



Figure 3.5: Operational State Diagram.

Active Computers, Faulty Computers, Active Controller, Component-Specific Recovery Actions, and System Recovery Actions. This comprehensive table serves as a reference for understanding the system's current state and determining the required actions to maintain or restore functionality.

The primary purpose of the State Management table is to provide a clear and organized framework for handling different operational scenarios. By detailing which computers are active or faulty, and specifying the active controller responsible for managing the UAV, the table helps in diagnosing issues quickly and accurately. Additionally, it outlines both component-specific recovery actions and broader system recovery actions, ensuring that every potential failure is addressed with an appropriate response. This structured approach allows for efficient troubleshooting and ensures that the UAV can maintain operational safety and efficiency even when faced with multiple system failures.

For component-specific recovery actions, the main strategy employed is to attempt to restart the component when it is lost. This approach is widely recognized in the field of embedded systems and UAV management as an effective initial response to component failures. Restarting a component can often resolve transient issues and restore functionality without requiring more invasive interventions. According to Patel and Shah [2017], restarting is a fundamental recovery action that can address a variety