

Appendix A: Customer Feedback Case A

Saved Sensors:

- The tool developed by has significantly improved the way we can analyze and understand what is happening in our models in live time. Prior to the tool development during some testing in 2018 using time-accurate sensors, the model unexpectedly broke 9 out of 13 sensors and only after the test were we able to understand that this may be due to the large unsteady aerodynamic phenomena acting on the sensors; however, during a new test happening in Oct 2021, since the code was in use, only 3 out of 13 sensors have had issues.

Allowed testing to Aero limits, while maintaining sensor data quality:

- The developed tool was able to show the wind tunnel test team the live data in both raw data format (pressure vs time), a PSD (amplitude vs frequency), and a calculated value that relates the time accurate data across all of the working sensors. These plots, and calculated values were significant to our testing success as they allowed us to actively monitor the time-accurate pressure fluctuations which we think have an effect on sensor health. Because we could accurately track and monitor the live data, we were able to implement a way to quickly and safely change the conditions to reduce the amplitude of the pressure fluctuations while still being able to test the model to its aerodynamic limits.

Captured data by automatic file save for event, with pre trigger:

- Not only was the tool able to accurately and quickly track the measurements that were critical to the tests success, the tool was also able to export data that is incredibly informative in relation to what happened just before an event occurred. While working with this tool, I am able to see what happened, via an automatic save file, before a time-accurate event occurred. Data such as this has not been available to us before and may be critical to understanding the complex aerodynamics associated with these events.

Captured data on Sensors when file with automatic event capture to disk, with pre trigger:

- Similarly, they were able to set up a function that automatically saved a file if a sensor had an exceeded a set range which provided me with several seconds with of data just prior to a potential sensor malfunction. This data will be incredibly beneficial to understand what may be causing the sensor to malfunction.

For Business community:

- The tool developed has significantly improved the way we can analyze and understand what is happening in our models in live time. Because of the tools capability, we were able to test the model to its full potential without requiring significant harm to the \$40K worth of instrumentation purchased for this test. Ultimately this software has already been critical to the health of these sensitive instruments and has kept ~\$15K worth of instrumentation functional over a similar time frame as a previous test where the instruments had failed when the software wasn't used.