
Contents

Acknowledgements	vii
Abstract	ix
List of Figures	xvii
List of Tables	xxi
1 Introduction	1
1.1 Motivation	1
1.2 Objectives	4
1.3 Structure of the Thesis	5
2 UAVs and UAV-based systems: An overview	7
2.1 Flight simulation alternatives	11
2.2 Current solutions for UAV coordination	13
3 UAVs built for real experiments	19
4 ArduSim simulation platform	21
4.1 ArduSim design and implementation	22
4.2 ArduSim validation	47
4.3 Summary	58
5 Mission Based Collision Avoidance Protocol (MBCAP)	61
5.1 Protocol overview	62
5.2 Protocol validation	72
5.3 MBCAP-e: Enhanced Mission Based Collision Avoidance Protocol	73

CONTENTS

5.4	Summary	94
6	Mission-based UAV Swarm Coordination Protocol (MUSCOP)	95
6.1	Protocol overview	95
6.2	Data sources and error assessment	100
6.3	Protocol validation	103
6.4	Summary	112
7	FollowMe protocol	113
7.1	Protocol overview	114
7.2	Data sources and error assessment	118
7.3	Protocol validation	121
7.4	Summary	129
8	Conclusions, Publications and Future Work	131
	Bibliography	139