



## High-Definition Video with Low-Speed Cameras

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**WARF: P130162US01**

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for generating high-quality HDR video using offset image capture and processing.**

### Overview

High dynamic range (HDR) video delivers imagery in a wide range of light intensities, from sunlight to dark shadows. This provides a truer brightness that can significantly enhance viewers' experience. However, capturing motion for HDR video is problematic because longer exposure times mean blurry pictures and shorter exposure times mean less light and noisy pictures.

Of course, high-speed cameras can produce quality video and record fast-moving objects. Yet these cameras are expensive and power consuming, and they require high bandwidth. Implementing them on portable devices like mobile phones has been difficult.

### The Invention

UW-Madison researchers have developed a temporally offset sampling scheme for generating high-definition video.

For each pixel in a camera, image data is captured at different times and with differing exposure periods (e.g., randomly selected), and temporally offset from all others. This image data from the disparate pixels and times are compared and matched to construct video.

Images may be sampled at a relatively low rate with offset, per-pixel exposure time. In this way, the scheme achieves high dynamic range by spatial or temporal redundancy, thereby matching images captured at the different pixels.

A CMOS or CCD-based sensor can be implemented to generate high-speed video frames using low sampling rate.

### Applications

- Modifying low-speed cameras
- New reconstruction software
- Mobile devices

### Key Benefits

- Makes quality video more accessible
- Uses less power

- Good temporal resolution and high dynamic range

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- Good low-light performance (nearby, full brightness throughout)

- Overcomes blurring and noise in dark regions by combining images with different exposures

- Scheme can be implemented on a single imaging chip for small mobile devices.



## Additional Information

### Related Technologies

- [WARF reference number P100231US01 describes a video retargeting approach that avoids jitter.](#)

### Tech Fields

- [Information Technology : Computing methods, software & machine learning](#)

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