DIGITON VIDEO TRACER

CDN RTMP BROADCASTER
STREAMING MPS
TCP/IP HD-SDI MDN
RTSP OTT
RECORDING Mp4 H.264
TRANSCODING FLV VIDEOCONFERENCE

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DIGITON VIDEO TRACER
ALL IN ONE

COMPLETE VIDEO
SUPPORT FOR
EVENTS

Multipoint Video Control Algorithm

DIGITON DVC 100 DIGITON

DIGITON DVC 100 DIGITON

Control Cube

Multipoint Video Control Algorithm

Fő jellemzők:
- Automatizált videovezérlés
  - előreprogramozott videokapcsolatok,
  - előreprogramozott robotkamerák.
- Smart Recording Technológia
  - a terem releváns eseményei kerülnek rögzítésre a teremhanggal,
  - nincs szükség utómunkára (vágásra).
- Videofelvétel, videostream, videokonferencia egységes, egy rendszeren belüli kezelése
Megvalósítás:
DIGITON VIDEO TRACER hardver és szoftver elemeivel.

A DIGITON Video Tracer alkalmazása a konferenciatechnikában

Bálint Ádám

MAIN FEATURES:
- FULL HD DISPLAY,
- FULL HD VIDEO RECORDING,
- FULL HD VIDEO CONFERENCE WITH REMOTE PARTICIPANTS, PLACES,
- FULL HD BROADCAST TO THE INTERNET (VIDEO STREAMING),
- PRE-PROGRAMMED FULL HD ROBOT CAMERAS,
- VIDEO CONTROLLER UNIT TO SWITCH AND CONTROL OF THE VIDEO SOURCES AND VIDEO TARGET DEVICES FOR THE AUTOMATED OPERATION,
- FULL HD VIDEO MINUTES,
- MORE CAMERA, MORE DISPLAY MANAGEMENT,
- SERVING EVEN HUNDREDS OF PARTICIPANTS,
- CONFERENCE MANAGEMENT SOFTWARE,
- SERVICE OF REMOTE INTERPRETERS WITH PICTURE AND SOUND,
- MULTIPOINT VIDEO CONTROL ALGORITHM: FOR THE COORDINATION OF VIDEO CONTROLLING, VIDEO RECORDING, VIDEO STREAMING AND VIDEO CONFERENCE,
- SERVICE WEBSITE TO VIEW THE VIDEO STREAM.

DIGITON VIDEO TRACER

FULL SCALE VIDEO SOLUTION

A DVC 302 adapter is required for the monitors, projectors and the devices that ensure remote connection. It is practical to install the DVC 302 adapter near to the display unit in order to use coax cables on the longer distances. As required several display units may be also used in the system, for example the remote video conference connection maybe allocated to a separate display.

The basic video source of the system is the HD-SDI speed dome camera that provides DVC 100 Full HD 1080p quality. The camera sends non-compressed digital video signals with the speed of 1.5 Gbit/sec to the Video Controller. The DVC 100 camera provides - contrary to the Full HD IP cameras - Blu-ray quality, brilliant images for our system. It has no latency, therefore even lip sync may be presented on the Full HD displays of the room, which is an unachievable requirement in the case of IP cameras. The 360° positioning and the 20x optical zoom makes each point of the room accessible with appropriate placement. With its 220 pre-programmable positions, it may be "programmed in advance" or "taught" for all the seats of the room. Therefore positioning does not have to be dealt with during the conference, with pressing a single button it gets into its "taught" position. If the arrangement of the room requires it, the system is able to manage even several DVC 100 cameras. The camera can be programmed from the Control Cube graphical screen or with the 3D joystick controller.

DVC 302

Video connection with the cloud-based video server

Camera control

HD-SDI digital video signal

DVC 303

A DVC 303 adapter is required for connecting HDMI video sources. It is practical to place the adapter near to the HDMI device in order to forward the uncompressed video through a coax cable between the HDMI source and the DVC 301 Video Controller.

The DVC 301 Video Controller operates as the video centre of the Digiton Video Tracer system. All of the event's video sources (video cameras, presentation notebook, images of the remote location etc.) and all of the event's video target devices (projectors, monitors, recording devices, images sent to a remote location etc.) connect to it. It creates the connections between the video sources and target devices. The DVC 301 sends control signals to the DVC 100 speed dome camera, also on a way that the Control Cube specifies. The DVC 301 is able to manage HD-SDI digital video signals. If Full HD video is available in the HDMI format, or if the output is connected to an HDMI device, then either DVC 303 or DVC 302 adapters are required. The HD-SDI signal transmitted with the aid of a coax cable may be forwarded up to 120 m without refreshing.

DVC 301

The PEP 3012V Video Conference Cube can connect remote participants to the event with image and sound. With the aid of special expansion cards it is able to connect to the DVC 301 or DVC 304 Video controller. The video conference client program installed on the Video Conference Cube is able to connect the sound and image of even 200 remote participants. It is also possible that the remote participant's presentation appears in the event monitor, so we can connect a remote presentation as well.

Image for the remote location

DVC 301 Control

Remote participant, remote location sound
Floor sound to remote participant, remote location
Remote participants, remote location image
The secondary monitor out of the Control Cube
Floor sound for recording and streaming

DVC 303

Presentation Notebook

DVC 303

Media player

DVC 303

Video stream to the cloud-based streaming server

The video streaming service means a one-way connection. The remote participants may view the events of the conference, but they are not able to have a say during the conference. The Control Cube sends the image and sound of the event as broadcaster to the cloud based streaming server that ensure the broadcaster. The broadcast quality is up to Full HD.

Control Cube is the system controller

The PEP 3010V Control Cube is the system controller computer. It controls the DVC 301 Video Controller, and through it, the robot cameras. It records and broadcasts the events of the room. In the preparation time of the conference, the camera should be "taught" to the desired room positions. During the conference we can call the required position by clicking on the appropriate part of the screen. With a special expansion card placed on the Control Cube, it is possible to record the events of the room in Full HD 1080p quality. The recording is saved in the hard drive of the Control Cube. The recorded video contains the events of the room in process. In addition to the floor sound, always that video is recorded, which is displayed on the monitor of the room, therefore the material recorded on the hard disk may be also used as a "video minutes", and it may be reproduced without post-production.

Public address system
The microphone signals of the public address and the audio signals of the media sources are forwarded through a mixer amplifier to the loudspeaker of the room, to the video recording, to the video stream and to the remote participants.
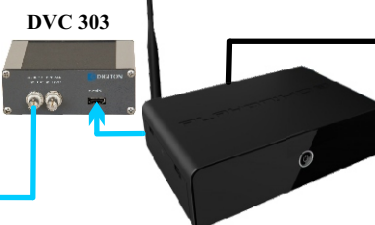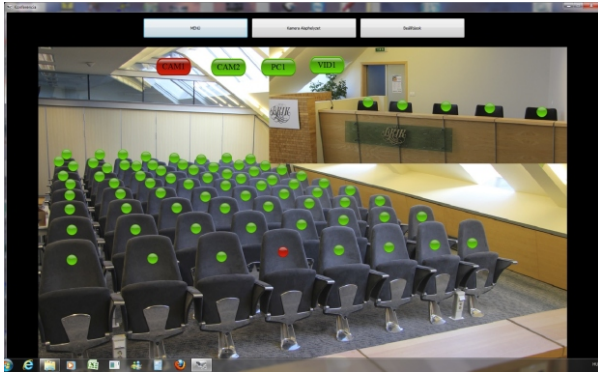
Blu-ray player

Audio signals of the media sources

CLOUD

VIDEO CONTROLLER PROGRAM

The image above shows a real scene. The small round buttons mark camera positions, which are ordered to chairs. The red button shows that participant, who is speaking. The oblong video source selector buttons can be seen on the top of the screen. Use these buttons to choose the displays and the recording sources.

We can see a photo about the room on the Control Cube screen during the event. We can see buttons on it, which we have connected camera positions during the preparation of the conference. During the conference, the technician clicks on the button, which is connected to the person who speaks, and the robot camera automatically focuses on that person. If we click on the rectangular shape button, the connection is created which we have made during the preparatory part of the conference. The program ensures (with Multipoint Video Control Algorithm), that the system is able to serve more cameras, more displays and more rooms with one operator and one video centre. Furthermore it ensures the Smart Recording video minutes, which means that only the relevant occurrences are recorded in the video minutes. If someone speaks then his speech, if someone presents then his presentation, if someone plays video then the video, and if someone speaks from remote site then the remote site image can be recorded on the video minutes. The Digiton Video Tracer allows splitting the screen display, when different video sources are recorded on one screen. The video voice is always equal to the floor sound. Of course the recording - match to the system - is Full HD. Important to say that in contrast to IP based systems, the Digiton Video Tracer system has no delay on the displays. On the Full HD screen the voice and the image is in lip-synch.

Screen schemes

The Digiton Video Tracer is able to record and forward the video on split screen to remote locations. This means that in addition to the presentation, the lecturer is also seen on a part of the screen, for example in smaller size. We can edit the screen schemes for the recording and the video stream in advance, and switch with a button. For example, a screen scheme can be a presentation + camera picture + event logo. (We can edit the event or the institution logo to the picture in advance.) It can be another screen scheme, which shows only the presentation. It can be a screen scheme, which only shows the camera image with the event logo + optional subtitles. So, on the screen scheme we can place the image of the video sources, text information or the window of the control PC programs. The size and position of the objects can be changed optionally, even during the event. The number of pre-structured screen schemes is unlimited, we can switch between them by clicking a mouse. We can see a presentation screen scheme of a lecture below.

Screen scheme with presentation, camera picture, logo, text information:

The image of the presentation, which comes to the system from the secondary output of the presentation notebook. The presentation has 4:3 aspect ratio. On the 16:9 image - which is on the recording and on the stream - there is a lane, where we can place visible information without uncovering the presentation. The presentation can run on the Control Cube as well, this time we place the presentation runner window of the Control Cube on the screen scheme.

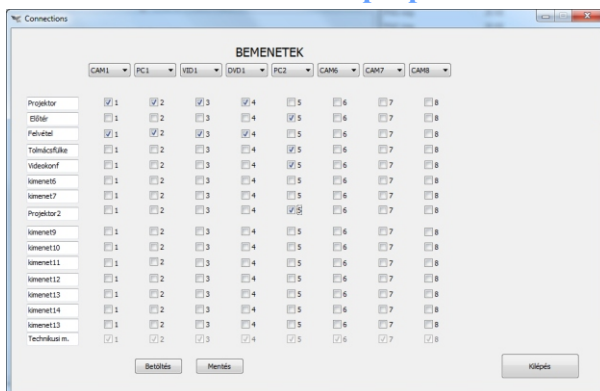The robot camera broadcasts live image about the speaker, which goes to the screen scheme in "cut" form.

The name of the speaker is on the screen scheme as text information.

The presentation title placed as a text information on white background.

Logo, positioned as PNG image

CLOUD

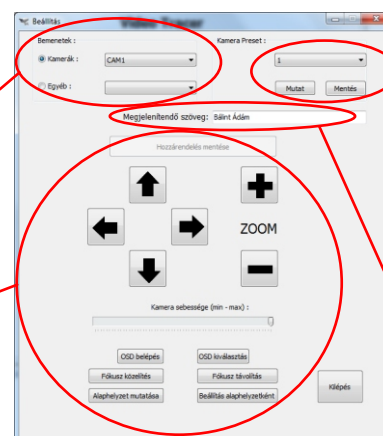Recording
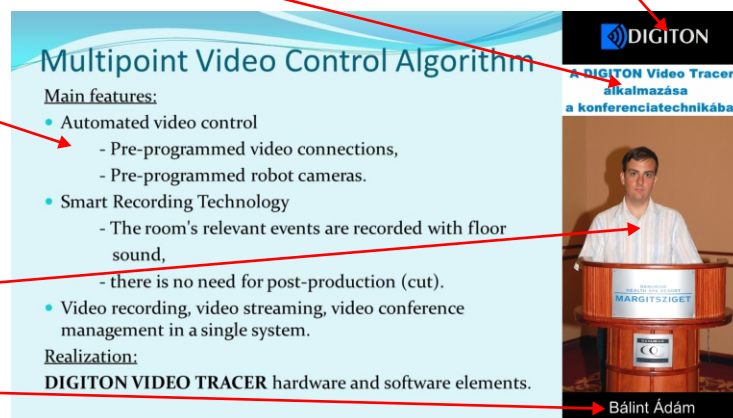
Some screens of the event preparation:

The video connection setting screen. We can connect inputs and outputs. We can specify all contacts that occurs during the conference. (That is why it seems on the figure like we connected more inputs to one output). The settings on the above screen is an important part of the realization of the Multipoint Video Control Algorithm.

Settings of video sources and assign them to the source selection control buttons.

Controls for setting the robot cameras. Position, zoom, focus, brightness, white balance etc.

During the preparation of the conference we can program the robot cameras on the "Settings" screen. Here we can assign camera positions and video source for the buttons. We can recall this screen anytime during the conference, if we need some correction on the positions. All functions of the robot camera, including the "teach" in certain positions can be set in this screen. 220 positions per camera can be programmed and can be assigned to a room position. If it is not enough, or the room layout requires, we can use more cameras in the system.

The set positions is stored by the camera. With these buttons it is possible to write and read the camera memory.

For the small round buttons which call the camera positions, text is also available (eg. name). It can be displayed on optional place of the screen.

DIGITON MOBIL VIDEO TRACER

The Mobile Video Tracer is carried in three aluminium suitcase and can be installed at various locations. It contains all the devices and cables, which are required for the arrangement of an average conference venue. The video minutes is put to the winchester of the notebook, which controls the system. The quality (as well as the fixed installed system's quality) is Full HD.

For the users who would like to use the system's services in more conference room is a cost-saving solution to obtain only one Digiton Mobil Video Tracer.

We also recommend to the rental companies to extend their services with it. Companies who providing guard services, can also use our system for video monitoring of casual events.
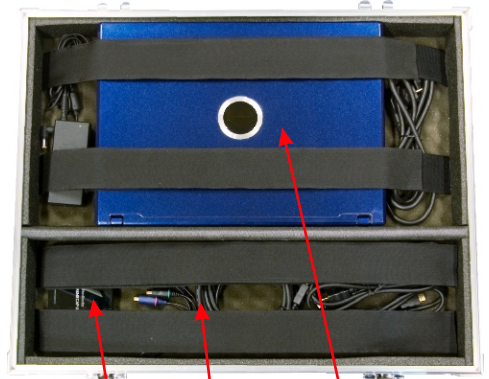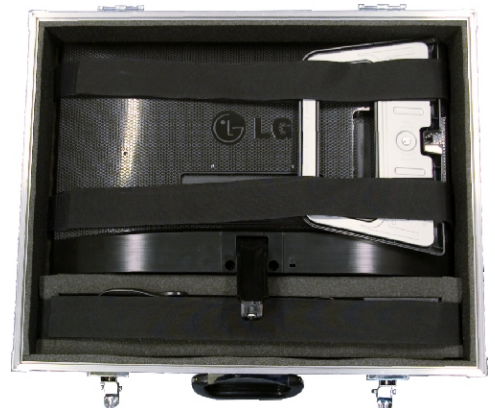
Naturally, the base mobile system can be extended with even more robot cameras or more DVC 302, DVC 303 adapters.
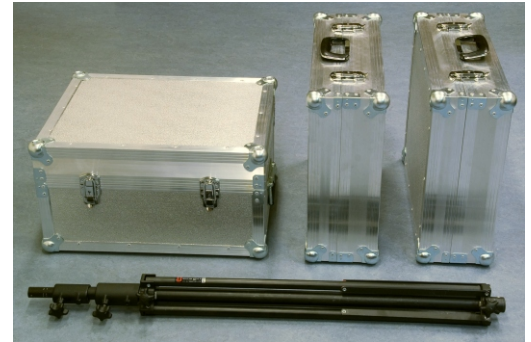
Third suitcase

The third suitcase's upper and lower parts contain devices.
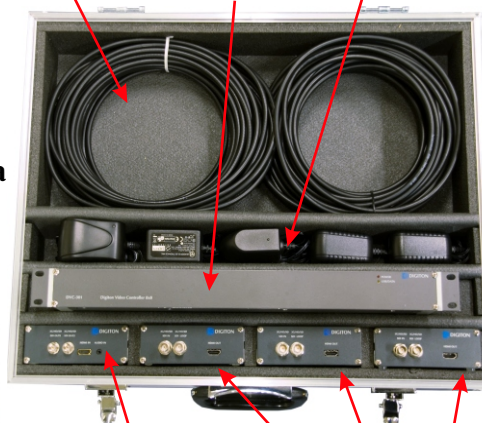In the upper part of the suitcase we placed the technicians monitor and the power supply.

Second suitcase

Cables

DVC 301 video controller

AC adapters

First suitcase

Stand adapter   **Robot camera**

Camera power supply   Cables

DVC 303 adapters for the presentation notebook

DVC 302 adapters for the projectors, the recording and the technician's monitor

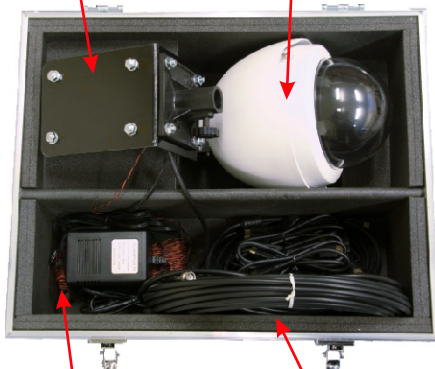**H264 capture adapter which provide the recording**

Control notebook with power supply

Cables

Camera stand (3m)

HARDWARE ELEMENTS OF THE DIGITON VIDEO TRACER

The basic video source of the system is the **DVC 100 Video Camera**. The camera is an HD-SDI speed dome camera, which provides Full HD 1080p quality. The DVC 100 camera provides - contrary to the Full HD IP cameras - Blu-ray quality, brilliant images for our system. It has no latency; therefore even lip sync may be presented on the Full HD displays of the room, which is an unachievable requirement in the case of IP cameras. The 360° positioning and the 20x optical zoom makes each point of the room accessible with appropriate placement. With its 220 pre-programmable positions it may be "programmed in advance" or "taught" for all the seats of the room. Therefore positioning does not have to be dealt with during the conference, with pressing a single button it gets into its "taught" position. If the arrangement of the room requires, the system is able to manage even eight DVC 100 cameras.

The **DVC 301 Video Controller** operates as the video centre of the Digiton Video Tracer system. It receives the video sources and switches them to the appropriate outputs. It has 8 inputs and 8 outputs. Any input may be switched to any output, and even one input may be selected for all the outputs. The DVC 301 controller is able to switch HD-SDI uncompressed audio-video sources even in the quality of Full HD 1080p 60 frame/sec. The DVC 301 controller unit sends the controlling signals to the DVC 100 speed dome video cameras. The Control Cube (the computer that operates the system), operates the DVC 301 via USB connection.

The **DVC 304 Video Controller** is the larger version of the DVC 301 Controller. It has 8 inputs and 16 outputs. Based on our operating experience the 8 outputs of DVC 301 Video Controller may be not enough in case of large events. The Control Cube engages 4 outputs and the remaining 4 outputs are not always sufficient. (For example if we operate more screens, we connect to video conferences, we transfer images to interpreters etc.) We have also expanded the service of the DVC 301 Video Controller. The DVC 304 cannot be only operated by USB, but we have also supplied it with a RJ45 network plug. The advantage of this service extension is that the system runner Control Cube can be removed from the DVC 304, so the USB port limited cable length is not problem. It can be controlled via local network or even the Internet. This also may be advantageous, because typically it connects to the Control Cube on the DVC 304 LAN placed on the technical location, so even the event moderator can manage the video control from the location with the help of the Control Cube graphical screen and a mouse.

The **PEP3010V Control Cube** is the computer that controls the system. With its built-in special extension card, it is able to receive 4 HD-SDI signals. These four video signals may be recorded separately or with a single split image. The software of the Control Cube is the control software that manage the Video Tracer. It controls the DVC 301 and DVC 304 controllers, and the robot cameras via the Video Controllers. It prepares the event by programming the cameras, and setting the possible connections. The Control Cube is the controller of the event, where the pre-programmed video camera connections and the robot cameras can be controlled only by mouse clicks. The video of the event is recorded to the Control Cube winchester in Full HD quality. The floor sound sign gets beside the recorded video. The Control Cube sends the video of the event to the streaming server as a broadcaster. Our system is able to record video with split screen, and to stream video as well. The PC program of the Control Cube can connect to all known video streaming provider server. For the Digiton Video Tracer we operate a service website, where we can even provide events with large headcount. At this website, the video stream sent by the Control Cube can be also viewed in Full HD quality. The service ensures the lag-free, continuous, high-quality play with CDN technology. The broadcast can be public or private (protected by user name and password). The website is available at www.konferenciastreaming.hu.

The **PEP 3012V Video Conference Cube** can connect remote participants to the event with image and sound. With the aid of special extension card it can connect to the DVC 301 or the DVC 304 Video Controllers. The video conference client program installed on the Video Conference Cube is able to connect even 200 remote participants' image and sound to the system. It is also possible that the remote participant's presentation appears on the screen of the event, so we can even connect a remote lecture to the event. The remote participant is enough to have a web camera and a microphone, as well as a free program installed on the PC, which has a simply used software. If we would like to connect two events (two Video Tracers) we also have to use the Video Conference Cube. The video conference service provides the low latency with cloud-based CDN technology. The low latency enables the PEP 3012V Video Conference Cube that with the help of Video Conference Cube we can ensure simultaneous translation with remote interpreters in the Digiton Video Tracer System. The remote interpreter can see and hear everything, what is happening on the event within 1 second delay. The video conference service can be tested on this website: www.konferenciastreaming.hu

The **DVC 302 and DVC 303 adapters'** job is to connect the devices which have HDMI input and output to the system. The DVC 302 adapter converts the HD-SDI signal into HDMI signal, so primarily we can use this adapter for projectors, LCD and plasma displays. The DVC 303 adapters convert the HDMI signal into HD-SDI signal, so primarily their job is to switch the HDMI sources (presentation notebook, Blu-ray player, media player etc.) to the system. Since the maximum cable length based on the standard is 10m (1080p, 60fps), it is advisable to place the adapters close to the HDMI device in order to use coax cables on the longer distances. The HD-SDI signal transmitted with the aid of a 75 ohm RG6 coaxial cable may be forwarded up to 150 m without refreshing. In the HD-SDI technology it is practical to use high-quality coaxial cable and BNC connectors to ensure the successful transfer. On coaxial cable the transmission speed is 1,5 Gbit/s (1080p, 30 fps). The HDMI and HD-SDI standard transmits uncompressed digital video signals, so the converters do not cause image quality degradation. The small adapters with mounting tabs can be fixed to the wall or table top.

The **DVC 305 3D Joystick Controller** provides the robot camera controlling, programming, and during the event it ensures to correct the positions. From the controller software all of the camera controlling and programming function are available, but not as ergonomic as with the help of DVC 305 3D Joystick controller. By tilting the joystick lever we can set the position on the selected camera, and we can also zoom by turning the button of the lever. We can set the brightness (iris) by the button at the top of the lever. The cameras can be programmed (stored the preset positions) by the DVC 305 Joystick controller individually, without turning the system on. This option is enabled by the PELCO P/D protocol, which controls the camera. In case of the PELCO P/D protocol, we do not store the positions according to the x, y, z coordinates, but the set positions are stored on the camera's preset memory. We can call the desired position by refer to the corresponding preset memory.