NAME					PROJECT PLAN	ENGR. REVIEW	DESIGN REVIEW	QUOTE QUES.	PAT SCULP COMPL.	PAT SCULP COMPL	QUOTES DUE	MAKE BUY
PROJECT NO.	PRODUCT NO.	MFG SOURCE	TURNOVER	ORIGINAL								
A = PRICE	QUOTA	POTENTIAL		CURRENT								
				ACTUAL								

ENGR. RELEASE	PROJECT REVIEW	RELEASE DWGS.	TOOL START	PHOTO SAMPLES	INSIDE SAMPLES	PKG. FILM	INSTR. LAYOUT	INSTR. FILM ART	FINAL PARTS	FIRST EP	FINAL EP	EP SIGN-OFF	ORIENT PS	OBS	PROD. PILOT	PT SIGN-OFF	PROD. START	ATS

Figure 10-14 Milestone monitoring chart for Figure 10-13.

10.4 COMPUTERIZED PMIS (PROJECT MANAGEMENT INFORMATION SYSTEMS)*

The project examples used in Chapters 8 and 9 were small, so that the concepts could be demonstrated. But real projects are often extremely large, with hundreds of tasks and thousands of work units. Diagramming, scheduling, and tracking all these tasks is clearly a job for the computer, and computerized PMISs were one of the earlier business applications for computers. Initially, the focus was on simple scheduling packages, but this quickly extended to include costs, earned values, variances, management reports, and so on.

The earlier packages ran on large, expensive mainframe computers; thus, only the larger firms had access to them. Still, the use of these packages for managing projects on a day-to-day basis was not particularly successful. This was because of the inability of project managers to update plans in real time, mainframe computers typically being run in a batch rather than online mode. With the development and proliferation of desktop (and laptop) computers, and servers, and the corresponding availability of a wide variety of project management software, project managers now use at least one PMIS.

These server or desktop computer-based PMISs are considerably more sophisticated than earlier systems and use the computer's graphics, color, and other features more extensively. Many systems can handle almost any size project, being limited only by the memory available in the computer. Many will handle multiple projects and link them together to detect resource over-allocation; e.g., Microsoft Project® can consolidate more than 1,000 projects. The PMIS trend has been to integrate the project management software with spreadsheets, databases, word processors, communication, graphics, and the other capabilities of Windows-based software packages. The current trend is to facilitate the global sharing of project information, including complete status reporting, through local networks or the Internet rather than using standalone systems.

Throughout this text we have illustrated software output from one project management software package, Microsoft's Project® (MSP). Surveys of project management tools published in *Project Management Journal* (e.g., Fox et al., 1998) and elsewhere listed MSP as

*Occasionally particular sections will be shaded, meaning that they can be skipped without loss of continuity.

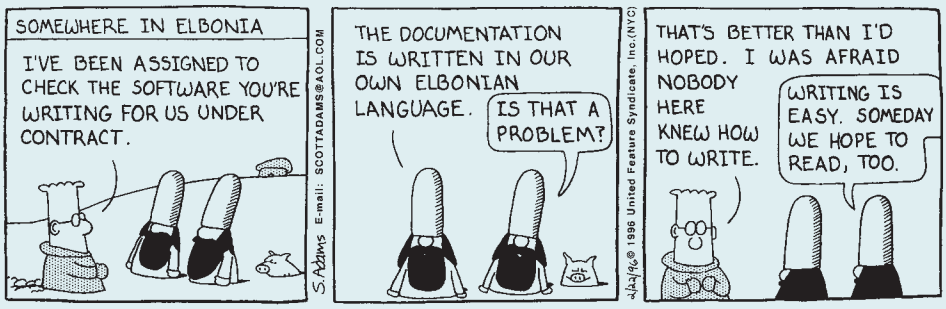
being used by about half of all respondents. Primavera Project Planner®, a system designed for very large projects, is a distant second. The development of these and other powerful software systems was accompanied by the development of desktop computers with memory, power, and speed undreamed of a decade ago. With project files stored in large memory banks on anything from a mainframe to workstations, servers, and PC's, the software and project files became available on LAN and WAN systems, as well as through the Internet so everyone involved, no matter where they were globally, could interact with the system in real time.

The reader interested in current capabilities would be wise to refer to recent annual or monthly software reviews such as those in the Project Management Institute's occasional software surveys, *PCMagazine* and *Federal Computer News*. Reviews of software are also widely available on the Internet at such magazine-sponsored Web sites as "qualitymag.com" and "zdnet.com" or sites sponsored by the software producers.

Finally, it is worth noting that these systems can very easily be misused or inappropriately applied—as can any tools. The most common error of this type is managing the PMIS rather than the project itself. This and other such errors are described by Thamhain (1987):

- ***Computer paralysis***. Excessive computer involvement with computer activity replacing project management; loss of touch with the project and its realities.
- ***PMIS verification***. PMIS reports may mask real project problems, be massaged to look good, or simply verify that real problems exist, yet are not acted upon.
- ***Information overload***. Too many reports, too detailed, or the distribution of reports, charts, tables, data, and general information from the PMIS to too many people overwhelms managers and effectively hides problems.
- ***Project isolation***. The PMIS reports replace useful and frequent communication between the project manager and top management, or even between the PM and the project team.
- ***Computer dependence***. PM or top management wait for the computer reports/results to react to problems rather than being proactive and avoiding problems in the first place.
- ***PMIS misdirection***. Due to the unequal coverage of the PMIS, certain project subareas are overmanaged and other areas receive inadequate attention; symptoms of problems are monitored and managed (budget overruns, schedule slippages), rather than the problems themselves.

We have also found that problems can result when someone other than the PM attempts to update projects without involving the PM in the changes.



Dilbert: © Scott Adams/Dist. by United Features Syndicate, Inc.

Choosing Software

When choosing project management software, the potential user should read several software surveys conducted with project managers, for example, Fox et al., 1998 and Libratore et al., 2003. Such surveys are now last year's news and thus, obsolete, but they clearly indicate the sorts of capabilities that are important to most users. We would, however, strongly warn against allowing the organization's software technicians from making the choice, unaided. Software that appeals to software specialists is not necessarily the optimal choice for the project manager.

The following characteristics of generally desirable attributes in project management software are based on a number of user surveys and the comments of experienced PMs.

- ***Friendliness.*** For the novice user, this includes clear and logical manuals, help screens, tutorials, a menu-driven structure, easy editing, and so on. For firms implementing project management, this means the existence of an organized training program on the use of the software conducted by trainers who have some understanding of project management.
- ***Schedules.*** Gantt charts are mandatory, as well as automatic recalculation with updates of times, costs, and resources. Plots of earliest start, scheduled start, slack/float, latest finish, planned finish, and actual finish times are desirable. The software should also be able to display AON or AOA networks. The time units for schedule display (and resource usage) should vary from minutes to months. The ability to handle three-time schedule inputs is desirable.
- ***Calendars.*** Either a job shop and/or calendar dates are necessary, plus the ability to indicate working days, nonworking days, and holidays for each resource used.
- ***Budgets.*** The ability to include a budget for planning, monitoring, and control. Especially desirable is the ability to interface this with a spreadsheet program.
- ***Reports.*** Individualizing report formats is most desirable. Again, having the ability to interface the reports with a word processing package is highly desirable.
- ***Graphics.*** The ability to see the schedule and interactions is especially important. For Gantt charts, the software should be able to show the technical dependencies between work units or tasks.
- ***Charts.*** Charts for responsibility and histograms for resources were deemed particularly useful.
- ***Migration.*** The ability to transfer data to and from spreadsheets, word processors, database programs, graphics programs, and desired add-on programs. The ability to interface with telecommunication systems and the Internet is required for most applications.
- ***Consolidation.*** The ability to aggregate multiple projects into a single database for determination of total resource usage and detection of resource conflicts. The software must have the ability to recalculate all schedules and resource records when updated information is added.

It is heartening to note that many of the current project management software packages have available almost all of the characteristics noted above. It is important, however, to remember that no one package will meet all needs. Numerous trade-offs exist not only between price and capability but also between functional capability, ease of use, complexity, and speed. In general, there are six areas of PMIS internal capabilities, separate from the ability to migrate data and communicate externally, that should be considered. These are project planning,

resource management, risk management, tracking/monitoring, report generation, and decision aiding. The potential purchaser of a PMIS should consider the intended use of the package, the background and needs of all the potential users, and the organizational setting where the package is to be employed, including the needs and orientation of those who will be receiving the reports and graphics.

A general PMIS selection process roughly based on Levine's excellent work (1987) is as follows:

1. Establish a comprehensive set of selection criteria, considering capabilities in project planning, resource management, tracking/monitoring, report generation, earned value/variance analysis, risk management.
2. Set priorities for the criteria, separating "must have" items from "nice to have" items and "not needed" items.
3. Conduct a preliminary evaluation of the software packages relative to the criteria using vendor-supplied data, product reviews, and software surveys.
4. Limit the candidate packages to three and obtain demos of each, evaluating the vendors at the same time in terms of interest, software maintenance, and support.
5. Evaluate each package with a standard project typical of your current and projected future needs. Make note of any weaknesses or strengths that are particularly relevant to your situation.
6. Negotiate on price, particularly if you are making a volume purchase or contemplating a site license. Include descriptions of vendor support, training, and product maintenance in the contract.

SUMMARY

In this chapter, we reviewed the monitoring function, relating it to project planning and control, and described its role in the project implementation process. The requirements for monitoring were discussed, in addition to data needs and reporting considerations. Last, some techniques for monitoring progress were illustrated and some computerized PMISs were described.

Specific points made in the chapter were:

- It is important that the planning-monitoring-controlling cycle be a closed loop cycle based on the same structure as the parent system.
- The first task in designing the monitoring system is to identify the key factors in the project action plan to be monitored and to devise standards for them. The factors should concern results, rather than activities.
- The data collected are usually either frequency counts, numbers, subjective numeric ratings, indicators, or verbal measures.
- Project reports are of three types: routine, exception, and special analysis.
- Project reports should include an amount of detail appropriate to the target level of management with a frequency appropriate to the need for control (i.e., probably not weekly or other such regular basis). More commonly, reports occur near milestone dates.
- Three common project reporting problems are too much detail, poor correspondence to the parent firm's reporting system, and a poor correspondence between the planning and monitoring systems.
- The earned value chart depicts scheduled progress, actual cost, and actual progress (earned value) to allow the determination of spending, schedule, and time variances.
- There exist a great number of computerized PMISs that are available for PMs, with software evaluations occurring regularly in various magazines.
- Project managers' preferred PMIS features were friendliness, schedules, calendars, budgets, reports, graphics, networks, charts, migration, and consolidation.

In the next chapter, we move into the final phase of project implementation, project control. We discuss the different types of control and describe some techniques useful to the PM in controlling the project.