



London Trams Modifications Panel

Submissions Template

Proposal Information		Descriptions					
Submission Ref:							
Document Title		Introduction of a fleet wide vigilance system					
Date of Submission:		08/08/17					
Submitted by:		Name: Arnaud Forget			Job Title: Fleet Engineer		
Reviewed by Sponsor: (name and signature required from appropriate senior manager)		Name: Allan Kill			Date: 08/08/17		
		Job Title: Sandilands Program Manager					
Areas impacted by the change: [Please tick all discipline areas or risk topics to ensure appropriate review has been carried out. Each item ticked will require referencing overleaf]		TOL Operations <input checked="" type="checkbox"/> 3 rd Party works <input type="checkbox"/> Track / Infrastructure <input type="checkbox"/> Street Works <input type="checkbox"/> Electrical Systems/OLE/signalling/DTO <input type="checkbox"/> CDM applicable works <input type="checkbox"/> Tram Technical Specification <input checked="" type="checkbox"/> Depot Access <input type="checkbox"/> Operational Procedures (including training / briefing) <input checked="" type="checkbox"/> LT Risk Model (checked - internal only) <input type="checkbox"/> Does this require an entry on Asset Management Information System (AMIS) <input type="checkbox"/> Pedestrian crossings (including site lines) <input type="checkbox"/>					<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Change Category		A		B		C	X
Approval by MODs Chair		Name:			Signature:		
		Date:					



Detail of Submission for Review

<p>Background/ Introduction</p>	<p>Subsequent to an incident that occurred in November 2016 during which a tram derailed in the Sandilands area, a number of work streams have been initiated to further increase safety performance of the London Trams (LT) Fleet. The primary focus of these initiatives is to develop and implement fully integrated safety systems that support driver vigilance and reduce the likelihood of a safety related event should a Tram Operator (TO) become fatigued or distracted</p>
<p>Details of the proposal – Including scope and purpose.</p>	<p>The proposed solution from Seeing Machines, the Guardian system, is a real-time fatigue and distraction detection solution that uses advanced sensors and image processing technology to track the micro-movements of a driver’s eyes, facial expressions and head to identify a fatigue or distraction event. When an event is detected, the driver receives immediate in-cab seat vibration alerts that help prevent an incident.</p> <p>Equipment required for installation will include two dashboard mounted infrared sensors, driver facing and forward facing cameras, and an under seat mounted vibration mechanism. Details of the final equipment locations as well as power supply and routing of cables will be determined as part of the trial installation in consultation with all project stakeholders.</p>
<p>Impact of the change.</p>	<p>The Guardian system doesn’t interact with the vehicle safety system and only triggers when an event occurs. There will be equipment on the dashboard and in the cab which will require maintenance. The facial expression sensor will be visible on top of the dash board.</p>
<p>Does this change require Operational briefing or training? <i>(details to be provided).</i></p>	<p>Yes</p>
<p>Mitigation of risk in connection with introducing the change.</p>	<ul style="list-style-type: none"> • The system is defective or disabled: the data processing centre is made aware by the system and contacts Control. • The dashboard mounted equipment mounting fail; the sensors are low weight and will rest on top of the dashboard or on the floor without causing any damage. • EMC and fire risk: the system is provided with



	regulations compliance certificates.
Benefits of change	The risk to tram operation is reduced compared to its current state (without the Guardian system) as driver fatigue and vigilance will be actively monitored going forward.
Change to IMS? If yes state what and how change will be made.	
Duration of project – start and finish dates.	<p>LT agree equipment installation locations with Seeing Machine. w/e 6th August</p> <p>Seeing Machine supervise “1st in Class” guardian system installation and commissioning. Remaining installation and commissioning will be by LT staff. w/e 6th August</p> <p>Seeing Machine deliver remaining Guardian system units. w/e 13th August.</p> <p>Installation and commissioning of Guardian system commences fleet wide across both Bombardier CR4000 and Stadler Variobahn trams; Guardian system remains powered down until completion of limited revenue trial. 14th – 31st August.</p> <p>Limited revenue service trial instigated (6 trams) for a nominal period of 2 weeks. This trial period may be subject to revision dependent on Guardian system performance and stakeholder approvals. 14th – 31st August.</p> <p>On stakeholder agreement of successful limited revenue trial, Guardian System is powered up fleet wide and enters general revenue service. 31st August.</p>
Date implemented (change complete – signature of change proposer confirms that change is fully implemented and no further action is required)	Signature.....Date.....