# Executive Summary: Ontario Gateway Insurance Analysis

## Problem Context

Ontario Gateway Corporation is currently assessing insurance policies to cover potential aircraft losses over a five-year period, beginning March 1, 1997. This decision is critical, as the company operates with high leverage and faces substantial risk from aircraft crashes, currency fluctuations, and political factors associated with its transatlantic operations. Selecting the appropriate insurance policy is essential to safeguard the company from significant financial exposure due to aircraft-related incidents, while also optimizing costs to maintain healthy cash flow. Ensuring sufficient insurance coverage while minimizing costs is vital to maintaining Ontario Gateway's stability and long-term growth prospects.

Ontario Gateway has sizeable fleet with a variety of aircrafts, that have different replacement costs, and fly multiple times a day, for 342 days, as seen below:

| Model | Fleet Size | Frequency per day | Replacement Costs (USD) |
|---|---|---|---|
| Boeing 757-200 | 47 | 6 | 56.4 M |
| Airbus A340-200 | 15 | 2.25 | 78.9 M |
| Airbus A340-300 | 24 | 2 | 88.5 M |

Additionally, the firm also needs to be able to to cover any incidental damage costs that could vary between $1M to $5M.

## Key Decision Making Criteria

Ontario Gateway’s insurance needs center around mitigating the risk of catastrophic losses that could threaten the company’s financial stability. With a modern fleet consisting of Boeing 757-200, Airbus a340-200, and Airbus a340-300 crafts, and operations within and across North America and Europe, the potential impact of an aircraft crash and the costs associated with the insurance plan could be financially devastating. The key criteria used to evaluate the right insurance policy are:

1. The company’s goal is to select an insurance policy that provides sufficient coverage to prevent losses exceeding $37 million in the first year .Ontario Gateway operates with significant debt, and as a result, its cash flow is already strained. If the company were to incur losses exceeding the $37 million safeguard in the first year, it could potentially push the company into bankruptcy.
2. The total costs associated with the insurance plan over the five years needs to be optimal, while ensuring the lowest risk of violating criteria 1.

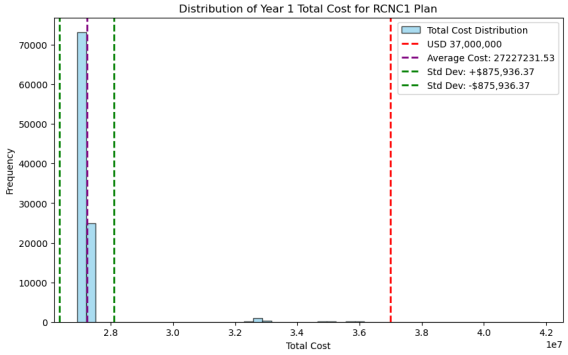
**Analysis on the four policies**

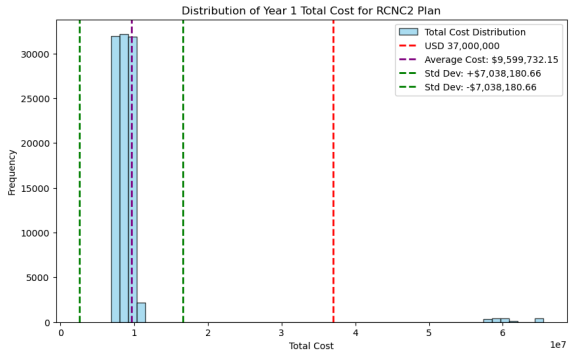
To evaluate the available options, a simulation of 100,000 data points, as per the industry average of 1 in 5 million chances of a craft crash, was conducted to assess the financial impact of **potential aircraft crashes and incidental damages**, under four proposed insurance plans. The simulation modeled expected crash occurrences, financial loss per crash, and each plan's cost over the five-year period, based on the premiums, costs, deductibles, coverage policies, and rebates offered by each plan. Key findings include:

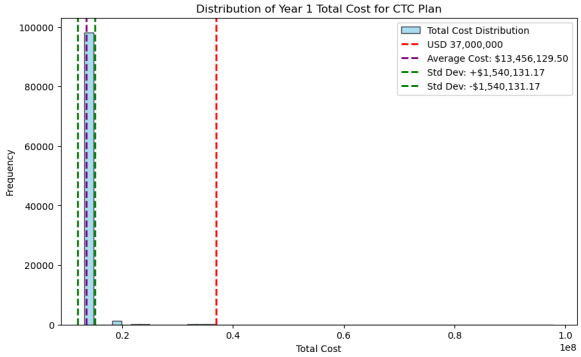
1. **RCNC1 (Royal Canadian National Corporation - Plan 1)**: This plan covers complete accidental replacement costs with an annual fee of 0.45% of the fleet's value and a 10% deductible on each aircraft. A rebate clause applies, where RCNC will refund 20% of any cumulative profits after claims at the end of the five-year term.
2. **RCNC2 (Royal Canadian National Corporation - Plan 2)**: This plan charges a fixed premium of 0.10% of the fleet's total insured value plus a variable premium based on actual losses each year, at 90% of total losses during the year or 1% of the insured value of the fleet, whichever is less.
3. **CTC (Canadian Trust Company)**: CTC's proposal involves an annual premium of $13 million, covering 90% of losses up to a maximum of $80 million for any single incident or cumulative losses in a given year.
4. **HIC (Hawthorne Insurance Corporation)**: Designed specifically for Ontario Gateway, this plan charges an annual premium of 0.165% of the fleet's insured value, paying for losses above $24 million. An additional rebate clause refunds 3.5% of the cumulative profits at the end of the 5 year period.

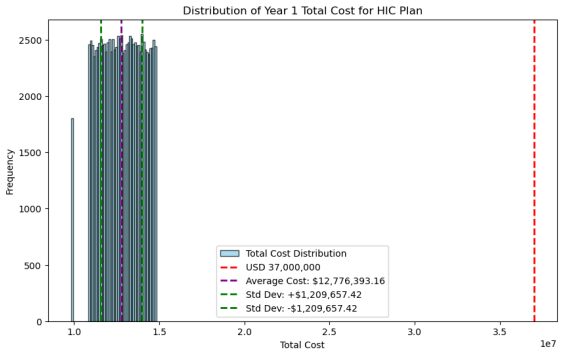
**The results obtained from the simulation show us that:**

1. The average total costs in the first year, for none of the plans exceed $37 million, as confirmed by the averages, standard deviations, and hypothesis testing at a 95% confidence level for each plan.






2. There is the risk (probability) of the total cost exceeding the threshold value, in most plans, and is most pronounced in RCNC 2 results and not possible in HIC results, as tabulated in the results below.

| **Plan** | **Risk** - Proportion of values that exceed the total cost threshold of $37 million in Y1 (%) |
|---|---|
| RCNC 1 | 0.028 % |
| RCNC 2 | **2.430 %** |
| CTC | 0.028 % |
| HIC | **0.000 %** |

3. The most optimal average total cost over the 5 years is presented by the RCNC 2 plan

| **Plan** | **Total Average Cost over 5 years (USD)** |
|---|---|
| RCNC 1 | 22.73 million |
| RCNC 2 | **9.95 million** |
| CTC | 13.51 million |
| HIC | **12.47 million** |

**Sensitivity to a lower accident probability**

Additionally, the simulation was also conducted at a 25% lower accident probability, since Ontario Gateway's fleet is newer and consists of crafts from two world class manufacturers. This simulation and similar evaluation metrics and hypothesis testing show similar trends in results. The average cost over year 1, risk of exceeding the $37 million threshold in year 1, and total average costs across 5 years for each plan in this scenario are tabulated below:

| **Plan** | **Average Cost over year 1 (USD)** | **Standard deviation is year 1 cost (USD)** | **Risk** - Proportion of values that exceed the total cost threshold of $37 million in Y1 (%) | **Total Average Cost over 5 years (USD)** |
|---|---|---|---|---|
| RCNC1 | 27.23 million | 875,936 | 0.016% | 22.62 million |
| RCNC2 | 9.60 million | 7,038,181 | **1.803%** | **9.63 million** |
| CTC | 13.46 million | 1,540,131 | 0.016% | 13.46 million |
| HIC | 12.78 million | 1,209,657 | **0.000%** | **12.47 million** |

It is to be noted that the total cost of the plans has generally decreased, with the RCNC2 plan showing the most significant cost reduction due to its sensitivity to accident probability. In contrast, the HIC plan, which includes a high deductible and a rebate clause, behaves differently. The high deductible reduces payout frequency, while the rebate clause provides a refund based on the difference between the annual fee and payouts. As accident probability decreases, crash costs also drop, but the high deductible limits the impact on payouts.

**Final Recommendation: HIC Plan**

Based on the evaluation of the plans, the Royal Canadian National Corporation Plan 2 (RCNC2) has the lowest average total cost over the 5 years but also has the highest probability/risk of the total cost exceeding $37 million (2.4%) which can lead to a potential bankruptcy in the first year. On the other hand, the Hawthorne Insurance Corporation Plan (HIC) has 0 probability of exceeding $37 million in the first year and has the second lowest total cost over the 5 years (11% greater/ ~ 10 M greater than RCNC 2, which is only slightly greater than the standard deviation of RCNC 2). Furthermore, these trends stand true at even a lower probability of aircraft accidents and crashes. Therefore, in order to mitigate the risk of bankruptcy in the first year, we recommend the HIC plan.