3GPP WG-SA6 Meeting #56 S6-23xxxx

Berlin, Germany 22nd – 26th May 2023 (revision of S6-23xxxx)

**Source: Huawei, Hisilicon**

**Title: New WID for study on Sensing application enabler for vertical applications**

**Document for: Agreement**

**Agenda Item: 10**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>   
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on Sensing enabler for vertical applications

Acronym: FS\_SAE

Unique identifier:

Potential target Release: *Rel-19*

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | X |  | X |  |
| No | X |  | X |  |  |
| Don't know |  |  |  |  | X |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
|  | Feature |
|  | Building Block |
|  | *Work Task* |
| X | Study Item |

## 2.2 Parent Work Item

|  |  |  |  |
| --- | --- | --- | --- |
| Parent Work / Study Items | | | |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| N/A |  |  |  |

### 2.3 Other related Work Items and dependencies

|  |  |  |
| --- | --- | --- |
| Other related Work /Study Items (if any) | | |
| Unique ID | Title | Nature of relationship |
| 950003 | Study on Integrated Sensing and Communication | Sensing application enabler functions should be based on the SA1sensing requirements and use cases |
| TBD | TBD | Sensing application enabler functions should be based on network architecture, procedures, sensing result exposed from SA2 |

# 3 Justification

5G wireless sensing is an key feature from the 5G system addressing different target verticals/applications, e.g. autonomous/assisted driving, V2X, UAVs, 3D map reconstruction, smart city, smart home, factories, healthcare, maritime sector. It provides capabilities to get information about characteristics of the environment and/or objects within the environment (e.g. shape, size, orientation, speed, location, distances or relative motion between objects, etc) using NR RF signals and, in some cases, previously defined information available in EPC and/or E-UTRA. Further 3GPP network can expose the sensing result to the 3rd party.

In addition, SA1 defines multiple use cases for multiple verticals/applications, further analyses and aggregates generic requirement of network. Then SA2 defines the generic network APIs based on the aggregated requirement of network. However some verticals/applications -specific service requirement may be overlooked and cannot be satisfied if verticals/applications directly utilising SA2’s generic network API.

Currently SA1 defines 32 sensing use cases including smart transportation, low-attitude UAV, smart home, smart city, smart factory, etc. However based on SA1’s sensing consolidated potential requirements and KPIs, only several generic APIs will be provided by SA2 e.g. intrusion detection API, traffic detection API, routing tracking API, etc. Thus directly utilising SA2’s sensing API may not be able to satisfy the requirement of verticals/applications. Take V2X as an example, SA2 may only provide intrusion detection API, traffic detection API, routing tracking API, collision detection API, positioning API, velocity detection API. With additional information from camera, Radar, and invoking other SEAL API defined in SA6, based on SA2’s sensing API SA6 can provide variety application-specific services including but not limited to:

* Speed suggestion and Lane change suggestion；
* High-speed Confluence Passage Assist；
* Slow and fast Vehicle Warning
* Obstacle warning
* Green wave speed guidance
* Updated dynamic HD map info；
* Visibility detection and warning
* Congestion report and estimated Dissipation Time result
* Available parking slot information and Recommended Parking Routes

Hence, it is beneficial to provide sensing enable layer functions towards the verticals, to instruct them how to utilize the 3GPP network sensing capabilities in an easy and friend way.

# 4 Objective

The objectives of the study of a sensing application enabler to support various vertical applications include:

1). Analyse the use cases defined in SA1 and identify potential SA6 requirements of sensing services for different target verticals/applications e.g. UAV service and V2X service.

2). Based on the above 1), develop key issues, corresponding architecture requirements and solution recommendations to enable the application layer support for the sensing services over 3GPP system considering the following aspects:

- How to provide the unified sensing service towards the application layer (considering both 3GPP and Non-3GPP data), define a new set of sensing based service API, or enhance the existing service API (if exist) with sensing options e.g. V2X service with sensing, UAV service with sensing, etc.

- How to combine the 3GPP sensing result from 3GPP network, and data provided by non-3GPP sensors from application the layer domain, e.g., camera, LiDAR, and offer enhanced value-added services.

- How to achieve efficient sensing, e.g., aggregating requests and notifications.

- How to analyse historical sensing data subject to user consent and regulations, to provide sensing service with higher accuracy.

*NOTE: May use a generic data storage framework which is outside the scope of this SID objective.*

3). Identify the potential improvement of existing functionalities/service API provided by the xAE/SEAL layer by utilizing sensing API exposed by SA2.

4). Identify architecture requirements and solutions for generic/specific architecture to support sensing if required.

# 5 Expected Output and Time scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| New specifications {One line per specification. Create/delete lines as needed} | | | | | |
| Type | TS/TR number | Title | For info  at TSG# | For approval at TSG# | Rapporteur |
| Internal TR | 23.xxx | Study on sensing application enabler for vertical application | SA#101 (Sep 2023) | SA#104 (Jun 2024) | Yanmei Yang, Huawei, Yangyanmei@huawei.com |

# 6 Work item Rapporteur(s)

Yanmei Yang, Huawei, yangyanmei@huawei.com

# 7 Work item leadership

SA6

# 8 Aspects that involve other WGs

SA1 on service aspects, SA2 on aspects related to 3GPP system, SA3 on aspects related to security, SA4 on aspects related to media streaming and caching, SA5 on aspects related to charging.

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| Huawei |
| Hisilicon |
| CATT |
| Inter digital |
| ZTE |
| China Mobile? |
| China Telecom |
| VIVO |
| TD-tech |
| China Unicom |
| Lenovo |
| Hytera |
| Toyota |
| Kyonggi University |