The relationship between the GNSS receiver position and the absolute sensor position is shown below.

where:

(*XSabs*, *YSabs*) is the UTM coordinate of the sensor’s absolute position;

(*XG*, *YG*) is the UTM coordinate of the GNSS receiver’s position;

*XS* and *YS* are the easting and northing offsets from the sensor to the GNSS receiver with a vehicle heading of 0° (due north);

*α* is vehicle’s heading angle, measured clockwise from true north;

*ZG* is the elevation of the GNSS receiver;

*ZS* is the elevation offset from the sensor to the GNSS receiver.