WORKING GROUP "GEODE蒂C REFERENCE"

Working Committee of the Surveying Authorities of the Laender of the Federal Republic of Germany (AdV)
SAPOS® is a service operated by the Surveying Authorities of the States of the Federal Republic of Germany

SAPOS® is organised as a joint project of the AdV

SAPOS® provides the official spatial reference

SAPOS® is considered as an infrastructure basic provision and as part of the legal task of the German state survey
Central Bureau SAPOS® (ZSS)

- Nationwide provision and integration of SAPOS®- data
- Access point for Private Public Partnership collaboration
- Exchange of SAPOS®- data between the states
- Technical support for the cross-border networking
- Marketing of SAPOS®- data for nationwide users
- International collaboration (RTCM)
SAPOS® - services, interoperability and standards

SAPOS®

- about 270 reference stations
- cross border networking with neighboring countries
- interoperability: use of international standards as part of the product definition (RTCM, RINEX, NMEA, NTRIP)
- standardized fees (AdV-fee catalogue)
- standardized quality management
- GPS → GLONASS → Galileo → Beidou
**SAPOS® - services, interoperability and standards**

### Real time

**EPS**
- 0.3-0.8 m
- Provision by mobile Internet
- Data format RTCM
- fees / open data

**HEPS**
- 1-2 cm
- Provision by mobile Internet and GSM
- Data format RTCM
- fees / open data

### Post Processing

**GPPS**
- < 1 cm
- Provision by Webserver
- Data format RINEX
- fees / open data

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**EPS:** Real Time Positioning Service  
**HEPS:** High Precision Real Time Positioning Service  
**GPPS:** Geodetic Precision Positioning Service
SAPOS® - services, interoperability and standards

- **developing** since 1994-1998
  - network tests

- **installation** 1999-2003
  - use for cadastral surveys (legal spatial reference)

- **production** since 2003
  - quality management

- **expansion and innovation** since 2015
  - Galileo, PPP, applications

SAPOS® Zentrale Stelle

Additional elements include:
- POS-related services, interoperability and standards
- SA POS services
- LED content on physically based networks (SBG/PPP apps)
- Reference antenna setup
- Broadcast communication systems
- Reference antenna setup
- Interoperability and standards
- Galileo PPP applications
SAPOS® - services, interoperability and standards

integrated spatial reference

http://www.adv-online.de/
SAPOS® - the quality management system

- multipath - index
- coordinate monitoring
- availability RINEX
- availability real time
- quality HEPS Fixed, TTFA
- quality HEPS monitoring
- inventory / QM
- product definition
- controlling, reporting
- user satisfaction

SAPOS® - quality management
SAPOS® - the quality management system

HEPS-service („fixed“)
- reporting since 2009
- fixing faster than 1 minute
- „fixed“-solutions >90%
SAPOS® - the quality management system

- user access – example: North-Rhine Westphalia
SAPOS® - steps to Galileo

- Strategic decision to integrate GLONASS & Galileo
- Integration / state by state G2 (GPS/GLONASS)
- Early tests with Galileo
- Full G3-services nation wide
- Integration / state by state G3/4 (incl. Galileo, Beidou)
- Precise Point Positioning (PPP) ???