

First trip summary: sensor system

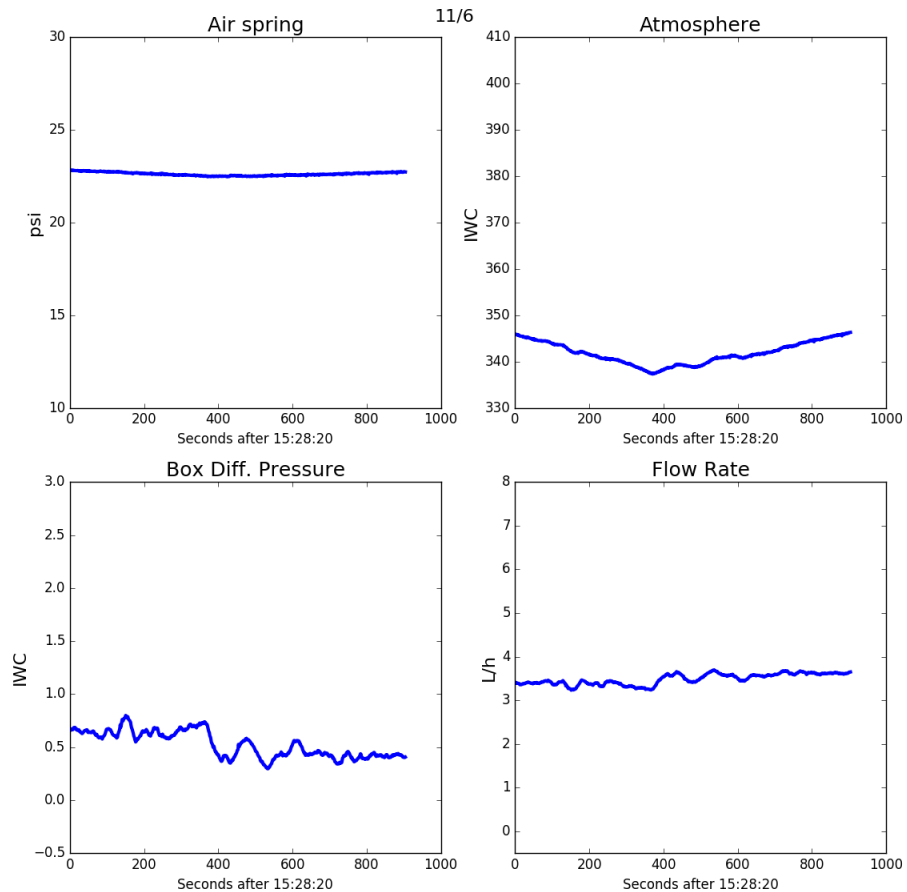
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Nov. 21, 2017

Summary

- The monitoring system worked well and as expected
- Scaling needs for sensor system driven by:
 - (largely) the number of accelerometers to get and their sampling rate
 - Gas system configuration (max of 1 more ADC unit)

ADC channels: this trip

- 1 differential channel for air spring pressure
- 1 differential channel for ambient pressure
- 1 single-ended channel for box pressure differential
- 1 single-ended channel for flow rate



ADC channels: next trip

From the last discussion:

- 3* (1 differential channel) for air spring pressure
- 1* (1 differential channel) for ambient pressure
- 3* (1 single-ended channel) for box pressure differential
- 1* (1 single-ended channel) for flow rate

We have exactly 4 differential channels and 4 single-ended channels on our current ADC. Hence, **no additional purchase** is needed.

This depends of course on the final configuration of the gas system.

Accelerometers: this trip

2 for each component:

- one in the front
- the other in the back

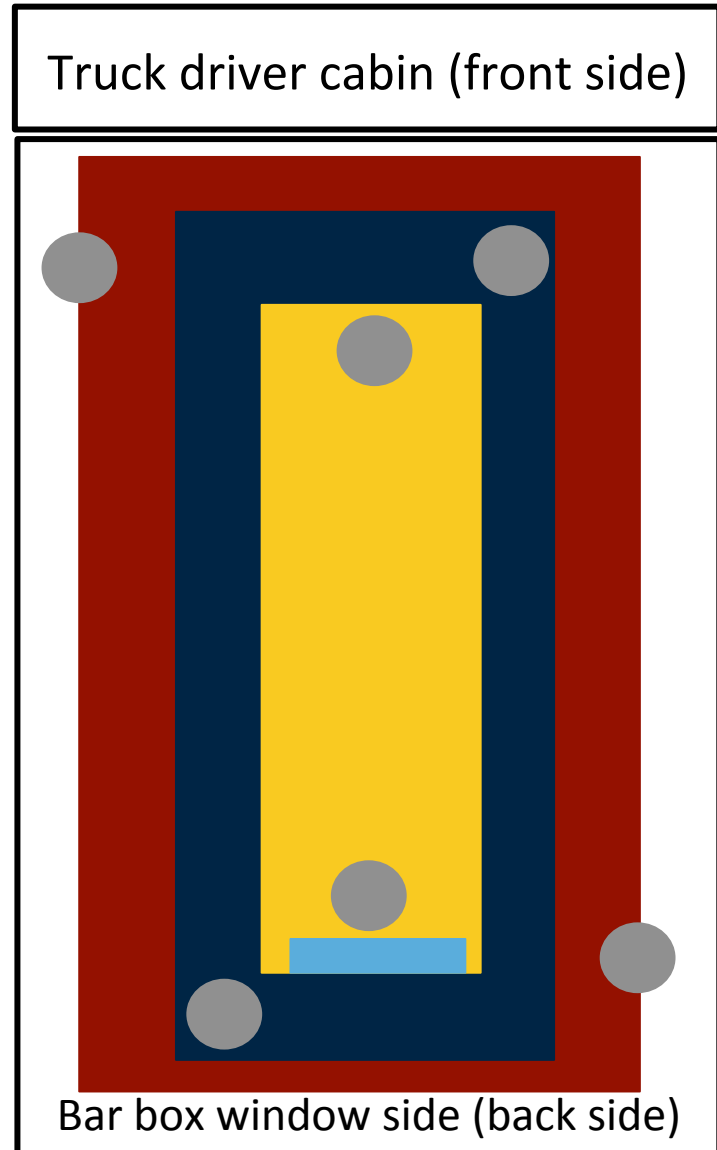
Red: outer crate

Blue: inner crate

Maize: bar box

● : accelerometer

■ : bar box window



Accelerometers: this trip

- Very roughly, largest shocks seen on bar box: ~0.8g in longitudinal, ~1.4g in transverse
- Details: need to define the questions we want to ask
- Lessons learned: bridge joints are bad

Accelerometers: next trip

Reduction of quantities in consideration

Scenarios	Bar box	Inner crate	Outer crate	Total	# Need
#1	2	1	1	12	4
#2	2	0	1	9	1
#3	2	0	1+1+0	8	0

Temperature

- This trip:
 - 1 thermocouple located next to cameras
 - Climate-control of the trailer worked very well: stayed near 76F within ~1 degree, when the outside temperatures were ~80F or ~40-50F
- Next trip: 1 thermocouple should be enough

Base stations

- Base station: wireless base for the sensor nodes to talk to the computer. We have 4.
- Next trip: decision highly depends on:
 - Number of accelerometers
 - And their sampling rates
- Can do with what we have, but at lower (e.g. 128Hz) sampling rates
- A potential cost-saving opportunity: run accelerometers on non-bar-box in “trigger-mode” (needs testing and development). In this case, should do with the 4 we have comfortably.

Likely purchasing scenario

- ADC: 0 - 1
- Thermocouple: 0
- Accelerometers: 1 - 4
- Base stations: 0 - 3