Using the G7 Accelerometer & Gyroscope Sensors

The G7 contains a silicon accelerometer and gyroscope.
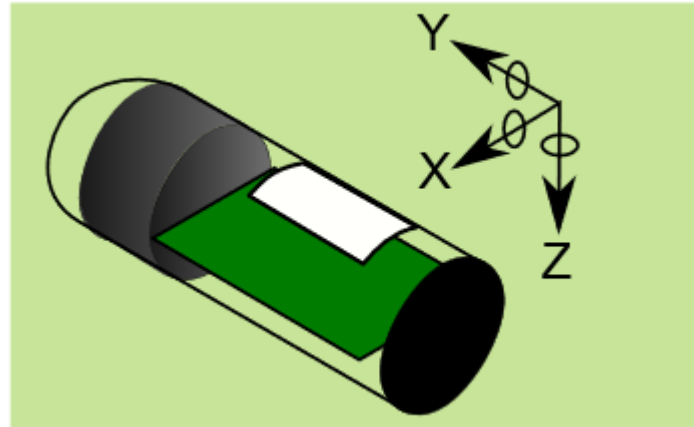

Figure 1: Axis orientation with reference to the tag label

Accelerometer

The accelerometer measures the acceleration on the tag as a three dimensional vector. This measurement is the sum of the gravitational force on the tag, and any external forces such as muscle movement. It can therefore be used as a measure of orientation, and of fish activity.

For applications where precise measurement is important, each axis will also have a fixed offset of up to 0.3G that can be measured and subtracted. This can be done by measuring the offsets prior to deployment, or postprocess by finding the optimum offset that keeps the acceleration vector one unit long. The accelerometer has a typical error of 10% after offset calibration.

Measurements are returned in units of G, where 1G is the gravitational force of the earth (9.81ms^{-2}).

Gyroscope

The gyroscope measures angular rotation on the tag as a three dimensional vector. For each axis, the gyroscope measures rotation about its corresponding accelerometer axis.

A gyroscope uses a considerable amount of the tag battery, and it needs to remain powered throughout the measurement period. It is therefore important to leave it disabled when ever possible. The deployment schedule should be designed with this in mind. Measurements are returned in units of degrees per second.

Deployment

Both the Accelerometer & Gyroscope sensors are housed in a single device, which draws significantly greater current than either the Pressure or Temperature sensors which come as standard on any of our DSTs. As such, when setting up a logging regime, you should refrain from incorporating any delay from the time of setup to the start of the deployment. Moreover, you should try to deploy the tag using the DST Host as close as possible to the intended start time of the physical deployment, as this will maximise the performance of the Accelerometer & Gyroscope sensors.