



# Penmap.NET Toolkit and Surveying Engine



The new platform for field surveying

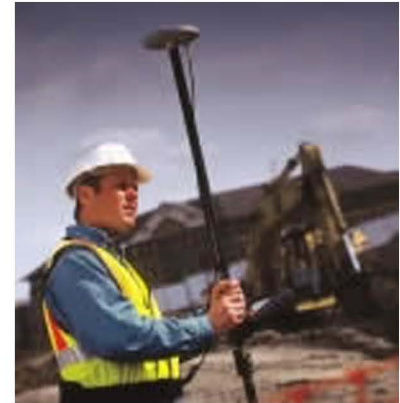
The PenmapGPS - Lite is the most compact full featured RTK GPS currently on the market. It has full colour screen and Penmap.NET software. PenmapGPS – Lite gives you all the tools for sub-centimeter surveying applications.

## Penmap.NET Toolkit

Now it is easy to integrate surveying technology into your own applications and to make software EXACTLY as you want it. Penmap.NET can be used as a stand-alone application or as a set of .NET tools to be integrated by you. Penmap.NET makes your software YOURS. Penmap is a popular software package used by surveyors' worldwide. Penmap Toolkit is designed to have functionality required by a much wider audience ranging from utility companies to environmentalists. Anyone needing to position data accurately would find Penmap.NET an asset.

The Penmap.NET toolkit is a software library that allows programmers to add surveying and data collection techniques to their existing applications. This can involve adding complex GPS systems to turn an existing application into a field tool. Alternatively a user can use the Toolkit to create a customised G.I.S. data collection tool.

The Penmap.NET toolkit uses the Microsoft .Net compact framework and is therefore designed to operate on a wide variety of hardware platforms including Mobile Phones, PDA's, PC's and Tablet PC's.

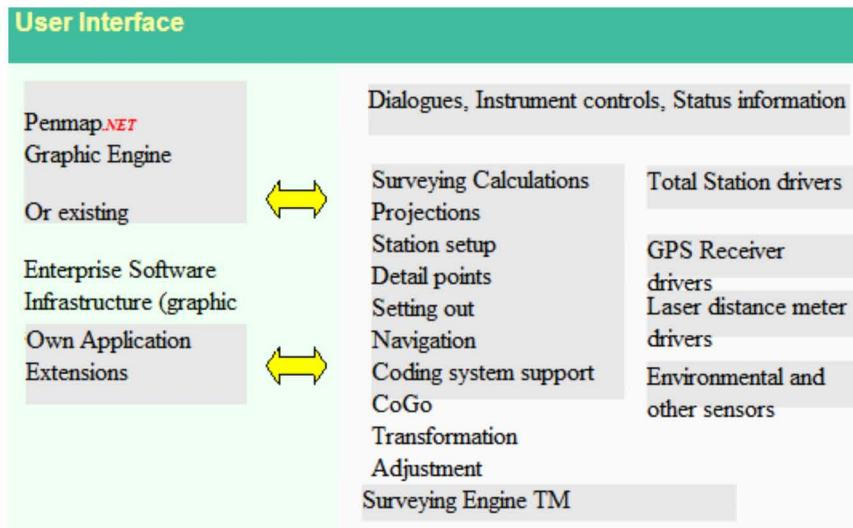


## Design Features

- \* A complete graphical solution for surveying field work.
- \* A library of surveying functions that can be integrated into existing software such as CAD and GIS system infrastructures, thanks to Microsoft .NET technology
- \* Open extension paths to add your own functions and applications using Microsoft.NET and direct databank access and expansion.
- \* No data conversion and resulting data loss between field surveying and existing office software.

## Surveying Engine TM

The heart of the new platform is the Penmap.NET Surveying Engine TM. This library of surveying functions can be integrated into the existing software infrastructure and provides all of the surveying functionality required for modern field work, storing all of the measurement and calculation data in a surveying databank using an integrated recorder function for all observations. Combined with interfaces and drivers for all generally available Total stations and GPS receivers, this library is ideal for integration into your CAD and GIS solutions.



- Surveying Functions (Methods)**
- Free point
  - Snap to point
  - Bilateral and Trilateration
  - Intersection
  - Chain and offset
  - Building measurement utility
  - Total station (free stationing, stationing on known point)
  - GPS calibration, dialling into reference station networks (SAPCS, ascos)
  - Total station and GPS observations and setting out
  - Multiple observations of a point, calculation of object heights, indirect point calculations etc.
  - Transformations and network adjustments



## The Software

**Penmap.NET** is divided into two components. The Toolkit and the Wrapper

### The Toolkit

The Toolkit enables integration of surveying functions into other applications. The most critical functionality is the following:

- \* Survey method mathematics for Bilaterations, Chain & Offset, Bearing & Distance, Construction nodes, total station nodes, resection nodes and GPS nodes.
- \* Geodetic transformations for all popular projection methods.
- \* Instrumentation, Data Capture, Control, and Setting Out (GPS + Total Station)
- \* Penmap Style (Survey + CAD + GIS) Data Structure stored completely independently of users own data structure. The ability to retrieve all observation parameters made during the collection of the survey points like:- time, date, quality information, satellite inventory etc, total station positional info etc.
- \* Simple ID Mathematics (Distance between points etc)

The Data Structure is needed even if the user is working within their system because **Penmap.NET** toolkit will need to create temporary points that are not necessarily going to be stored in the users system. For example in a Utility company the Total Station Position might not be stored in the host database (G.I.S) but the points measured will. The toolkit provides a complete record of all elements used in the acquisition and creation of survey positions. All parameters used in the surveying process are stored and maybe retrieved at any time.

Users of the toolkit can record the reference to each point in their own database. At a later time, the survey may be edited due to correcting errors in the survey. The toolkit, upon request, would then send a table of references to points and their new coordinate position. The toolkit database is entirely independent and may be queried at any time for coordinate information.

The option is available of either using the dialogues of Penmap or applying their own custom look and feel, allowing seamless blending with in-house software.

### The Wrapper -

The Wrapper is an end user interface provided with the Toolkit. The programming source is provided for the Wrapper to indicate an example of using and interfacing to the Toolkit. If the user is injecting the toolkit into an existing package then the wrapper is probably not needed, as it contains the Graphical User Interface and other tools needed to make a stand-alone application. The Wrapper is generally used if the user wishes to make a simple stand-alone application.

The Wrapper requires the rest of the toolkit and adds the following functionality

- \* A GUI
- \* Layers Toolbox
- \* Graphics (Points, circles, arc, lines, text, beziers, clothoids, arc smoothed pathways and polylines, etc)
- \* Path offset capability with closed connectivity capability.
- \* Symbols
- \* Background raster maps
- \* Transfer functionality to PenmapPC (Universal Interface?)

The combination of the Toolkit and Wrapper gives everything needed for building a G.I.S. or Surveying data collection package.

### Technical Specification

#### **.Net Environment**

#### **GPS supported**

#### **Total Stations Supported**

#### **Lasers**

Compact Framework

All major brands of High precision RTK GPS and low accuracy units as well

All major brands of Total Station

All major types of Distance laser supported