Overview of Main Surfer Functions

I. File Command Bar

A. The file command bar allows user to input data, read data files, save data files, save a map file.

1. Essential File Types

a. *.dat: data file for use in contouring and map making

(1) Data in X, Y, Z format according to columns in spread sheets

(a) X-Y = cartesian coordinates (eastings and northings)
(b) Z = point elevation data, rain fall, ground water elevations, chemical concentrations, any data that can be contoured.

(2) Other File Types
(a) User may use surfer worksheet function to set up data or may import other data types

i) WK1 = lotus worksheet
ii) XLS = excel worksheet
iii) ASCII or Text Files (unformatted text files)

b. *.grd: a "grid" file that surfer generates during the gridding function

(1) gridding takes scattered data points and interpolates values between the data points to provide continuous surface coverage of

c. *.srf: a "surf" file, i.e. a particular map image that is saved in its entirety

(1) .srf files are linked to pre-existing .dat and .grd files
(2) .srf files save images, titles, text and other attributes of a map, as well as the contour structure

d. .dat and .srf files may be "opened" using the File Command Bar in the surfer main menu

2. *.dat files
a. data files contain the map data in spreadsheet format
b. by default, the first row of the spreadsheet may contain the title or heading of the data column

(1) e.g. Easting, Northing, Elevation, Well Name (columns A,B,C,D)

c. Data files may contain numbers (X,Y,Z) and labels for data points (text)

(1) text is specified by placing quotation marks around the string
(a) "Well TC-3" or "14579"

(2) Numbers/numeric characters have no quotation marks

B. File/Worksheet Function
1. Open, New, Save
a. Opens an existing worksheet
b. Creates a new worksheet
c. Saves the worksheet to a surfer *.dat file

C. File/Print Function
1. Prints a saved *.srf file or the current map image on the screen

II. View Command Bar

A. View allows user to change the view perspective of the map that is on the work screen
1. Zoom in/Zoom out
a. allows user to get closeup or further away from map view
b. Zoom allows the user to refine text and drawing attributes of the map at a close-in scale

2. Actual Size
a. will show the working map to scale on the screen as it will appear on paper
b. The ruler bars on the screen show the dimensions of the map in inches

3. Fit to Page
a. compresses the map view so that the entire map is visible on the work screen

4. Redraw: freshens up the map after edits have been made

III. Edit Command Bar
A. Allows user to edit various cartographic aspects of the map (e.g. text, drawings, 3-d viewing, to delete attributes of the map)

1. Select Command: allows user to select aspects of the map for editing using the mouse... essentially highlighting areas for editing

2. Select All: will select the entire map for editing
3. Delete: will delete the highlighted attribute that has been selected

IV. Draw Command Bar

A. Allows user to draw figures or place text, titles, labels on the map
1. Draw Command
a. User can use to draw lines, rectangles, boxes, circles, ellipses on the map

b. Edit Linestyle: allows user to to edit the appearance and line weight of drawn items

2. Text Command
   a. Allows user to place text, labels and titles on the map

      (1) Select text command
      (2) Move mouse cursor to the position of where the text will be placed, click mouse
      (3) Text Display box appears

         (a) can set font size, color, style, alignment
         (b) type text in the text work box
         (c) Hit Ok and text will be located at cursor position above

3. Rotate Objects

   a. Allows text and other attributes to be rotated to varying orientations

4. Alignment

   a. Allows text and other attributes to be aligned to the left, right or center of the selected cursor position

V. Gridding Function

A. Gridding processes the scattered data points in the XYZ *.dat file and interpolates data into a regular grid spacing

1. Grid: essentially sets up a defined grid network over the X-Y data range at a selected grid node spacing

   a. The grid routine then determines a Z value for each node on the defined grid, based on the scattered Z data provided.

2. The grid function will analyze a *.dat file, grid/interpolate it, and save the resulting data in a *.grd file

B. Grid Methods: Spatial Statistics

1. Kriging:

   a. A flexible grid method that is highly utilized in the geosciences. A very effective method of generating smooth contour patterns

   b. Surfer by default using kriging because of its wide applicability

2. Inverse Distance Method
   a. A rapid computation method

b. Drawback: tends to close contours and produce bulls-eye patterns

3. Minimum Curvature Method
   a. O.K. method produces smooth data sets

4. Polynomial Regression
   a. Using polynomial equations to approximate the data surface
   b. Very good to decipher regional trend patterns, but local detail is lost

5. Shepard's Method
   a. Similar to Inverse Distance, but eliminates some of the bull's eye patterns

6. Triangulation with linear Interpolation
   a. Uses triangular interpolation method

   b. tends to produce blocky triangular patterns with small data sets

C. Data Set Size vs. Method (Recommended)

1. 0-10 data points: Kriging and/or radial Basis Function

2. <250 Points: Kriging and/or Radial Basis Function

3. 250-1000 Points: Triangulation, Kriging, Radial Basis

4. >1000 Points: Minimum Curvature = fastest, Kriging = better results but slower computation time

VI. Map Menu

A. Allows user to generate Contour Maps or 3-D Block Diagrams
   1. Select a grid file (*.grd) to create a map or 3-D diagram

B. Contour Map Variables

1. Allows user to select contour interval, contour line/patterns, allows smoothing of contour lines, labelling contours, map shading

C. Map/Scale Menu

1. Allows user to change the map scale, to label map axes, to set a scale/legend.

D. Surface

1. Takes a *.grd file and creates a 3-D block diagram