R&S®MapView
Geographic Information Software
For displaying geographic data on digital vector and raster maps

ROHDE & SCHWARZ

R&S®MapView Geographic Information Software

At a glance

The software is used to display geographic data on digital vector and raster maps. R&S®MapView is primarily designed for radiomonitoring and radiolocation applications. The software presents online results in a fast, optimized manner.

Displaying direction finding and radiolocation results on maps is essential for the interception of radio signals and also for direction finding evaluations in radiomonitoring systems. Examples include the transmitter-site display to support DF evaluation and a cartographic display to support operational and tactical analysis. The map display in conjunction with running fixes is especially useful during mobile operations and allows fast location of the tracked target (homing). Other applications include the display of status information for all the stations in a radiomonitoring system, the visualization of database information and the display of results in coverage measurement systems.

The following functions simplify working with digital maps:
❙ Use of elevation data in conjunction with maps
❙ Fast map zooming (zoom and pan function)
❙ Direct selection of map objects as well as direction finding and radiolocation results
❙ Tooltips for fast access to information on displayed map objects
❙ Rapid finding of map objects by means of the tree view next to the window

R&S®MapView supports a wide variety of different map formats, projection types and geodetic grid systems so that customers can generally make use of their own digital map data in radiomonitoring and radiolocation systems from Rohde & Schwarz.

Key facts
❙ Use in direction finding and radiolocation systems as well as in coverage measurement systems
❙ Fast online display of results on digitized maps
❙ Offline display of results in combination with external databases
❙ Integrated layers for graphical situation display
❙ Use of digital maps in various formats
❙ Generation of user-specific maps
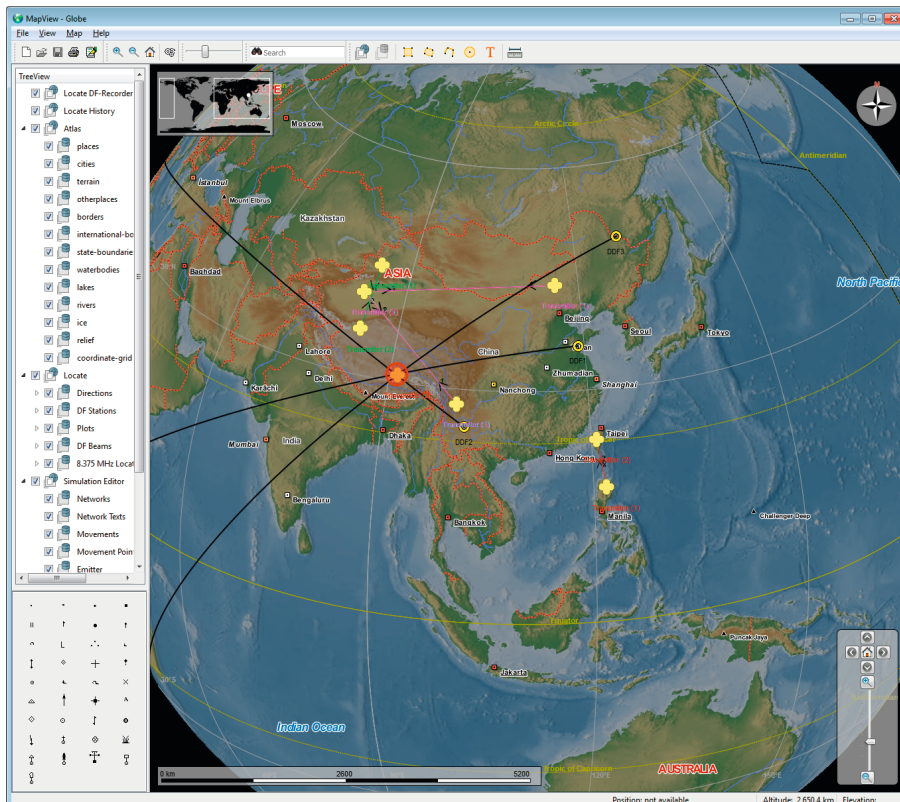
R&S®MapView Geographic Information Software
Benefits and key features

Very wide variety of maps available
❙ Free use of OpenStreetMap (OSM) and other publicly available map data
❙ Use of map data from the market leaders in the field of geographic information systems

Generation of user-specific maps
❙ Georeferencing of raster images
❙ Creation of map tiles in line with the TMS map tiles convention

Integrated situation display
❙ Editor for situation display
❙ Saving/loading of situation layers

System integration
❙ Interfaces to the R&S®RAMON, R&S®ARGUS and SatMon applications from Rohde & Schwarz
❙ Open interface for integration into customer applications

Very wide variety of maps available

The quality of the available maps plays a decisive role in the usefulness of geographic display software. During the development of R&S®MapView, the focus was therefore on worldwide availability of up-to-date maps.

R&S®MapView can use different types of map data that is publicly available from the Internet. Moreover, R&S®MapView enables customers to read in and use their own digital maps (e.g. in MapInfo format or in one of the numerous ESRI-compatible formats).

Free use of OpenStreetMap (OSM) and other publicly available map data

Use of OpenStreetMap (OSM) map data

When planning to purchase a radiomonitoring system, customers are frequently not able to define during the offer phase whether digital maps can be made available for the system or which format the maps use. For Rohde & Schwarz, too, it is often difficult to procure and supply current maps in a suitable resolution for all countries.

Therefore, the digital maps from the OpenStreetMap project can be used in R&S®MapView. A map server – an integral component of R&S®MapView – provides this functionality.

A PC with installed R&S®MapView requires an Internet connection for online access to the OSM map data. All map data displayed in R&S®MapView while the Internet connection is active is saved locally on the hard disk so that the data can also be used offline later.

The map data can be copied from one PC to another PC if the second PC (or any number of additional PCs) may not or cannot be connected to the Internet, for example.

As a result, R&S®MapView offers an excellent world map that is freely available and already has a very high level of detail for many regions.

OpenStreetMap (OSM)

OpenStreetMap (OSM) is a user-editable world map that is available at the following Internet address:
http://www.openstreetmap.org/

OSM is a wiki project in which users can participate by uploading and editing geographical information such as GPS tracking data or the course of a road or river. This world map is growing daily.

OpenStreetMap data can be used freely under the terms of the Creative Commons Attribution-ShareAlike 2.0 license.

Use of map data from other providers

In addition to OSM data, map data from the following providers can directly be used in R&S®MapView:
ı World landscape data
ı Nokia OVI satellite data
ı Google maps data
ı Google satellite data

The map data from Google and from Nokia can only be used if the computer with running R&S®MapView is connected to the Internet. The map data will not be cached permanently in the RAM or on the hard disk of the computer for licensing reasons. World landscape data will be cached permanently like OpenStreetMap data.

Use of map data from the market leaders in the field of geographic information systems

Customers mostly have digital maps for their own country or their operation areas. In many cases, these maps cannot be purchased from public sources. Therefore, maps from other manufacturers can be opened and used directly in R&S®MapView (without conversion):
ı Vector maps/raster maps in ESRI format
ı Vector maps/raster maps in MapInfo format

OSM map section with shading for elevation display; shading is based on SRTM elevation data.
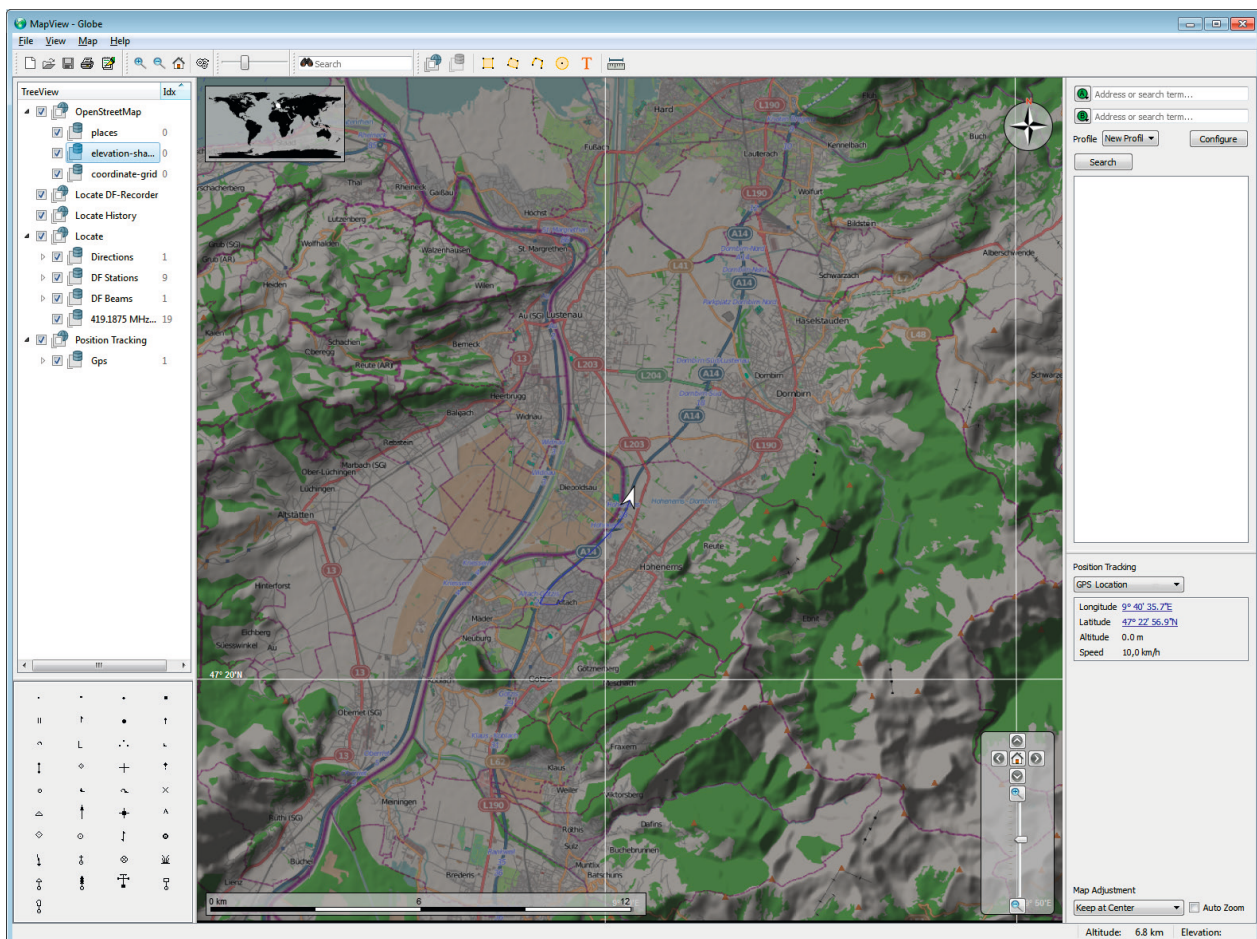
Generation of user-specific maps

Georeferencing of raster images

If digital maps are unavailable, R&S®MapView enables users to generate and edit their own digital maps using the R&S®GeoRefWizard software module supplied with R&S®MapView. R&S®GeoRefWizard allows raster images to be georeferenced and stored as map tiles according to the TMS[1] map tiles convention.

A wide range of projection types and map datums (earth ellipsoid) is supported for the generation of maps.

Creation of map tiles in line with the TMS map tiles convention

In order to create a map with data of different resolutions and to accelerate the map display, map tiles can be created and stored according to the TMS specification. This structure is the same as used by OpenStreetMap and other comparable providers of map data.

The creation of map tiles makes it possible to combine different raster images into a single map that can be generated, saved and then used on different operator workstations in a radiomonitoring system.

[1] Tile map service (TMS) is a protocol for serving maps as tiles, i.e. splitting the map up into a pyramid of images at multiple zoom levels.

R&S®GeoRefWizard user interface: A satellite image is imported and referenced for later use in R&S®MapView.
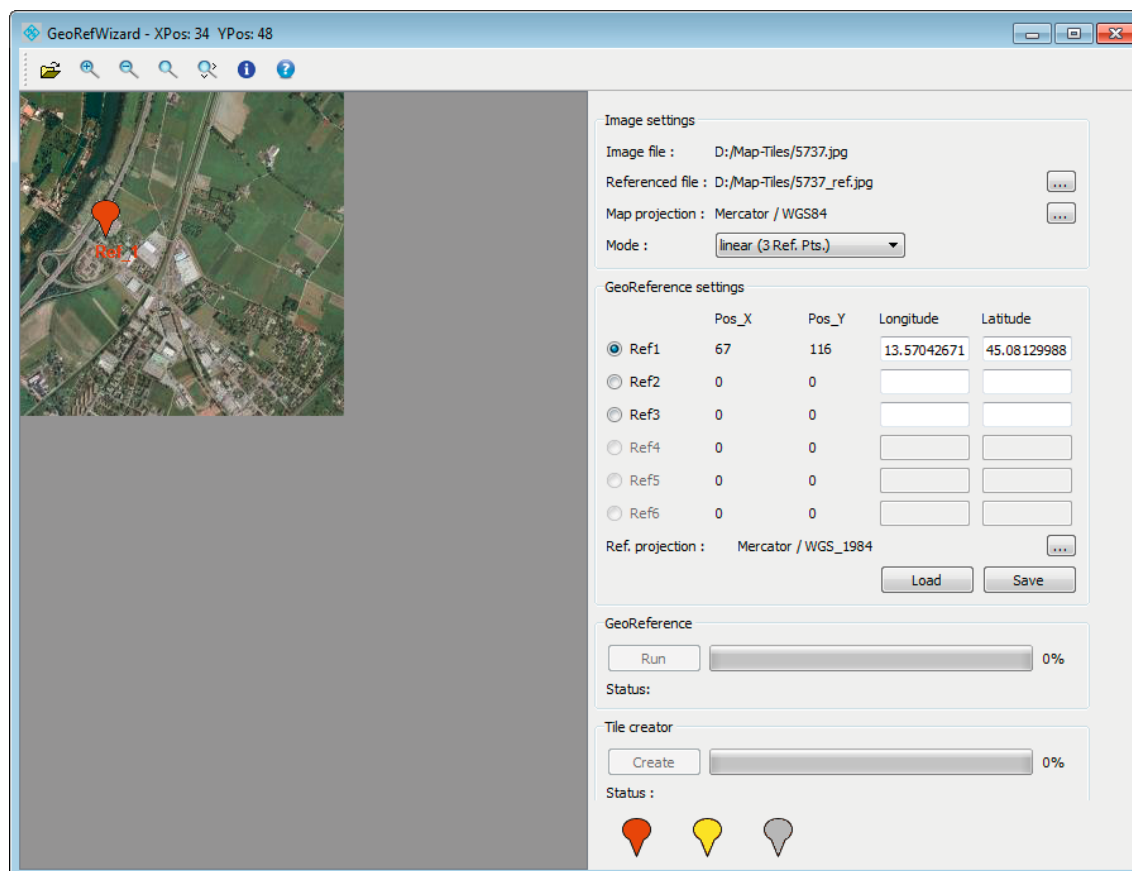
Integrated situation display

Editor for situation display

The map data generated in R&S®MapView or used by means of map servers typically consists of multiple layers. Additional layers are used to display the current situation. With the aid of graphical elements, R&S®MapView also makes it possible to display the results obtained from different analyses in a radiomonitoring system. This display provides the basis for assessing the situation. The corresponding layer can also be saved in KML[1] format. This format allows the stored information to be opened and displayed in third-party software applications such as Google Earth.

Besides standard functions such as text entry and drawing of various geometric line figures, the user can select symbols with the mouse and position them on the map.

[1] Keyhole markup language (KML) is an XML notation for expressing geographic annotation and visualization within Internet-based, two-dimensional maps and three-dimensional earth browsers (Wikipedia).

These symbols can be individually created and saved to various libraries. Moreover, a graphical symbol editor is available as a software option. It enables the user to create the graphical symbols defined in MIL-STD-2525B and use them on the map for the situation display.

Saving/loading of situation layers

The figure shows a map with graphical symbols created using the R&S®RA-GSE graphical symbol editor. This figure shows radiocommunications networks that are saved in the database of the R&S®RAMON software and transferred to the R&S®MapView map application. The editor in R&S®MapView makes it possible to enter comments about the radiomonitoring results.

After saving these layers as a file, e.g. by an evaluator, the file can be sent as a message attachment to another operator within the radiomonitoring system, e.g. to the supervisor. This person can then load the file and display it on the local screen. The file also contains information about the map and the map zoom level used for generating the situation layers so that the supervisor will automatically see the correct map section on the screen.

Display of radiocommunications networks on a map for offline evaluation of radio traffic using specific R&S®RAMON software tools.
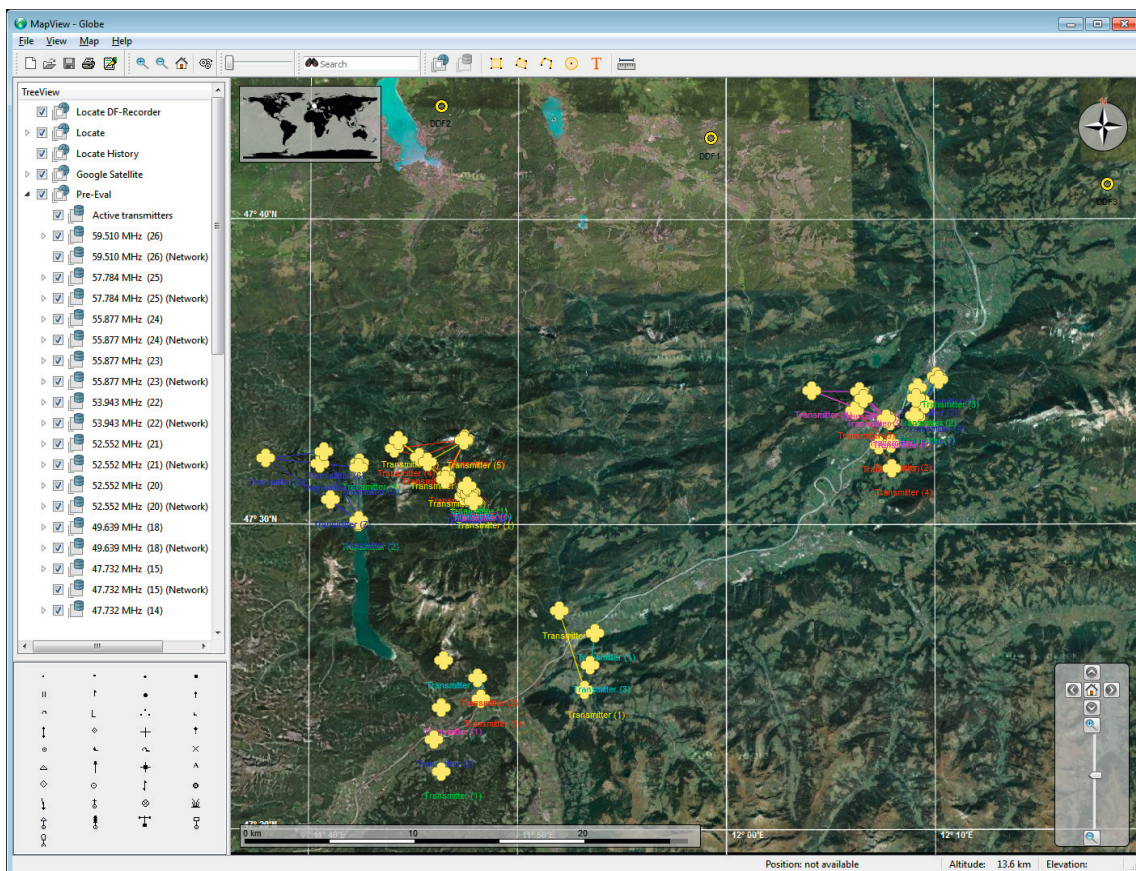
System integration

Interfaces to the R&S®RAMON, R&S®ARGUS and SatMon applications from Rohde&Schwarz

In radiomonitoring systems, the display of DF/radio-location results on a map background is an extremely important tool for the operator. This applies to operators who work online to intercept radio signals and need to display the DF/radiolocation results, as well as to operators who must evaluate the intercepted radio signals offline at a later time.

R&S®MapView communicates with other software applications from Rohde&Schwarz (e.g. control software for direction finder and radiolocation software) via a TCP/IP interface. Interworking with these software modules, for example, ensures that the current locations of the direction finders are automatically displayed on the map; the map display is continually updated to show any movement of the direction finders. The current heading of the vehicle is also indicated on the map using the DF symbol. DF results are displayed on the map as DF beams, radiolocation

R&S®MapView in SatMon systems: The map shows the location history (track) of a Thuraya subscriber.
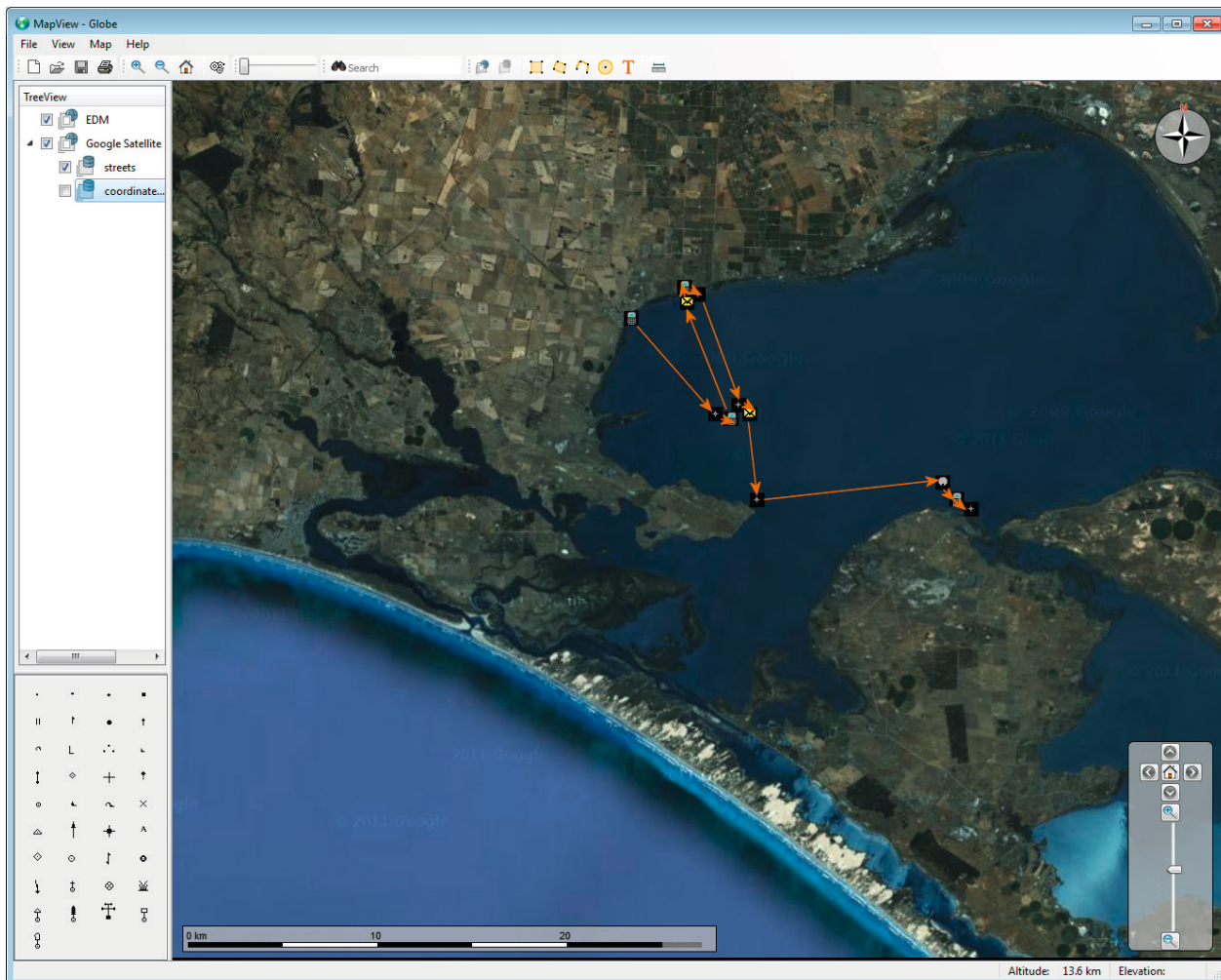
results as circles. The R&S®ARGUS bearing measurement mode or the R&S®RAMON radiolocation software can be used to record the DF results for more detailed analysis at a later date. This also makes it possible to take running fixes and locate radio signals with just one direction finder (direction finding from different locations).

The results can also be displayed offline when the system software packages mentioned above are used. Saved DF and radiolocation results can be recalled from a database and displayed on the map. Using the R&S®ARGUS software package, the transmitter sites and the coverage measurement results can also be displayed.

R&S®MapView is also used in SatMon systems if geographic information is available for intercepted SatCom traffic. The screenshot shows the map displayed on the operator workstation of a Thuraya interception system. In large radiomonitoring systems, the digital maps do not have to be stored on each operator workstation, but are provided on a central computer (e.g. an application or file server). R&S®MapView runs on each workstation and downloads the required map data directly from this server.

Open interface for integration into customer applications

An open TCP/IP interface makes it possible to use R&S®MapView even in systems without any additional Rohde & Schwarz software. In this case, R&S®MapView functions as a server application and accepts connections from multiple client applications (see figure below). The interface is documented to allow easy integration of R&S®MapView into customer systems.

R&S®MapView in customer applications

Geographic elements

External system → R&S®MapView

Mouse clicks on geographic elements
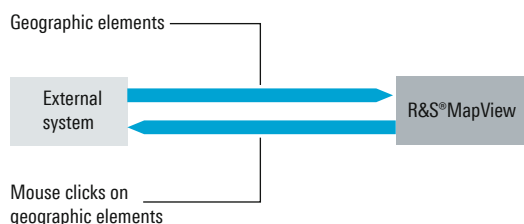
Specifications

Specifications	
R&S®MapView directly supports the following map formats:	
ESRI shapefile	
ESRI grid	
ESRI MXD file (geoset)	
ESRI ArcSDE (database)	
ArcInfo binary grid	
ArcInfo coverage	
ArcInfo E00	
CADRG image layer	using R&S®GeoRefWizard (included in R&S®MapView)
ADRG image layer	using R&S®GeoRefWizard (included in R&S®MapView)
ERDAS image layer	using R&S®GeoRefWizard (included in R&S®MapView)
Intergraph/Bentley design files (DGN)	
DXF	
DWG (after conversion into DXF format)	
GeoTIFF	
MapInfo (vector & raster)	
S-57 nautical	
LS telcom	
Elevation data (3D) in the following formats can be used directly in R&S®MapView:	
USGS-SRTM	
The following coordinate formats are currently supported:	
Lat/Lon (formats: GEO-long, GEO-short, GEO-decimal)	
UTM	
MGRS	
RT90	
SWEREF99	
QTH Maidenhead	
The following map formats can be imported into R&S®MapView:	
DXF	
Bitmap formats (.JPG, .BMP, .TIFF)	
The following map projections are supported by R&S®MapView:	
Albers equal area conic	Mercator (1SP)
Azimuthal equidistant	Mercator (2SP)
Cassini-Soldner	Miller cylindrical
Cylindrical equal area	Mollweide
Eckert IV	New Zealand Map Grid
Eckert VI	Oblique Mercator
Equidistant conic	Oblique stereographic
Equidistant cylindrical	Orthographic
Equirectangular	Polar stereographic
Gauss-Kruger	Polyconic
Gall stereographic	Robinson
GEOS – geostationary satellite view	Rosenmund oblique Mercator
Gnomonic	Sinusoidal
Hotine oblique Mercator	Swiss oblique cylindrical
Krovak	Swiss oblique Mercator
Laborde oblique Mercator	Stereographic
Lambert azimuthal equal area	Transverse Mercator
Lambert conic conformal (1SP)	Transverse Mercator (Modified Alaska)
Lambert conic conformal (2SP)	Transverse Mercator (South Oriented)
Lambert conic conformal (2SP Belgium)	Tunisia Mining Grid

Specifications	
Lambert cylindrical equal area	VanDerGrinten
UTM (Universal Transverse Mercator)	
Formats for import/export of geographic data	
Import and export	KML, KMZ
Import only	GPX

Ordering information

Designation	Type, description	Order No.
R&S®MapView Geographic Information Software	R&S®MapView	4046.1205.02
	contains a license for R&S®MapView, display of raster or vector maps, elevation data, situation display editor, system interface, and optimized display for DF and radiolocation results (maps not included); **licensing via PC hardware (softlock)**	
R&S®MapView Geographic Information Software	R&S®MapView	4046.1205.03
	contains a license for R&S®MapView, display of raster or vector maps, elevation data, situation display editor, system interface, and optimized display for DF and radiolocation results (maps not included); **licensing via included hardlock**	
R&S®MapView Geographic Information Software	R&S®MapView	4046.1205.04
	contains a license for R&S®MapView, display of raster or vector maps, elevation data, situation display editor, system interface, and optimized display for DF and radiolocation results (maps not included); **licensing via hardlock for the R&S®RAMON or R&S®ARGUS workstation PC**	

Your local Rohde & Schwarz expert will help you determine the optimum solution for your requirements.
To find your nearest Rohde & Schwarz representative, visit
www.sales.rohde-schwarz.com

About Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

Sustainable product design

▪ Environmental compatibility and eco-footprint
▪ Energy efficiency and low emissions
▪ Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

Rohde & Schwarz GmbH & Co. KG

www.rohde-schwarz.com

Regional contact

▪ Europe, Africa, Middle East | +49 89 4129 12345
  customersupport@rohde-schwarz.com
▪ North America | 1 888 TEST RSA (1 888 837 87 72)
  customer.support@rsa.rohde-schwarz.com
▪ Latin America | +1 410 910 79 88
  customersupport.la@rohde-schwarz.com
▪ Asia Pacific | +65 65 13 04 88
  customersupport.asia@rohde-schwarz.com
▪ China | +86 800 810 82 28 | +86 400 650 58 96
  customersupport.china@rohde-schwarz.com