SURPAC Surveying Software
Version 5.75
for
Windows XP/Vista/7/8/10
Topographical, Engineering, Mining and Cadastral Surveying Applications
SURPAC Surveying Software is structured to provide Surveyors with a flexible selection of surveying software components.

The Entry Level for SURPAC Surveying Software is the SURPAC “Lite” Module

This SURPAC “Lite” Module is a suite of programmes covering the fundamental, day to day, calculation and CAD requirements of most Survey Offices, at a cost effective price of (R 7,100.00 or US$ 790.00). (Prices and Leasing options are at the end of this document.)

Surveyors wishing to build up their software capability may add any of the other seven SURPAC Modules, as and when required, to the SURPAC “Lite” Module.

SURPAC Software Purchase and Leasing Pricing

Please refer to the table shown on Page 18 of this document for the list of prevailing SURPAC Software prices. The Leasing option prices are shown on Pages 18 - 21.

The SURPAC Modular Structure

Below is a list of all the applications that can be found in the various SURPAC Modules, including a brief résumé on each application. If you would like to see fuller details on both SURPAC and TopoCAD CAD/GIS software, including screen shots, then please visit our Internet site www.surpac.co.za
• The entry level SURPAC "Lite" Module is the only "stand alone" Module, and represents the minimum software configuration for SURPAC Software.
• Any of the other seven Modules may then be added to the SURPAC "Lite" Module, as per Users' requirements.

The SURPAC "Lite" Module

• The SURPAC "Lite" Module provides an ideal entry level suite of Survey Software applications that covers the fundamental calculation and CAD requirements for most Survey Offices.
• The omission of specific applications found in the Conversions, Least Squares, Topographical, Engineering, Mining and Cadastral Modules provides a cost effective "starter" suite of applications.
• Users having the SURPAC "Lite" Module may purchase any of the other seven Modules, as and when required.

The SURPAC "Lite" Module includes the following applications :-
• Support for various South African and U.K. Survey Systems such as :
  ▪ South African "WG" Hartebeeshoek94 Datum,
  ▪ Southern African "Lo" Cape Datum,
  ▪ Southern African Arc 1950 Datum,
  ▪ U. K. National Grid (OSGB36),
  ▪ Irish National Grid,
  ▪ U. K. National GPS Network (ETRS89),
  ▪ Universal Transverse Mercator,
  ▪ and others.

• Support for Ellipsoids such as :
  ▪ Clarke 1880 (Modified),
  ▪ Clarke 1866,
  ▪ WGS 1984,
  ▪ WGS 1972,
  ▪ Airy 1830,
  ▪ Airy 1830 (modified),
  ▪ Bessel 1841,
  ▪ and others.

• 2D and 3D Join calculations,
• Polar calculations from plane data and from field observations,
• Reverse Polar calculations,
• Two Sides & the Included Angle calculations,
• Intersections and Trilaterations,
- Curve Tangent Point and 3 Point Curve fitting,
- Areas with or without Co-ordinate checking,
- Fixed Area and Pivot Point Calculations
- Off-Line Calculations and Least Squares Line fitting,
- Splay Point calculations and Apex Points calculations,
- Data Traverses,
- Field Traverses (using Observation files)

Traverse Adjustment using standard Bowditch Adjustment

- Line Running and adjustment,
- Total Station/Logger Downloading and Uploading of Co-ordinates,
- File Printing and Setting Out Data Sheet printing,
- Importing and Exporting [Latitude, Longitude, Height] ASCII files,
- Importing and Exporting [Y (or E), X (or N), Height] ASCII files,
- Importing and Exporting [Y (or E), X (or N), Height] DXF format files,
- Importing and Exporting [Y (or E), X (or N), Height] data from a Microsoft Access Database,
• General 2-D CAD drawing facility using Lines, Arcs, Text, Mark Points, Contours and Images, Includes on-screen Join, Polar, Intersection and Area calculations, dynamic moving, orienting and sizing of Text items. DXF, HPGL and ASCII data input and output. Using various symbols, colours and sizes to mark Point positions. Uses various Line styles, colours, thicknesses. Line functions such as Trim, Snap, Replicate, Dimension, bisect, show direction and/or length etc.

General CAD Programme showing background Image

• Basic Co-ordinate, Distance and Area Conversions (from the Conversions Menu),
• Geographical Transformations : Ellipsoid to/from Plane and Panel to Panel (Conversions Menu),
• Standard Helmert (1st Order) System to System Transformations (Conversions Menu),
• Locating and Meaning Point Groups in a Co-ordinate File (Conversions Menu),
• Point comparisons using different Co-ordinate Files (Conversions Menu),
• [Y, X, Z] (or [E, N, H]) Resections and Intersections using Least Squares (Least Squares Menu),
• Direct and/or ASCII loading of Observations from a wide range of Total Stations and Loggers (Topographical Menu),
• Mass Polar reductions direct from Observations Files (Topographical Menu),
• Viewing ASCII Files and Databases,
• On screen Calculator with Survey, mathematical and financial functions.
SURPAC interfacing with Google Earth

The Google Earth application is available from Google as a free download from the internet site http://earth.google.com/

Google Earth allows for the viewing of 2D or 3D colour satellite imagery for any point on the Earth, as well as being able to view galaxies and the ocean floors. The surface terrain imagery can usually be viewed at a scale in the region of 1:2500 without any loss of detail quality. This figure can vary from region to region, but it is generally true for built up areas.

Google Earth, therefore, makes a very useful visual display tool for SURPAC Users when it is interfaced, or linked, with survey co-ordinate and/or image data. This interfacing can be in the form of:

- Displaying the locations of Trig. Beacons and/or Town Survey Marks for a User selected area.
- Displaying Beacons and Stations from a previous survey to help locate these points.
- Displaying User selected Points in a Co-ordinate file to help locate these points.
- Displaying Points and/or Lines from a survey plan, or sheet, to view their positions.
- Displaying a survey plan, or sheet, itself as an overlay image on the earth surface, etc.
- Importing of Placemarks into a SURPAC Co-ordinate file and importing Paths, Polygons and Images from Google Earth to a SURPAC General CAD Sheet.

Example of a SURPAC generated 3D View of Trig Beacons displayed on Google Earth
Example of a SURPAC cadastral layout, showing Lines and Named Points, on Google Earth

Example of a SURPAC township design with full background transparency, on Google Earth
The SURPAC Conversions Module includes the following applications:

- Basic Co-ordinate, Distance and Area Conversions (Included in SURPAC "Lite"),
- Geographical Transformations: Ellipsoid to/from [Y, X] Plane System (Included in SURPAC "Lite"),
- Geographical Transformations: Ellipsoid to Ellipsoid (Included in SURPAC "Lite"),
- Geographical Transformations: System Panel 1 to System Panel 2 (Included in SURPAC "Lite"),
- Standard Helmert System to System Transformations (Included in SURPAC "Lite"),
- Weighted Helmert System to System Transformations,
- Polynomial (2nd Order) System to System Transformations,
- Auto Transformations from "Lo" RSA Cape Datum to "WG" Hartebeeshoek94 Datum,
- Auto Transformations from "WG" Hartebeeshoek94 Datum to "Lo" RSA Cape Datum,
- Auto RSA "Goldfields" System to/from "Lo" and "WG" RSA Cape Datum,
- Locating and Importing nearest Trig/TSM control Points (RSA only),
- [DY, DX, DZ] stability precision Monitoring facility using multiple epochs,
- Locating and Meaning Point Groups in a Co-ordinate File (Included in SURPAC "Lite"),
- Point comparisons using different Co-ordinate Files (Included in SURPAC "Lite").

Auto Conversion of a Clarke 1880 co-ordinates to WGS 84 co-ordinates (RSA only)
Auto Location of the nearest Trig. Beacons to a User defined position (RSA only)

Conversion of Y, X (or E, N) values to Latitude and Longitude values
The SURPAC Least Squares Module uses rigorous Least Squares adjustment techniques and includes the following applications:

- Point \([Y, X, Z]\) determination for Resections, Intersections or Trilaterations,
- \([Y, X]\) Planimetric Control Network Adjustments for up to 400 Points,
- Trig Height Network Adjustments for up to 500 Points,
- Spirit Level Network Adjustments for up to 500 Points.

**Error Ellipse display for a Least Squares Planimetric Adjustment**
The SURPAC Topographical Module includes the following applications:-

- Direct and/or ASCII loading of Observations from a wide range of Instruments (Included in SURPAC "Lite"),
- Manual Observation Data entry and editing,
- Direct and/or ASCII loading of Spirit Level Observations from Instruments,
- Manual Spirit Level Observation Data entry and editing,
- Rapid Observation File reductions for Co-ordinate Files (Included in SURPAC "Lite") and Tacheometric Files,
- Tacheometric File Create/Edit, plus importing from ASCII and Co-ordinate Files,
- Contour Development CAD facility, using Surface Triangles and/or Break Line methods,
- Digital Terrain Modelling - Volumes, Areas, Sections and DTM comparisons.

Contour CAD showing created Contours with background Triangulation shading
Contour CAD showing created Contours with background Triangulation shading

DTM display showing both Surface Model and Base Model
The SURPAC Engineering Module includes the following applications:

- Horizontal Alignment (Straights, Circular & Transition Curves),
- Vertical Curve Alignment and Profile Formations,
- Cross Section Creating and Plotting,
- Longitudinal Section Creating and Plotting,
- Sectional Volumes and Toe Peg calculations.
The SURPAC Mining Module includes the following applications:

- Peg Calculating and Checking using the Double Set Up Method, plus Grade,
- Peg Calculating and (Semi) Checking using the Double Button Method, plus Grade,
- Peg Calculating and (Semi) Checking using Double Back Fix Method,
- Viewing and importing SURPAC Peg ASCII files for Peg re-Calculations,
- Extended Peg Index Listing using the SURPAC Peg ASCII files
- Offset Surveys (Bord and Pillar) with manual or ASCII input,
- Offset Surveys using an Observation File (U/G tache),
- Pillar Safety Factor Calculations,
- Gyro-Theodolite Calibrations (using Transit Method or Schuler Means),
- Gyro-Theodolite Bearing Reductions (using Transit Method or Schuler Means).

The SURPAC Cadastral (Standard) Module

The SURPAC Cadastral (Standard) Module includes the following CAD applications: -
- Diagram CAD facility for A0 - A4 Diagram Construction, Editing and Plotting,

Example of an A4 Diagram, showing surrounding properties
Example of an A0 Diagram

Example of a Working Plan
The SURPAC Cadastral (Extended) Module includes the following CAD applications:

- General Plan CAD facility for GP Constructing, Editing and Plotting,
- GP Data Sheet CAD facility for DS Constructing, Editing and Plotting,
- Sectional Title Plan CAD facility for ST Constructing, Editing and Plotting.

Examples of Sectional Title Sheets
Example of General Plan Sheets
### SURPAC for Windows XP/7/8/10

<table>
<thead>
<tr>
<th>SURPAC SOFTWARE MODULE</th>
<th>ZAR</th>
<th>US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURPAC &quot;Lite&quot; (Entry Level Software Suite)</td>
<td>R 7 100.00</td>
<td>$ 520.00</td>
</tr>
<tr>
<td>SURPAC CONVERSIONS Module</td>
<td>+ R 3 900.00</td>
<td>+ $ 290.00</td>
</tr>
<tr>
<td>SURPAC LEAST SQUARES Module</td>
<td>+ R 5 900.00</td>
<td>+ $ 430.00</td>
</tr>
<tr>
<td>SURPAC TOPOGRAPHICAL Module</td>
<td>+ R 6 400.00</td>
<td>+ $ 470.00</td>
</tr>
<tr>
<td>SURPAC ENGINEERING Module</td>
<td>+ R 8 500.00</td>
<td>+ $ 620.00</td>
</tr>
<tr>
<td>SURPAC MINING Module</td>
<td>+ R 8 500.00</td>
<td>+ $ 620.00</td>
</tr>
<tr>
<td>SURPAC CADAstral (Standard) Module</td>
<td>+ R 5 900.00</td>
<td>+ $ 660.00</td>
</tr>
<tr>
<td>SURPAC CADAstral (Extended) Module</td>
<td>+ R 8 100.00</td>
<td>+ $ 900.00</td>
</tr>
</tbody>
</table>

**Notes:**

1. The SURPAC "Lite" represents the minimum purchase for SURPAC Software.
2. Any other Module(s) may be added to the SURPAC "Lite" Module.
3. The above Prices exclude the optional SURPAC Maintenance Contract.
4. The cost of an annual Maintenance contract is 10% of the software purchased.

For larger organizations, multiple SURPAC Licenses may be purchased. In this case, the following discount structure will apply to the above prices:

<table>
<thead>
<tr>
<th>License Type</th>
<th>Discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st License</td>
<td>Full Price</td>
</tr>
<tr>
<td>2nd License</td>
<td>20% Discount</td>
</tr>
<tr>
<td>3rd License</td>
<td>30% Discount</td>
</tr>
<tr>
<td>4th License</td>
<td>35% Discount</td>
</tr>
<tr>
<td>5th License</td>
<td>40% Discount</td>
</tr>
<tr>
<td>All further Licenses</td>
<td>40% Discount</td>
</tr>
<tr>
<td>Multi Site Licenses (Minimum of 10)</td>
<td>per agreement</td>
</tr>
</tbody>
</table>

For fuller details on SURPAC Software, please visit [www.surpac.co.za](http://www.surpac.co.za).
SURPAC Leasing Options

This Leasing facility allows Surveyors the unique and cost effective option of being able to Lease SURPAC Surveying Software Modules for a specified time period, ranging from 6 months to 24 months.

Using the Leasing option, it is possible to have the entry level SURPAC "Lite" Module operational from less than R342 per month, (plus an optional SURPAC Software Maintenance Contract.)

Leasing SURPAC Modules is flexible, and may be changed, by the User, from time to time.

For example, if a Survey practice, or department, is mainly involved in Topographical, or general Surveys, they could Lease the SURPAC "Lite", Conversions and Topographical Modules for, say, 6 months. If they then needs to carry out some Cadastral Surveys, they may then add the Cadastral modules to the Lease, for the next 6 month period. After this, they may revert back to the originally Leased Modules for the subsequent Lease period.

Leasing SURPAC provides Users the advantage of spreading their software costs over a period of time, instead of having to pay the full amount "up front".

Leasing also allows Users to better evaluate their needs for SURPAC.

For example, a User could initially Lease a full SURPAC License for a 6 month period, which includes the "Lite", Conversions, Least Squares, Topographical, Engineering and Cadastral Modules. After this initial period, the User would have a better evaluation of SURPAC in relation to his software requirements and could then, say, continue with a new Lease for only those Modules suitable to his/her practice.

Licensing Lease options include :-

- the time period required (minimum of 6 months),
- the SURPAC software Modules required, and
- the number of installations required.

SURPAC Surveying Software Leasing Prices (Southern Africa SADC)

Prices Valid until 31 December 2019

<table>
<thead>
<tr>
<th>SURPAC Module</th>
<th>6 Month Lease</th>
<th>12 Month Lease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lite (Entry Level Module)</td>
<td>R 2 050.00</td>
<td>R 3 900.00</td>
</tr>
<tr>
<td>Conversions</td>
<td>R 1 180.00</td>
<td>R 2 150.00</td>
</tr>
<tr>
<td>Least Squares</td>
<td>R 1 750.00</td>
<td>R 3 250.00</td>
</tr>
<tr>
<td>Topographical</td>
<td>R 1 950.00</td>
<td>R 3 650.00</td>
</tr>
<tr>
<td>Engineering</td>
<td>R 2 600.00</td>
<td>R 4 600.00</td>
</tr>
<tr>
<td>Mining</td>
<td>R 2 600.00</td>
<td>R 4 600.00</td>
</tr>
<tr>
<td>Cadastral (Standard)</td>
<td>R 1 900.00</td>
<td>R 3 300.00</td>
</tr>
<tr>
<td>Cadastral (Extended)</td>
<td>R 2 650.00</td>
<td>R 4 600.00</td>
</tr>
</tbody>
</table>

Prices are "once off" payments, made in advance, and cover the stipulated Lease Period.

Prices are excluding a SURPAC Software Maintenance Contract (SMC).

An SMC may be purchased at an additional cost of 10% of the software leased.

Prices are in South African Rand and are subject to change without notification.
### SURPAC Surveying Software Leasing Prices (all other countries)

**Prices Valid until 31 Dec 2019**

<table>
<thead>
<tr>
<th>SURPAC Module</th>
<th>6 Month Lease</th>
<th>12 Month Lease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lite (Entry Level Module)</td>
<td>US$ 230.00</td>
<td>$ 280.00</td>
</tr>
<tr>
<td>Conversions</td>
<td>$ 130.00</td>
<td>$ 160.00</td>
</tr>
<tr>
<td>Least Squares</td>
<td>$ 200.00</td>
<td>$ 240.00</td>
</tr>
<tr>
<td>Topographical</td>
<td>$ 220.00</td>
<td>$ 270.00</td>
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<tr>
<td>Engineering</td>
<td>$ 290.00</td>
<td>$ 340.00</td>
</tr>
<tr>
<td>Mining</td>
<td>$ 290.00</td>
<td>$ 340.00</td>
</tr>
<tr>
<td>Cadastral (Standard)</td>
<td>$ 210.00</td>
<td>$ 250.00</td>
</tr>
<tr>
<td>Cadastral (Extended)</td>
<td>$ 300.00</td>
<td>$ 340.00</td>
</tr>
</tbody>
</table>

Prices are "once off" payments, made in advance, and cover the stipulated Lease Period.

Prices are excluding a SURPAC Software Maintenance Contract (SMC).

An SMC may be purchased at an additional cost of 10% of the software leased.

Prices are in United States Dollars and are subject to change without notification.

### General conditions for Leasing SURPAC Surveying Software

- **The maximum** Leasing period for any SURPAC Module is 24 months. After this 24 month period has been accumulated, a Permanent License will be issued to the User, for the SURPAC Module(s) Leased, without any further cost. The only (optional) fee then payable would be for a SURPAC Software Maintenance Contract, covering the next year's usage.

- **The minimum** Lease period is 6 months.

- When a User initially agrees to take out a Lease License, they will be supplied with a fully functional SURPAC CD, plus Licensing software covering the agreed Lease period for the SURPAC Modules required.

- If, at the end of this Lease period, the User decides not to continue with a new Lease the software will become deactivated and will be unusable. The User may however, at any future time, take up a new Lease License. In this case they will be issued with new Licensing software to re-activate SURPAC Software for the agreed period.

- In order to extend a Lease License, and/or to change the Modules Leased, the User will be supplied (by e-mail) with new Licensing software covering the new Lease period and the required SURPAC Modules.

- Lease payments must be made in full, in advance. Licensing software will not be issued unless payment for the agreed Lease period has been received from the User.

- The User must sign, and adhere to, the normal SURPAC Software Copyright Agreement.

- The entry level SURPAC "Lite" Module represents the minimum Lease License for SURPAC for Windows XP/Vista/7/8 software. Any, or all, of the other Modules may then be added to the SURPAC "Lite" Module, as required.

- The SURPAC Cadastral (Extended) Module may only be Leased if the SURPAC Cadastral (Standard) Module is Leased simultaneously, or has already been purchased.

- Existing SURPAC Users who have already purchased one or more Modules, and whose software is currently covered by a SURPAC Software Maintenance Contract, may Lease any of the Module(s) not already purchased.
For larger organizations, multiple SURPAC Licenses may be Leased. In this case, the following discount structure will apply to the above prices:

<table>
<thead>
<tr>
<th>Lease License</th>
<th>Discount</th>
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<tbody>
<tr>
<td>1st License</td>
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<td>2nd License</td>
<td>20% Discount</td>
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<tr>
<td>3rd License</td>
<td>30% Discount</td>
</tr>
<tr>
<td>4th License</td>
<td>35% Discount</td>
</tr>
<tr>
<td>5th License</td>
<td>40% Discount</td>
</tr>
<tr>
<td>All further Lease Licenses</td>
<td>40% Discount</td>
</tr>
<tr>
<td>Multi Lease Site Licenses</td>
<td>40% Discount</td>
</tr>
</tbody>
</table>

Special educational discounts apply for bona fide education institutions such as Universities, Technikons, Polytechnics and Technical Colleges.

Example of a General CAD Sheet showing a proposed layout on an imported image