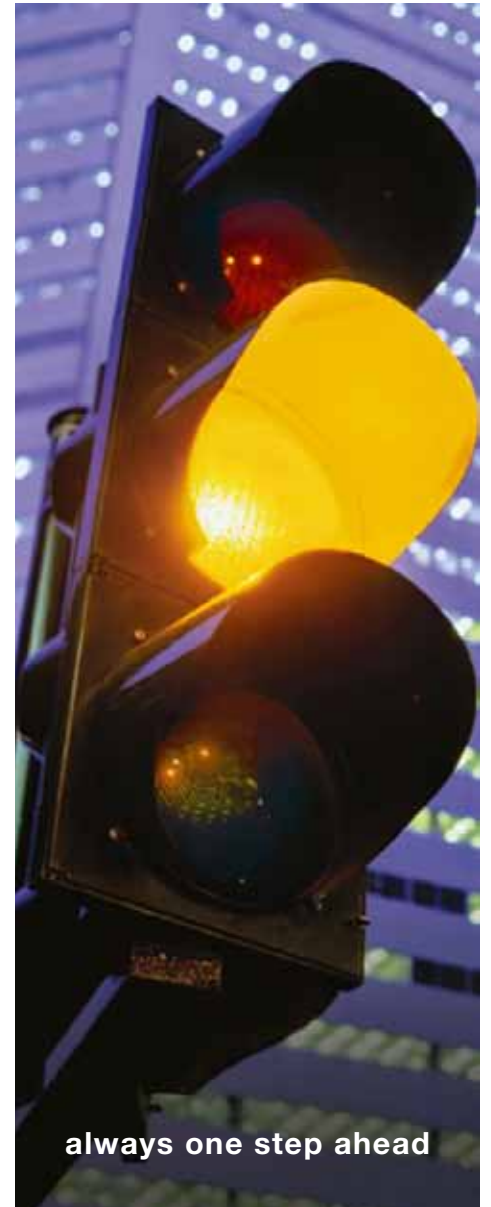
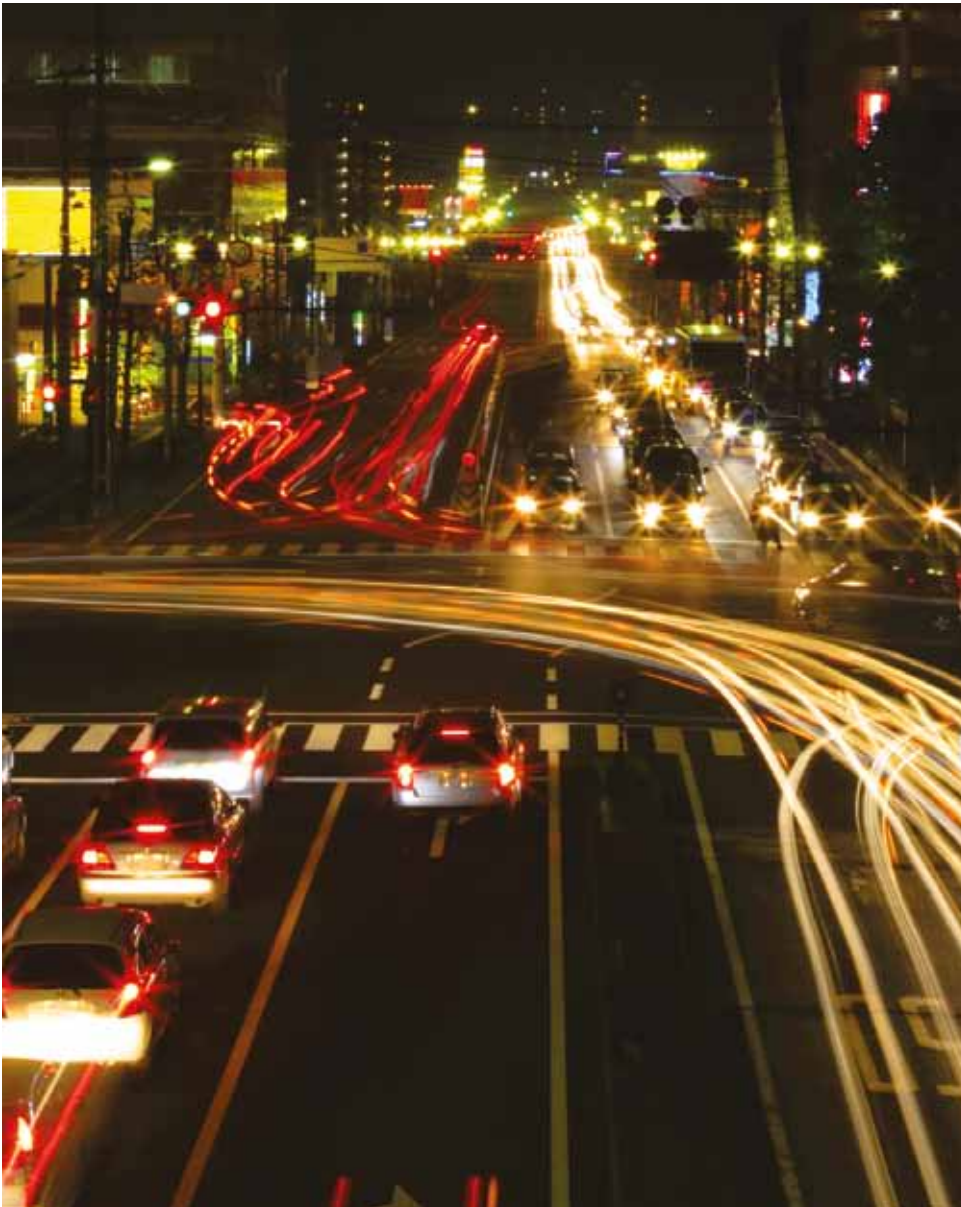


EN

Kapsch **Red Light Enforcement:** for traffic safety.



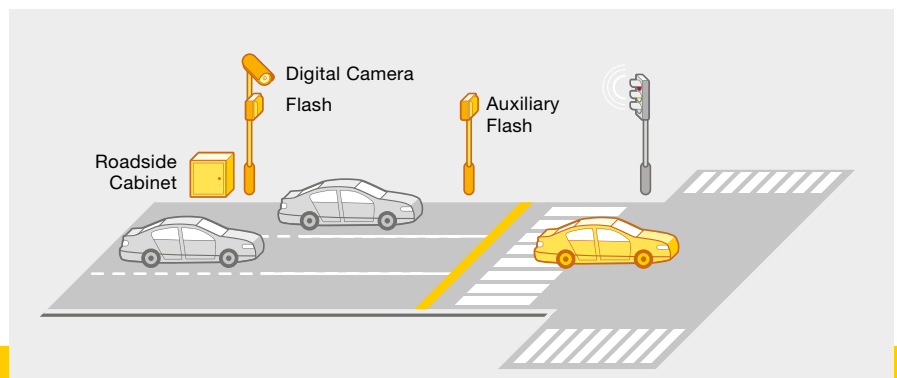
always one step ahead

Kapsch Red Light Enforcement: for traffic safety.

Managing intersections with traffic lights is a critical area of traffic control to reduce fatalities and related collateral damage. Red-light violations are a frequent cause for serious injury and fatalities among motorists as well as pedestrians, especially in urban areas.

Kapsch Red Light Enforcement is a digital system for automatically detecting traffic light infringements. The system is interfaced to the traffic light controller and uses sensors to detect the presence of a vehicle after the stop line in real-time. In the case of violation detection, up to five evidential images are taken, showing the vehicle, its license plate and the context of the infringement. The images may be colour and/or monochrome (infrared) for nighttime. The digital camera may be augmented by flashes in order to enhance night vision capabilities.

The typical configuration for one roadside setup covers up to two roads in different driving directions, each up to 3 lanes. One driving direction requires one single camera. The roadside controller interfaces to a central application via high-speed communication line (Ethernet / TCP-IP). Any violation is packed in a file and transmitted, containing the data of the violation and five jpg images. The transmission may be encrypted with PGP. The files may be accessed with any FTP client.



Detection Process.

Each detected incident (possible violation) consists of five jpg images. Background information is integrated into each image, in accordance with the local legal framework, containing the respective number of the image, the installation site, the date and time of the violation, the lane, the time spent since the shift of the red light and eventually the vehicle speed.

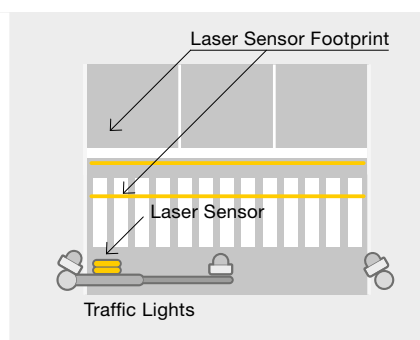
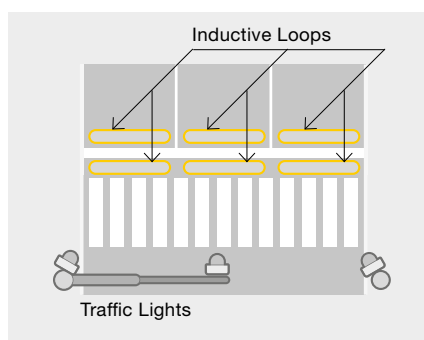
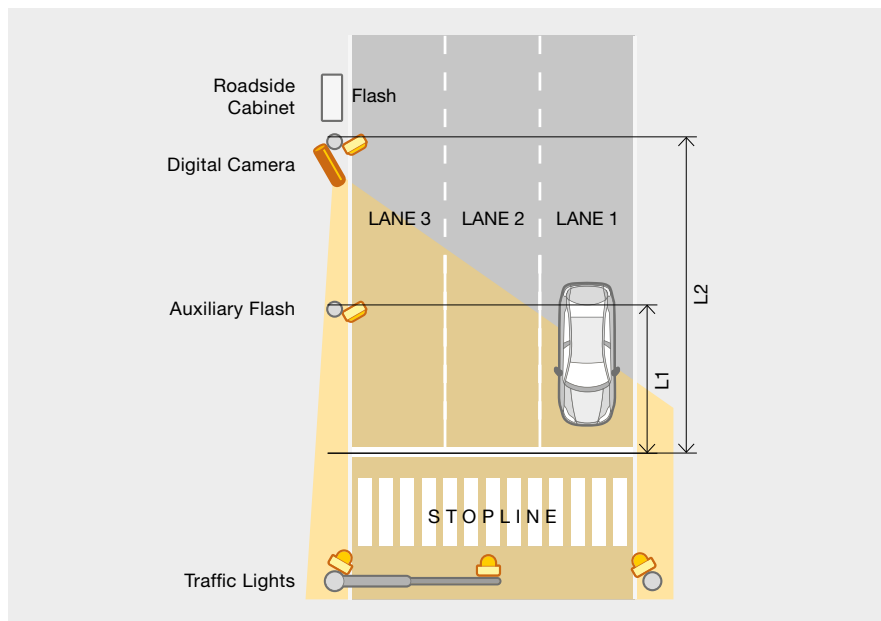
Image 1: The image is post-triggered; it shows the context of the situation at the moment the traffic signal turned red. It is used for all violations that may occur during this phase of the signal cycle. It shows the traffic and eventually position of the violating vehicle at this moment, in order to avoid disputes and to give to more information. Hence it is possible to verify if the violating vehicle was at this moment in the proximity of the stop line.



Image 2, image 3: These two images are taken at the moment when the vehicle passes the stop line with a red traffic signal. They are acquired sequentially with different acquisition parameters; Image 3 is slightly darker in order to avoid over-exposure and to achieve better readability of the license plate.



Image 4, image 5: Images 4 and 5 are taken with a dynamically calculated delay according to vehicle speed in order to document the violation in the middle of the intersection and trace the vehicle trajectory. Image 5 is slightly darker.



Roadside Setup

The system consists of a high-resolution image acquisition module that allows simultaneously monitoring of multiple lanes and that is connected to a roadside controller cabinet. The roadside setup for up to three lanes and one driving direction consists of one digital camera, up to two flashes, one roadside cabinet with the controller and detection sensors (inductive loops or laser sensors). In case of laser sensors, two of them are mounted on a pole near the stop sign. In the case of laser sensors, two sensors are mounted on the roadside above the lane near the stop line. The typical distance between traffic signal and camera (L1) is 10...15m. The auxiliary flash may be needed to enhance the image quality during night operation; its distance to the camera (L2) depends on local conditions.

In the case the camera is not able to show both the traffic light and the vehicle with a readable license plate on a single image, a wide angle high resolution variant is available.

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