

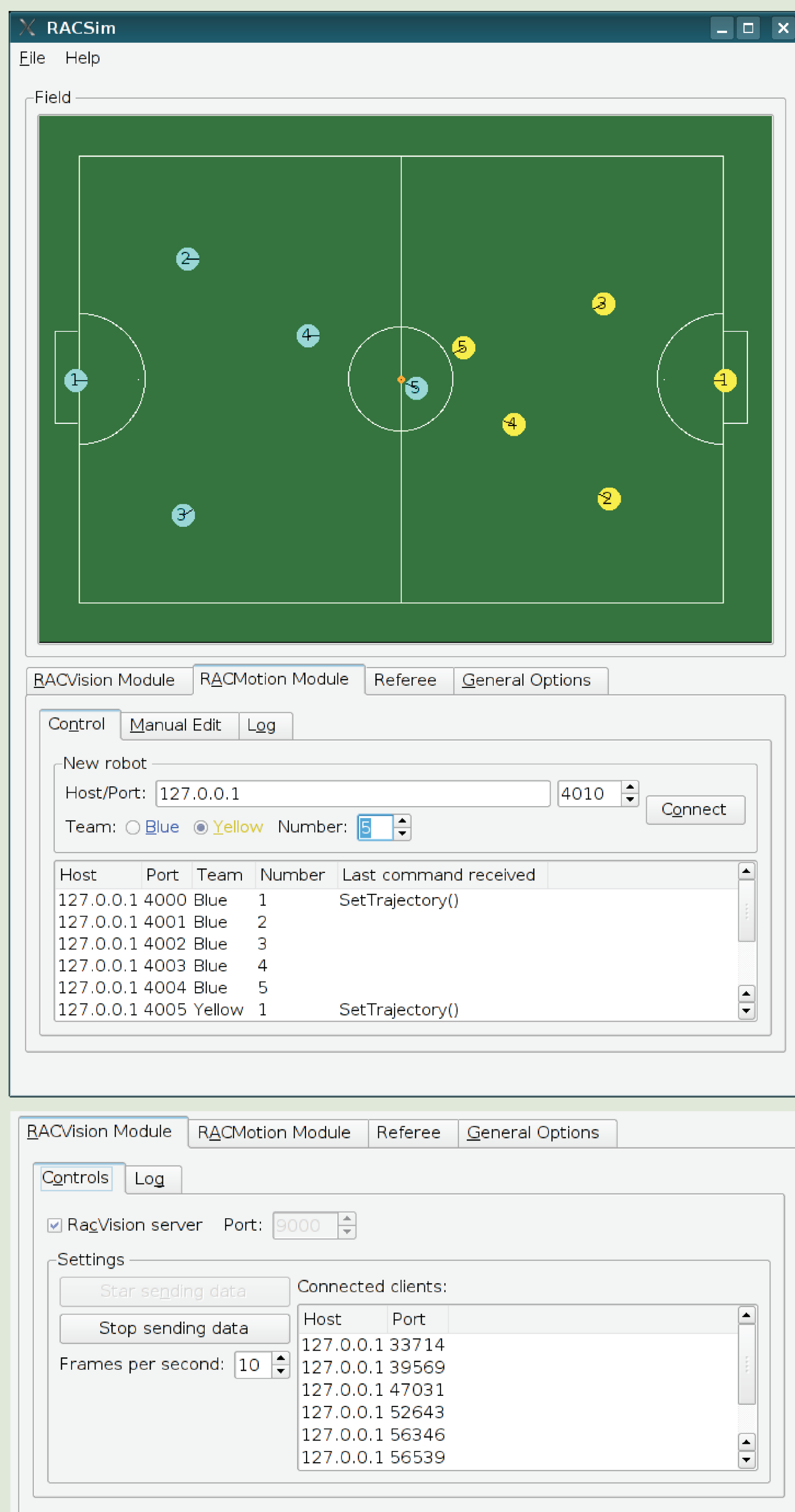
RACManager

Distributed control system for a robotcup small size league team

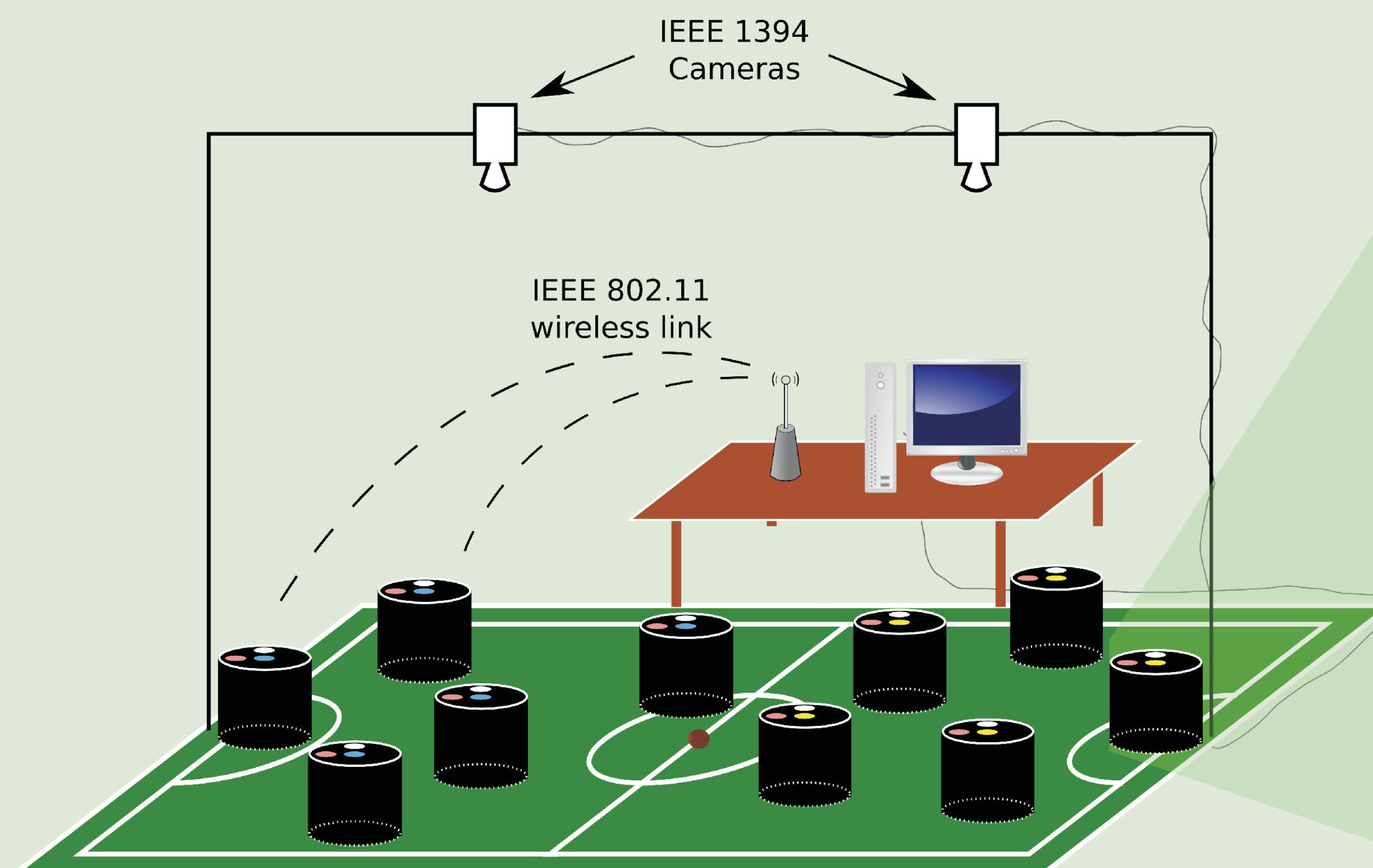
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RACSimulator

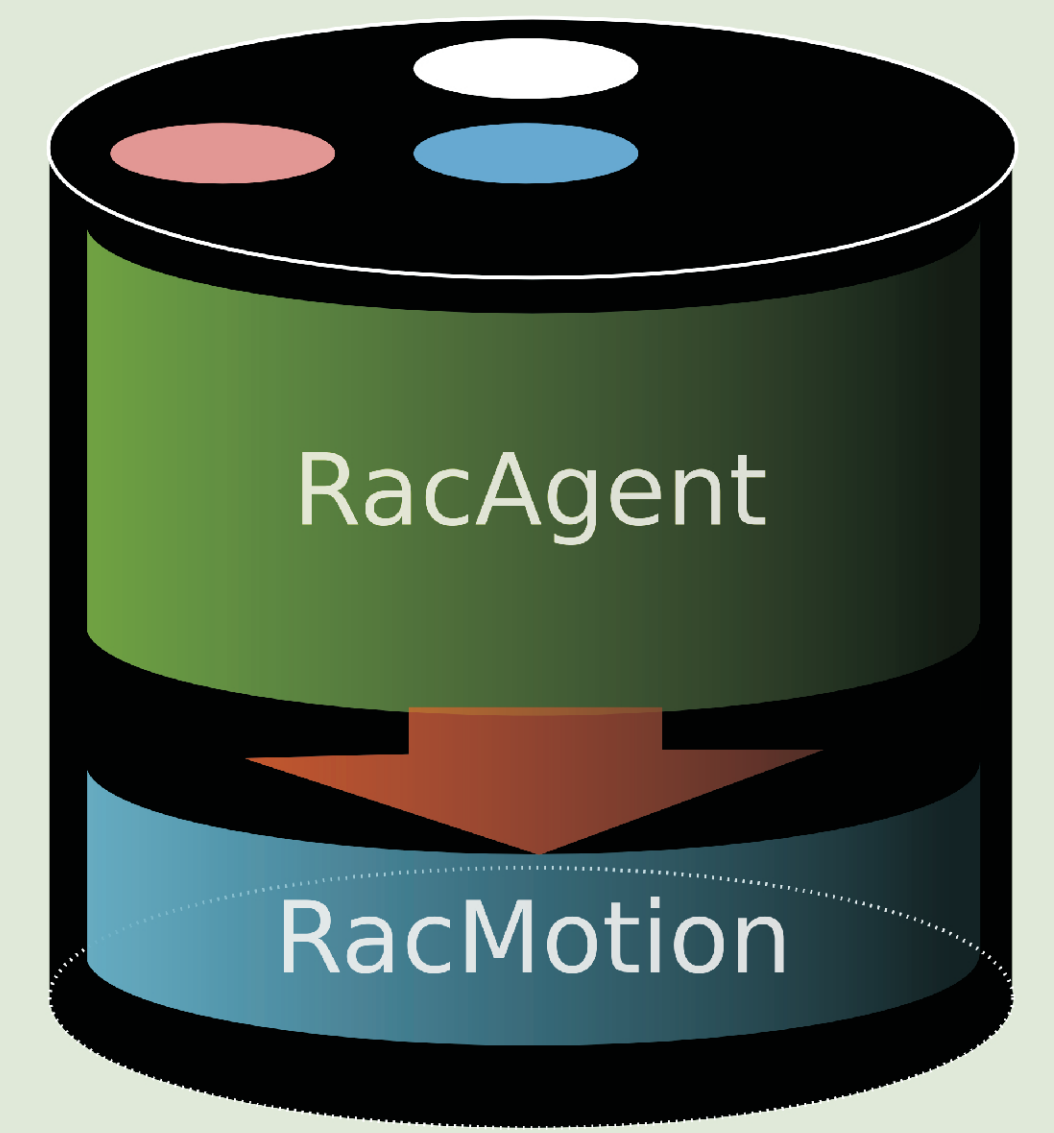
Graphical user interface



Gameplay

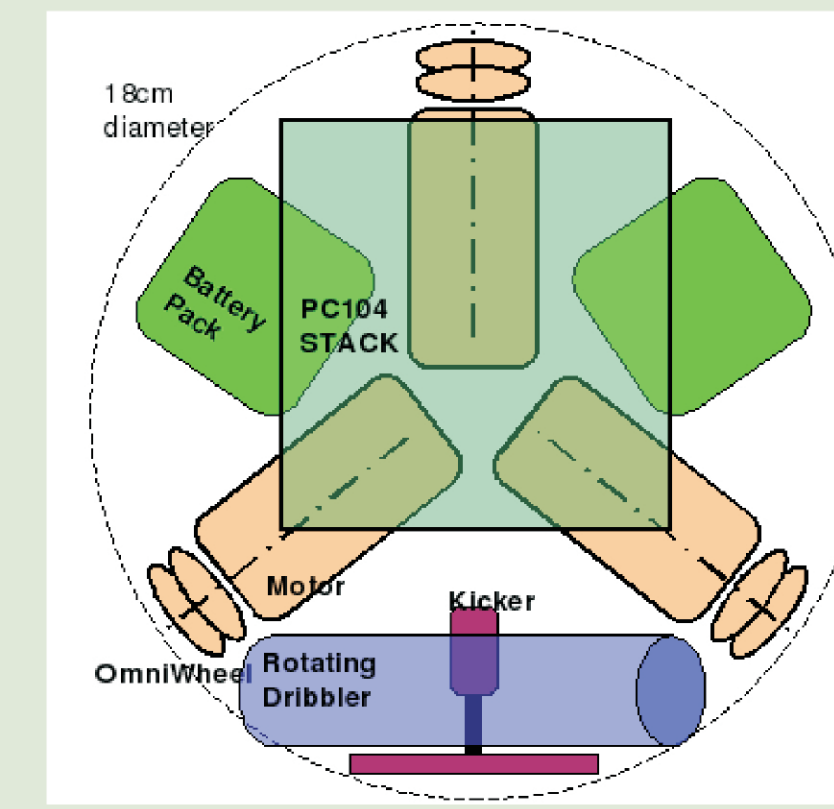
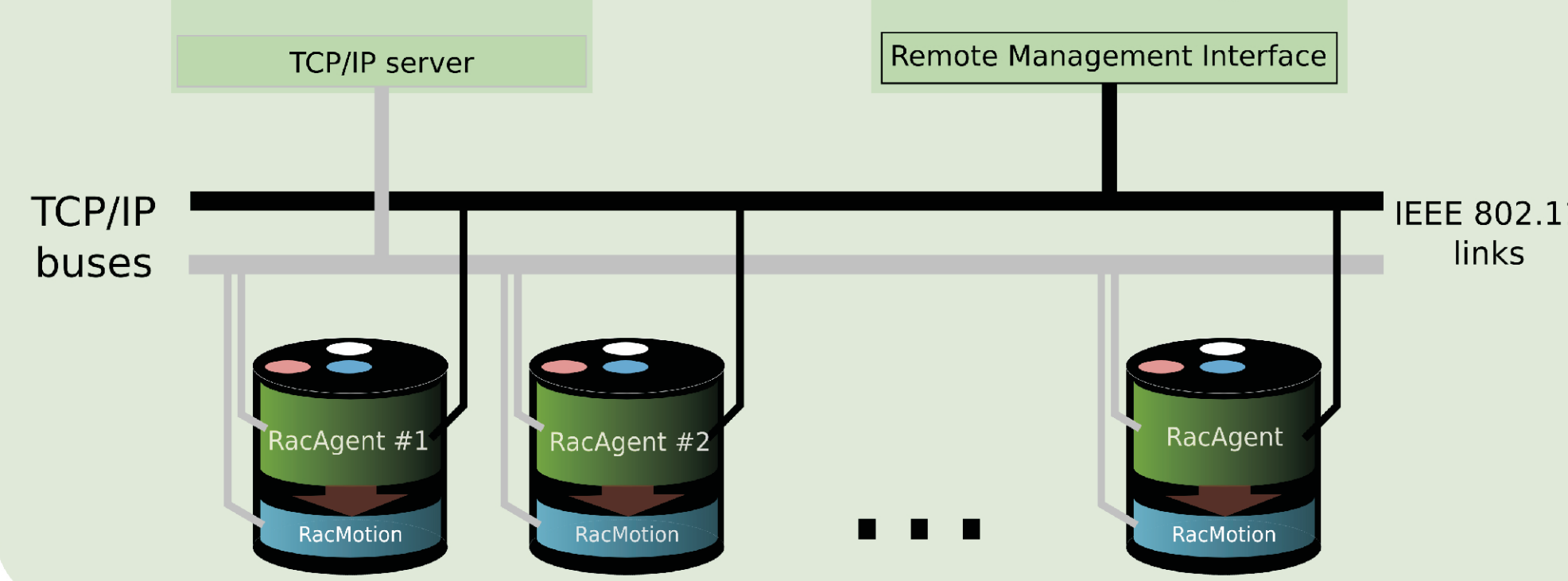


RacBot Logic Layers



RACvision

RACmanager



Purpose

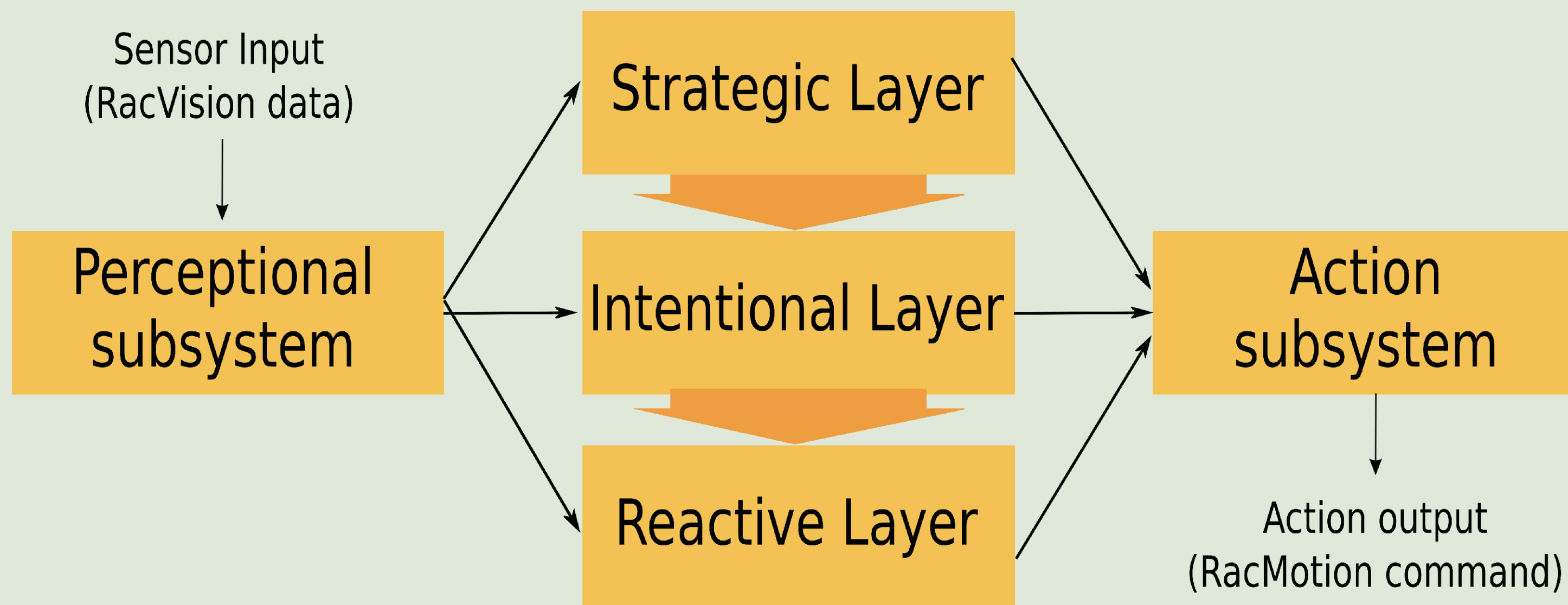
To have a solid test platform for RACagents to play exactly as they would in a real gameplay situation. This platform runs on a single machine and does not need any other piece of software to simulate the whole game environment.

Features

RacVision Module	RacMotion Module	Referee Module	Other features
Identify virtual robots and ball	Perform holonomic motion	Simulate all official referee commands through a virtual COM port.	Log all gameplay information, optionally save it to file. (Future work can lead to game reconstruction/replay)
Send TCP/IP message with data	Simulate kicker, with desired power		
Adjust desired framerate for user preference	Receive and handle all RacMotion messages.		

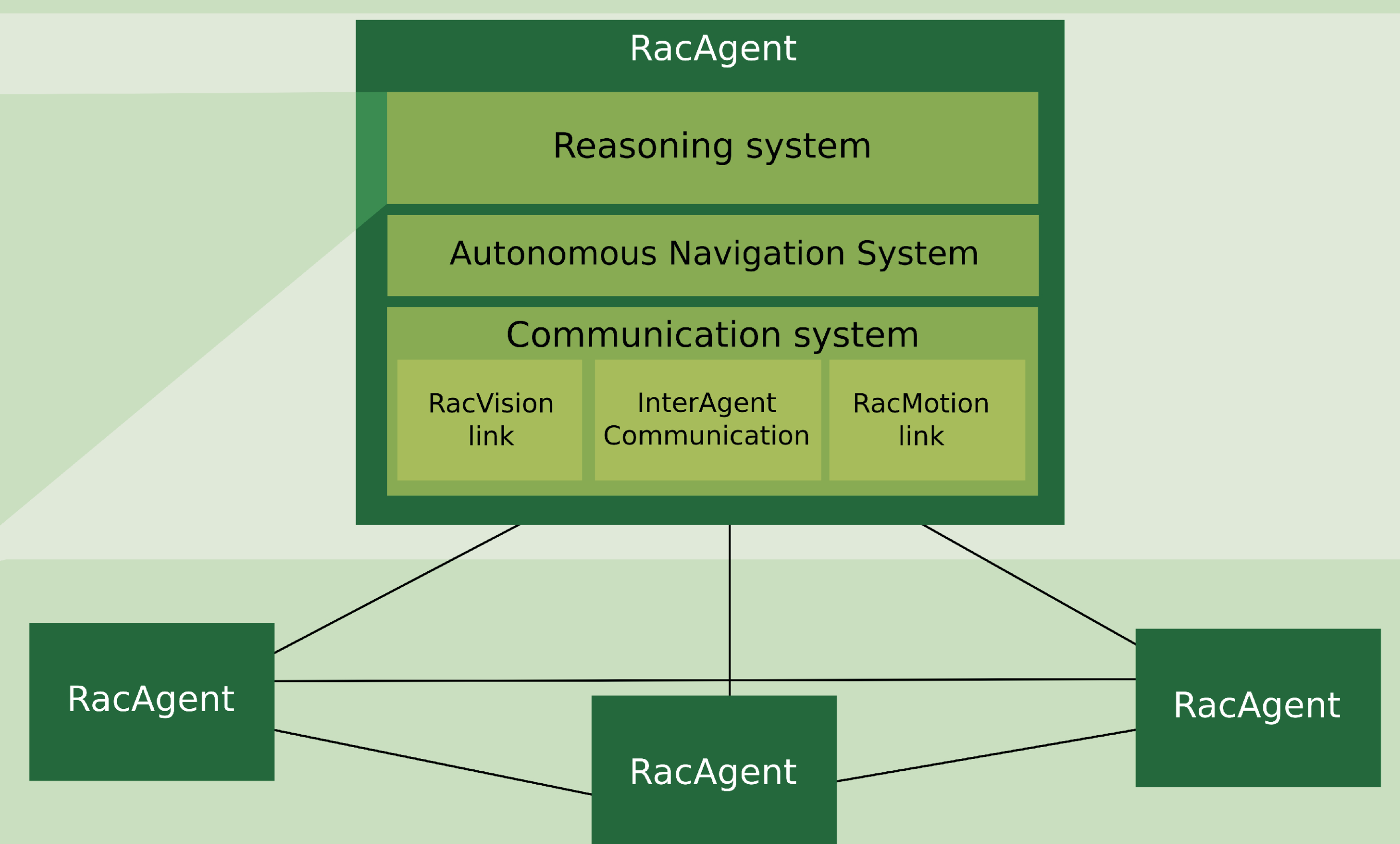
RACAgent

Model Architecture



Modified version of the touring machine adapted to team needs
Assures responsiveness through reactive layer continuous reactivity
Can achieve high levels of complexity depending on strategic layer algorithm implemented

Agent framework space

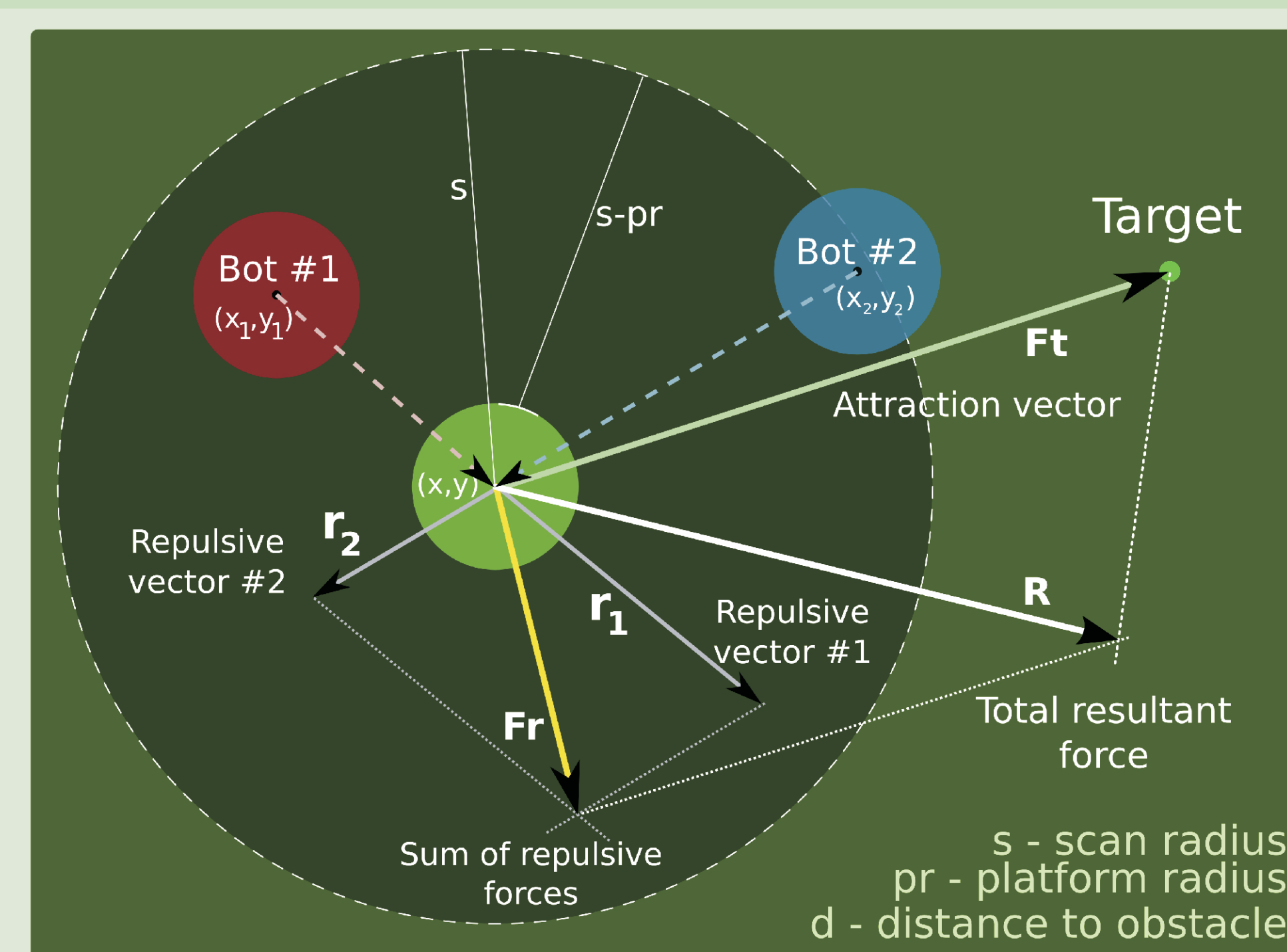


RACManager

Agent Space Administrator

- RacManager is responsible for managing agents in framework
- Add, remove, change settings about agents on platform
- Decide tactically (where and how to play)
- Choose strategically (organizing gameplay to achieve a goal)
- Interfaces with official Robocup Referee Box

Autonomous Navigation System



Virtual Forces Field Technique

Easy to add or remove obstacles

Fast (no use of matrixes)

Repulsive forces

$$\vec{r}_i = (x-x_i, y-y_i)$$

$$\vec{r}'_i = \frac{F_{MAX} \times (d-s)}{(s-pr)} \times \frac{\vec{r}_i}{|\vec{r}_i|}$$

$$\vec{F}_r = \sum_i \vec{r}'_i$$

Attractive force

$$\vec{F}'_i = (x_i-x, y_i-y)$$

$$\vec{F}_i = 1.33 \times F_{MAX} \times \frac{\vec{F}'_i}{|\vec{F}'_i|}$$

Resultant force

$$\vec{R} = \vec{F}_i + \vec{F}_r$$