### DRONEswarm™

### Software Cost Estimate

### Final Draft

### ACME Software Company

### Brandon Lavinsky

### 6 December 2017

### Software Cost Estimate Table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CSCI | Total SLOC | New SLOC | Reused SLOC | Equivalent SLOC | Total Development Hours |
| Air Vehicle Segment | 800,000 | 800,000 | 0 | 800,000 | 4000 |
| Ground Control Segment | 540,000 | 540,000 | 0 | 540,000 | 2,700 |
| Swarm Simulation Segment | 300,000 | 300,000 | 0 | 300,000 | 1500 |
| Ground to Air Segment Interface | 50,000 | 50,000 | 0 | 50,000 | 250 |

|  |  |
| --- | --- |
| **CSCI** | **Basis of Estimate** |
| Air Vehicle Segment (AVS) | Due to the nature of the Air Vehicle Segment and its demand for largely autonomous control it will contain the largest amount of SLOC. The Air Vehicle Segment will perform tasks directed by the Ground Control Segment completely on their own without user control. Users will simply monitor the drones making sure they are completing or failing tasks as well as the status of the drone (online, offline, damaged, etc.) The unmanned air vehicle will operate as a unit with cross vehicle communication which will result for the need of an extensive amount of SLOC. In addition it will need to be compatible with customer furnished electronics so creating compatible software will up the amount of SLOC. No prior development of technologies related to the specifications of the Air Vehicle Segment has been developed by the ACME Software Company; therefore there are 0 Reused Source Lines of Code for this Segment. With these reason the Air Vehicle Segments total SLOC will be 800,000. Due to the high amount of SLOC there will be a large number of total development hours. The ACME Software Company’s standard ESLOC/Hour ration states that for every 200 ESLOC there is 1 hour of development. Using this standard, the total number of development for the AVS is 4000. |
| Ground Control Segment (GCS) | The Ground Control Segment will be less code intensive than the Air Vehicle Segment. The GCS confines the AVS however the AVS is largely autonomous and can complete tasks with little assistance or instruction. The GCS will be in charge of giving the AVS a mission profile to complete with certain parameters, but will not control the AVS directly. Because of this, the GCS will have far less SLOC compared to the AVS. Little to no autonomy will be involved with the GCS however it will still need to be able to interface with the AVS. No prior development of technologies related to the specifications of Ground Control Segment has been developed by the ACME Software Company; therefore there are 0 Reused Source Lines of Code for this Segment. With these factors considered the estimated total SLOC for the Ground Control Segment will be 540,000. The ACME Software Company’s standard ESLOC/Hour ration states that for every 200 ESLOC there is 1 hour of development. Using this standard, the total number of development for the GCS is 2700. |
| Swarm Simulation Segment (SSS) | The Swarm Simulation Segment is the offline non real-time software portion of the DRONEswarm™ used for operator training and high-level system performance characterization. The SSS will have the least amount of SLOC due to the fact that it is a simulation and is non real-time. Yes it will still need a substantial amount of SLOC to create a efficient and effective simulator, however it will require far less than that of the autonomous AVS and real-time GCS. No prior development of technologies related to the specifications of the Swarm Simulation Segment have been developed by the ACME Software Company, therefore there are 0 Reused Source Lines of Code for this Segment. While the SSS will simulate functions of both the AVS and GCS it is completely separate from the two, for the purpose of simulation and training in non-real time situations. With all this in mind the estimated total SLOC for the Swarm Simulation is 300,000. The ACME Software Company’s standard ESLOC/Hour ration states that for every 200 ESLOC there is 1 hour of development. Using this standard, the total number of development for the SSS is 1500. |
| Ground to Air Segment Interface | The Ground to Air Segment Interface is the interface that allows for the communication between the GCS and AVS. The AVS is confined by the GCS meaning they must work together each performing separate functions. Due to the fact that most of the development of each segment will have already taken place the interfacing will not require an extensive amount of SLOC. Although the Interface will realize the code from both the AVS and GCS, the interface code will be completely new. No prior development will have taken place for this development due to the fact that one the ACME software company hasn’t worked on any projects similar to the AVS and GCS and also the AVS and GCS must exit before any interfacing can begin. Therefore there will be 0 reused SLOC for this segment. Because it is an interface realizing existing code the Ground to Air Segment Interface will require and estimated total SLOC of 50,000. The ACME Software Company’s standard ESLOC/Hour ratio states that for every 200 ESLOC there is 1 hour of development. Using this standard, the total number of development for the Ground to Air Segment Interface is 250. |