

PROLEC pcX-3D - THE TOTAL SOLUTION

Prolec's pcX-3D system combines all the key elements required to meet the demands of a variety of machine control applications. Precision sensors are combined with a number of accurate positioning options to produce a solution that is capable of monitoring to centimetre accuracy. Using Prolec's proprietary application software the resulting product is one which offers benefits at all levels in the value chain, from machine operator through to site engineer, to project manager and financial controller.

MAXIMISING PROFIT, OPTIMISING EFFICIENCY

The first benefit of pcX-3D comes before any earth has been moved, piles hammered or holes drilled; as the ability to upload 3D digital terrain maps (DTM) directly into pcX-3D for land based applications negates the need for lengthy and costly setting out. In sub-sea excavations the benefits are obvious as any guess work is removed. pcX-3D allows any number of machines to operate autonomously on one site.

Once the DTM has been uploaded, the information is displayed to the machine operator in either wire frame or fully rendered topography. As pcX-3D works in real-time, the operator has the ability to work to the required plan, ensuring the task is completed accurately and without the need for secondary personnel. Completing work to a plan is a major factor in ensuring the profitability of groundwork or dredging operations - something that pcX-3D offers total control over. Additional benefits of moving the right amount of material first time are potential transportation and rework cost savings. The omission or inaccurate positioning of a pile or borehole can be equally as costly in ground engineering operations, risks that are significantly reduced with pcX-3D.

PUTTING YOU IN THE PICTURE

pcX-3D is a tool that truly offers benefits from the beginning to the end of the project. All the plant activity versus the plan is recorded by pcX-3D, so project



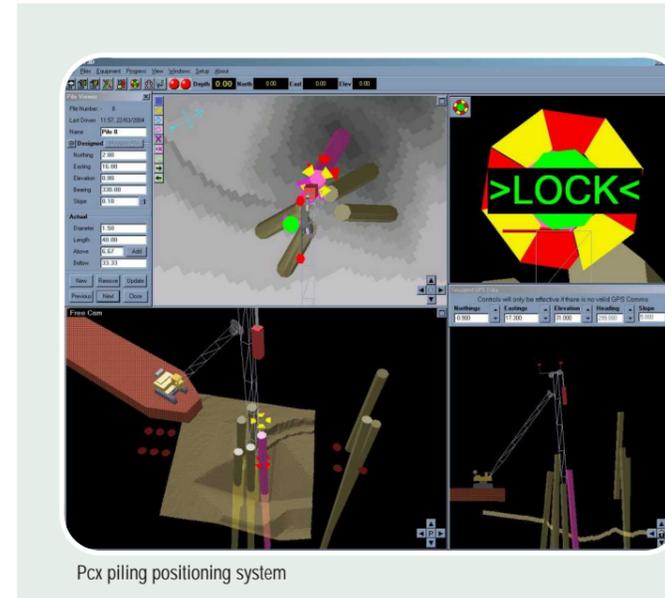
progress can be fully monitored. Once the project is complete the information recorded can be used to provide full traceability to both contractor and the client, which is especially important in decontamination, dredging or drilling and piling applications.

POWER THROUGH CONTROL

pcX-3D has an impressive array of features that ensure total control in whichever application the system is deployed. One of the significant advantages of pcX-3D machine control is the flexibility it affords the machine operator, complimenting his own personal skill and experience. The Prolec approach ensures that the operator has all the tools and information he requires to complete the project. Project engineers, and even the client, are afforded an unprecedented level of control over their project, secure in the knowledge that work is being completed to their requirements and all relevant information is recorded for future reference.

FEATURES

- ❑ DXF or CSV file import - 3D triangles or CSV point data
- ❑ Precision sphere - shows current level of system accuracy at the bucket teeth
- ❑ Multiple resizeable views - side, rear and plan can be displayed at any size and position on screen
- ❑ Terrain mapping - current terrain can be measured using the bucket teeth and/or excavator tracks
- ❑ Unlimited equipment options - multiple buckets, clamshells and hammers etc. can be swapped easily and quickly when needed
- ❑ Touch position - system can operate during GPS downtime by touching known points around the site
- ❑ Satellite Viewer (MNS1200 only) - displays current position of all visible satellites above the horizon.
- ❑ 2D DXF overlay - allows line drawing to be superimposed over plan view
- ❑ Extruded profiles - prismatic profiles can be entered and worked to with no design data
- ❑ System diagnostics - built in sensor fault finding
- ❑ Material simulation - allows maximum gradient and other properties to be set for dredging applications
- ❑ Auto target lock - indicates required position reached for drilling and piling operations
- ❑ Full dredge history - option to record bucket position time, date and GPS quality
- ❑ Colour coded depth - precisely illustrates the location of any under or over excavation
- ❑ Progress viewer - colour coded heights, 3D shading and .bmp export option
- ❑ Adjustable dead band - displays bucket colour change indicating height from design
- ❑ Graphical objects - any 3D objects can be displayed as a visual aid
- ❑ Auto views - automatically switches between full screen views depending on tool height
- ❑ Material moved - estimate of material moved in bucket
- ❑ Rainbow bucket option - displays bucket colour change indicating height from design



Pcx piling positioning system



TECHNOLOGY

pcX-3D consists of three core technology elements - the first of these, angle sensors, are drawn from Prolec's proprietary range used across the company's product portfolio. These include accelerometer-based devices, pendulum encoder magnetically damped sensors and direct drive variants. Software is the second key component, and Prolec engineers have produced a powerful engine which offers maximum application specific versatility, whilst seamlessly integrating all of the other system components. pcX-3D's versatility is such that the third core element, the positioning system, is configured to be cost effective for the intended application, and includes a number of GPS variants and electronic compasses. In its

pcX-3D is available in a number of application dependent configurations, and the table below gives a list of our recommended arrangements. pcX-3D has been designed to be tailored to individual customer requirements. To discuss these please contact the Prolec Sales Office or your local representative.

Application	Sensor Configuration	Positioning System	Expected Accuracy	Options
Dredging	2 x AS8 (Marine Variant) + 1 x AS7 Pitch and Roll	2 x Dual Frequency DGPS	5cm XYZ	Flow Meter or AS7 SS Bucket Sensor, Slew Control, Tide Gauge
Ground Engineering	4 x AS7	1 x Single Frequency DGPS	5cm XYZ	Tilting Bucket, Compass
Ground Engineering AHS	4 x AS7	2 x Dual Frequency DGPS	5cm XYZ	Tilting Bucket
Ground Improvement	2 x AS7	1 x Single Frequency DGPS 1 x Compass	20cm XY	
Vertical Drilling & Piling	2 x AS8 (LB Variant)	1 x MNS 1230 1 x Compass	<5cm	
Specialist Drilling & Piling	2 x AS8 (LB Variant)	2 x MNS 1230	<5cm	AS7 Pitch & Roll

optimum configuration pcX-3D has an unsurpassed accuracy, with the GPS providing 5mm accuracy and angle sensors offering a precision of 0.09°.

APPLICATIONS

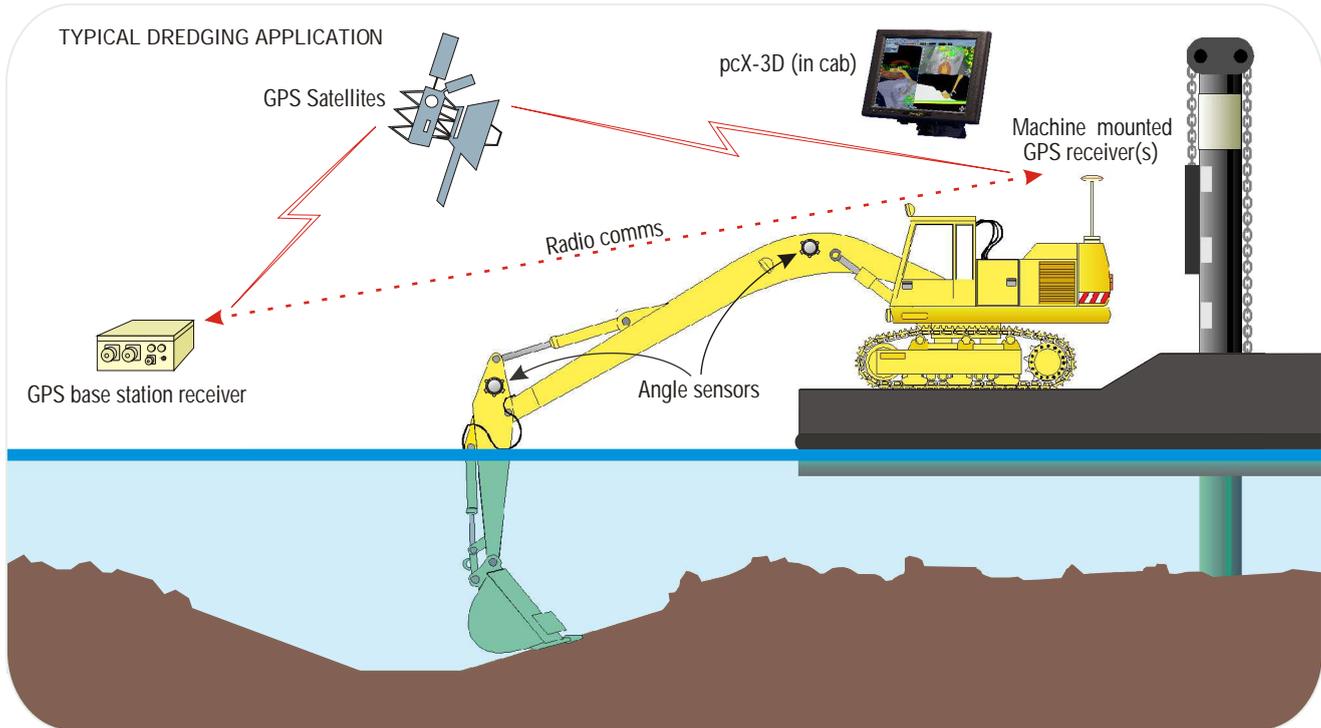
pcX-3D has been deployed around the globe in a wide variety of applications - all with a high degree of success and customer satisfaction. Projects that have benefited from pcX-3D include a canal restoration in Germany, coastal dredging operations in Africa, dredging, drilling and piling operations in an increasing number of countries, sub sea piling in Scandinavia, and even an under water excavator that operates 2000m under the North Sea for oil platform and pipeline maintenance.

SYSTEM RELIABILITY

With pcX-3D comes the reassurance of Prolec's many years of experience in providing both safety critical machine monitoring systems and 2D/3D machine control systems, ensuring reliability comes as standard - not as an option.

PRODUCT SUPPORT

The quality of after sales support is as important as the product itself. Prolec provides customer support through a network of mobile service engineers in the UK and appointed international distributors overseas. In addition to this Prolec has a dedicated in-house customer support team.



TECHNICAL SPECIFICATION

DISPLAY	Ruggedised, SVGA (800 x 600) back lit 32 bit colour LCD
COMPUTER I/O	Ruggedised and shock-mounted custom PC 1 x CAN 2.0B PC Interface 2 x RS232 (GPS) 1 x USB (mouse, number pad, flash card reader)
POWER SUPPLY	+20V to +30 DC @ 5.0 amp max Reverse polarity protection Solid state re-settable fuses
TEMPERATURE	Operating -20° to +50°C Storage -40° to +80°C Display 0° to +50°C
EMC	CE Approved Display and PC IP65 Sensors IP67-68

SENSORS	AS7 Angle Sensors	0.2° accuracy (all variants) 360° electrical operating range 360° mechanical operating range Electrically damped Solid state technology 20000g sensor shock resistance
	AS8 Angle sensors	0.09° accuracy (all variants) 360° electrical operating range 360° mechanical operating range Magnetically damped pendulum operation High accuracy encoder technology
	AS9 Angle Sensors	0.09° accuracy (direct drive) 360° electrical operating range 360° mechanical operating range Fast response magnetically coupled direct drive control High accuracy encoder technology

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