



By mounting an array of cameras on armoured vehicles, an unobstructed 360° view over the near surroundings of the vehicle can be maintained with the hatches closed, providing safety for the entire vehicle crew and assets.

The Citadel Panoramic is a camera system that combines images from two 85.5° FOV

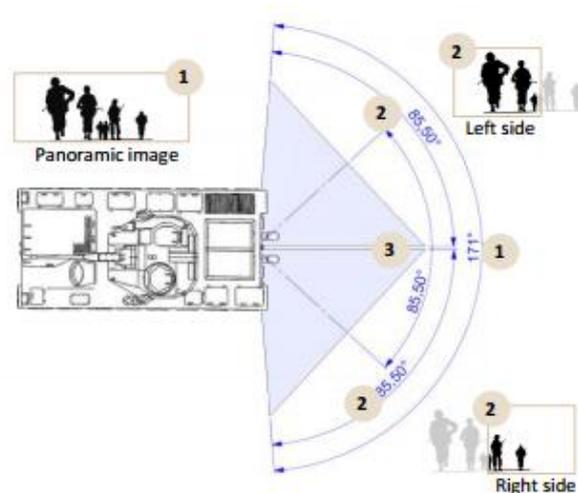
cameras to a complete seamless 170° FOV viewing system for mounting on a wide variety of vehicles, such as armoured personnel carriers (APCs), light armour vehicles (LAVs) tanks and other wheeled or tracked vehicles. It is designed to deliver high-performance images, even under the harshest conditions, in temperatures ranging from -40°C to +70°C.

Graphic overlays

The Citadel Panoramic allows configuration of several graphic overlays in the form of distance markers and text strings.



Panoramic image with example of distance marker overlays



Distortion-free images

The Citadel Panoramic is designed around the latest generation 1/3" CCD image sensors and custom designed optics to provide a seamless, distortion-free panoramic 170° horizontal FOV image, without fish-eye effect, under a wide range of viewing conditions.

The camera design provides several viewing modes :

1. Full 170° Field of View, both cameras stitched together.
2. Separate 85.5° Field of View from left or right side camera.
3. 85.5° Field of View from the centre of both cameras.

Ready for tough action

Citadel Panoramic is encased in a rugged IP-65 housing, designed to withstand vibration in accordance with MIL STD 810F (metal track vehicles). It is also sturdy enough to easily withstand the impact of soldiers' boots treading on the housing. Furthermore, with its low profile (78 mm), it is a difficult target for enemy snipers.

The camera protection windows are heated for condensation-free operation. In case of damage by scratching or cracking, a replacement window can easily be fitted in the field.

Conductive cooling

The Citadel Panoramic uses conductive cooling to remove heat from the CCD sensors. This reduces random noise in the CCD sensors, resulting in improved image quality, particularly in low-light conditions.

Fog penetration

The fog penetration function is designed to automatically increase visibility under conditions such as fog, haze and fire smoke.

The camera continuously analyses the picture and once it detects a low-contrast condition, it will automatically enhance the contrast.

Expanded Hi-Dynamic Range (XDR)

XDR is useful in conditions where there are large variations in brightness in the picture, i.e. when there are very dark and very bright areas in the picture. XDR amplifies the signal level in dark areas and reduces it in very bright areas thereby improving the visibility in the picture.

Digital Noise Reduction (DNR)

The Digital Noise Reduction in the Citadel Panoramic camera is a function which analyses the video image and reduces the noise, particularly in low-light conditions.

The analysis is based on a 3-dimensional algorithm.

Main features

- Panoramic 170° horizontal Field of View
- Distortion-free, no fish-eye effect
- Real-time for drivers
- Wide temperature range, -40°C to +70°C
- Day/Extended Night Mode operation
- Heated protective window
- Fog penetration
- Digital Noise Reduction, DNR

| | PAL | NTSC |
|--------------------------------------|--|------------|
| Image system | | |
| Sensor | (2x) high sensitivity 1/3" colour CCD sensor with complementary mosaic | |
| Lens | (2x) Focal length 2.6 mm, f/1.6, <1% distortion | |
| Effective pixels (H x V), per camera | 976 x 582 | 976 x 494 |
| Horizontal FOV | 170° (two images with each 85.5° stitched together with minor overlap) | |
| Vertical FOV | 70° | |
| Scanning system | 2:1 Interlace | |
| Horizontal frequency | 15.625 kHz | 15.734 kHz |
| Vertical frequency | 50 Hz | 59.94 Hz |

| | PAL | NTSC |
|----------------------------------|--|------|
| Mechanical | | |
| Overall dimensions (W x H x L) | 200 x 78 x 134 mm (not incl. connectors) | |
| Net weight | <2.1 kg | |
| Housing material | Aluminium with corrosion protection coating | |
| Protective housing integrity | IP-65 (NEMA 4) rating, back-filled with dry nitrogen | |
| Camera windows | Chemically strengthened, AR-coated BK7 glass. Heated to prevent ice (NOTE 3) | |
| Connector (power, data, control) | 22-pin circular - In accordance with MIL 38999 (optional bottom mounting) | |

| | PAL | NTSC |
|--|---|----------------------|
| Electrical specifications and functions | | |
| Video output | Composite VBS, 1 Vpp, 75 ohm | |
| Output formats (user selectable) | Panoramic 170° FOV fitting 16:9 monitor, Panoramic 170° FOV horizontally compressed to fit 4:3 monitor, Left, right side image and central portion of panoramic image fitting 4:3 monitor | |
| Horizontal resolution | left & right separate image: 425 TVL; Stitched panoramic image: 240 TVL | |
| Sensitivity | 0.007 lx, 25% video @ f/1.6, AGC on | |
| Spectral response | Visible – NIR light on request (NOTE 1) | |
| Signal to noise ratio | > 52 dB, AGC Off | |
| Electronic shutter, fixed | 1/50 to 1/10,000 sec. | 1/60 to 1/10,000 sec |
| Gamma correction | 0.45 / 1.0 | |
| Automatic Gain Control. Range | 0 to +36 dB 6 DB DGC | |
| Frame integration | Extended night mode, 4x | |
| Day/Extended night mode switching | Via serial RS-422 interface | |
| Fog penetration | Image contrast enhancement 3 Levels | |
| White balance | Auto Tracking White Balance (ATW) | |
| Noise reduction | 2D and 3D Digital Noise Reduction 2 Levels | |
| Heat haze reduction | On and off function | |
| Graphical overlays | Distance markers, 5-character text strings | |
| Configuration, serial interface | Control Panel Applet and serial RS-422 (CAN-BUS optional, NOTE 2) | |

| | PAL | NTSC |
|-----------------------|---|------|
| Environmental | | |
| Operating voltage | 18 to 36VDC (1275B protection filter) | |
| Current consumption | Camera system with heater: 24W, (thermostat controlled) (NOTE 4) | |
| Operating temperature | -40°C to +70°C | |
| Storage temperature | -40°C to +70°C | |
| Vibration/shock | MIL STD 810F, tracked vehicle 5.7G-rms, 3 hours each direction MIL STD 810F, method 514.5, procedure 6 | |
| EMC | Tested in accordance with MIL STD 461F | |
| MTBF | 30 000 hours | |

NOTE 1: Order with IR-cut filter for 400-700nm spectral response. Order without IR-cut filter for 400-950nm spectral response.

NOTE 2: Ask for CAN-BUS, upon ordering, if needed.

NOTE 3: Please inform Falitec International if the heater for de-icing is not needed. Then it will be removed and the price adjusted accordingly.

NOTE 4: If ordered without heater, the current consumption is 12W.

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