

Long Range IR Night Vision Cameras

Standard surveillance cameras all use visible light 400~700nm. In order to produce images they need a lot of light to work. Due to this, Ascendent offers a number of technologies and camera systems that allow you to see in complete darkness without any light. Ascendent camera systems uses Thermal, SWIR and Laser illumination to provide clean crisp image in even the most difficult conditions such as complete darkness, haze, smoke, rain, snow, and even bright light. Ascendent takes full advantage of these technologies and design multi sensor systems and offer camera solutions that detect objects at over 20 miles (30km) in complete darkness. This is ideal for mission critical applications such as ports and harbor authorities and military logistics.

Thermal IR advantages over optical Cameras

Unlike optical systems, which like the human eye requires light, thermal imaging uses infrared electromagnetic radiation 900-14,000nm wavelengths (heat) to produce images. All objects that are above -213°C emit infrared radiation. The amount of radiation emitted is proportional to the temperature of the objects and thermal imaging detects these minute temperature variations and accurately reproduces the scene in greyscale. Since all objects emit infrared radiation a thermal imager is able to "see" the environment regardless of lighting conditions. Thermal energy passes through many obscurants including smoke, dust, modest foliage and light fog. The thermal camera can see this person clearly through the fog, but the standard visible light color camera cannot. Thermal cameras are ideal for detection because they use heat rather than light. Thermal cameras are unable to provide details like a visible camera system which is often why ascendant recommends using an integrated dual sensor camera system.

Cooled Thermal Imagers

Cooled thermal imaging cameras are a thermal camera that has an integrated cryocooler hence the name cooled camera. The cooler brings the thermal image core to temperatures as low as -40C. Since thermal cameras work by using heat waves cooling the core, this exponentially increases the sensitivity, dramatically increasing both range and performance. Since the Cooler has to constantly maintain temperatures often below the freezing point, the cryogenic cooler is continuously running and requires replacement every 8000~10,000 hours of operation . This makes cooled cameras have a much higher cost of ownership compared to standard uncooled thermal cameras. Cooled thermal infrared cameras are extremely sensitive to minute temperature differences allowing a few degrees temperature difference between a target and the background clearly visible. Cooled cameras work on mid wave infrared or MWIR and typically use wavelengths of 3-5UM (3000nm ~5000nm). The combination of the Cooled image core and the ability to work on the MWIR spectrum when used with Ascendent's long range optics Results in ultra-long range **detection** capabilities up to **20 miles** or **30km** even if there is only a few degrees temperature variance between the target and background . While Cooled cameras are a significant investment and are considerably more expensive then uncooled there superior range and performance allows them to replace up to 8 uncooled cameras, making them viable and cost effective solution for certain applications such as Home land security, and Coastal surveillance.

Uncooled Thermal Imagers

. Uncooled thermal imaging cameras are infrared cameras that do not require cryogenic cooling. A common detector design is based on the micro bolometer, a tiny vanadium oxide resistor with a large temperature coefficient on a silicon element with large surface area, low heat capacity and good thermal isolation. Changes in scene temperature cause changes in the bolometer temperature which are converted to electrical signals and processed into an image. Uncooled sensors are designed to work in the Longwave infrared or LWIR band from 7 to 14 microns in wavelength, where terrestrial temperature targets emit most of their infrared energy. Uncooled cameras provide up to 8km of detection and have no maintenance cost making them account for over 80% of all thermal cameras due to their low price and high value compared to cooled cameras.

Ultra-Sensitive Color Night vision Cameras

Ascendent's ultra-sensitive visible cameras offer significant advantages over thermal imaging by producing images with up to 800% higher resolution with real time performance at a full 1080P. As mentioned above visible cameras require light in order to reproduce an image which is not a problem by day but can render them useless at night. Ascendent has developed ultra-sensitive cameras that work on both IR and visible light (700nm~1100nm) to provide detail rich color images by day and clean crisp black and white images by night. Often times especially in urban environments an illuminator is not necessary due to their superior sensitivity that render color images in with just $\frac{1}{4}$ the amount starlight glow and monochrome images in 2 milli-lux. Unlike EMCCD and intensifier cameras Ascendents camera have excellent anti blooming properties that provide high contrast images even in the presence of bright light sources. And since they do not artificially enhance light do they do not have streaking issues when there is motion as they maintain a high frame rate. These cameras also offer many advantages over thermal imaging as they produce much higher resolution, capture details such as facial features rather than heat blobs and have the ability to see through windows and other optically pure substances at night. In short, unlike thermal cameras that use heat and can only be used for detection and knowing the rough size of an object, Ascendents Visible cameras not only provide detection but also the ability to actually identify an object.

Active IR ZLID Laser illumination

For applications that do occasionally get complete darkness due to color cover or other environmental applications, Ascendent has developed its ZLID laser illuminators. Ascendent's ZLID illuminators combine laser diode technology with precision engineered optics and sophisticated electronics to provide extreme long range Active IR illumination. There are many companies who offer laser illumination but none compare with the performance ZLID as they use standard lasers that do not give a consistent uniform light which causes speckle and creates a very noisy image often worse than intensified or EMCCD cameras. Many laser illuminators only illuminate the center of the screen and act as a spot beam that overexposes the middle of the image and leaves the edges dark. These images often provide little more detail than a standard thermal camera. Ascendent's ZLID (Zoom Laser IR Diodes) Technology (IR Laser) synchronizes IR intensity and area illumination with motorized zoom lens for outstanding active IR performance, eliminating overexposure, washout, and hot-spots for unparalleled performance at distances up to 5km (16,400ft) in complete darkness.

SWIR imaging

Ascendent's camera system is the most effective perimeter-intrusion detection systems that use multiple technologies to increase the probability of rapid detection and low false alarm rates under a range of atmospheric and lighting conditions. (SWIR) cameras offer many of the features of both thermal and visible cameras. Like thermal they have the ability to cope with atmospheric conditions such as rain, fog and mist but cannot detect objects like thermal unless the target is over 110°C. Like visible cameras, the SWIR also work on NIR (Near-Infrared) and can be used in tandem with Ascendent's ZLID cameras to provide identification level performance in 0 lux. SWIR in tandem with Ascendent zoom optics allows SWIR to be used for security and surveillance rather than just traditional machine vision or spectroscopy.

Precision Long Range Electro Optics

Ascendent optics are precision engineered and designed to offer unparalleled performance and use a variety of standard zoom lenses such as 1000mm, 1500mm and 2000mm. Ascendent's ULR camera boasts industry leading focal lengths up to 3000mm without a use of a doubler. Not only does Ascendent optics offer long range, but can handle high resolution sensors used in military satellites in excess of 60MP compared with standard lens that are .5MP. Ascendent also uses a wide variety of spectral filters and coatings are integrated to compensate or eliminate the effects of parasitic light conditions such as fog, smoke, haze, heat-waves UV and IR, to optimize image clarity and resolution. The optional Automatic Light Optimizer (ALO) uses the video signal to adjust the amount of light that hits the sensor in real time. This eliminates over and under Exposure for detailed rich images even in the most difficult lighting scenario. All Ascendent optics must pass rigorous control processes and performance benchmarks to ensure maximum optical clarity. Ascendent's optics unlike standard lenses are not measured in line pairs but ARC resolution; which is a standard for evaluating telescopes for space observation. Ascendent's 6000mm lens can read a license plate a 2km making it vastly superior in both zoom power and image quality of traditional continuous zoom lenses for recognition of targets up to 50km away.

Multi-Sensor IR and Optical Camera systems

There are many competent manufacturers of thermal and visible cameras but often they are only skilled at one of them and push their customers into either thermal or visible. Ascendent is highly experienced and has implemented a host of camera technologies that include but not limited to Visible, Thermal, Active IR, Range Gated, SWIR, Starlight, cooled thermal. Ascendent designs and manufactures multi sensor systems to leverage the benefit of all of these technologies into integrated camera systems that operate as one unified system. Ascendent custom builds cameras to suite the individual needs of our customers and has proud and rich history of being the premiere manufacture for night vision electro-optics.

Available Options

Gyro Stabilization

Ascendent's cameras can be equipped with state-of-the-art 2-5 axis gyro gimbals that keeps the sensors firmly stabilized to 1 rms at frequencies up to 5Hz, giving you clear images without degradation typically caused by rough seas, swaying, thus making it ideal for ground, marine and aerial applications.

"Slew to Cue" Radar Integration:

A superbly effective and strategic solution uses radars in tandem with pan and tilt imagers (visible CCD and thermal) and software technology to automate many of the critical challenges that the security force faces. This solution automatically detects and tracks moving objects and positions the camera to focus on the object. If the tracked object moves into a blind spot or out of a camera's view, it will be picked up automatically by another camera and tracking will continue seamlessly.

Auto Tracking PTZ Camera

Ascendent camera systems can be ordered with built-in auto tracking option. This allows the camera to track a moving object or automatically without any manual operation or any operator intervention. Upon detection of motion in the image, the PTZ camera is positioned on the detected object and tracks it automatically. Since many of Ascendent's camera solutions are multi-sensor and fitted with a variety of optics with both wide angle view to provide situational awareness and then a zoom in to capture details for identification and recognition. The Auto tracking module can be used in tandem with the slew to cue to provide a full 360 degree panoramic autonomous surveillance system with the ability for manual override if desired making ideal for homeland defense and coastal surveillance.

Precise Target Measurement & Localization

Ascendent system can be built with a LRF Laser range finder that is eye safe and pulses light at 1,550 nanometers to give real time measurements of a target. Because it operates a 1550nm it is stealth in that it will not be detected by other night vision devices such as thermal and image intensifiers. It can also be order with a digital magnetic compass (DMC) and GPS module it gives the exact GPS coordinates of the target and has an effective distance up to 30km.

Intelligent Video Analytics

AVA or Ascendent Video Analytics is our video analytics software suite, AVA allows you to intelligently track object such as people, vehicles, etc. AVA software can be configured to count people and vehicles crossing a predetermined point, and in which direction they are moving. Size and speed of objects can be calculated and saved, unattended objects can set off alarms after a specified period of time. AVA eliminates the complicated setup associated with other video-analytics software, which can have as many as 100 algorithm setup parameters for aspects such as digital filters or adjusting for various lighting conditions. In contrast, Ascendents analytics has no algorithm parameters; instead, it automatically adjusts to the conditions it encounters. AVA can also be used on existing cameras to turn it into an intelligent, information-gathering device. Systems equipped in this way can perform intelligent analysis of motion with application areas including intrusion detection, vehicle monitoring, abandoned-object detection, people counting, and loitering detection, as well as camera tampering and failure detection. Ascendent is thereby able to provide very sophisticated video analytics that upgraded existing cameras into intelligent homogenous security solutions that operates automatically and autonomously.

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