Chemical Warfare

New Mexico
Supercomputing
Challenge
Final Report
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Team # 36
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Executive Summary

We are creating a model that can show how a chemical can spread

and what the behavior of the chemical will be like, how would it spread? in how much time? and what will effect the way it is spreading. These are some of the questions that our model is answering, this model shows the effect of sarin in a city about the same size as albuquerque, we are now only concentrating on how this chemical will spread in just a certain area of albuquerque, as it would give us a faster work pace. Sarin is appropriate is this type of situation since it is a deadly chemical agent, this will allow for a more realistic model as it is a chemical that is preffered in a combat situation.

Introduction

Chemical warfare is a deadly way of fighting wars, a model showing the way that a chemical agent is spread, the rate at which is desolves, how it can be effected by the inviroment, and how that chemical agent will effect a person or a populated city. The chemical of choice is sarin, a deadly chemical that can kill big sized groups in just a matter of seconds with a good concentrated dose, a chemical that has been used in wars and has left a great number of infected or dead, even when the chemical is being spread and the concentration is being reduced, it is still a chemical that should be feared as it's side effects are great.

Description

The model involves user input, where the user will be able to choose wind speed, population size, and how much sarin gas will be spread, the model involves an area with buildings that will effect how the chemical spreads and the damage will vary according to how exposed someone is to the chemical, the chemical will be spreading from a position that can be chosen, it can be either placed in a building or it can be set out in the open where wind will decide where the chemical shall travel.

Results

The equations that will really define our model are being worked out, these equations will be put on the model in order to make all of the user input options possible, thanks to google earth we are able to make a realistic model that will be a replica of albuquerque.

Conclusion

This is a complicated project and we have everyone working on a diffrent part of the project, the work has been destributed, every person on the team has a goal to achieve. What we originally wanted to create was a model just showing sarin gas spreading and its effects, the more we got into this project, the more we wanted to add, soon we found that we where trying to add too much detail into the model.

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Appendix A

```
#include <iostream>
#include <fstream>
#include "math.h"
using namespace std;


void f(float const * const x, float t, int
const n, float * g)
{
    for(int i=0; i<n; i++)
    {
        g[i] = 1.0 / t * exp(-x[i]*x[i]/(t*t));
    }
}

void output(ofstream & outfile, float *
const g , float const t, int const n)
{
```

```
    for(int i = 0; i<n; i++)
    {
        outfile << g[i] << t << endl;
    }
}


int main()
{
    ofstream myoutputfile;
    int n = 5;
    float x[n];
    float g[n];
    float t = .25;
    for(int h=0; h < 5; h + 1)
    {
        cout<<"In the loop"<<endl;
        float t = t + .25;
    }
    x[0] = 14.0;
    x[1] = 0.0;
    x[2] = 52.1;
    f(x , t , n , g);
```

```
    cout<< "Hello World!"<<endl;
     for(int i=0; i < n; i++)
     {
            cout << g[i] << endl;
     }

     myoutputfile.open("function.txt");
     myoutputfile << "Factorials!" <<endl;
     output(myoutputfile,g,t,n);
     system("PAUSE");
}
```