

ITS

## Railway video surveillance solution

**DV-rec** on-board video surveillance solution provides security, protection against vandalism and driver's assistance in the daily operation.

Designed for the railway market, **DV-rec** covers the needs in all kind of fleets, from high-speed trains to local trains or trams.

**DV-rec's** on-board equipment is rugged designed and fully compliant with the main railway standards.

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## ARCHITECTURE

- Fully digital architecture. All the system is distributed on an Ethernet backbone. Power-over-Ethernet cameras are used, providing easier system installation and maintenance.
- Network redundancy could be optionally provided.
- The entry-level system is composed of 1 DVR and a few cameras. The number of cameras can be increased to meet the specific needs of any particular application, installing additional DVRs. The final architecture will be configured according to the required parameters (type of coding/compression, image resolution, frame rate...).
- Touch screens are installed in both cabins to provide the driver with live view and video playback. Additional terminals can be installed in the network (supervision terminals).
- Rear view mirror functionalities.
- DV-rec connects to some on-board elements, such as emergency handles and 'open-doors' signals, to perform automatic transitions between different working modes.



## FEATURES

### DIGITAL VIDEO RECORDING

- Multiple recording formats (H.264, MPEG-4,...)
- Audio recording, embedded in the video
- High variety of cameras supported
- Records at every resolution and frame rate supported by the camera
- Label overprinted on recorded videos with: train number, timestamp and camera number
- Automatic camera configuration (resolution, frame rate, date/time synchronization) by the DVR
- Multiple sources for system time synchronization (own GPS receiver, NTP on-board time server, proprietary protocol)
- GPS support, for video positioning
- Alarm events recording. Embedded in the video
- Camera covering/tampering detection
- Disk redundancy (RAID1) management

### ON-BOARD LIVE VIEW & VIDEO PLAYBACK

**DV-rec** implements live view and video playback functions for the driver, on the HMI unit located in both cabins.

- Internal and external cameras management. Other classifications are possible. Manual or automatic switching (using 'open-doors' or other signals)
- Loop switching in each group of cameras: manual or automatic (configurable timer)
- Screen arrangements: 2x2 mosaic and full screen mode (selectable)
- Very low latency for rear-view mirror functionalities
- System performance supervision from the driver's interface or from supervision terminals



### CONTROL CENTRE: DV-desk

**DV-desk** is an integrated application which allows downloading and playing the recorded videos, as well as performing system monitoring and configuration.

- Real time video streaming from the train over 2G/3G/4G. Dynamic streaming control, for good performance under low bandwidth conditions
- Local tracks management. Filtering and classifying with several criteria (by train number, time period, camera...)
- Wired Ethernet downloading or wireless Wifi downloading. Direct downloading detaching SSD disk, with optional cradle

- Several video playback arrangements: single video, NxN mosaic, Asimetric mosaic
- In all mosaic arrangements, videos are displayed synchronously with the recording timestamp. The time-base showed in playback is the real time-base recorded
- Playback functions: play, pause, forward, fast forward, backward, fast backward. Time search function. Variable playing speed: 0.5x, 1x, 2x
- Other image functions: zoom, save image, copy to clipboard, print
- Diagnosis and configuration view, for easily setting up the system using just one integrated application

## TECHNICAL CHARACTERISTICS

EN50155, EN50121-3-2 and EN61373 compliant.

Nominal supply voltages: 110Vdc, 72Vdc, 48Vdc, 24Vdc (voltage range according to EN50155).



### DVR unit:

- CPU-based platform. Linux O. S.
- 1GB RAM memory
- 1GB Flash memory for O. S. and applications
- Video storage in Solid State Disk (SSD)
- Removable SSD unit. Double key locking
- RAID 1 redundancy (optional)
- 20-channel GPS receiver
- 4G/HSPA/UMTS/GPRS modem
- WIFI connectivity. 802.11 b/g/n
- Ethernet 10/100 interface. Rugged M12 connector
- USB interface
- RS-232/RS-485 interfaces
- Metallic case. Reduced dimensions (9.5" wide)
- Mounting brackets

### HMI unit:

- Multiple sizes available (15", 10.4", 7" ...). Another formats are possible by customer request
- Resistive or capacitive options
- Luminance: 400 nits
- Contrast ratio: 500:1
- Viewing angle: H: 120°, V: 100°
- Antiglare surface
- Mounting brackets for driver's desk. Optional mounting solutions could be provided

### CAMERAS & SWITCHES:

- A wide range of PoE IP Cameras is supported
- **DV-rec** has been tested with most of PoE switches of the railway market

### GMV SERVICES

All the systems are supplied with mating connectors together with all the required documentation for system installation and operation: user manuals, installation and configuration guide and wiring schemes. Additional documentation could be also provided by customer request.

A catalogue of spare parts is available during the whole life-cycle of the system.

In-factory assistance for the installation and setup of the system is optionally provided.

GMV offers customized maintenance contracts for all the systems supplied.