MECH 431
Assignment #3

1 [10 marks] Through a series of strange and unlikely events, you find yourself in the lucrative business of cocaine smuggling.   A new lab in your organization has recently started production, and you are responsible for distributing it.

The lab will produce 5000 kg of cocaine per year, at a cost of $2000 per kg. Once it is produced, you have two methods of shipping the cocaine.

Firstly, you can ship it to Miami by smuggling it in shipping containers through the port. You can smuggle 1000 kg of cocaine in a single shipment in this manner. Your cost of shipping is $500 per kg. This is a relatively risky method and somewhat new to you, so you estimate each shipment has a uniform chance between a 5% and 15% chance of being caught and confiscated.

Alternatively, you can ship the cocaine via trucks. This takes longer and only 500 kg can be shipped at a time, so the cost is $650 per kg, however is better established with a more known risk. There are some losses, but 95% of the shipments get through to your dealers.

If a shipment is not confiscated, it will be sold to your network of dealers in the area. Sales prices have typically had an average of $14,000 per kg (price determined and paid in full upon delivery of the shipment), with a standard deviation of $3,000 per kg.

Use a simulation to recommend a shipping method, and estimate expected profits for running this operation for one year. Also evaluate the risks by looking at other characteristics, such as the likelihood of losing money, maximum and minimum expected profits, and other such factors.

MECH 431
Assignment #3

2 [10 marks]: You are considering purchasing a small aircraft as an alternate means of smuggling the cocaine. The aircraft would cost $2,000,000 and should last for five years, with no resale value (you can guess why).

There are two potential scenarios for cocaine demand – low demand, which would result in a net benefit of $2,000,000 per year for the next five years. Or high demand, which would result in a net benefit of $3,000,000 per year for the next five years. You estimate the likelihood is about 60% for low demand and 40% for high.

There is a chance the aircraft will be caught and confiscated by the border authorities. You estimate there is a 20% chance of this happening, in which case you would only get one year of benefits from the aircraft. You estimate the odds of the aircraft not being confiscated at 80%, for which you would get a full five years of benefits.

What is your expected IRR for purchasing this aircraft, and using the rule of thumb about acceptable risk levels, would you recommend moving ahead with it?

Bonus Question [1 mark]: What was the name of the cartel run by drug lord Pablo Escobar?