Collisions involving light rail vehicles unfortunately result in high impact: severe damage and injuries and high cost. Bombardier, together with research partner AIT Austrian Institute of Technology, has developed the Driver Assistance System for the specific requirements of light rail vehicles to further reduce the risk of collision.

An innovative safety system to avoid collisions
The driver assistance system helps the driver to evaluate and react appropriately to critical situations. The specially developed optical 3D sensor system helps to make the vehicles more proactive, intelligent and thereby even safer for pedestrians, motorists and other road users.

The driver assistance system offers many benefits to the stakeholders of light rail vehicles
• Driver support in critical situations
• Increased active safety for passengers, drivers, pedestrians, cyclists
• Reduced collision follow-up costs for operator
Joint Development with AIT Austrian Institute of Technology
Bombardier started the driver assistance system development project with AIT in 2013. The technology used is based on the AIT development “3D Stereo Vision” that is implemented in different applications such as research projects for autonomous driving or dental scanning.

System Concept
Two stereo cameras focused on the area in front of the vehicle and highly advanced software algorithms evaluate the vehicle envelope in real time along the track for obstacles and the related collision risk.

As soon as an obstacle bearing a considerable collision risk is detected, the driver will be alerted using optical and acoustical measures to activate the brakes or other vehicle safety systems.

Collecting experience
Following the development stage in which particular focus was placed on the specific LRV characteristics, a BOMBARDIER FLEXITY tram with a DAS prototype onboard was tested in regular passenger service on the network of the Frankfurt Transport Company (VGF). After the successful evaluation of the system’s performance, VGF has decided to equip 74 bi-directional vehicles with the innovative BOMBARDIER Driver Assistance System.

Application on existing fleets and on new vehicles
Thanks to its precise algorithms and its robustness the system can be installed both on new as well as existing vehicles. As a result, the system can be used to significantly increase the active safety of complete vehicle fleets.

Technical Data
<table>
<thead>
<tr>
<th>Field of observation</th>
<th>1.5 – 60 m in front of the vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal Field of view</td>
<td>80°</td>
</tr>
<tr>
<td>Lateral field of view</td>
<td>50°</td>
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<tr>
<td>Response Time</td>
<td>0.3 s</td>
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<tr>
<td>Frame rate</td>
<td>10 Hz</td>
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<tr>
<td>Object size</td>
<td>≥ 0.4 m</td>
</tr>
</tbody>
</table>

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