

# GeoVISION™ Borehole Video Camera Systems

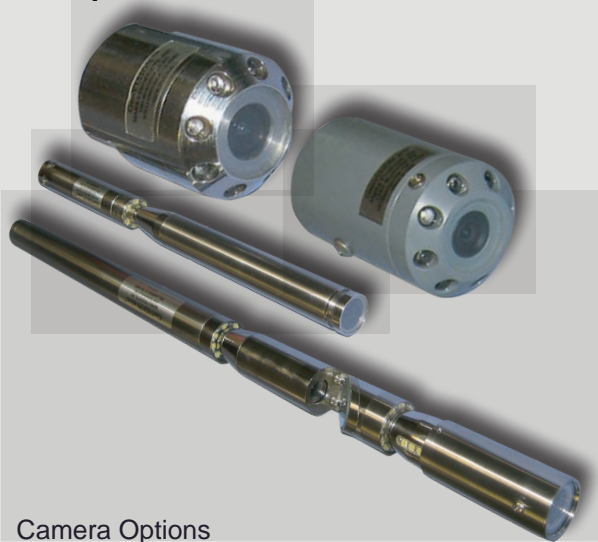
GeoVISION Deluxe **Configuration Options**



CAMERA

- Five different depths 100, 200, 300, 500, and 650 meters of cable
- Seven different interchangeable cameras - Jr plastic (color and B/W), Standard stainless steel (color and B/W), color nano, and color Dual Scan micro and old micro - GeoVISION™ cameras can view in boreholes as small as one inch in diameter to very large boreholes, caves, crevices, pipes, tanks, and mines.
- Up to seven viewing modes – Standard view down, motorized pan and tilt, manual pan and tilt, Dual Scan, motorized mirror for the old micro and nano cameras only, and manual side-looking mirror, Camera lights on or off with supplemental light
- Up to three methods for determining and recording the depth of the camera – OSD, cable depth marks, and pipe string
- Many different viewing and recording options – Use any nTSC monitor and recording system such as the Sony DVD recorder, a VCR, hard drive, or laptop computer.
- Up to three ways to power the system -110 volts, 220 volts, or an inverter with power from a 12 volt battery
- Several ways of providing light - On camera LEDs plus two supplemental lightsystems

## 2 Year Warranty and Waterproof to 660 metres



Camera Options



Deluxe Winch Setup

The GeoVISION™ Deluxe is the most versatile and least expensive professional quality borehole camera system in the 0 - 2000 foot (660 metres) depth underwater range.

Available in 2 versions:

- Deluxe Motorized Winch
- Deluxe Motorized Winch with Motorized Pan and Tilt

MAJOR FEATURES & OPTIONS	Depth Limit	Deluxe	Econo Heavy Duty	Econo Light Duty
On Screen Depth Display	2000	Std	Yes	No
Motorized Winch	2000	Yes	No	No
Dual Scan micro	2000	Std	No	No
Motorized pan & tilt - Jr CPVC cameras	1000	Yes	No	No
Motorized pan & tilt - Standard stainless cameras	2000	Yes	No	No
Motorized side looking mirror - old micro only	2000	Yes	No	No
Motorized side looking mirror - nano only	2000	Yes	Yes	Yes

## TECHNICAL SPECIFICATIONS

### VIEWING & RECORDING

One may use any TV monitor (NTSC) that accepts an analog signal to view and any VCR to record from the GeoVISION™ video and audio outputs. Sunshades are standard on all GeoVISION™ monitors. There are several types of video to USB adapters available from electronic retailers, They are not stocked by MPI. These devices allow one to view with and record directly to a computer.

### BUILT IN & SUPPLEMENTAL LIGHTS

The Super 8 Light and Adjustable Super 8 Light provide supplemental light for use in boreholes, shafts, mines, and caves. Versatile brackets allow these lights to be attached at many different places on the GeoVISION™ system. Supplemental off camera light also improves the quality of the image by increasing the subject texture and by reducing glare. The two Super 8 Lights are bright and are recommended for large boreholes, shafts, and mines.

Eight high brightness LEDs are built into the standard stainless steel cameras. This camera also has a camera lights on and off circuit for use with supplemental lights. This switch helps GeoVISION™ obtain some of the best videos possible in poor quality water.

### Camera size, underwater depth limit, and system compatibility

Dimensions at widest point	Diameter	Length	in Feet	Deluxe	HD	Econo
Dual Scan Micro - color, stainless steel	1 1/8	27	2000	Yes	No	No
nano - color, stainless steel	3/4	10	2000	Yes	Yes	Yes
Standard color or B/W, stainless steel	5/8	2.77	2000	Yes	Yes	Yes
Jr - color, plastic	1 3/4	3.25	1000	Yes	Yes	Yes
Jr - black and white, plastic	1 3/4	3.25	1000	Yes	Yes	Yes

\*Not available in meter sizes

### VIEWING MODES







- GeoVISION™ system cameras are usually lowered into the borehole viewing down. In small and moderate size bores this is adequate. When one wants to view to the side or back up the borehole, or view into to a crevice or mine, there are several other choices.
- Motorized Pan and Tilt option with the Jr and Standard cameras. One may view 360 degrees by panning and tilt up and down 170 degrees with the motorized pan and tilt attachment. This option allows one to view in any direction with the operation of the joystick on the control panel.
- One can manually pan and tilt with the Jr and Standard cameras by using a pipe string and the GeoVISION™ supplied manual head tilting assembly. The operator can view in any direction including up by pulling on the power cable and by turning the pipe. All GeoVISION™ systems have a threaded pipe-fitting, ready for attaching a user supplied pipe string. The camera can be pushed or pulled past obstructions or pushed and pulled horizontally or overhead with a pipe string. Pipe strings can be made from many different materials.
- One can rotate the side viewing camera of the Dual Scan micro. It has twenty-one high brightness LED's in three groups.
- The Motorized Mirrors for the old micro & nano cameras, allow one to view to the side 360 degrees.
- An Optional Side-looking Mirror is available with the Standard and Jr cameras to allow side viewing in small diameter boreholes.
- Camera Lights On-Off Circuitry- This switch allows the eight LEDs in the Stainless Steel Standard camera and the 21 LEDs in the Dual Scan micro camera to be turned on or off. Using the supplemental lights reduces glare from suspended particles in the water, increases texture of the subject, and improves depth perception by using indirect light. When the water quality is good the built in camera lights should be turned on to provide fill light. The combination of built-in and supplemental lights achieves the best images in clear water. Generally, the best videos are obtained by using brighter off camera lights such as the Adjustable Super Eight Light.

### Cable lengths available by width





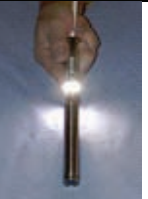
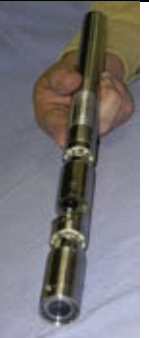
Dimensions at widest point	Diameter	Length	in Feet	Deluxe	HD	Econo
Dual Scan Micro - color, stainless steel	1 1/8	27	2000	Yes	No	No
nano - color, stainless steel	3/4	10	2000	Yes	Yes	Yes
Standard color or B/W, stainless steel	5/8	2.77	2000	Yes	Yes	Yes
Jr - color, plastic	1 3/4	3.25	1000	Yes	Yes	Yes
Jr - black and white, plastic	1 3/4	3.25	1000	Yes	Yes	Yes

All specifications subject to continuous improvement

## CAMERA SPECIFICATIONS

CAMERA SPECIFICATIONS	JR M6	JR M6	Standard SSM1	Standard SSM1	nano	Dual-Scan Micro
						
Colour or Black & White	Colour	B/W	Colour	B/W	Colour	Colour
Housing Material	Plastic CPVC	Plastic CPVC	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Lens window material	Glass	Glass	Sapphire	Sapphire	Sapphire	Sapphire
Max. camera depth in feet/meters. Max.cable length and underwater limit	1000/300	1000/300	2000/600	2000/600	2000/600	2000/600
Weight in ounces/grams	5/141.7	5/141.7	12/340.2	12/340.2	12.8/362.87	3.5lbs/1587.5
Lux rating at F2.0	.2	.01	.2	.01	.2	2
Lens with glass element (mm)	2.9	2.9	2.45	2.45	2.9	2.9side 2.45 down
Optional lens available (mm)	3.6	3.6	3.6 or 2.9	3.6 or 2.9	3.6	No
Resolution horizontal lines	550	420	550	420	550	550
Camera lights On/off circuitry	No	No	Yes	Yes	No	Yes
Max. operating temperature C/F	43 / 110	43 / 110	60 / 140	60 / 140	60 / 140	60 / 140
Min. operating temperature C/F	0 / 32	0 / 32	-40 / -40	-40 / -40	-40 / -40	-40 / -40
<b>CAMERA DIMENSIONS</b>						
Diameter in inches/mm at the thickest point	1 ¾ 44.45	1 ¾ 44.45	1 5/8 41.625	1 5/8 41.625	¾ 19.05	1 1/8 28.6
Length in inches and millimetres	3 ½ 88.9	3 ½ 88.9	2 ¾ 69.85	2 ¾ 69.85	10 254	27 658.8
<b>VIEWING SPECIFICATIONS</b>						
Min. borehole diameter in inches for camera passage (this specification assumes some minor irregularities in the pipe or borehole)	1 7/8	1 7/8	1 ¾	1 ¾	7/8	1 ¼
Min. recommended borehole size in inches for good image	2	2	1 7/8	1 7/8	1	1 ¼
Max. borehole diameter in inches when viewing down under good conditions for good image	36 inches	60 inches	36 inches	60 inches	24 inches	36 inches side 60 inches down
Max. borehole diameter in feet when using GeoVISION™ supplemental Super Eight Light under good conditions for good image	15 feet	25 feet	15 feet	25 feet	10 feet	20 feet

## CAMERA SPECIFICATIONS





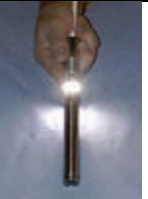
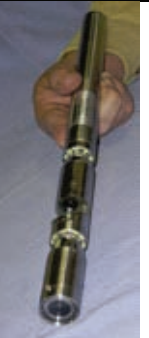
CAMERA SPECIFICATIONS	JR M6	JR M6	Standard SSM1	Standard SSM1	nano	Dual-Scan Micro
						
Max. borehole diametre in feet when viewing with motorized side looking mirror and GeoVISION™ Super 8 Light under good conditions for good image	NA	NA	NA	NA	5 feet	5 feet
Max. viewing distance in feet from camera when using Pan and tilt under good conditions for good image	6 feet	15 feet	6 feet	10 feet with 2.45mm lens	NA	NA
Max. viewing distance in feet from camera when using both the Pan and Tilt and the Adjustable Super 8 Light under good conditions for good image. Using the 3.6mm lens	20 feet	40 feet	20 feet	40 feet	NA	NA
<b>FOCAL LENGTH</b>						
Min. distance in inches to subject for excellent focus	2	2	1.5	1.5	2	0.5 side 1.5 down
Max. distance in inches to subject for excellent focus	36	36	60	60	36	36 side 60 down
Min. distance in inches to subject for usable focus	1.5	1.5	1	1	1.5	0.25side 1 down
Max. distance in inches to subject for usable focus	Infinity	Infinity	Infinity	Infinity	Infinity	Infinity
<b>LIGHTING</b>						
Number of High Brightness LED's in camera	8	8	8	8	NA	NA
Number of High Brightness wide field LED's in camera	NA	NA	NA	NA	6	21**
Optional ring-light & out-front LED's	No	No	No	No	No	No

### \*\*Dual-Scan micro camera

The Dual-Scan micro camera has three sets of lights that can be turned on and off independently from switches on the control panel. The upper recessed ring light has nine brightness LEDs that provide light for the side viewing camera as well as indirect light for both cameras. The middle three LEDs provide direct light for the side viewing camera. The lower recessed ring light has nine brightness LEDs that provide light for the down viewing camera as well as indirect light for both cameras. The combination of three switchable sets of lights provides the best overall lighting of any borehole camera. This lighting system is especially effective in producing high quality videos that show shadow and texture. This Dual-Scan micro lighting is better than other systems in poor quality water due to the use of in LEDs that are placed a few inches away from the lens, providing indirect lighting and giving the user the flexibility to select different combinations of light sources.

All specifications subject to continuous improvement

## CAMERA SPECIFICATIONS

CAMERA SPECIFICATIONS	JR M6	JR M6	Standard SSM1	Standard SSM1	nano	Dual-Scan Micro
						
<b>SYSTEM COMPATIBILITY</b>						
May be used with Deluxe winch	Yes	Yes	Yes	Yes	Yes	Yes
May be used with the Econo Heavy Duty winch	Yes	Yes	Yes	Yes	Yes	No
May be used with the Econo Light Duty reel NR=Not Recommended	Yes	Yes	Yes NR	Yes NR	Yes NR	No

### Special features of GeoVISION cameras

- The GeoVISION Standard stainless steel cameras have camera lights on/off circuitry for use with supplemental lights for improved visibility in poor quality water.
- All GeoVISION cameras are interchangeable when used with the GeoVISION™ Deluxe system
- All GeoVISION cameras have over voltage and heat protection.
- The GeoVISION stainless steel cameras have recessed attachment points allowing the camera to fit in smaller boreholes.
- The GeoVISION black and white cameras have a lux rating of .01 at F2. This ultra low light feature means that even in very low light these cameras will produce a good image where other borehole cameras under the same lighting conditions will not have a usable image.

### Recommendations for large boreholes, mines, caves, tunnels, tanks, pipes, caissons, and other voids.

Any combination of these items listed below will help get a better image at greater distances:

1. Black and white ultra low light camera
2. Motorized pan and tilt option for depths to 2000 feet or the manual pan and tilt that is standard with all JR and Standard cameras for use at depths less than 200 feet. The 200 foot depth is a matter of personal choice. The manual system becomes more difficult to operate at greater depths.
3. Supplemental lighting

### Factors that determine the quality of an image from a borehole camera

1. Water clarity
2. Distance to subject
3. Amount of light and lux rating of camera. The GeoVISION black and white cameras are all ultra low light and are the best borehole cameras for viewing distant objects.
4. Location of light in relation to camera and subject. For example suspended particles may reflect light from on camera lights directly into the camera lens. Supplemental lights off camera reduce this reflection and provide texture to the subject so that it can be comprehended better.
5. Stability and location of camera in borehole. This is best achieved by the use of adjustable centralizers.
6. Angle of view between camera and subject. Tilting cameras provide by far the most options by allowing the operator to view the subject at different angles
7. Type of lens - A wide angle lens such as the 2.45 allows a better view of the borehole when viewing down and provides a better view of close subjects. The 3.6 lens provides a larger image of distant objects but is not as good when viewing close objects.

All specifications subject to continuous improvement