ONTARIO GATEWAY

Mary Litton, Chief Operating Officer of Ontario Gateway, re-read the memo she had just dictated and sighed. She did not envy her Operations staff the task she had just assigned to them. Making sense of all the available data and quotes to choose the best aircraft insurance policy for the Ontario Gateway fleet of aircraft would not be an easy job. Furthermore, if the wrong policy was chosen, the company would have to live with the consequences until the policy expired in five years time. She hoped her staff would be able to make good sense of all the data in her memo and would turn the data into a sound (and defensible) insurance policy recommendation in time for the Board of Directors' meeting on December 11. At that time, she would have to put forward the recommended insurance policy to the rest of the Board, and be prepared to justify her choice with supporting data and analysis.

Background

Ontario Gateway Corporation was the brainchild of Ontario Airlines CEO, Robert McDermott. Mr. McDermott, a French-Canadian, had built Ontario Airlines from a small cargo-carrying enterprise serving Canada into a respectable but marginal pas-

senger carrier serving North American air transportation hubs. In the Spring of 1995, while attending a European Union Aviation Convention in Paris, France, he approached the Chairman of Air Prix Corporation (a French passenger carrier serving selective parts of Europe) about a possible merger. After several months of consultation, a memorandum of understanding was reached that led to the merger of both firms and the creation of a new world class airline, Ontario Gateway.

The Global Airline Industry

The airline industry in North America had become extremely competitive since deregulation over a decade ago. Furthermore, competition in the European airline industry had been heating up as well, mostly as a result of market initiatives within the European Union. State-owned airlines were being considered for privatization, while the market itself was being deregulated under "open skies" initiatives that allowed all European Union (EU) based airlines to fly without restriction within the EU. The EU retained restrictions on non-EU airline firms, as did the United States and Canada. Thus, EU based firms had a competitive advantage over non-EU firms within Europe, while North American firms likewise essentially competed only among themselves.

Ontario Airlines

Ontario Airlines drew little notice within North America until it began upgrading its fleet of largely older leased DC-8 and DC-9 aircraft in 1994. The first of 47 Boeing 757 aircraft was delivered in the fall of that year, and the firm held an option to buy 28 more aircraft at the same price and financing terms over the next three years. This allowed Ontario Airlines to modernize virtually overnight, giving the firm a homogenous fleet of the most advanced passenger aircraft in the world.

Mr. McDermott was determined to make his firm the most efficient airline in North America. The firm aggressively priced its way into the major North American hubs, and created a highly-trained pool of pilots and service personnel dedicated only to the operation of the 757 fleet. Ontario Airlines tended to routinely fill their flights, helping the firm to cover costs on even the most aggressively priced routes.

Air Prix

Formed in 1992 to coincide with the opening of markets in the European Community, Air Prix was a "Southwest Airlines style" upstart airline in France. Although its major competitor was state-owned Air France, it managed to eke out positive earnings on routes between Paris, Lille, Lyons, and Marseilles by efficiently operating only in these profitable routes. Preparing for aggressive operations throughout Europe in the coming years, Air Prix negotiated in 1993 with both Airbus and Boeing to obtain preferable arrangements to acquire new aircraft. A deal was finally reached for the EU to finance the purchase of 39 Airbus A340 aircraft. By Spring of 1995, Air Prix was flying its fleet of A340s within France and parts of Europe but was having difficulty competing with British Airways and other firms. Even though Air Prix enjoyed generous financing subsidies, it had trouble filling up the large A340s on a consistent basis.

The Merger Strategy

Air Prix and Ontario Airlines were very similar. Both firms were relatively small and had recently purchased new aircraft, and both firms were serving their respective continental markets. A merger would create a truly world class airline with the legal right to serve both the North American and EU markets. Furthermore, it could then

exercise the option to buy more of the Boeing 757s and use them on the European routes, while shifting the A340s (which have more seat capacity and can fly longer distances) into trans-Atlantic service. The objective was to exploit operational economies of scale on a global basis.

Managing Risk

Partially because of the peculiarities of the financing terms for its fleets of aircraft, the newly formed Ontario Gateway Corporation was highly leveraged, requiring much of its cash flow to service its substantial debt obligations. The situation was further complicated by pre-existing loan agreements that restricted the firm's freedom to issue any further debt for a minimum of five years. If, for any reason, the firm were to face a cash flow problem, creditors could easily bring the firm into bankruptcy for failing to meet current debt obligations. Mr. McDermott felt that his firm faced several major risks over and above the normal business risks in the air transportation industry. These risks were exchange rate risk, political risk, and accident risk.

Exchange rate risk was analyzed in detail during the merger negotiations. Both firms intended to avoid the exchange-rate-driven bankruptcy that brought down Sir Freddie Laker's Laker Airlines a decade earlier. Even after thorough analysis, it was found that Ontario Gateway's costs and revenues were fairly balanced in ECU (European Currency Unit) and US dollar terms. McDermott had directed the Treasurer to implement a fairly standard currency hedging strategy in the currency options markets to ensure that exchange rate risk was minimized.

Political risk essentially entailed the exposure to potential government interference in both the North American and EU market operations. The firm's lawyers believed that they had firm legal grounds to ward off protectionist regulatory attacks in either market. Nonetheless, Mr. McDermott took every opportunity to promote his airline in France and Europe as a Franco-French Canadian venture that supported Airbus and the concept of EU economic integration. Furthermore, he made sure that press coverage in the United States regularly reminded the public of the firm's close relationship with Boeing, and its furtherance of open skies under the NAFTA framework.

Accident risk was traditionally handled in both firms by insurance contracts that would separately cover legal liability for loss-of-life and the replacement cost of the aircraft. The firm was covered for loss-of-life liability claims by a standard policy that was competitively priced. Aircraft loss coverage was another matter. The Airbus A340s were covered under a policy issued to Air Prix by Lloyds of London. The Boeing 757s were covered by an initial purchase insurance policy issued through the U.S. Export-Import Bank by the Reinsurance Corporation of Northern California (RCNC). The loan agreement with the U.S. Export-Import Bank required that all of the aircraft must be insured at replacement cost. The expensive Lloyds of London policy on the A340s was scheduled to terminate on March 1, 1997 and would not be renewed.

Thus on December 1, 1996, Mr. McDermott directed his Chief Operating Officer, Mary Litton, to obtain alternative insurance policy bids (see Enclosure 1) and make a recommendation regarding aircraft loss insurance coverage after March 1, 1997. Although Mr. McDermott was reasonably happy with the RCNC policy, he wanted to investigate the cost effectiveness of alternative insurance plans before he decided what to do after March 1, 1997. His specific guidance was as follows:

> I want to keep the 757s completely covered to keep the Export-Import Bank happy; furthermore, I want the A340s insured on a cost-effective basis—no more Lloyds of London over-priced policies! But don't forget—we have got

to maintain cash flow at its current level. This means we must be thoroughly covered for any loss of aircraft; if we lose a plane, we will need the cash to replace it quickly—otherwise we will be driven straight into bankruptcy court.

Mary returned to her office to contemplate her boss's guidance. She reached into the file containing the recently obtained aircraft insurance proposals from the RCNC, the Canadian Trust Company (CTC), and Hawthorne Insurance Corporation (HIC). Although the mechanics of the policies were very easy to understand, it was not easy to translate the numbers into a workable sense of the risk coverage that each proposal offered. She was determined to create an accurate picture of the costs and benefits of each of the policies in order to make an informed recommendation to the CEO.

Enclosure 1: Insurance Proposal Breakdown for Ontario Gateway

General Information:

Government statistics and industry publications indicate that the probability of aircraft loss is relatively straightforward to estimate, as follows. Aircraft are at the greatest risk of crash during take-offs and landings (and not during flight in mid-air), and so the likelihood of a crash of an aircraft is proportional to the number take-offs and landings of the aircraft. This likelihood is usually expressed as the accident rate per given number of flights of the aircraft. The OECD-based airline industry experiences a very low and virtually constant accident rate per flight. Current data shows an industry-wide accident rate of about one accident per five million flights. Incidental aircraft damages (minor takeoff/landing damage, bird strikes, etc.) tend to be firm specific.

Ontario's fleet characteristics are outlined in Table 5.19. A baseline assumption of about 342 flying days per plane per year is an appropriate operational benchmark. The Executive Vice President for Maintenance and Services estimates an annual cost of incidental aircraft damages varying between $1 million to $5 million per year.

Insurance Plans:

I. RCNC offers two plans:

   A. RCNC1: This plan covers complete accident replacement cost of the aircraft fleet for an annual fee of 0.45% of fleet value and carries a 10% deductible on all aircraft losses. However, there is a rebate clause, wherein RCNC will rebate to Ontario Gateway 20% of any cumulative profits (premiums minus claims) at the end of the five year term of the plan.

   B. RCNC2: This plan calls for an annual fixed premium of 0.10% of the insured value of the fleet, plus an annual variable premium paid at the end of the year consisting of the lesser of:

      (i) 90% of all losses during the year, and

      (ii) 1.00% of the insured value of the fleet.

II. CTC: CTC has offered the following insurance plan. Ontario Gateway would pay $13 million annually. CTC would then cover 90% of losses up to $80 million of annual aircraft losses. Losses in excess of $80 million would not be covered.

III. HIC: HIC developed this policy specifically for Ontario Gateway. For a premium of 0.165% of fleet value, this policy will pay for all fleet losses above $24 million. This plan also has a rebate clause: HIC would rebate 3.5% of any cumulative profits to be paid at the end of the five year term of the plan.

Enclosure 2: Memo To Operations Staff from Mary Litton

TO: Operations Staff
FROM: Mary Litton
DATE: December 4, 1996
SUBJECT: Insurance Proposal Analysis

This firm must choose an insurance policy to cover our fleet from aircraft crash losses for the five-year period beginning March 1, 1997. We have four viable policies to choose from at this time. You are to conduct a thorough analysis of the cost and benefits of each proposal, and recommend one of the policies to me by December 11, 1996.

As you know, this firm is currently trying to grow global operations under a highly leveraged capital structure. We need to maintain high revenue levels in order to continue meeting existing debt obligations. Hence, we cannot afford to take chances with respect to unanticipated negative cash flow. The insurance policy we choose must protect us from unanticipated losses of aircraft, especially during the next year. Specifically, we must be insured so we do not incur a liability for more than $41 million in aircraft crash losses and insurance costs combined in the next year (March 1, 1997 to February 28, 1998). As this is the absolute maximum loss we can incur, it would be wise to leave ourselves a margin of safety of about 10% which means we should aim to minimize the chance of losses exceeding $37 million. Contingent on this, our other major goal is to obtain this insurance coverage at lowest cost over the entire five-year period.

I look forward to your report.

Mary Litton
Chief Operating Officer

TABLE 5.19
Ontario Gateway Aircraft Fleet.

Aircraft	*Number*	*Replacement Cost*[1] *($ million)*	*Flights per Day*
Boeing 757			
Model 200	47	$56.4[2]	6.0
Airbus A340[3]			
Model 200	15	$78.9[4]	2.25
Model 300	24	$88.5[5]	2.0
Total	86	$5,958	

[1]Ontario Gateway chooses to insure airplanes at the cost of a new airplane with the same options.
[2]Source: UAL and AMR 1995 Annual Reports: Case writer estimates.
[3]Airbus A340 models differ by model based on flying range, number of seats, fuel capacity, and type of engine.
[4]Source: Aviation Week & Space Technology, January 8, 1996: Case writer estimates.
[5]Source: Aviation Week & Space Technology, January 8, 1996: Case writer estimates.

Assignment:

A simulation model of the Ontario Gateway insurance decision is provided in the spreadsheet OGSIM.XLS. This model is designed to run with the Crystal Ball® simulation software spreadsheet add-in that can be conveniently embedded in Microsoft Excel®.

(a) Run the simulation model OGSIM.XLS built for this insurance decision. Make sure you understand how the model works, especially because you will want to modify the model to do your analysis.

(b) To add clarity to the analysis, modify the model so that you can analyze the cost savings between the plans that are viable.

(c) Check the sensitivity of your analysis to the presumed probability of a crash. Because Ontario Gateway operates a newer fleet of aircraft with only two different types of aircraft, it may be reasonable to suppose that they are slightly safer than the industry as whole. Change the probability of a crash to make Ontario Gateway 25% safer than the industry average, and see what effect this has on the output and the consequent insurance decision.

(d) Based on your simulation results and analysis/judgment, prepare a concise but detailed decision recommendation with supporting analysis and justification. Your recommendation should account for the nature of the uncertainty and risk involved in the decisions under consideration.

GETTING STARTED WITH CRYSTAL BALL® FOR THE ONTARIO GATEWAY CASE

Here we show how to get started using the Crystal Ball® simulation software spreadsheet add-in.

Launching Crystal Ball®

After loading Crystal Ball® onto your computer, you can run Crystal Ball® by clicking the Start button, and then select Programs, and you will see the menu selection for Crystal Ball®. When you click on Crystal Ball®, it will load Excel® automatically. **(Note: Although Crystal Ball® is an Excel® add-in, you should always start Crystal Ball® first.)** After Excel® loads, you will see a window that warns you that this software has macros which could have viruses. Do not be alarmed by this. You should select the "Enable Macros" option to continue. You will next see the Crystal Ball® logo on the screen as it finishes loading. You will notice that there is now a new tool bar and new menus that Crystal Ball® provides. You are now ready to open the Ontario Gateway simulation model spreadsheet provided with the case, which is called OGSIM.XLS.

Guidelines on Understanding and Using Crystal Ball® for the Ontario Gateway Case

Introduction

Crystal Ball® is a powerful simulation tool that is conveniently embedded in the familiar Excel® software. Crystal Ball® allows you to simulate events that are based on random occurrences. For this case, aircraft crashes and incidental aircraft damage for

the next five years are the random variables. While we may be able to make reasonable assumptions about the number of crashes and the amount of incidental aircraft damage, it is not possible to know precisely which planes in the fleet will crash in each of the next five years nor what the amount of annual other incidental damage will be. These variables directly affect the relative attractiveness of the different insurance policies. If we could predict the future, the insurance policy decision would be a trivial exercise in arithmetic. Since we cannot predict the future, the insurance policy decision is a more complicated one. This is precisely where simulation plays a valuable role, and where the Crystal Ball® simulation software can be used to great advantage.

Crystal Ball® allows you to:

- Make the assumption that crashes and other aircraft damage obey specific probability distributions.
- Run an n-trial simulation of crashes and other damage for the five-year period.
- Calculate the costs under the insurance policies for each of the n trials.
- Generate a probability distribution for the costs of the policies (and the cost differences) based on the n-trial simulation.

In turn, this should assist you in deciding which is the most attractive insurance policy.

Understanding The Model: Assumption Cells and Forecast Cells

Although the model appears to be a normal Excel® spreadsheet, it is in fact slightly different. There are certain cells that are important to Crystal Ball®. Green-colored cells are so-called **Assumption Cells** and blue-colored cells are **Forecast Cells.**

Assumption Cells take on values from a defined probability distribution. The five incidental aircraft damage Assumption Cells are uniform distributions and the fifteen aircraft loss Assumption Cells are binomial distributions (there might be other equally plausible distributions to use as well). To view the specific distribution, select the Assumption Cell and choose the **Define Assumption...** command under the **"Cell"** menu. Note the parameters for the distribution (min and max values for the uniform distributions; probability and number of trials for the binomial distributions).

Forecast Cells are cells for which a probability distribution is generated based on the simulation. These cells contain formulas that are driven by the values of the Assumption Cells. As the Assumption Cells take on different values, the Forecast Cell values change accordingly. Forecast Cells can be viewed by selecting the cell and choosing the **Define Forecast...** command under the **"Cell"** menu.

Before running the simulation, you should spend some time learning the spreadsheet model in general, and the Assumption Cells and Forecast Cells in particular. Start by clicking through the spreadsheet to understand the policy cost tables. Then go to the color coded Assumption Cells and verify that they are built correctly. This can be done by clicking on the **"Cell"** command, and then selecting the **"Define assumption"** command. The assumption will be illustrated by an appropriate probability distribution. Next, go to the Forecast Cells. Check the formulas in the cells. Then click on the **"Cell"** command, and then on the **"Define forecast"** to verify that the Forecast Cell and the output title match. Note that the Forecast Cells have been built with the "automatic forecast display feature" turned OFF; otherwise, the simulation may "choke" during a complicated run due to lack of memory.

Running The Model

To run the model, click on **"Run,"** and then click on **"Run preferences"** to choose the number of trials (try 5,000 to start). Choose "Run" again and wait until the simulation stops. That's it!

You can stop and continue the simulation at any time using the applicable commands from the **"Run"** menu.

Viewing the Output

Click on **"Run,"** and then on **"Forecast windows."** From there, click on the reports you want to see and open them. Two additional menus, **"Preferences"** and **"View"** also appear on the menu bar. The **"View"** menu selects the type of statistics that are displayed for each Forecast Cell. The **"Preferences"** menu alters the format of the displayed charts. By the way, the reports can be copied and pasted into a Word® document using **"Paste special"** as a **"picture."**

Saving and Re-running

Your simulation run can be saved using the **"Save Run"** command in the **"Run"** menu. To re-run the simulation, say with a different number of trials or with a different probability of a crash, etc., select **"Reset"** from the **"Run"** menu, make any necessary changes, and then choose **"Run"** once again.

Final Word

These directions are enough to teach you the basics of this software and to allow you to get started with Crystal Ball®. You should be able to work effectively with the simulation model in a short period of time. Use the on-line help menu for additional pointers.