

Towards Resilient Autonomous Navigation of Drones

Angel Santamaria-Navarro*, Rohan Thakker*, David D. Fan,
Benjamin Morrell, and Ali-akbar Agha-mohammadi



Angel Santamaria-Navarro
347T Robotic Aerial Mobility
www.angelsantamaria.eu

Jet Propulsion Laboratory
California Institute of Technology

Objective

Autonomous navigation of drones in perception-challenging environments

What if...

A sensor malfunctions

The estimation becomes inconsistent

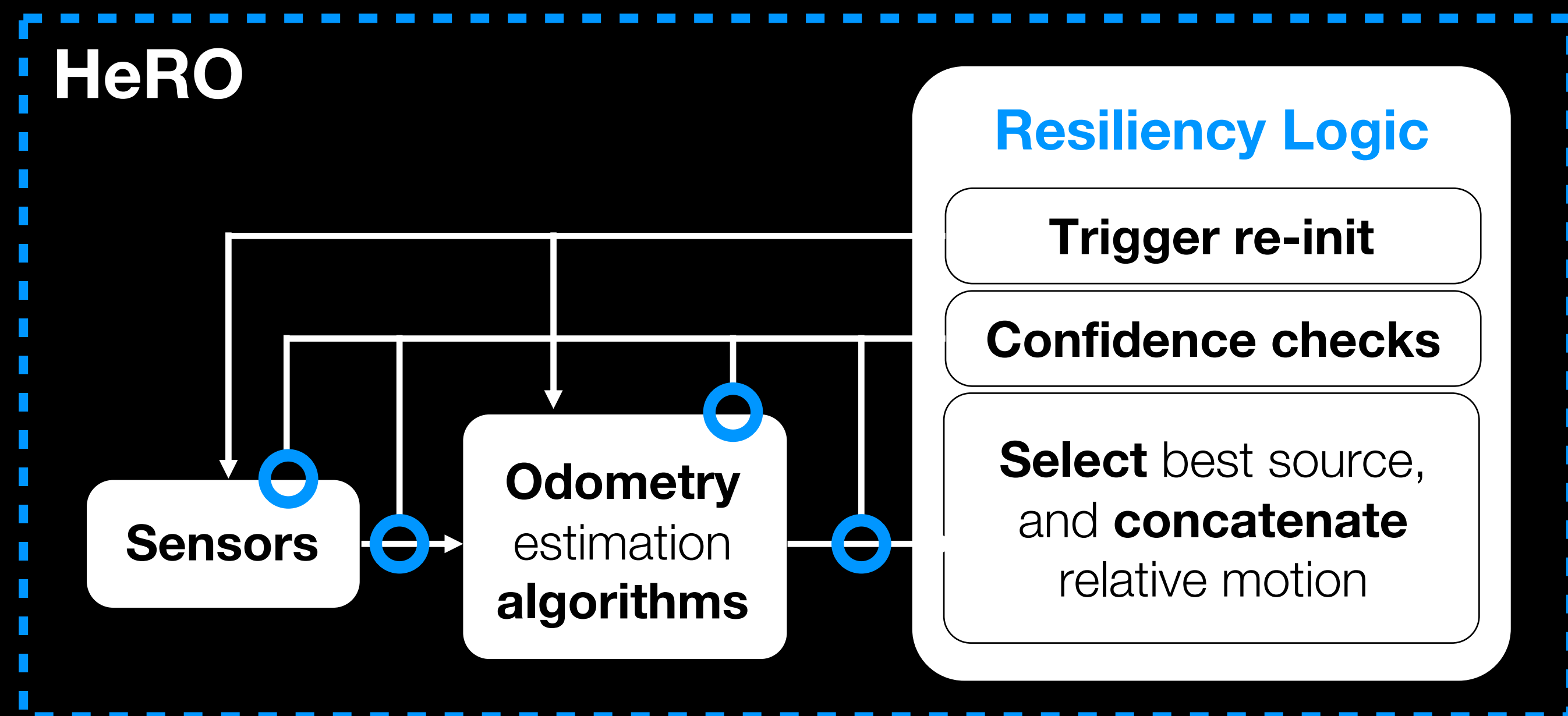
Our assumptions do not hold due to scenario characteristics

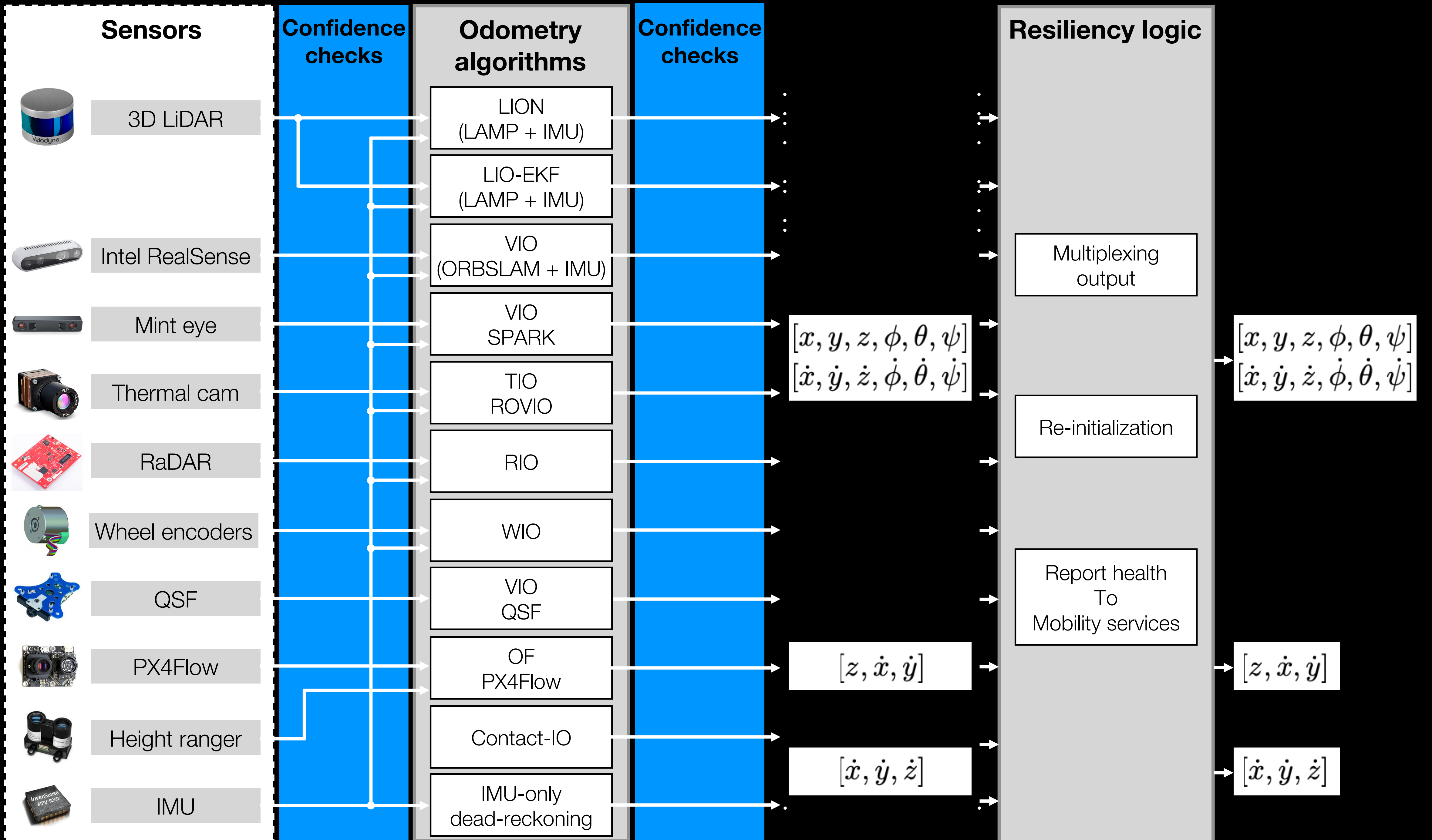
We need robustness!

HeRO: Heterogenous Redundant Odometry estimation

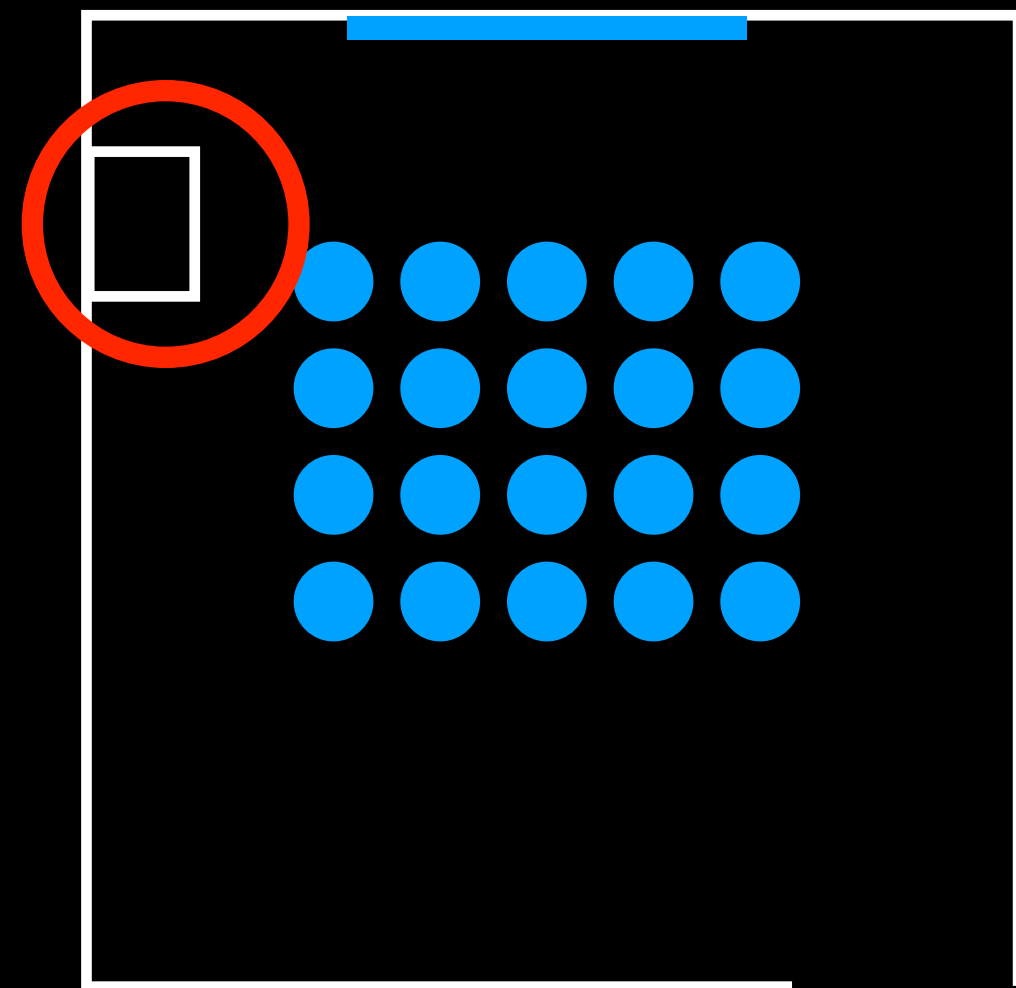
Stack of odometry algorithms using **different sensor modalities** and supervised by a **resiliency logic**

- **Supervise “health”** of measurements and estimations.
- Select the **best estimate** (respecting a user-defined policy) and concatenate producing a **continuous output**.
- **Trigger re-initialization** if required.
- **Report health to mobility services** to act accordingly





Thanks for attending! I'll be in booth **num 1**



Angel Santamaria-Navarro
347T Robotic Aerial Mobility
www.angelsantamaria.eu

Jet Propulsion Laboratory
California Institute of Technology