**TO:** LFEV-ESCM Team  
**FROM:** Brendan Flood  
**DATE:** 10 October 2012  
**SUBJECT:** LFEV System States

**ABSTRACT:**
This memo describes the states of the system, especially from the viewpoint of the SCADA and its interactions with the rest of the system.

**TECHNICAL FINDINGS:**
When working with a complex system, it is important for us to track the possible states of the system and prescribe behavior for each possible state. Before developing the SCADA, we drew out a basic state diagram of the system.

![State Diagram](image)

Green states represent the normal, desired operation of the car. Yellow states represent warning states, where something has gone wrong but does not affect the performance of the car itself (for example, the wireless transmission of data stops working). Red states are states
where systems critical to the operations of the car malfunction. These error states represent critical failures, and the behavior is normally a shutoff of the system and a display from the SCADA of what system failed and why.

While the tractive system is on, the SCADA will run the control loop diagrammed below:

**SCADA Control Loop (normal function)**

- Check BMS temp → Update
- Check BMS SOC → Update
- Check controller RPM → Update

**Recommendations and Decisions:**

The state machine described above will involve interaction between the SCADA and each system it communicates with. Details of the implementation of this state machine will be described in later memos about the particular hardware and software deliverables developed by team. The SCADA, BMS, and motor controller teams should communicate closely when implementing their portions of this state diagram.