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Title

Augmenting Film Video Footage with Sensor Data

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Augmenting Film/Video Footage with Sensor Data

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Introduction: Media & Film Production

A New Driver Application for Sensor Networks

- **Daily Process of Current Filmmaking**
 - Humans have to document and archive every information at every step
 - Lack of *flexibility* and *inadaptability*
 - Lots of manual work to integrate CGI and real world scenes
 - No management tools
- **Propose to deploy *Sensor Networks* on a Film Set**
 - Seamless Integration
 - Portability
 - Cost Savings
 - Increased Expressiveness

Usage of Data from Sensor Networks

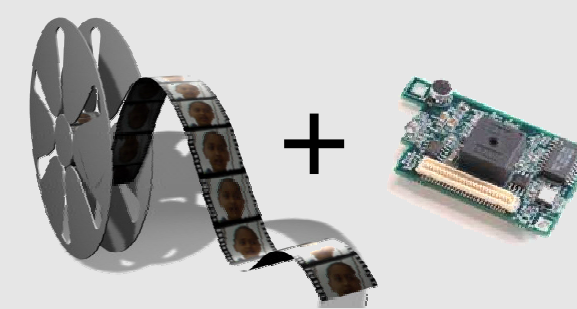
- ***Continuity* management between shots by supporting consistently,**
 - Locations of props
 - Type and intensity of lights used
 - Angle and settings of cameras
- **Support decision-making for directors and cinematographers**
 - Camera and light settings
 - Enhance *flexibility*
- **Adding CGI to scenes according to the environment**



Problem Description: Augmented Footage and Guided-Incremental Sensor Deployment

Unique Requirements and Research Challenges

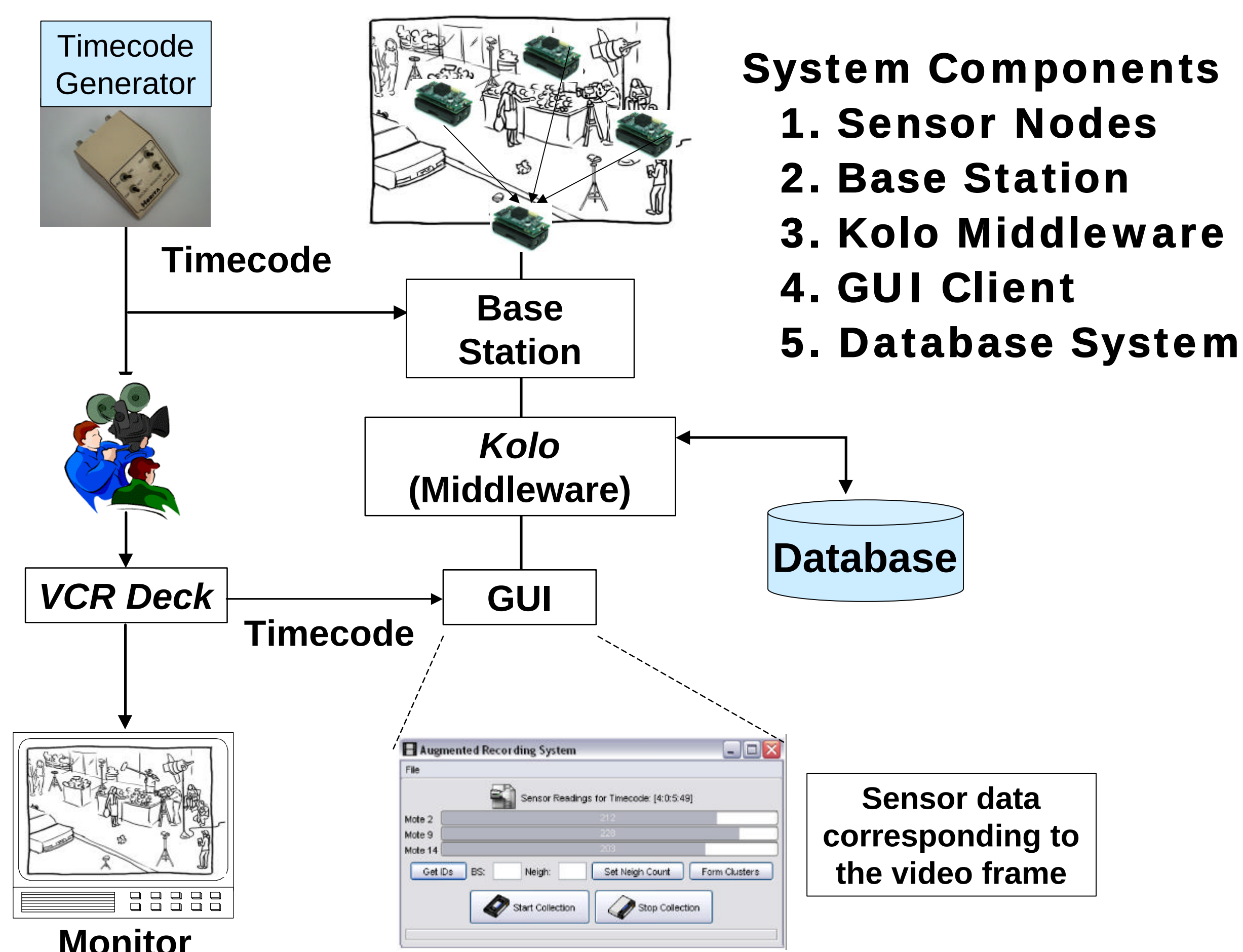
- **Guidance for Sensor Deployment**
 - *Human-in-the-loop* deployment
 - Crews are non-expert in sensor networks
 - *Rapid* deployment
- **Deployment-Time Services**
 - *Guide* people who deploy sensors
 - How to consider *coverage* problems at deployment-time?
 - *Distributed* algorithms



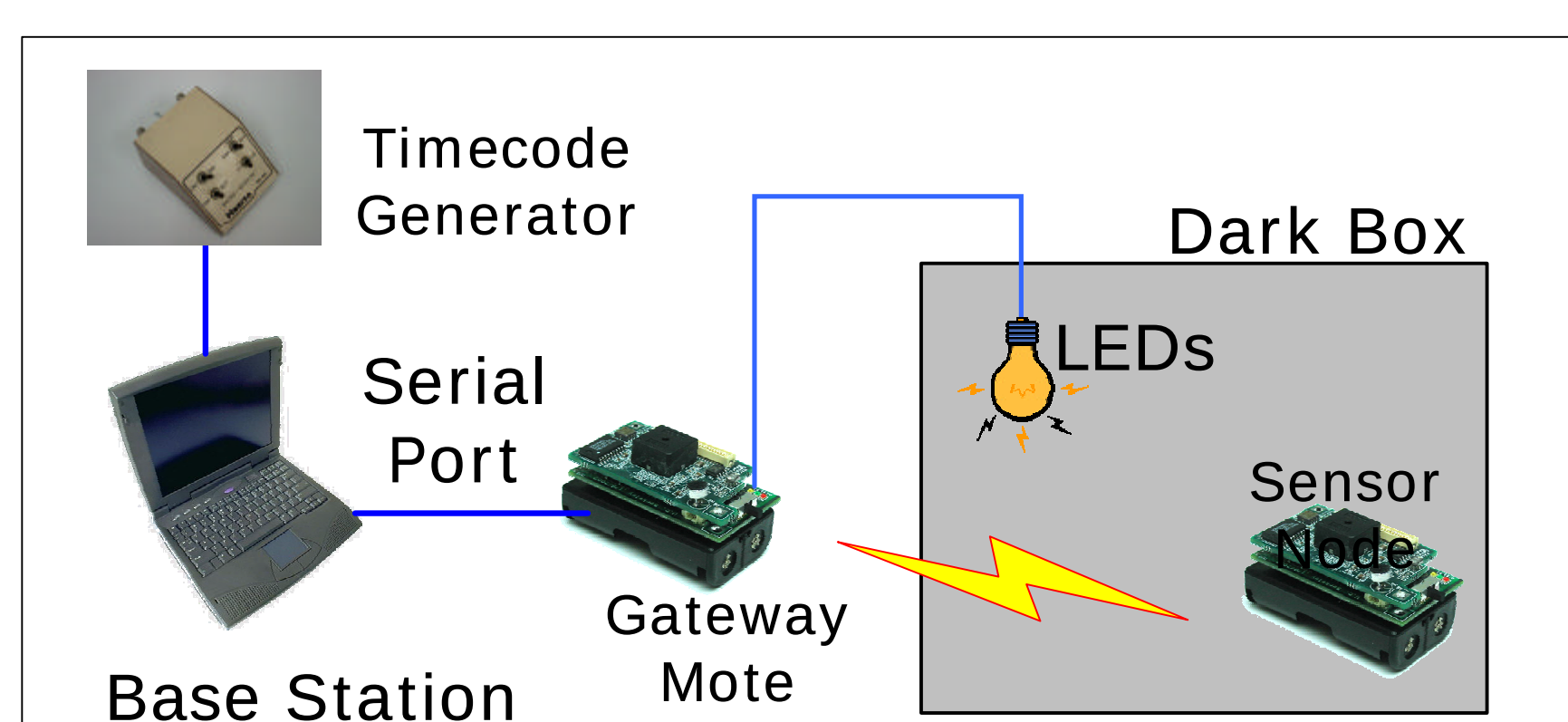
- **Augmented Film Footage with Sensor Data**
 - Sensor data record *synchronized* with the film camera's visual record
 - Synchronized with external timecode signal
 - SMPTE timecode generator (TV standard: 29.97 frames per second)
- **System Architecture for Augmenting Film Footage**
 - Coupling with film equipment
 - Time synchronized sampling
 - *Sensor network architecture* to support high sampling rate

Proposed Solution: Augmented Recording System

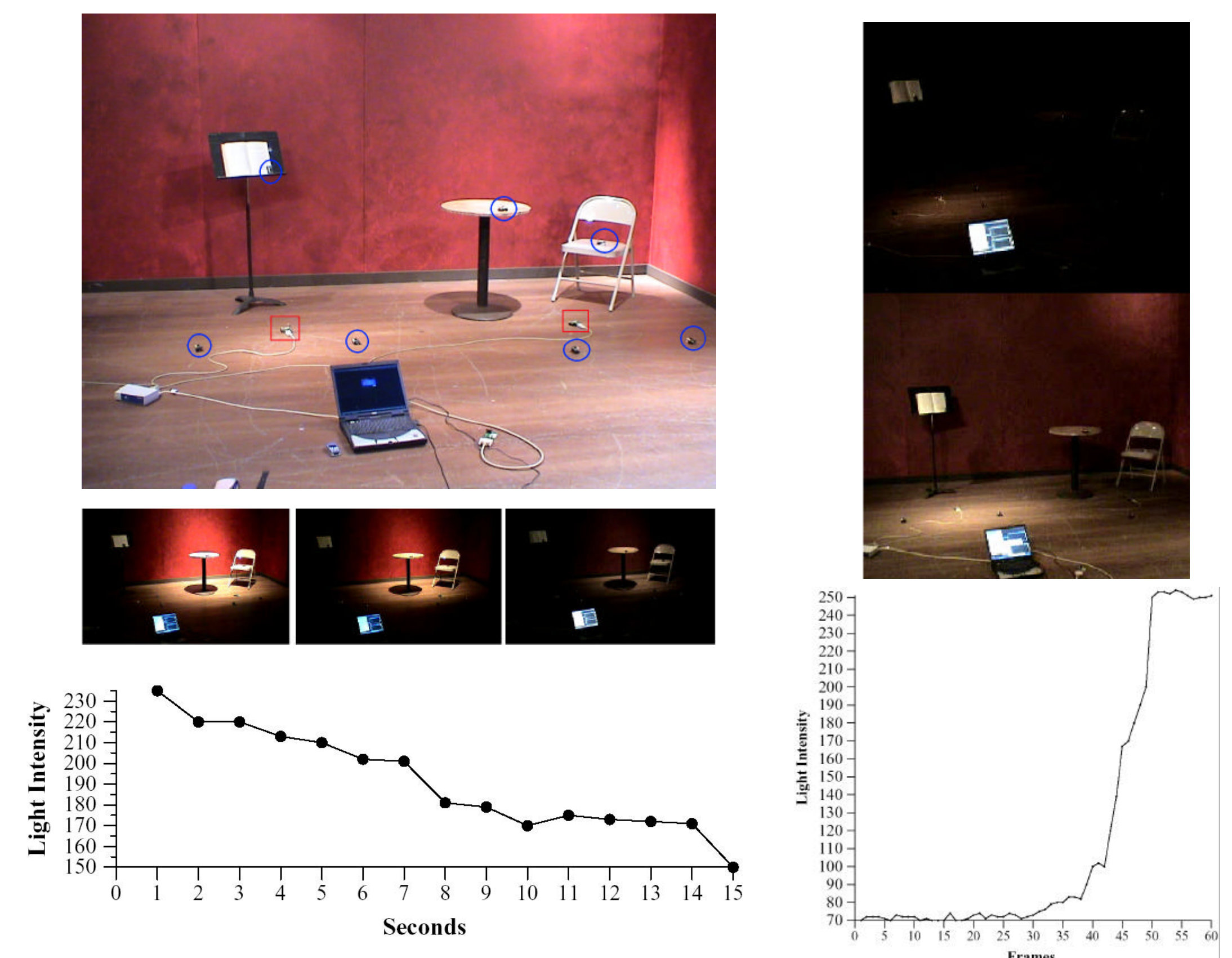
System Architecture of Augmented Recording System



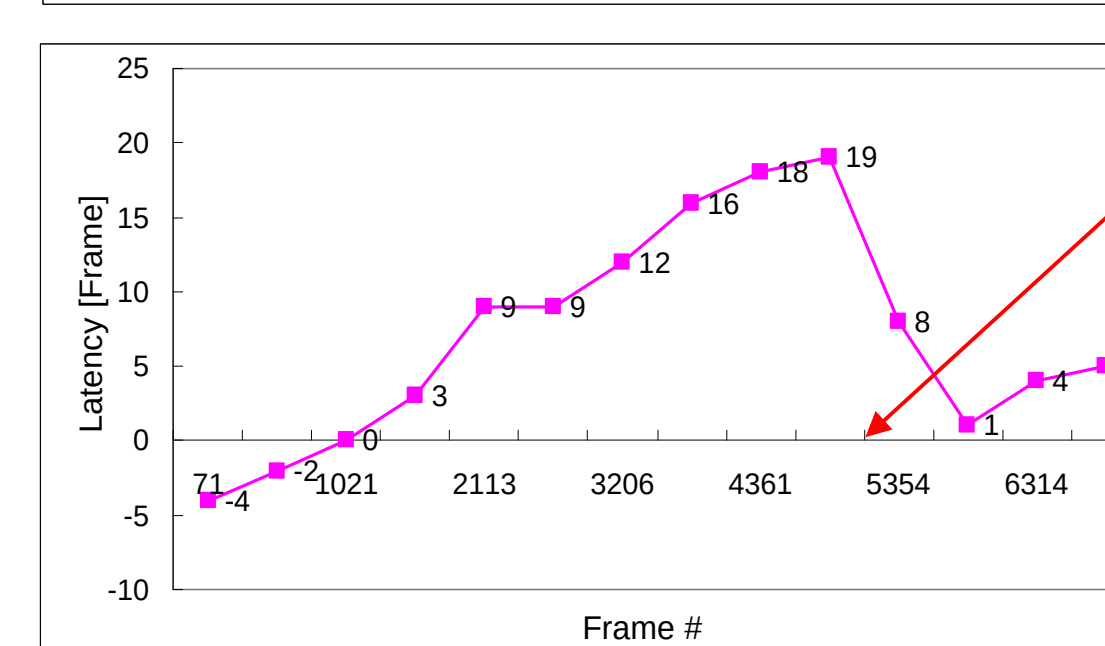
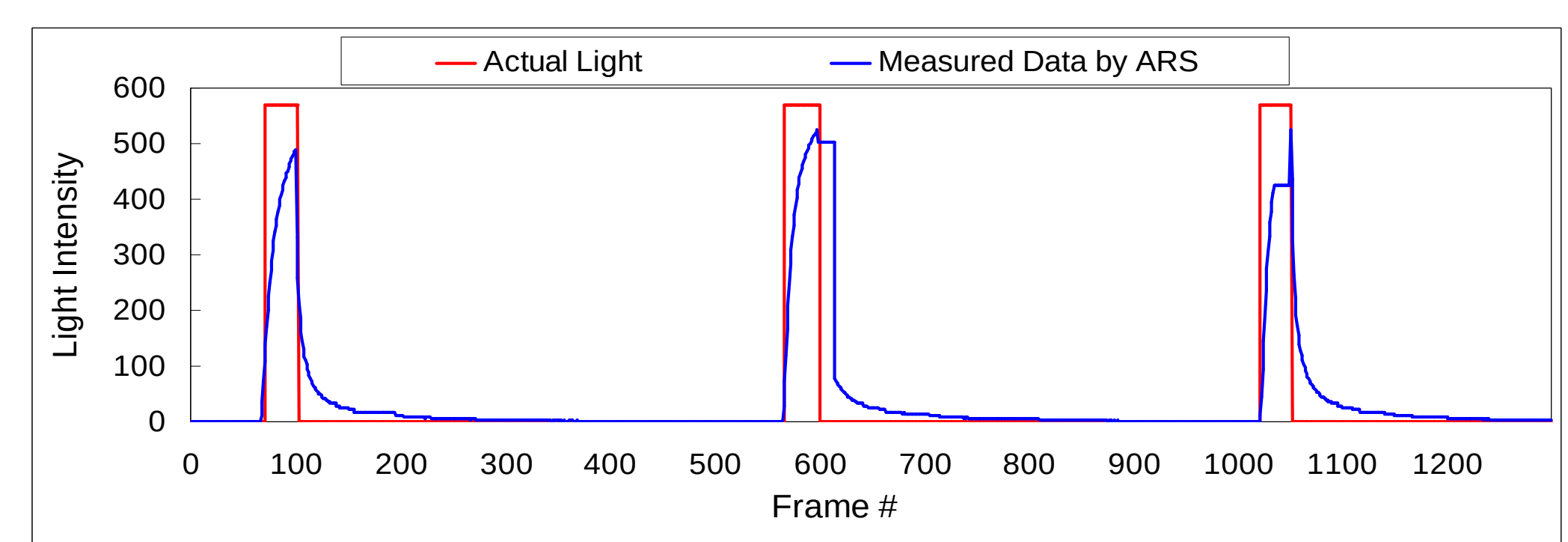
Latency Measurement Setup



Evaluation



Preliminary Latency Measurement Results



SYNC Command broadcasted at 5272th frame

- Period of Timer of Motes = 33ms
- SMPTE Timecode = $1/29.97 = 33.67\text{ms}$