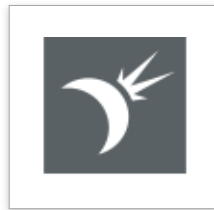


Arecont Vision® STELLAR™ Technology



Advanced Low-Light Technology for Noise Reduction and
Enhanced Color Imaging in Near Complete Darkness

425 E Colorado Street, Glendale, CA 91205 USA | +1.818.937.0700 | sales@arecontvision.com

© 2017 by Arecont Vision LLC.

All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of Arecont Vision.

Arecont Vision, the Arecont Vision logo, MegaBall, MegaDome, MegaDynamic, MegaVideo, MegaView, MicroBullet, MicroDome, and SurroundVideo are registered trademarks of Arecont Vision.

Arecont Vision University, Casino Mode, Channel Partner Certification Program, CorridorView, Leading the Way in Megapixel Video, Massively Parallel Image Processing, MegaLab, MegaVertical, NightView, SituationalPlus, SNAPstream, STELLAR, True Day/Night, and True Wide Dynamic Range are business use trademarks of Arecont Vision.

Table of Contents

• Introduction	5
• What Is STELLAR?	6
• How It Works	7
• Processor	7
• Optics	7
• Sensor	8
• Algorithms	8
• Low-Light Imaging	9
• Noise Reduction and Motion Blur	10
• Bit Rate and Storage Reduction	11
• STELLAR Images	12
• Models with STELLAR	14
• Conclusions	17
• Recommendations	18
• Learn More	19



Introduction

Spatio **TE**mporal **Lo**w **LI**ght **AR**chitecture (STELLAR™) is an advanced imaging technology developed by Arecont Vision exclusively for use in our single- and multi-sensor multi-megapixel cameras. STELLAR cameras offer complete day/night operation to provide high-quality color video, even in extreme low light conditions for professional surveillance projects.



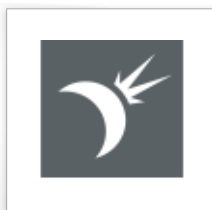
Arecont Vision STELLAR technology is composed of four components – Processor, Optics, Sensor, and Algorithms. In combination, these components are tuned to provide excellent low light imaging with minimal ambient light. Color imaging is possible with as little as 0.2 lux, and monochrome imaging is available with as little as 0.002 lux.

STELLAR technology reduces noise, motion blur, bitrate, and storage consumption while providing excellent low light video and images.

Models across the Arecont Vision product line include STELLAR technology to meet the widest possible range of requirements. A subset of STELLAR, known as NightView™, also appears in some Arecont Vision camera families.

This paper reviews the technology in detail, how it works, and the single- and multi-sensor Arecont Vision megapixel cameras that include STELLAR technology.

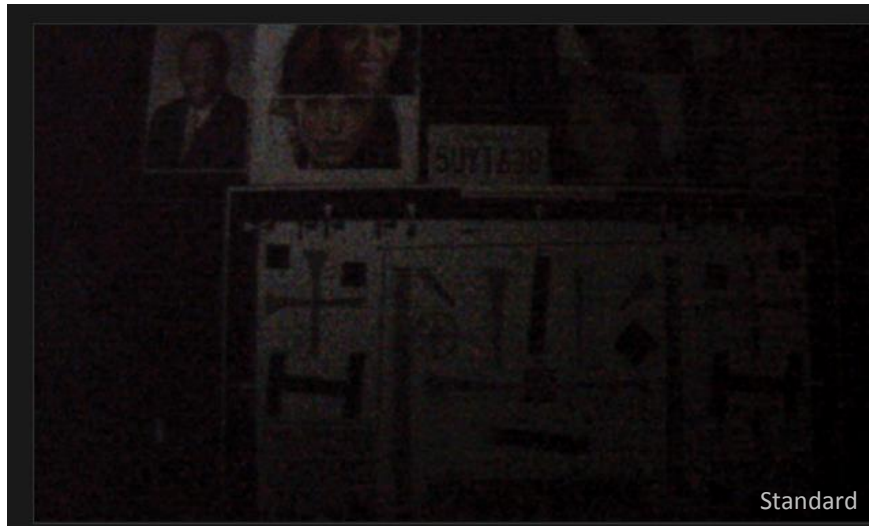
A companion interactive webpage can be found online at: <https://www.arecontvision.com/landing-pages/stellar/overview.php>.



What is STELLAR?

Spatio **TE**mporal **Lo**w **LI**ght **AR**chitecture (STELLAR) is the most advanced Arecont Vision technology for color imaging in near complete darkness. First introduced in 2014, STELLAR is an available option across five Arecont Vision IP megapixel single- and multi-sensor product families.

STELLAR technology utilizes a patent-pending algorithm that reduces noise, motion blur, bit rate, and storage requirements. This technology delivers superior low light sensitivity, making STELLAR-equipped megapixel cameras capable of covering areas where very little light is present.



The image above is of a standard megapixel camera viewing a lab scene with very little light. The image below is of the same scene, but with a STELLAR-enabled Arecont Vision camera.



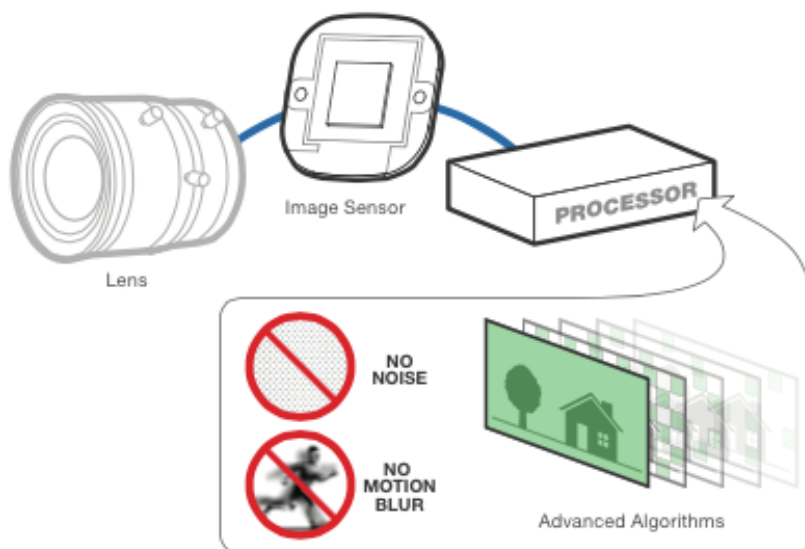
How It Works

STELLAR technology integrates four components to deliver superior color low light imaging without image blur while reducing bandwidth and storage requirements.

STELLAR combines the *processor*, *optics*, *sensor*, and patent-pending *algorithms*.

PROCESSOR

Arecont Vision's patent-pending smart processing algorithms collect relevant information from multiple video frames to reduce both noise and motion blur as new video is recorded.

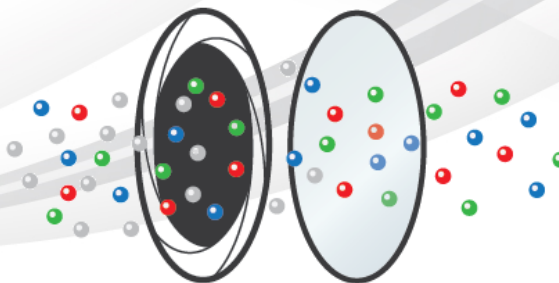


OPTICS

In a dark environment, a wide open iris and a shorter focal length collects more light.

Infrared light is removed from the stream of photons passing through the iris for better color accuracy.

PHOTON KEY

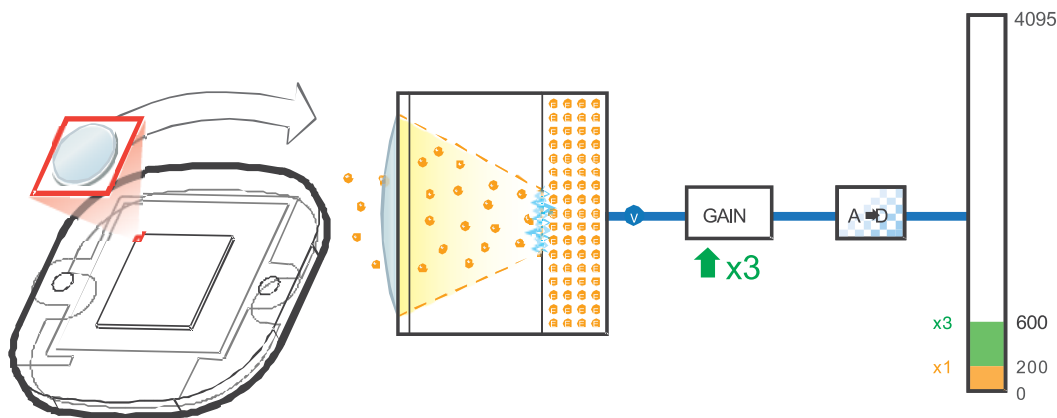


How It Works

SENSOR

As the pixels individually gather light, the photons are converted into electrons and digitized.

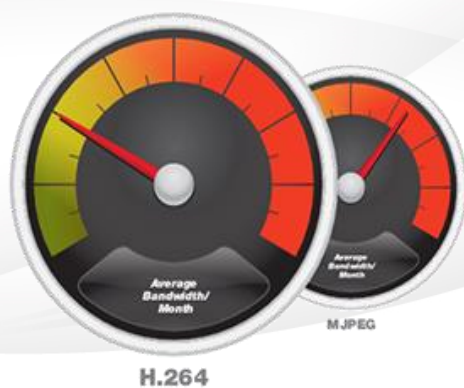
Gain can be raised to increase the analog pixel voltage before the digital conversion process takes place, revealing more details.



ALGORITHMS

STELLAR technology employs advanced video processing algorithms to improve quality before compression, ensuring low-light video does not consume excessive network bandwidth, or significantly compromise image quality.

STELLAR delivers efficient compression (H.264) with average 10x bandwidth and storage reduction vs. MJPEG.

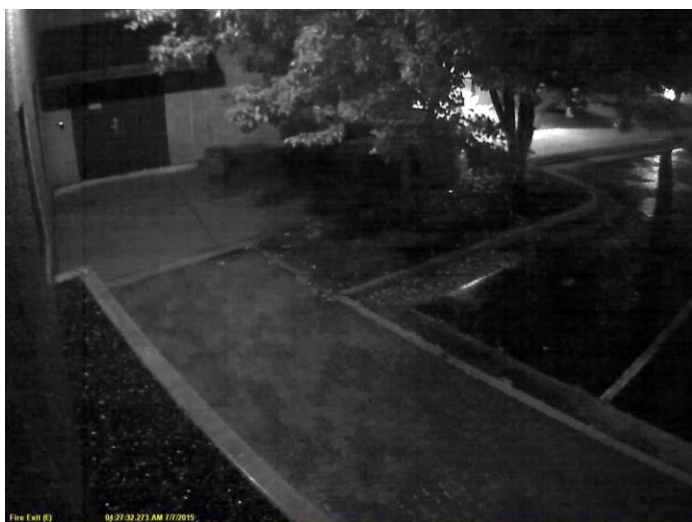


Low-Light Imaging

STELLAR-enabled cameras feature a unique sensor specifically designed for low-light performance, enhanced color accuracy, and low noise level performance requirements. This allows the camera to be used in both daylight and in night time/low light conditions. Utilizing cutting-edge technologies to enhance contrast and reduce motion blur and noise, Arecont Vision cameras with STELLAR technology generate high-quality color video under even the most challenging lighting conditions. This includes operation in near complete darkness.

STELLAR technology was developed in house by Arecont Vision to use a custom designed lens and IR cut filter combination. Together, the lens and IR cut filter are optimized with a pass-band filter so that a particular range of wavelengths can be provided to the image sensor for the best possible color reproduction in low-light applications.

Since STELLAR-enabled cameras deliver usable video with minimal ambient light in both color (0.02 lux) and monochrome (0.002 lux) modes, clear images are delivered in even the most challenging low light conditions.



A typical low light night scene without a STELLAR technology-enabled camera.

The monochrome image produced does not deliver much useful detail.



The same night scene and illumination with an Arecont Vision camera with STELLAR enabled is recreated in this shot.

STELLAR dramatically increases the detail and sharpness of the scene.

Noise Reduction and Motion Blur

STELLAR technology includes our unique video processing algorithms which are used to minimize noise and improve color accuracy, sharpness, brightness, and contrast without sacrificing image resolution.

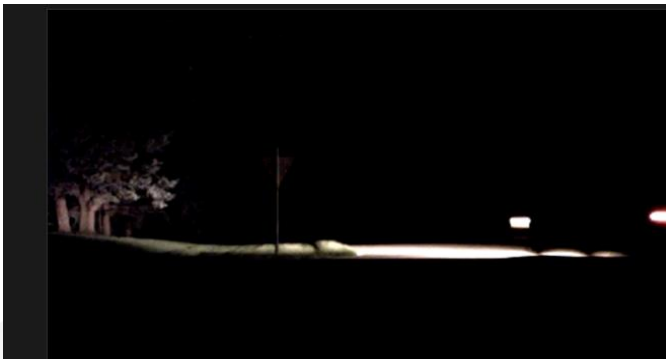
These patent-pending algorithms extract and analyze key image quality metrics, and use them to control lens, image sensor, and processor parameters to further enhance images in future frames.

STELLAR technology delivers color images in near-complete darkness at up to 17 frames per second (FPS) for single-sensor cameras, and up to 12 FPS for SurroundVideo G5 multi-sensor panoramic cameras.

The STELLAR algorithm is computationally inexpensive and operates using low memory and bandwidth with no artifacts. Motion blur and noise are minimized through custom algorithms using both temporal and spatial data. STELLAR video processing algorithms are implemented in a highly efficient manner to best manage and control the camera's hardware resources without compromising or distorting fast moving objects.

Arecont Vision STELLAR technology overcomes challenging lighting conditions by using a judicious selection of optical parameters to balance light collection, depth of field, and field of view throughout the design process. Fast-moving objects can be captured without blur whether monitored for activities such as moving traffic or indoor activities like casino gaming.

Standard cameras blur moving objects and important details are missed in low light conditions, as above. Below, STELLAR is enabled, and moving objects are captured in color without blur while providing more detail even in extreme low light conditions.



A typical low light night scene without a STELLAR technology-enabled camera.

The monochrome image produced has significant motion blur.

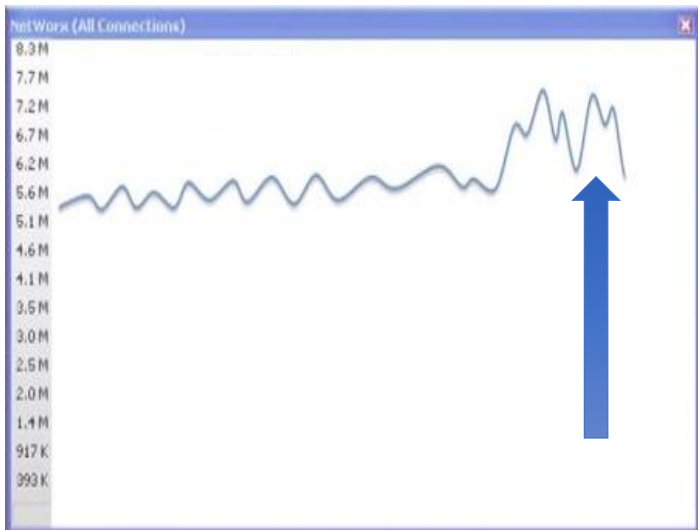


When STELLAR is enabled, moving objects are captured in color without blur while providing more detail even in extreme low light conditions.

Bitrate and Storage Reduction

STELLAR technology simultaneously reduces bitrate and storage requirements by suppressing noise through temporal noise reduction. High-quality videos can be compressed more effectively, which in turn results in a lower bitrate.

Advanced video processing algorithms are deployed to improve quality before the video is compressed ensuring low-light videos do not consume excessive network bandwidth, or significantly compromise image quality while encoding noisy video.



Standard MJPEG



Bandwidth Reduction with H.264

Full color STELLAR imaging for an night time outdoor scene at a snow-covered service station with typical poor lighting conditions using a single-sensor Arecont Vision camera captures crisp details.



STELLAR Images

Full color imaging in a varied outdoor night time street scene from an Arecont Vision SurroundVideo G5 180° panoramic camera equipped with STELLAR technology.

Top image: Overall panoramic image. **Lower image:** Partial scene digitally zoomed in from far right of the panoramic image.



Models with STELLAR

STELLAR technology is currently available in four Arecont Vision single-sensor megapixel camera series and one multi-sensor panoramic series.



SurroundVideo® G5

180° Panoramic Dome IP Megapixel Cameras

SurroundVideo G5 5 megapixel 180° panoramic indoor/outdoor dome IP cameras integrate four 1.2MP camera sensors with motorized remote focus P-iris lenses and True Day/Night functionality with an IR Cut Filter.

Model AV5585PM features STELLAR technology. Learn more about this model online: <https://www.arecontvision.com/product/SurroundVideo+G5/AV5585PM#KeyFeatures>.

Learn more about the SurroundVideo series online: <https://www.arecontvision.com/landing-pages/surround-video/overview.php>.



Models with STELLAR

MegaView® 2

IP Megapixel Bullet Cameras

The MegaView 2 Series is an all-in-one indoor/outdoor Bullet IP camera solution, with 1.2MP to 10MP resolutions, remote focus/zoom P-iris lens, built in IR illuminator, tamper resistant housing with an easily adjustable 3-axis bracket with junction box included.

Model AV1225PMIR-S features STELLAR technology. Learn more online:

<https://www.arecontvision.com/product/MegaView2/AV1225PMIR-S#KeyFeatures>

Learn more about the MegaView series at:

<https://www.arecontvision.com/landing-pages/megaview/overview.php>



MegaDome® G3

Motorized IP Megapixel Cameras with Adjustable IR Option

MegaBall G3 1.2 megapixel True Day/Night indoor IP cameras feature an Adjustable IR model option, which automatically adjusts the IR beam angle and LED intensity in relation to the distance of objects and the field of view.

Model AV1355PM-S

<https://www.arecontvision.com/product/MegaDome+G3+Series/AV1355PM-S>

and model AV1355PMIR-S

<https://www.arecontvision.com/product/MegaDome+G3+Series/AV1355PMIR-S>

Learn more the MegaDome series at:

<https://www.arecontvision.com/landing-pages/megadome-g3/overview.php>

Models with STELLAR

MegaVideo® G5

IP Megapixel Box Style Cameras with Motorized Lens Options

MegaVideo G5 1.2 megapixel single sensor indoor cameras feature customizable motorized remote focus and zoom lens and manual lens options as well as multiple indoor and indoor/outdoor housing options to fit a broad range of IP camera needs.

Model AV1225PMIR-S features STELLAR technology. Learn more online:

<https://www.arecontvision.com/product/MegaView2/AV1225PMIR-S#KeyFeatures>

Learn more about the MegaVideo series:

<https://www.arecontvision.com/landing-pages/megavideo/overview.php>



MegaBall® G2

Motorized IP Megapixel Cameras with Adjustable IR Option

MegaBall G2 1.2 megapixel True Day/Night indoor IP cameras feature an Adjustable IR model option, which automatically adjusts the IR beam angle and LED intensity in relation to the distance of objects and the field of view.

Model AV1245PMIR-SB-LG features STELLAR technology. Learn more online:

<https://www.arecontvision.com/product/MegaBall+G2+Series/AV1245PMIR-SB-LG#KeyFeatures>

Learn more about the MegaBall series:

<https://www.arecontvision.com/landing-pages/megaball/overview.php>

Conclusions

Arecont Vision STELLAR technology optimizes four separate components in each STELLAR-equipped camera (Processor, Optics, Sensor, and Algorithms). This in house developed technology provides unmatched high quality color video regardless of the time of day or the lighting conditions in the scene.

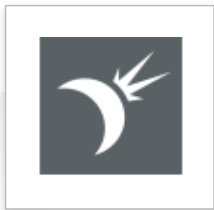
STELLAR technology makes high quality color and monochrome images possible while reducing noise, motion blur, bandwidth, and storage requirements.

A wide range of customer needs can be addressed by this advanced technology for non-stop surveillance with high quality color imaging possible with STELLAR equipped cameras at as little as 0.02 lux and monochrome imaging at as low as 0.002 lux.

Five Arecont Vision product families include STELLAR-equipped models to meet the widest possible range of customer requirements for night imagery.

- *SurroundVideo G5 180° panoramic multi-sensor dome cameras*
- *MegaView 2 bullet cameras*
- *MegaDome G3 dome cameras*
- *MegaVideo G5 compact box cameras*
- *MegaBall G2 compact ball cameras*

Arecont Vision cameras with advanced STELLAR technology should be the first choice of security professionals when 24 hour operation is required for video surveillance indoors or out¹, even in extreme low light conditions.



1 - Model dependent. MegaDome 2 and MegaBall are indoor cameras. SurroundVideo G5, MegaView 2, and MegaVideo G5 are intended for indoor or outdoor use with proper installation. See Arecont Vision product pages online for more details: <https://goo.gl/1I9X5x>.

Recommendations

1. Customers, systems integrators, and consultants should always consider Arecont Vision STELLAR equipped megapixel camera series for projects that have varied lighting conditions and require both day and night surveillance from a single camera.
2. Learn more about STELLAR technology by visiting the interactive companion page for this paper at: <https://www.arecontvision.com/landing-pages/stellar/overview.php>.
3. Learn more about other industry-leading technologies that have been developed in house by Arecont Vision that benefit our customers every day at: <https://www.arecontvision.com/landing-pages/industry-leading-technology/overview.php>.
4. Use the Arecont Vision Try-and-Buy program to obtain and install an Arecont Vision camera risk free for a trial at the customer site. Cameras can be purchased at a special discounted price through the program in order to demonstrate the real-life advantages Arecont Vision offers [see current promotions at <https://www.arecontvision.com/landing-pages/promos/overview.php#tryandbuy>].
5. Contact Arecont Vision today to discuss your project needs or to learn more.
 - Look up the Arecont Vision contact for your region around the world online here: <https://www.arecontvision.com/where-to-buy.php>
 - Request information at: <https://www.arecontvision.com/contactform.php>
 - Email us at: sales@arecontvision.com
 - Call our corporate headquarters at: +1.818.937.0700
 - Visit us online at www.arecontvision.com

425 E Colorado Street, Glendale, CA 91205 USA | +1.818.937.0700 | sales@arecontvision.com

Learn More



Leading the Way in Megapixel Video™

www.arecontvision.com

sales@arecontvision.com

+1.818.938.0700



<http://blog.arecontvision.com>

AV News Center

Get the latest news on Arecont Vision with press releases, videos, events, webinars and more...

<https://www.arecontvision.com/news.php>



linkedin.com/company/arecont-vision



facebook.com/arecontvision



twitter.com/arecontvision

[@arecontvision](https://twitter.com/arecontvision)



youtube.com/user/ArecontVision

Arecont Vision

425 E Colorado St., 7th Floor
Pasadena, CA 91107 USA

© Arecont Vision, 2017. All rights reserved