


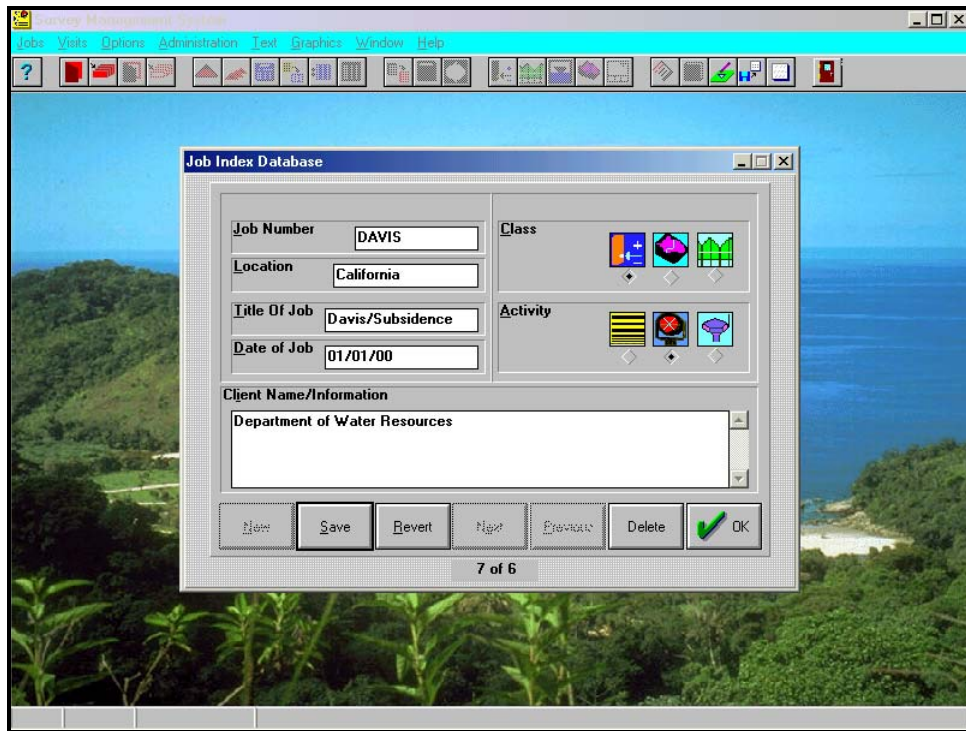
Introduction

SMS is a proven survey solution with emphasis on the use of survey information. Whereas the software is comprehensive by covering survey data capture as well as processing, computations and presentations, it also has to accommodate dynamic changes in data types and evolution in instrumentation. One way of achieving this is through import mechanisms. Until the advent of GPS, most monitoring for subsidence or deformation was by traditional survey methods involving the levels and total stations. This is still the practice for precise monitoring. However, today GPS plays important role in providing real time positional changes for monitoring. With other forms of measurements such as extensometers, this mass of data can be a challenge to process and manage. It is here therefore that SMS, Survey Management System could become an asset.

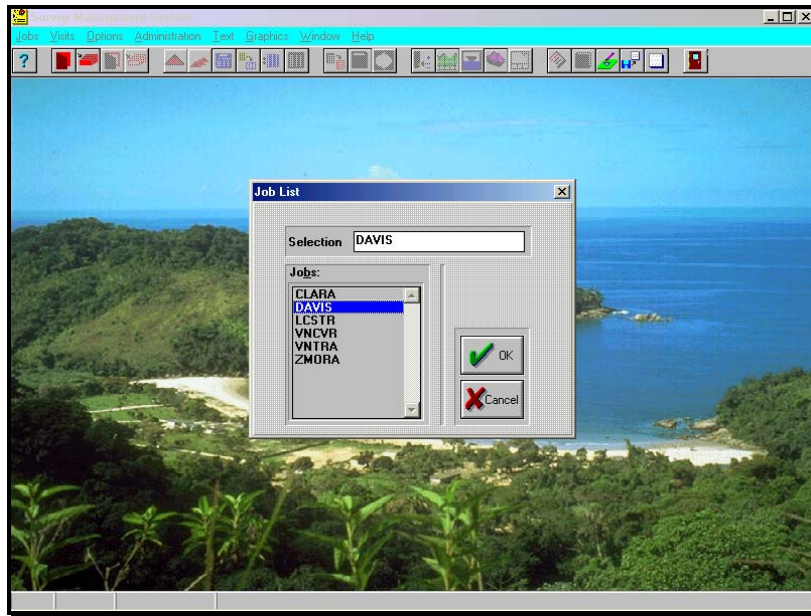
Thus we provide the method of import and management of GPS data for purpose of monitoring land subsidence and deformation.

Job Registration

Start SMS, by clicking the program icon . Then select New Job, F2 and fill the Job Number, alphanumeric code of five characters. This reference should reflect the monitoring project such as DAVIS, California or VNCVR, British Columbia.

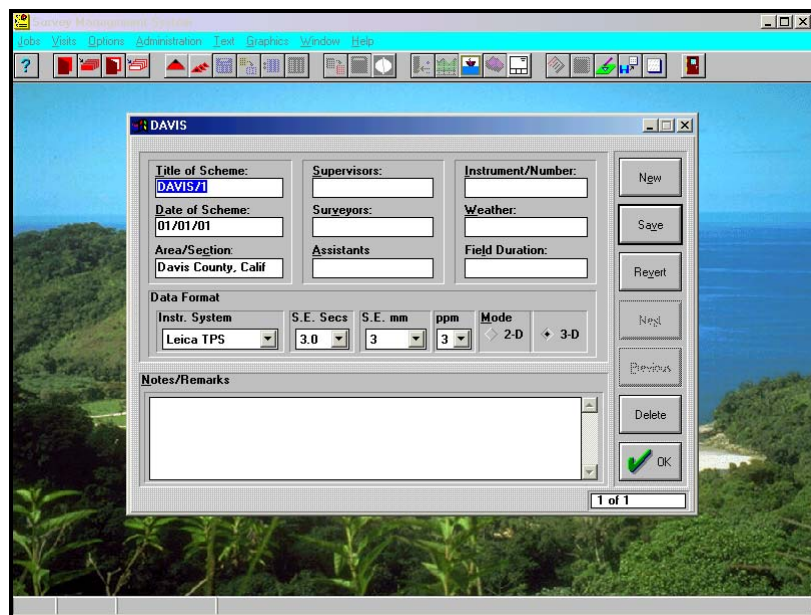


Endeavour to complete the rest of the information fields for proper documentation. Then save data and close the window.



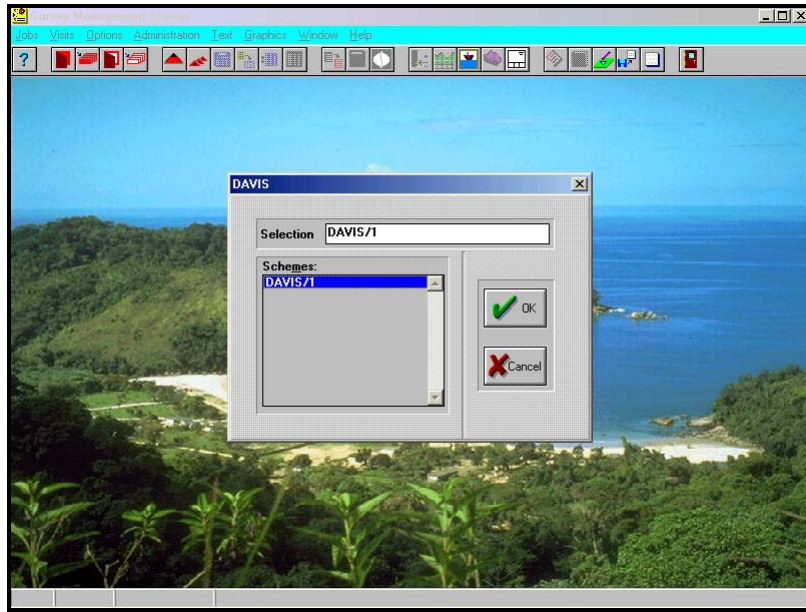
Registration of Visits

Every monitoring project starts with a visit or scheme within the project, for example DAVIS, as registered above. SMS allows management of up to 16,000 projects in each system's folder. Hence out of these possible projects, select DAVIS by clicking Job Selection and then New Scheme to register the first cycle, DAVIS/1, in monitoring. Fill in the key fields (Ignore Data Format).

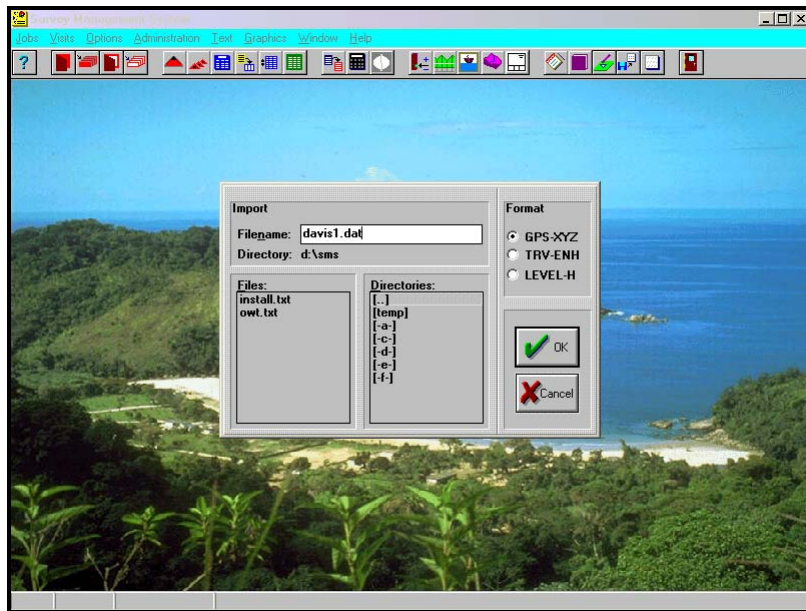


Start of Monitoring

SMS, supports up to 16000 cycles in each project reference. The next step therefore begins with selecting any epoch of interest, in this instance DAVIS/1.

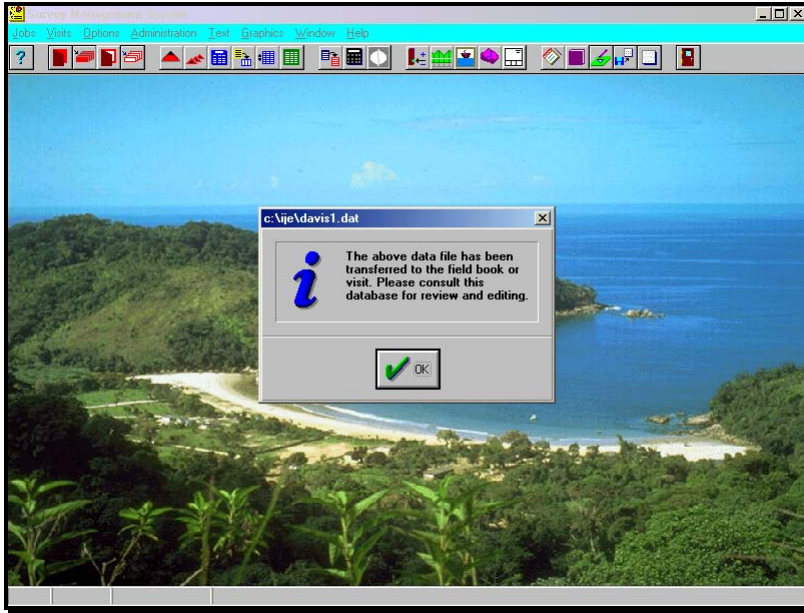


GPS Import



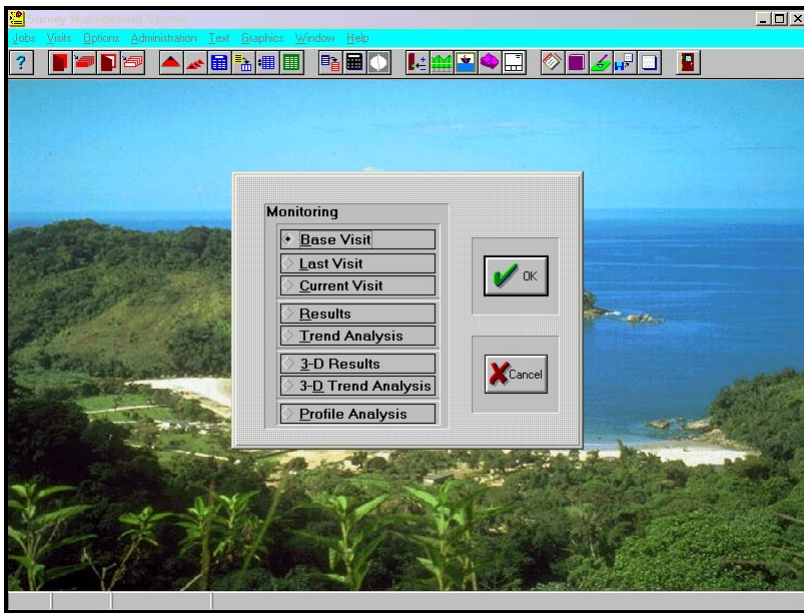
Having selected the cycle of interest, go to Administration and Import Results on program top menu. In the import window above, enter or choose for example, Davis1.dat. Tick the data format, in this case GPS, as illustrated in SMS help. Ok the selection and the results are loaded into Edit/Current visit database for monitoring applications, as shown below.

GPS Monitoring



Monitoring

Monitoring now begins with activating base, last and current visits and generating results of movements, trend and profile analysis.



The screenshot shows a software window titled 'DAVIS / DAVIS/1' with a menu bar (Jobs, Views, Options, Administration, Text, Graphics, Window, Help) and a toolbar. The main content is a 'MONITORING RESULTS' window containing a table with columns for Station, EASTING, Movements[mm], NORTHING, Movements[mm], and HEIGHT, Movements[mm]. The table lists 12 stations (P1 to P3750) with their respective coordinates and movement values. At the bottom of the window, there are buttons for Print, File, a color calibration icon, a bar chart icon, a checkmark icon, and an OK button. A 'Stations' field at the bottom right shows the number 10.

| Station | EASTING | | NORTHING | | HEIGHT | |
|---------|------------|---------------|-----------|---------------|----------|---------------|
| | 01/01/01 | Movements[mm] | 01/01/01 | Movements[mm] | 01/01/01 | Movements[mm] |
| P1 | 10379.0718 | 0.00 | 5546.7395 | 0.00 | 100.1301 | 0.00 |
| P2 | 10304.2285 | 0.00 | 5627.3454 | 0.00 | 99.8140 | 0.00 |
| P3 | 10308.1903 | 0.00 | 5629.4925 | 0.00 | 99.7533 | 0.00 |
| P301 | 10649.9070 | 0.00 | 5853.1500 | 0.00 | 100.3210 | 0.00 |
| P303 | 10451.3590 | 0.00 | 5662.2880 | 0.00 | 100.1170 | 0.00 |
| P305 | 10351.7180 | 0.00 | 5570.6530 | 0.00 | 100.2358 | 0.00 |
| P36 | 10249.1569 | 0.00 | 5224.3786 | 0.00 | 99.4938 | 0.00 |
| P37 | 10361.6700 | 0.00 | 5527.4595 | 0.00 | 100.4701 | 0.00 |
| P375 | 10363.8870 | 0.00 | 5581.8797 | 0.00 | 100.2929 | 0.00 |
| P3750 | 10363.8854 | 0.00 | 5581.8750 | 0.00 | 100.0606 | 0.00 |

Conclusion

The facility in SMS is a versatile approach that enables users to apply spatial data from any ready source for monitoring. The embedded functions are superior, quicker and obviate the need for external spreadsheet, database and presentation packages. Data formats are specified in SMS Help, with option of custom solutions. Collation is another provision that allows complement of data between Digital Level, TPS and GPS sources to ensure uniform precision. On the whole therefore SMS is able to support all types of monitoring with any type of survey instrumentation.