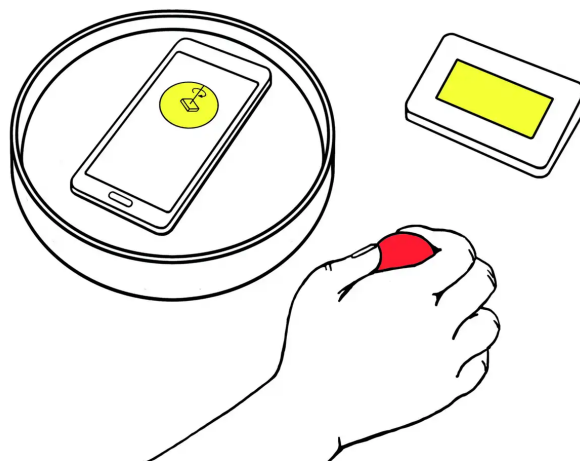


Measuring rotation rate

How does a navigation program know that you are driving around a curve?



Turn on your smartphone's gyroscope sensor, for example via the phaeno Entdecker-App.

In the app, display the angular rate in the z-direction.

Place your smartphone on the rotating plate.

Use the rotary knob to gently move the plate.

What do you measure when setting different rotational speeds?

You can measure the rotational speed of the rotating plate with the gyroscope sensor (angular rate in the z-direction, Fig. 1). This indicates how quickly an angle changes around the axis of rotation. The faster the plate rotates, i.e. the more revolutions per minute (rpm) it makes, the greater the angular rate. Note that the table is only labelled with the German unit symbol U/min, which translates to rpm.

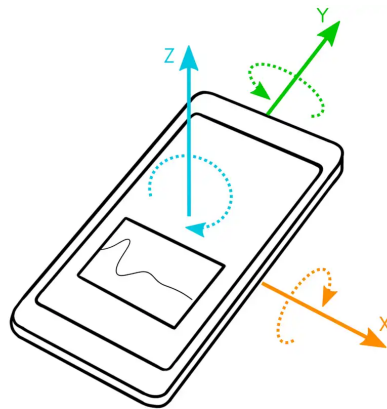


Fig. 1: The coordinate system in which the smartphone measures the angular rate.

Sensors in smartphones, so-called micro-electro-mechanical systems (MEMS) are only 0.001 to 1 mm in size. The MEMS gyroscope sensor measures the effect of the Coriolis force on tiny oscillating masses and thereof the angular rate is determined. Older gyroscope sensors consist of small gyroscopes that rotate very quickly.

Gyroscope sensors support navigation systems. If they only used satellite data, they would be far too imprecise. Via gyroscope sensors, navigation devices know whether you are driving around a curve even before it is shown in the satellite data.