

Joint Communication and Sensing: Myth, Hype, or Game Changer?

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Let's do a small thought experiment together and start by asking:



What is JCAS anyway?

Or is it ISAC? Or...?

Some definitions out there

Ericsson:

“ISAC integrates sensing and spatial location of **passive** (not connected) objects into the mobile communication network, expanding the **network's functionality** beyond just communication.”

3GPP SA WG1 Meeting #97e:

“Integrated Sensing and Communication in a 3GPP 5G system means the sensing capabilities are provided by the same 5G wireless communication system and **infrastructure** as used for communication, and the sensing information could be derived from **RF-based** and/or **non-RF based sensors**.”

Rohde & Schwarz:

“Integrated sensing and communication (ISAC), also known as joint (or integrated) communication and sensing (JCAS/ICAS), combines **radar** sensor data with **associated** communication data and is one of the numerous topics in the field of future communication systems such as 6G being investigated within various projects worldwide.”

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“One of the key drivers towards enabling this massive digital transformation is integrated, or joint communication and sensing (JCAS) [3], which offers radio sensing services such as **localization**, **object detection** and **classification** along with communications capabilities, all under a unified hardware platform.”



My takeaway:

JCAS/ISAC is a solution to jointly solve communication and observation tasks, everything else is just up for debate

What about use cases?

A snapshot from TR 22.837

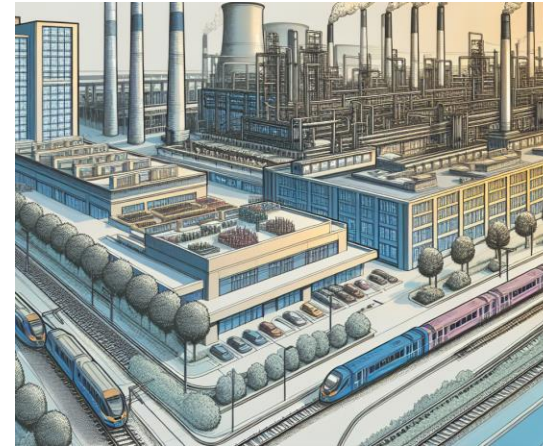
Automotive and safety



Entertainment



Intrusion detection



Disaster response



This looks oddly familiar, doesn't it?

What about requirements

Snapshots from TR 22.837, TR 22.840, and TR 22.856

Positioning accuracy

Automotive and safety

Object detection: ≤ 5 m

Public area safety: 0.5 m

ADAS: 0.1 – 1.3 m

ADAS (short radar): 0.02 – 2.6 m

Disaster response

Human detection: ≤ 2 m

Rainfall monitoring: ≤ 10 m

Sensing smart grid

Object detection: ≤ 0.7 m

Velocity estimation accuracy

Automotive and Safety

Public area safety (human): ≤ 1.5 m/s

Public area safety (vehicle): ≤ 15 m/s

ADAS: 0.03 – 0.12 m/s

Entertainment

Gesture recognition: 0.1 m/s

Sensing smart grid

UAV: ≤ 25 m/s

Human: ≤ 1.5 m/s

Vehicle: ≤ 1.5 m/s

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Object detection: ≤ 0.7 m

Velocity estimation accuracy

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Sensing smart grid

UAV: ≤ 25 m/s

Human: ≤ 1.5 m/s

Vehicle: ≤ 1.5 m/s

Are these just numbers out of established systems?



Is JCAS...

a myth?

No!

a hype?

Maybe was!

a game changer?

Only if we are smart!



So let us then together make JCAS the game changer that it should be!

Also: time for an analog sensing experiment!

Thank you!



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