# **Compositionality and Reconfiguration** for Distributed Hybrid Systems

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#### Abstract

This project proposes a compositional reasoning approach to the verification and analysis of distributed hybrid systems. The major difficulties in advanced cyber-physical systems for traffic applications are caused by scalability issues, nonlinearities in the system dynamics, and lack of modeling features. Verifying the system with hierarchical reasoning principles enables us to tackle systems which would generally be too big to handle. With these techniques, this project implements an initial formal verification tool for distributed hybrid systems.

## **Hierarchical Modularity**



### Nonlinear Dynamics



#### **Distributed Aircraft Control**



#### Calculus

## **Compositional Distributed**



# KeYmaeraD: An Automated Theorem Prover for Distributed Hybrid Systems

