Conducted a **pilot field study** to revise the International Safe Transit Association (ISTA) guidelines to include multiple degree of freedom motion.

**Approach**

- Test stability of representative package product to common truck motion over controlled test track for common hazards and maneuvers.
- Visually recorded truck motion during test: 1) pace car behind truck, 2) truck suspension, 3) inside trailer.
- Measured and recorded truck vibration utilizing a mixed sensor array of tri-axial accelerometers and angular rate sensor to record motion.
- Post processed the data to obtain velocity and displacement.

**Discussion**

- Test unit load **lost stability** and overturned during test.
- Current ISTA guidelines may contain a lower frequency limit **eliminating destabilizing** low frequency motion present in transport.
- Integrating time domain signals to predict velocity and displacement introduced drift or low frequency content in the signal that could not be distinguished from actual motion.
- Angular rate measurements were of limited use due to noise in the signal and limited bandwidth.

**Results**

Displacement range in top figure (ISTA) is almost half of the displacement range in bottom figure (this project).