

Discussion about Integrated Sensing and Communication phase2

China Mobile

Motivations

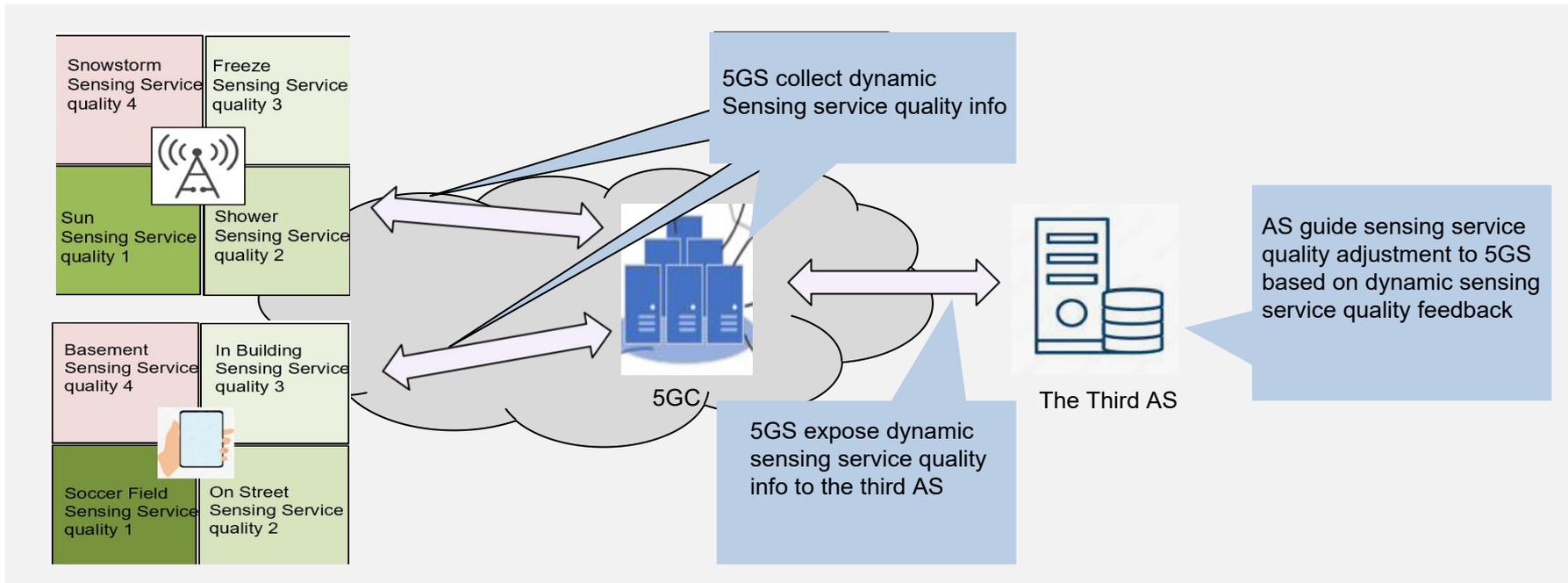


Integrated Sensing and Communication for Rel-19 SA1 have already been discussed and more than 30 use cases have been captured in the TR 22.837 so far covering broad applications at V2X, smart home, industry and city.

However, there are still sensing scenarios or features missed in Rel-19 ISAC. It is worthing to do further study in ISAC phase 2 in Rel-20:

- ❑ Sensing service quality is not static. Sensing service quality is dynamic in terms of factors of the surrounding environment, weather, and so on. 5GS should have the capability to collect dynamic sensing service quality information and expose it to the third AS in sensing operations;
- ❑ There are lots of sensing scenarios without signal coverage. Non-real-time sensing service could be considered; it's worth to study how the network could provide Non-real-time sensing service through NR or UE, or even none 3GPP sensing device.
- ❑ It is beneficial to study how the sensing target (with 3GPP terminal) could be recognized by 5GS and 5GS can communicate with the target to provide both sensing service and communication service;

Dynamic sensing service quality information



Background: Sensing service quality is not static. And the Sensing service quality should be dynamic in terms of factors of the surrounding environment, weather, and so on.

Scenarios: In order to provide subscribed sensing service quality in sensing activities, the 5GS can acquire the dynamic sensing service quality, and take appropriate actions to ensure subscribed sensing service quality, such as transmitter/receiver re-selection. In case, 5GS can't provide the subscribed sensing service quality, it may notify event to the third AS and the third AS could make the decision based on sensing service quality feedback from 5GS to guide ongoing sensing service.

non-real-time ISAC service



UE explore sensing in Cave



UE rescue sensing in Basement
Without signal coverage



UE rescue sensing on UAV in
earthquake --no signal coverage



Wildlife Migration Sensing



Flood Sensing – No signal coverage

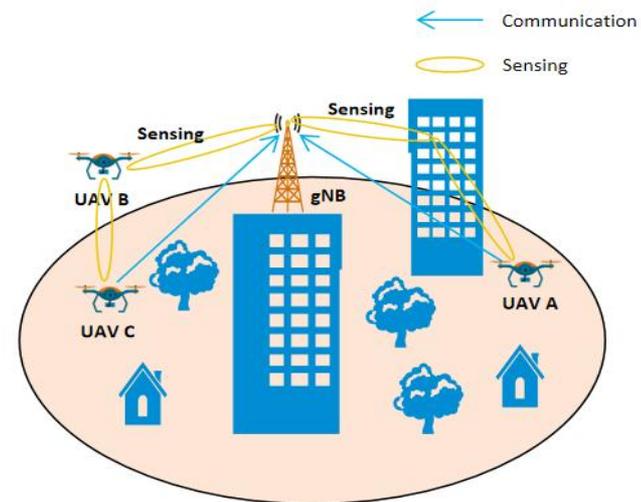
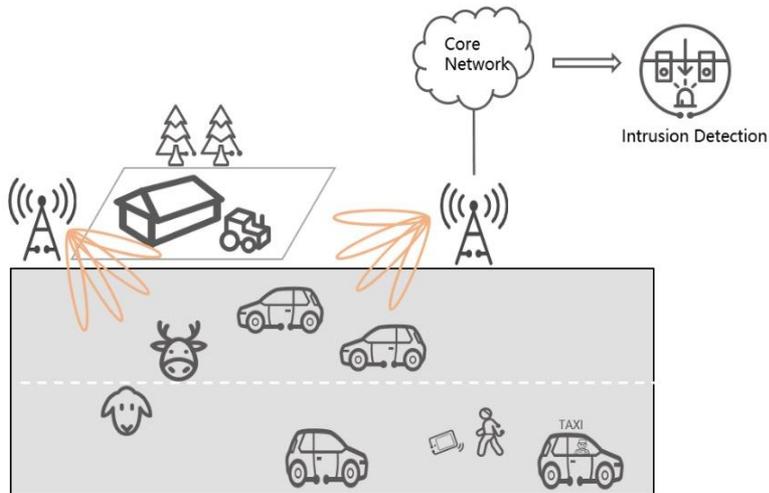


Wild Rainfall Sensing

Background: The above sensing scenarios have the common sensing characteristic -- no signal coverage. Real-time sensing service can not be executed. Non-real-time ISAC service sensing method could be adopted to support the above sensing scenarios:

Gaps: In R20, there is the need to study the scenarios that the transmitter/receiver can perform sensing service in a no-signal coverage environment by **collecting and saving sensing data locally**. Once they move back into the signal coverage area, they can **forward stored sensing data to the 5G network and get the non-real-time sensing result**.

Combined communication and sensing service



Background: When the 5GS provides sensing services, the sensing target information obtained from the sensing result and the communication target information of the communication network are isolated. The network cannot provide both sensing service and communication service for same 3GPP users at the same time.

Scenarios: When a 3GPP user requests the communication network to provide sensing services, the network can determine which target is the one that needs to provide sensing service and can provide communication services to the 3GPP as well. This is extremely valuable in V2X and low-altitude networked A2X scenarios.

Objectives



The objectives are to consider the following aspects:

- Study new use cases for

5G wireless sensing, which includes

- Sensing service with dynamic quality
- Non-real-time ISAC service
- Combined communication and sensing service
- Construction Deformation Sensing