

The basics of spatial orientation

We deal with coordinates on a daily basis. Around 80 % of all decisions have a spatial dimension, which can be defined in terms of coordinates.



Office for Spatial Development

These days it's hard to imagine life without navigation apps and positioning services. They help us find restaurants and friends – or even save lives. There are also other, not-so-everyday uses for these georeferenced data:

Cities use them when planning a new bus route or looking for ways to upgrade the water supply system.

Engineering and architecture firms need accurate data to base their plans on.

Modern construction equipment and rail vehicles are also linked to coordinates.

Navigation devices guide public and private traffic on land, water and in the air.

Farmers use satellite navigation technology to optimise their use of fertilisers, seeds and pesticides.

National coordinate system

The control point is part of a nationwide network of fixed points which form the basis of Switzerland's coordinate system. All spatial data and determinations of location refer to this system of coordinates – including the official cadastral surveys done on an ongoing basis to document land ownership by defining property boundaries and recording and tracking buildings, bodies of water and woodland boundaries. These surveys help safeguard property ownership and thus play an important role in assuring legal certainty and prosperity in this country.



Canton Zurich
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Office for Spatial Development

What's your exact position?

Find out your mobile device's location accuracy

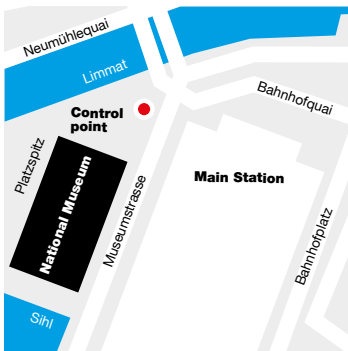


National Museum control point

You can use the control point to check the accuracy of your smartphone or navigation device.

Smartphone: Scan the QR code or go to the site <https://maps.zh.ch/k1>. You'll then see the amount by which your device deviates from the control point, which is defined to the precise centimetre.

Navigation device: Compare the coordinates displayed with the precisely defined coordinates of the control point.



Coordinates of the control point:

Swiss LV95 coordinate system:
E (East): 2'683'256.46
N (North): 1'248'117.47
Elevation: 408.36 m

World Geodetic System (WGS 84):
47°22'43.07" or 47.3786314° N (northern latitude)
08°32'27.99" or 8.54110776° E (eastern longitude)

The history of this stone

From 1971 to 1986 this piece of granite, designated 4e, marked the national border with Germany between the municipalities of Wasterkingen and Hohentengen am Hochrhein. Cross-border gravel quarrying and the subsequent straightening of the border meant that the boundary stone was no longer needed. Now it's back in use in the heart of the City of Zurich.

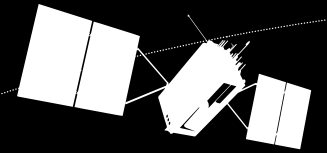


The boundary stone at its old position.

What causes inaccuracy?

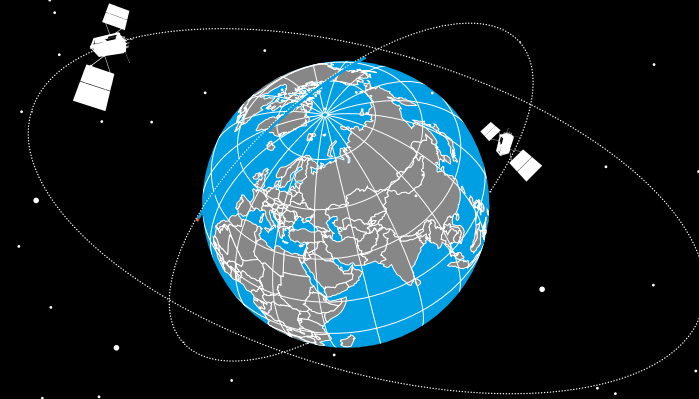
Navigation satellites

orbit the earth at an altitude of more than 20,000 kilometres. The satellite receiver measures the distance to these satellites and calculates its location on the basis of their known positions. Professional surveying equipment can pinpoint the location to an accuracy of 1 or 2 centimetres.



Weather conditions

don't affect modern navigation devices. Satellite signals go through fog and cloud but not through rock, metal or wood. This means that signals are interrupted or reflected by building facades, wooded areas and narrow valleys, resulting in imprecise position data. Ideal conditions are where you have an unrestricted view of the sky and a wide horizon.



The number of measurements

is crucial if you want to improve accuracy. Most devices do one measurement a second, and take account of prior measurements when calculating your position. The longer they measure for, the more accurate the position.