

# V-REP Integrated Paparazzi Simulation

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# Overview

Introduction and Motivation

Architecture

Problems

Evaluation

## Project goals

- ▶ Creation of a simulation environment for the SwarmLab copters
- ▶ Use existing Paparazzi infrastructure
- ▶ Should be easy to use and extend

## Why do we even need a Simulation?

- ▶ Simulation allows experiments without risking potentially expensive hardware
- ▶ Exploration of a wide range of potential environments and conditions
- ▶ Scalability

## Project idea

- ▶ Idea: V-REP plugin providing communication between Paparazzi and V-REP
- ▶ V-REP provides the copter state, Paparazzi the corresponding commands
- ▶ Main advantage: same code and infrastructure usable on simulated and real copters

## Work done in last project

- ▶ Created basic framework
- ▶ Communication, control loop, coordinate transformations

## Goals of current project

- ▶ Implement sensors with error models, customizable from the GUI
- ▶ Add swarm capability and synchronization

## Base Architecture

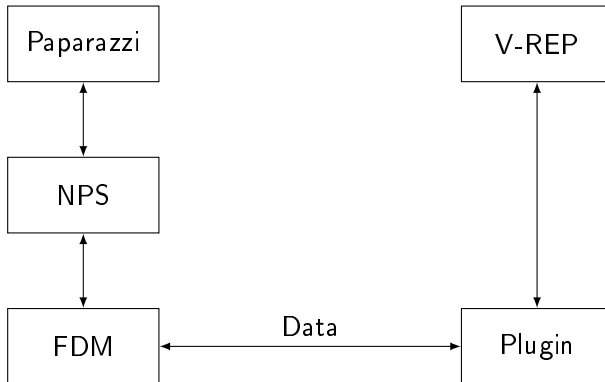
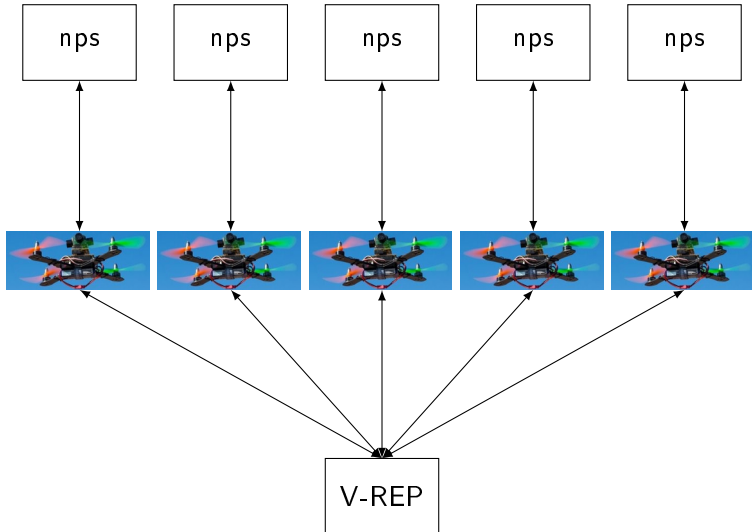


Figure 1: Basic simulation architecture



## Connection Architecture



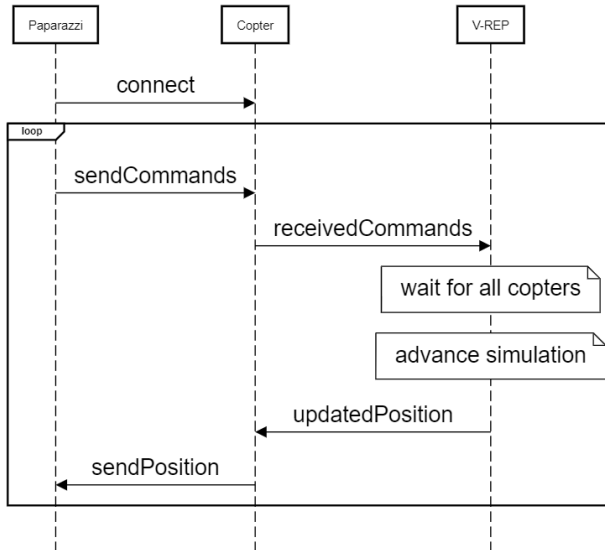


Figure 2: Basic sync loop overview

## Exchanged data: V-REP

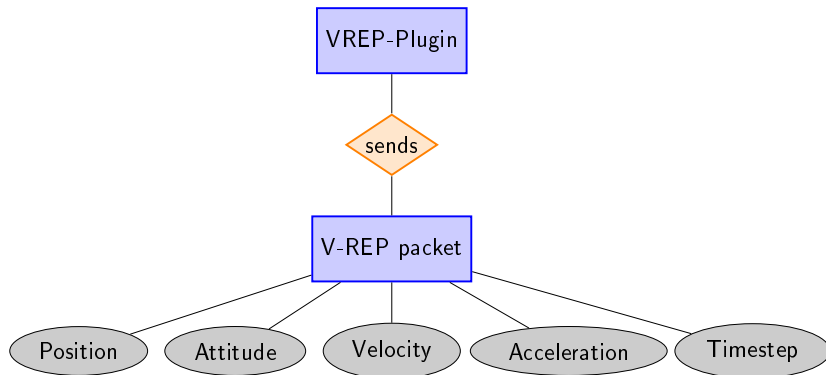


Figure 3: Data sent by V-REP to Paparazzi

## Exchanged data: Paparazzi

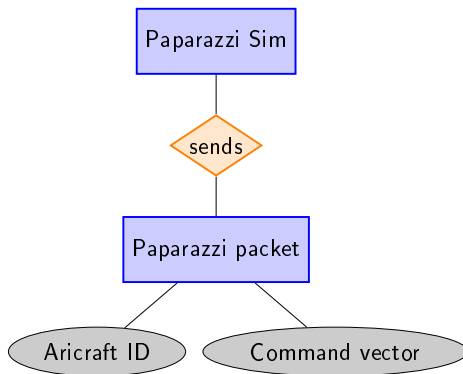


Figure 4: Data sent by Paparazzi to V-REP

## Problems

- ▶ Connection crashing with more than one client
- ▶ Syncing of multiple threads for a single control thread difficult

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