

Civil Design through disciplines and lifecycles



Made by users for users

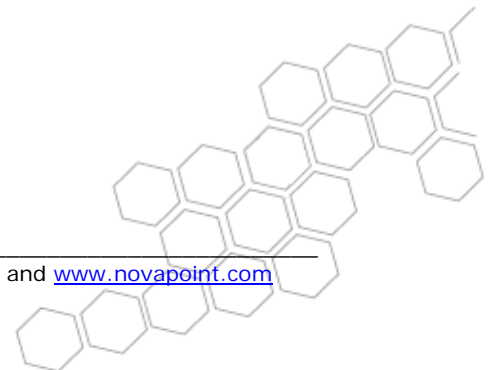
In 1984 the engineers who established the **Vianova Civil Engineering Network** started integrating CAD and advanced mathematic engineering algorithms to make highway design more efficient and flexible. The algorithms and methods had been used widely in Norway since late 60's, but this was the first time they were integrated with a graphical CAD engine, and this was the start of the first of the today's more than **20 Civil Design modules in Novapoint**.

The aim was to let the users have a **complete, professional** but at the same **efficient and easy to use** design software. We also wanted to give our users a **flexible** solution, and at the same time the ability to **share data** through all disciplines and lifecycles. This is still our philosophy. Thanks to more than **4000 enthusiastic users of 12 000 licenses in 20 countries**, we continue to develop integrated, professional, easy to use Civil Engineering tools.

Novapoint has more partners than customers. This means we establish tight relations to the engineers using Novapoint. This results in higher level of feedback to the continuous improvement of existing modules and the development of new ones. Local and international reference groups, **yearly user seminars**, a **user magazine**, updated **web-sites**, developing project relations and distributed responsibility for the development projects in a wide international network is just some of the reasons why Novapoint is increasingly the chosen solution for **Road Authorities, Rail Authorities, Civil Aviations, Harbour Authorities, major engineering groups, small engineering offices, municipalities, Universities and Landscape Architects in Europe, Asia and Africa**.

Share data instead of translate and move data

Road Authorities and Rail Authorities are integrating the Civil Design functions in Novapoint within their **National Transportation GIS** and management systems. Novapoint is based on an advanced common **data model** called **Quadri**. This means that intelligent objects from design, information, Mapping and GIS is shared and reused through projects **lifecycles**. The development and evolution from these projects are accumulated back to all existing users through continuous updates and new releases.



Designing the future with less limitations



Creativity first

Novapoint's philosophy is to let the user concentrate on the engineering and architectural result so that the projects become as optimized as possible without wasting too much time and focus on the tools and working methods. As an example in Novapoint we have integrated **local standards** and integrated **3D presentation** that allow the user to automatically calculate and visualize the project as a part of the design process. No special skills of training are necessary for simple and fast design and presentations.

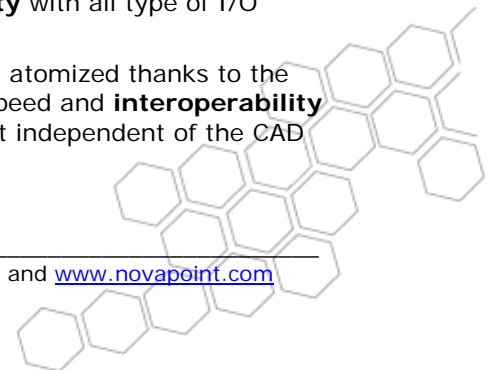
Combined with the Novapoint **Multiview** concept the designer is given the possibility to optimize his project with help of up to **6 types** of similar views inside the Novapoint user interface environment. Plan, Profiles, Sections, Parametric/Numeric input/output, 3D/Virtual reality and Quantities/tables. From this 6 main types of similar information views there is possible to use almost unlimited numbers of alternatives and customer wished views. This helps the user to see the result of the design work and take faster decisions directly.

As an example a part of a road could be dynamically adjusted with drag and drop in the plan view, and at the same time be adjusted by parameters in the numeric view, and the result of this is served in almost real time in the longitudinal and cross section view, or adjusted graphically here too. All results of design views could be continuously updated in the **Virtual Reality view**. The user can even maneuver directly in real time 3D along the road, carry out sight analyses or optimize the cut and fill. This is possible due to the common and advanced **Quadri** data model that managing the relations between the different data and calculations in an efficient way. The result is that the finished road, rail or terrain project has been optimized with better control and maximum creativity. The history of the tasks is as well taken care of and the user can easily **roll-back** to earlier version of design if not happy with the last work.

Flexibility without compromise

Novapoint functions and user interface is as well, if users choose, possible to use as a integrated solution with the leading CAD system platform from **Autodesk (AutoCAD/Autodesk MAP)**. In the next version of Novapoint we as well work with tighter integration with other CAD platforms as **Micorstation** from Bentley. Even today Novapoint has the ability to communicate and share data with a number of systems and standards trough a **powerful I/O functions** with huge amount of input/output standards. This means the user extends Novapoint expert functions with hundreds of design and editing functions inside the CAD engine especially for drawing production and presentations even if a lot of automatic drawing and presentations of documents is handled automatic as built in and parametric setup inside Novapoint itself. The possibility to work integrated with open CAD standard platforms also insures **compatibility** with all type of I/O formats and 3rd party SW and HW.

Novapoint design functions and result documentation is atomized thanks to the **Integration of Local Engineering Standards**. The speed and **interoperability** is been taken care of through project data management independent of the CAD environment.



Tired of wasting hours on drawing functions, strings and templates?



Efficiency to be proved!

Novapoint philosophy is to give the engineer the result of the design work as early in the design phase as possible. To make this possible we have over the last 20 years implemented in detail the **local standards** and formulas for each country Novapoint are in use. This allows **Automated Calculations**, presentations and documentation. This combined with a **Multi Dynamic User Interface** (real time graphic and parametric control of both design and calculations) are some of the unique features that enable engineers to perform more efficient.

Because Novapoint uses in-built and automated routines the user gets complete projects directly without having to set up the traditional templates, or waste hours or days making static strings to limit the project boundaries. Anyway the user can make **own setups and templates** and parametric combinations of earlier set ups in addition to the already built in local and country standards.

In Road module the user just choose a few standard parameters like **Road class, AADT, Design Speed** and then link these to the reference line and the whole **3D structure** of a road (or railway). The complete details, **slopes, superelevation (cant), widening, ditches, embankments, rock slopes, cut and fill** etc. will be calculated in just a few seconds. The result is a complete 3D model that can be easily edited, and fine tuned, by adding more details. The model boundaries can easily be defined both by parameters and by supplement and integrated combination of 2D and 3D strings.

Complex geometry as **Intersections, Roundabouts, Interchanges** and **driving vehicle paths** could fully or partly automatically and directly be calculated, presented and documented. The user just points on the wished reference points, reference lines or partly elements from survey data imported and the whole intersection with all details is drawn up and calculated in a few seconds, based on the built in standards or user defined parameters. Changes on whole or particular objects could be done using **Multi Dynamic functions** or **Parametric adjustments**, or by using in combination of these together with basic CAD functions.

Novapoint even have a lot of built in geometry functions covering all kind of purposes. E.g. the geometric calculation and analyzing function **geometry from points** that could give the user a suggestion for geometry based on survey data from existing roads and railways. Then in this there is a dynamic user interface for tuning such geometry to fit to dedicated rules and standards and exactly reestablishment to existing geometry. This gives the user control over the quality for **reshaping** and road- and rails.



Dynamic and object oriented



Dynamic Surface Engine

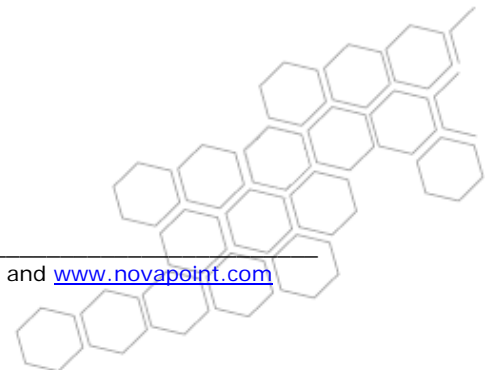
Novapoint has built in an advanced and efficient terrain model engine. Because this is more than just a traditional DTM we have called it **DSE** (Dynamic Surface Engine). Novapoint DSE could calculate not only on **TIN**, but also on 3D **survey** or **GIS** data, or Grid network or on all in **combination** at the same time. This is possible due to the **Quadri** data model engine that manages to handle **Dynamic Spatial Calculations**. Even earlier designed Roads, Landscaping or Bridges is a part of the model and will influence the DSE calculations.

All data in Novapoint is stored with **feature codes** and in **groups** like in most advanced GIS system. The difference is that Novapoint through **Quadri** could handle all data in 3D directly, even in combination with advanced geometry combinations, because the **geometry** at the same time is stored as **objects** in the same database.

The controllers in **DSE** are even able to handle **priority of groups** of data. This is useful on large scale projects when continues measurement from surveying is changing the calculation source.

Dynamic Topology Engine

Novapoint has built in advanced **Topology calculation** functions. This is built like a independent calculation engine and is used by all applications in Novapoint that need simple or advanced Topology functions. DTE handles both **network-**, **area** and **dynamic segments** – and has special functions to calculate **infrastructure corridors** in an efficient way.



One, a few or all modules - it is your choice! [1]



Road Professional*

Interactive design and calculation of roads and intersections, national road standards integrated and automatic generation of quantities, drawings and documentation. Interactive alignment design, virtual reality, vehicle turning circles, sight distance control plus much more. Chosen by road Authorities, municipalities, universities and all types of consultants and constructors in more than 20 countries.

Road Standard

Flexible design and calculation of roads with automatic generating of drawings and documentation.

Bridge and 3D structures Professional*

Standard or custom profiles interacting with the road geometry, complete 3D, automatic geometry tables and drawings for bridges, culverts and tunnels. User defined and standard profile library.

Bridge and 3D structures Standard

Standard bridges design with automatic calculation, drawing and documentation.

Road geometry from survey data – included in Novapoint Road Professional

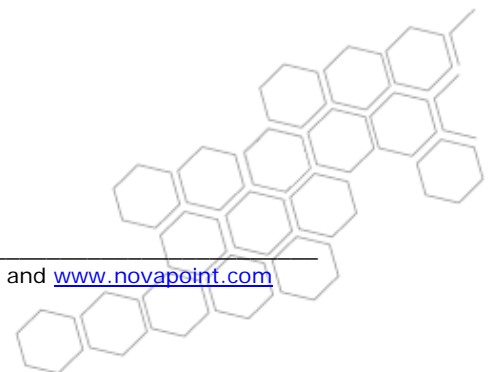
Input of survey points along an existing road to analyze, calculate and propose complete new best fit geometry. Both horizontal and vertical geometry. Graphical interface for editing with speed and curvature tables. Connected to Road Professional for Super Structure optimization.

Land Acquisition

Calculation and presentation of land acquisition data from planned new corridors or areas. Tables with land owner information, all type of areas, pre- or user defined drawing layouts, under World Bank approval, detailed documentation with separate drawings for each land parcel. Dynamic updating of maps and tables when changing the corridors.

Virtual Map

Generates 3D models from Autodesk Map drawings and Novapoint projects. 3D object and texture library connected to AutoCAD layer structure. Fly over and road simulation with or without multimedia equipment connected to your PC.



Infra Design Modules [2]



Road Markings

Generates all types of road markings based on local standards. Longitudinal markings, stop marks, refugees, footpaths and measurement of the amount of paint etc. Automatic quantities from the drawing.

Road Signs

Standard signs, standard variable signs, traffic plates and direction signs, information signs, tables and plate size calculations. All signs with variable information are dynamic editable objects. User defined floating menus, with colors and built in local standards for sign text, type and size.

Railway

Horizontal and vertical alignment, ballast- and superstructure details. Based on Railway specific engineering parameters and standards, single- or double tracks. Interactive functions for switches/points, automatic "first" suggestion for signals- and overhead mast placement along tracks.

Track Geometry Optimisation

Calculation and suggestions of complete horizontal- and vertical geometry (curbs, lines and clothoids) based on survey data from existing tracks that decided to be upgraded. Adjustable within integrated dynamic diagrams

Water and Sewer design

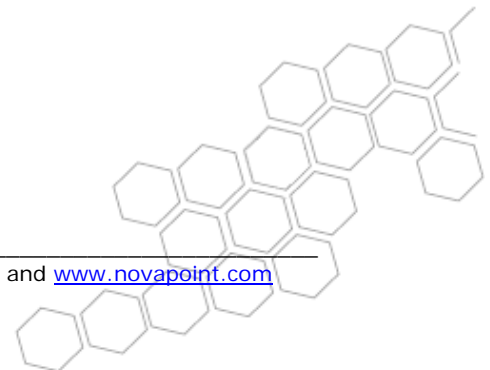
Dynamic horizontal- and vertical design and calculation of pipes/ditches. Manholes and user defined ditches with multi-pipe placement and flow direction integrated. Dynamic editing of existing objects in plan and profile. Terrain-model for cross sections and quantity calculation built in.

Waterways design

Built in design rules and functions for designing of canals and harbor planning.

Dynamic Road and Railway Noise

Road- and Rail Traffic Noise calculations and presentations. Automatic suggestion of Noise barriers. Results presented as points, grids or contours or tables. Integrated DTM with full 3D situation incl. house facades calculations.



Infra Design Modules [3]



Landscape architect design

Calculation and drawing production for Landscape Architects. Covers landscape plans, site plans, plant layout drawings, sections and details. Includes a wide range of functions for terrain forming, quantity calculations based on both grid and triangle with 3D visualisation.

Product Explorer

Parametric library and product catalogues. Concrete and stone street products, pre-produced concrete walls, street furniture's, calculation and presentation functions, automatic quantities.

Area planning

Design and presentation of types of area usage in planned projects, master plans or area-planning projects. Based on local standards.

Soil Mechanics "New"

Novapoint geotechnical functions is established as a suite of supplemented functions with the goal to become a complete concept covering integrated needs in the Civil Design work as well as specialized analyses and calculations in other related fields. Based on local standards. Will includes Stability, Settlement, Piles and Sheet Piles.

Airport obstacle maps

Calculation and presentation of complete airport obstacle maps in plan and profile. Based on the International Airport Standards. Terrain-model built in. Airport symbol library. This module is sold only on special request and cooperation.

Airport signs and markings

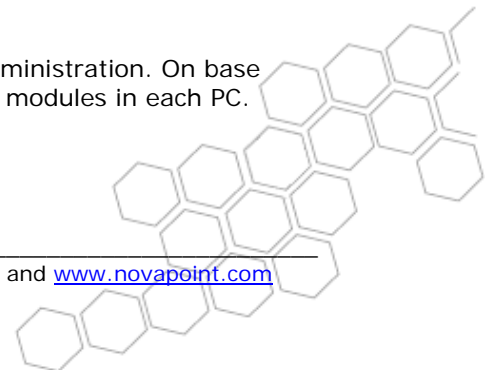
Interactive design and presentation of Standard signs, variable signs, plates. Interactive design of Airport markings and marking areas. Based on the International Airport standard. This module is sold only on special request and cooperation. This module is sold only on special request and cooperation.

Civil Construction

Complete software for light road and terrain design, controlling and settlement for contractors. Functions from Novapoint Road Professional and other modules fitted into one easy to use and "compressed" solution for entrepreneurs and contractors.

Basic Menu Single and Network

Core calculation functions for all modules, setup and administration. On base module is needed to run one particular or all Novapoint modules in each PC. Network version available.



Functions and technology



Operating system

- MS NT
- MS 2000
- MS XP

Platform

- AutoCAD and Autodesk Map 2006-2008
- MS Windows

Code language

- C++
- Fortran
- Autodesk ARX

Code routines

- UML
- Rational Unified Process (RUP)
- Vianova Unified Process (VUP)

I/O

- Autodesk MAP 1:1 to/from NP datamodel
- ASCII formats
- 03- and 10-table
- SOSI, DSFL, KF85
- NADB
- NYLP
- VIPS
- MOSS Genio (Terrain in)
- KOF (Survey equipment and field books)
- Borehole data from Geoplot and AutoGraf
- VRML
- MS-Excel
- LandXML (Hor. & Vert. alignment I/O)
- C++ and LISP (NP System Centers)
- Novapoint Presentation Engine NPE with XML configuration

Datamodel – Quadri

- Dynamic datamanagement
- Feature coded elements

- Segments, groups and feature managed
- Open structure
- BFILDI (or Oracle for interaction with national customized GIS)
- Multiuser core but individual setting in applications
- Info: www.vianovasystems.com (pdf)

Datastorage

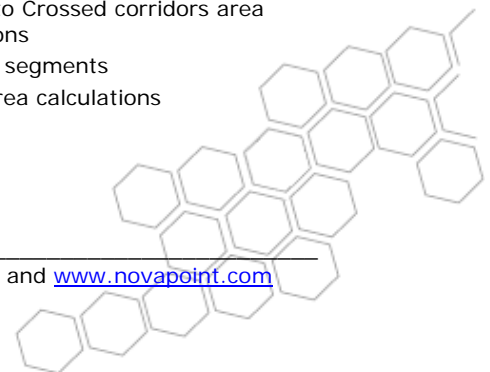
- BFILDI (internal file system)
- Oracle for National Authorities administrating huge infrastructure amounts TIN, GRID and primary data and/or mixed

DSE (Dynamic Surface Engine)

- Primary data calculations (3D strings, areas, topology and points) – high speed, no limits
- TIN calculations
- Grid calculations
- Operates with feature coded data
- Group priority settings
- Cross section calculations
- Longitudinal calculations
- Volume calculations
- Colored level analysis
- Break lines
- Unlimited layers
- Integrated with Novapoint datamodel (Quadri)

DTE (Dynamic Topology Engine)

- Topology clean up
- Topology network
- Topology nodes
- Topology areas
- Mix of above integrated calculations and analysis
- Automatic calculation of topology regards to Crossed corridors area calculations
- Dynamic segments
- Info in area calculations



Functions and technology



Superstructure model

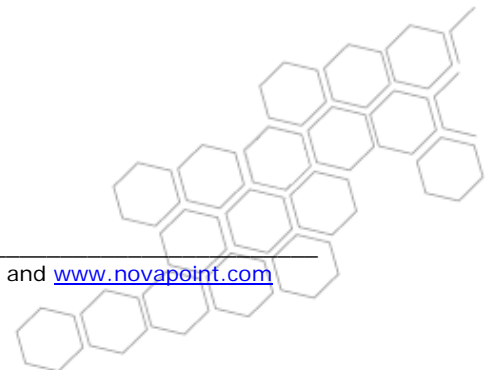
- Road – 3D
- Rail – 3D
- Airports – 3D
- Water/Sewer – 3D
- Bridges – 3D
- Local standards 17 countries integrated
- Dynamic adjustment
- Templates and 3D strings automatically built with user interface for editing
- Parametric set up and editing
- Mass calculations
- Mass diagrams
- Automatic 3D modelling
- Automatic drawing generator
- User and pre-defined reports
- Export to total stations and construction machinery

Geometry functions

- Multi-dynamic editor
- Numeric input/output, reports
- Lines, spirals/clotoids, traverses
- Intersections
- Roundabouts
- Interchanges
- Road-objects tools
- 3D string tools
- Automatic geometry establishment from survey data - calculation from points (horizontal and vertical incl spirals suggestions)

User interface

- Dynamic
- MultiView
- Parametric/Numeric
- Roll-back
- AutoCAD and Autodesk MAP integrated
- Some functions in plain MS Windows
- 3D and VR-View integrated
- Joystick, steering-wheel, speakers



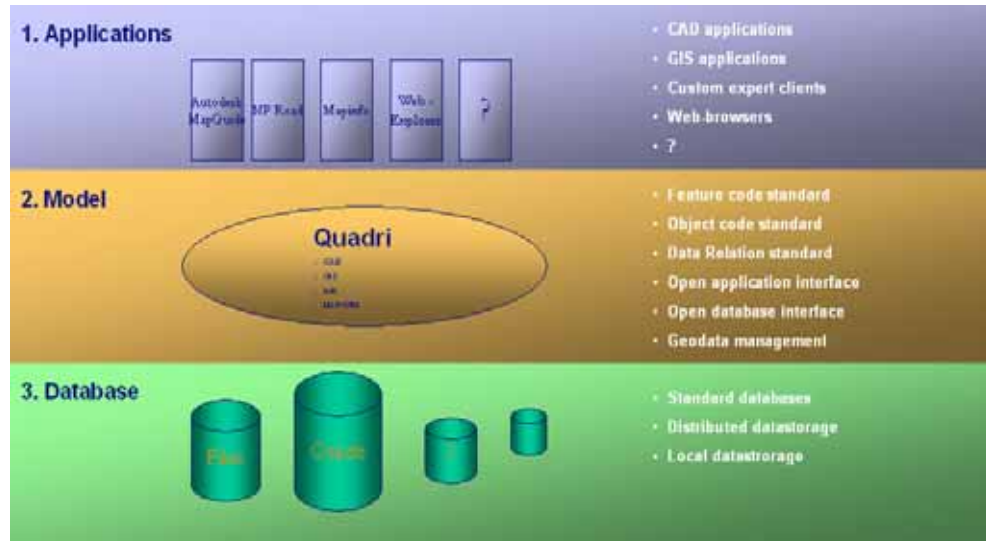
Data structure and dataflow




Novapoint
www.novapoint.com

Novapoint – System structure

The 3 Layer architecture – Quadri Data Model Framework:



Novapoint – Dataflow

With multi-dynamic user environment:

- Input from files, survey, Autodesk MAP
- Feature oriented storage and management to ensure lifecycle reuse
- All data as objects (feature code and relations)
- Interactive design of road- and rail geometry
- Parametric Road Design with Standard Values built in
- Automatic calculation of superstructures, widening, rock/soil slopes etc.
- All road and rail elements integrated in 3D for easy adjustment
- Bridge, Noise, Land Acquisition, cut and fill etc. connected as interactive objects to main geometry object
- Multi-view user interface: Plan, Profile, Cross-Sections, Parameters, 3D/VR and Hypermedia
- Detailed mass calculations
- Detailed Intersections design
- Automatized drawing generator fitted to local standards
- History functions

For local contacts in Asia Pacific region see: www.baezeni.com and www.novapoint.com
For Vietnam see: www.vianova.com.vn.

Version: 3.20



Some references



Example Reference Users:

Novapoint users has today 8400 modules in daily use in 18 countries in Europe, Asia and Africa. Novapoint is used by all types of designers from National Authorities and international consultants to small consultants, municipalities and universities:

- Rambøll, Denmark, Sweden, Norway, Finland
- Norconsult, Norway
- WPS, Sweden
- Aalborg University centre, Denmark
- Vianova Civil Engineering Network, Norway
- L&T Consultants, India
- SIMPLEX, India
- Secon Survey, India
- Department Of Highways (DOH), Thailand
- NCE Co. Ltd., Thailand
- SPAN Co. Ltd., Thailand
- Public Works Department (JKR), Malaysia
- CDRI, Laos
- TEDI, Vietnam
- Finnish and Norwegian Rail Administration
- Danish Local Road Authorities
- Swedish, Norwegian, Finnish and Island Road Authorities
- University of Malaysia, Kuala Lumpur

Example Reference Projects:

Novapoint solutions has been in use for more than 20 year and have created more than 100.000 Civil design projects in 20 countries – here are just a few examples:

- Wat-Na-Korn-In bridge and Highway Thailand
- High Speed Railway and new Highway to New Oslo Airport
- 20km bridge and road project Kashmir in India
- 600 km road rehabilitation of new highway Tanzania
- New Hydroelectric Dam in Norway
- New outer Ring-road Stockholm Sweden
- Oslo Ring Road
- New National Roads Laos
- 1000 km new rural roads in Thailand
- New national Roads in Malaysia
- National roads in Greenland
- Traffic Noise barrier calculations and design Helsinki Finland
- New National Road Databank, Norwegian Road Authorities
- New National Rail Databank, Norwegian Rail Authority
- New Distributed National Map Information System, Norwegian Map Authority



Vianova and partners



Vianova Systems AS

Novapoint is developed and owned by Vianova Systems AS and partly by our long term partners in 12 countries in Europe and Asia. Vianova Systems AS is located in Sandvika in Norway. Vianova Systems AS was started beginning of 2000 as a friendly demerger in the former Vianova consultants and programming group.

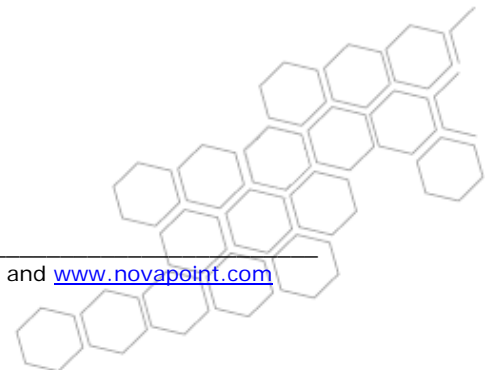
The Novapoint and former NovaCAD software solutions started its history in the beginning of 1980s and continuously have been developed within the same group of people and environment since then. Vianova Systems AS with its sister companies have now 150 employees in 12 countries and 50 at our head office in Norway. Vianova Systems AS is 84% owned by its employees within the Vianova Systems companies.

Vianova Systems cooperates and have part-ownership in 20 companies in 12 different countries within the Vianova Network. All these companies is involved in the Novapoint development. Each company has dedicated responsibility for some of the development of the 20 Novapoint modules.

Vianova Systems AS together with its partners also offers programming services and system design for large and small organizations. The New Norwegian National Road Data Bank, National Geo-data and Map Info System (NGIS) and the new National Rail Databank (SNB) are such examples.

Vianova network

The Vianova network's more than 20 companies comprise more than 300 engineers and about half of these are involved in Novapoint development and support. In addition Vianova Systems AS has long term written cooperation agreements with research centres, universities, specialist companies and institutions in many countries. Vianova has been a dedicated Autodesk partner since the former Novapoint and as well we have had dedicated development projects in cooperation with Autodesk within some of their products.



In Asia Pacific



A priority since 1996

In the early 90's the decision was taken that one of the main areas for Novapoint operations and development should be Asia Pacific. The believe in this rich cultures future, a huge amount of projects in the transportation area, combined with a huge population with well educated and enthusiastic engineers was just a few elements behind the decision. Because Novapoint is a system developed by an international partner network, that have its strength in the contribution from each powerful node in this network, this strategy has been kept until today and. A prove this is a winning idea is the increasing amounts of professional users now changing to Novapoint in the region.

Novapoint resources in the region

In Vietnam, Thailand and India we are 20 developers. As always a mix of engineering user expertise and high end developers is our philosophy. In addition to the development and reseller activities we have close relations to our dedicated resellers who in APAC count 100 engineers in Thailand, Malaysia, Vietnam, India, Taiwan so far.



In Thailand 8 employees in Vianova are responsible for central development in Novapoint and Baezeni Co. Ltd. in Bangkok are responsible for distribution, marketing and sales in both Thailand and the Asia/Pacific region except Vietnam.



Vianova System Vietnam Ltd. started in 2002 and has 11 employees who are well educated and experienced Novapoint developers. VNSV is responsible for dedicated global modules in Novapoint as Traffic signs and Markings as well as central parts of DTM and the Land Acquisition module. They are also responsible for localization of the other Novapoint modules fitted to the Vietnamese market.

The reseller activities in Vietnam are taken care of by the local well reputed Harmony Co. Ltd. www.harmonysoft.com.vn.



Contact us



The main resellers, representatives and system centers in the region are:

Malaysia

ACAD Systems Kuala Lumpur and Penang. www.acadsystems.com

India

ParasCADD Technologies Mumbai/Delhi and Secon Survey Bangalore

Thailand

Baezeni Co. Ltd. Bangkok. www.baezeni.com

Vietnam

Harmony Ltd. Hanoi and Ho Chi Ming City. www.harmonysoft.com.vn

China representative

PIL Systems Ltd and Spatial Technologies in Hing Kong

Taiwan

Jesstek. www.jesstek.com.th

