

Motivation for Rel-19 ISAC

China Unicom

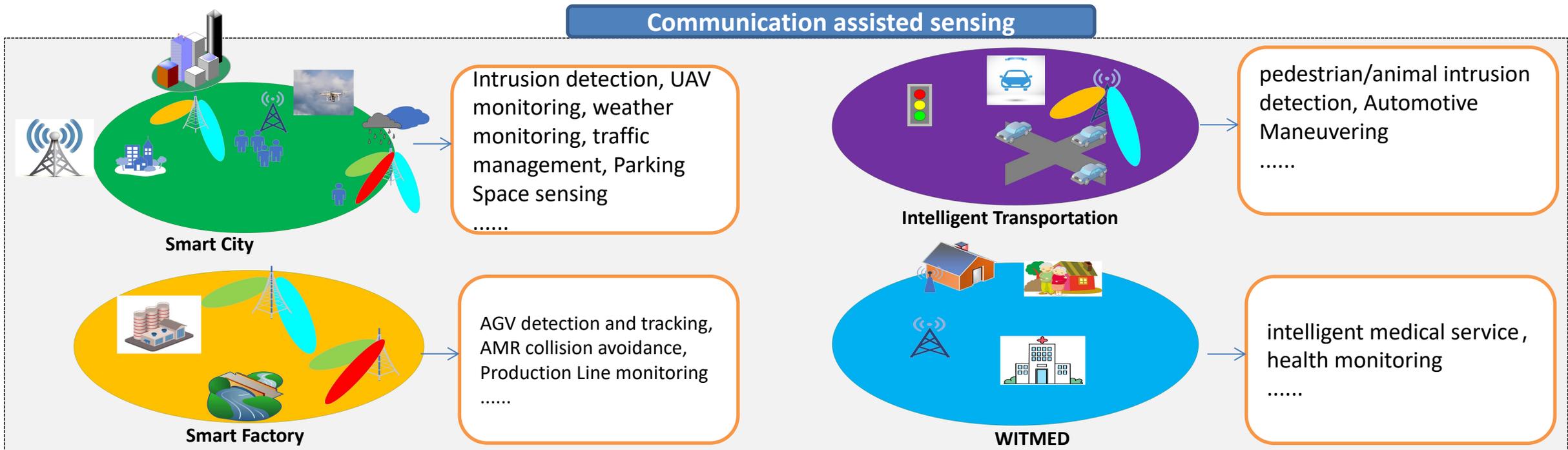
Integrated sensing and communication (ISAC)

□ Motivation:

ISAC provides one set of devices with the new type of service combing of communication and sensing on the basis of 5G network. ISAC is designed to utilizes NR bands (FR2, FR1) to provide consumers with new type of sensing capability, e.g. objective detection, tracking and monitoring. ISAC can provide new service at a low cost of supporting the integrating of the sensing function for commercial deployed gNB in our network.

□ Scenarios

- Communication assisted sensing: smart city, intelligent transportation, WITMED, smart factory;



Integrated sensing and communication (ISAC)

Overall architecture:

Communication assisted sensing

- gNB sensing: single gNB and multiple gNBs;
- UE sensing: how to interact with UE depending on potential UE solution.

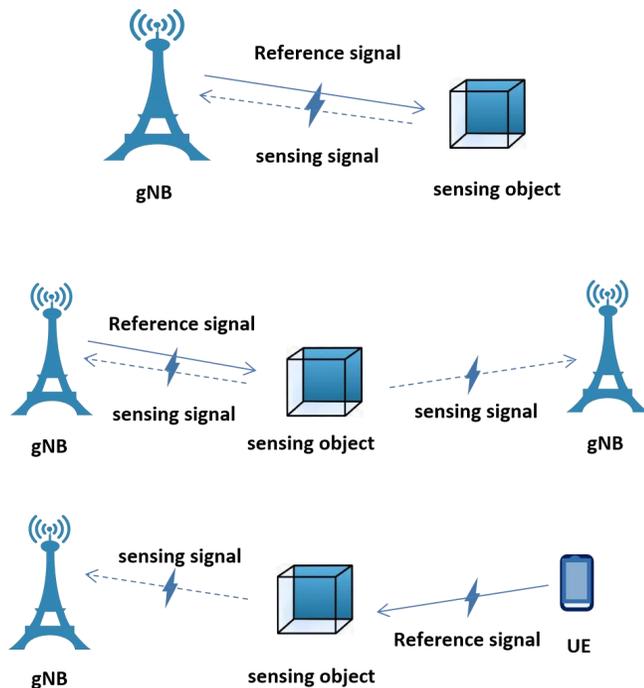


Fig 1. gNB sensing mode

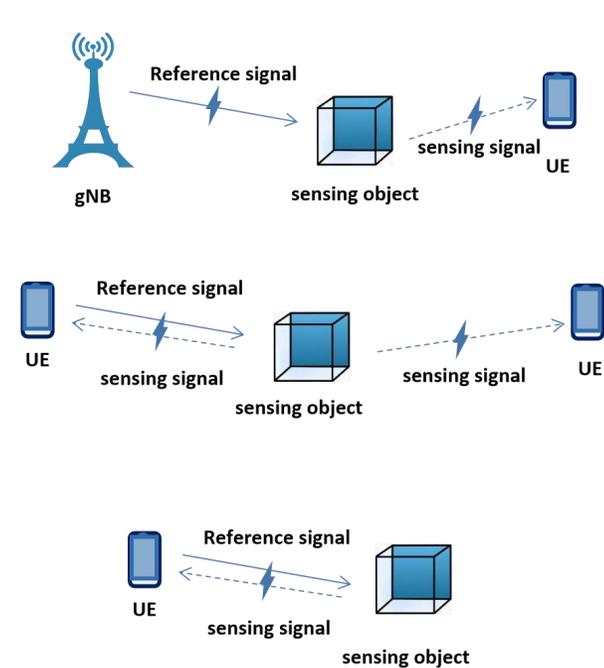


Fig 2. UE sensing mode

Integrated sensing and communication (ISAC)

□ Common points for positioning and ISAC:

- The NE in the core network can be reused;
- Part of the reference signal can be reused, e.g. PRS, SRS, etc;

□ Differences between positioning and ISAC:

- Scenarios and signal transmission patterns are different;
- Positioning is designed to monitor the registered UE, and ISAC is sensing for both registered UE and objects in the service area;

Integrated sensing and communication (ISAC)

□ Objective:

The detailed objectives of the study item (work item) are as follows:

- Identify the target use cases and the corresponding KPIs for each use cases.
- Study the gNB and UE sensing mode and sensing functions on the basis of 5G network for ISAC corresponding to each target use case.
 - Study on ISAC channel models based on TR 38.901;
 - Performance evaluation of the identified KPIs for the target use cases in Rel-19;
 - Study the physical layer related design and specification impacts for ISAC.
 - ◆ Reusing the legacy reference signals (e.g. CSI-RS, SRS, PRS) as the baseline, and study the necessary enhancement on RS , measurement quantities, etc.
 - Study the signaling and procedures of different sensing modes.

Integrated sensing and communication (ISAC)

□ Objective:

➤ Study the ISAC potential architecture and functionality:

- Study the ISAC candidate sensing architecture based on current 5G network architecture, e.g. gNB sensing (no UE involvement), gNB and UE coordinated sensing;
- Study and identify interface(e.g. Uu, NG, Xn, F1) impacts related sensing functionality, e.g. sensing resource configuration, sensing information report, etc.
- Study the sensing interference coordination among multiple gNBs/UEs;
- Study the gNBs sensing coordination if sensing echo signal is received by different gNB;
- Study the sensing service continuity when sensing object moving between gNBs;

Thanks