

# The Spread of Radiation



AiS Challenge  
Final Report  
April 6, 2005

Bosque School  
Team #011

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## Executive Summary

This was our first year in the AiS Challenge, thus we kind of started off slowly, and it took some time to get used to using Starlogo. However now at the end of the year we're moving faster than ever. In our final report we have summed up this year into the information below.

Our project is the spread of radiation from a dirty bomb. A very hard project that even our sponsoring teacher suggested that we work on it for a year and then submit it next year. Instead we decided to get it done with and do it all this year. In our project we decided to model the effects of the spread of radiation from a dirty bomb. The bomb will be set off at Queen's Plaza, Roosevelt Island, New York City. We choose New York City, because of the universal idea of a city, and its record of previous terrorist attacks.

In this report, almost everything we have done through out the year is in here. From our code to the background information which sets the scenario to our project. However we are not completely finished and will be finished before April 26<sup>th</sup>, the final AIS event in 2005.

## Introduction

### *The Project*

#### **Definition of Terms**

We will be including the spread of radiation that is transferred between people, and the wind and how it spreads the radiation from a dirty bomb with a radioactive cobalt rod. Cobalt is used today to cure cancer by blasting the cancer cells with so much radiation that the cancer cells will die, the same curing radiation can also spread in the air, or from person to person and if there is too much radiation then the infected person will die from the decomposing of the human's body cells. We will be modeling the spread of this fatal type of radiation using Starlogo, which will be explained later on in this report.

### ***Background Information***

Dirty bombs have been threats since the aftermath of September 11<sup>th</sup>, as has everything else. A Dirty Bomb is a device containing radiation that can be easily spread such as inhaling, or skin contact. After detonation the radiation would then infect the body and if not treated could quickly kill. Which is what makes the bomb so dangerous. By doing our project we may help the government and the people by raising their awareness of the situation as to what can happen if such an event is to occur.

## Project Description

## Results

Because our Model is not done yet we have no results to report on. The expected results that we have are that about 60% - 70% of the people will die from infection.

### *The Code*

The start of the project is signified by the command “to start” this in turn gives the computer the setup and run protocol. When the computer gets the “to start” command it reads the code and the sets up the turtles. With in the code there are different commands for the turtles and most of those at least in our model are commands like that tell the turtles what to do in a situation like “

```
to infect2
```

```
if color = blue [wait 10 die]
```

```
if color = blue [wiggle]
```

end” these commands make the turtles turn blue after they hit the purple witch simulates the radiation. Before they die they wiggle for as long as they can witch is about after they are infected they wait ten scents then they die.

```
wiggle
```

```
if pc = blue [rt 180]
```

```
if pc = red [die]
```

```
if pc = violet [infect1]
```

```
if pc = 107 [jump 6]
```

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end

These commands tell the turtles what to do if they hit a certain color like if they red the turtle dies and that is the end of the turtle. But if the turtle hits blue it gets redirected and starts going in a different direction. The purple color in our projects the dirty bomb and there for when the turtles hit the purple they get infected.

```
to wiggle
```

```
rt random 100
```

```
fd 1
```

```
lt random 100
```

```
end
```

These commands tell the turtle where to go and what to do if they get stuck. In one color, like to start out the computer “crt” 100 turtles then they move in a random path for 100 steps or seconds. But the turtles never go in one direction for more then step that is what “fd 1” means.

```
to infect1
```

```
setc blue
```

```
end
```

This is just a starter for the program to start to kill the turtles. And the all-important command “end” is what makes the program stop and then they.

## Conclusions

So far we have not come up with any conclusions, because our project is not completely finished. However we can guarantee that our project will be completely finished by April 26<sup>th</sup>.

## **Recommendations**

Seeing that our project has to do with a dirty bomb and what could and would happen if the dirty bomb were dropped on a city anywhere. We think that the USA and the F.B.I. Probably have models like these that show what would happen if the bomb were set off but what we think that they do not have is a plan. To respond in a enough time to clean up the disaster so that there would be very little casualties. There for we recommend that every country in the world have a plan to ad those that need help if there is ever a disaster like this one. We also recommend that the president of the USA MR.G mush destroy the weapons that are in the USA and keep them. Or he could closely monitor these weapons when they come in and out the USA and other countries. These weapons are stolen all the time by terrorist groups all over the world and then used for the evil things that people use weapons that are that powerful for.

## **Most Significant Achievement**

We've had many significant achievements through out the year, one of them is the our model. We've worked on this all year, and although it is not done, it is rather impressive. The finishing of all of our reports. From the Intern at the beginning of the year, to this report it is a miracle that we have finished all of them on time. Out of those two we have mentioned, the model is more impressive. Which will be presented at Los Alamos, on April 26-27<sup>th</sup>.

## ***Acknowledgments***

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## Appendices:

### *Appendix A: Code*

Turtle Commands:

```
to start
  wiggle
  if pc = blue [rt 180]
  if pc = red [die]
  if pc = violet [infect1]
  if pc = 107 [jump 6]
end

to infect2
  if color = blue [wait 10 die]
  if color = blue [wiggle]
end

to wiggle
  rt random 100
  fd 1
  lt random 100
end

to infect1
  setc blue
end
```

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Observer Commands:

to setup

ct

crt 100

clearplots

end