

## Final Project Case Alternative

### (See Volume 2 - Chapter II-5)

In this chapter, we provide an alternative means for assignments throughout course PM-1 using the concept of a “running problem case”. This involves the use of a single problem scenario that provides an opportunity for students to create multiple deliverables throughout the course that apply to this scenario as they learn various topics within the subject of Project Management (PM). The case develops as the students learn the fundamentals in class, and the deliverables match the course content. Sections 5.14, 5.18 and 5.22 of this chapter provide the detailed description of the case that would be provided respectively for PM classes in IT, Management and Engineering domains but, for context, we provide a brief summary below:

#### *Problem Case Summary*

Wilmont’s is a top-ranked US retail pharmacy with more than 8,000 stores nationwide. The company is secretly considering delivering prescriptions by flying drone. DroneTech, a small firm in San Francisco, CA announced the approach in March, and Wilmont’s has made an agreement with DroneTech to prototype this project in the San Francisco area. DroneTech will provide the drone technology as well as the drone piloting and delivery systems, but will customize its systems and business process to conform to Wilmont’s requirements.

You are the project manager assigned to lead this project. (Depending upon the course domain, the case positions the student as the project manager in either Wilmont’s IT, Wilmont’s Pharmacy Operations, or DroneTech Engineering.)

- Wilmont’s has limited the project expenditures to a maximum of US\$1,750,000 for this prototype project and will implement it first in only four stores.
- The project begins next January 5 and the first customer delivery flight should take place no later than November 30 to avoid harsh weather in the San Francisco area.
- You will need to plan tasks and assign team members to them from a list of people involved in the project. Regular meetings need to be held with the team and stakeholders as well as other forms of communication.
- Approval points are needed through the project sequence.
- Risks, testing, quality control and provision issues may develop.
- Issues in security, reliability, integrity, interfaces between the systems of the two organizations and customer interaction are all considerations that must be made as you plan the project.
- User training and other preparations will be required for system implementation. The Wilmont’s Change Management Team will assist you in this effort.

Final schedules need to show a certain level of completion based upon a given date.

## **Rationale for Use of a Common Case for All Students:**

This chapter involves the teaching approach of assigning all students in the course the same case problem from which they develop their PM deliverables throughout the progression of the course. This differs from the alternative common practice of allowing students to choose their own individual case problem for their assignments. There are some advantages and disadvantages to the common-case approach:

### **Advantages:**

- All students in the class are required to analyze a relatively sophisticated project scenario that has been designed to incorporate typical issues in real-world project management. Sometimes, when students are allowed to choose their own project scenario, the less-ambitious students will likely choose scenarios having fewer complications. The common case brings all students into contact with a certain scale of problem size and complexity, requiring a certain level of critical thinking on their part.
- Students learn from each other as the course progresses, and their own expectations increase as they see the quality of work produced by their peers.
- Instructors can develop a common and clear set of standards for grading, discussions, and other measures of learning.
- Instructors can be more prescriptive and better defined in expectations, an important criterion particularly for undergraduates in such issues as late work and resubmission procedures.
- Depending upon the instructor's preference, individuals or groups can be assigned certain roles within the common scenario, creating an even more challenging environment as the overall project is planned and managed.
- Instructors should use the specific case domain version (IT, Management or Engineering) that most closely represents their own domain of expertise and that of the majority of the students. Neither instructors nor students need to be expert in IT or the technology of the drones, because the point of the case is to apply PM best practices to it, and relevant details of the technology are provided in the case problem text. In addition, the domain versions remain focused on the particular aspects of that given domain within this case. There is no requirement for IT people to know the technology of the drones, for example, because the emphasis of that

case version is on the information systems that are involved. The Engineering version focuses not on developing the specific drone technology, but rather on typical issues in the preparation of any newly developed technology for the purpose of commercial retail use. The Management version focuses on internal business processes, contractor relationships, market acceptance issues and regulatory concerns that would accompany any such innovative use of sub-contracted technology.

- The case has two views: The first is an initial view, but the second iteration of the case introduces very detailed information about the project for later use in the course, and requires the student to simulate a certain level of completion as well. This provides a limited, but effective, opportunity for instructors to challenge students with measuring completion, EVM approaches, and tracking techniques.

#### **Disadvantages:**

- The more that students have had contact with managing real projects in a work environment, the more that they may prefer to use their own projects for their assignments. These students are normally a minority in the university undergraduate (and possibly even graduate) environment, although certain domains such as construction and engineering, where students may be more familiar with projects, may fall into this category. Instructors should feel free to allow such experienced individual students to use their own case if it is approved to be of sufficient scale and complexity to compare to the common case as there may be only from one to three such students in a given introductory PM course such as PM-1.
- Common case scenarios need to be changed somewhat as the course is repeated in order to keep each class dealing with unique situations, and preventing the use of previous course solutions that may be available to students in digital format. Many instructors develop a “pool” of scenarios that can be rotated through time, or the specific constraints, dates, people’s names, costs and types of resources can be varied with each implementation of the case. Electronically posting “best” solutions is discouraged since this is the first step in subsequent students using this solution for their own assignment work.

#### **Chapter Sections:**

The remaining sections of this chapter will define specific types of related assignments based on a case problem, including instructor guidance for each. Finally, a specific sample problem case scenario will be given in three separate versions for the Information Technology, Management, and Engineering domain areas, along with instructor administration guidance. The nature of

the scenario content has to do with some actual experimentation with technology dimensions in health care product retail. These combinations and alternatives will give instructors a modular set of materials that can be interchanged according to the intended domain of the course.

## **5.1 The Nature of a “Running Problem Case”**

The classic “case study” is normally a structured account of a past actual occurrence that gives students an opportunity to analyze the situation according to methods taught, and then to provide some form of written deliverable that describes this analysis and makes certain recommendations or poses certain outcomes. The students discuss the case further in class and then learn about the actual outcome of the scenario so that they can determine how completely their own analysis reflected the actual situation and outcome.

However, another type of case used in teaching features a scenario that is highly adapted to the course content, but incorporates sufficient realistic content that it can stimulate some amount of experiential learning. Such scenarios need to be based on concepts that either are, or might actually be, taking place in the field of application, and they can contain either real or contrived information which will sufficiently enable the student to develop the necessary deliverables that reflect professional project documents. This approach serves to aid significantly in the transfer of the student’s learning from the course environment to future project scenarios that the student encounters in practice. These types of cases pose problems for the student, who then must provide appropriate deliverables that address these problems, so the concept is not necessarily to understand what happened in a real past situation, but rather to engineer an appropriate set of project plans and other documents that would be sufficient to carry out the project in the future. Therefore, it is not critical that the case be historically accurate, but it must be practical and realistic in order to preserve the learning that comes from this type of situational simulation.

This chapter provides materials that are in this latter category. The problem case scenario is based upon certain events that are taking place in practice today, but it uses organization and personnel names and other data that are not necessarily real. The information is structured to allow the student to develop different and increasingly complex deliverables in pace with the course topics learned throughout the full course delivery period. Information is provided in such a way to illustrate various issues or complex concepts, with students seeing different modules of the content revealed to them by the instructor as the course progresses. This creates opportunities for students to learn new information and to respond to newly occurring issues along the way that simulate much of what the practicing project manager might experience in the field during the full term of a project. Such a single case scenario that develops more detail

over time and involves the student's completion of multiple deliverables as the course progresses is known as a "running problem case."

## 5.2 Syllabus Information for the Running Problem Case

Instructors may wish to include a section in the course syllabus that describes the nature of how the case is used in various assignments. The following is an example of such a statement:

### **"Project Assignments:**

**Assignments will demonstrate the student's understanding of the course concepts learned and the student's ability to construct the typical work products expected of real-world project managers. There will be multiple assignments submitted during the semester, each consisting of individual parts that are related to a single case problem that develops throughout the course. Assignments are submitted by students individually to ensure that students acquire the skills needed to perform individually as a competent project manager.**

**Case scenarios used for the assignments will provide students opportunities to respond to the complexities of real-world issues in project time, cost, scope and resource management. The focus of grading the deliverables created will be on how well the student organizes the information about the case problem and creates the typical project management documents that explain to stakeholders how the project will be designed and executed.**

**Assignments in the earlier portion of the course will reflect fundamental information typically understood by a project manager at that point in the project timeline, and which takes the form of the initial set of planning deliverables that might be submitted to management and/or stakeholders for approval as the project is designed. Assignments in the latter portion of the course will reflect increasingly complex information that often develops as projects are refined and more detailed requirements are understood, while still remaining within the overall project objectives that were first defined in the earlier assignment submissions."**

## 5.3 Student Deliverables Based Upon the Problem Case

The following are the types of deliverables recommended for submission by students for the running problem case:

- Project charter and initial scope document (25 points), including summary sections for:
  - Name, Background and Context of the Project
  - Business Case
  - Process and Product Deliverables
  - Initial Project Constraints and Assumptions
  - Project Team Management, Members and Reporting Structure
  - Project Integration Plan and Management Strategy

- Initial description of Risks and Mitigation Summary
- Quality Management
- Project Milestones
- Document Approval by Key Stakeholders
- Initial WBS (16 points)
- Sample WBS dictionary (9 points)
- Project Risk Management Plan (30 points), including Risk Register
- Project communications management plan (30 points), including stakeholder analysis and communications planning matrix
- Final WBS (60 points), including resource assignments, task sequencing and costs of work and materials

*Deliverable Scheduling:*

Scheduling of the assignment deliverables can take many forms, but it is common to group certain deliverables together, or at least close to one another in time for submission. For example, the instructor can require students to submit the project charter/scope first, followed closely by the WBS and WBS dictionary. Later in the course, the students can submit the risk management and/or communications management plans at the time that these are covered in class. Lastly, the final WBS is submitted near the end of the course because it incorporates numerous high-level concepts of scheduling, resource assignment, procurement, budgeting, and project strategy that come together as a terminal assignment.

## 5.4 General Assignment Grading

The point values above suggest relative weights of the deliverables so that the instructor can see how their impacts will vary on the student's final course grade. Actual point values may be different as the instructor desires, but at least the above points give a starting value to illustrate relative effort involved. The following are examples of how to describe the evaluation of the student submissions, and it is recommended that a section like this be included in the course syllabus to inform students well in advance about how the Running Problem Case assignments will be evaluated generally:

*Time Management*

Deduction as per situation based on the following table:

0	No deduction - assignment on time or late with permission.
-1	Assignment up to 1 day late
-2	Assignment 1-2 days late
-3	Assignment submitted 2-3 days late
-4	Assignment submitted 3-4 days late
-5	Assignment submitted more than 4 days late.

*Note: Points deducted for late submission will remain on re-submission of the same assignment.  
Late resubmissions may be subject to additional deductions.*

### *Assignment Overall Quality*

Points earned based on the following:

- 1 *Appropriate analysis effort and correct file naming and submitted file format.*
- 0 *Appropriate analysis effort, but file submission format or naming does not follow requested criteria as specified.*
- 1 *Assignment does not clarify enough detail to serve as a client-ready document for this case.*
- 2 *Use of templates or generic sections that are not adjusted enough to this case problem.*
- 3 *Assignment does not reflect appropriate analysis or understanding of the case problem.*
- 4 *Assignment is incomplete with several missing segments that decrease its overall value.*

	<b>Most</b>	<b>Criteria</b>	<b>Could be</b>
<b><u>Concept/Skill Mastery</u></b>	<b>Mastered</b>	<b>Achieved</b>	<b>greatly improved</b>
<b>(See below for list of Skills)</b>	<b>(3 points)</b>	<b>(2 points)</b>	<b>(1 point)</b>

*Bonus points may be earned with exceptional work on any given skill category.*

### ***Project Charter/Scope, WBS and WBS Dictionary Evaluated Skill Categories:***

1. *Has the student summarized the basic problem of the case study in sufficient detail, including what is to be done and who is to do it?*
2. *Are the roles and responsibilities of the stakeholders and team members in the case study correctly identified?*
3. *Are all major deliverables listed and defined correctly so that they are easily understood?*
4. *Does the scope document contain the needed content sections as defined in class and explain the project as far as possible with the initial case information given?*
5. *Is there an appropriate section where it is described how the project will be structured in terms of relationships of team members and management?*
6. *Is the project defined generally in terms of milestones and description of the general order of activities to accomplish all deliverables successfully?*
7. *Are there sections that describe the approach to be taken to ensure quality of deliverables, project integration strategy and the monitoring/control activities that will be used?*
8. *Is there a formal place for a few key stakeholders, the sponsor and the project manager to sign and date?*

9. *Is the WBS logical and numbered properly, does it follow the case problem, shows proper action words and is it appropriate to the scale of this case problem (not just from a general template)?*
10. *Is the WBS dictionary formatted properly, does it contain several entries, and does it describe work, not include just definitions of terms?*

***Risk and Communications Management Plan Evaluated Skill Categories:***

1. *Does the risk management and/or communications management plan follow the general content as specified in class? Is the content reasonable and customized to be specific and sufficiently detailed for this project?*
2. *Is a detailed risk register included in the risk management plan that specifies the nature and priorities of each identified risk according to the approach covered in class?*
3. *Is a detailed communications analysis matrix included in the communications management plan that specifies the nature, interval, originator, recipient, and technologies for each identified communication event?*

***Project Final WBS Evaluated Skill Categories:***

1. *Is the Gantt chart properly formatted with necessary data columns? Top level task? Auto scheduled?*
2. *Does the WBS contain details for the assignment as specified in the case problem? Logic allows for time to receive procured equipment before installation? Looks reasonable for this project? Predecessors logical?*
3. *Are the costs reasonable for equipment and labor? Do all tasks have appropriate costs?*
4. *Do all tasks have resources assigned? Reasonable hours for tasks and no tasks with 0 hours?*
5. *Does the project resource sheet contain resources specified in the assignment? Are the rates and costs correct?*
6. *Does the budget total seem reasonable for this project? Is the project time and cost consistent with the case problem and at the correct scale?*

## 5.5 Assignment Resubmissions

It is recommended that instructors consider allowing students to resubmit assignments a second time based upon initial instructor feedback on the first submission. While this involves additional instructor grading of the second submission, it promotes learning from mistakes while minimizing the fear of not submitting a perfect deliverable the first time. However, to encourage students to submit their best efforts the first time, it is recommended that a policy be developed that reduces the final grade points of the second submission based upon the quality of the first submission. An example policy that can be placed into the course syllabus might be as follows:

### **“Policy of Mastery Achievement through Assignment Resubmission:**

**This course is designed to allow students to take advantage of feedback from the instructor on their knowledge and skills in order to master the subject matter. Students may revise an assignment one time and re-submit it to show that the quality has improved based on the feedback received originally.**

**The grade entered for the resubmitted assignment will be that earned from the revised submission, but with the following point deductions that depend upon the value of the original grade as follows:**

- **If the original grade was 1 - 4 points lower than the maximum grade, then the resubmission may earn up to 1 point less than the maximum grade.**
- **If the original grade was 5 - 7 points lower than the maximum grade, then the resubmission may earn up to 2 points less than the maximum grade.**
- **If the original grade was 8 - 10 points lower than the maximum grade, then the resubmission may earn up to 3 points less than the maximum grade.**
- **If the original grade was 11 - 15 points lower than the maximum grade, then the resubmission may earn up to 4 points less than the maximum grade.**
- **If the original grade was more than 15 points below the maximum grade, then the resubmission may earn up to 5 points less than the maximum grade.**

**Original point deductions for late assignment submissions will carry through to the re-submission as well, which means that these late penalty points cannot be made up through re-submission. Assignment revisions must be resubmitted on the due date specified in the class schedule.”**

## 5.6 The Role of the Problem Case in the Context of the Course

From a pedagogical standpoint, the role of the problem case is not comprehensive in evaluating student acquisition of knowledge, skills, or attitudes for PM-1. The total course grade should include evaluation of attendance and participation, discussions, examination(s), and readings as appropriate. The most

appropriate role of the problem case is to provide an evaluation of the student's ability to take what has been learned through class activities and apply their new knowledge and skills to a specific scenario through transfer of learning.

The problem case is not a good tool to measure acquisition of terms and their definitions—examinations or quizzes are better suited for this. It is also not a good tool for measuring attitudinal skills or the relationship skills used in interacting with, and/or managing stakeholder, management, and/or team members associated with the project. These can best be measured through written or presented reflections or by actual project management experience in an experiential learning environment.

Therefore, the problem case is specifically designed to evaluate the student's ability to create the most common deliverables that project managers typically use, given a specific project scenario. This means that the instructor should not use this approach exclusively to calculate a total course grade, but should use it as an important part of a suite of student performance evaluation tools that, together, will measure the student's achievement of all course learning objectives as well as they can be measured in a typical college course.

## **5.7 Student Assignments**

### **5.7.1 *Charter and Initial Scope Document Assignment***

#### **Assignment Requirements:**

- Due on #####
- Format: Electronic PDF-type print-imageFile formatted in standard US letter size pages by Adobe Acrobat or compatible software.
- Tools: Standard Word-processing software; Adobe Acrobat or compatible print-image software
- File Naming Requirements:
- Note: You may not be familiar with all of the technical aspects of the project, but this project requires that you know something about the typical life cycle of projects and the processes that occur within them, which you have learned in class. Therefore, do not concentrate on the technology or process solutions – focus instead on the management of this project as stated in the case, using the best practices that you have learned.

#### **Assignment Deliverable Content:**

Project charter/scope document, containing:

- Project identification: name/number
- Background – the organizational context
- Business objectives and business case (benefits)

- Detailed and measurable deliverables to be produced
- Detailed constraints (time, cost, scope) and scope/out of scope boundaries
- Project organizational structure
- List of high-level milestones, no dates or budget unless specifically mentioned in the case.
- Project strategy, including project integration and quality management approach
- Initial summary of risks and mitigation approaches
- Signature lines/dates for evidence of approval by sponsor, PM, and key stakeholders only

You may include some text from the assignment case problem in certain categories of your charter/scope document as appropriate.

### **General Assignment Guidelines For Students:**

While you can use help gained from researching templates found online, your documents must reflect the content and scale of this project case only! Most templates found online contain too many steps that are not appropriate for project cases we will use in class. Please focus on this problem only and do your best to produce proper documentation on your own that you would actually submit on the job. You will be graded as though this were a professional assignment, so be sure you think through what would be needed as though you were producing this for your boss! Note: ***Do not attempt to produce a project schedule in MS-Project or assign resources for this assignment.*** You do not have the necessary detail to produce a schedule, estimate times for tasks or assign resources to specific tasks at this time and you will lose points if you do.

Don't get distracted with the technology solution – think instead about what you, as a project manager, and your team should do, even if you don't know how the technology components or project steps will all be at this point. Try to imagine as much detail as you can. If you aren't familiar with the technology concepts, technical terms or approaches, please ask for help.

There is no single, correct “answer” to this assignment. Rather than make you guess a predetermined solution, you need to think out the problem on your own and develop documentation that you consider best. Grades will depend upon what you have included, how you have structured the documentation, the way you have expressed expectations, constraints, deliverables or other concerns, and the approach you have suggested for organizing and executing the work.

***(Instructor should attach the appropriate Part 1 Case Problem here – see sections 5.14, 5.18 or 5.22)***

## 5.7.2 *Student Initial WBS Assignment*

### **Assignment Requirements:**

- Due on #####
- Format: Electronic PDF-type Print-image File formatted in standard US letter-size pages using Adobe Acrobat or compatible software. The appropriate print-image can be created as a PDF file within the MS-Project software by using the “save as PDF” command in the File tab.
- File naming requirements:
- Tools: MS-Project software
- Note: You may not be familiar with all of the technical aspects of the project, but this project requires that you know something about the typical life cycle of projects and the processes that occur within them, which you have learned in class. Therefore, do not concentrate on the technology or process solutions – focus instead on the management of this project as stated in the case, using the best practices that you have learned.

### **Assignment Deliverable Content:**

Preliminary Work Breakdown Structure (WBS) using Microsoft MS-Project software that illustrates the possible structure of the project work from general concepts to detailed work packages that you would recommend at this stage as a project manager. Remember that you do not have all details of the project at this point, so do not attempt to infer what the details are – use only the information you have to develop a preliminary list of activities in the form of a WBS.

- THE FILE NAME OF THE SUBMITTED ASSIGNMENT must appear at the top task (PROJECT LEVEL) OF YOUR WBS. If you name the project file with the proper name following the instructions for formatting as stated in the assignment submission instructions above, and if you check ON the “Project Summary Task” this will appear automatically.
- Show at least 3 task detail levels in MOST of the areas of your WBS (Major task level and 2 additional sub-task levels).
- Include appropriate project management tasks, like team meetings, training and testing tasks in all appropriate areas of the WBS for this particular case study.
- Include all of the features you have learned about in your WBS including code numbering.
- Show very manageable tasks at the work package level. Enter the WBS into Microsoft Project

- Save the WBS directly from the software into a PDF format document according to the directions given in lab/class. (Screen shots of the WBS are not acceptable.)

### **General Assignment Guidelines For Students:**

While you can use help gained from researching templates found online, your WBS must reflect the content and scale of this project case only! Most templates found online contain too many steps that are not appropriate for project cases we will use in class. Please focus on this problem only and do your best to produce proper documentation on your own that you would actually submit on the job. You will be graded as though this were a professional assignment, so be sure you think through what would be needed as though you were producing this for your boss!

Note: *Do not attempt to produce a project schedule in MS-Project or assign resources for this assignment.* You do not have the necessary detail to produce a schedule, estimate times for tasks or assign resources to specific tasks at this time and you will lose points if you do.

Don't get distracted with the technology solution – think instead about what you, as a project manager, and your team should do, even if you don't know how the technology components or project steps will all be at this point. Try to imagine as much detail as you can. If you aren't familiar with the technology concepts, technical terms or approaches, please ask for help.

There is no single, correct “answer” to this assignment. Rather than make you guess a predetermined solution, you need to think out the problem on your own and develop documentation that you consider best. Grades will depend upon what you have included, how you have structured the documentation, the way you have expressed expectations, constraints, deliverables or other concerns, and the approach you have suggested for organizing and executing the work.

*(Instructor should attach the appropriate Part 1 Case Problem here – see sections 5.14, 5.18 or 5.22)*

### **5.7.3 Student Sample WBS Dictionary Assignment**

#### **Assignment Requirements:**

- Due on #####
- Format: Electronic PDF-type print-image file formatted in standard US letter size pages by Adobe Acrobat or compatible software.
- Tools: Standard word-processing software; Adobe Acrobat or compatible print-image software

- Note: You may not be familiar with all of the technical aspects of the project, but this project requires that you know something about the typical life cycle of projects and the processes that occur within them, which you have learned in class. Therefore, do not concentrate on the technology or process solutions – focus instead on the management of this project as stated in the case, using the best practices that you have learned.

### **Assignment Deliverable Content:**

**WBS Dictionary** formatted as described in class and in the textbook using standard word processing software. The WBS Dictionary is a special type of project management document, and is not a glossary of terms. Those submitting a glossary of terms will not get credit for this part of the assignment. THERE SHOULD BE AT LEAST 15 TASKS IN YOUR WBS DICTIONARY selected from various parts of your project to show that you know how to do this. You should use only the SIMPLE format WBS Dictionary consisting of:

WBS code (1.2.3.4)

Task description

Detailed description of the work being performed

Example:

**5.2.4 Product Testing**

**Products will be scheduled for testing in 6 stages as defined within the corporate quality assurance manual. The product quality assurance team will be the lead for this set of tasks.**

*(Instructor should attach the appropriate Part 1 Case Problem here – see sections 5.14, 5.18 or 5.22)*

### **5.7.4 Student Project Risk Management Plan Assignment**

#### **Assignment Requirements:**

- Due on #####
- Format: Electronic PDF-type print-image file formatted in standard US letter size pages by Adobe Acrobat or compatible software.
- Tools: Standard word-processing software; Adobe Acrobat or compatible print-image software
- Note: You may not be familiar with all of the technical aspects of the project, but this project requires that you know something about the typical life cycle of projects and the processes that occur within them, which you have learned in class. Therefore, do not concentrate on the technology or process solutions – focus instead on the management of this project as stated in the case, using the best practices that you have learned.

### **Assignment Deliverable Content:**

You defined initial risks in your charter/scope document, and then identified some of the risk management activities in your initial WBS. This assignment extends these previous assignments by providing you an opportunity to create a specific “subsidiary plan” that concentrates on risk and opportunity management. You may include other risks besides those you had in your Charter/Scope document. You are now much further in the course, and you are more aware of the types of things that can present risk or opportunity to a project of this particular subject, scale and complexity. This assignment is your opportunity to define these positive and negative risks in a professional document that demonstrates your understanding of what risk management includes, and how you envision that it applies to this specific project.

A project risk management plan describes in detail the types of risk management that will take place in the project, and the list of risks/opportunities that will be the focus of these activities. Package this document into a presentable format that could be issued to all team members, stakeholders, and the sponsor once approved.

Risk Management Plan Contents must include the following items only (do not submit a risk planning template gathered from outside the course as this will not satisfy this particular assignment requirement):

1. Title Page (with your name)
2. Description of Risk Management Activities – In this section of the plan, you should imagine what you would do as a project manager to conduct what sort of meetings or other activities you would need in order to define in detail what risks and opportunities might be present in this project, and also what specific sequence of actions you would need to have in the WBS to assess, document, prepare practical contingency actions for, and monitor the risks or opportunities that could affect THIS CASE PROBLEM.

Be sure to keep your activities appropriate to the scale of the project and the content of this case problem. You should apply your learned knowledge of what risk management activities there could be to this situation and describe the various activities that should take place in the sequential order that you think is best. For each of the risk management meeting, planning, documentation or monitoring activities you think you should list, you should describe the risk management activity and identify who will participate in it, what role they have in the risk management process and what risk management deliverable will be the outcome of that activity. Think of risk and opportunity management as something that is a sub-project throughout this client project. Remember that we have a number of specific deliverables that have been requested by the client, so your risk management activities should be designed to

assess, document, track and report on all the different types of risks or opportunities that these particular deliverables will involve.

3. Risk register table with the following contents for each Risk:
  - a. Risk/opportunity ID (a sequential number that you give each risk in the table)
  - b. Risk/opportunity description – short description of the risk.
  - c. Impact probability (IP); (scale 1-5)
    - (1) No Impact
    - (2) Impact is Not Likely
    - (3) Impact is Unknown
    - (4) Impact is Likely
    - (5) Impact is Definite
  - d. Impact severity (IS); (scale 1-5)
    - (1) No Effect on the Project
    - (2) Effect is Not Significant
    - (3) Effect is Unknown
    - (4) Effect is Significant
    - (5) Effect is Severe
  - e. Likelihood of advance discovery (AD); (scale 1-5)
    - (1) Definite
    - (2) Probable
    - (3) Unknown
    - (4) Not Likely
    - (5) Not Possible
  - f. Risk/opportunity priority number (RPN) calculated according to only the following formula as discussed in class:  $RPN = P \times IS \times AD$
  - g. Potential responses to each risk/opportunity based on priority and the standard choices for risk/opportunity responses we discussed in class. You will need to be specific on each according to how you feel a particular response is recommended and the practical rationale for your recommendation.
  - h. Risk/opportunity owner (accountable person who is assigned to monitor the risk, track it and report on it) You must appoint a Risk owner for each risk in your table.
4. Place for signatures/dates for key stakeholders to indicate approval (like you did for the charter/scope document).

The highest scores on this assignment will be for a practical risk management plan containing information specific to this project's requirements and deliverables, which name specific people and roles, address the practical concerns or opportunities

that exist only in this project, and will help the client to feel like you have the project under control, demonstrating that you can produce a professional document. Assignments should not contain generic material imported from somewhere else as this will not be appropriate for this situation and will lose points.

*(Instructor should attach the appropriate Part 1 Case Problem here – see sections 5.14, 5.18 or 5.22)*

### **5.7.5 Student Project Communications Management Plan Assignment**

#### **Assignment Requirements:**

- Due on #####
- Format: Electronic PDF-type Print-image File formatted in standard US letter size pages by Adobe Acrobat or compatible software.
- Tools: Standard word-processing software; Adobe Acrobat or compatible print-image software
- Note: You may not be familiar with all of the technical aspects of the project, but this project requires that you know something about the typical life cycle of projects and the processes that occur within them, which you have learned in class. Therefore, do not concentrate on the technology or process solutions – focus instead on the management of this project as stated in the case, using the best practices that you have learned.

#### **Assignment Deliverable Content:**

A **project communications management plan** describes in detail the types of communications that will take place in the project, and specifies forms to use for certain types of key project information that must be transferred among team members and to others involved in the project. The communications management plan should be written for the Case Problem. As the project manager, you will need to develop the policies and procedures for all means of communication across the project, taking into account the requirements for communicating with the sponsor, stakeholders, vendors and project team. Package this document into a presentable format that could be issued to all team members, stakeholders and the sponsor once approved.

The communications management plan should include:

1. Title Page (with your name)
2. Table of Contents
3. Description of “Who needs what communication, and by when or how often”
4. Description of “Who will produce this information for each of the above”

5. Determine the various technologies you will use to communicate for each of these, including:
  - a. Format of the information – communication systems or software to be used
  - b. Where forms or templates can be found by team members
  - c. Where copies of the official project records will be stored; who can access them
6. List Communication constraints:
  - a. Your policy for confidential or restricted information.
  - b. How do you define these and how should the team members handle such situations?
7. Your policy for communication outside the project team, stakeholders, and sponsor group
8. Include sample form templates as well as the instructions for using them for the following standard project management tools:
  - a. Status reporting
  - b. Change control
  - c. Issues management

The highest scores on this assignment will be for a practical project communications management plan containing information specific to this project's requirements and deliverables, which name specific people and roles and address the practical communication requirements that exist for this project, demonstrating that you can produce a professional document. Assignments should not contain generic material imported from somewhere else as this will not be appropriate for this situation and will lose points.

*(Instructor should attach the appropriate Part 1 Case Problem here – see sections 5.14, 5.18 or 5.22)*

### **5.7.6 Student Final WBS Assignment**

#### **Assignment Requirements:**

- Due on #####
- Format: MS-Project File (.mpp)
- File Naming Requirements:
- Tools: MS-Project software
- Note: You may not be familiar with all of the technical aspects of the project, but this project requires that you know something about the typical life cycle of projects and the processes that occur within them,

which you have learned in class. Therefore, do not concentrate on the technology or process solutions – focus instead on the management of this project as stated in the case, using the best practices that you have learned.

### **Assignment Deliverable Content:**

#### **MS-Project Schedule with Resource Assignments and Costs:**

- a. Develop the original Case Problem Part 1 and the new Part 2 details into a formal project schedule. *You will need to modify and finalize your WBS from the new case problem information* in order to develop the complete list of tasks that must be entered into the software for the schedule. This will mean that you may need to either take out information, or add new information, to modify your previous WBS from Assignment 1 now that you have the details.
- b. **All tasks in the WBS must be set to Auto Schedule task mode.** While an occasional constraint is sometimes appropriate, points will be lost if you force the schedule using manual constraints on your tasks to get the dates to work.
- c. Be sure to add project management and quality management tasks on your own in order to show how you would accomplish the project management and ensure that stakeholder satisfaction is achieved with the quality of the deliverables and communications.
- d. Set up the project software according to the instructions you receive in class (and the lab sessions) to add columns for Work and Cost and to set the necessary parameters including work hours per day and work hours per week.
- e. *Your Gantt Chart schedule should also show total work hours, cost, duration, average % complete, and start/finish dates for the entire project through the use of a project summary task in the WBS as discussed in class. This summary task should show your project submitted file name as the project name using the filename format specified above.*

#### **Other Tips and Requirements for a successful assignment:**

##### **MS-Project Resource Sheet:**

1. Resource Sheet should show **all resources as mentioned in the case**, types, availability and costs.
2. Your name should clearly be one of the resources assigned to appropriate project management tasks and should appear in the resource sheet.
3. **Names of individual team members, vendors and other stakeholders should clearly be shown in the resource listing, you may list 3-character**

**initials for these people as specified in the case, but you may not group these into general teams.**

4. If any material resources are mentioned in this case problem, these also should be visible in the resource sheet with correct costs specified **on a unit basis only. Combined costs for material resources will not be acceptable. Material resources should be included ONLY if they are mentioned in the case!**

#### **WBS Work Packages:**

1. No work packages at the lowest level of your WBS should have zero resources assigned, or zero hours (0h) in the work column. The only work packages that may have no cost in the cost column are special cases where fixed fees for this work are factored in from outside the scope of this project, or where executives or other staff of the client organization are doing certain work at no cost to the specific project team you manage. If these scenarios are appropriate for this case, it will be clearly mentioned, and you should follow those guidelines.
2. Grade will depend on how appropriate your effort estimates are — be careful to give a realistic estimate for project management and quality tasks. For example, writing a report or revising a schedule in 30 minutes or one hour may not be realistic! Think carefully about each task and review your work. If you see a resource allocation of 0.13 FTE for a single resource on a task, for example, this means that the person will spend about 8 minutes on the task at a time, and this is not at all something that can be managed. In this situation, it is likely that the software adjusted things due to schedule constraints that you have put manually on tasks, and that you did not go back and reset these allocations to a more realistic level.
3. **Costs must be automatically calculated through resource assignment onto work packages only, not entered directly into any task or summary task cost fields.**
4. **Budget total must reflect the appropriate scale and complexity of this case problem, and must comply with any constraints and restrictions indicated previously in the case. Do not add costs to try to get to the top-level constraint mentioned in this case problem. If you work carefully on the appropriate tasks for the case, you will be able to justify a cost total, even if it is under the constraints. Just be sure that all resource costs are included.**

#### **Some additional considerations:**

1. You need to modify your original WBS to produce a final WBS from the additional information in this part of the case study. ***Be sure you give each of***

*the WBS entries the proper numerical code and indents to show the structure of the project WBS.*

2. Resources and costs have been identified for you. **The final budget total will be calculated using the MS-Project software but should adhere to the constraints in the case. Points will be deducted if your budget exceeds the constraints of the case.**
3. You must think about how to sequence the tasks logically and efficiently. Some task dependency may be mentioned in the assignment, but is ultimately up to you, as there are several correct possibilities. Do your best to identify the logical progression of tasks that makes sense and determine which can be done in parallel.

There is no single, correct “answer” to this assignment. Rather than make you guess a correct approach, you need to think out the problem on your own and develop a deliverable that you consider best. You will be evaluated on what you have included, how you have structured the project, how you have assigned resources, the way you have forecasted costs, and the approach you have suggested for organizing and sequencing the work.

*(Instructor should attach the appropriate Part 2 Case Problem here – see sections 5.15, 5.19 or 5.23)*

## **5.8 Instructor Guide for Overall Assignment Management**

*Instructor Notes for Student Project Charter/Initial Scope Assignment (5.7.1)*

This assignment is designed for the early stages of the course after the concepts of project structure, methodology, integration, scope and stakeholders are covered.

The case problem used for this segment (Part 1) has various bits of critical information scattered through the text. This is purposeful, because it is meant to simulate the situation where information comes to the project manager in several clues, contexts, and forms. Part of the skill of developing the documents that describe the project at the early stages of the project is making certain that everything is gathered together and organized in those documents. This activity is critical to helping students realize that very important pieces of information about the project may appear very inconsequential at first, only to become a major constraint or critical risk factor.

One of the most common issues that occurs in this assignment is the use of generic templates that students can find on the Internet and even on some textbook publisher sites. Instructors should be firm with students that submission of these generic templates are not acceptable. Grading should focus on the details of the case problem, and whether the student has made the effort to properly analyze the case.

There can be confusion about how some sections seem to duplicate information found in others. Students are sometimes uneasy about this, and they think that each section should contain mutually exclusive information with regard to all other sections. Instructors need to point out that this is project documentation, and that the point of a structured document is to allow the reader to find the information needed in the appropriate labeled sections. Some readers will only review certain sections, so it is acceptable to repeat some information in multiple sections if it makes sense if recipients of the document are reading only that section.

Students often ask for sample documents. This is symptomatic of a student who is uneasy about where to begin because they have had little experience in originating a structured document. The instructor should be cautious about providing a sample that is very similar to the case, because students will focus on that sample as the assumed required format and content. If a sample is provided, it should show the appropriate format and section headers that the instructor requires, but the content should be very different from the case problem. It is also appropriate to review the process of creating the document in class. Students can be instructed to start first with a document formatted with each section title, then review the case problem and insert points as phrases into the appropriate sections of the document, and then the student works to make these sections readable with all complete information.

It is important that the instructor recognize that this assignment incorporates only Part 1 information for the case problem. This means that the document will necessarily be more high-level, but it should still reflect the nuances of the specific case situation.

*Instructor Notes for Student Initial WBS Assignment (5.7.2)*

The WBS assignment is designed to be due at the point when students have first learned about developing a WBS.

Like assignment section 5.7 above, the most common issue that occurs in this assignment is the use of generic WBS templates that students can find on the Internet and even provided by MS-Project with the software. Instructors should be firm with students that submission of these generic templates are not acceptable. Grading should focus on the details of the case problem, and whether the student has made the effort to properly analyze the case and build WBS steps that are specific to the project.

It is important that the instructor recognize that this assignment incorporates only Part 1 information for the case problem. The purpose of this assignment is not to develop a full project schedule, but to gain practice with the MS-Project software earlier in the course rather than waiting until the final assignment. In practice, this has reduced final assignment errors and student anxiety significantly because students have at least had some contact with the software in order to do this earlier assignment.

Therefore only a properly-formatted WBS is needed – no resources, Gantt Chart or costs are required, and that is why the Part 1 Case Problem does not contain this information. This simulates the very initial information that project managers often get when they must come up with an early idea of the tasks that may be involved in the project. If students receive only this rather light form of the information, they become more aware that project managers have to begin developing documents without complete project information at the early stages of the project timeline. If students are given complete information at the beginning, they will expect it on the job later, and this can lead to frustration when it is not available, compromising the learning effectiveness.

Instructors should look for project administration, quality and communication tasks in the WBS. These are purposefully left out of the case problem in order to give students the experience of needing to think about these tasks and add them. Often, students look only at the given information of the case for their WBS, and it is a major learning experience when they realize that there is more to a project than just the specific deliverables that are named in the initial requirements.

*Instructor Notes for Student Sample WBS Dictionary Assignment (5.7.3)*

The WBS dictionary assignment is designed to be due at the same time as the WBS assignment (5.7.2).

The most common error made with this assignment is the use of the WBS dictionary document to simply define terms or abbreviations. Students have a difficult time understanding that the term “dictionary” in this context is not meant literally. Instructors are encouraged to reinforce the fact that the WBS dictionary is for the purpose of further defining the work that would be involved in a given task of the WBS. Examples help significantly with this, but the examples given should be different in content from any part of the case problem.

Another issue with this assignment is whether the student is using a format of the WBS dictionary that requires detailed task information to be included. The student does not have this information at this stage of the course, so that is why the WBS dictionary format should be simplified. If instructors want students to submit the full, complex WBS dictionary format with all task, cost and schedule information, then this assignment should be given along with the final project schedule assignment (5.12) that includes more detailed case information from Part 2.

*Instructor Notes for Student Project Risk Management Plan Assignment (5.7.4)*

This assignment can be due at any point in the course after the topic of risk management is covered, but it should proceed the Final WBS assignment (5.7.6) because that assignment should include the incorporation of detailed tasks for the team’s risk planning and the development of the plan document that was done here. When

students do this assignment before that final plan, they have a more realistic sense of what it takes to do risk assessment and mitigation planning.

Students normally need only a week or so to complete this assignment.

The most common issues that come up with this type of assignment appear in the nature of the risks that are assessed by the student. Instructors should be firm about distinguishing generic risks (like, “A critical team member may fall ill and not be able to perform their duties sufficiently.”) from more specific risks to this case problem (like, “Regulatory agencies in California may issue restrictions for the use of drones to deliver pharmacy products.”) when coaching students. While the former are appropriate to include, the risk management plan should not consist of these exclusively. The majority of the risks should be specific to the case problem, discouraging students from merely copying generic plan templates that can be derived from Internet sources.

Risk management planning activities are an area that can confuse students. The Instructor needs to coach students to think about this particular case problem, and to determine what activities should be done in order to properly assess potential risks and to develop this plan. This differs from risk mitigation activities, of course, but some students will focus on what one does once a risk has been identified or occurs, and not on the nature of assessment and planning for risks.

Another issue that occurs is the common misunderstanding of the nature of the “risk owner” in the risk register. Some students may assign the whole team to this role in the belief that all people have some responsibility for every risk. Other students may assign only themselves as project manager to be the owner of all risks in the belief that the PM has the ultimate accountability if a risk threatens the project plan. However, Instructors need to focus the student on the role of risk owner as the one who is specialized in this particular area, can monitor the project context for the occurrence of the risk, determine to what extent it is taking place, and at least alert the PM to the fact that actions need to be engaged to take account of it.

Sometimes the student’s calculations of the risk priority number (RPN) are in error, so it is important that the Instructor not only check these, but assess the relative priority being calculated for a given risk to ensure that it makes logical sense based upon the case scenario.

*Instructor Notes for Student Project Communications Management Plan Assignment (5.7.5)*

This assignment can be due at any point in the course after the topic of project communication is covered, but it should proceed the final WBS assignment (5.7.6) because that assignment should include the incorporation of detailed tasks for the team’s communication planning and the development of the plan document that was

done here. When students do this assignment before that final plan, they have a more realistic sense of what it takes to do assessment of total project communications activity and the assignment of roles and responsibilities associated with these items..

Students normally need only a week or so to complete this assignment.

The most common issues that come up with this type of assignment appear in the nature of the communications that are included. Instructors should be firm about distinguishing generic communications (like, "Hold regular status meetings between the project team and the client.") from more specific risks to this case problem (like, "Hold weekly status meetings between key team representatives from Wilmont's and DroneTech project teams.") when coaching students. While the former are appropriate to include, the communication management plan should not consist of these exclusively. The majority of the communication activities and deliverables should be specific to the case problem, discouraging students from merely copying generic plan templates that can be derived from Internet sources.

Another area that can be of concern in this assignment is in students understanding the difference between a stakeholder communications analysis and a common RACI or RAM assignment matrix for general project tasks. Again, the instructor may need to coach students on the nature of how project communications activities like meetings, reports and other communication information needs to be planned with regard to the originator, the receiver and the properties of that communication. The difference between communication activities and other project activities is critical in this assignment. There also needs to be consistency between the areas of the plan that list certain communication activities and deliverables and then the corresponding areas of the stakeholder communications analysis where these deliverables and activities should all be further defined. Students often leave things out of the communication analysis table, even though they have mentioned that a meeting, report or communication is necessary in the communications activity management area of the plan.

*Instructor Notes for Student Final WBS Assignment (5.7.6)*

This assignment is designed to be the final assignment for the course because it involves multiple skills and concepts delivered throughout the course. Students should have about 3 weeks to complete this assignment, so instructors should distribute it along with the Case Problem Part 2 about 4-5 weeks before the final class, with due date about 1-2 weeks prior to that class to allow for grading and feedback. If the course schedule permits students to turn in a resubmission one week after the last class meeting time, this will be sufficient, but if not, the assignment schedule will need to be moved up one week to be distributed about 5-6 weeks before the last class.

This is an intense assignment, and students should be provided with guidance, in a lab setting if possible, for the use of the software tools that are involved in creating the schedule from the WBS. A lab or course assistant will help if there is a large quantity of students enrolled in the course, but this assistant needs to be coached by the instructor not to divulge information about how to analyze the case or sequence the tasks. The assistant's role is in helping students to understand the use of the software tools to enable them to create their schedule deliverable. Lab settings can be used to discuss techniques for how to schedule recurring meetings, develop resource lists, create lag and lead times for tasks, and assign resources to tasks, etc. Demonstrations are an important part of this assignment, so the instructor needs to be familiar with the software tools.

The assignment is submitted in the preferred scheduling software file format, allowing the instructor to examine how the student has formulated all aspects of the schedule, including cost, time and scope. The native software tools will also be at the instructor's disposal to enable investigation of issues that might be present in a student's submission, helping in the delivery of constructive feedback to the student for potential resubmission as appropriate.

*Special Notes Regarding Evaluation of Student Submissions for the Assignment:*

As described in the Instructor Guide for Part 1 of the Case Problem (See sections 5.20, 5.22 and 5.24), one of the features of this case problem is that the constraints defined in the problem text are maximum. There is a budget figure mentioned, and there is a requirement for the date of the first prototype flight/delivery. However, these constraints of time and cost are greatly in excess of those required for the range of appropriate project plans. In essence, this case problem is a "trick question", and the specifications of the project contained in it could lead some students to assume that the final project schedule and budget should be at the constraint levels that were mentioned in the case.

Of course, best practice would suggest that projects should be planned with schedule and budget constraints in mind, but not so that all time or cost resources are consumed. Therefore, the parameters of this situation must be carefully analyzed by students to fully understand that the stakeholders in the case problem are not *requiring* the project to reach these constraints, but are simply stating that these are the *ultimate* constraints. Case problems with this type of twist will challenge students to think critically, and it is obvious when looking at their final schedules that some have greatly exaggerated estimates of time and cost in order to stretch the project to reach the maximum constraints. Other students get the concept that the responsible project manager estimates tasks realistically, and then uses the constraints to adjust the plan if needed to remain within them—not the other way around!

Therefore, the instructor should examine the student's submitted WBS to determine to what extent the student has followed estimation, scheduling and resource allocation best practices. There are specific features of this case problem that make such an examination straightforward, including the relative proportion of development vs. testing, cost of project administration tasks vs. design/execution, contract payments to the vendor, etc.

If using MS-Project, the resource sheet should list all resources mentioned in the case problem, and the resource utilization/usage view will identify to which tasks resources have been assigned, giving a clear picture of how the student has allocated resources throughout the project.

Project meetings and other administrative tasks should be reasonable for the project's scale and complexity. Project template files are readily available, and the instructor should become familiar with these options that students sometimes will attempt to submit. Look for very generic tasks in the WBS, or tasks that are well beyond the scale and complexity of the project situation. Generally, the instructor can assume that if the WBS clearly shows the specific details of the case problem, then that indicates that the student had to have developed it carefully in order to incorporate all of those unique details. If the WBS looks like it could be for any general project, then likely the student used a general template without much customization for this problem situation. Many available project software template files already have resources and costs assigned to these general tasks, but the lack of tasks and resources that are unique to the case problem situation would be the first indicator of a sub-standard effort by the student.

Of particular interest should be the sequencing of procurement and execution tasks. If parts or equipment are required, then they cannot be used until they have been purchased and received. If contract payments are made upon completion of certain deliverables, then these deliverables should be appropriately scheduled within the overall project plan, and the payments would be sequenced at the points where they reflect the completion of those stages.

Another issue that can develop is in the area of recurring task scheduling, such as weekly meetings. Students can independently program such a recurring schedule of repetitive meetings to start and end at specific dates, and some students do so without thinking about the total range of time they have specified. This can be confusing, since the meetings may continue for several weeks beyond the final stages of the project execution, extending the project finish date simply because of the meeting tasks. In some cases, students may do this deliberately as a technique to make the project extend to a certain length that they feel is appropriate given the constraints as mentioned above. Therefore, instructors should carefully check the meeting schedules to ensure

that they correspond to the project execution dates and remain within the appropriate time frame for the other project tasks.

Predecessors should be checked to ensure that weekly status meetings are not used as predecessor tasks for project execution, as this is another technique that can be used by students to make a project “fit” into a specific fixed timeframe without having to actually specify start dates for certain tasks. In addition, predecessors should be examined to ensure that these are logical and do not create excessive constraints on the scheduling algorithms. If many tasks do not have predecessors, this can be an indicator that the student has taken shortcuts in developing the schedule rather than sequencing carefully at the detailed work package level.

The nature of the assignment specifies that all tasks must be auto-scheduled, allowing the project scheduling software to take all the parameters specified by the student in calculating the final schedule. The instructor should examine the schedule information column (MS-Project) for indicators that specific tasks have been constrained by dates, or the tasks are manually scheduled. In either case the learning is compromised, because the student forces the schedule to take a certain timeline.

Another item to examine is the nature of the cost roll-up. Sometimes, when students place costs directly on tasks, the total costs of the project are compounded and greatly expanded. Students should place costs on resources in the resource database only (MS-Project resource sheet) from which costs enter the budget when those resources are assigned to a task in the schedule. This particular condition is difficult to determine without careful comparison of task costs to assigned resource costs, but the typical indicator that something is wrong will be most likely that costs on sub-tasks do not add up properly, or that they do not correspond to the individual costs of the resources assigned to those tasks.

The case problem states that students need to indicate a degree of completion of various tasks that are scheduled up to a given date. This section of the assignment can be managed according to the priority of the instructor, who may wish to include EVM and other measures of progress in addition to those specifically mentioned in this document. Instructors should remember that a running problem case is a form of simulation, but it is not reality. The classroom can only simulate the progress of projects just so much, and it may not adequately prepare students to make judgments in the way that they may have to do so in real project situations. Still, it is useful for students to get a sense for what might be involved in tracking progress using the tools of PM and scheduling – in other words, to reflect a given decision or status of progress in the form of defined deliverables rather than in the nature of actually making the decision itself.

Finally, instructors need to take note of the fact that the case problem does not specify project administration, requirements gathering, deliverable design, project

integration, risk and quality management, stakeholder interaction or communication tasks. This requires the student to take what has been learned in the course and make their own judgments about what these tasks and effort estimates might need to be. If students have learned sufficiently, their schedules will be complete and practical with all of these considerations in place, demonstrating that they can approach the problem as a project manager, and not as a domain specialist who considers only project execution as the most important priority.

## **5.9 Problem Case: Information Technology Student Information**

### **5.9.1 Part 1**

#### **Case Problem – Part 1:**

Wilmont's is a top-ranked US retail pharmacy company based in St. Louis, MO with more than 8,000 stores nationwide and in all 50 states, and employing more than 244,000 people overall.

The company has engaged in a number of innovative business practices, and now they are once again secretly considering breaking ground with an even newer concept – delivering prescriptions and drugstore items by flying drone.

The concept isn't new – a small firm named DroneTech in San Francisco, CA announced the approach in March, and they are looking to develop a relationship with drugstores nationwide to launch the concept for real. Wilmont's may be the big break they are looking for!

The Operations Vice President (George Cranston) of Wilmont's has asked the CIO to develop a pilot project to get something moving and see how this works. George will provide the funds and will oversee all aspects of this initiative. Mary Pearson is the project lead on the business operations side who will manage the project generally for Mr. Cranston.

Mr. Cranston has made an agreement with DroneTech CEO and founder Jordan Kempler to prototype this project in the San Francisco area, which is the home location of the DroneTech organization where it developed the system. DroneTech will customize its systems, interfaces and business processes to conform to project requirements from Wilmont's.

You are a project manager for Wilmont's internal IT department, and you have been assigned by your CIO, James Connor, to lead this project in terms of the information systems that will be needed to support the initiative. Phillip Greenberg is the project manager at DroneTech who will work with you. Generally, from the IT perspective, the project will likely need to accomplish the following:

- Develop a Wilmont's online order entry system modification that will allow customers in the San Francisco area to register their willingness to

have a drone deliver their orders by means of online entry or smartphone entry. There will be significant restrictions on the approval of customers for this service, so there will need to be a segment of the system to allow Wilmont's management to approve the customer, send a confirmation to the customer, etc..

- Create reports for Wilmont's management to provide information on sales, customer reactions and key performance indicators that senior management will define for you.
- Create communications for customers electronically through email, online and through mobile alerts as the customer requests.
- Interface to the DroneTech Corporation for its order entry, delivery confirmation and mobile application software. Eileen Seymour is the point of contact on the information systems side with DroneTech and will be overseeing the team on their side. A price for this system customization is not yet determined and the development of this proposal will be a part of your project plan.
- Develop security options for all systems that will safeguard the data as it is stored within your company, and also as it is exchanged with DroneTech. You will work with Wilmont's Information Security Management Team to accomplish this, and William Scott is the project lead on that team for this project.
- You will need to identify basic requirements and then determine your team members from the list of people given in this document as you move toward final project planning.
- It has been determined that only four (4) of Wilmont's pharmacies will participate in the prototype delivery system. These are in a close geographic area to one another, and they are in a non-city environment consisting mainly of suburban homes and small businesses. Customers in apartment buildings will not be permitted in the prototype due to delivery issues.

No hardware, servers, workstations or other network infrastructure will be required for this project, as all of that is only on the DroneTech side, and they will be including it in their proposal and a separate project plan that they will give to you as a part of their contract. Wilmont's can accommodate this prototype system within their existing infrastructure that handles customer orders. Ongoing system maintenance scheduling or planning after the prototype is implemented will not be a part of the project schedule or plans —you will be developing that plan separately once the systems design is known.

Wilmont's has allocated a maximum of \$1,750,000 for this prototype project. You have been asked by your CIO to ensure that your project does not go over this figure,

and, if possible, that the total project cost is under that amount.. The two companies agreed that they would like to begin the project on next January 5, and that their first customer delivery flight should take place no later than November 30 to avoid harsh weather in the San Francisco area.

Of course, you also need to include specific steps and processes for:

- Regular meetings with the Team, Stakeholders, and Cross-impacted areas of the company.
- Approval points as needed through the project sequence.
- Points at which you will refine cost and staffing requirements (you do not need to calculate costs or total staffing at this point)
- Points at which you will produce the various project plan documentation deliverables discussed in class.
- Testing, quality control and provision for issues that may develop.
- User training and other preparations for system implementation. The Wilmont's Change Management Team, headed by Shirley Johnson, will assist you in this effort.

#### **Summary of Personnel Involved in the Project (name initials are in brackets):**

##### **DroneTech Corporation Staff:**

- Jordan Kempler (JXK) - CEO and Founder
- Phillip Greenberg (PAG) - Project Manager – main point of contact
- Stephanie Williams (SMW) – Senior Business Analyst
- Gerald Hasper (GPH) – Senior Systems Engineer
- Eileen Seymour (ERS) – Project Lead, IT Systems

##### **Wilmont's Staff:**

- George Cranston (GWC), Operations VP
- James Connor (JFC), CIO
- Mary Pearson (MJP), Project Lead, Business Operations Team
- William Scott (WKS), Project Lead, Security Team
- Julie Green (JRG) Pharmacy Manager Store #35864
- Steve Haskell (SLH) Pharmacy Manager Store #32185
- James O'Donnell (JLO) Pharmacy Manager Store #38734
- Wilma Marcy (WPM) Pharmacy Manager Store #33001
- You as Project Manager (Come up with your own initials)
- Mary Kerstner (MJK), Business Systems Analyst
- Jonathan Perry (JSP), Programmer
- William Postner (WKP), Senior Programmer
- Sherry Loganthorpe (SPL), Database Administrator

- Linda Thornton (LET), Reports Systems Programmer/Analyst
- Gerald Peritoni (GEP), Testing Specialist
- Elizabeth Walton (EMW), Senior Testing Specialist
- Shirley Johnson (SPJ), Change Management Coordinator

### *End of Case Problem*

#### **5.9.2 Part 2**

##### **Case Problem – Additional Information for Part 2:**

Please review the Part 1 Case Problem information as it is the general background and requirements of the case. This information should be added to the following clarifications regarding the project schedule:

1. Total project cost must not exceed project constraints. Project schedule should begin January 5, and should meet the schedule constraints as per the case for completion, etc. You may assume 100% (1.0FTE) allocation to this project for each resource in the list below. Load leveling is NOT required for this assignment, and over-allocation warnings on your WBS will not be counted as a problem as long as the resource effort allocation is reasonable.
2. It is critical that your assignment WBS is specific to this case problem in detail. You must ensure that all required deliverables appear in your WBS specifically, and that each includes design, development, testing and implementation as appropriate. Your WBS must include project management steps for the charter/scope, risk management plan, WBS, schedule, training and the required meetings to conduct and manage the project. Do not include things like “procurement management plan” or “staffing plan” or “quality management plan” as these are not a part of this case problem. A generic WBS is not acceptable for this assignment. This is practice for you to see how you might deliver such a detailed schedule for this case problem to your boss, and it will be evaluated that way.
3. It is up to you to add the project management, communication, testing and training tasks as needed to make the project successful. Use the information in the case and the other assignments, along with your own ideas about how much effort is involved to ensure a quality implementation overall throughout the project. Be sure that you do not exceed the project constraints.
4. Remember that this project will be tight in terms of time and cost, so do not include steps that are not really necessary for this particular project. You should schedule the project from the beginning, including charter/scope, planning meetings, risk management and communications management plan development, WBS and schedule development—these items need to

appear in this schedule along with resource assignments and the appropriate costs that go along with them.

5. Finally, you are required to indicate an appropriate quantity of tasks that have likely been already in progress or completed. Assume that we are looking at your schedule on June 27. Show which work packages would probably be at what stage of completion by this specific time in the schedule. Use your own judgment based on the work package finish dates, but be reasonable!
6. The personnel involved in the DroneTech Corporation do not have billing rates per hour because their cost is being absorbed by the fixed fee specified in their proposal below. These people should be listed in your resource sheet, but with \$0.00 standard rate, and they should be assigned to the appropriate tasks for the project.
  - Jordan Kempler (JXK) – CEO and Founder
  - Phillip Greenberg (PAG) – Project Manager and main point of contact
  - Stephanie Williams (SMW) – Senior Business Analyst
  - Gerald Hasper (GPH) – Senior Systems Engineer
  - Eileen Seymour (ERS) – Project Lead, IT Systems

They should be assigned to project tasks as appropriate using the information in the case and the details below.

7. DroneTech Corporation Contract Fees and Dates:  
Wilmont's has signed a contract with DroneTech specifying the following phased payment plan that is linked to specific dates or deliverables. You are responsible for ensuring that the payments occur on time, but are only made if the appropriate conditions have been met. Be sure to include the necessary tasks in your WBS to accommodate evaluating, and paying for, these contract activities:
  - Total DroneTech fee for customizing order entry, delivery confirmation and mobile application software to Wilmont's specifications: \$423,592.00 with payments to be received as follows:
  - February 2 – initial payment due: \$42,000
  - After Wilmont's approval of DroneTech Customization Design Phase: payment of \$45,000
  - After successful demonstration of order entry module: payment of \$35,000
  - After successful demonstration of delivery confirmation module: payment of \$55,000
  - After successful demonstration of mobile application module: payment of \$25,000

- After production system test approval by Wilmont's: payment of \$85,000
  - After successful implementation signoff by Wilmont's: final payment of \$136,592
8. Wilmont's staff, internal effective hourly rates and official abbreviated names (initials):
- George Cranston (GWC), Operations VP (\$200/hr)
  - James Connor (JFC), CIO (\$150/hr)
  - Mary Pearson (MJP), Project Lead, Business Operations Team (\$50/hr)
  - William Scott (WKS), Project Lead, Security Team (\$50/hr)
  - Julie Green (JRG) Pharmacy Manager Store #35864 (\$60/hr)
  - Steve Haskell (SLH) Pharmacy Manager Store #32185 (\$60/hr)
  - James O'Donnell (JLO) Pharmacy Manager Store #38734 (\$60/hr)
  - Wilma Marcy (WPM) Pharmacy Manager Store #33001 (\$60/hr)
  - You as Project Manager (Add your own initials): (\$55/hr)
  - Mary Kerstner (MJK), Business Systems Analyst (\$45/hr)
  - Jonathan Perry (JSP), Programmer (\$40/hr)
  - William Postner (WKP), Senior Programmer (\$52/hr)
  - Sherry Loganthorpe (SPL), Database Administrator (\$55/hr)
  - Linda Thornton (LET), Reports Systems Programmer/Analyst (\$38/hr)
  - Gerald Peritoni (GEP), Testing Specialist (\$38/hr)
  - Elizabeth Walton (EMW), Senior Testing Specialist (\$49/hr)
  - Shirley Johnson (SPJ), Change Management Coordinator (\$38/hr)
9. The following is the estimated total EFFORT HOURS for only the software programming and reporting to the customer and Wilmont's management for the prototype systems. (these do not include design requirements, project management activities, testing, training, final implementation or meetings – you will need to add those additional steps and estimates for each):
1. Wilmont's Inventory Management System Modifications (180 hours)
  2. Wilmont's Pharmacy Customer Database System Modifications (180 hours)
  3. DroneTech General Interface – Wilmont's Side System (150 hours)
  4. Website Content Update – Wilmont's Side (175 hours)
  5. Customer/Management Reporting (135 hours)
  6. Store Management Reporting (135 hours)
  7. Credit Card Processing (75 hours)
  8. Wilmont's Sales Management Reporting (150 hours)

You need to determine who on Wilmont's and DroneTech's staff should be involved in the various deliverables based upon your best judgment, and how their positions and skills relate to the tasks.

## *End of Case Problem*

### **5.10 Information Technology Instructor Guide for Part 1**

This part of the problem case sets the stage as a situation involving the student as a project manager in Wilmont's IT group. This case focuses on the modification of Wilmont's systems to enable the DroneTech control systems to interface with them.

The DroneTech system customizations are characterized in this case as a "black box" type of software development project scenario – where the vendor has an independent project plan that is largely unknown to the client organization, but where deliverables are created for that organization in return for payments matched to those deliverables. Therefore, the case stages a typical vendor/client relationship, but it does not complicate the project by making the student consider project details for both vendor and client. In a more advanced course, such complexity could be more appropriate than in a fundamental PM course.

Students might wish to use Agile approaches in developing the project strategy, so the instructor needs to be clear about whether this is permissible. If Agile approaches are permitted, then the instructor needs to be clear about how the documents will be judged for best reflection of Agile best practices.

One distraction that often comes up is the focus of some students on just the software development aspects of the project. This is an excellent opportunity for students to learn how much is involved in a software development or modification project other than software! In addition, each subgroup of the project has its own project manager, so the IT PM is the only one and the students must design the project to take account of the other PMs as key stakeholders. The instructor should help to focus the students on PM without letting them get lost in the details of a particular system or technical solution.

In Part 1, the focus is on designing the project overall, so students should not get distracted with scheduling things at this point, nor should they attempt to develop details that are not given in the case. Certain key points are mentioned, including start date, first flight date and ultimate budget constraints. Student deliverables should remain consistent with these, and they should not read into the case things that are not mentioned. Costs for certain milestones are not known, so until the final assignment, these should not be mentioned in the charter/scope document. Instead, students need to imagine themselves dealing with all the information systems that would be necessary to properly take the customer's original order for a product and carry that through to the point where it is reflected in the drone control systems at DroneTech and the management reporting systems at Wilmont's. There are numerous systems that are involved, so student plans should reflect these individual deliverables and the

surrounding effort that is needed in order to build quality, reliable software to manage this approach.

Instructors should help the IT students envision the scale and complexity of the information systems that would be involved in such a project for such a large organization – even though the actual project is involving only four pharmacies at the prototype stage. This is a typical IT scenario – the systems need to be modified or built completely even for a limited prototype. If one can develop the systems for drone delivery of one customer’s product, then theoretically it will work when scaled up to hundreds of thousands.

However, in this case problem, the limit of four pharmacies in the prototype keeps the project complexity at a certain level while students focus on the PM tools and approaches in this fundamental PM course. The purpose of Part 1 is to help the students to gain a sense of what would be involved and what is the appropriate scale, while helping them to be clear about deliverables, constraints, multiple teams, contract relationships and end user acceptance of both the drones and the information systems that must be used along with them.

### ***5.10.1 Problem Case: Information Technology Instructor Guide for Part 2***

Since the second part of the case builds upon the first part with additional information, specific resource costs and estimates for certain portions of the project effort, students may need the original case text as well as the text for this part 2. Instructors should provide the original text in a place where students can get to it while working on part 2, or combine the case texts into one set that is distributed together for the final assignment.

The second part of the case details the effort, people, and costs involved in the systems and more fully expands the nature of the contract with DroneTech. Key to this part of the case is that the information given is limited to just the costs and effort of software development. This gives students an opportunity to estimate other parts of the project effort based upon the known software development parts. Algorithms are not given in the case for these – instructors should either provide these algorithms or have students do their own research on ways to estimate the unknown surrounding tasks of requirements gathering, design, testing, and implementation of software when the programming effort is known. Final solutions will vary, but instructors should view acceptable results as a range of possible solutions rather than a right or wrong answer. Making a first pass through the assignments to gauge the overall extent of the range of project time and cost values will help the instructor to determine what the acceptable values are. Then students who submitted solutions that are outside of the acceptable range should be given feedback about what might have gone wrong.

Students will often ask how to use the given effort estimates to arrive at an appropriate schedule: Should they split hours among the assigned resources? Should they include certain detailed steps to be involved in system development? Should they consider documentation and requirements gathering as one step or two? These questions are typical of students with less experience in project planning, and it may also reflect students who have had some detailed experience with software development that was planned in a specific way in one organization. The instructor should be prepared for these questions and have answers ready. Remember that the focus of the assignment is on the project management process, so it is up to the instructor to use their own domain knowledge in order to best respond to student inquiries. None of these issues will greatly affect the nature of the way this case is intended to be used as a learning tool. So, a variety of possible student approaches are completely workable, and the instructor should feel free to direct students to approach these queries in the ways that seem most appropriate.

Instructors should also feel free to adjust various parameters of this part of the case to conform to a particular approach that makes sense for the course and for the domain area of focus. The intent of the case is to lift the student from the details of the technology or business process and focus them on what is needed to get the project done successfully within the constraints of PM best practices. Above all, the case is intended to assist students in understanding where tools and templates for project management can be used, and what it might be like to adapt and apply them to a given scenario. Therefore, the values of effort, cost per hour, total budget, dates and other constraints and values can be flexible without compromising the nature of what the case can do for the learning process. The important thing is to provide students a scenario that appears somewhat realistic, while recognizing that it is impossible to make it actually real within the context of a college course learning experience. In its present form, the case is only partially able to be a simulation, so the Instructor should keep the focus on giving students the opportunity to rehearse under controlled circumstances while recognizing that the ultimate performance will be up to the student when they must apply their skills to a real situation at a later time.

## **5.11 Problem Case: Management**

### ***5.11.1 Problem Case: Management Student Information Part 1***

#### *CASE PROBLEM – Part 1:*

Wilmont's is a top-ranked US retail pharmacy company based in St. Louis, MO with more than 8,000 stores nationwide and in all 50 states, and employing more than 244,000 people overall.

The company has engaged in a number of innovative business practices, and now they are once again secretly considering breaking ground with an even newer concept – delivering prescriptions and drugstore items by flying drone.

The concept isn't new – a small firm named DroneTech in San Francisco announced the approach in March, and they are looking to develop a relationship with drugstores nationwide to launch the concept for real. Wilmont's may be the big break they are looking for!

The Operations Vice President (George Cranston) of Wilmont's wants to develop a pilot project to get something moving and see how this works. George will provide the funds and will oversee all aspects of this initiative. You are the Project Manager on Wilmont's business operations side who will manage the project generally for Mr. Cranston.

Mr. Cranston has made an agreement with DroneTech CEO and founder Jordan Kempler to prototype this project in the San Francisco area, which is the home location of the DroneTech organization where it developed the system. DroneTech will customize its systems, interfaces and business process to conform to project requirements from Wilmont's.

Mary Pearson is the Project Manager for Wilmont's internal IT department, and she has been assigned by CIO, James Connor, to lead the information systems development that will be needed to support the initiative. Phillip Greenberg is the project manager at DroneTech who will work with you. Generally, from the Operations perspective, the project will likely need to accomplish the following:

- Develop a Wilmont's online order entry process that will allow customers in the San Francisco area to register their willingness to have a drone deliver their orders by means of online entry or smartphone entry. There will be significant restrictions on the approval of customers for this service, so there will need to be a segment of the process to allow Wilmont's management to approve the customer, send a confirmation to the customer, etc.
- Create reports for Wilmont's management to provide information on sales, customer reactions and key performance indicators that senior management will define for you.
- Create communications for customers electronically through email, online and through mobile alerts as the customer requests.
- DroneTech will handle piloting the drones and delivery of the products. They already have processes that handle order entry, delivery confirmation and a mobile app, but they need to be customized for Wilmont's so that customers don't see these as two separate companies. Eileen Seymour is the point of contact on the information systems side

with DroneTech and will be overseeing the team on their side. A price for this system customization is not yet determined and the development of this proposal will be a part of your project plan. You will need to build in the contract negotiations between Wilmont's and DroneTech as you develop the project plan as well. Members of the legal teams of both organizations will assist you with this.

- Ensure that the relationship between DroneTech and Wilmont's does not compromise the security of Wilmont's business information, the customer's privacy and the proprietary information about how Wilmont's will use the drones for delivery. You will work with Wilmont's Information Security Management Team to accomplish this, and William Scott is the project lead on that team for this project.
- You will need to identify basic business process requirements and then determine your team members from the list of people given in this document as you move toward final project planning.
- It has been determined that only four (4) Wilmont's pharmacies will participate in the prototype delivery system. These are in a close geographic area to one another, and they are in a non-city environment consisting mainly of suburban homes and small businesses. Customers in apartment buildings will not be permitted in the prototype due to delivery issues. You will need to ensure that the four participating pharmacies are fully ready to engage in this prototype by the time for first flight, and the drone deliveries need to be seamless enhancements to Wilmont's already top-quality delivery processes for customers.
  - The IT folks have determined that no additional IT infrastructure will be required for this project from Wilmont's, as all of that specialized technology is only on the DroneTech side, and they will be including it in their proposal and a separate project plan that they will give to you as a part of their contract. Wilmont's can accommodate operating this prototype system within their existing infrastructure that handles customer orders, but those processes need to be enhanced in order to provide this delivery option and all the management processes that must accompany them.
  - Wilmont's has allocated a maximum of \$1,750,000 for this prototype project, although this is only an ultimate constraint – you will eventually need to tell Mr. Cranston what your project estimate will be, but you don't have enough information about the project design yet to be able to give such a budget figure. You have been asked by Mr. Cranston to ensure that your project not only does not go over this figure, but that it is under that total if possible. The two companies

agreed that they would like to begin the project on next January 5, and that their first customer delivery flight should take place no later than November 30 to avoid harsh weather in the San Francisco area.

Of course, you also need to include specific steps and processes for:

- Regular Meetings with the Team, Stakeholders, and Cross-impacted areas of the company.
- Approval points as needed through the project sequence.
- Points at which you will refine cost and staffing requirements (you do not need to calculate costs or total staffing at this point)
- Points at which you will produce the various Project Plan documentation deliverables discussed in class.
- Testing, quality control and provision for issues that may develop.
- User training and other preparations for system implementation. The Wilmont's Change Management Team, headed by Shirley Johnson, will assist you in this effort.

**Summary of Personnel Involved in the Project (name initials are in brackets):**

**DroneTech Corporation Staff:**

- Jordan Kempler (JXK), CEO and Founder
- Phillip Greenberg (PAG), Project Manager – main point of contact
- Stephanie Williams (SMW), Senior Business Analyst
- Gerald Hasper (GPH), Flight Operations Manager
- Eileen Seymour (ERS), Project Lead, IT Systems
- Katie O’Ryan (KRO), Corporate Attorney – DroneTech

**Wilmont’s Staff:**

- George Cranston (GWC), Operations VP
- James Connor (JFC), CIO
- Mary Pearson (MJP), Project Lead, IT Systems Team
- William Scott (WKS), Project Lead, Security Team
- Julie Green (JRG) Pharmacy Manager Store #35864
- Steve Haskell (SLH) Pharmacy Manager Store #32185
- James O’Donnell (JLO) Pharmacy Manager Store #38734
- Wilma Marcy (WPM) Pharmacy Manager Store #33001
- You as Project Manager on the Business Operations side (Come up with your own initials)
- Mary Kerstner (MJK), Business Systems Analyst
- Jonathan Perry (JSP), Retail Operations Assistant
- William Postner (WKP), Marketing Analyst
- Sherry Loganthorpe (SPL), Social Media Specialist

- Linda Thornton (LET), Online Customer Process Analyst
- Gerald Peritoni (GEP), Testing Specialist
- Elizabeth Walton (EMW), Senior Testing Specialist
- Shirley Johnson (SPJ), Change Management Coordinator
- Alan Swanson (AES), Attorney – Legal Department
- Denise Delgado (DLD), Financial Operations Analyst

*End of Case Problem*

### **5.11.2 Problem Case: Management Student Information Part 2**

*CASE PROBLEM – Additional Information for Part 2:*

Please review the Part 1 Case Problem information as it is the general background and requirements of the case. This information should be added to the following clarifications regarding the project schedule:

1. Total Project Cost must not exceed Project Constraints. Project Schedule should begin January 5, and should meet the schedule constraints as per the case for completion, etc. You may assume 100% (1.0FTE) allocation to this project for each resource in the list below. Load leveling is NOT required for this assignment, and over-allocation warnings on your WBS will not be counted as a problem as long as the resource effort allocation is reasonable.
2. It is critical that your assignment WBS is specific to this case problem in detail. You must ensure that all required deliverables appear in your WBS specifically, and that each includes design, development, testing and implementation as appropriate. Your WBS must include project management steps for the charter/scope, risk management plan, WBS, schedule, training and the required meetings to conduct and manage the project. Do not include things like “procurement management plan” or “staffing plan” or “quality management plan” as these are not a part of this case problem. A generic WBS is not acceptable for this assignment. This is practice for you to see how you might deliver such a detailed schedule for this case problem to your boss, and it will be evaluated that way.
3. It is up to you to add the project management, communication, testing and training tasks as needed to make the project successful. Use the information in the case and the other assignments, along with your own ideas about how much effort is involved to ensure a quality implementation overall throughout the project. Be sure that you do not exceed the project constraints.
4. Remember that this project will be tight in terms of time and cost, so do not include steps that are not really necessary for this particular project. You

should schedule the project from the beginning, including Charter/Scope, planning meetings, Risk Management and Communication Plan development, WBS and schedule development – these items need to appear in this schedule along with resource assignments and the appropriate costs that go along with them.

5. Finally, you are required to indicate an appropriate quantity of tasks that have likely been already in progress or completed. Assume that we are looking at your schedule on June 27. Show which work packages would probably be at what stage of completion by this specific time in the schedule. Use your own judgment based on the work package finish dates, but be reasonable!
6. The personnel involved in the DroneTech Corporation do not have billing rates per hour because their cost is being absorbed by the fixed fee specified in their proposal below. These people should be listed in your resource sheet, but with \$0.00 standard rate, and they should be assigned to the appropriate tasks for the project.
  - Jordan Kempler (JXK) - CEO and Founder
  - Phillip Greenberg (PAG) - Project Manager – main point of contact
  - Stephanie Williams (SMW) – Senior Business Analyst
  - Gerald Hasper (GPH) – Flight Operations Manager
  - Eileen Seymour (ERS) – Project Lead, IT Systems
  - Katie O’Ryan (KRO) – Corporate Attorney – DroneTech

They should be assigned to project tasks as appropriate using the information in the case and the details below.

7. DroneTech Corporation Contract Fees and Dates:  
After a complicated negotiation, Wilmont’s has signed a contract with DroneTech specifying the following phased payment plan that is linked to specific dates or deliverables. You are responsible for ensuring that the payments occur on time, but are only made if the appropriate conditions have been met. Be sure to include the necessary tasks in your WBS to accommodate evaluating, and paying for, these contract activities:
  - Total DroneTech fee for customizing order entry, delivery confirmation and mobile application software to Wilmont’s specifications: \$423,592.00 with payments to be received as follows:
  - February 2 – Initial payment due: \$42,000
  - After Wilmont’s approval of DroneTech Customization Design Phase: Payment of \$45,000

- After Successful demonstration of Order Entry module: Payment of \$35,000
  - After Successful demonstration of Delivery Confirmation module: Payment of \$55,000
  - After Successful demonstration of Mobile Application module: Payment of \$25,000
  - After Production System Test Approval by Wilmont's: Payment of \$85,000
  - After Successful Implementation Signoff by Wilmont's: Final Payment of \$136,592
8. Wilmont's Staff, Internal effective hourly rates and official abbreviated names (initials):
- George Cranston (GWC), Operations VP (\$200/hr)
  - James Connor (JFC), CIO (\$150/hr)
  - Mary Pearson (MJP), Project Lead, IT Systems Team (\$55/hr)
  - William Scott (WKS), Project Lead, Security Team (\$50/hr)
  - Julie Green (JRG) Pharmacy Manager Store #35864 (\$60/hr)
  - Steve Haskell (SLH) Pharmacy Manager Store #32185 (\$60/hr)
  - James O'Donnell (JLO) Pharmacy Manager Store #38734 (\$60/hr)
  - Wilma Marcy (WPM) Pharmacy Manager Store #33001 (\$60/hr)
  - You as Project Manager on the Business Operations side (Come up with your own initials) (\$55/hr)
  - Mary Kerstner (MJK), Business Systems Analyst (\$45/hr)
  - Jonathan Perry (JSP), Retail Operations Assistant (\$40/hr)
  - William Postner (WKP), Marketing Analyst (\$52/hr)
  - Sherry Loganthorpe (SPL), Social Media Specialist (\$45/hr)
  - Linda Thornton (LET), Online Customer Process Analyst (\$40/hr)
  - Gerald Peritoni (GEP), Testing Specialist (\$38/hr)
  - Elizabeth Walton (EMW), Senior Testing Specialist (\$49/hr)
  - Shirley Johnson (SPJ), Change Management Coordinator (\$40/hr)
  - Alan Swanson (AES), Attorney – Legal Department (\$60/hr)
  - Denise Delgado (DLD), Financial Operations Analyst (\$40/hr)
9. The following is the estimated total EFFORT HOURS for only the business process enhancements and reporting to the customer and Wilmont's management for the prototype systems. (these do not include the time for process design requirements, project management activities, testing, training, final implementation or meetings – you will need to add those additional steps and estimates for each):
1. Wilmont's/DroneTech Legal Contract Negotiations (250 hours)

2. Wilmont's Inventory Management Process Modifications (180 hours)
3. Wilmont's Pharmacy Customer Information Modifications (180 hours)
4. DroneTech Reporting Interface – Wilmont's Side System (150 hours)
5. Website/Mobile App Content Update – Wilmont's Side (175 hours)
6. Social Media Strategy and Implementation Plan – (75 hours)
7. Customer/Management Reporting (135 hours)
8. Store Management Reporting (135 hours)
9. Credit Card Processing (75 hours)
10. Wilmont's Sales Management Reporting (150 hours)

You need to determine who on Wilmont's and DroneTech's staff should be involved in the various deliverables based upon what you think best, and how their positions and skills relate to the tasks.

### *End of Case Problem*

#### **5.11.3 Problem Case: Management Instructor Guide for Part 1**

This part of the Problem Case sets the stage as a situation involving the student as a Project Manager in Wilmont's Pharmacy Operations group. This case focuses on the modification of Wilmont's business procedures and systems to enable seamless use of DroneTech for the purpose of product delivery to Wilmont's customers.

DroneTech will be handling the technology and the details of the flight operations, but there is a need to customize their operations in order to appear as one organization to the customer. This sub-contractor relationship is characterized in this case as a "black box" type of vendor scenario – where the vendor has an independent project plan that is largely unknown to the client organization, but where deliverables are created for that organization in return for payments matched to those deliverables. Therefore, the case stages a typical vendor/client relationship, but it does not complicate the project by making the student consider project details for both vendor and client. In a more advanced course, such complexity could be more appropriate than in a fundamental PM course.

Students might wish to use Agile PM approaches in developing the project strategy, so the Instructor needs to be clear about whether this is permissible. If Agile approaches are permitted, then the Instructor needs to be clear about how they will judge the documents for best reflection of Agile best practices.

One distraction that often comes up is the focus of some students on specific business procedures or solutions and less on Project Management. The case mentions that each subgroup of the project has its own Project Manager, so the Operations PM is

only one of these and they must design the project to take account of the other PMs as Key Stakeholders. The Instructor should help to focus the students on PM without letting them get lost in the details of a particular procedure, system or solution.

In Part 1, the focus is on designing the project overall, so students should not get distracted with scheduling things at this point, nor should they attempt to develop details that are not given in the case. Certain key points are mentioned, including start date, first flight date and ultimate budget constraints. Student deliverables should remain consistent with these, and they should not read into the case things that are not mentioned. Costs for certain milestones are not known, so until the final assignment, these should not be mentioned in the Charter/Scope document. Instead, students need to imagine themselves dealing with all the business procedures and systems that would be necessary to properly take the customer's original order for a product and carry that through to the point where DroneTech can seamlessly execute each delivery according to plan. There are numerous additional aspects of this plan that must be involved, such as contract negotiations, marketing, social media, management reporting and information systems. Student plans should reflect these individual aspects, the appropriate deliverables that are part of these, and the surrounding effort that is needed in order to implement an initial prototype.

Instructors should help the management students envision the scale and complexity of the tasks that would be involved in such a project for such a large organization – even though the actual project is involving only 4 pharmacies at the prototype stage. This is a typical business process change scenario – the approaches need to be modified or built completely even for a limited prototype, while keeping in mind that the ultimate goal will be to scale up. If one can successfully design the business approaches to deliver one customer's product by drone, the next step is to adjust these approaches to work even when scaled up to hundreds of thousands.

However, in this case problem, the limit of 4 pharmacies in the prototype keeps the project complexity at a certain level while students focus on the PM tools and approaches in this fundamental PM course. The purpose of Part 1 is to help the students gain that sense of what would be involved and what is the appropriate scale, while helping them to be clear about deliverables, constraints, multiple teams, contract relationships and end user acceptance of both the drones and the new business processes that must be used along with them.

#### ***5.11.4 Problem Case: Management Instructor Guide for Part 2***

Since the second part of the case builds upon the first part with additional information, specific resource costs and estimates for certain portions of the project effort, students may need the original case text as well as the text for this part 2. Instructors should provide the original text in a place where students can get to it while

working on part 2, or combine the case texts into one set that is distributed together for the final assignment.

The second part of the case details the effort, people and costs involved in the project by both companies and more fully expands the nature of the contract with DroneTech. Key to this part of the case is the limit of the information given to just the costs and effort for business process enhancements and reporting to the customer and Wilmont's management for the prototype systems. This gives students an opportunity to estimate other parts of the project effort based upon the known parts. Instructors should have students do their own research on ways to estimate the unknown surrounding tasks of requirements gathering, testing and implementation when the core effort for process design is known. Final solutions will vary, but Instructors should view acceptable results as a range of possible solutions rather than a right or wrong answer. Making a first pass through the assignments to gauge the overall extent of the range of project time and cost values will help the Instructor to determine what the acceptable values are. Then students who submitted solutions that are outside of the acceptable range should be given feedback about what might have gone wrong.

Students will often ask how to use the given effort estimates to arrive at an appropriate schedule: Should they split hours among the assigned resources? Should they include certain detailed steps to be involved in marketing analysis? Should they consider definition of business processes and the information systems that support them as one project activity or two? These questions are typical of students with less experience in project planning, and it may also reflect students who have had some detailed experience with business procedures or operations that might have been planned in a specific way in one organization. The Instructor should be prepared for these questions and have answers ready. Remember that the focus of the assignment is on the project management process, so it is up to the Instructor to use their own domain knowledge in order to best respond to student inquiries. None of these issues will greatly affect the nature of the way this case is intended to be used as a learning tool. So, a variety of possible student approaches are completely workable, and the Instructor should feel free to direct students to approach these queries in the ways that seem most appropriate.

Instructors should also feel free to adjust various parameters of this part of the case to conform to a particular approach that makes sense for the course and for the domain area of focus. The intent of the case is to lift the student from the details of the technology or business process and focus them on what is needed to get the project done successfully within the constraints of PM best practices. Above all, the case is intended to assist students in understanding where tools and templates for project management can be used, and what it might be like to adapt and apply them to a given

scenario. Therefore, the values of effort, cost per hour, total budget, dates and other constraints and values can be flexible without compromising the nature of what the case can do for the learning process. The important thing is to provide students a scenario that appears somewhat realistic, while recognizing that it is impossible to make it actually real within the context of a college course learning experience. In its present form, the case is only partially able to be a simulation, so the Instructor should keep the focus on giving students the opportunity to rehearse under controlled circumstances while recognizing that the ultimate performance will be up to the student when they must apply their skills to a real situation at a later time.

## **5.12 Problem Case: Engineering**

In this section we provide the problem case and instructor guide.

### **5.12.1 Problem Case: Engineering Student Information Part 1**

#### *CASE PROBLEM – Part 1:*

Wilmont's is a top-ranked U.S. retail pharmacy company based in St. Louis, MO with more than 8,000 stores nationwide and in all 50 states, and employing more than 244,000 people overall. The company has engaged in a number of innovative business practices, and now they are once again secretly considering breaking ground with an even newer concept – delivering prescriptions and drugstore items by flying drone.

The concept isn't new – your company is a small firm named DroneTech in San Francisco, CA and your firm announced the approach in March, and is looking to develop a relationship with drugstores nationwide to launch the concept for real. Wilmont's may be the big break your firm is looking for!

The Operations Vice President (George Cranston) of Wilmont's wants to develop a pilot project to get something moving and see how this works. He will provide the funds and will oversee all aspects of this initiative. Mr. Cranston has made an agreement with DroneTech CEO and founder Jordan Kempler to prototype this project in the San Francisco area, which is the home location of the DroneTech organization where it developed the system. DroneTech will customize its systems, interfaces, and business process to conform to project requirements from Wilmont's. You are the Project Manager for DroneTech who will manage the DroneTech customization project generally and serve as DroneTech' point of contact for Wilmont's. You report directly to Jordan Kempler, as this is a visible project that could mean the future for DroneTech. While your company's drones will fly with Wilmont's markings, a successful long-term relationship with a large-scale company like Wilmont's will make DroneTech a stable company in any measure.

As far as DroneTech's interface to Wilmont's is concerned, the project will likely need to accomplish the following in order to appear seamless to Wilmont's pharmacy customers:

- DroneTech will handle piloting the drones and delivery of the products. You already have processes that handle order entry, delivery confirmation, and a mobile app on the DroneTech side, but these need to be customized for Wilmont's so that customers don't see these as two separate companies. Eileen Seymour is your firm's IT point of contact on the DroneTech information systems side and will be overseeing the data interface team with her counterparts at Wilmont's. Mary Pearson is the Project Manager for Wilmont's internal IT department, and she has been assigned by CIO James Connor, to lead the information systems development for Wilmont's that will be needed to support the initiative. Phillip Greenberg is the project manager on Wilmont's business operations side who will work with you to organize the Wilmont's resources in order to interface with DroneTech's flight operations and other management systems that control and manage the drone delivery system.
- Interface to Wilmont's enhanced online order entry process that will allow customers in the San Francisco area to register their willingness to have a drone deliver their orders by means of online entry or smartphone entry. There will be significant restrictions on the approval of customers for this service, so there will need to be a segment of the process to allow Wilmont's management to approve the customer, send a confirmation to the customer, etc.. While DroneTech systems already do this, you need to interface your systems to Wilmont's so that customers are not going directly to DroneTech's normal customer websites or mobile applications.
- Interface communications about deliveries for Wilmont's customers electronically through email, online, and through mobile alerts as the customer requests.
  - Your firm has not yet established a signed contract with Wilmont's, and there is not yet an agreement on all aspects of either the services to be provided, or the cost of those services. DroneTech needs to modify several systems and interfaces for the drone flight operations in order to customize things for Wilmont's but the nature of this is not yet determined. The development of this proposed contract and payment plan will be a part of your project plan. You will need to build in a period of time for contract negotiations between Wilmont's and DroneTech as you develop the project plan as well. Members of the

legal teams of both organizations will assist you with the negotiations, so your role in this will be to ensure that the right people from DroneTech Engineering and Flight Operations are involved in the development of the legal requirements for the relationship.

- Ensure that the relationship between DroneTech and Wilmont's does not compromise the security of Wilmont's business information, the customer's privacy and the proprietary information about how Wilmont's will use the drones for delivery. You will work with Wilmont's Information Security Management Team to accomplish this, and William Scott is the project lead on that team for this project.
- You will need to identify what modifications to the drone flight operations will be necessary and then determine your team members from the list of people given in this document as you move toward final project planning.
  - Your Flight Operations Manager, Gerald Hasper, has let you know that Wilmont's already wants one such modification: They want to adapt a temperature-controlled product bagging system along with a bubble-type cushioning system for the customer delivery packaging in order to ensure that certain temperature-sensitive or breakable items are not affected by the delivery process. While you've got that ability to adapt the drone package clamps to this sort of packaging, this will require a measure of testing to make sure that issues are resolved and that the new package release systems will work reliably. You'll need to be sure that your project plan has this engineering sub-project defined.
- It has been determined that only four (4) of Wilmont's pharmacies will participate in the prototype delivery system. These are in a close geographic area to one another, and they are in a non-city environment consisting mainly of suburban homes and small businesses. Customers in apartment buildings will not be permitted in the prototype due to delivery issues. You will need to provide the four participating pharmacies with all the information needed on the drone delivery technology, making sure they are fully comfortable to load products into the drone package carrier and engage in this prototype by the time for first flight. As mentioned earlier, the drone deliveries need to be seamless enhancements to Wilmont's already top-quality delivery processes for customers, and Jordan Kempler has promised Mr. Cranston that this will be the case.
  - DroneTech will need to allocate a total of 4 new drones for this prototype project, and these will need to be painted in the Wilmont's corporate colors and logo.

- Wilmont's can accommodate operating this prototype system within their existing infrastructure that handles customer orders, but those processes need to be enhanced by Wilmont's project teams in order to provide this delivery option and all the management processes that must accompany them. The customized special technology needed for delivery and drone control is on your side, and you will be including it in your proposal and budget. A project plan with detailed costs will be given to Wilmont's as a part of your final contract.
- Jordan Kempler is unsure of the cost of the customized enhancements of the flight operations systems for this prototype project because the project is just being defined right now. However, based on some customized work that was done before with another customer for small package delivery, Kempler determined that the project should likely come well under a total of \$750,000, so he gave that initial figure to Wilmont's last week. That puts you in the position of needing to treat this figure as the maximum that the project could cost. This is only an ultimate constraint – you will eventually need to tell Mr. Kempler what your project estimate will be, but you don't have enough information about the project design yet to be able to give such an accurate budget estimate. You have been asked by Mr. Kempler to ensure that your project not only does not go higher than this, but that it should be less than that total, if possible.
- The two companies agreed that they would like to begin the project on next January 5, and that their first customer delivery flight should take place no later than November 30 to avoid harsh weather in the San Francisco area.

Of course, you also need to include specific steps and processes for:

- Regular meetings with the Team, Stakeholders, and Cross-impacted areas of the company.
- Approval points as needed through the project sequence.
- Points at which you will refine cost and staffing requirements (you do not need to calculate costs or total staffing at this point)
- Points at which you will produce the various Project Plan documentation deliverables discussed in class.
- Testing, quality control and provision for issues that may develop.
- User training and other preparations for system implementation. The Wilmont's Change Management Team, headed by Shirley Johnson, will assist you in this effort.

## **Summary of Personnel Involved in the Project (name initials are in brackets):**

### **DroneTech Corporation Staff:**

- Jordan Kempler (JXK), CEO and Founder
- You as Project Manager overall for DroneTech (Add your own initials)
- Stephanie Williams (SMW), Senior Business Analyst
- Gerald Hasper (GPH), Flight Operations Manager
- Eileen Seymour (ERS), Project Lead, IT Systems
- Katie O’Ryan (KRO), Corporate Attorney for DroneTech
- Rohan Shah (RXS), Programmer
- Shravani Sinha (SXS), Senior Programmer
- William Holt (WKH), Drone Systems Engineer (\$45/hr)
- Ashish Nehra (AXN), Drone Systems Technician (\$35/hr)

### **Key members of Wilmont’s Staff for this project:**

- George Cranston (GWC), Operations VP
- James Connor (JFC), CIO
- Mary Pearson (MJP), Project Lead, IT Systems Team
- William Scott (WKS), Project Lead, Security Team
- Julie Green (JRG), Pharmacy Manager Store #35864
- Steve Haskell (SLH), Pharmacy Manager Store #32185
- James O’Donnell (JLO), Pharmacy Manager Store #38734
- Wilma Marcy (WPM), Pharmacy Manager Store #33001
- Phillip Greenberg (PAG), Project Manager, Business Operations side
- Jonathan Perry (JSP), Retail Operations Assistant
- Linda Thornton (LET), Online Customer Process Analyst
- Gerald Peritoni (GEP), Testing Specialist
- Elizabeth Walton (EMW), Senior Testing Specialist
- Shirley Johnson (SPJ), Change Management Coordinator
- Alan Swanson (AES), Attorney – Legal Department

### ***End of Case Problem***

#### **5.12.2 Problem Case: Engineering Student Information Part 2**

##### *CASE PROBLEM – Additional Information for Part 2:*

Please review the Part 1 Case Problem information as it is the general background and requirements of the case. This information should be added to the following clarifications regarding the project schedule:

1. Total Project Cost must not exceed Project Constraints. Project schedule should begin January 5, and should meet the schedule constraints as per the

case for completion, etc. You may assume 100% (1.0FTE) allocation to this project for each resource in the list below. Load leveling is NOT required for this assignment, and over-allocation warnings on your WBS will not be counted as a problem as long as the resource effort allocation is reasonable.

2. It is critical that your assignment WBS is specific to this case problem in detail. You must ensure that all required deliverables appear in your WBS specifically, and that each includes design, development, testing and implementation as appropriate. Your WBS must include project management steps for the charter/scope, risk management plan, WBS, schedule and training and the required meetings to conduct and manage the project. Do not include things like procurement management plan or staffing plan or quality management plan as these are not a part of this case problem. A generic WBS is not acceptable for this assignment. This is practice for you to see how you might deliver such a detailed schedule for this case problem to your boss, and it will be evaluated that way.
3. It is up to you to add the project management, communication, testing and training tasks as needed to make the project successful. Use the information in the case and the other assignments, along with your own ideas about how much effort is involved to ensure a quality implementation overall throughout the project. Be sure that you do not exceed the project constraints.
4. Remember that this project will be tight in terms of time and cost, so do not include steps that are not really necessary for this particular project. You should schedule the project from the beginning, including charter/scope, planning meetings, risk management and communications management plan development, WBS and schedule development – these items need to appear in this schedule along with resource assignments and the appropriate costs that go along with them.
5. Finally, you are required to indicate an appropriate quantity of tasks that have likely been already in progress or completed. Assume that we are looking at your schedule on June 27. Show which work packages would probably be at what stage of completion by this specific time in the schedule. Use your own judgment based on the work package finish dates, but be reasonable!
6. The personnel involved in Wilmont's do not have billing rates per hour because their cost is being separately budgeted internally for Wilmont's. These people should be listed in your resource sheet, but with \$0.00 standard rate, and they should be assigned to the appropriate tasks for the project.
  - George Cranston (GWC), Operations VP
  - James Connor (JFC), CIO

- Mary Pearson (MJP), Project Lead, IT Systems Team
- William Scott (WKS), Project Lead, Security Team
- Julie Green (JRG), Pharmacy Manager Store #35864
- Steve Haskell (SLH), Pharmacy Manager Store #32185
- James O'Donnell (JLO), Pharmacy Manager Store #38734
- Wilma Marcy (WPM), Pharmacy Manager Store #33001
- Phillip Greenberg (PAG), Project Manager on the Business Operations side
- Jonathan Perry (JSP), Retail Operations Assistant
- Linda Thornton (LET), Online Customer Process Analyst
- Gerald Peritoni (GEP), Testing Specialist
- Elizabeth Walton (EMW), Senior Testing Specialist
- Shirley Johnson (SPJ), Change Management Coordinator
- Alan Swanson (AES), Attorney – Legal Department

These people should be assigned to project tasks as appropriate using the information in the case and the other details below, but they will not affect the DroneTech portion of the project budget.

7. Special Equipment Needed:

- DroneTech Corporation New Drone Procurement: Each new delivery drone will cost \$18,034.00. DroneTech will supply four of these to Wilmont's for the purpose of the prototype project. The cost of the drones will be incorporated into the budget of your project.
- Drone Maintenance/Repair Parts: You should allow \$20,000 worth of spare drone parts and batteries to be on-hand for this project.

8. DroneTech's Staff, effective hourly rates and official abbreviated names (initials):

- Jordan Kempler (JXK), CEO and Founder (\$200/hr)
- You as Project Manager overall for DroneTech (Add your own initials) (\$55/hr)
- Stephanie Williams (SMW), Senior Business Analyst (\$50/hr)
- Gerald Hasper (GPH), Flight Operations Manager (\$65/hr)
- Eileen Seymour (ERS), Project Lead, IT Systems (\$60/hr)
- Katie O'Ryan (KRO), Corporate Attorney – DroneTech (\$65/hr)
- Rohan Shah (RXS), Programmer (\$45/hr)
- Shravani Sinha (SXS), Senior Programmer (\$50/hr)
- William Holt (WKH), Drone Systems Engineer (\$45/hr)
- Ashish Nehra (AXN), Drone Systems Technician (\$35/hr)

9. The following is the estimated total EFFORT HOURS for DroneTech engineering, flight operations enhancements, and customized interfaces to the pharmacy customer and Wilmont's management for the prototype project. (these do not include the time for procurement, process or engineering design requirements, project management activities, testing, training, or final implementation or meetings – you will need to add those additional steps and estimates for each):
  1. Wilmont's/DroneTech Legal Contract Negotiations (160 hours)
  2. Specialized Customer Order/Information Interface (150 hours)
  3. Custom Management Reporting Interface (135 hours)
  4. Customization of Flight/Delivery Processing (75 hours)
  5. Custom Drone Construction (40 hours each for 4 drones – 160 hours total)
  6. Custom Temperature/Shock Protection Product Carrier (160 hours)
  7. Flight path engineering (120 hours)
  8. Pharmacy Manager Drone Delivery Operations Procedures (80 hours)
  9. Drone Maintenance/Repair Procedures and Parts (80 hours)

You need to determine who on Wilmont's and DroneTech's staff should be involved in the various deliverables based upon your best judgment, and how their positions and skills relate to the tasks.

*End of Case Problem*

### **5.12.3      *Problem Case: Engineering Instructor Guide for Part 1***

This part of the problem case sets the stage as a situation involving the student as a project manager in DroneTech's Engineering group. This case focuses on the modification of DroneTech's drones, procedures and systems to enable seamless use of DroneTech for the purpose of product delivery to Wilmont's customers.

DroneTech will be handling the technology and the details of the flight operations, but there is a need to customize their operations in order to appear as one organization to the customer. This sub-contractor relationship is characterized in this case by deliverables that are created for that organization in return for payments matched to those deliverables. Therefore, the case stages a typical vendor/client relationship, but it does not complicate the project by making the student consider project details for both the vendor and client – only the vendor in this case. In a more advanced course, such complexity would be more appropriate than in a fundamental PM course.

Students might wish to use Agile PM approaches in developing the project strategy, so the instructor needs to be clear about whether this is permissible. If Agile

approaches are permitted, then the instructor needs to be clear about how the documents will be judged for best reflection of Agile best practices.

One distraction that often comes up is the focus of some students on specific engineering solutions and less on project management. The case mentions that each subgroup of the project has its own project manager, so the DroneTech Engineering PM is only one of these and the students must design the project to take account of the other PMs as key stakeholders. The instructor should help to focus the students on PM without letting them get lost in the details of a particular procedure, system, or solution.

In Part 1, the focus is on designing the project overall, so students should not get distracted with scheduling things at this point, nor should they attempt to develop details that are not given in the case. Certain key points are mentioned, including start date, first flight date, ultimate budget constraints, and certain key engineering modifications. Student deliverables should remain consistent with these, and they should not read into the case those things that are not mentioned. Costs for certain milestones are not known, so until the final assignment, these should not be mentioned in the charter/scope document. Instead, students need to imagine themselves dealing with all the procedures and systems that would be necessary to properly take the customer's original order for a product through Wilmont's and then carry that through to the point where DroneTech can seamlessly execute each delivery according to plan. There are numerous additional aspects of this plan that must be involved, such as contract negotiations, engineering of specialized devices, management reporting, and information systems. Student plans should reflect these individual aspects, the appropriate deliverables that are part of these, and the surrounding effort that is needed in order to implement an initial prototype.

Instructors should help the engineering students envision the scale and complexity of the tasks that would be involved in such a project for such a large organization even though the actual project involves only four pharmacies at the prototype stage. This is a typical technology scenario—the approaches need to be modified or built completely even for a limited prototype, while keeping in mind that the ultimate goal will be to scale up. If one can successfully design the technology and supporting systems to deliver one customer's product by drone, the next step is to adjust these concepts to work even when scaled up to hundreds of thousands.

However, in this case problem, the limit of four pharmacies in the prototype keeps the project complexity at a certain level while students focus on the PM tools and approaches in this fundamental PM course. The purpose of Part 1 is to help the students to gain a sense of what would be involved and what is the appropriate scale, while helping them to be clear about deliverables, constraints, multiple teams, contract

relationships, and end user acceptance of both the drones and the new business processes that must be used along with them.

#### **5.12.4      *Problem Case: Engineering Instructor Guide for Part 2***

Since the second part of the case builds upon the first part with additional information, specific resource costs and estimates for certain portions of the project effort, students may need the original case text as well as the text for this part 2. Instructors should provide the original text in a place where students can get to it while working on part 2, or combine the case texts into one set that is distributed together for the final assignment.

The second part of the case details the effort, people, and costs involved in the project by both companies and more fully expands the nature of the contract between DroneTech and Wilmont's. Key to this part of the case is the limit of the information given to just the costs and effort for DroneTech engineering, flight operations enhancements and customized interfaces to the pharmacy customer and Wilmont's management for the prototype project. This gives students an opportunity to estimate other parts of the project effort based upon the known parts. Instructors should have students do their own research on ways to estimate the unknown surrounding tasks of requirements gathering, testing, and implementation when the core effort for the engineering of the products, processes, and systems is known. Final solutions will vary, but instructors should view acceptable results as a range of possible solutions rather than a right or wrong answer. Making a first pass through the assignments to gauge the overall extent of the range of project time and cost values will help the instructor to determine what the acceptable values are. Then students who submitted solutions that are outside of the acceptable range should be given feedback about what might have gone wrong.

Students will often ask how to use the given effort estimates to arrive at an appropriate schedule: Should they split hours among the assigned resources? Should they include certain detailed steps to be involved in custom drone modification? Should they consider technology engineering and the information systems that support the drones as one project activity or two? These questions are typical of students with less experience in project planning, and it may also reflect students who have had some detailed experience with the engineering of products or technology operations that might have been planned in a specific way in one organization. The instructor should be prepared for these questions and have answers ready. Remember that the focus of the assignment is on the project management process, so it is up to the instructor to use their own domain knowledge in order to best respond to student inquiries. None of these issues will greatly affect the nature of the way this case is intended to be used as a learning tool. So, a variety of possible student approaches are completely workable,

and the instructor should feel free to direct students to approach these queries in the ways that seem most appropriate.

Instructors should also feel free to adjust various parameters of this part of the case to conform to a particular approach that makes sense for the course and for the domain area of focus. The intent of the case is to lift the student from the details of the technology or engineering process and focus them on what is needed to get the project done successfully within the constraints of PM best practices. Above all, the case is intended to assist students in understanding where tools and templates for project management can be used, and what it might be like to adapt and apply them to a given scenario. Therefore, the values of effort, cost per hour, total budget, dates, and other constraints and values can be flexible without compromising the nature of what the case can do for the learning process. The important thing is to provide students a scenario that appears somewhat realistic, while recognizing that it is impossible to make it actually real within the context of a college course learning experience. In its present form, the case is only partially able to be a simulation, so the instructor should keep the focus on giving students the opportunity to rehearse under controlled circumstances while recognizing that the ultimate performance will be up to the student when they must apply their skills to a real situation at a later time.

