



# Towards collective perception hybrid testing in a roundabout scenario with AVs



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# Research Objective & Inputs

**Research Objective:** Develop algorithms for fusion of object information coming from multiple observers based on probabilistic scene state estimation via occupancy grid maps

## CPM information/Inputs

- Ego FoV angle.
- Ego state information

for each CCAV:

- Ego Position coordinates in  $x,y$
  - Ego Speed vector  $v_x, v_y$
  - Ego Heading (yaw angle)
- Perceived objects information

for each perceived object:

- Position coordinates in  $x,y$
- Speed vector  $v_x, v_y$
- Heading (yaw angle)

## Individual CCAV perception model

A known individual perception model is assumed for each CCAV, provided in terms of a standard forward sensor model, i.e., the 4 probabilities  $P(M_i = 0|A_i = 0)$ ,

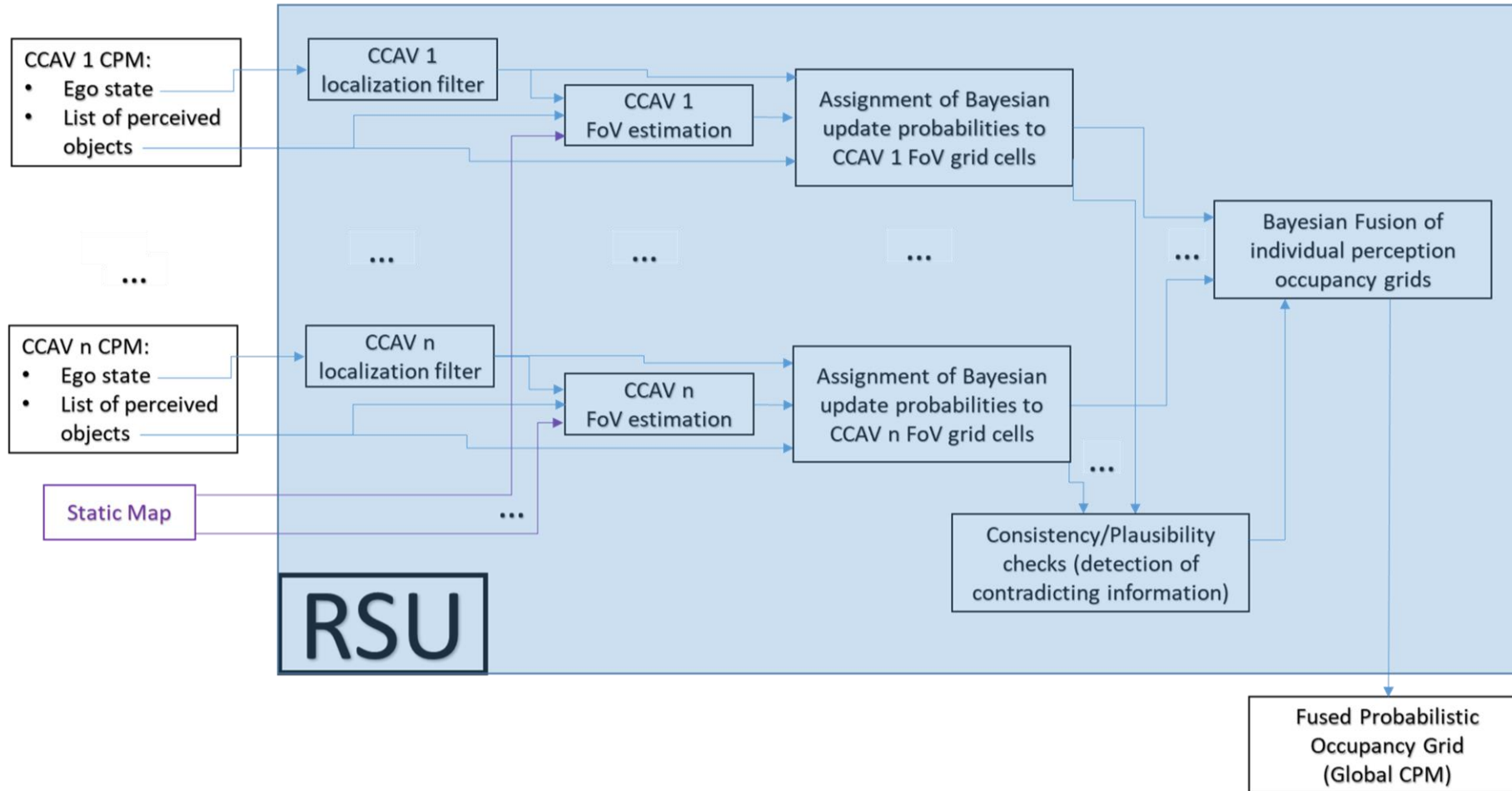
$P(M_i = 1|A_i = 0)$ ,  $P(M_i = 0|A_i = 1)$ ,

$P(M_i = 1|A_i = 1)$ , where

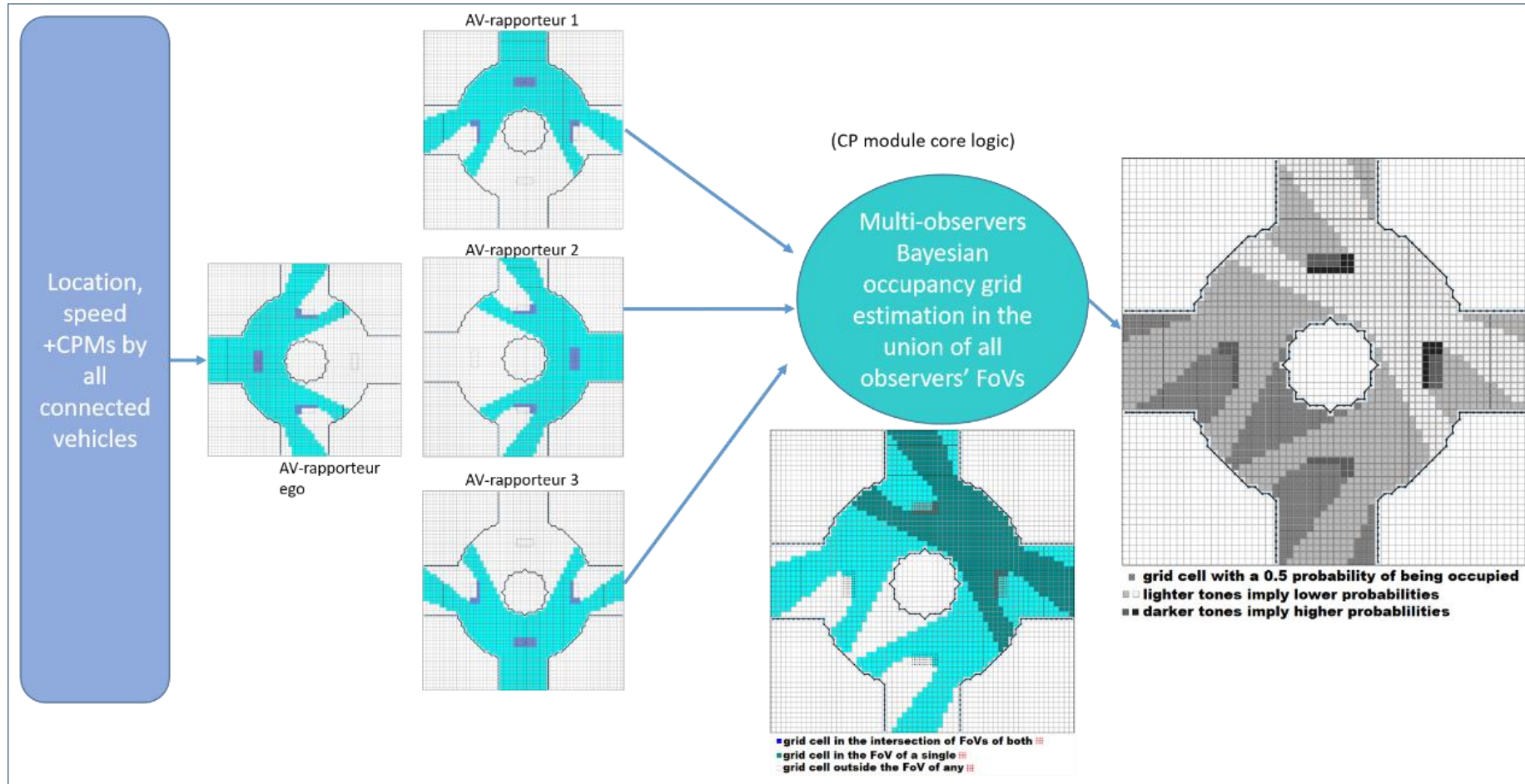
- $A_i \in \{0,1\}$  denotes the random variable “cell  $i$  is actually occupied ( $A_i = 1$ ) or not ( $A_i = 0$ )”
- $M_i \in \{0,1\}$  denotes the random variable “cell  $i$  is perceived as occupied ( $M_i = 1$ ) or not ( $M_i = 0$ )”



# CPM Module



# CPM Module







**Thank you!**



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