



VBOX USA Demo Report

Caterpillar Product Demonstration

March 14-15, 2007. Tucson Proving Grounds, Arizona.

Equipment demonstrated

- VBOX III with RTK and Glonass and Ground Plane Antenna
- Qty. 2 VBOX II Slip angle Sensors with Ground Plane Antennas
- BaseStation III with Glonass
- Inertial Measurement Unit
- Other equipment: Telemetry Radio for BaseStation, CAN Splitters, VBOX Battery Pack

Purpose of test

To accurately measure the position, path, and articulation of an articulated wheel loader (see photographs) for export to 3D modeling software for optimization, remote control, and automation. The VBOX III and BaseStation are used for 2cm positional accuracy, and the two slip sensors are used to compare the heading of the front and rear of the vehicle for vehicle articulation. The IMU was used to log pitch, roll, and yaw rates to calculate body angles in post-processing. Other sensors on the vehicle were used and logged separately to show driver inputs, implement status and other vehicle parameters.

The engineer we were working with primarily was Sameer Marathe from Caterpillar Engineering in Peoria, IL.

Equipment setup

The front slip sensor was mounted to the right-side front fender of the vehicle, with two ground plane antennas on top of the vehicle's light brackets. The two antennas were approximately 2.6m apart. A 30m CAB05C cable was used to connect this sensor to the VBOX III. See figures 1 and 3.

The rear slip sensor was mounted on the center platform of the vehicle in an enclosure with the VBOX III. The ground plane antennas were mounted on the rear deck with a 1m separation.

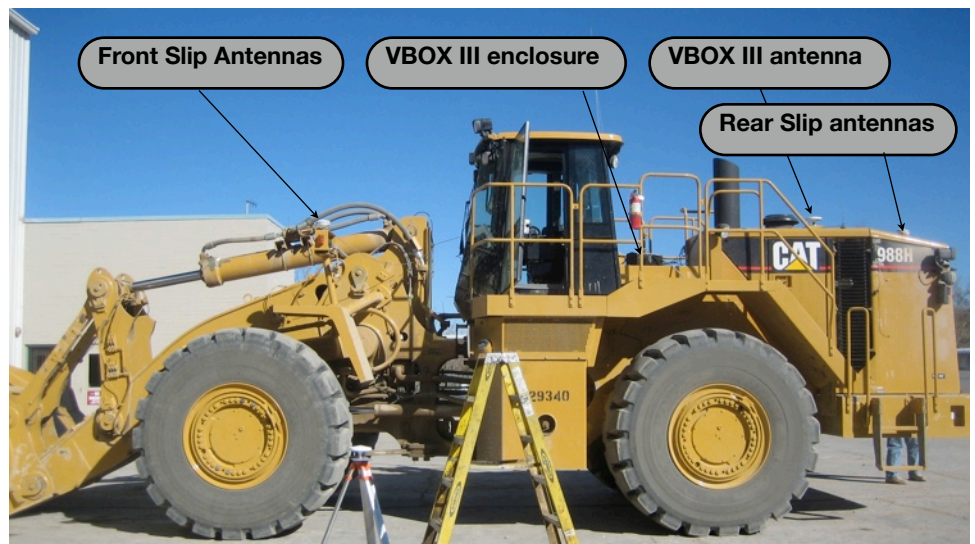


Figure 1

The VBOX III was in an enclosure with the rear slip sensor (see figure 2), and its ground plane, Glonass-compatible antenna was mounted on the rear deck of the vehicle as far away from obstructions as possible (see figure 4).

The IMU was mounted just behind the cab of the vehicle, with a 2m cable running to the VBOX III enclosure. Cables were run through a hole in the enclosure to minimize dust and debris getting to the equipment. The modules did get quite hot to the touch, but everything in the enclosure worked all day.

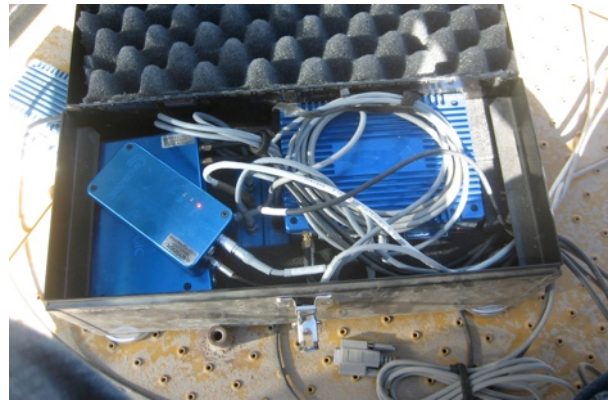


Figure 2



Figure 3



Figure 4

Summary

The market for VBOX products for use with heavy equipment has been growing in the US, and this is a prime example of one of the interesting applications that arise when working with such equipment. Caterpillar has used VBOX equipment for more more standard speed and stopping distance tests in the past, but as more VBOX products become available with different capabilities, we see whole new applications emerge.