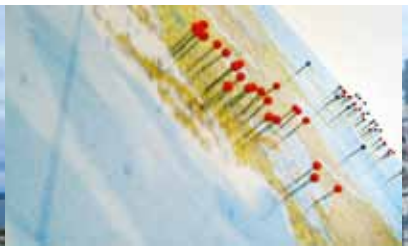
SAPOS®

GeoBasis-DE

Satellite Positioning Service of the
Offical German Surveying and Mapping

Agency for Geoinformation and
State Survey of Lower Saxony (LGLN)

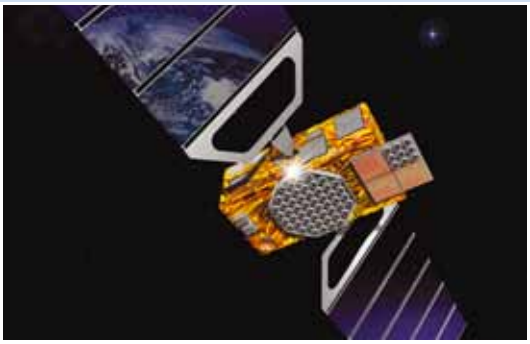


SAPOS®

Precise Positioning in Location and Height

OFFICIAL GERMAN SURVEYING AND MAPPING

SA*POS*® – The benchmark in terms of accuracy, reliability and economy!



SA*POS*® enables a highly accurate position determination in location and height.

As a joint-project of the Working Committee of the Surveying and Mapping Agencies of the Laender of the Federal Republic of Germany (AdV), SA*POS*® is based on a nationwide network of reference stations. The permanently registered signals of the Global Navigation Satellite Systems (GNSS) are processed centrally and provided as correction data by means of digital data transmission.

SA*POS*® is available all over Germany, uses international, open and standardised formats and offers high information security owing to its official quality and more than 20 years of experience. Due to its high level of availability, its multi-functionality and quality, SA*POS*® has been internationally recognised for many years.

SA*POS*® –
The Satellite Positioning Service of the Official German Surveying and Mapping

SA*POS*® is your solution if you wish to coordinate information, navigate vehicles or geo-reference thematic data. Making use of modern technology you easily and comfortably receive the spatial reference for your data quickly and precisely, based upon the Satellite Navigation Systems GPS, GLONASS and in the future also Galileo. The following services, tailored to your individual requirements, are offered in different accuracy levels and applications in both real-time and post-processing:

SA*POS*® – HEPS

High Precision Real-Time Positioning Service with a horizontal accuracy of 1 to 2 cm and vertical accuracy of 2 to 3 cm.

SA*POS*® – EPS

Real-Time Positioning Service with a horizontal accuracy of 0,3 to 0,8 m and vertical accuracy of 0,5 to 1,5 m.

SA*POS*® – GPPS

Geodetic Postprocessing Positioning Service with a horizontal accuracy of 1 cm and better and vertical accuracy of 1 to 2 cm.

Competencies

- The Satellite Positioning Service SA*POS*® of the Official German Surveying and Mapping provides the official spatial reference using the latest technology. The implementation of the geodetic spatial reference is a statutory core task of the German Laender.

- The SA*POS*®-services are further developed in permanent collaboration with business and research according to user requirements.

Infrastructure

- SA*POS*® is making use of more than 270 own reference stations across Germany and another 30 reference stations from all neighbouring countries for a nationwide network. SA*POS*® is operated by the German Laender.

Real Time

- The position determination is effected during your measurements directly on the spot.

Post Processing

- Subsequent to the local measurements the coordinates are determined through a postprocessing in your office or in a SA*POS*®-centre.

How to make best use of SA*POS*®

Some applications from everyday practice

1st Example Real estate cadastre

The high accuracy requirements of a few centimetres for the real estate cadastre pose a challenge to the satellite positioning services. SA*POS*® meets these requirements in a masterful way, even in less favourable measuring conditions, through a high-quality network of reference stations and the use of GPS, GLONASS and Galileo in the future.

The number of geodetic control points will constantly decline over the next couple of years. SA*POS*® offers an excellent supplement and alternative to traditional tachymetry for your tasks and solutions.

The SA*POS*®-measurements are performed within the official ETRS89 reference system. ‘Official‘ thereby stands among others for reliability and high quality. This guarantees an enormous investment protection for all authorities and companies.

2nd Example
Documentation of cables and pipes

The simple operation of modern GNSS receivers and the easy integration of correction data make SA*POS*® an efficient and indispensable documentation aid – even non-professionals learn how to use SA*POS*® in no time.

SA*POS*® complements modern sensors, computers, communication systems and processing modules to a mobile real-time system with a continuously digital data flow to the graphic field book.

‘GNSS opens up new dimensions.

In the marine survey it is now possible to determine the height in real time by using SA*POS*®-HEPS. This means an increase in accuracy compared to the existing feed of data on the water level and an optimisation of the evaluation process.‘

(Gunther Braun, Generaldirektion Wasserstraßen- und Schifffahrt, Außenstelle Nordwest)

3rd Example Hydrography

On sounding ships and dredgers, SA*POS*® has catered for high resolution 3D data acquisition of the river beds with centimetre accuracy for many years now.

Besides exact positioning, also depth information of highest quality is generated. Further, the AdV quasi geoid GCG2011 allows a conversion of ellipsoidal height information determined with SA*POS*® into physical heights for the sea and inland area.

Other areas of application

- Traffic management systems, logistics and fleet management
- Authorities and organisations with security management tasks (BOS)
- Agriculture and forestry, environmental protection
- GIS-data acquisition in a municipal and business environment
- Aerial photography and airborne laser scanning (LIDAR) – precise determination of projection centres
- Hydrological, geological and geodynamic investigations
- Coastal protection, monitoring of dwelling and level monitoring
- Land consolidation, soil valuation
- Engineering survey
- Classical tasks of the official surveying and mapping

Your benefits

- Measurements directly in the official reference system
- Exact coordinates in location, height and 3D
- Simple transformation into defined target systems
- Digital data flow
- Easy data exchange with third parties
- Optimisation of available staff resources
- Time saving due to maximum flexibility
- Long-term investment security
- SA*POS*® offers a maximum of quality, security and reliability.

RTCM

SA*POS*® has been an active member in the RTCM since 2003. This international standardisation committee has developed open standards for the transmission of GNSS correction data since the 1980s.

Ntrip

With Ntrip a technology for transmission of GNSS data streams via the Internet is available. In this way, the SA*POS*®-data can be accessed via a GPRS, UMTS or LTE connection on the Internet.

Network

Through the networking of SA*POS*®-reference stations, the distance-dependent components of the overall GNSS error budget can largely be reduced. Networking enables better positioning accuracies and a fast initialisation.

RINEX

RINEX is a manufacturer-independent data format used to provide SA*POS*®-data for postprocessing applications.

How to become a SA*POS*® user

Quickly and easily in two steps...

1. The following equipment is required

For **SA*POS*®-HEPS** you will need a rover equipment including a geodetic, RTK-capable GNSS receiver as well as a mobile telephone (GPRS, UMTS, GSM, LTE) for receiving **SA*POS*®** data. As a **SA*POS*®** user you are entitled to benefit from agreements with special rates for data communication services.

To use **SA*POS*®-EPS**, a DGNSS-capable single-frequency receiver is sufficient.

The reception of **SA*POS*®** data is realised via mobile telephone (GPRS, UMTS, LTE).

In the **SA*POS*®-GPPS**, GNSS observation data are provided in the RINEX format via Internet through respective data servers for subsequent evaluation (postprocessing). The GNSS-receiver must be able to record its measurements. Reversely, the service GPPS-PrO allows users to transmit of their data to an evaluation server located in the **SA*POS*®**-centre, which performs the calculation.

2. Registration as SA*POS*® user

Log in and register (You can find your contact partners on the reverse side):

- At the responsible Land Surveying Agency for enabling access to the service in your Land.
- At the central office **SA*POS*®** for a nationwide release.

SA*POS*® – An overview

	HEPS	EPS	GPPS
Procedure	Real time	Real time	Postprocessing
Accuracy – position	0,01 - 0,02 m	0,3 - 0,8 m	≤ 0,01 m
Accuracy – height	0,02 - 0,03 m	0,5 - 1,5 m	0,01 - 0,02 m
Transmission technique	Ntrip over Internet (GPRS, UMTS, LTE), GSM	Ntrip over Internet (GPRS, UMTS, LTE)	Internet (Web server)
Clocking Unit	1 second	1 second	≥ 1 second
Unit	1 minute	inapplicable	1 minute
SA*POS*®-fee per unit	0,10 EUR	150,- EUR p. a.	0,20 EUR
Standard, Format	RTCM 3, RTCM 2.3	RTCM 2.3	RINEX 2.1

Source: Product definition SA*POS*®, Version 6, 2013

SA*POS*® developments

As **SA*POS***®-operator, we are constantly working on the quality improvement of our services. In this way, added-value services such as providing users with information on transformation into defined target systems are possible.

In order to further increase satellite availability in the future, we are working already now towards a nationwide introduction of Galileo in **SA*POS***®. This will offers more accurate and reliable services for position determination to all **SA*POS***®-customers.

Contact partner:

GeoBasis-DE

Satellite Positioning Service of the
Offical German Surveying and Mapping

Agency for Geoinformation and
State Survey of Lower Saxony (LGLN)

or the SA*POS*®-distribution agency of your Land
(contacts see reverse side)

GNSS

Global Navigation Satellite Systems (GNSS) is the general term for satellite-based navigation and positioning systems. GNSS is not limited to GPS alone, but does also refer to GLONASS, Galileo and regional extension systems (e.g. EGNOS).

GPS

The Global Positioning System (GPS) was developed in the 1970s in the USA and is based on a military concept. It has increasingly been used for civil purposes since the 1980s. By the end of the current decade an extensive modernisation will be implemented.

GLONASS

The construction of the Russian system GLONASS coincided with the establishment of GPS. After several years of reconstruction the full operational functionality was achieved again in 2011.

Galileo

The European Union (EU) and the European Space Agency (ESA) are working on the establishment of Galileo, a non-military and technically system-independent GNSS. The initial operative readiness of Galileo is scheduled for the year 2015.

Statewide, nationwide, distribution agencies of the Official German Surveying and Mapping

GeoBasis-DE

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Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany

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