



# Thesis Opportunities at Pitch



## Background - High Level Architecture (HLA)

High Level Architecture (HLA) is a standard for distributed simulation. It is used when building a simulation for a larger exercise by combining (federating) several simulations together. The standard was developed in the 90s under the leadership of the US Department of Defense and was later transitioned to become an open international IEEE standard. Today HLA is used in a number of domains including defense, security, and civilian applications.

### Serious Gaming with Unreal Engine

Pitch has developed a door gunner simulator for Helikopter 16 (Black Hawk) which uses a moving platform and a VR-headset.

The object in this thesis is to create a game in Unreal Engine that can communicate/play with the door gunner simulator, for example a tank that plays the target for the door gunner. The information exchange should use HLA and Pitch Unreal Engine Connector.

The thesis also includes looking at how the 3D-terrain can be correlated in both simulators. The focus is not 3D-modelling, Pitch already has access to a number of 3D models, or if necessary they can be bought.

### Populating a distributed simulation with pattern-of-life models

When running a distributed simulation, it would be useful to have a realistic simulation of ships, aircrafts and traffic moving around, and display realistic behavior, in the simulated world. This thesis would look at how AI and Machine learning techniques could be used to create such models. This thesis would extend on a previous thesis done at Pitch, which investigated civilian ship movement. The models should use HLA to communicate with other simulators.

### Connecting embedded systems to a distributed simulation using Thin HLA.

Current software implementations of HLA requires a standard operating system, such as Windows or Linux, making it hard to connect an embedded system to a distributed simulation using HLA.

There is currently a proposal for the next version of the HLA standard called Thin HLA, which defines a protocol standard for communicating with the distributed simulation. This would remove the requirement to have a HLA implementation installation on the embedded system. In this thesis you would provide engineering support and validate the Thin HLA proposal.

### Other topics

If you are interested in Pitch, but didn't find the above ideas matching your profile, please let us know and we will try to find a that topic does. We have other ideas for a thesis such as a federated flight model, a path finding federate and more.

### Already have an idea for a thesis?

If you have an idea for a thesis we would be happy to discuss it with you. We offer opportunities both for bachelor's and master's thesis.