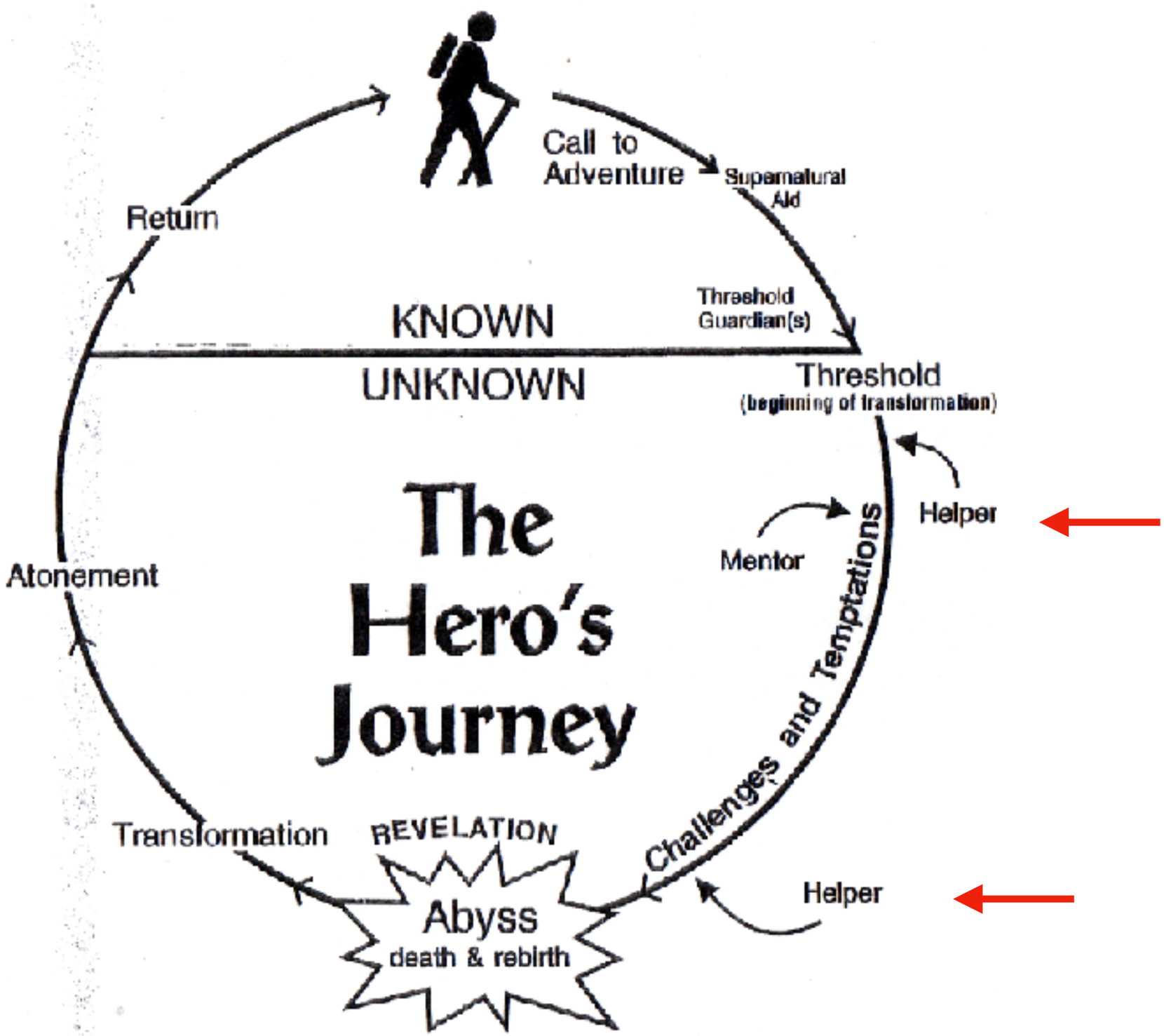
Putting things together

Figures that help put things together

- We have three figures that will help coordinate the efforts:
  - Software Architect
  - System Architect
  - Knowledge Tzarina


Call to Adventure
Supernatural Aid
Threshold Guardian(s)
Threshold
(beginning of transformation)
Helper
Mentor
Challenges and Temptations
Helper
Abyss
death & rebirth
REVELATION
Transformation
Atonement
Return
KNOWN
UNKNOWN
The Hero's Journey

System Architect

- The system architect is ultimately responsible:
  - The **logical architecture**
    - Decomposition in modules
    - Who knows what
    - Who says what to whom
  - Definition of performance metrics
  - Definition of contracts (bounds on metrics)

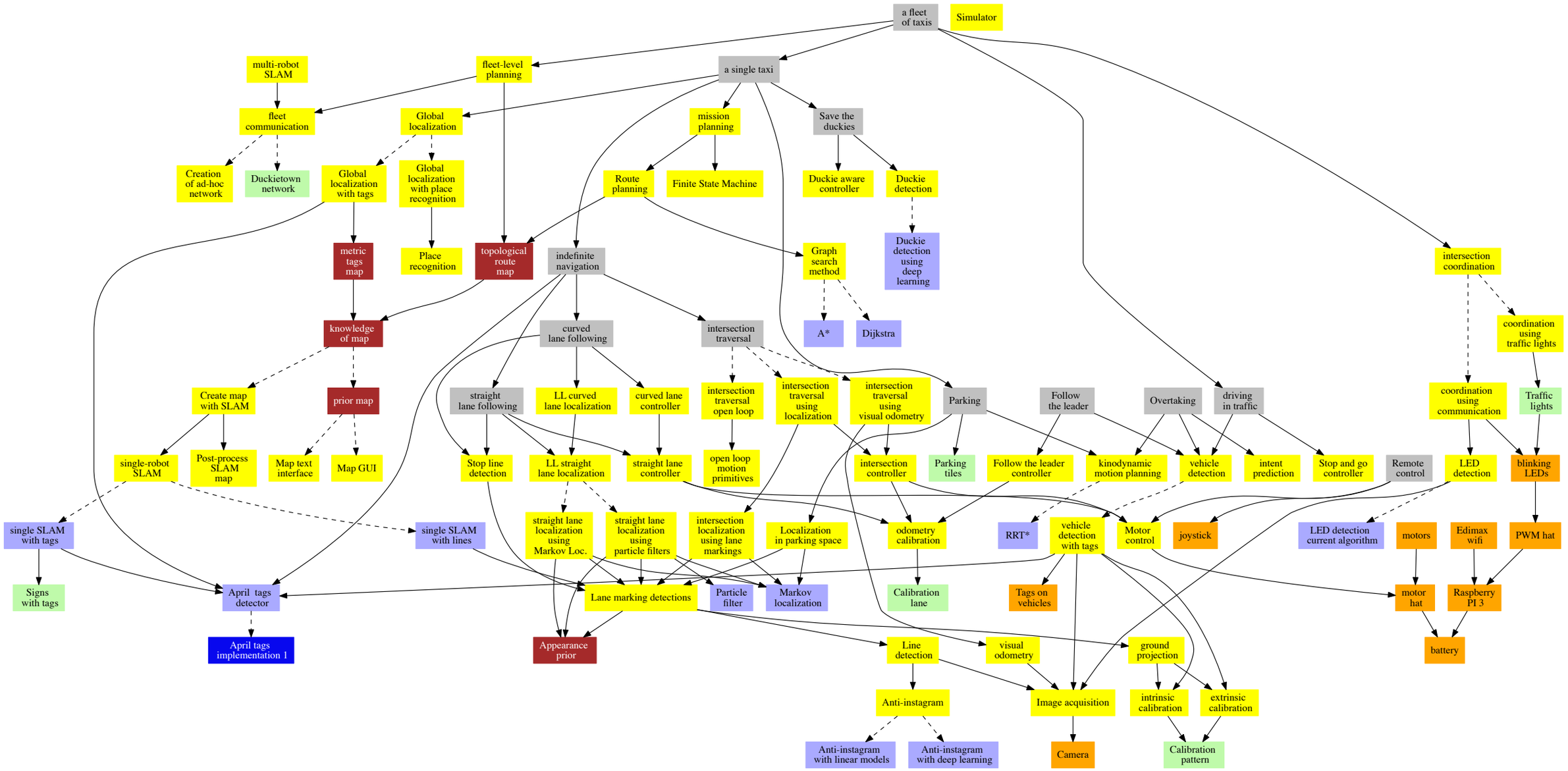
Software Architect

- The Software Architect is ultimately responsible for:
  - The **physical architecture**
    - messages formats
    - protocols
    - ...
  - Coding conventions
    - directory layouts
    - naming conventions
    - launch scripts

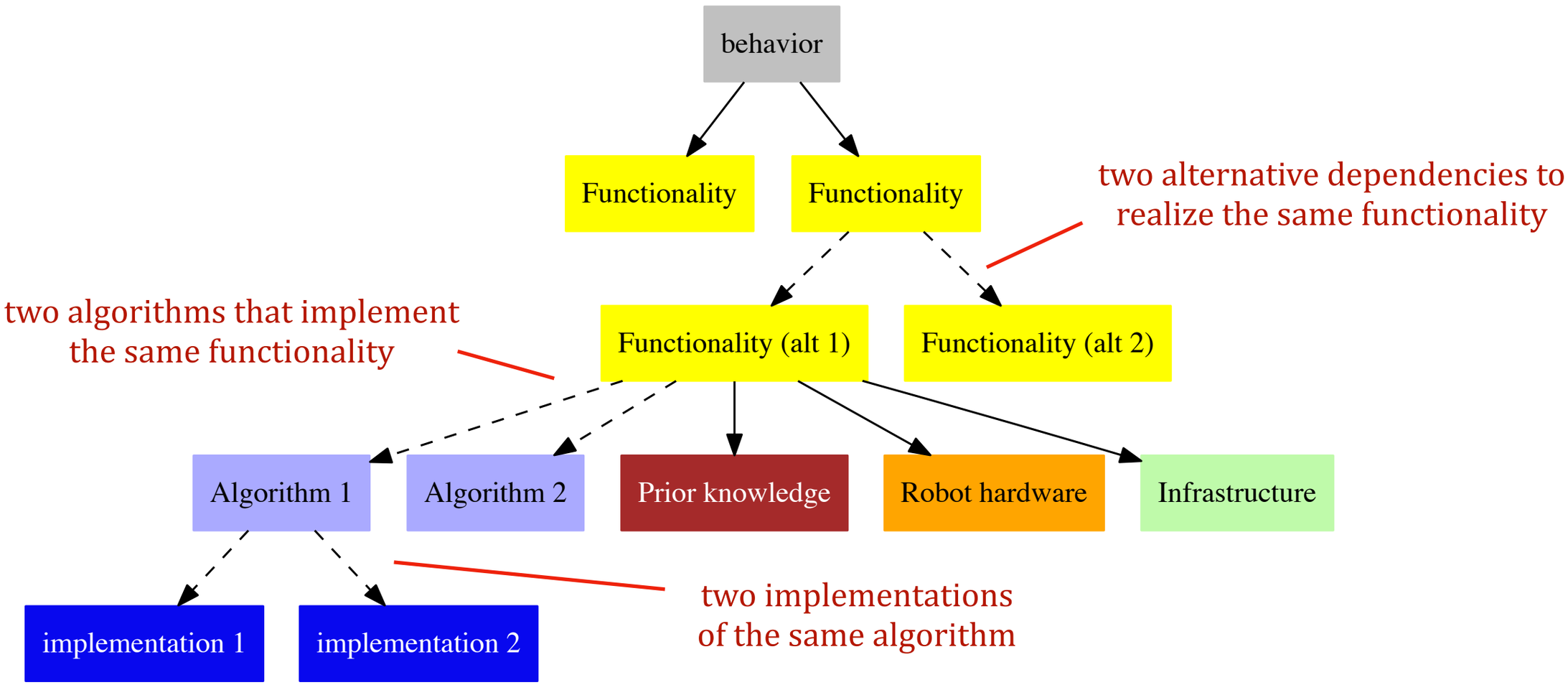
Knowledge Tzarina

- The Documentation Tzarina is ultimately responsible for:
  - Documentation conventions
    - document outlines
    - style
  - Directory layout, figure formats, etc.
  - Proper cross-referencing
    - project to code
    - project to project

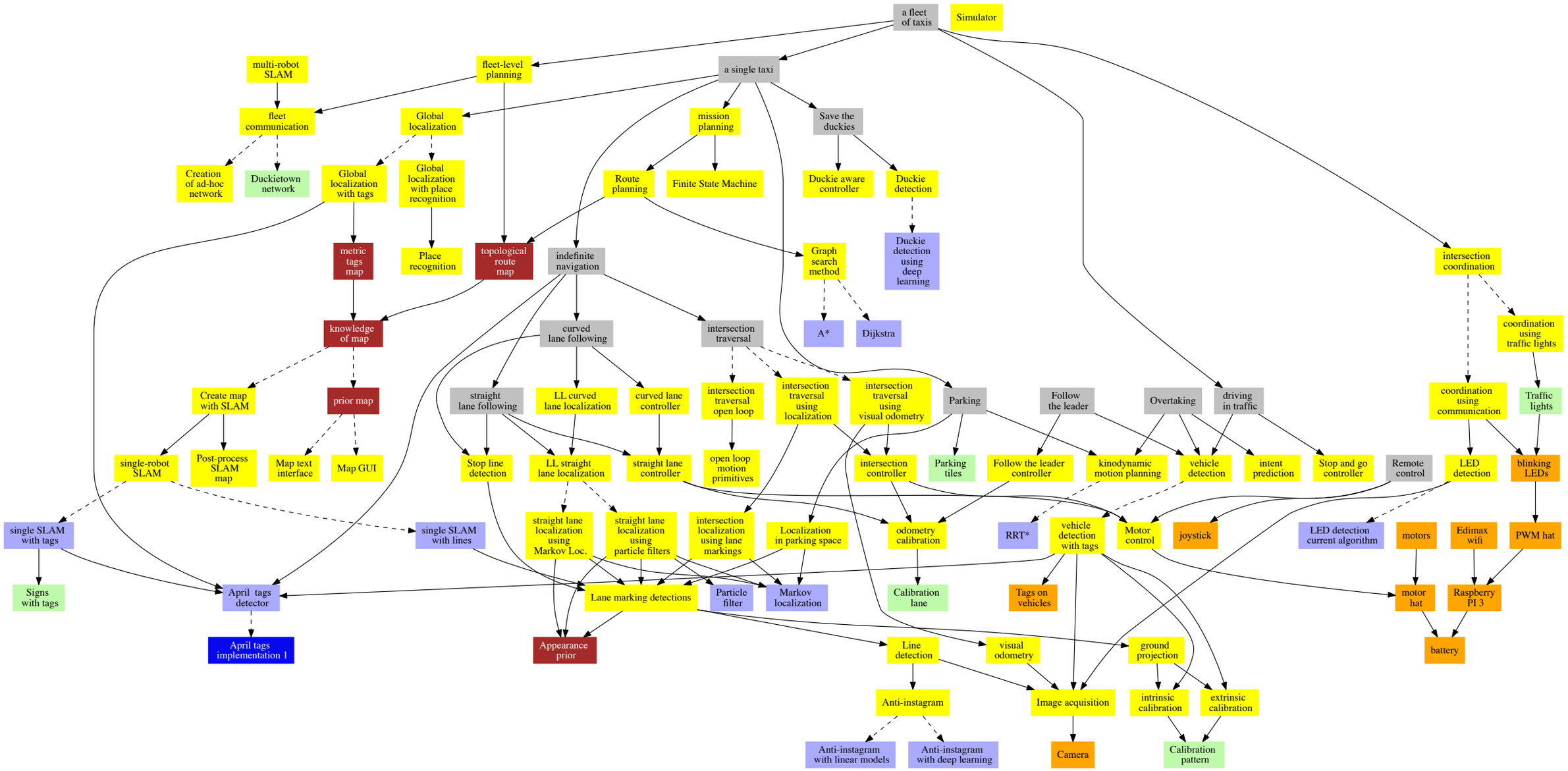
Functionality diagram



Functionality diagram legend



Functionality diagram



Odometry calibration

Functionality

What the module provides
(why is it there at all?)

- Knowledge of model
  - quantified as accuracy?

Resources/costs/dependencies

What the module requires
for it to work

- Time to perform calibration
- Skills to perform calibration
- Extra materials to perform calibration
- Space to perform calibration
- Computation

Camera

Functionality

What the module provides
(why is it there at all?)

- Allows to acquire image
  - field of view
  - spatial resolution [pixels]
  - temporal resolution [Hz]
  - sensitivity
  - acquisition modes
  - …

Resources/costs/dependencies

What the module requires
for it to work

- Hardware budget
- Power
- A way to attach it on the chassis
- …

Fleet communication using Wifi

Functionality

What the module provides
(why is it there at all?)

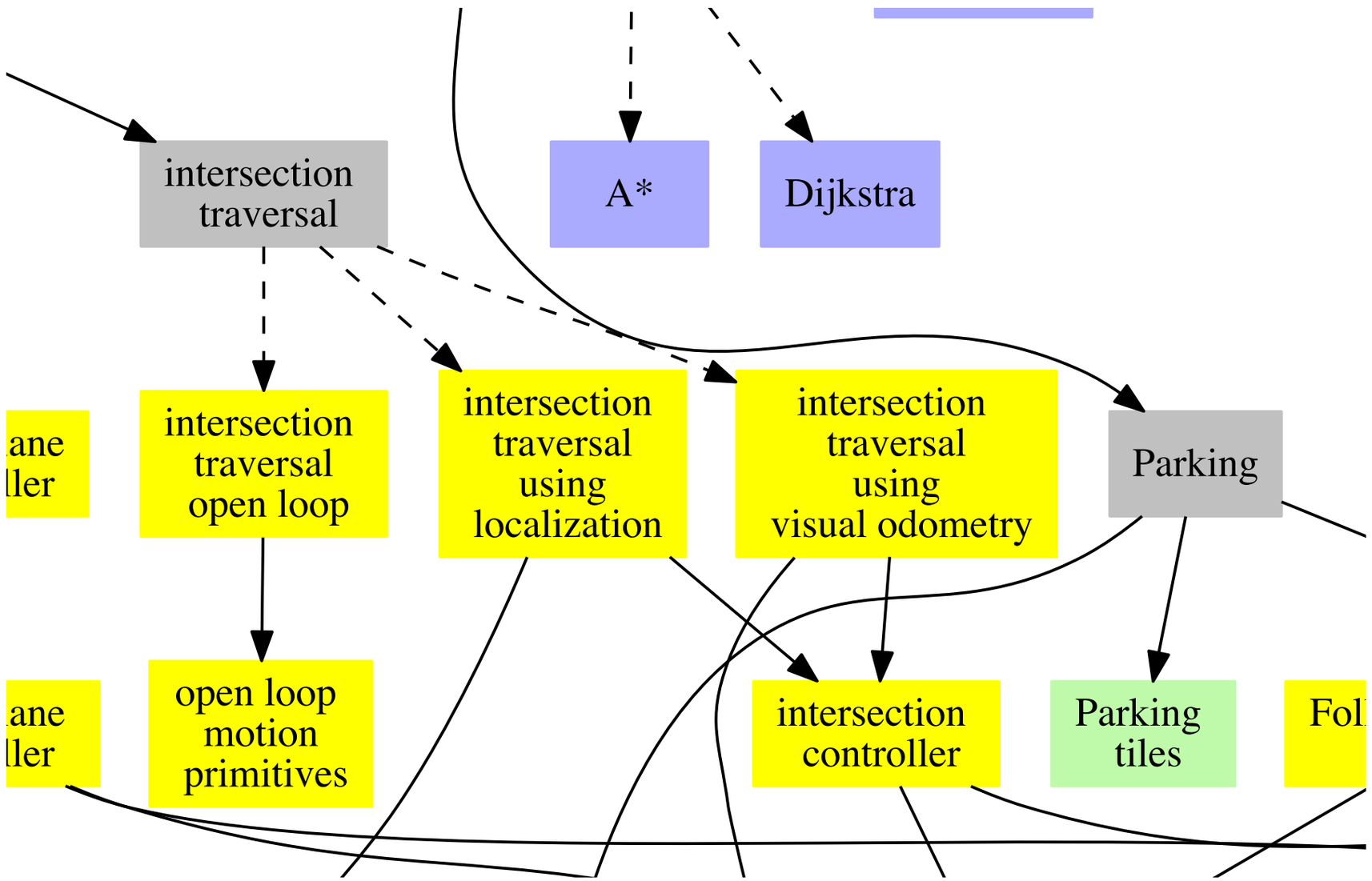
- Allows Duckiebots to communicate
  - how many Duckiebots?
  - messages per second
  - size of each message
  - reliability
  - distance
  - ...

Resources/costs/dependencies

What the module requires
for it to work

- Wifi card
- Spectrum available
- A way for the Duckiebots to join the same channel.
- ...

Intersection traversal



Intersection traversal

Functionality

What the module provides
(why is it there at all?)

- Allows Duckiebots to traverse an intersection
  - Size of intersection
  - Reliability (probability of success)
  - Speed

Resources/costs/dependencies

What the module requires
for it to work

Intersection traversal: open loop

Functionality

What the module provides
(why is it there at all?)

- Allows Duckiebots to traverse an intersection
  - Size of intersection
  - Reliability (probability of success)
  - Speed

Resources/costs/dependencies

What the module requires
for it to work

- A library of motion primitives (go left, go right, go straight).
- Accurate knowledge of where the robot started from at the beginning of the maneuver
- Accurate knowledge of robot model

Intersection traversal: closed loop, using April tags

Functionality

What the module provides
(why is it there at all?)

- Allows Duckiebots to traverse an intersection
  - Size of intersection
  - Reliability (probability of success)
  - Speed

Resources/costs/dependencies

What the module requires
for it to work

- April tags detector
- April tags placed at the intersection
  - (how many? how big? …)
- Image acquisition
  - resolution, frequency, …

Intersection traversal: closed loop, visual odometry

Functionality

What the module provides
(why is it there at all?)

- Allows Duckiebots to traverse an intersection
  - Size of intersection
  - Reliability (probability of success)
  - Speed

Resources/costs/dependencies

What the module requires
for it to work

- Visual odometry method
- Image acquisition
  - resolution, frequency, …
- Assumptions on image appearance?