What does Pinnacle actually provide and why is it called Ultra HDR™?

Pinnacle Imaging Systems mission is the quest to replicate as close as possible our internal human vision system in embedded video camera systems by utilizing various embedded multi-exposure/multi-frame capture IP methods and combinations of proprietary IP and algorithms, to achieve the highest possible dynamic range for camera systems. Our IP blocks and cores for camera systems are independent upon logic and sensor type, they do not sacrifice video and image quality, deliver required frame rates and do not inhibit resolution. Our scalable resolution IP cores provide unsurpassed dynamic range where data acquisition, range, detection and recognition in vision systems is paramount.

Why is Ultra HDR™ important in video capture?

Our visual world is changing rapidly. Video camera systems are now not only required to produce high quality, high resolution scene replication, they're required to serve up the highest possible data set from the video even in high contrast situations for computational tasks. Most non HDR camera systems fail at this and deliver non-usable data for recognition and video analytics in post.

Pinnacle has spent 8 years in development towards solving the problem of high dynamic range capture, improving the DR of video capture to meet and exceed the DR presented in everyday scenes cameras are expected to replicate. This allows usable data to be delivered to the analytics system and increases the degree of accuracy in the algorithms used for computational intensive tasks. Without Ultra HDR™, it's just unusable, dark data being delivered to the post capture analytics engines and machine learning systems.

Why is improved video analytics important?

Because video camera systems are no longer expected to just provide a visual replication and are now being categorized as smart cameras, conscience cameras, assertive cameras, connected cameras, providing data to recognition engines for video analytics and machine learning. All these newer computational intensive technologies connote a higher degree of video-to-data utilization with post capture algorithm-based data analytics. In-fact, there is a tremendous reliance on the data source – the camera system capturing a high level of video data in all applications, all situations and, they have to provide "usable" data for the analytics engines to have higher accuracy.

How can Ultra HDR™ aid in providing a higher level of usable data for analytics?

More often than not, the real-life scene a video camera is capturing has a much higher dynamic range, (the difference in luminance between the darkest area of a scene and the lightest, adjusting for noise) than most image sensors, lens and image pipeline combinations can capture, rendering unusable data to the analytics algorithm engines to process. Experts in data analytics call this "dark video data" and it refers to unusable video capture to obtain a high enough degree of accuracy in analytics. A good example would be if a burglar is caught on a surveillance camera walking in and out of a commercial building from dark indoor areas into bright sunlight. Most existing camera systems would have a difficult time in this kind of circumstance to recognize any detailed facial features for post facial recognition algorithms to identify who this person might be based on known databases. Ultra HDR™ easily solves this kind of problem.

What applications can Ultra HDR™ be used?

Ultra HDR™ can be used in nearly all applications that present a high contrast (high dynamic range) scenario. In nearly all cases, this is also a mission critical circumstance, particularly in automotive ADAS systems, commercial / industrial surveillance, police body and dash cameras, commercial drones, traffic camera systems, military, endoscopy, astronomy, and scientific.

Is Dynamic Range in Ultra HDR™ improving and how is it disruptive?

Yes, it is improving rapidly at the sensor level as well as our development of novel approaches to provide higher DR beyond what any sensor can provide.

We feel our IP blocks and cores have the capability to provide enormous disruptive value to our visual systems and could eventually have implications on a social level outside of visual and data enhancement.

We believe humans were never meant to see replication of our natural world with such a limited color gamut, producing deep shadows with no detail and blown out highlights currently replicated by our camera and display systems. Our eyes don't see realistic scenes this way, why should our replication devices be limited by our capture and display systems? Humans see up to 150dB in dynamic range – some beyond that. Current camera systems without HDR provide only 65Db natively. If one looks back in time before we had camera systems to what was available for visual reproduction, our master painters all painted what the internal human vision system could see, what we call HDR.