June 2021

Line Of Sight Communication Using Pixel Encoding

punarjeewa abeysekera

Line Of Sight Communication Using Pixel Encoding.

ABSTRACT

This disclosure describes a method to transmit and receive information between two line of sight end points at the same time eliminating signal jamming possibility. The communication takes place at night time or at adequately low light conditions. Two endpoints who needs to communicate with each other are positioned at a known pre-configured distance from each other. They can see each other in a line-of-sight manner. They are stationary relative to each other. the information to be transmitted will be displayed as a video stream on a video display at one end point. The other end point to which this information needs to be transferred has a telescope which is pointed at the information displaying video display on the information transmitting end point. The telescope fitted with a video camera at this information receiving end point can record and store the video stream the other end point is displaying. Both the endpoints are equipped with a telescope plus a video display configuration. Both endpoints can both transmit and receive information at the same time. The information is encoded as pixel patterns. The pixel patterns after receiving are decoded to meaningful information according to a pre-configured decoding method.

BACKGROUND

Communication is an important aspect in the society. Nowadays, various communication methods are used. One of the most popular over the air wireless communication method is through radio signal communication. Even though radio communication is a very popular method of communication, it is vulnerable to signal jamming.

KEYWORDS

Line-of -sight

Video display

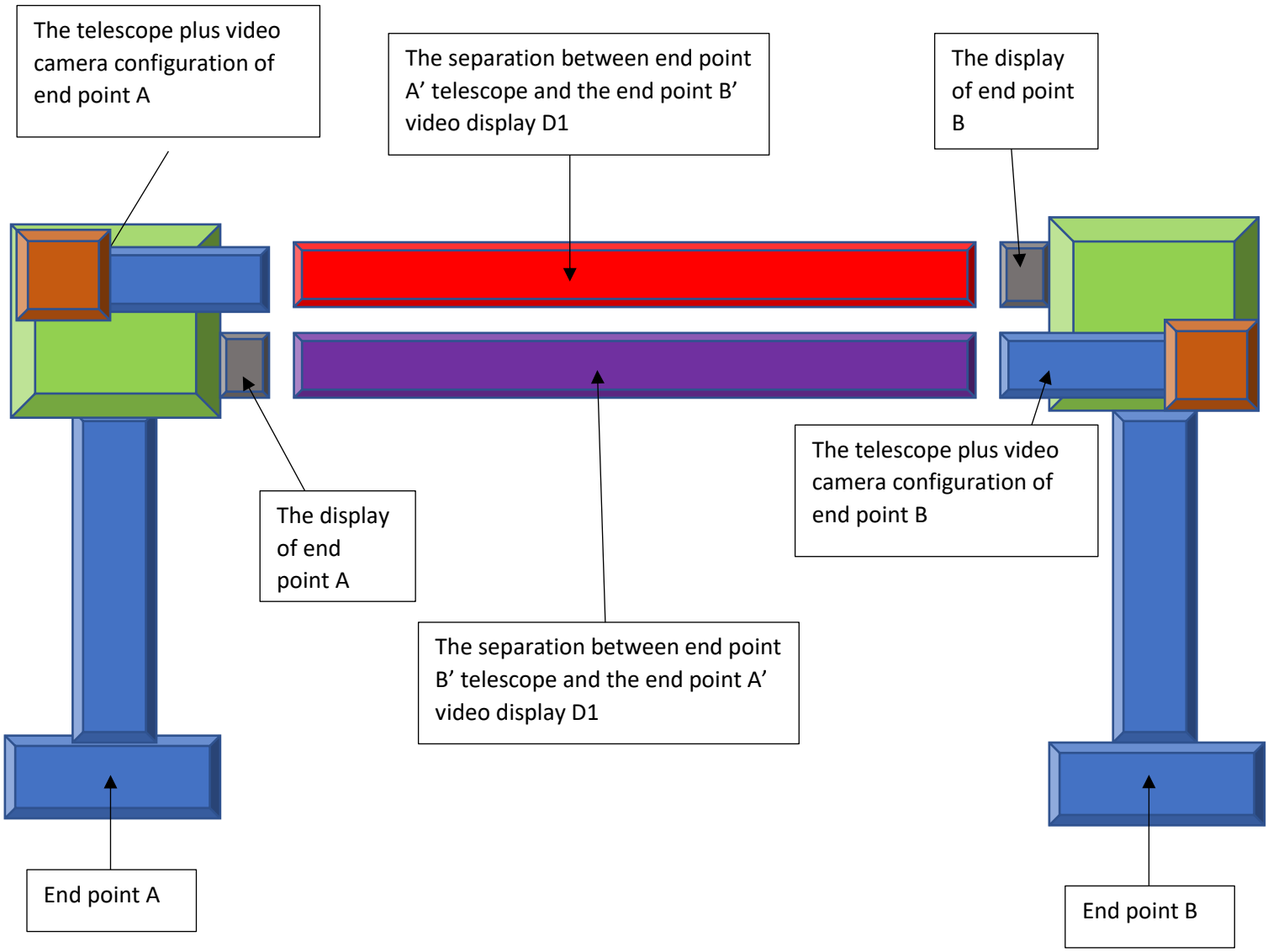
Video camera

Telescope

Unit of pixel information

DESCRIPTION

This disclosure describes a method to exchange information between two line-of-sight endpoints. The communication process is configured to happens during the night time or at adequately low light conditions. The two end points involved in the communication are given by the diagram below.



- The requirements for the communication configuration.

The requirements of the communication system as a whole

The requirement one:

The two communication end points (the end point A and the end point B) must be positioned in a way that they are both in a line-of-sight manner. That is each end point must directly see the other end point.

The requirement two:

The two communication end points (the end point A and the end point B) must be positioned in a way that they are both on a straight line with a separation distance of D1.

The requirement three:

The communication system will work reliably only at night time or when there are adequately dark conditions (low light conditions where there are no bright light illuminations).

The requirement four:

The two communication end points (the end point A and the end point B) must have sufficient computing units to execute the communication process.

The requirement five:

The two communication end points (the end point A and the end point B) must be stationary at their positions in space or have to be relatively stationary in space. (Relatively stationary in space here, means that the two end points can be on motion but has to have zero relative velocity.)

The requirements of the end point A

The requirement one:

The end point A must have a telescope fitted to a video camera.

The requirement two:

The video camera mentioned in the requirement one needs to have a capability to record an N1 number of video frames per second.

The requirement three:

The end point A must have a video display.

The requirement four:

The video display mentioned in the requirement three must have the capability to display an N1 number of video frames per second.

The requirement five:

The video display mentioned in the requirement three must have the capability to display a P1 amount of total pixel information units per second. (a pixel unit of information could be a single pixel on the screen or a defined number of pixels on the screen that combines to creates a square shape on the screen). That is to display a P1 divided by N1 number of frames of pixel units in a one video frame.

The requirement six:

The video camera mentioned in the requirement one needs to have a capability to record a P1 number of total pixel information units per second. (a pixel unit of information could be a single pixel on the screen or a defined number of pixels on the screen that combines to creates a square shape on the screen). That is to capture a P1 divided by N1 number of frames of pixel units in a one video frame of recording.

The requirement seven:

The telescope mentioned in the requirement one should be positioned in a way that it is directly pointing at the video display of the end point B, mentioned in the

The requirement three of the end point B.

The requirement eight:

The telescope mentioned in the requirement one should be able to focus properly on the video display of the end point B, mentioned in the

The requirement three of the end point B. That is this telescope should be able to focus on the video display at a distance of D1.

The requirement nine:

The telescope mentioned in the requirement one should have a magnification sufficient enough to capture all the pixel unit information on one frame of the video display of the end point B, mentioned in the

The requirement three of the end point B. One pixel unit information is a single pixel on the screen or a defined number of pixels on the screen that combines to creates a square shape on the screen, as explained in the requirement five and the requirement six of the end point A.

The requirements of the end point B

The requirement one:

The end point B must have a telescope fitted to a video camera.

The requirement two:

The video camera mentioned in the requirement one needs to have a capability to record an N1 number of video frames per second.

The requirement three:

The end point B must have a video display.

The requirement four:

The video display mentioned in the requirement three must have the capability to display an N1 number of video frames per second.

The requirement five:

The video display mentioned in the requirement three must have the capability to display a P1 amount of pixel information units per second. (a pixel unit of information could be a single pixel on the screen or a defined number of pixels on the screen that combines creates a square shape on the screen) That is to display a P1 divided by N1 number of frames of pixel units in a one video frame.

The requirement six:

The video camera mentioned in the requirement one needs to have a capability to record a P1 number of pixel information units per second. (a pixel unit of information could be a single pixel on the screen or a defined number of pixels on the screen that combines creates a square shape on the screen) That is to capture a P1 divided by N1 number of frames of pixel units in a one video frame of recording.

The requirement seven:

The telescope mentioned in the requirement one should be positioned in a way that it is directly pointing at the video display of the end point A, mentioned in the

The requirement three of the end point A.

The requirement eight:

The telescope mentioned in the requirement one should be able to focus properly on the video display of the end point A, mentioned in the

The requirement three of the end point A. That is this telescope should be able to focus on the video display at a distance of D1.

The requirement nine:

The telescope mentioned in the requirement one should have a magnification sufficient enough to capture all the pixel unit information on one frame of the video display of the end point A, mentioned in the

The requirement three of the end point A. One pixel unit information is a single pixel on the screen or a defined number of pixels on the screen that combines to creates a square shape on the screen, as explained in the requirement five and the requirement six of the end point B.

- The communication system configuration in the diagram and in the requirements can exchange information in the form of pixel unit information patterns.

- The meaningful Information that is to be send will be first encoded into pixel unit information patterns and then only will be transferred to the other end point.

- After receiving the information in the form of pixel unit information patterns, they will be decoded into the original meaningful information.

- since this communication method does not utilizes radio waves the system is not vulnerable to radio signal jamming.

  Applications of the method.

  Application one:
  The communication between two end points at ideal requirements (all requirements fulfilled) where the two communicating end points are stationary at their positions.

  Application two:
  The communication between two end points at ideal requirements (all requirements fulfilled) where the two communicating end points are in motion and when their relative velocity is zero.