Thank you, Xsens: Our 2026 season with the MTi-680G

[Image1: the car on track, wide shot]

A Formula Student car changes direction, brakes and accelerates in fractions of a second. Every control system on board, including performance-critical systems like traction control and torque vectoring, relies on accurate data about the vehicle's orientation, speed and acceleration.

Throughout the 2026 season, that data came from the Xsens MTi-680G in TANKIA2026. Xsens kindly provided the RTK GNSS/INS module as a sponsor. As the car's primary IMU, it fed every control system on board.

What the sensor does

The MTi-680G combines inertial sensors with a GNSS receiver and fuses both on board. For us, that meant one consistent estimate of the car's orientation, velocity and position, instead of stitching raw signals together ourselves. Its small size and low weight make it easy to fit into a tightly packaged chassis like ours.

Integration

Installing the sensor took very little work. We mounted the MTi-680G on a rigid bracket close to the car's centre of gravity, connected it to our existing CAN network and configured it with the Xsens software. Getting it to work was just as straightforward.

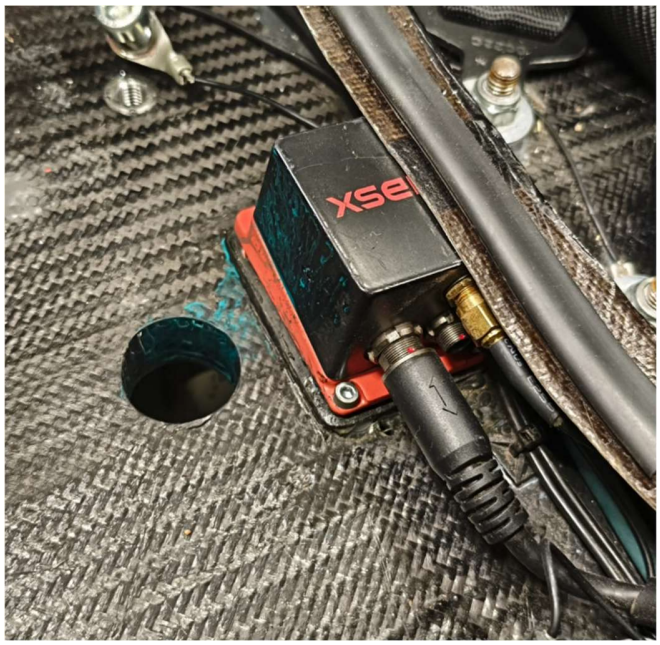


Figure 1 Sensor mounted inside the car

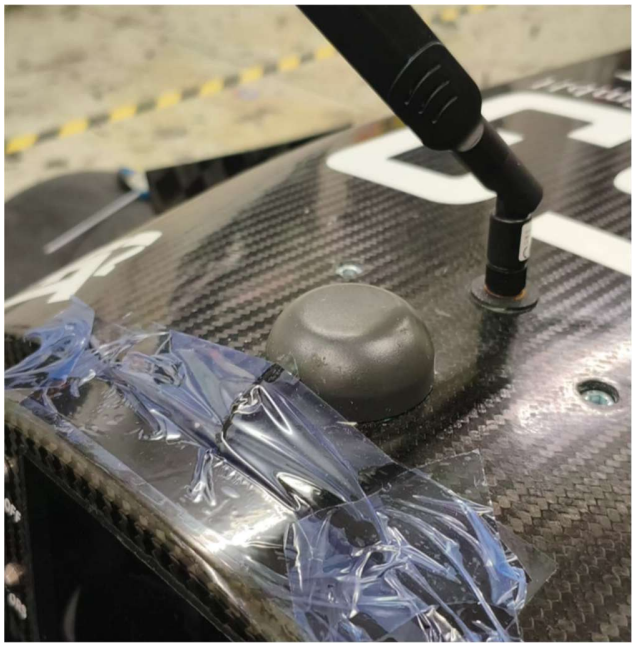


Figure 2 Antenna installed on the hull of the chassis

How we used it this season

- **Vehicle dynamics control.** The MTi's accelerations and yaw rate were key inputs for our traction control, torque vectoring and other control systems. Its velocity signal also served as a redundant backup to our main velocity source.
- **Driver analysis.** The sensor's GNSS position was the main source for our in-house lap and segment analysis tools, which let us overlay laps, compare driving lines and correlate them with tyre and suspension data.
- **Data visualisation.** It was our main source for the forces acting on the vehicle whenever we visualised driving data, including in our onboard video overlays.
- **Testing and validation.** A reliable reference measurement made it easier to tune and verify our own estimators and simulation models.



Figure 3 Forces breakdown by sector

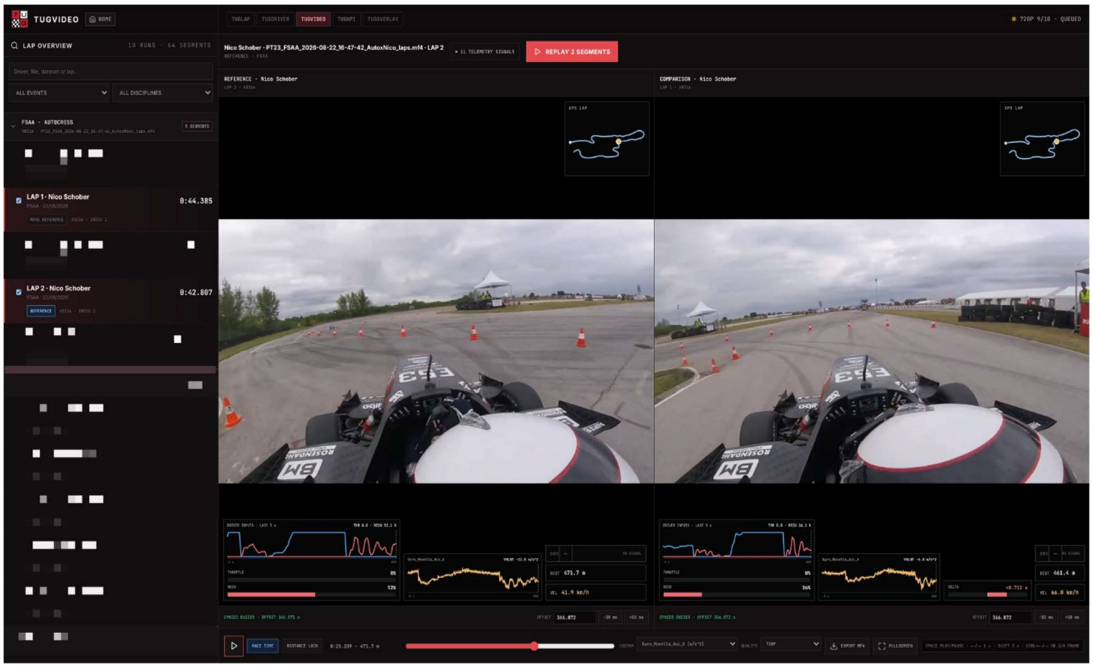


Figure 4 Comparing longitudinal acceleration side-by-side

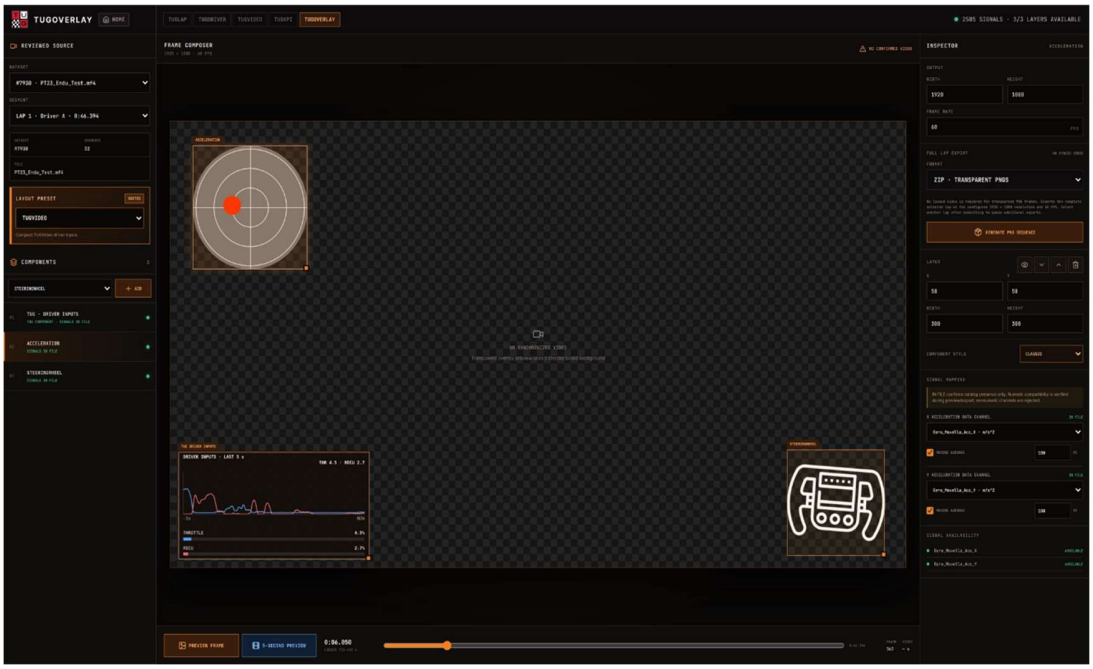


Figure 5 Overlaying longitudinal and lateral vehicle acceleration using MTi-680G signals

Thank you, Xsens

With the 2026 season behind us, we would like to thank Xsens Automation & Mobility for their support and for the sensor at the heart of Chelsea's control systems.

Learn more about Xsens sensor modules: xsens.com/sensor-modules