International Telecommunication Union

MPEG-4 video transmission for ambulatory application

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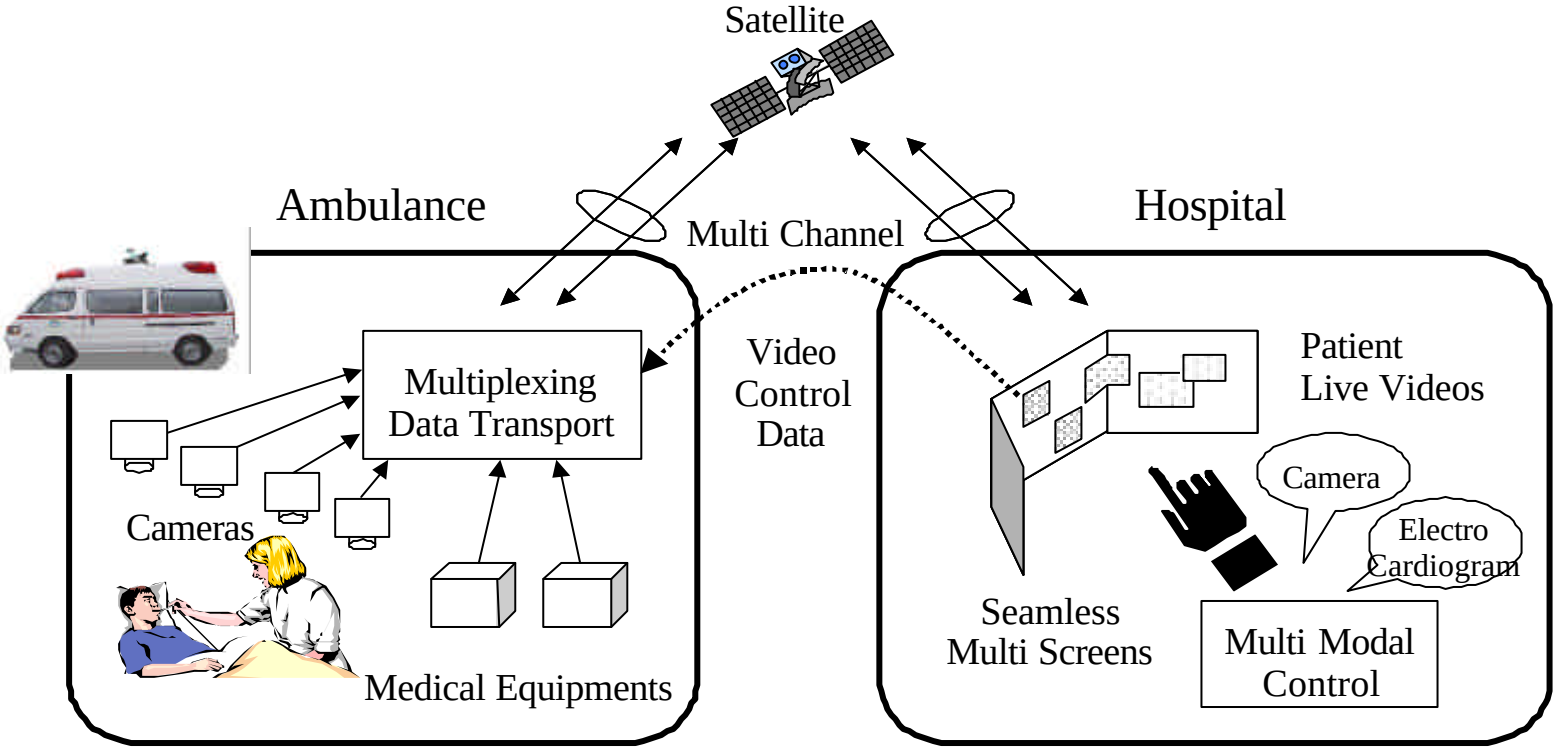
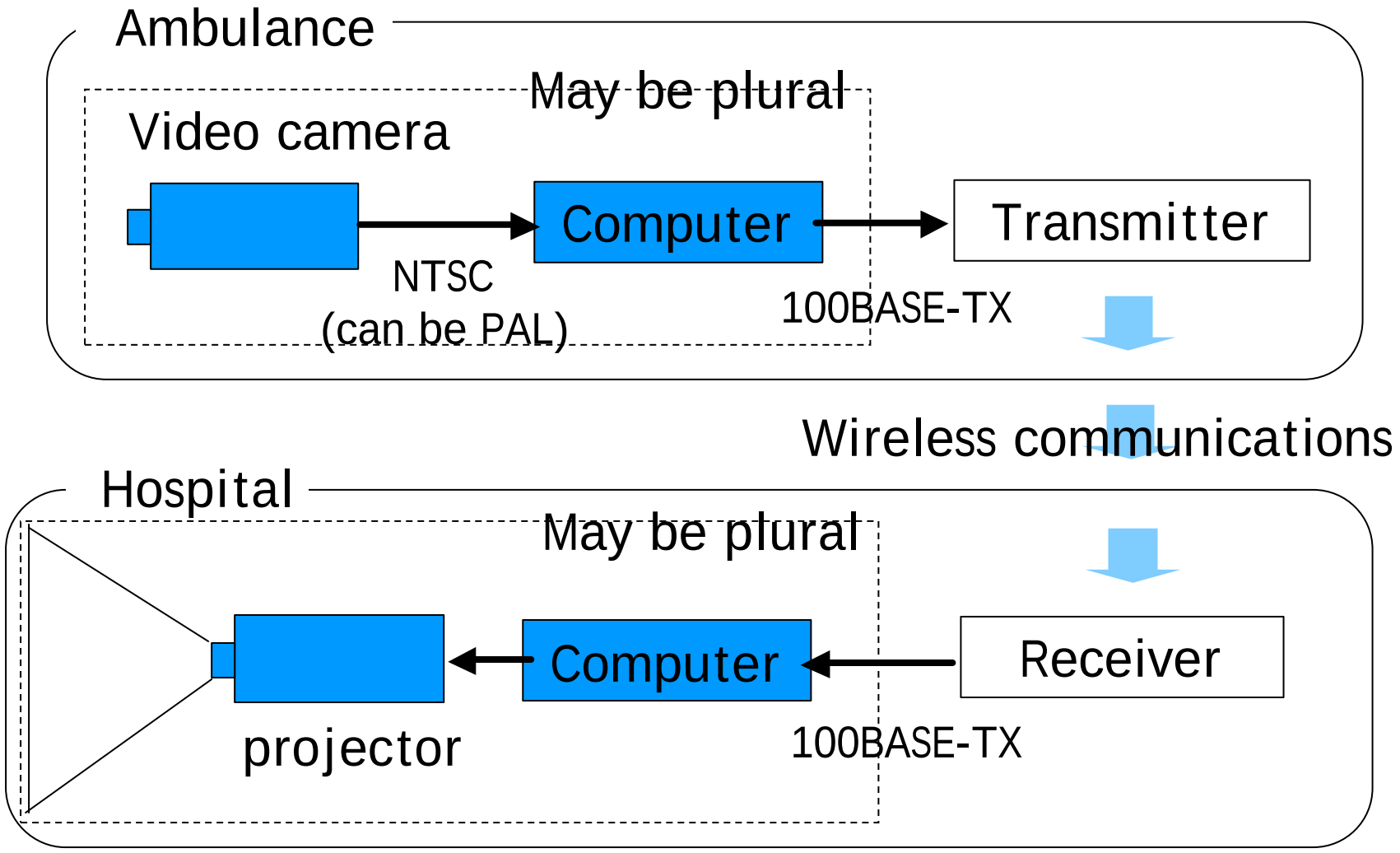
Workshop on Standardization in E-health
Geneva, 23-25 May 2003

Emergency medical video transmission

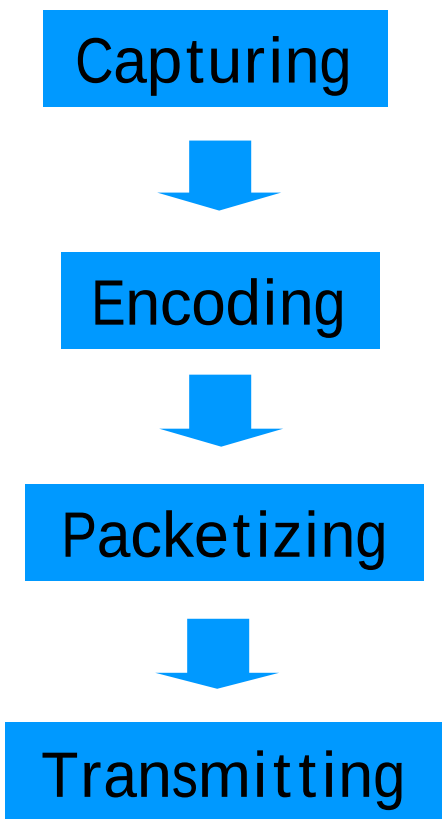
Transmission of video from the moving ambulance to the hospital



Assumption for system configuration



Processing in ambulance side



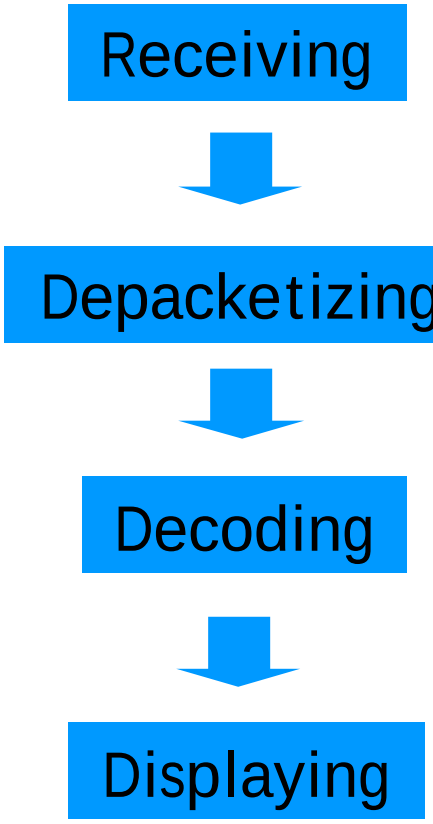
Digitizing of video signal with video capture cards

Transforming of digitized video signal into compressed bitstream

Dividing the bitstream into packets with bitstream format preserved

Adding RTP header to packets and transmitting with UDP/IP

Processing in hospital side



Receiving packets sent in UDP/IP

Removing RTP header from packets and reconstructing bitstream for one frame

Decoding bitstream and producing image data for one frame

Displaying image data for one frame

Encoding / decoding process

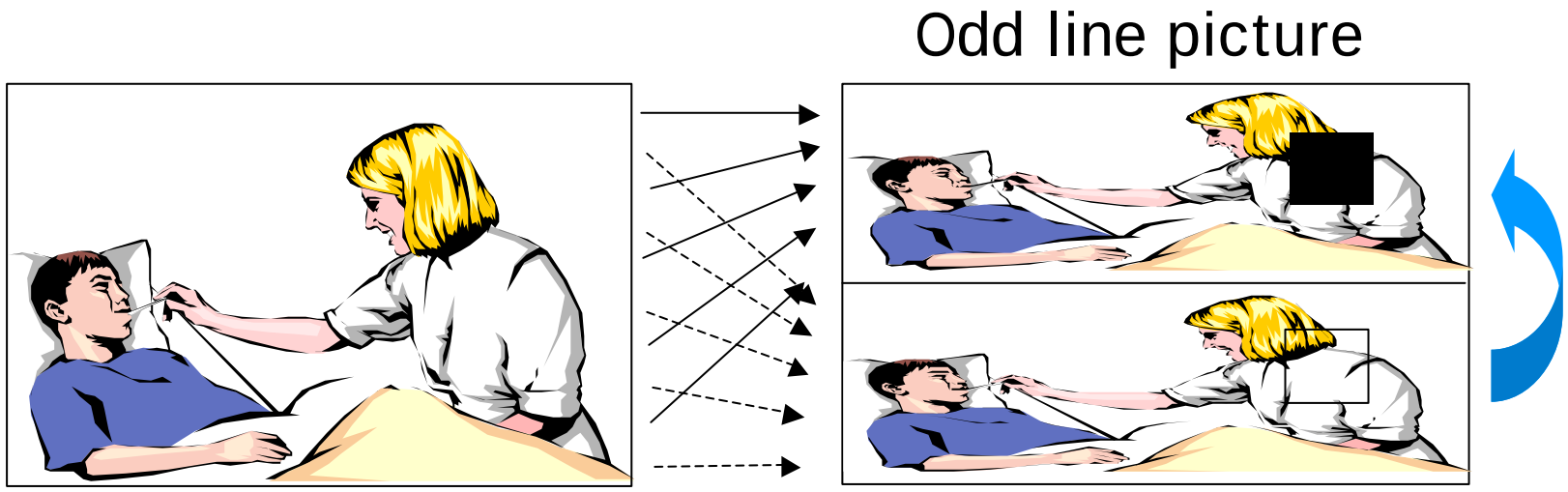
- Using self-made software codec conforming to MPEG-4 Visual simple profile
- The software codec can process the video stream of QVGA resolution and 15 fps (including communication processing)

Transmitting / receiving process with RTP protocol

- Adding RTP header and transmitting / receiving the packets in UDP/IP
- Detecting disorder, packet loss and fluctuation of arrival with sequence number and timestamp
- Dividing MPEG-4 bitstream into packets in accordance with RFC3016
- Not using RTSP

An algorithm for concealing packet loss

Using the spatial similarity in the picture (outside of the standards)



Before transformation

After transformation

About measures for loss of RTP packets

- Concealment process is CPU intensive
- With forward error correction codes (even with the simplest parity codes), packet loss can be recovered
- For RTP packets, RFC2733 can be used; but it is restricted to continuous 24 packets
- Underlying protocols is responsible?

Future works

- To conduct the video transmission experiment with experimental vehicles
- To construct effective and efficient error correcting codes
- To determine the necessary resolution and bitrate for medical image
- To find more appropriate underlying protocols (UDP/IP is not necessary)