TELE-IMMERSION

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VIRTUAL REALITY

- Technology which allows the User to interact with Computer Simulated Enviornment

TELE-IMMERSION ???

- Tele-Immersion is a kind of Virtual Reality which is a medium that enables a User to share a Virtual Space with remote participants

- Synthesis of Virtual Reality,Video conferencing and Advanced Computations

- Kind of Virtual Reality ,which is the next step of Internet Video Conferencing

TECHNOLOGY

Tele-immersion enables users at geographically distributed locations to collaborate in a shared space

Combines the display and interaction techniques of virtual reality with new computer-vision technologies

Computers recognize the presence and movements of individuals and image

Continued.....

The tracked items are projected in

REALISTIC,

MULTIPLE,

GEOGRAPHICALLY DISTRIBUTED IMMERSIVE ENVIORNMENTS

on **stereo- immersive surfaces**

Tele-immersive enviornments will faclilitate

- Interactions between users

- and also between Users and Computer generated models and simulations

<u>Tele-immersion takes video conferencing to next level</u>

Video Conferencing vs Tele-immersion

- Video conferencing delivers flat images to a screen

- Tele-immersion is a kind of Virtual Reality which creates the 3D enviornment of the scene

VIDEO CONFERENCING

TELE-IMMERSION

REQUIREMENTS FOR THE SYSTEM

-Large Display flat screen

-Camera cluster units

-Work Stations

-Gigabit Switch

-Set of Speakers and microphones

-Infrared lighting setup

DISPLAY SYSTEM

-Need for display that covers the whole viewing angle of the visual system

-Provided with Desktop arrangement with large,flat screens like plasma displays

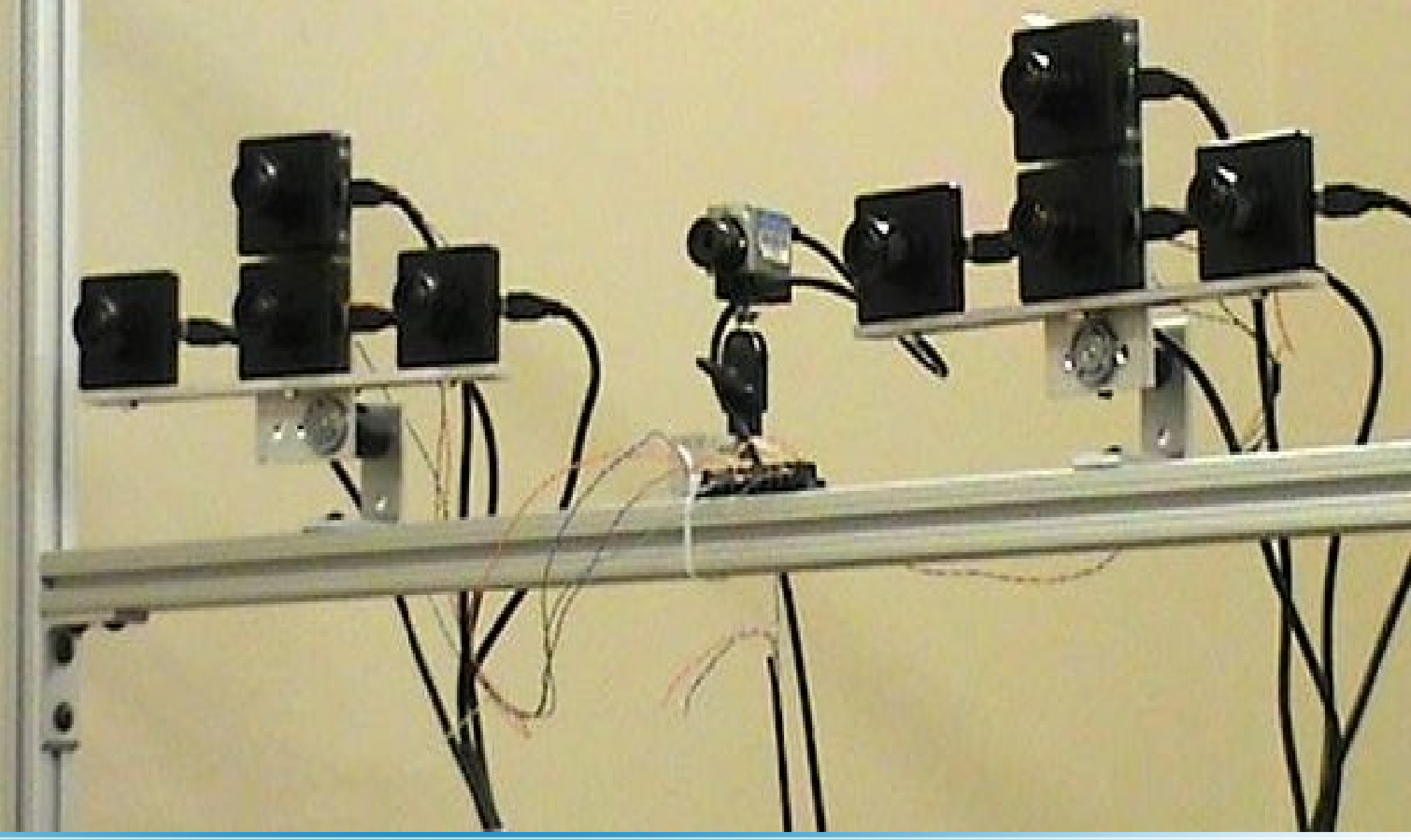
-A Diagonal of 50 inch or more needed for efficient Display

CAMERA CLUSTERS

-The current apparatus includes 48 cameras arranged in 12 stereo clusters

-The images from each cluster are processed by stereo reconstruction program running in parallel on 12 computers

-A truss and 80/20 frame is used to hold the camera clusters



A CAMERA CLUSTER UNIT

WORKSTATIONS

-A Dell Precision 530 Workstation operating at dual 2.4Ghz pentium4 with an integrated 1394 Controller

-Each camera cluster is connected to workstation for image processing

GIGABIT SWITCH

-All the machines are connected to the Gigabit switch

-Provides connection to the network

SYSTEM OVERVIEW

-A cluster of 7 firmwire cameras are arranged on arc at 15 degree seperation which surrounds the user

-The cameras are used to calculate binocular and trinocular stereo depth maps.

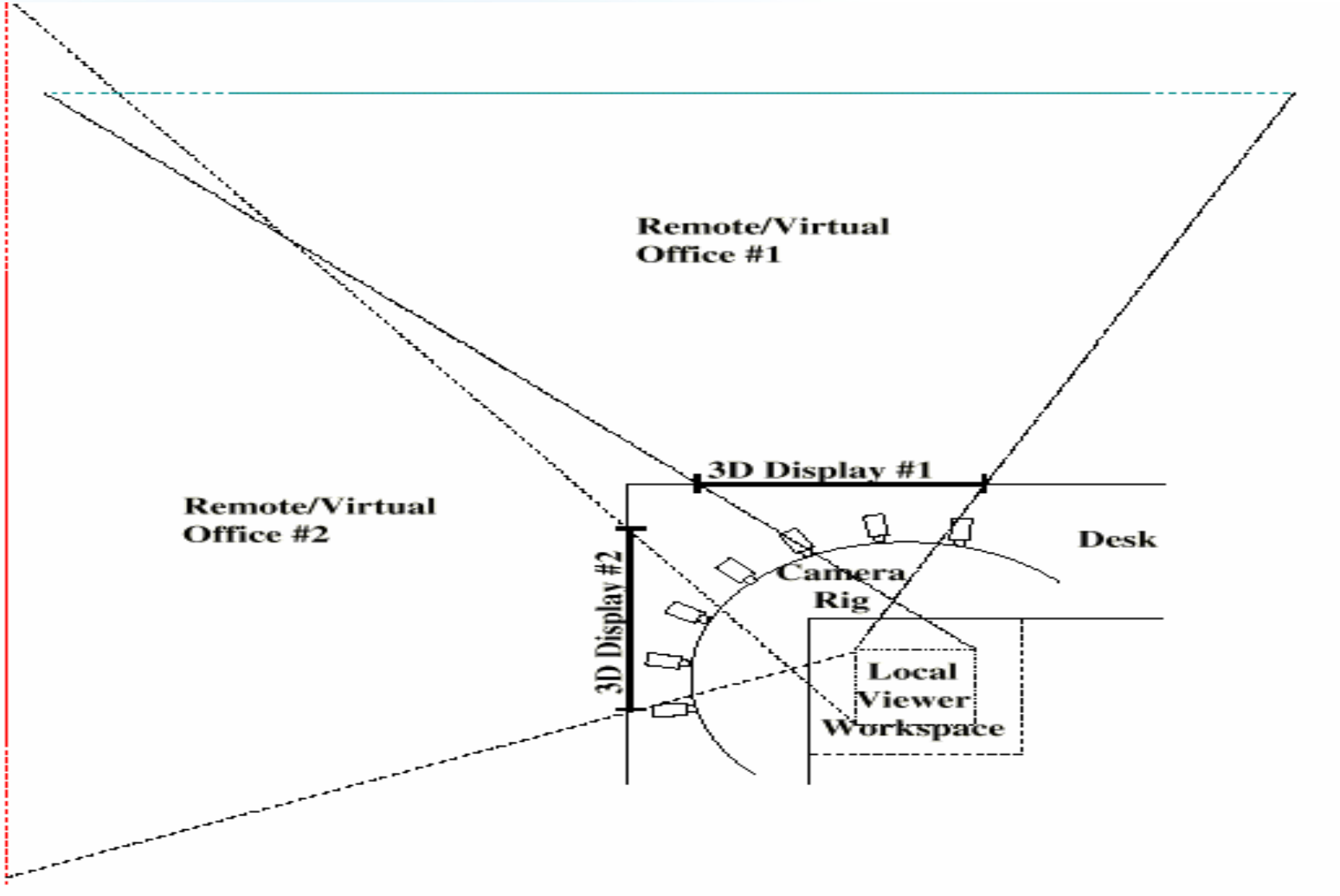
-User wears lightweight polarisd glasses and head tracker to drive the stereo display function

continued....

-The user moves freely in a 1 meter workspace at his desk.

-Cameras are arranged on an arc at 15 degree seperation

-Reconstruction of each image is performed on a seperate computer



ILLUSTRATION

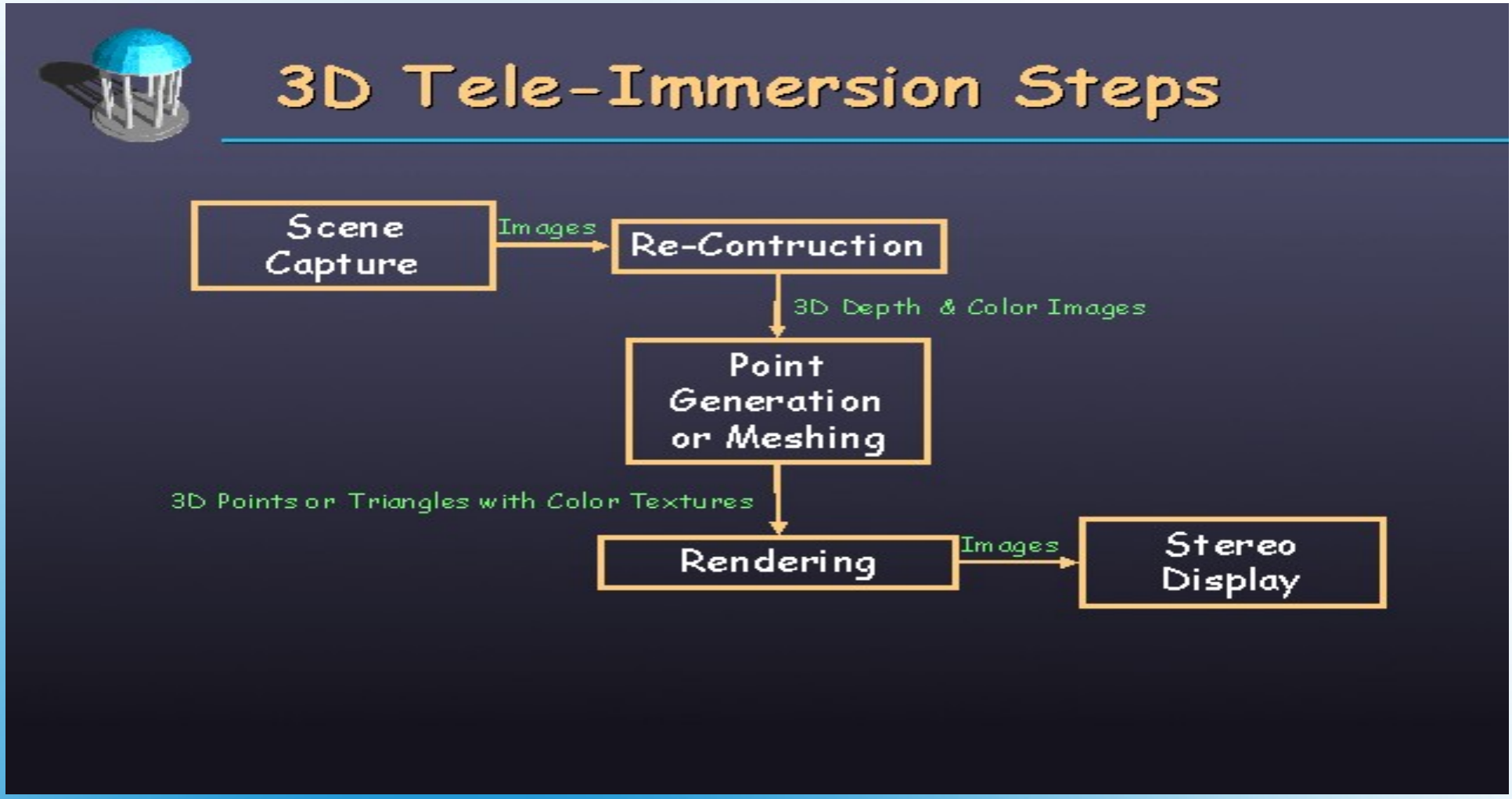
BACKGROUND SUBTRACTION PROCESS

-The workspace will contain a person in the foreground interacting with remote users

-A background scene which remains constant for a duration of session

- background subtraction is a process to detect a movement in video frame (foreground)and to remove all the non significant components(background)

BACKGROUND SUBTRACTION



SYSTEM OVERVIEW

SYSTEM WORKING

-Tele-immersion system has 360 degree stereo capturing capability-allows 3d reconstruction of people and objects

-The images from each cluster cameras are processed by stereo reconstruction program running on 12 workstations

-The data is sent via gigabit internet 2 another computer to be rendered into a 3D scene.

-Each computer grabs image from 1 or 2 cameras

-Transmits,recieves the images needed by its neighbours.

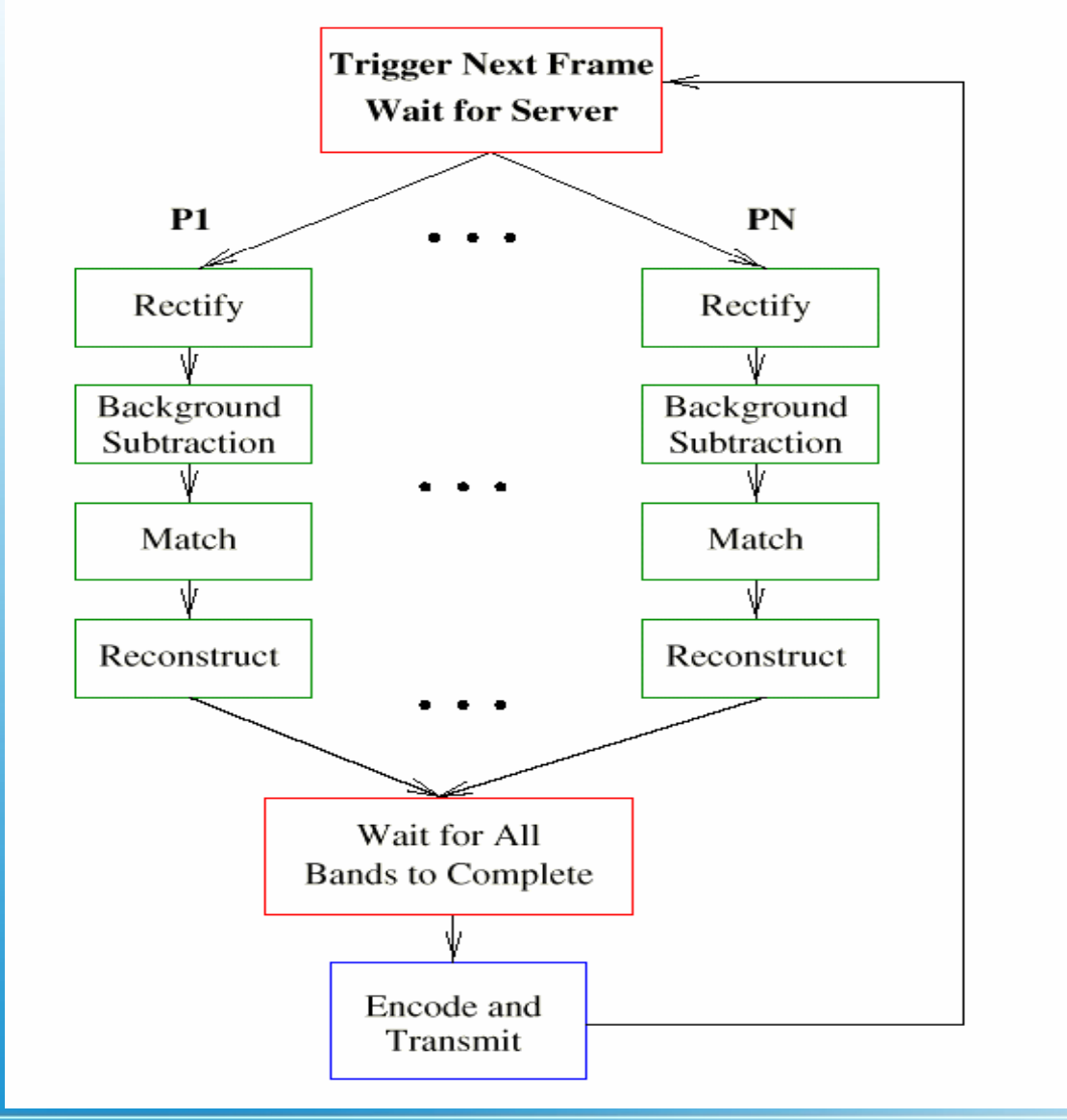
-within each 4 machines,the image is divided into 4 equal bands

-Each processor is devoted to a particular band

-Background subtraction proceeds

-When processors completed tasks-Texture and Depth map are transmitted via TCP/IP network

-3 Mbits are required for each Frame



Outline of the system

APPLICATIONS

Preoperative planning

Tele-Diagnostics

Tele-Assisted Surgery

Tele-Meetings

Tele-collaborative

DISADVANTAGES

- Information transmission is affected by HIGH PACKET LOSS

-Expensive

-Requires High Band Width

CONCLUSION

Tele-immersion-The next major development in information technology

-Combined aid of Virtual reality along with advanced computer networking and media technologies

-Responsible for Rapid prototyping of next generation computers

-The technology is not far ahead-AS WE DONT HAVE TO STEP EVEN A FOOT OUTSIDE!!!!

THANK YOU!!

QUESTIONS ???