

## Real Time Positioning System for Bridge Components

The Confederation Bridge is an 8 mile long, continuous, precast concrete multispan structure crossing the Northumberland Strait between the provinces of Prince Edward Island and New Brunswick in eastern Canada. The main bridge is comprised of forty-three 820-foot long spans. The main girder component of each span is 640 feet long. For structural reasons, the superstructure was integrally connected to the piers, and to facilitate these connections, Strait Crossing, Inc. (SCI) developed a horizontal matchcast joint to be placed between the underside of each main girder and the top of its supporting pier shaft. A Heavy Lift Vessel (HLV) was utilized to place the main girder components on top of the piers within very high accuracy requirements.

To meet these requirements, SCI developed a system that utilized existing and modified Global Positioning System (GPS) hardware and firmware along with a specially developed, site-specific navigation graphical software. Two GPS receiver antennas were placed on the extreme ends of the main girder component, and were connected to receivers located at the navigation operator station. The coordinate position and elevation obtained from the system was processed in the navigation software. Component specific information about the geometry of the segment was used in the software to overlay the actual target points on the pier shaft with the display of the main girder's matching control points as computed from Real Time Kinematic GPS. The elevation of the component mating surface was determined from the vertical offset to the GPS antenna obtained from the main girder yard geometry survey, and the actual elevation difference to the target elevation was shown and updated every second on the same graphical display along with the horizontal positioning information.

Contact:	Mirek Bursa, P.E.
Organization:	Strait Crossing, Inc.
Address:	#700, 1177 11 Avenue S.W.
City:	Calgary
State/Province:	Alberta
Postal Code:	T2R 1K9
Country:	Canada
Phone No:	403-244-9090
FAX:	403-228-8643
URL:	
Email:	mirekb@grouppsci.com