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**Heidelberger Innovationsforum 2009**

# **Motion artifact free HDR camera system**

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**THOMSON**

TECHNICOLOR. 

# Agenda

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## Introduction

- Team and Product Profile

## Extracts of our portfolio

- HDR – High Dynamic Range Capturing and Processing
- Lens Correction algorithm

## Our offer



# Introduction

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## Team Profile

- At least 25 years know-how in video algorithm and IC development
- Experience in Consumer and Professional video applications

## Product Profile

- High quality algorithms – e.g. used in Thomson Grass Valley Broadcast Cameras  
(~70 % of the cameras of Olympic games in Peking from GV)
- In-house HDR CMOS Sensor available  
(1920x1080 Pixel, Pixel size: 5x5um, max.120dB dynamic range)



# What means HDR – High Dynamic Range

- Picture details of a scene may be lost due to limited dynamic range of today's cameras



**Under Exposed**  
**EV -2**



**Automatic Mode**  
**EV 0**



**Over Exposed**  
**EV +2**

→ **State of the art solutions to overcome this problem:**

- Logarithmic HDR sensor → Noisy picture, strange colors, ...
- Multiple read-out capturing → Motion artifacts



# Example 1 : HDR

Captured with typ. Camera (Dynamic max. 60db) based on CCD or CMOS Sensor



Linear CMOS Sensor (multiple read-out + HDR processing)



-> Scene shows ~100 dB of visible dynamic range

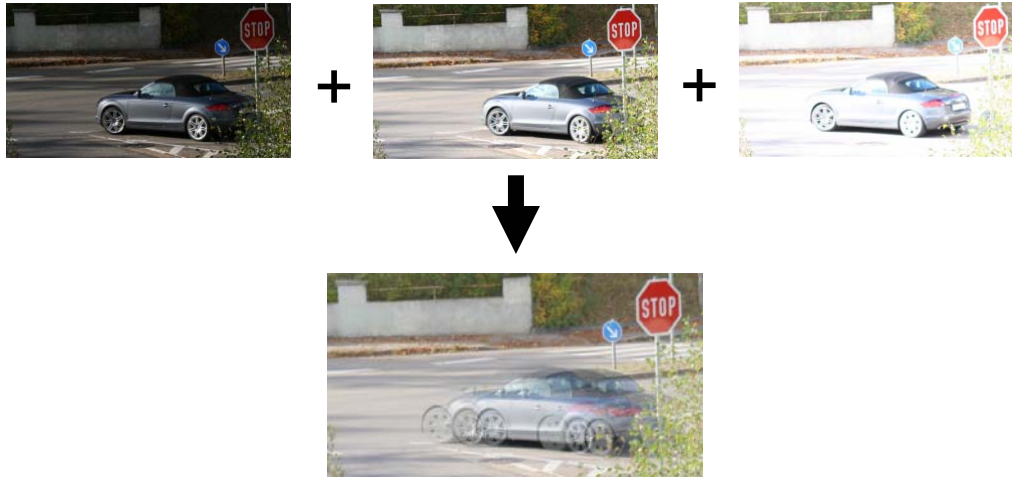
-> Very low noise level compared to logarithmic HDR capturing systems



# Example 1 : HDR State of the art

## State of the art linear HDR capturing results in motion artifacts

- Example done with DSLR camera



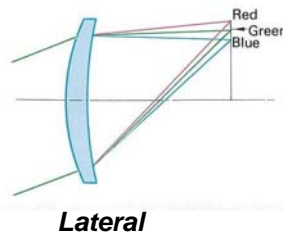
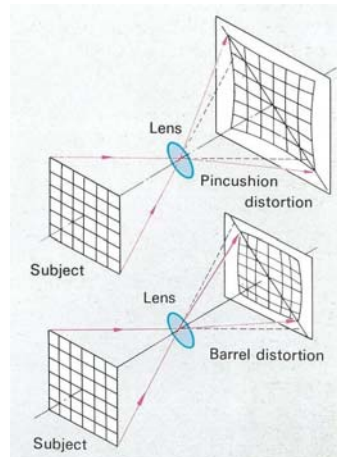
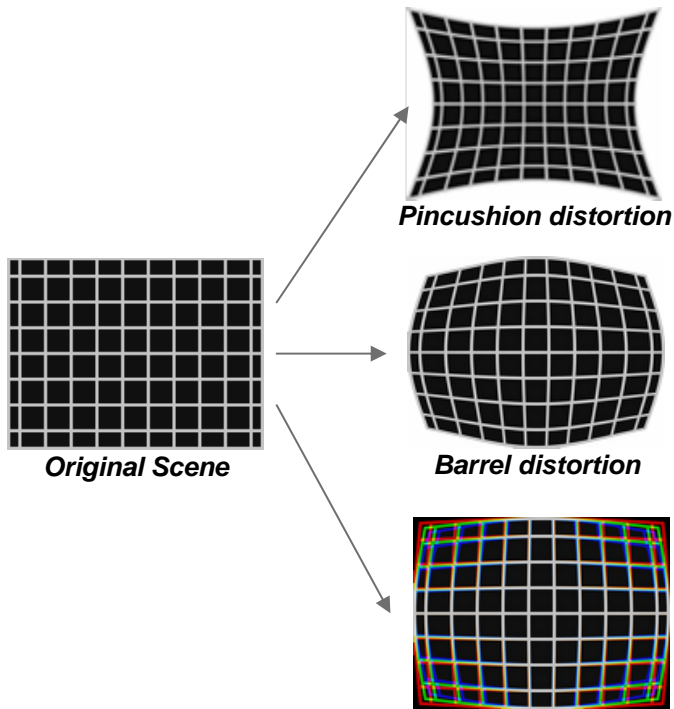
## Our approach based on a linear CMOS sensor + special HDR processing captures all in one frame

- No motion artifacts



# Example 2 : Lens Corrections

## Typical Lens Distortions/Aberrations caused by optics



Example for Chromatic Aberration

## HD-Image



Uncorrected Cut-Out



Corrected Cut-Out

## Lens Correction Algorithms opportunities

- Reduce the cost of the camera lens in an application
- Improve the overall performance of a camera design
  - e.g. to measure exact distances based on a camera



# Our Offer

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## Our solutions

- Higher Dynamic Range for your camera design
- All kinds of „Lens Corrections“ for performance and/or cost optimizations (Distortion, Aberration, Vignetting, ...)
- Standard camera algorithms (De-Bayer, NR, Autofocus, ...)
- Color management

## Our service

- Sale of IP blocks (Specification + Software)
- Customer specific algorithm design
- Customer specific VDHL implementation
- In-house HDR CMOS Image Sensor available

## Activity considered to spin-off in near future

## You are welcome to visit our lab in Villingen/Black Forest



# Thank you for your attention

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