ADDITIONAL CASES

CASE 9.2 AIDING ALLIES

Commander Votachev steps into the cold October night and deeply inhales the smoke from his cigarette, savoring its warmth. He surveys the destruction surrounding him—shattered windows, burning buildings, torn roads—and smiles. His two years of work training revolutionaries east of the Ural Mountains has proved successful; his troops now occupy seven strategically important cities in the Russian Federation: Kazan, Perm, Yekaterinburg, Ufa, Samara, Saratov, and Orenburg. His siege is not yet over, however. He looks to the west. Given the political and economic confusion in the Russian Federation at this time, he knows that his troops will be able to conquer Saint Petersburg and Moscow shortly. Commander Votachev will then be able to rule with the wisdom and control exhibited by his communist predecessors Lenin and Stalin.

Across the Pacific Ocean, a meeting of the top security and foreign policy advisers of the United States is in progress at the White House. The President has recently been briefed about the communist revolution masterminded by Commander Votachev and is determining a plan of action. The President reflects upon a similar October long ago in 1917, and he fears the possibility of a new age of radical Communist rule accompanied by chaos, bloodshed, escalating tensions, and possibly nuclear war. He therefore decides that the United States needs to respond and to respond quickly. Moscow has requested assistance from the United States military, and the President plans to send troops and supplies immediately.

The President turns to General Lankletter and asks him to describe the preparations being taken in the United States to send the necessary troops and supplies to the Russian Federation.

General Lankletter informs the President that along with troops, weapons, ammunition, fuel, and supplies, aircraft, ships, and vehicles are being assembled at two port cities with airfields: Boston and Jacksonville. The aircraft and ships will transfer all troops and cargo across the Atlantic Ocean to the Eurasian continent. The general hands the President a list of the types of aircraft, ships, and vehicles being assembled along with a description of each type. The list is shown below.

Transportation Type	Name	Capacity	Speed
Aircraft	C-141 Starlifter	150 tons	400 miles per hour
Ship	Transport	240 tons	35 miles per hour
Vehicle	Palletized Load System Truck	16,000 kilograms	60 miles per hour

All aircraft, ships, and vehicles are able to carry both troops and cargo. Once an aircraft or ship arrives in Europe, it stays there to support the armed forces.

The President then turns to Tabitha Neal, who has been negotiating with the NATO countries for the last several hours to use their ports and airfields as stops to refuel and resupply before heading to the Russian Federation. She informs the President that the following ports and airfields in the NATO countries will be made available to the United States military.

Ports	Airfields
Napoli	London
Hamburg	Berlin
Rotterdam	Istanbul

The President stands and walks to the map of the world projected on a large screen in the middle of the room. He maps the progress of troops and cargo from the United States

to three strategic cities in the Russian Federation that have not yet been seized by Commander Votachev. The three cities are Saint Petersburg, Moscow, and Rostov. He explains that the troops and cargo will be used both to defend the Russian cities and to launch a counterattack against Votachev to recapture the cities he currently occupies. (The map is shown at the end of the case.)

The President also explains that all Starlifters and transports leave Boston or Jacksonville. All transports that have traveled across the Atlantic must dock at one of the NATO ports to unload. Palletized load system trucks brought over in the transports will then carry all troops and materials unloaded from the ships at the NATO ports to the three strategic Russian cities not yet seized by Votachev. All Starlifters that have traveled across the Atlantic must land at one of the NATO airfields for refueling. The planes will then carry all troops and cargo from the NATO airfields to the three Russian cities.

(a) Draw a network showing the different routes troops and supplies may take to reach the Russian Federation from the United States.

(b) Moscow and Washington do not know when Commander Votachev will launch his next attack. Leaders from the two countries have therefore agreed that troops should reach each of the three strategic Russian cities as quickly as possible. The President has determined that the situation is so dire that cost is no object—as many Starlifters, transports, and trucks as are necessary will be used to transfer troops and cargo from the United States to Saint Petersburg, Moscow, and Rostov. Therefore, no limitations exist on the number of troops and amount of cargo that can be transferred between any cities.

The President has been given the following information about the length of the available routes between cities:

From	To	Length of route in kilometers
Boston	Berlin	7,250 km
Boston	Hamburg	8,250 km
Boston	Istanbul	8,300 km
Boston	London	6,200 km
Boston	Rotterdam	6,900 km
Boston	Napoli	7,950 km
Jacksonville	Berlin	9,200 km
Jacksonville	Hamburg	9,800 km
Jacksonville	Istanbul	10,100 km
Jacksonville	London	7,900 km
Jacksonville	Rotterdam	8,900 km
Jacksonville	Napoli	9,400 km
Berlin	Saint Petersburg	1,280 km
Hamburg	Saint Petersburg	1,880 km
Istanbul	Saint Petersburg	2,040 km
London	Saint Petersburg	1,980 km
Rotterdam	Saint Petersburg	2,200 km
Napoli	Saint Petersburg	2,970 km
Berlin	Moscow	1,600 km
Hamburg	Moscow	2,120 km
Istanbul	Moscow	1,700 km
London	Moscow	2,300 km
Rotterdam	Moscow	2,450 km
Napoli	Moscow	2,890 km
Berlin	Rostov	1,730 km
Hamburg	Rostov	2,470 km
Istanbul	Rostov	990 km
London	Rostov	2,860 km
Rotterdam	Rostov	2,760 km
Napoli	Rostov	2,800 km

Given the distance and the speed of the transportation used between each pair of cities, how can the President most quickly move troops from the United States to each of the three strategic Russian cities? Highlight the path(s) on the network. How long will it take troops and supplies to reach Saint Petersburg? Moscow? Rostov?

(c) The President encounters only one problem with his first plan: he has to sell the military deployment to Congress. Under the War Powers Act, the President is required to consult with Congress before introducing troops into hostilities or situations where hostilities will occur. If Congress does not give authorization to the President for such use of troops, the President must withdraw

troops after 60 days. Congress also has the power to decrease the 60-day time period by passing a concurrent resolution.

The President knows that Congress will not authorize significant spending for another country's war, especially when voters have paid so much attention to decreasing the national debt. He therefore decides that he needs to find a way to get the needed troops and supplies to Saint Petersburg, Moscow, and Rostov at the minimum cost.

Each Russian city has contacted Washington to communicate the number of troops and supplies the city needs at a minimum for reinforcement. After analyzing the requests, General Lankletter has converted the requests from numbers of troops, gallons of gasoline, etc., to tons of cargo for easier planning. The requirements are listed in the next column.

City	Requirements
Saint Petersburg	320,000 tons
Moscow	440,000 tons
Rostov	240,000 tons

Both in Boston and Jacksonville there are 500,000 tons of the necessary cargo available. When the United States decides to send a plane, ship, or truck between two cities, several costs occur—fuel costs, labor costs, maintenance costs, and appropriate port or airfield taxes and tariffs. These costs are listed below.

From	To	Cost
Boston	Berlin	$50,000 per Starlifter
Boston	Hamburg	$30,000 per transport
Boston	Istanbul	$55,000 per Starlifter
Boston	London	$45,000 per Starlifter
Boston	Rotterdam	$30,000 per transport
Boston	Napoli	$32,000 per transport
Jacksonville	Berlin	$57,000 per Starlifter
Jacksonville	Hamburg	$48,000 per transport
Jacksonville	Istanbul	$61,000 per Starlifter
Jacksonville	London	$49,000 per Starlifter
Jacksonville	Rotterdam	$44,000 per transport
Jacksonville	Napoli	$56,000 per transport
Berlin	Saint Petersburg	$24,000 per Starlifter
Hamburg	Saint Petersburg	$ 3,000 per truck
Istanbul	Saint Petersburg	$28,000 per Starlifter
London	Saint Petersburg	$22,000 per Starlifter
Rotterdam	Saint Petersburg	$ 3,000 per truck
Napoli	Saint Petersburg	$ 5,000 per truck
Berlin	Moscow	$22,000 per Starlifter
Hamburg	Moscow	$ 4,000 per truck
Istanbul	Moscow	$25,000 per Starlifter
London	Moscow	$19,000 per Starlifter
Rotterdam	Moscow	$ 5,000 per truck
Napoli	Moscow	$ 5,000 per truck
Berlin	Rostov	$23,000 per Starlifter
Hamburg	Rostov	$ 7,000 per truck
Istanbul	Rostov	$ 2,000 per Starlifter
London	Rostov	$ 4,000 per Starlifter
Rotterdam	Rostov	$ 8,000 per truck
Napoli	Rostov	$ 9,000 per truck

The President faces a number of restrictions when trying to satisfy the requirements. Early winter weather in northern Russia has brought a deep freeze with much snow. Therefore, General Lankletter is opposed to sending truck convoys in the area. He convinces the President to supply Saint Petersburg only through the air. Moreover, the truck routes into Rostov are quite limited, so that from each port at most 2,500 trucks can be sent to Rostov. The Ukrainian government is very sensitive about American airplanes flying through their air space. It restricts the U.S. military to at most 200 flights from Berlin to Rostov and to at most 200 flights from London to Rostov. (The U.S. military does not want to fly around the Ukraine and is thus restricted by the Ukrainian limitations.)

How does the President satisfy each Russian city's military requirements at minimum cost? Highlight the path to be used between the United States and Russian Federation on the network.

(d) Once the President releases the number of planes, ships, and trucks that will travel between the United States and the

Russian Federation, Tabitha Neal contacts each of the American cities and NATO countries to indicate the number of planes to expect at the airfields, the number of ships to expect at the docks, and the number of trucks to expect traveling across the roads. Unfortunately, Tabitha learns that several additional restrictions exist which cannot be immediately eliminated. Because of airfield congestion and unalterable flight schedules, only a limited number of planes may be sent between any two cities. These plane limitations are given below.

From	To	Maximum
Boston	Berlin	300 airplanes
Boston	Istanbul	500 airplanes
Boston	London	500 airplanes
Jacksonville	Berlin	500 airplanes
Jacksonville	Istanbul	700 airplanes
Jacksonville	London	600 airplanes
Berlin	Saint Petersburg	500 airplanes
Istanbul	Saint Petersburg	0 airplanes
London	Saint Petersburg	1,000 airplanes
Berlin	Moscow	300 airplanes
Istanbul	Moscow	100 airplanes
London	Moscow	200 airplanes
Berlin	Rostov	0 airplanes
Istanbul	Rostov	900 airplanes
London	Rostov	100 airplanes

In addition, because some countries fear that citizens will become alarmed if too many military trucks travel the public highways, they object to a large number of trucks traveling through their countries. These objections mean that a limited number of trucks are able to travel between certain ports and Russian cities. These limitations are listed below.

From	To	Maximum
Rotterdam	Moscow	600 trucks
Rotterdam	Rostov	750 trucks
Hamburg	Moscow	700 trucks
Hamburg	Rostov	500 trucks
Napoli	Moscow	1,500 trucks
Napoli	Rostov	1,400 trucks

Tabitha learns that all shipping lanes have no capacity limits, owing to the American control of the Atlantic Ocean.

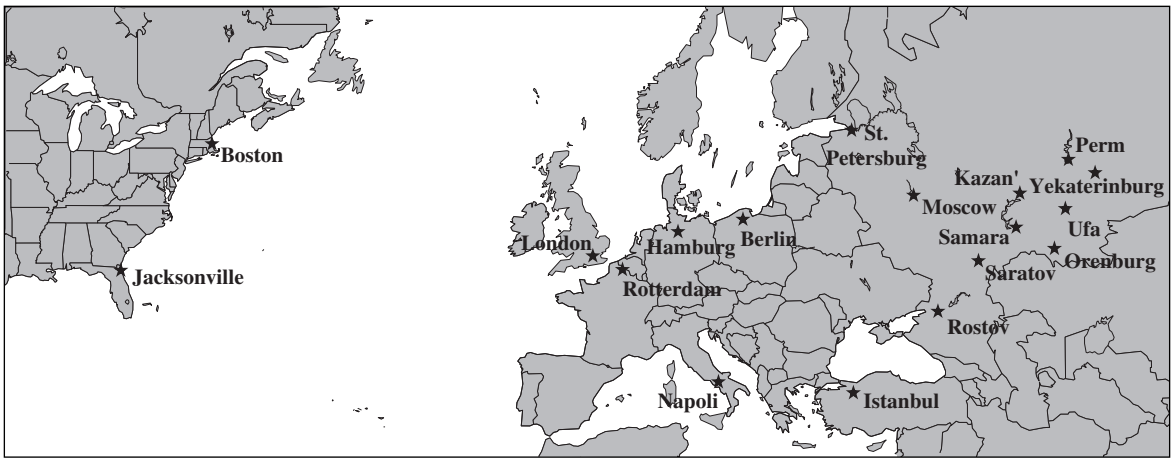
The President realizes that because of all the restrictions he will not be able to satisfy all the reinforcement requirements of the three Russian cities. He decides to disregard the cost issue and instead to maximize the total amount of cargo he can get to the Russian cities. How does the President maximize the total amount of cargo that reaches the Russian Federation? Highlight the path(s) used between the United States and the Russian Federation on the network.

(e) Even before all American troops and supplies had reached Saint Petersburg, Moscow, and Rostov, infighting among Commander Votachev's troops about whether to make the next attack against Saint Petersburg or against Moscow split the revolutionaries. Troops from Moscow easily overcame the vulnerable revolutionaries. Commander Votachev was imprisoned, and the next step became rebuilding the seven cities razed by his armies.

The President's top priority is to help the Russian government to reestablish communications between the seven Russian cities and Moscow at minimum cost. The price of installing communication lines between any two Russian cities varies given the cost of shipping wire to the area, the level of destruction in the area, and the roughness of the terrain. Luckily, a city is able to communicate with all others if it is connected only indirectly to every other city. Saint Petersburg and Rostov are already connected to Moscow, so if any of the seven cities is connected to Saint Petersburg or Rostov, it will also be connected to Moscow. The cost of replacing communication lines between two given cities for which this is possible is shown next.

Between	Cost to Reestablish Communication Lines
Saint Petersburg and Kazan	$210,000
Saint Petersburg and Perm	$185,000
Saint Petersburg and Ufa	$225,000
Moscow and Ufa	$310,000
Moscow and Samara	$195,000
Moscow and Orenburg	$440,000
Moscow and Saratov	$140,000
Rostov and Saratov	$200,000
Rostov and Orenburg	$120,000
Kazan and Perm	$150,000
Kazan and Ufa	$105,000
Kazan and Samara	$ 95,000
Perm and Yekaterinburg	$ 85,000
Perm and Ufa	$125,000
Yekaterinburg and Ufa	$125,000
Ufa and Samara	$100,000
Ufa and Orenburg	$ 75,000
Saratov and Samara	$100,000
Saratov and Orenburg	$ 95,000

Where should communication lines be installed to minimize the total cost of reestablishing communications between Moscow and all seven Russian cities?



Note: Data files for this case are provided on the CD-ROM for your convenience.

CASE 9.3 STEPS TO SUCCESS

Janet Richards fixes her eyes on those of her partner Gilbert Baker and says firmly, "All right. Let's do it."

And with those words, InterCat, a firm founded by Janet and Gilbert that specializes in the design and maintenance of Internet catalogs for small consumer businesses, will be going public. InterCat employs 30 individuals, with the majority of them computer programmers. Many of the employees have followed the high-technology market very closely and have decided that since high-technology firms are more understood and valued in the United States than in other countries, InterCat should issue its stock only in the United States. Five million shares of InterCat stock will comprise this new issue.

The task the company has ahead of itself is certainly daunting. Janet and Gilbert know that many steps have to be completed in the process of making an initial public offering. They also know that they need to complete the process within 28 weeks because they need the new capital fairly soon to ensure that InterCat has the resources to capture valuable new business from its competitors and continue growing. They also value a speedy initial public offering because they believe that the window of opportunity for obtaining a good stock price is presently wide open—the public is wild about shopping on the Internet, and few companies offering Web page design services have gone public.

Because the 28-week deadline is breathing down their necks, Janet and Gilbert decide to map the steps in the process of making an initial public offering. They list each major activity that needs to be completed, the activities that directly precede each activity, the time needed to complete each activity, and the cost of each activity. This list is shown below.

Activity	Preceding Activities	Time	Cost
Evaluate the prestige of each potential underwriter.		3 weeks	$ 8,000
Select a syndicate of underwriters.	Evaluate the prestige of each potential underwriter.	1.5 weeks	$ 4,500
Negotiate the commitment of each member of the syndicate.	Select a syndicate of underwriters.	2 weeks	$ 9,000
Negotiate the spread* for each member of the syndicate.	Select a syndicate of underwriters.	3 weeks	$12,000
Prepare the registration statement including the proposed financing and information about the firm's history, existing business, and plans for the future.	Negotiate both the commitment and spread for each member of the syndicate.	5 weeks	$50,000
Submit the registration statement to the Securities and Exchange Commission (SEC).	Prepare the registration statement.	1 week	$ 1,000
Make presentations to institutional investors and develop the interest of potential buyers.	Submit the registration statement to the SEC.	6 weeks	$25,000
Distribute the preliminary prospectus affectionately termed the red herring.	Submit the registration statement to the SEC.	3 weeks	$15,000
Calculate the issue price.	Submit the registration statement to the SEC.	5 weeks	$12,000
Receive deficiency memorandum from the SEC.	Submit the registration statement to the SEC.	3 weeks	$0
Amend the registration statement and resubmit it to the SEC.	Receive deficiency memorandum from the SEC.	1 week	$ 6,000
Receive registration confirmation from the SEC.	Amend the registration statement and resubmit it to the SEC.	2 weeks	$0

Activity	Preceding Activities	Time	Cost
Confirm that the new issue complies with the "blue sky" laws of each state.	Make presentations to institutional investors and develop the interest of potential buyers. Distribute the preliminary prospectus affectionately termed the red herring. Calculate the issue price. Receive registration confirmation from the SEC.	1 week	$ 5,000
Appoint a registrar.	Receive registration confirmation from the SEC.	3 weeks	$12,000
Appoint a transfer agent.	Receive registration confirmation from the SEC.	3.5 weeks	$13,000
Issue final prospectus that includes the final offer price and any amendments to all purchasers offered securities through the mail.	Confirm that the new issue complies with the "blue sky" laws of each state. Appoint a registrar and transfer agent.	4.5 weeks	$40,000
Phone interested buyers.	Confirm that the new issue complies with the "blue sky" laws of each state. Appoint a registrar and transfer agent.	4 weeks	$ 9,000

*The spread is the payment an underwriter receives for services.

Janet and Gilbert present the list of steps to the employees of InterCat. The head of the finance department, Leslie Grey, is fresh out of business school. She remembers the various project management tools she has learned in business school and suggests that Janet and Gilbert use PERT/CPM analysis to understand where their priorities should lie.

(a) Draw the project network for completing the initial public offering of InterCat stock. How long is the initial public offering process? What are the critical steps in the process?

(b) Janet and Gilbert hear through the grapevine that their most fierce competitor, Soft Sales, is also planning to go public. They fear that if InterCat does not complete its initial public offering before Soft Sales, the price investors are willing to pay for InterCat stock will drop, since investors will perceive Soft Sales to be a stronger, more organized company. Janet and Gilbert therefore decide that they want to complete the process of issuing new stock within 22 weeks. They think such a goal is possible if they throw more resources—workers and money—into some activities. They list the activities that can be shortened, the time the activity will take when it is fully shortened, and the cost of shortening the activity this much. They also conclude that partially shortening each activity listed below is possible and will give a time reduction and cost proportional to the amounts when fully shortening.

Activity	Time	Cost
Evaluate the prestige of each potential underwriter.	1.5 weeks	$14,000
Select a syndicate of underwriters.	5 weeks	$ 8,000
Prepare the registration statement including the proposed financing and information about the firm's history, existing business, and plans for the future.	4 weeks	$95,000
Make presentations to institutional investors and develop the interest of potential buyers.	4 weeks	$60,000

Activity	Time	Cost
Distribute the preliminary prospectus affectionately termed the red herring.	2 weeks	$22,000
Calculate the issue price.	3.5 weeks	$31,000
Amend the registration statement and resubmit it to the SEC.	5 week	$ 9,000
Confirm that the new issue complies with the "blue sky" laws of each state.	5 week	$ 8,300
Appoint a registrar.	1.5 weeks	$19,000
Appoint a transfer agent.	1.5 weeks	$21,000
Issue final prospectus that includes the final offer price and any amendments to all purchasers offered securities through the mail.	2 weeks	$99,000
Phone interested buyers.	1.5 weeks	$20,000

How can InterCat meet the new deadline set by Janet and Gilbert at minimum cost?

(c) Janet and Gilbert learn that the investment bankers are two-timing scoundrels! They are also serving as lead underwriters for the Soft Sales new issue! To keep the deal with InterCat, the bankers agree to let Janet and Gilbert in on a little secret. Soft Sales has been forced to delay its public issue because the company's records are disorganized and incomplete. Given this new information, Janet and Gilbert decide that they can be more lenient on the initial public offering timeframe. They want to complete the process of issuing new stock within 24 weeks instead of 22 weeks. Assume that the cost and time to complete the appointment of the registrar and transfer agent are the same as in part (b). How can InterCat meet this new deadline set by Janet and Gilbert at minimum cost?

Note: A data file for this case is provided on the CD-ROM for your convenience.