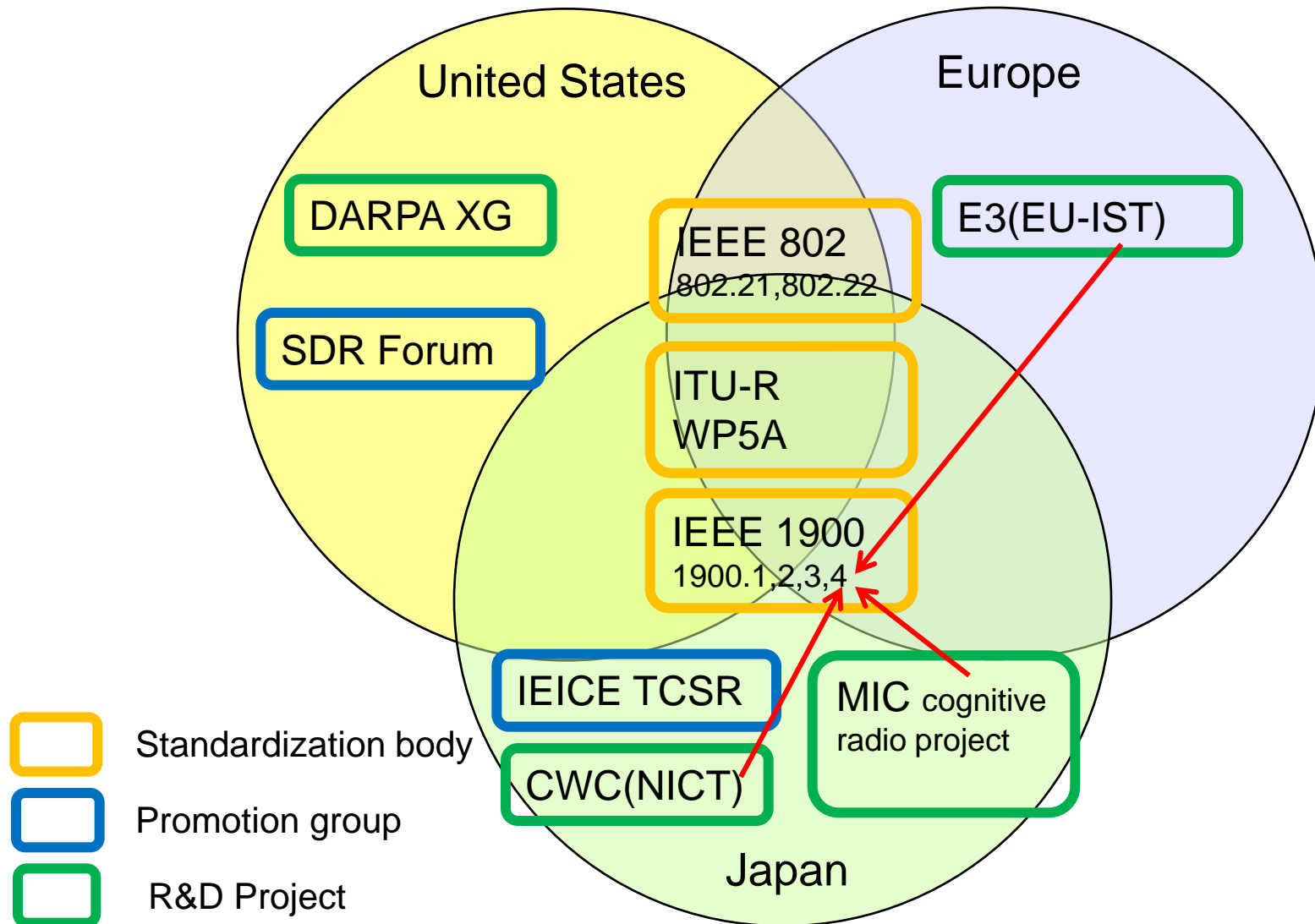
Future image of wireless network

Single/multiple primary operators) and multiple secondary operators managed cognitive radio

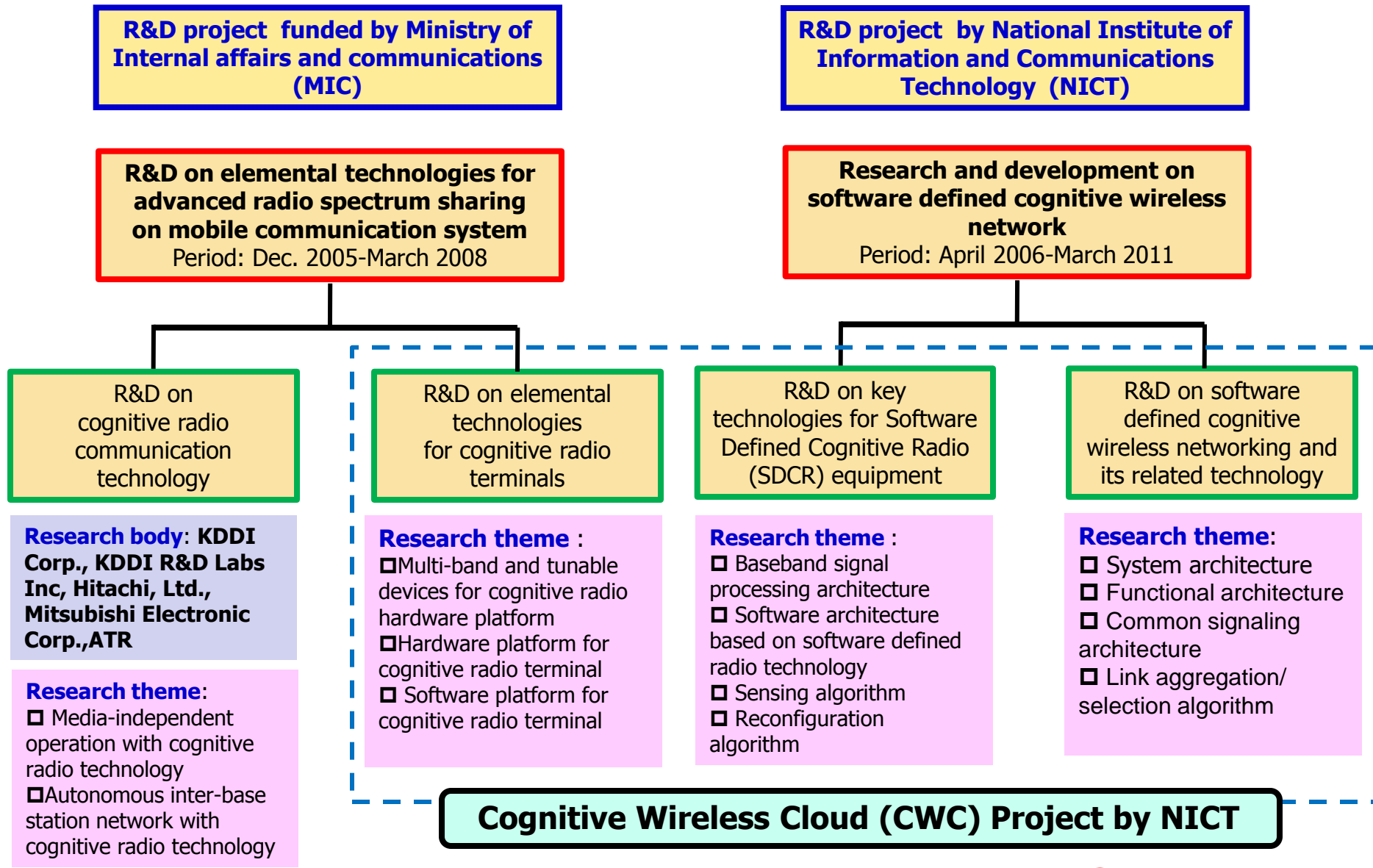


Secondary operators use frequency band and time period that primary operator does not use by sensing spectrum and link quality.

Dynamic Spectrum Access Network Standards



R&D project related to dynamic spectrum access technology in Japan



In this session

- Based on background in this presentation
 - Share concerns related to frequency assignment for future standardized wireless communication systems
 - Confirm the importance of collaboration between wired and wireless network
 - Consider solutions to manage future standardized broadband wireless communication systems on the common platform

Now it is the time to start presentation and discussion