Figure 3: Surface images collected at traffic-speed

HARRIS2. This HARRIS2 employs the latest developments in high-speed data collection, providing high-resolution colour images of the pavement, linked to a scanning laser for the measurement of shape – see Figure 2. The example images shown in Figure 3 clearly show the defects such as joint failure, spalling, and surface loss, which are easily recorded in the manual assessment.

One of the limitations of high-speed image collection systems has been the inability of images to show depth. Although an assessment of the images can provide a report of the presence of defects such as spalling or potholes, the assessor is unable to quantify the depth, and hence the overall severity, of the defect. High-resolution laser measurements provide a three-dimensional picture of the pavement alongside the images, which can be used to assess depth and height. Tools can also be provided to assist the assessor by automatically highlighting severe features, as shown in Figure 4.

Clearly this technique can only be applied practically if the data can be accurately located in relation to the airfield. Developments in inertially aided Global Positioning Systems have simplified the achievement of highly accurate location referencing. The data collection has therefore become the simple process of driving over the areas to be assessed, ensuring that the survey is planned such that the vehicle covers the entire area (for example using several passes each covering a 4m width).

The potential of this approach has recently been demonstrated on the concrete taxi-ways of a major UK airport. Image, shape and location data was collected at high-speed (around 40km/h) and manually analysed following the survey. The defects identified in a 60m x 40m area are shown graphically, as a defect map, in Figure 5. The number and variety of defects identified can be structured to suit individual client needs. Because each defect is related to its Ordnance Survey Grid Co-ordinate it is a simple matter to transfer the defects to a GIS for further processing and, for example, calculation of a PCI.

Work on the highway network has shown that this approach to the assessment of high-speed survey data can provide a measurement of condition that compares directly with manual on-site surveys. However, the surveys are more consistent and less hazardous than the manual surveys, and they provide the additional benefit of delivering a permanent visual record that can be used later for auditing, assessing changes in condition, or determining treatments. With the increasing demand for airfield and runway space, combined with the need to achieve high levels of safety, there is significant potential for the application of this approach in the assessment of airfield pavements.

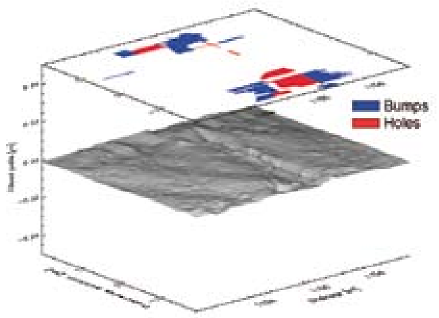

Figure 4: Surface shape measured at traffic-speed

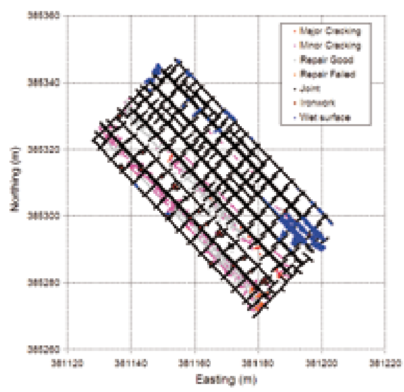

Figure 5: Map of defects identified in high-speed survey data

Cargo Stands Replacement Project at London Luton Airport

In partnership with Lagan Construction, WSP have recently completed a design and build airfield pavement project for London Luton Airport Operations Ltd. The project consisted of a total of 14,000m^2 of new Pavement Quality Concrete to accommodate concurrent operations of two A300-600 freighter aircraft and their associated ground service equipment.

The construction of the works, required to facilitate the move of part of the business aviation facility, had to be phased in order to maintain the continued operation of the adjacent cargo operation and was completed within the programmed 12 week construction period.

The replacement pavement areas, consisting of 335mm thick Pavement Quality Concrete on 150mm of wet lean concrete, was constructed by Lagan sub-contractor Gill Civil Engineering utilising an on-site batching plant with quality control assured by Lagan's on-site materials testing laboratory.