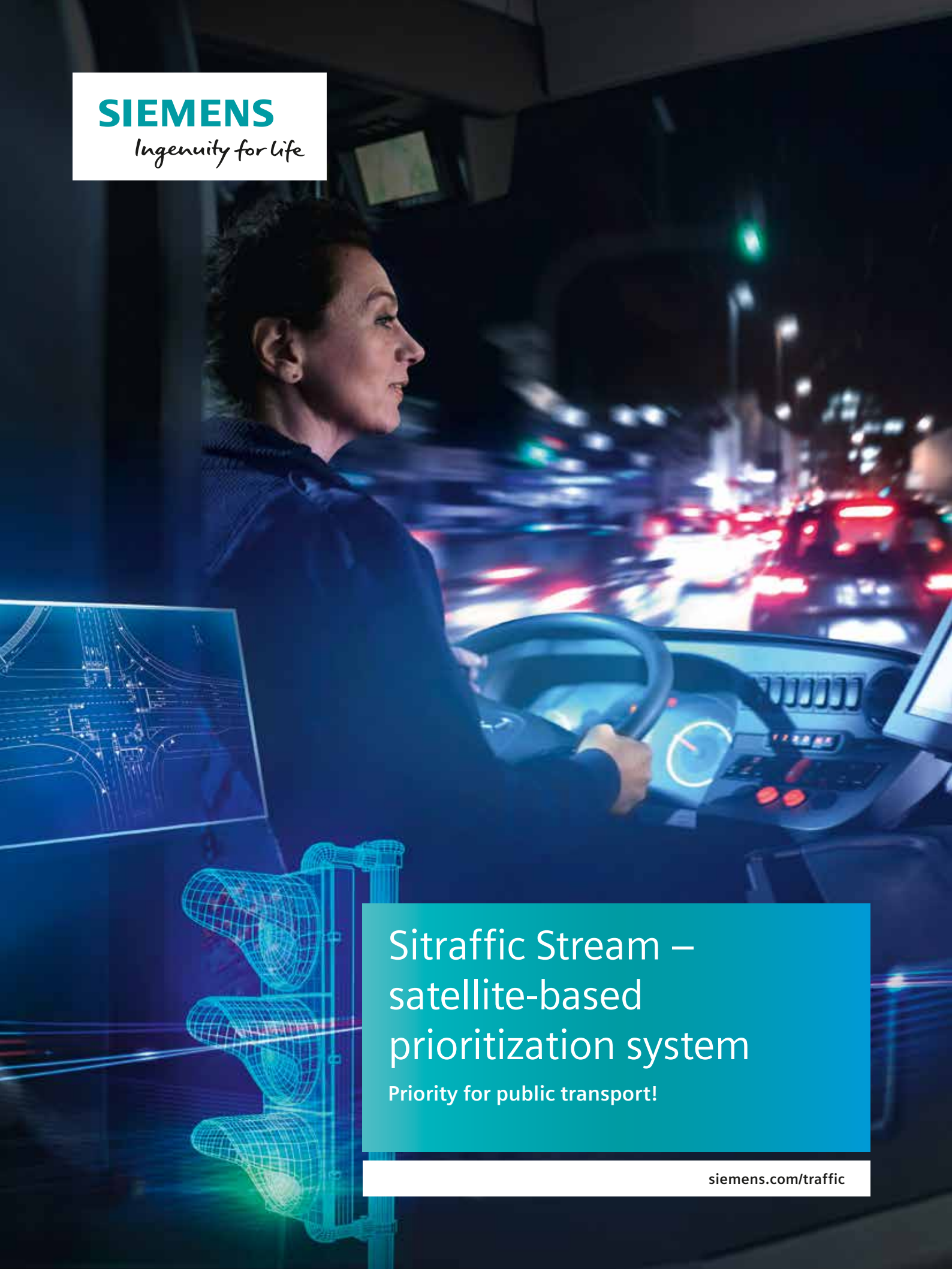


Sitraffic Stream – satellite-based prioritization system

Priority for public transport!

siemens.com/traffic

Fast and on-time public transport – quick and easy to implement!

Fast and convenient travel across the city, on buses that arrive on the dot at the bus stop, with exact arrival times indicated on easy-to-read dynamic displays – that's what users expect from their public transport providers. With the new, satellite-based Sitraffic® Stream prioritization system, these wishes can now be answered easily and cost-effectively – with minimal impact to the flow of individual traffic. 'Stream' stands for "**S**imple **t**racking **re**al-time **a**pplication for **m**anaging traffic lights and passenger information" and ensures that at every intersection the light automatically switches to green for an approaching bus and that the exact arrival times can be displayed anywhere along the route.

Easy and cost-effective thanks to satellite navigation

Sitraffic Stream benefits from the advantages of satellite navigation technology, which works without extensive and costly roadside installations. Every bus carries a so-called on-board unit (OBU) with GNSS (GPS, Galileo, GLONASS) and mobile network 4G receivers. The OBU uses GNSS to determine the vehicle's exact position, and mobile network 4G to transmit the positioning data of the bus as well as the passing one of the pre-defined registration points to the traffic control center. The control center successively switches all traffic lights on the route to green for the approaching bus. The positioning data are very precise; the average localization accuracy is 5 m.

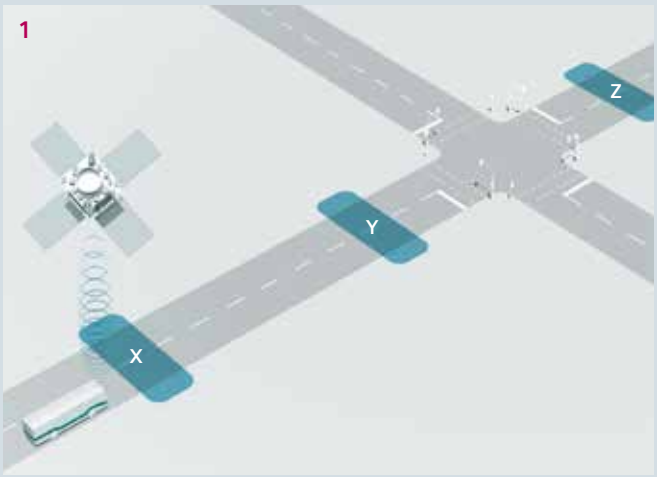
Reliable bus prioritization, immediate return to regular switching routines

Sitraffic Stream allows online localization of every single bus. When a bus passes the registration point before the intersection, the control center arranges for the traffic light to be switched to green just in time. As soon as the bus has crossed the intersection, it signs off at the corresponding sign-off point and the control center activates the command to return to normal traffic light switching routines. By the way, the registration points are a purely software-based function and require no roadside infrastructure.

No special equipment for intersection controllers needed

The traffic controllers at the intersection can remain just as they are. No additional hardware components are required to use Sitraffic Stream because the vehicles communicate directly with the control center. From there, the system passes the relevant information on to the intersection controllers via existing communication links.

The basic principle is simple. As is the implementation!



The implementation of Sitraffic Stream is fast and cost-effective because it requires no changes or extensions to the technical roadside infrastructure. And the bus prioritization process is as straightforward as it gets, as the pictures below illustrate.

Figure 1:
For each intersection, two registration points (pre-registration and main registration point at a distance of X and Y meters before the intersection) as well as a sign-off point Z are defined on the software level. Since Sitraffic Stream is based on satellite navigation, it can be implemented without any investment in roadside equipment.

Figure 2:
The on-board unit installed in the vehicle uses GNSS satellite navigation (GPS, Galileo, GLONASS) to identify the first registration point and sends the message "Pre-registration point X passed" per mobile network 4G to the traffic control center.

Figure 3:
The control center sends a "Bus approaching" message to the controller at the intersection, including the command to switch the traffic light to green after a certain time interval or, as the case may be, to extend the current green phase to let the bus cross without stopping.

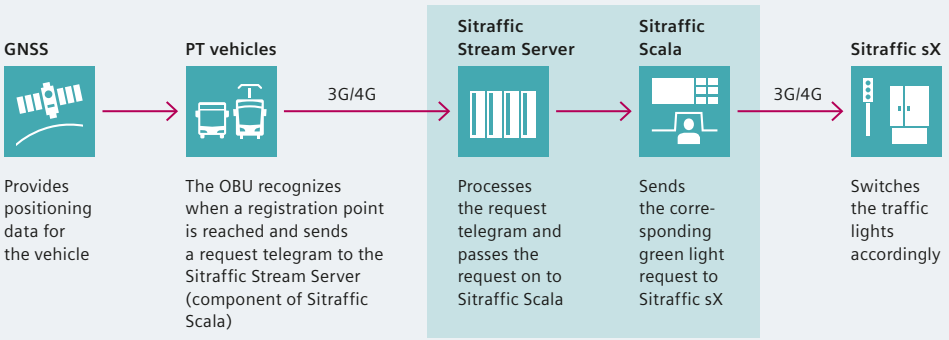
Figure 4:
By the time that the vehicle drives by the second registration point close to the intersection, the light has already switched to green or received the command to stay green for the time that the bus needs to reach the intersection.

Figure 5:
So the bus can cross the intersection without slowing down or stopping, which saves valuable seconds.

Figure 6:
A few meters behind the intersection the bus passes the sign-off point. The OBU in the bus recognizes this point per satellite navigation and sends the "Sign-off point Z passed" telegram per mobile network 4G to the traffic control center. Then the center orders the intersection controller to return to the regular traffic light switching routine.

Figure 7:
Hence the system returns to normal operation immediately after the bus has left the intersection, and traffic on the other streets can be given the green light. Any interventions by Sitraffic Stream are limited to only a few seconds so that the impact on other road users remains minimal.

The working principle of Sitraffic Stream



Sitraffic Stream as cost-effective cloud solution

Also those municipalities that do not have a traffic computer of their own can benefit from Sitraffic Stream. The prioritization system can be operated as a component of the centrally hosted Sitraffic Scala ASP.

Sitraffic Stream is a cost-effective solution for small and medium-sized towns planning to implement a system for bus prioritization and/or for ensuring the safe and fast passage of fire engines and rescue vehicles. Since the system permits the exact positioning and tracking of individual vehicles, and the required reference points in the road network are defined on software level, the user can realize valuable additional functions.

Besides bus acceleration including easy dynamic passenger information, the system offers options for recording and analyzing journey profiles. What's more, Sitraffic Stream can be extended to additional bus lines and routes at any time – simply per software function.

Sitraffic Stream – field-proven for years and in many places

In many German and European cities, Sitraffic Stream has already proven its value in daily operation.

Böblingen: Priority for buses and fire engines since 2014

In Böblingen, a mid-sized town south of Stuttgart, the first pilot deployment of Sitraffic Stream successfully started operation back in 2014 – and has been gradually extended ever since. Today more than 80 buses and most fire engines are equipped with Sitraffic Stream, providing them with automatic green light at 50 intersections across the urban area.

Wedel and Husum: Sitraffic Stream in the cloud

Also for small towns without a traffic computer of their own Sitraffic Stream is a practical solution: Wedel uses the system to give priority to fire brigade vehicles, and Husum to prioritize buses at intersections. System control is assured by the Sitraffic Stream Server in the cloud operated by Siemens Mobility. The towns simply pay a monthly fee – and have had only very low investment costs.

Freiburg: Operated in conjunction with the Convexis rescue operations control system

In Freiburg, all fire engines can now be given priority at all major intersections across the city. Special feature: Sitraffic Stream uses the OBU signals of the existing rescue vehicle guidance system Rescue-Track designed by Convexis. This allows the customer to benefit from all the advantages of Sitraffic Stream without modification to the vehicles' equipment.

Successful implementation also in other countries

The city of Reykjavik – another early Sitraffic Stream customer – now operates almost 100 buses and fire engines that enjoy prioritization at 50 inner-city intersections. Belgrade has recently signed a contract for the provision of 160 OBU (on-board units) that will give priority to the city's trams at intersections.

Three time prize-worthy – also in the experts' eyes

Best Practice Award for Telematics Applications
For their joint Sitraffic Stream pilot project, Siemens Mobility and the town of Böblingen won the Best Practice Award for Municipal Telematics Applications in the "up to 50,000 inhabitants" category. The prize was created by the European TelematicsPRO association in 2012.

Winner of the "Landmarks in the Land of Ideas" competition
Lighthouse projects that generate groundbreaking impulses for the future of cities, towns and municipalities can enter this competition. The Sitraffic Stream pilot project in Böblingen won the prize in 2013/14 in the "Ideas for the city" topic area.

Winner of the 2015 innovation award for "Mass Transit" applications
With this prize, the Ministry of Transport and Infrastructure of the German State of Baden-Württemberg honors projects that provide pioneering solutions for mobility development.

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