



ASIX GeoSCADA

GIS MAP DIAGRAMS

Management of Wide-Area Media
Distribution Networks Using Maps



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The ability to design GIS map diagrams opens Asix to the new type of systems called 'GeoSCADA', which refer to industrial objects with a high level of geographic dispersion. Such systems play a key role in the process of control and supervision of industrial or distribution networks, mostly in gas, water and sewage, energy, transportation or telecommunications.

The system operator in the central control room gets an insight into the operation of the entire installation, regardless of its location on the geomap. With GIS mechanism-enabled synoptic masks, the operator may locate efficiently selected sections of the installation, which are entered on the map by means of easy-to-find coordinates, and diagnose the operational status remotely. It largely reduces the time required to identify alarm conditions, even in the most geographically distant branches of the facility and enables to manage intervention services in the most reasonable manner.

The purpose of GIS map diagrams is to display elements on geographic maps. Maps are from the OpenStreetMap service and may be downloaded online from the Internet or offline from the local buffer prepared earlier by the application designer. Visual elements (markers, (broken) lines, areas, texts or pictures) may be plotted onto GIS diagrams. The work with GIS diagrams is based on a somewhat different concept than the concept known from ordinary diagrams. First of all, the focus is on the layered organization of elements plotted. Both the application designer and its user (operator) may freely control the visibility of chosen diagram layers. It is also possible to fill in the layers with elements automatically, based on geographic data obtained from MS SQL databases. This type of diagrams allows you to set the zoom level of the view over a wide range.

» What you gain from Asix with GIS implemented?

- *Comprehensive, integrated IT system for geographically dispersed enterprises*
- *Access to complete information on the status and operation of the entire facility*
- *Global control and monitoring of the operation of industrial and distribution networks*
- *Fast detection of failures and supervision of their removal in the most remote branches of the facility*
- *Optimized control of the operation of machines and equipment / reduction of the number of failures*



Mechanism of GIS Diagrams

GIS diagrams use geographic coordinates in the WGS 84 reference system (GPS); the working area is between coordinates -180.0 to 180.0 degrees longitude (equivalent to X coordinates) and -90.0 to 90.0 degrees latitude (equivalent to Y coordinates). The diagram (map) may be zoomed in from 2 to 25 exponentially, but it is also possible to impose limits to a defined range. You may scale or position the view with a mouse or set the relevant zoom and location by means of dedicated operator's actions. With the diagram, you may also configure several buttons displayed along one edge and assign any operator's actions to them.

Background Maps

The diagram may be operated in one of three modes: without a background map, with a background map downloaded online from OSM (OpenStreetMap) servers or with a background map downloaded from the local buffer, where the designer has saved selected areas for specific zoom-in levels. You may use the no-OSM map mode to design diagrams (not necessarily geographic), with a large zoom-in scale. Optionally, you may apply your own raster or vector images in a layer as the background map. If you use OSM maps online or offline, you may display them in colour, in grey scale or in negative.

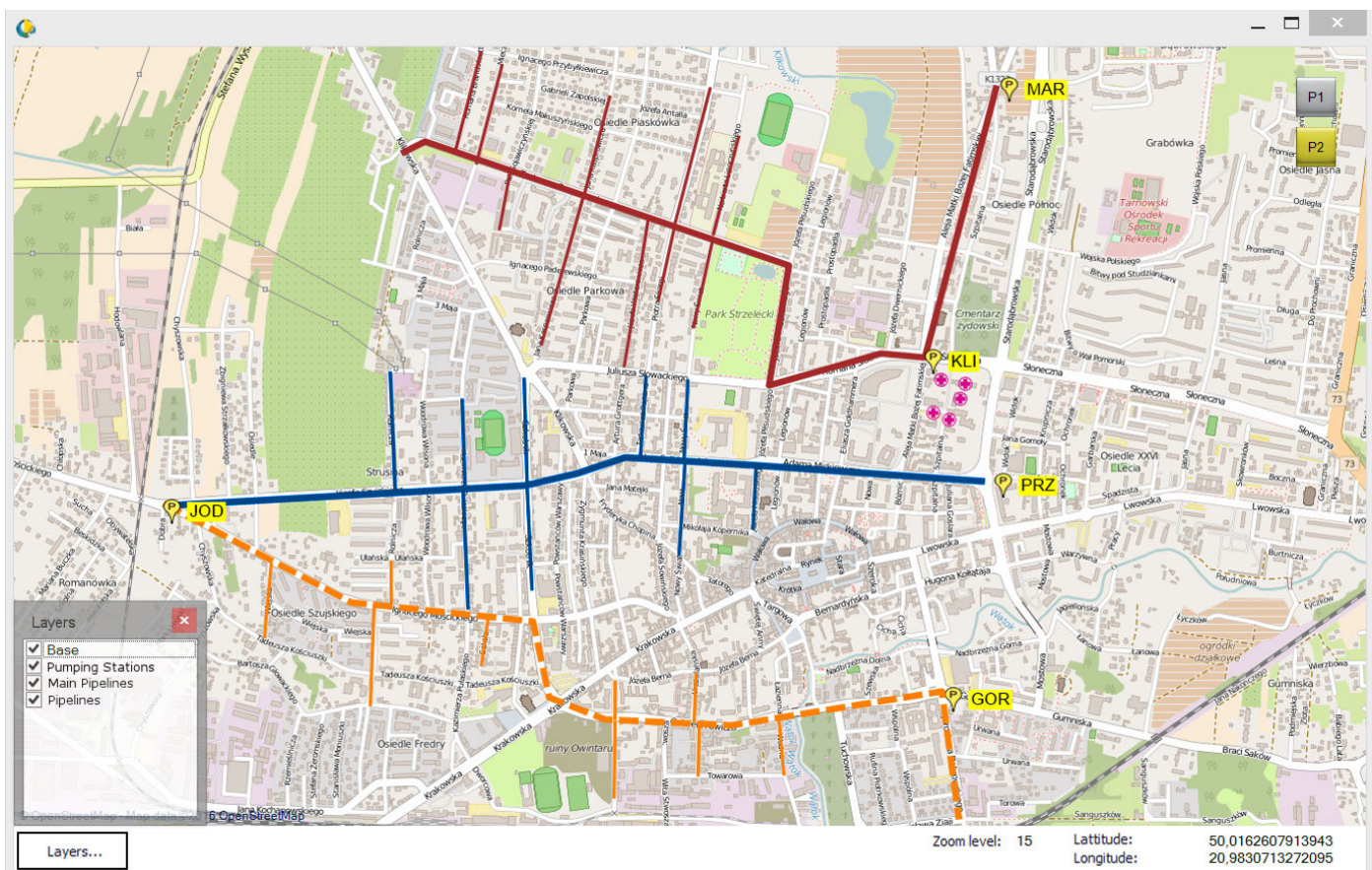
GIS Diagram Layers

GIS diagram layers work differently from layers in ordinary diagrams. In ordinary diagrams, layers are not individual, definable beings; the layer number only assigned to the object determines the location of the object in relation to other objects (mutual covering). With GIS diagrams, you may define layers explicitly, name and describe them. It is also possible to make the visibility of GIS layers dependent on any conditions or the diagram zoom-in level. There is a special window for layer visibility management, where both the application designer and the operator (if allowed) gets a list of all the layers. In edit mode, the designer may use the window to select the active layer being edited at the moment. You may edit the active layer only. The other (inactive) layers may be displayed but their objects may not be selected or edited and thus they do not interfere with the edition of the active layer.

Visualisation Elements

The application designer may use five types of visual objects and place them on GIS diagrams:

1. Line – scalable vertices object which represents a broken line
2. Region – scalable vertices object which represents an area
3. Text – scalable object which displays static or dynamic inscriptions
4. Marker – point object whose size is independent from the scale
5. Picture – scalable rectangular object used to display any raster or vector image



For objects, you may set up visibility ranges with reference to the diagram zoom-in level, a message to be displayed in a bubble or assign actions to be executed after the mouse right- or left-click. Further, you may link objects with a process variable and they will change their appearance dynamically depending on the process variable status.

The Region, Line or Text objects may have individual display and performance settings or download such settings from pre-defined templates in the application. GIS templates are sets of object properties and interaction modes defined by the designer. They are useful if you wish to configure multiple objects in the same, repeated manner. If it is necessary to change properties of many objects, you do not need to configure them over and over again for every object; it is enough to make changes to the template. Optionally, templates may have parameters. The Marker-type object is displayed by default as a dot with a specified size and colour, but you may apply to the object any appearance defined by the application designer. Similarly to Lines and Regions, Markers may also use templates; in addition, the Marker template allows you to design it graphically. Defined and named Marker templates may also have parameters.

Cooperation with MS SQL Geographic Databases

There is an alternative to the manual placement of objects on GIS diagram layers: it is possible to fill in layers with objects automatically, based on the contents of an MS SQL geographic database. To do this, you may define GIS datasources, in the Asix.Evo application, associated with a specific database and table containing the GEOMETRY type column. The data in the table will be mapped onto relevant objects, depending on the geometry type. The geographic database for objects is developed manually according to object definition standards. A data source may support geometry of points (POINT) – to be mapped onto Markers or Texts, of lines (LINESTRING) – to be mapped onto Line-type objects or of Polygons (POLYGON) – to be mapped onto Region-type objects. A single data source may only handle objects of a single type. The GIS data source allows you to define a default Line, Region, Text or Marker template to be used to visualise records in the table or indicate a table column which will contain individual template names for each record. Further, the data source may retrieve any other attributes besides geometry and the attributes will be assigned automatically to object parameters (e.g. texts, descriptions).

The screenshot displays the Asix.Evo application window titled "Asix.Evo - C:\AsixApp\Production_company : BPI-ASUS". The interface includes a menu bar (File, View, Tools, Full screen mode, Run application, Help), a toolbar, and a main workspace. On the left, the "Application Explorer" shows a tree view of project settings, including "Global settings", "Stations settings", "Security", "Variable definitions", "Channels", "Archives", "Alarms system", "Windows", "Diagrams", "Maski", "Tabele", "Diagram1", "MapaGliciv", "Templates", "GIS markers", "GIS templates", "GIS datasources", "Menu", "Action Sets", "Global properties", "Images", "Sounds", "Message sets", "Scheduler", "Timetables", "Reports", "Power guard", "Scripts", "Multilanguage applications", and "Diagnostics".

The central map area shows a satellite-style view of an industrial site with labels such as "Tworzeń", "KEM", "Walcownie", "Walcow", "Jamki", and "Podlesie". Several GIS objects are overlaid on the map, including a red location pin, a yellow square labeled "P2", and a 3D industrial facility model. The "Properties" panel on the right is active, showing the "Basic Properties" tab for a selected "GIS Object: Picture". The object's coordinates are listed as {19,2677450180054, 50,3323403513045}, {19,2732...}. The "Elements" table below shows the following data:

Element Name	Value
Layer name	Base
Hint	
Min visibility zoom	
Max visibility zoom	
Top latitude	19,2677450180054
Left longitude	50,3323403513045
Bottom latitude	19,2732810974121
Right longitude	50,3293816749033

At the bottom of the window, the "Variable Preview" table is empty, and the "Messages" panel shows "Record 0 of 0". The status bar at the bottom indicates "Selected station: BPI-ASUS" and the coordinates "19.275084,50.348938".