

Visitor Research Report

Visitor Name: Mr. Christopher Osborn
University of Illinois at Urbana Champaign

Area of Research: Formal Methods

Period of Visit: May 12, 2008 through August 1, 2008

Goal:

1. Implement RR2D + strategic algorithm in C++
2. Model strategic algorithm in PVS

KB3D and KB2D are tactical conflict and resolution algorithms for airplanes. KB3D offers several choices of resolution in 3-space, from which the pilot is expected to pick one.

RR3D and RR2D are extensions that also provide a recovery vector that brings the plane back on its initial course.

These tactical algorithms are designed for short look-ahead times and assume constant velocity vectors for the planes.

We also considered a strategic algorithm, which takes into account flight plans (lists of waypoints) of the planes. We explored using tactical algorithms such as RR3D and RR2D as sub-routines to a strategic algorithm.

Strategy:

1. Concentrate on implementation of RR2D algorithm
2. Learn about PVS
3. Model strategic algorithm in PVS, attempt proofs

Accomplishments:

1. Implemented RR2D in Mathematica
2. Implemented RR2D in C++
3. Partially modeled strategic algorithm in PVS

Future Work:

1. Implement strategic algorithm in C++
2. Finish strategic algorithm specification in PVS, couple with specification of KB3D in PVS

Pending Publications:

None

Seminar Presented:

Date/Location: August 1, 2008 – NIA

Title: “A KB3D Approach to Strategic CD&R”