APPENDIX G: HOOK DOCKING

As an alternative to the existing docking scheme, a hook docking system could be implemented. The vehicle side of this system would consist of two arms with hooks on the end, attached to the vehicle, one on top and one on the bottom. The dock would consist of two vertical poles with two cables stretched between them. The vehicle would fly between the cables and the hooks would catch each cable. Once captured, a "docking clamp" would slide across from one of the vertical poles to the other which would sandwich the vehicle and hold it firmly in place. A charging connector could be mounted to the stationary clamp and with a slight funnel shape in the side of the vehicle the connector could be guided to make a solid connection.

Once the vehicle had finished charging and data transfer, the clamp and the latches on the hooks would open and the vehicle would back out to a safe distance and then start the new mission.

Preliminary tests were conducted using the hooks and the clamps using VisualNastran simulations (Figure 63) and the dummy vehicle in the pool. The results of these tests were very encouraging.

Other than the potential for a more gentle capture system, the hook docking has another big advantage in its variable horizontal size. The horizontal dimension could be made any size simply by altering the length of the cables. This would enable the vehicle to begin docking at a much lower level of refinement of the SBL navigation and the docking controller. By starting with a larger horizontal dimension, a much larger navigation error is

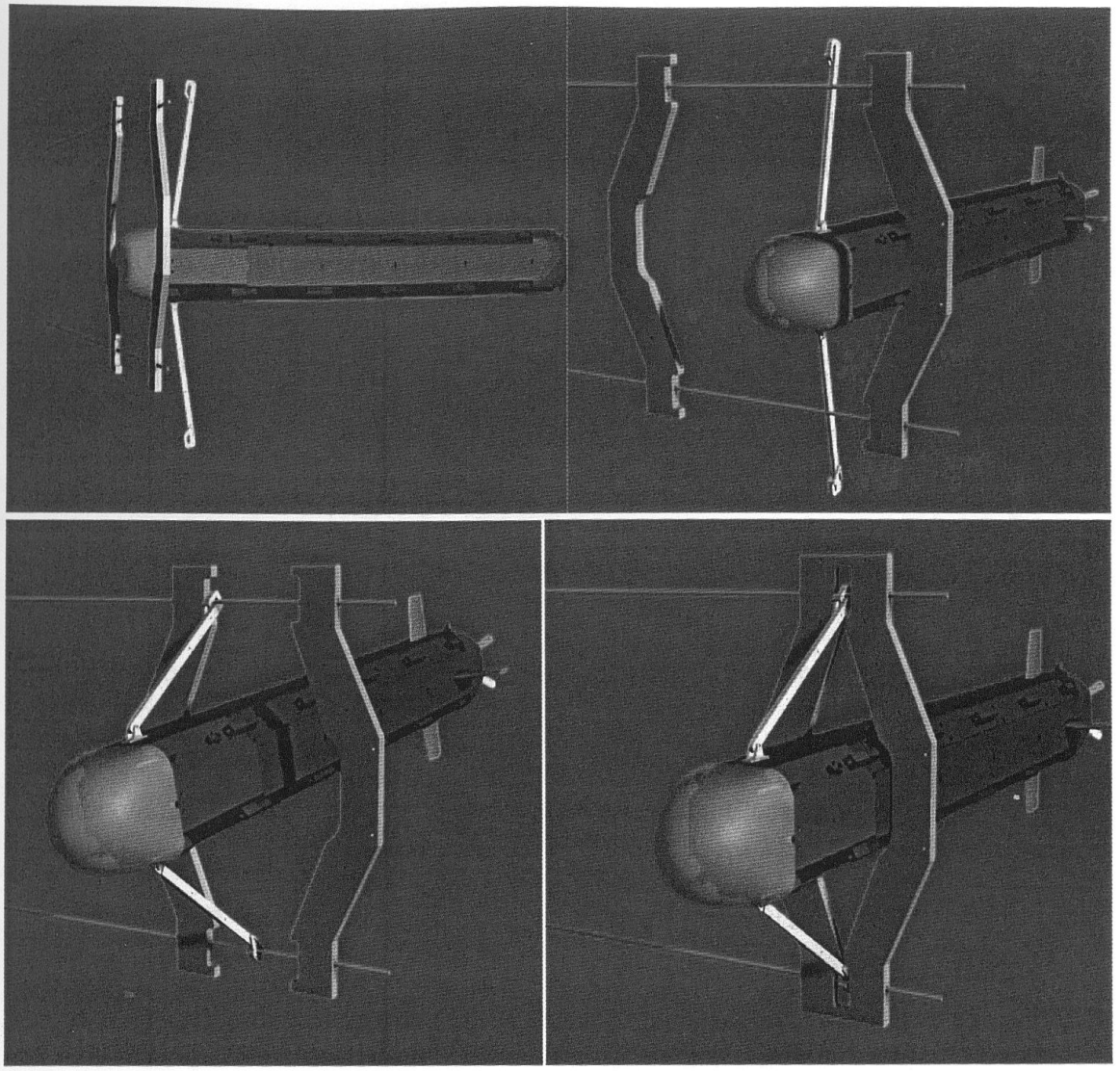

FIGURE 63. Images of hook docking system from VisualNastran simulation.

acceptable. The vehicle could begin running missions that require docking capabilities while the navigation is still being refined. As the navigation improves, the horizontal dimension could easily be reduced until a point when the desired dimension is reached. Even with the much larger horizontal dimension, the actual bulk, and deployment size, of the dock could remain small.