



Continental's crash test dummies have a track record of success – thanks to Kistler's groundbreaking DTI technology.

Success Story

Kistler's DTI technology: the modern approach to in-dummy crash test measurements

Continental Safety Engineering needs its crash tests to be efficient and effective. And that's precisely why Continental relies on data acquisition technology from Kistler, the innovation leader. Tried-and-tested DTI (Digital Transducer Interface) technology is installed in their crash test dummies. DTI technology converts the analog measurement data into digital signals directly in the sensor, and transmits them to a central data recorder via a digital data bus circuit. This is all accomplished inside the dummy. Kistler's measurement technology gives Continental a whole series of benefits, such as reliability, high data quality and reduced space requirements. The data acquisition system (DAS) required in the trunk is less bulky, and thick analog sensor cabling is replaced by one single digital cable from the dummy to the vehicle. The advantages: installation is easier, and less time is needed to prepare tests.

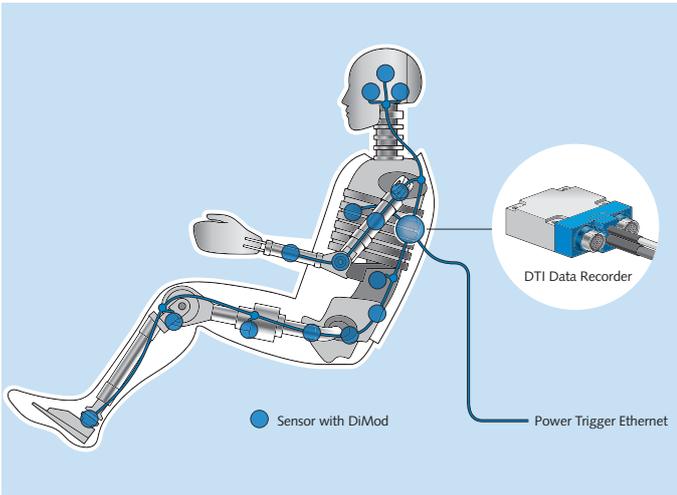
Crash tests are a crucial factor in passive safety throughout the automotive industry. They give manufacturers and OEMs in-depth knowledge about the structural and energy absorption behavior of vehicles and their components, and they also show how a crash impacts the vehicle occupants. Results from these tests are key inputs for the development process. As vehicles become more complex and digitization becomes more widespread, there is a growing need for larger numbers of onboard and in-dummy measuring channels. Continental Safety Engineering International GmbH, based in Alzenau, has been collaborating with Kistler since 1993. The two firms' cooperation focuses on data acquisition for sled tests as well as crash tests and head impact tests (Free Motion Headform or FMH for short). Continental – a subsidiary of the international technology corporation – operates

its own test and development center in the Lower Franconia region of Germany. Since it was founded in 1992, the company has completed about 300 series development projects here, as well as over 6,000 crash tests and more than 200 simulated projects. By introducing DTI technology, Kistler offered a straightforward solution for users to fully modernize their existing crash test measuring equipment. Like many other customers, Continental Safety Engineering was won over by this concept: in 2015, Kistler was contracted to expand the DAS and upgrade the existing in-dummy sensor systems to the new DTI technology.

The revolution in data acquisition

At Continental's development site, approximately 550 sled tests and 450 crash tests are currently performed per year. Thomas Wild, Team Manager for Measurement and Video Technology at Continental Safety Engineering, explains: 'With so many tests, we wanted to update our test equipment with the latest technology to ensure efficient processes and guarantee accurate, reliable measurement data. Requirements for the scope of testing are generally on the increase, and the same applies to the numbers of measuring points on vehicles.'

The number of sensors needed in a crash test is constantly growing: back in 1993, just 246 analog measurement channels were controlled and processed but nowadays, the number can exceed 600. At the same time, the installation space available in the vehicle is decreasing. Another motivation for Continental was the need to improve the system's reliability and minimize the error rate. Setup times had to be shortened and the number of analog input channels reduced.



DTI technology for crash test application

DTI technology: the new standard

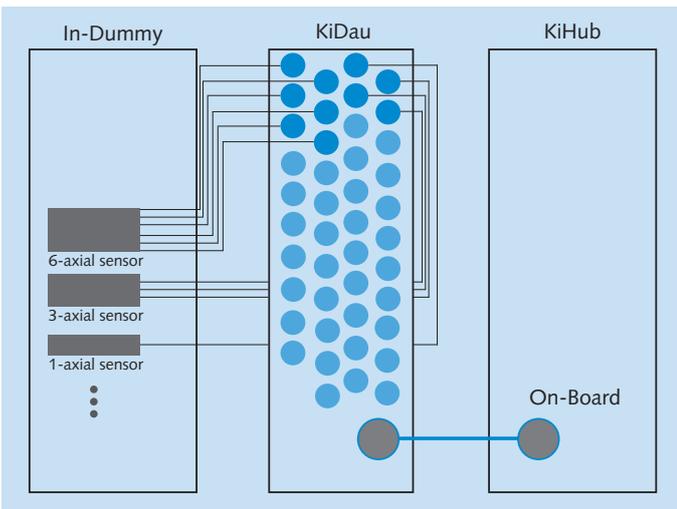
DTI technology plays a key part in the expansion of the DAS for in-dummy data measurement. This technology uses an integrated data bus system. Data from a wide range of sensors is converted into digital output signals by digitization modules (or DiMods for short). The DiMods are installed directly in the Kistler sensors; where sensors are already in place, suitable Kistler DTI integration solutions are used. The digitized sensor signals are then recorded during the crash event by a central Kistler DTI data recorder mounted in the dummy. One single cable for data, synchronization, triggering and power supply runs from the dummy to the vehicle communication box. Post test, the data is downloaded via the vehicle communication box for evaluation by the facility computer on Ethernet.

Integrating DTI technology into existing processes

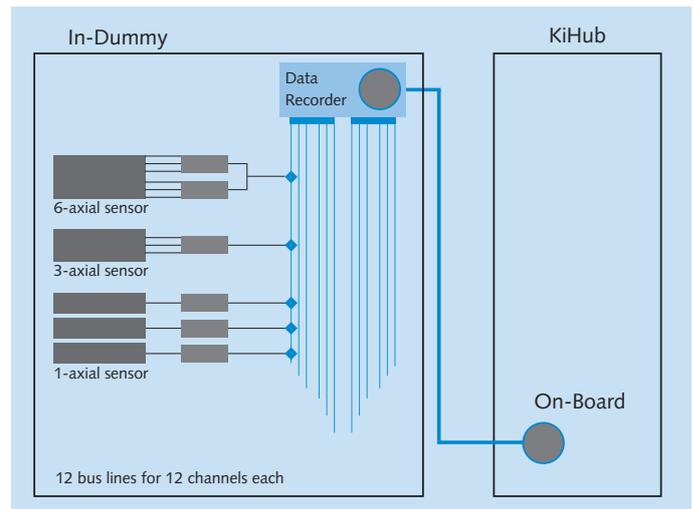
In early 2014, Kistler began the DTI integration for ten existing H3 dummies; the WorldSID dummy upgrade followed at the end of the year. The challenge posed by the H3 dummies was to integrate this technology into the existing processes and infrastructure. With analog measurement technology, each sensor channel had to be plugged into the data acquisition system by hand. This meant long setup times – and potential for errors. For the onboard system, Continental opted for the latest generation of Kistler technology: the KiDAU data acquisition unit. Compatibility between existing and newly-integrated hardware was guaranteed, and Kistler also adapted and expanded its CrashDesigner software to meet Continental's needs.

Qualitative crash tests of the future

DTI technology can be installed in all dummy models – including THOR-M: so now Continental can reliably combine a number of different devices that include both new and tried-and-tested hardware. This avoided the need to convert all technical devices to the new technology, thereby saving the company a great deal of time and money. Thomas Wild sums up Continental's collaboration with Kistler: 'In this project, Kistler drew on its technical expertise and lengthy experience of vehicle safety. The end result: convincing proof that DTI technology is the most suitable measurement system on the market for in-dummy installations. Kistler knows what matters in highly complex crash tests – especially as regards converting to DTI technology. So now we can guarantee that our crash tests will continue to meet the highest standards in the future, just as they do at present. As well as delivering accurate measurement data, Kistler's sensors are extremely reliable and durable. As far as we're concerned, that's the perfect combination. That's why we're already involved in intensive discussions about future projects,' Mr. Wild concludes.



Previous sensor solution



New DTI sensor solution

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