

Contents

1	Introduction	1
1.1	Cooperating Objects Context	1
1.2	Magna Carta of Featured Applications	2
1.3	Integration Aspects	3
1.4	Design Space	6
1.5	Conclusions	10
	References	10
2	Deployment and Management of Cooperating Objects	13
2.1	Overview	13
2.2	Monitoring Railway Bridges	14
2.2.1	Overview	14
2.2.2	Application Description/Usage Scenarios	15
2.2.3	Key Results and Lessons Learned	17
2.3	Cooperative Industrial Automation Systems	19
2.3.1	Overview	19
2.3.2	Application Description/Usage Scenarios	20
2.3.3	Key Results and Lessons Learned	24
2.4	Light-Weight Bird Tracking Sensor Nodes	25
2.4.1	Overview	25
2.4.2	Application Description/Usage Scenarios	26
2.4.3	Key Results and Lessons Learned	28
2.5	Public Safety Scenarios	30
2.5.1	Overview	30
2.5.2	Application Description/Usage Scenarios	31
2.5.3	Key Results and Lessons Learned	33
2.6	Road Tunnel Monitoring and Control	34
2.6.1	Overview	34
2.6.2	Application Description/Usage Scenarios	34
2.6.3	Key Results and Lessons Learned	36
2.7	Conclusions	37
	References	37

3	Mobility of Cooperating Objects.	39
3.1	Overview	39
3.2	Mobility in Industrial Scenarios.	40
3.2.1	Overview	40
3.2.2	Application Description/Usage Scenarios	44
3.2.3	Key Results and Lessons Learned	46
3.3	Mobility in Air Traffic Management	47
3.3.1	Overview	47
3.3.2	Application Description/Usage Scenarios	48
3.3.3	Key Results and Lessons Learned	52
3.4	Mobility in Ocean Scenarios.	54
3.4.1	Overview	54
3.4.2	Application Description/Usage Scenarios	54
3.4.3	Key Results and Lessons Learned	56
3.5	Person Assistance in Urban Scenarios	59
3.5.1	Overview	59
3.5.2	Application Description/Usage Scenarios	60
3.5.3	Key Results and Lessons Learned	61
3.6	Mobility in Civil Security and Protection	63
3.6.1	Overview	63
3.6.2	Application Description/Usage Scenarios	64
3.6.3	Key Results and Lessons Learned	66
3.7	Conclusions	68
	References	68
4	Cooperating Objects in Healthcare Applications	73
4.1	Overview	73
4.2	Physical Activity Recognition	75
4.2.1	Overview	75
4.2.2	Application Description/Usage Scenarios	76
4.2.3	Key Results and Lessons Learned	77
4.3	Real-Time Physical Energy Expenditure.	78
4.3.1	Overview	78
4.3.2	Application Description/Usage Scenarios	78
4.3.3	Key Results	80
4.4	Emotional Stress Detection.	80
4.4.1	Overview	80
4.4.2	Application Description/Usage Scenarios	81
4.4.3	Key Results	82
4.5	Physical Rehabilitation.	83
4.5.1	Overview	83
4.5.2	Application Description/Usage Scenarios	83
4.5.3	Key Results and Lessons Learned	84

4.6	Energy Aware Fall Detection	84
4.6.1	Overview	84
4.6.2	Application Description/Usage Scenarios	86
4.6.3	Key Results and Lessons Learned	87
4.7	Distributed Digital Signal Processing	87
4.7.1	Overview	87
4.7.2	Application Description/Usage Scenarios	88
4.7.3	Key Results and Lessons Learned	90
4.8	Model Predictive Control	91
4.8.1	Overview	91
4.8.2	Application Description/Usage Scenarios	92
4.8.3	Key Results and Lessons Learned	93
4.9	Conclusions	94
	References	95
5	Markets for Cooperating Objects	99
5.1	Market Overview	100
5.2	Featured Applications	102
5.2.1	Deployment and Management of Cooperating Objects	102
5.2.2	Mobility of Cooperating Objects	107
5.2.3	Cooperating Objects in Healthcare Applications	108
5.3	The CONET Survey	112
5.4	Conclusion	114
	References	115
6	Conclusions	117
	Index	119