Temasek Defence Systems Institute

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Cross-Domain Network Connectivity

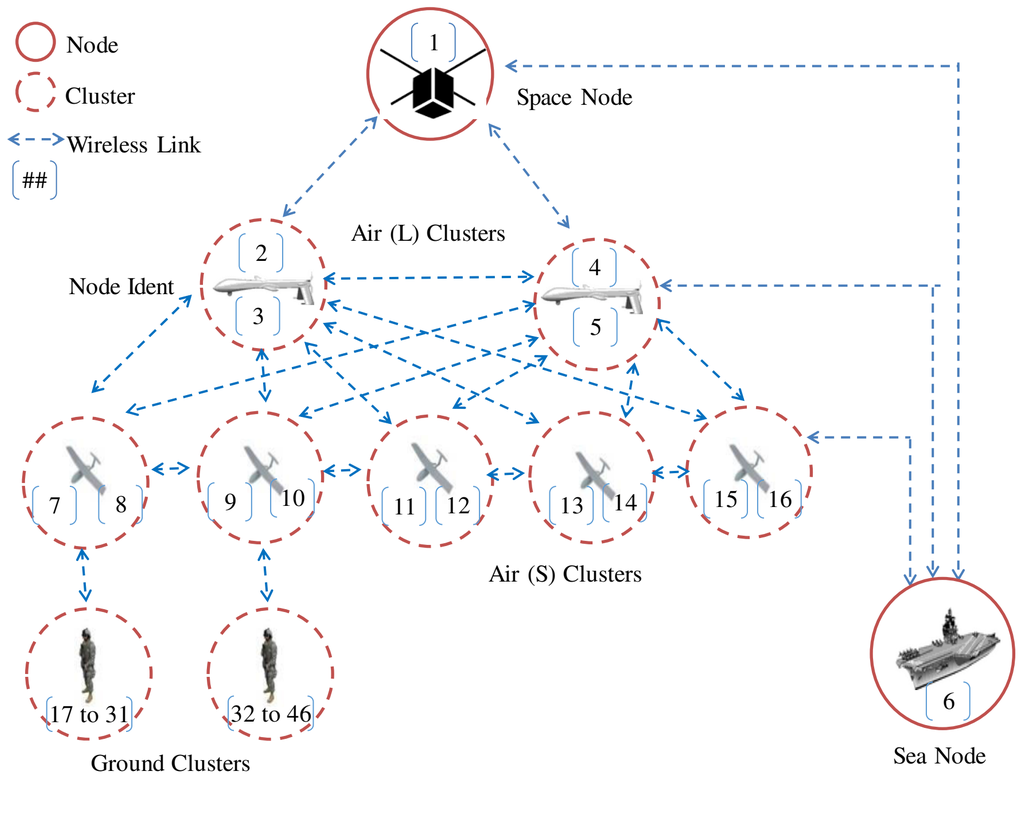
Prepared by: Wu Kam Wah (Steven), Singapore Technologies Aerospace Ltd
Thesis Advisor: Professor Tri Ha and Associate Professor Su Weilian

Objective:

- To analyze the network connectivity between air, ground, sea and space communication nodes in a multi-tier network architecture.

Main Research:

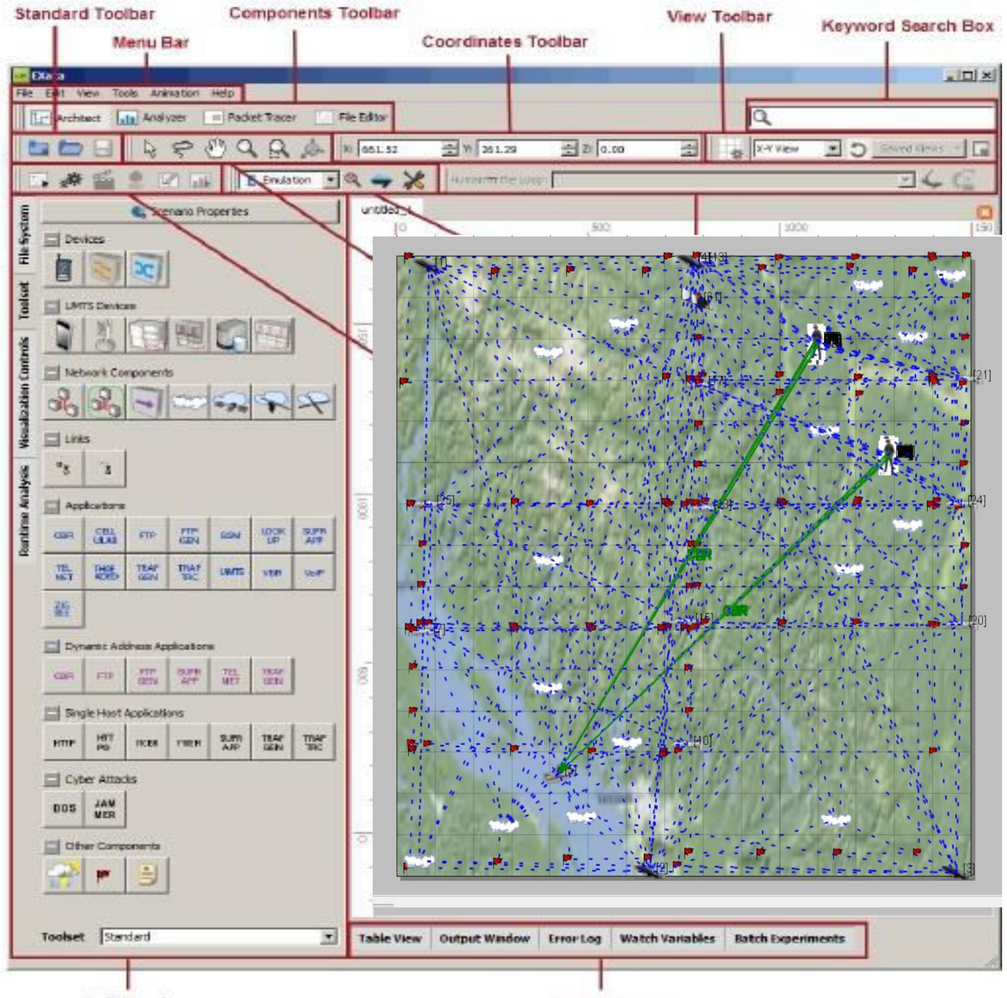
- Perform a link budget calculation to determine the transmit power, SNR per bit and link margin necessary to close up the communication link.
- These values will be used in EXata (version 5.3) commercial networking software tool developed by Scalable Network Technologies to perform simulation on multiple operational scenarios.
- Network parameters such as average end-to-end delay, average unicast jitter and average unicast received throughput are key indicators to assess the connectivity and network redundancy of the multi-tier network architecture.



Scenario Description:

- Scenario I: Air(S) cluster with data traffic only
- Scenario II: Air(S) cluster with data and network traffic
- Scenario III: Air(S) and Air(L) cluster with data traffic only
- Scenario IV: Air(S) and Air (L) cluster with data and network traffic
- Scenario V: Air cluster and CubeSat with data traffic only
- Scenario VI: Air cluster and CubeSat with data and network traffic

For scenarios III to VI, air clusters will be disabled 10 seconds into the simulation.



Results: