

	Case Name: C2019-03	Sector	Event management	
	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	
Submitted by	Mayté & Thymo		One of nine std. scenarios	
Date	2019		User defined distributions	
File Name	C2019-03	Project Control	Automatic tracking	
			Tracking based on user input	

1. Project description

Project Authenticity

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	30
Planned Duration (PD)	27 days*
Budget at Completion (BAC)	€ 126.955,30
Renewable Resources	1
Consumable Resources	-

Network Topology	
Serial/Parallel (SP)	27%
Activity Distribution (AD)	62%
Length of Arcs (LA)	0%
Topological Float (TF)	23%

* Standard eight-hour working days

2.2. Risk analysis

Random simulation by ProTrack was performed using the default symmetric triangular risk distribution profiles.

	Cost sensitivity		
	avg (%)	std dev (%)	skew (-)
CRI-r	92,97	24,86	-3,7
CRI-rho	67,63	8,06	0,3
CRI-thau	32,63	20,33	2,5

	Time sensitivity		
	avg (%)	std dev (%)	skew (-)
CI	7,0	19,0	2,8
SI	23,3	25,2	1,7
SSI	0,3	0,9	3,6
CRI-r	82,9	22,3	-3,6
CRI-rho	67,1	7,6	0,8
CRI-thau	32,5	21,5	2,3

	Resource sensitivity		
	avg (%)	std dev (%)	skew (-)
CRI-r	99,00	0,00	N/A
CRI-rho	100,00	0,00	N/A
CRI-thau	82,00	0,00	N/A

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	17,57	10,29
PV - SPI	30,02	26,68
PV - SCI	30,08	26,85
ED - 1	48,26	43,31
ED - SPI	30,02	26,68
ED - SCI	30	26,7
ES- 1	9,99	6,26
ES- SPI(t)	19,34	17,82
ES - SCI(t)	19,37	17,89

simulated EAC accuracy		
Method - PF	MAPE (%)	MPE (%)
1	0,21	0
CPI	0,4	0
SPI	14,53	14,05
SPI (t)	11,96	11,86
SCI	14,59	14,1
SCI (t)	12,03	11,93
0.8 CPI + 0.2 SPI	7,11	7,03
0.8 CPI + 0.2 SPI (t)	4,75	4,72

According to the MAPE values the best performance for time forecasting can be expected from the unweighted Earned Schedule *method*. For cost forecasting the CPI-weighted method should yield the best results.

2.3.2. Tracking description

Tracking Authenticity

Manual tracking was performed over 23 tracking periods with *regular* lengths of approximately one month. The Real Duration and Real Cost mentioned in section “2.3.3. Earned Value Management” are based on manual user input.

The tracking information obtained from the project owner and introduced in ProTrack includes actual activity start dates, durations, and costs.



2.3.3. Earned Value Management

2.3.3.1. Performance metrics

	CV (€)	SV (€)	SV(t) (d)	CPI(-)	SPI (-)	SPI(t) (-)	p-factor (-)
avg	479,72	30899,54	44,39	1,01	3,79	1,96	0,81
std dev	186,12	19139,04	19,37	0,00	4,88	0,97	0,22
final	604,00	2453,00	31,00	1,00	1,02	1,19	1,00

2.3.3.2. Time forecasting



PD	27 days	Real duration	23 days	Late	-16,20%
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EAC (t)	Real Accuracy			
Method - PF	avg (d)	std dev (d)	MAPE (%)	MPE (%)
PV - 1	18,09	3,42	21,4	-21,4
PV - SPI	12,09	6,31	47,4	-47,4
PV - SCI	12,00	6,24	47,8	-47,8
ED - 1	12,52	7,70	45,6	-45,6
ED - SPI	12,09	6,31	47,4	-47,4
ED - SCI	12,09	6,31	47,4	-47,4
ES- 1	18,35	2,37	20,2	-20,2
ES- SPI(t)	14,70	4,80	36,1	-36,1
ES - SCI(t)	14,65	4,85	36,3	-36,3

2.3.3.3 Cost forecasting

BAC	€ 126.955,30	Real cost	€ 124.502,30	Over Budget	-1,93%
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EAC	Real Accuracy			
Method - PF	avg (€)	std dev (€)	MAPE (%)	MPE (%)
1	126475,58	186,12	1,6	1,6
CPI	126003,82	264,17	1,2	1,2
SPI	92964,83	27032,35	50,9	-50,4
SPI (t)	98854,64	25668,55	43,7	-43,2
SCI	92775,09	27075,05	51,3	-50,8
SCI (t)	98614,06	25738,16	44,2	-43,7
0.8 CPI + 0.2 SPI	109534,03	18035,84	18,5	-18,0
0.8 CPI + 0.2 SPI (t)	115360,68	13032,40	10,4	-9,8