Final Report

The problem we investigated was how well airplane cabins can recycle air for use, more specifically the efficiency of the filters at removing airborne contagions and sicknesses. Also, we looked at the virulence of certain airborne diseases in this enclosed space.

We input data in terms of units of people and air particles for an average size of airplane cabin. There were "clean" air particles and "infected" air particles, both of which moved around the sealed cabin. Some air particles were removed regularly to be filtered according to the average contagion removal rate and were then reintroduced to the cabin. People were also entered in with an approximate movement rate and randomly generated resistance to infection. As they came into contact with air particles and became infected, they either became free of the infection, instantly or over a random period of time, or remained infected for the term of the simulation. Infected units produced infected air at regular intervals. If a specific particle infected a person, the infected person's output particles were given a slightly higher level of virulence (infection success rate). Likewise, a person who resisted infection would be allotted a higher resistance level. This was to mimic a real scenario in a shorter amount of time.

We learned how to set up and run a basic program that maps out simple infection and new particle introduction. We have very little actual data based on an airplane model, but we have a simple model and airplane specs and information that can be put together to get results.

Due to lack of group time together, we have very little exact data that can be used to draw any set results, but we have familiarized ourselves with the program and made a usable base model. This was the first year that our school has done this program, and we have very little exact data to offer any information that conclusions can be drawn from.

We produced a Starlogo model of the setup of our project, which is attached to this report.

Our biggest achievement this year has been to understand the program and set up a model. We have had very little actual computer training, but we were able to mess around and figure out how the basics of the program work. We feel that now we are much more comfortable, and prepared, to work with this software. We are by no means complete experts, but we have a much larger understanding of computing and obtaining computational data.

We would like to thank Ms. Yolanda Koontz, Ms. LeAnne Salazar, the numerous Supercomputing mentors, and the students and staff at NM Tech for their hospitality.