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| **Master Test Plan (MTP) for SW Train Controller** | | |
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| **Testing Task and Outcome** | **Input** | **Output** |
| **Power Calculator Test:** Calculate Power Test Successfully  **Expected Outcome:**   1. At least two power integrals calculate power successfully and is encoded | Current velocity, Kp, Ki | Power |
| **Outcome of Test** | **Who Performed Test** | **Completed When** |
| Power is calculated correctly with safety critical architecture (Full Pass) | Ethan Vukelich | 11/20/2021 |

| **Testing Task and Outcome** | **Input** | **Output** |
| --- | --- | --- |
| **Train Controller Test:** Test station stops  **Expected Outcome:**   1. The train will announce a station automatically, slow down, stop at the station for some time, opens the left/right door, turn on interior lights, then close doors and leave. | Passenger emergency and service brakes, current velocity | Announcement, interior lights, left doors, right doors, power |
| **Outcome of Test** | **Who Performed Test** | **Completed When** |
| Train stops when given beacon data, however track model does not place beacons correct distance from station. Stopping at stations will vary. | Bryan Hess | 12/14/2021 |

| **Testing Task and Outcome** | **Input** | **Output** |
| --- | --- | --- |
| **Train Controller Test:** Brake Failure  **Expected Outcome:**   1. Train unsuccessfully tries to enable a brake and cuts power until it stops | Passenger emergency and service brakes | Power |
| **Outcome of Test** | **Who Performed Test** | **Completed When** |
| Brake failure is recognized and 0 power is sent to train model | Matthew Meehan | 12/1/2021 |

| **Testing Task and Outcome** | **Input** | **Output** |
| --- | --- | --- |
| **Train Controller Test:** Engine Failure  **Expected Outcome:**   1. Train is unable to supply power to the train and enables emergency brakes until it stops | Power | Emergency brakes |
| **Outcome of Test** | **Who Performed Test** | **Completed When** |
| Engine failure is recognized and emergency brakes are enabled. | Matthew Meehan | 12/2/2021 |

| **Testing Task and Outcome** | **Input** | **Output** |
| --- | --- | --- |
| **Train Controller Test:** Track Circuit Failure  **Expected Outcome:**   1. Track circuit data is corrupted (through decoder) and enables emergency brakes until it stops | Encoded data | Emergency brakes |
| **Outcome of Test** | **Who Performed Test** | **Completed When** |
| Train recognises the track circuit is no longer working and enables the emergency brake. If this happens when a train moves across blocks it will not receive the new track circuit data until it is resolved. | Matthew Meehan | 12/11/2021 |
| **Testing Task and Outcome** | **Input** | **Output** |
| **UI Test:** Real time updates  **Expected Outcome:**   1. All inputs to UI affect system in real time and changes in the system affect the UI in real time | Setpoint velocity, Kp, Ki, mode, left doors, right doors, interior lights, exterior lights, announced station, emergency brake, service brake | Setpoint velocity, mode, left doors, right doors, interior lights, exterior lights, announced station, emergency brake, service brake, current velocity, power |
| **Outcome of Test** | **Who Performed Test** | **Completed When** |
| UI updates in real time with the train. | Justin Harnishfeger | 11/13/2021 |

| **Testing Task and Outcome** | **Input** | **Output** |
| --- | --- | --- |
| **Signal Handler Test:** Decode track circuit data  **Expected Outcome:**   1. Decoder is able to parse all relevant info to the train controller | Encoded data | Current velocity, authority, speed limit, commanded velocity |
| **Outcome of Test** | **Who Performed Test** | **Completed When** |
| Decoder is able to decode track circuit data when emitting a signal it is on a new block. | Patrick D | 12/02/2021 |

| **Testing Task and Outcome** | **Input** | **Output** |
| --- | --- | --- |
| **Signal Handler Test:** Send power to train model  **Expected Outcome:**   1. Power is sent to train model | Current velocity | Power |
| **Outcome of Test** | **Who Performed Test** | **Completed When** |
| Power is sent to train model and usable | Matthew Meehan | 11/15/2021 |