OR-AS Operations Research Applications and Solutions	Case Name: **MIVB SeSaMe**	Sector	Construction (Civil)	
	OR-AS Operations Research - Applications and Solutions www.or-as.be info@or-as.be	Baseline Schedule	Schedule with resources	
			Schedule with costs	
		Risk Analysis	Random simulation	
			One of nine std. scenarios	
Submitted by	Livine Maerschalck		User defined distributions	
Date	December 22, 2012	Project Control	Automatic tracking	
File Name	C2012-11 MIVB SeSaMe.p2x		Tracking based on user input	

1. Project description

Project authenticity

The MIVB, a Belgian public transport provider in the Brussels area, commences the installation of new access doors to the subway stations to prevent non-paying passengers - the so-called fare dodgers - to use the subway network.

The project consists of activity, resource and cost data that were obtained directly from the actual project owner.

2. Project properties

2.1. Baseline Schedule

General	
# Activities	22
Planned Duration (PD)	13 days*
Budget At Completion (BAC)	1,535,854 €
Renewable Resources	2
Consumable Resources	-

Network topology	
Serial/Parallel (SP)	34%
Activity Distribution (AD)	47%
Length of Arcs (LA)	96%
Topological Float (TF)	1%

* standard eight-hour working days

2.2. Risk Analysis

Use of the predefined skewed (all to the left) distribution profiles.

	Cost sensitivity		
	avg [%]	std dev [%]	skew [-]
CRI-r	8.6	19.0	2.7
CRI-rho	43.7	15.8	-1.0
CRI-tau	74.6	36.4	-0.8

	Resource sensitivity		
	avg [%]	std dev [%]	skew [-]
CRI-r	57.0	41.0	N/A
CRI-rho	56.5	41.5	N/A
CRI-tau	44.0	43.0	N/A

	Time sensitivity		
	avg [%]	std dev [%]	skew [-]
CI	38.5	47.2	0.5
SI	60.5	32.3	-0.2
SSI	10.7	19.4	1.5
CRI-r	9.3	17.2	1.7
CRI-rho	45.6	14.1	-2.1
CRI-tau	77.6	32.6	-0.9

2.3. Project Control

2.3.1. Simulated forecasting accuracy

The accuracy of time and cost forecasting methods has been evaluated based on Monte Carlo simulation runs using the risk profiles described in section “2.2. Risk Analysis”. Based on these risk profiles, the Mean Absolute Percentage Error (MAPE) and Mean Percentage Error (MPE) has been calculated to evaluate the expected accuracy of the time and cost predictions, EAC(t) and EAC, respectively.

Simulated EAC(t) accuracy		
method - PF	MAPE [%]	MPE [%]
PV - 1	70.2	-10.9
PV - SPI	62.9	2.2
PV - SCI	62.9	2.2
ED - 1	120.5	36.4
ED - SPI	62.9	2.2
ED - SCI	62.9	2.2
ES - 1	23.2	-22.1
ES - SPI(t)	18.0	17.7
ES - SCI(t)	18.0	17.7

Simulated EAC accuracy		
method (PF)	MAPE [%]	MPE [%]
1	0.0	0.0
CPI	0.0	0.0
SPI	7.5	7.5
SPI(t)	10.3	10.3
SCI	7.5	7.5
SCI(t)	10.3	10.3
0.8 CPI + 0.2 SPI	2.7	2.7
0.8 CPI + 0.2 SPI(t)	4.6	4.6

According to the MAPE values[1] the best performance for time forecasting can be expected from the SPI(t)- and SCI(t)-weighted Earned Schedule methods. For cost forecasting the unweighted and CPI-weighted methods should yield the best results.

2.3.2. Tracking description

The user has not performed any project control and therefore no tracking periods have been defined. Tracking periods can now be generated automatically by ProTrack or by manually inputting tracking data period by period.

[1] The MAPE gives the best indication for the forecast accuracy (the lower the MAPE, the more accurate the method) since all deviations from the targeted real duration (real cost) are cumulated, whereas for the MPE underestimates can be compensated by overestimates and vice versa, possibly leading to an overly positive evaluation of a certain method. However, the MPE can provide useful information about the nature of the deviations, i.e. does the method rather underestimate or overestimate the real duration (real cost)?