

Accelerating Co-Innovation for Transformation & Export (Xcite) 2021: Problem Statements

Theme	Problem Statements
Productivity	<p>1. Traffic Control Plans Management Platform <i>(supported under National Innovation Challenge)</i></p> <p>Leveraging innovative technologies, the aim is to develop an engineering project management software to identify, recognise & track changes and comments between different revisions of traffic control plans with smart search tool plug-in, for ease of review process and achieve productivity gains.</p> <p>For review of traffic control plans (TCPs) and drawings, LTA's traffic engineers go through a tedious and repetitive process as they need to cross reference separate documents concurrently to ensure that plans are ready for approval/endorsement. Additional time is spent to correct design errors when traffic engineers fail to abide by the standards and requirements in the road design manuals.</p> <p>Companies are invited to propose a solution that can help manage various steps of the process on one common platform. These steps include:</p> <ol style="list-style-type: none"> i. cross-referencing between traffic drawings, ii. identifying variations between different revisions and tracking comments and changes across all TCP revisions. <p>The search tool plugin should enable stakeholders to quickly and efficiently retrieve relevant road standards across the road design manuals to reduce corrections required.</p> <p>2. Street Signs Auto-Generation and Review System</p> <p><i>[To improve productivity by automating and streamlining the process of design generation, checking and approval of road signages.]</i></p> <p>The current process is manual and time-consuming, as it requires iterative review and amendments of submitted traffic sign design, between LTA and consultants/ contractors, to ensure compliance to required standards.</p> <p>A solution is sought to automate the design review process, through leveraging new technologies that ensure artworks generated in accordance to LTA's standards. This solution should result in reduced human error, as well as a faster turnaround time in the application process of road sign designs.</p>
Lean Maintenance	<p>3. Detection of Water Movement on Roads</p>

	<p><i>[To enhance the current inspection regime. New technologies will be leveraged to develop a system for detecting and diverting away the water seepage on roads to reduce formation of defects.]</i></p> <p>Currently, high hydrostatic pressure from surrounding water features result in frequent water seepage onto road pavements, especially into tunnel structures. This reduces the bonding strength of the premix material, and may lead to the formation of potholes and road stains on road/tunnel pavements.</p> <p>A solution is sought to alleviate the formation of potholes and road stains (seawater efflorescence) on the road pavements.</p>
<p>Safe Assets</p>	<p>4. Cleaning of Facades at Train Stations and Depots</p> <p><i>[To make available a safe, easy-to-use, low-cost automated cleaning solution for the efficient maintenance of train stations and depots.]</i></p> <p>There are challenges in 2 areas. First, the difficulty of cleaning and washing external façades at stations/depots, due to a lack of access as a result of obstructions around the building (e.g. covered linkways and trees). Second, the difficulty of cleaning claddings and skylights inside stations that are 20m high. This is especially so for those beside staircase voids or above escalators. Current methods of using boom lift, cherry picker or rope specialists are manual, ineffective and cannot cover all areas thoroughly.</p> <p>A solution is sought to improve cleaning efficiency and reduce building deterioration, as well as to ensure safe use of assets by public rail operators' maintenance teams.</p>
	<p>5. Cleaning of Gantry Signs</p> <p><i>[To develop a safe, cost-effective cleaning solution for gantry signs, reducing disruption to traffic.]</i></p> <p>Current method of cleaning gantry signs involves workers accessing the gantry signs and manually washing them. Washing needs to be conducted late at night or early in the morning, in order to minimise any traffic disruption to motorists caused by lane / full road closure for gantry signs located on expressways, slip roads and other arterial roads.</p> <p>An efficient (automated or semi-automated) solution leveraging new technology is sought to enhance operational capabilities in gantry signs cleaning.</p>
	<p>6. Cleaning of Road Tunnels</p> <p><i>[To enhance current road tunnel cleaning process through technology innovation such as automation to protect the assets.]</i></p>

Specialised tunnel washing vehicles (TWV) are used as the default means to help maintain the cleanliness of the tunnels. A group of cleaners will follow behind the TWV with high pressure jet cleaners to manually cover areas that cannot be accessed by the machines. Due to the harshness of this washing method, occasional damage to tunnel equipment (e.g. cameras and signage) may occur. The maintenance regime may also be disrupted by breakdowns of TWV and manpower shortages.

An efficient solution is sought to improve the tunnel cleaning process through automation, thereby reducing disruption due to machinery faults and reliance on cleaning manpower, as well as preventing property damage.