

Contents

Abstract	i
Sommario	iii
Acknowledgments	v
List of Figures	ix
List of Tables	xi
1 Introduction	1
1.1 Challenges in Low-Power Wireless	2
1.2 Existing Communication Support	4
1.3 Taking a Different Stand with a Wireless Bus	6
2 Glossy: Efficient Network Flooding and Time Synchronization	11
2.1 Synchronous Transmissions	13
2.2 Glossy Overview	18
2.3 Glossy in Detail	21
2.4 Implementation	25
2.5 Theoretical Analysis	31
2.6 Experimental Evaluation	36
2.7 Related Work	49
2.8 Summary	52
3 Low-Power Wireless Bus (LWB): A Versatile Wireless Bus	55
3.1 Overview	58
3.2 Protocol Operation	61
3.3 Scheduler	69
3.4 Evaluation Methodology	74
3.5 Bootstrapping	77
3.6 Many-to-One Communication	79
3.7 Many-to-Many Communication	84
3.8 Topology Changes	86
3.9 Mobility	90
3.10 Discussion	98
3.11 Related Work	103
3.12 Summary	105

4	VIRTUS: A Wireless Bus with Virtual Synchrony Guarantees	107
4.1	System Model	109
4.2	LWB as the Communication Support	110
4.3	Building Up to Virtual Synchrony	111
4.4	FIFO Delivery	127
4.5	Implementation	128
4.6	Evaluation	129
4.7	Related Work	140
4.8	Summary	140
4.A	Delivery between Successive Stable Rounds	141
5	Conclusions and Outlook	143
5.1	Contributions	143
5.2	Possible Future Directions	144
	Bibliography	147
	List of Publications	159
	Curriculum Vitæ	163