

LIST OF FIGURES

Figure 1.1	Generation of Mobile Communication Techniques	2
Figure 1.2	Coexisting HAP and Terrestrial BS Scenario	15
Figure 1.3	Heterogeneous Wireless Systems Incorporating HAP	16
Figure 2.1	Categories of HAP	23
Figure 2.2	Wind Speed	25
Figure 2.3	HAP Altitude	26
Figure 2.4	A Stand Alone HAP System	28
Figure 2.5	Integrated HAP-Terrestrial System	28
Figure 2.6	An Integrated Terrestrial – HAP - Satellite System	29
Figure 2.7	Coverage of HAP	31
Figure 2.8	Frequency Allocation of HAP	31
Figure 2.9	HAP Applications	32
Figure 3.1	Concept of HAP based Cell Architecture	52
Figure 3.2	Concept of Cellular Wireless Network	54
Figure 3.3	Cell Disposition and Parameters	55
Figure 3.4	Cell Geometry	57
Figure 3.5	Desirable Hand-off Features	59
Figure 3.6	Hand-off Cellular System	60
Figure 3.7	Hand-off Classification	61
Figure 3.8	Vertical Shifting up and down of HAP	63
Figure 3.9	Horizontal shifting of HAP	64
Figure 3.10	Steerable Antenna Solution for Hand-off	65
Figure 3.11	Spectrum Etiquettes for HAP and WiMAX	69
Figure 3.12	Time Advance and User Allocation	75
Figure 3.13	Model of Artificial neuron	77
Figure 3.14	RBF Neural Network	79
Figure 3.15	Hand-off Algorithm	82
Figure 3.16	Spectrum Etiquettes in BPSK Modulation for Varies Distance	84
Figure 3.17	Spectrum Etiquettes in 64QAM Modulation for Varies Distance	84
Figure 3.18	Service Probability in 2^0 Radiation Pattern	86
Figure 3.19	Service Probability in 5^0 Radiation Pattern	86
Figure 3.20	Receive Signal Strength Using Hata Model	87

List of Figures

Figure 3.21	Hand-off Rate Versus Mean Arrival Time	88
Figure 3.22	Hand-off Rate Versus Traffic Intensity	88
Figure 4.1	Reservation Channel Technique in HAP Cells and Scenarios	97
Figure 4.2	Classification of channel allocations	100
Figure 4.3	Fixed Channel Allocation	101
Figure 4.4	Borrowing Channel Technique	102
Figure 4.5	Dynamic Channel Allocation	103
Figure 4.6	User in Overlapping Cell	104
Figure 4.7	HAP Cells and Overlapping	106
Figure 4.8	New Call and Hand-off Call	107
Figure 4.9	Reservation Channels Algorithm	109
Figure 4.10	Reservation State Diagram for the Proposed Technique	111
Figure 4.11	Probability of Call Blocking and Dropping in Scenario 1	113
Figure 4.12	Probability of Call Blocking and dropping in Scenario 2	114
Figure 4.13	Probability of Call Blocking and Dropping in Scenario 3	114
Figure 5.1	Channel Reservation and Bandwidth Degradation supporting CAC	124
Figure 5.2	CAC Implimented in HAP	126
Figure 5.3	Bandwidth Degradation	129
Figure 5.4	Different Channels for Different Services	131
Figure 5.5	Classification of Services	132
Figure 5.6	Framework of CAC	135
Figure 5.7	CAC Algorithm	138
Figure 5.8	State Diagram Using an Ergodic Markov Chain	139
Figure 5.9	Dropping and Blocking Probability of UGS Connections	144
Figure 5.10	Dropping and Blocking Probability of rtPS Connections	145
Figure 5.11	Dropping and Blocking Probability of nrtPS Connections	145
Figure 5.12	Bandwidth Utilization of the System	146
Figure 6.1	Existing Techniques for Improving QoS	154