STONEX

Cube-nrtk Software

Software for CORS and GNSS Network

suite cube

cube-nrtk

Cube-nrtk is a GNSS software designed for managing GNSS station networks. Utilizing data from reference stations in real-time, it calculates a network solution to provide users with accurate positioning. The software offers an intuitive graphical interface for real-time monitoring of network performance and user activity. It efficiently manages the four major constellations: GPS, GLONASS, Galileo, and BeiDou, across three frequencies.

Additionally, it supports various network solutions such as Virtual Reference Station (VRS), Master Auxiliary Concept (MAC), and Flächen Korrektur Parameter (FKP). Cube-nrtk is offered in two versions, Cube-nrtk BASE and Cube-nrtk FULL, allowing users to exploit the software modules according to their specific needs.

In particular Cube-nrtk BASE offers all the needed modules to set up a caster solution with single base and nearest corrections, while Cube-nrtk FULL includes all the software modules for the complete network solution. At any moment, it is possible to upgrade from the BASE version to the FULL version.

cube-nrtk

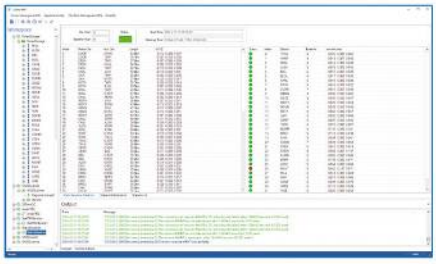
Modules

The Cube-nrtk software, in its FULL version, consists of several different modules. The most important ones are:

- **GNSSReceivers**: a module that enables connection with all receivers within the network.
- **SSDataQC**: this module allows for a quality check of the data received from the stations. It provides useful information such as the ratio between acquired observations and possible observations, cycle slips, and the mean multipath on the different frequencies acquired.
- **GNSSSubnet**: the main component responsible for network definition and calculation of differential corrections.
- **GNSSCaster**: a module for distributing differential corrections to users.
- **StaRTKMonitor**: in this module, the coordinates of reference stations are calculated in real-time, and any deviations from the reference coordinates set by the user are displayed.

All those modules can be accessed by the system administrator through both a desktop interface and a Web-UI. Cube-nrtk adopts a distributed architecture concept which is based on the fact that different modules can be installed on multiple servers. This ensures high scalability and the ability to support very large networks and high numbers of concurrent users.

Users can apply for registration to the service, and once approved, they can request data from physical or virtual stations. The manager can monitor the status of the network and user activity in real-time, publish information, and view reports.

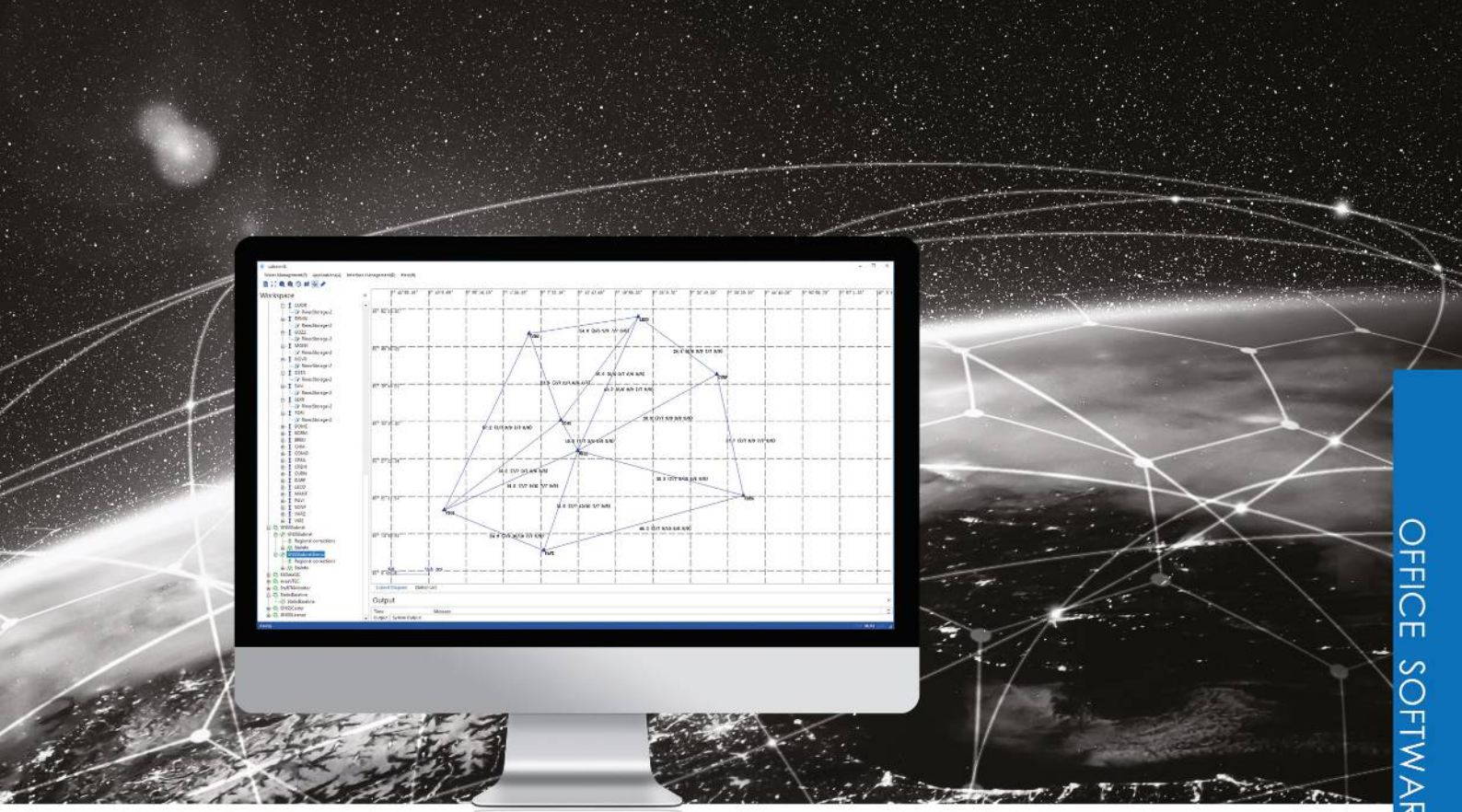


Software Configuration and Management

The software is configured through a graphical and intuitive interface in a few simple steps:

- System configuration; caster address and port, data storage, automatic start settings.
- Station configuration; connection settings, general information, antenna type, coordinates.
- Network configuration; composition of one or more sub-nets based on the available stations.

The FULL version includes a web interface through which users can register and later request station RINEX or Virtual RINEX files.
Additionally, the software includes an online post-processing service. A solution integrity monitoring system is also included in the software. Specifically, it displays ionospheric activity, analyzes station data quality, and provides real-time results for baselines.

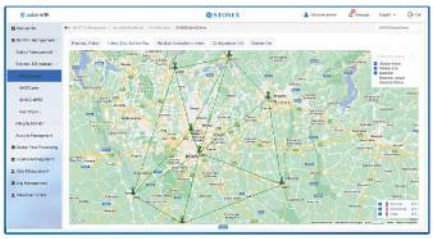


GNSS technologies

The software supports the following constellations:

- GPS
- GLONASS
- BEIDOU
- GALILEO

The differential corrections provided by the software can be utilized by receivers of any type.

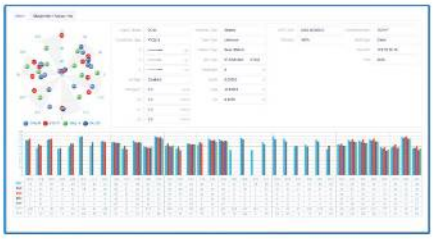


Supported input formats are:

- RTCM2
- RTCM3
- Raw data from Stonex receivers and major receiver manufacturers

The software supports the following methods of connecting the receivers:

- TCP Server
- TCP Client
- NTRIP Client
- Serial port



Real-time products come in two types:

- Network solution: The software supports common differential correction products such as Virtual Reference Station (VRS), Master Auxiliary Concept (MAC), and Flächen Korrektur Parameter (FKP).
- Real station: The software provides real-time data from network stations, with the option to automatically receive data from the nearest station (NEAR), chosen by the software based on the rover's position.

Real-time products are distributed through an NTRIP Caster. For users engaged in post-processing, real station data is available in standard RINEX format with sampling down to 1 Hz. Cube-nrtk also provides the option for Virtual RINEX points within the network.

Cube-nrtk FEATURES

	Cube-cors	Cube-nrtk BASE	Cube-nrtk FULL
Receivers management	✓		
Firmware update	✓		
Real time status receivers	✓	✓	✓
Web interface	✓	✓	✓
Raw data transfer		✓	✓
Support for other brands GNSS receivers		✓	✓
Caster function		✓	✓
Manage multiple casters simultaneously		✓	✓
Single Station RTK correction		✓	✓
Nearest RTK		✓	✓
Online user monitoring status		✓	✓
Rinex from single station		✓	✓
Virtual Rinex			✓
GNSS Core Network			✓
Real time monitoring of reference stations' coordinates			✓
Real time GNSS data Quality Check		✓	✓
Ionospheric activity index computation			✓
Customizable top bar logo			✓
Web registration form to service			✓
VRS (Virtual Reference Station)			✓
MAC (Master Auxiliary Concept)			✓
FKP (Flächen Korrektur Parameter)			✓
Post processing monitoring of reference stations' coordinates			✓
Online post processing			✓

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