Chapter 6
Top-down or Bottom-up Project Tracking

This chapter serves as an integrative summary research study relying on the results obtained from the three previous simulation studies discussed in this book so far. More precisely, a bottom-up and a top-down project tracking approach within a corrective action framework is compared and general summary conclusions are presented. The top-down tracking approach relies on a traditional Earned Value Management (EVM) system investigated in detail in chapter 4, while the bottom-up tracking mechanism makes use of the well-known Schedule Risk Analysis (SRA) method discussed in chapter 5.

6.1 Introduction

Project scheduling, risk analysis and monitoring are crucial steps in the life of a project. The project manager uses the project schedule to help planning, executing and controlling project activities and to track and monitor the progress of the project. A major component of a project schedule is a work breakdown structure (WBS). However, the basic critical path method (CPM) schedules, or its often more sophisticated extensions, are nothing more but just the starting point for schedule management. Information about the sensitivity of the various parts of the schedule, quantified in schedule risk numbers or of a more qualitative nature, offers an extra opportunity to increase the accuracy of the schedules and might serve as an additional tool to improve project monitoring and tracking. Consequently, project scheduling and monitoring tools and techniques should give project managers access to real-time data including activity sensitivity, project completion percentages, actuals and forecasts on time and cost in order to gain a better understanding of the overall project performance and to be able to make faster and more effective corrective decisions. All this requires understandable project performance dashboards that visualize important key project metrics that quickly reveal information on time and cost deviations at the project level or the activity level. During monitoring and tracking, the project manager should use all this information and should set thresh-
olds on the project level or on lower WBS levels to receive warning signals during project execution. These thresholds serve as triggers to take, when exceeded, corrective actions. These project tracking topics have been discussed in the previous chapters.

This chapter tests two alternative project tracking methods by using two types of dynamic information during project progress to improve corrective action decisions. Information on the sensitivity of individual project activities obtained through schedule risk analysis (SRA) as well as dynamic performance information obtained through earned value management (EVM) will be dynamically used to steer the corrective action decision making process.

The outline of this chapter can be summarized along the following lines. Section 6.2 introduces the two project monitoring methods that will be used throughout this chapter. In section 6.3 the test setting and computational results of the simulation study are discussed in detail. Section 6.4 draws overall conclusions and highlights future research avenues.

### 6.2 Project scheduling and monitoring

A crucial choice during project tracking is the level of detail and the resulting management effort needed to effectively manage the project tracking process. Hence, the choice of the right WBS level is of crucial importance, and requires a balance between level of detail and ease of project tracking. The importance of the right WBS level has been discussed in literature, and has been mentioned repeatedly throughout the various chapters of this book. Worth repeating is the concluding remark of Lipke et al (2008) who state that “some practitioners of EVM hold a belief that project duration forecasting can be made only through the analysis of the network schedule. These practitioners maintain the understanding and analysis of task precedence and float within the schedule cannot be accounted for by an indicator, and belief that the right WBS level for project tracking is on the activity level.” Among others, Book (2006a,b), Jacob (2006) and Jacob and Kane (2004) are authors that express their ideas on EVM project performance measurement and argue that EVM can only be used to measure project time performance as long as the SPI and SPI(t) metrics are used on the activity level, and not on the control account level or even higher WBS levels. However, Lipke et al (2008) also note that detailed schedule analysis is a burdensome activity and if performed often can have disrupting effects on the project team. EVM in general, and the earned schedule method more specific offer calculation methods yielding reliable results on higher WBS levels, which greatly simplify final duration and completion date forecasting. Under this assumption, the EVM metrics are set up as early warning signals to detect in an easy and efficient way (i.e. at the cost account level, or even higher), rather than a simple replacement of the critical path based scheduling tools. This early warning signal, if analyzed properly, defines the need to eventually drill down into lower WBS levels. In conjunction with