Basic Airtanker Simulation Model

Simple Model 1:

Closely replicate what can be done with simple analytical and numerical queueing models

1. Fire arrival rate constant for a very long period of time (based on user input for the mean of an exponential distribution for time between fires)

2. Number of airtankers that are dispatched to a fire is a constant (so start off assuming one).

3. Service time (time from when an airtanker is dispatched to when it returns to the base) is exponentially distributed with a mean time found from a user entered number of fires per hour value

- No specific airport, or fire locations necessary

Keep track of the waiting time for every fire that is reported and the time it was requested at. Calculate the mean waiting time, standard deviation and the probability that a fire has to wait for an airtanker to be dispatched from this data. (Simple M/M/S queue model)

Graph this data over time (i.e. average from 0-100, 0-200, 0-300 until the end with all being in relation to the starting time) and notice the long time needed to reach a roughly constant average.

More Realistic Model 2:

Build on our more detailed understanding of the use of airtankers for initial attack (e.g. Clark thesis) to develop more realistic airtanker models

Version A:

Same as above model except the service time is changed to 3 Erlang distributions

Travel time Erlang distribution

On scene time Erlang distribution

Return time Erlang distribution

Similar plots to the first model

Version B:

-Use Clark travel time

-Distance to lake

-Number of drops per fire from Clark model

Even More Realistic Model 3 (TBD) – Incorporate FBP and real fire + base locations, etc.

Write a report on each model documenting the process it is taking and the python objects I have created and where they fit into the model. Need to explain how the whole model works and how I set up everything.