pioneering technology development

SCM

XY ENCODER

2D String Encoder

- **The scanner offers fast set-up and easy calibration.**
- **Accuracy of up to 0.05mm with no manipulator required.**
- **For use with almost any data acquisition set that has encoder input.**
- **On screen display or output to laptop display**
- **Up to 1m x 1m scan area.**

Large, flat surfaces can be found in several industries ranging from tanks, pressure vessels to ship hulls. These surfaces are often used such that their integrity is vital for safety and continuous production. Legislation has thus been implemented that calls for regular inspections of critical surfaces. The inspections would look for defects or thinning of the surface. Testing of these large scale surfaces with non-destructive techniques poses unique difficulties with regards to the logistics of the operation. The two main concerns are usually that access to the surface can only achieved by rope access or scaffolding and that reliable and economically viable recording of the scan data is almost impossible under such conditions. Recording of data is important for offsite analysis or archiving of results. Until now this has led the company requiring the inspection to choose between using expensive, reliable data collection methods or affordable yet dubious methods. Neither of these was an acceptable alternative. There is a need for a versatile, robust system that would facilitate scanning under these conditions.

The ideal system should allow the user to scan large and small areas with the same scanner since the types of surfaces to be scanned can vary significantly.

The methods currently available include custom made 2D encoders based on intricate bearing and slide assemblies and other frame based apparatuses. To be fair, these usually meet the requirement that a high degree of accuracy in 2D scans is needed, but to have the unfortunate task of spending a shift scanning a large vessel while working in a rope harness while moving around a bulky frame based system is not a task that could be wished on anyone. The need wasn't fulfilled yet.

The system must be easy to assemble yet once assembled it should not disassemble under normal operating conditions. It must be rugged and very compact yet lightweight enough since it would often be used in hard to reach areas. The scanner should require only a single technician for set-up, calibration and operation. It should further allow for repeatable scan results.

Using all the constraints mentioned above and applying a pragmatic, user centred approach, SCM designed an all round solution with their SCM XY Scanner.

The scanner is light weight, flexible with regards to scan size and area, extremely easy to assemble and simple enough to use by anybody, anywhere.
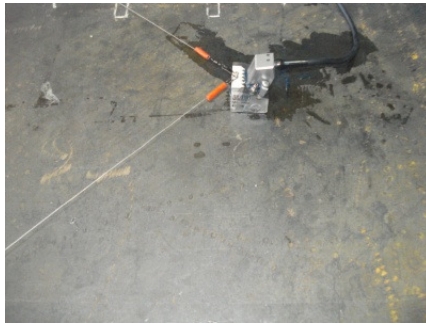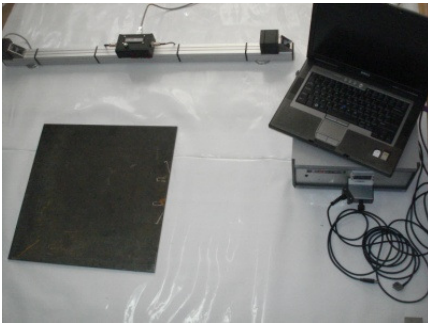
The SCM XY Scanner is placed on any flat, magnetic surface and mounts with magnetic feet. It can be used in several combinations depending on the application. In this case, it was used on a phased array probe (figure1). It could also have been used on a crawler or any probe holder that requires accurate recording of the position during a scan. Mounting a probe to the encoder is done by a simple connection to the probe/crawler at a point which is constant for the entire scan (figure 2). It uses a complex trigonometric level of accuracy the location of the probe/crawler which is then output to the software as well as the LCD screen as x and y coordinates. The user could then simply look at the LCD display for the coordinates meaning that the test set can be placed at a more convenient location. The system allows a completely intuitive scan movement. The user can scan as if there were no encoder present and have peace of mind from knowing that the SCM XY Scanner is capturing all the data reliably.
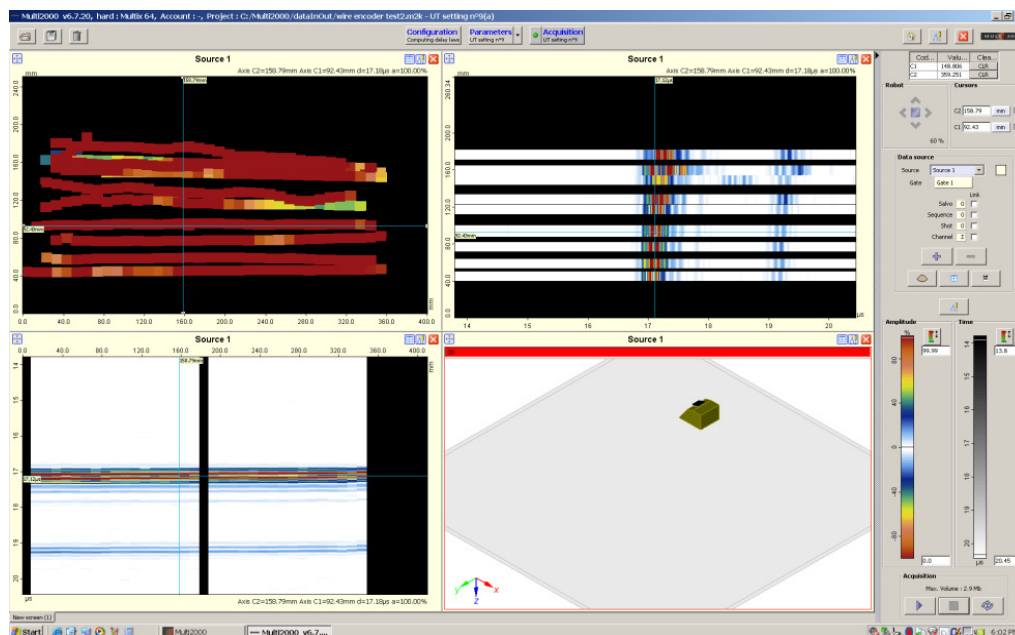
These are the typical results that are to be obtained when the SCM XY Scanner is connected to the M2M Phased Array software package. A 3D plot of the defects can be seen since the phased array software can typically estimate depth and size of flaws with fair accuracy. This system is currently in use by several NDT companies and the feedback has thus far proved that the system is exactly what was required.