

MAINLINE INSPECTION TECHNOLOGY



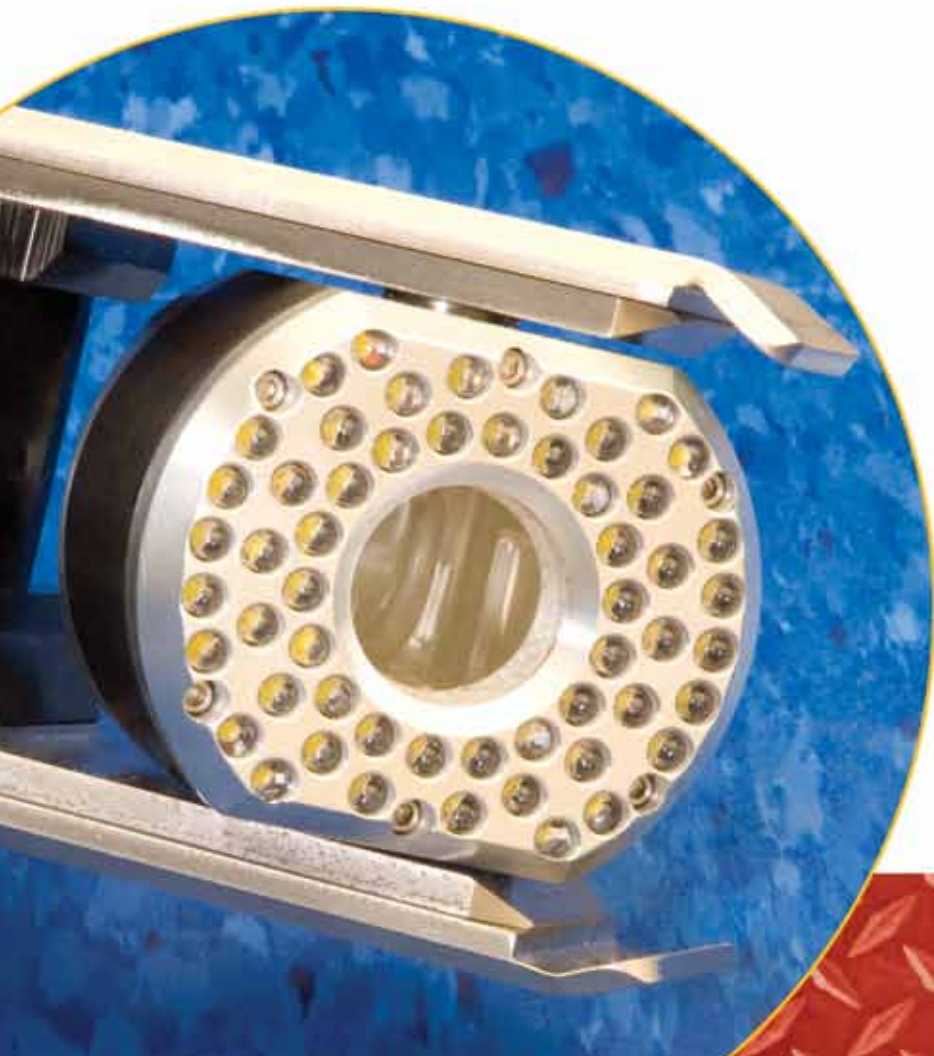
GET MORE. DO MORE. RST.

RST Technical Services Inc.
Design and Manufacture of Video Pipeline Inspection Systems

FROM MAINLINES TO LATERALS TO STORM DRAINS...

For over twenty years, RST has been an innovative, driving force in the closed circuit televising, or CCTV, pipeline inspection industry. As the needs of our customers in the pipeline inspection industry have changed, RST has been right there, in step, to provide them with rugged, dependable mainline cameras, transporters that can really tow the load, mini cameras that stand up to the rugged environments they're subjected to, data acquisition systems that incorporate the latest computer hardware and NASSCO PACP certified software capable of interfacing with GIS systems and vehicle installations that tie it all together.

NOVASTAR ZOOM CAMERA



Pan & Tilt with
built-in, adjustable
LED lighting

40X Zoom:
10X optical
4X digital

Re-lined 6" and
larger pipe
inspection capability

FEATURES

This versatile camera is designed to operate in wet environments such as sanitary sewers and storm drains while mounted on any of RST's mainline or storm drain transporters or pull skids.

The NovaSTAR is capable of operating on up to 2,500' of single conductor or multi-conductor cable.

Manual or continuous auto focus, manual or continuous auto iris, adjustable shutter speed for improved low light performance insure outstanding picture clarity.

- Remote controlled with full camera head swing/rotation
- Programmable pan and rotate limits
- Sapphire lens window
- Home function to return camera head to upright and straight ahead position
- Available in NTSC and PAL formats
- Camera diagnostics and inclinometer options available
- 54 high-intensity bright white LED's

OMNI EYE III ZOOM CAMERA

The Omni Eye III Zoom pan & tilt zoom camera is designed to mount on all of RST's mainline and storm drain transporters. Use it to inspect re-lined 6" and larger pipelines.

The Omni Eye III Zoom camera can be run on up to 2,500' of single conductor cable and still produce outstanding video quality that is unmatched by others.

TOTAL CONTROL

The camera has an automatic iris and focus feature that also can be manually controlled and has a 10X optical plus 4X digital for a total of 40:1 zoom capability.

Two built-in high power halogen lights mounted in the head of the camera allow you to direct the light where you need it to inspect small and large pipelines.

Manual or continuous auto focus, manual or continuous auto iris, adjustable shutter speed for improved low light performance insure outstanding picture clarity and precise video data capture.

SPECIALIZED SKIDS AND FLOAT DEVICES ARE AVAILABLE FOR VARIOUS APPLICATIONS.

Capable of
single 2,500'
inspection runs

40X Zoom:
10X optical
4X digital

Field Replaceable
Halogen
lighting



FEATURES

- The camera head with two lamps, pans and rotates as a single unit
- Home function to return camera head to upright and straight ahead position
- Available in NTSC and PAL formats
- Camera diagnostics and inclinometer options available
- Anodized aircraft aluminum housing
- 460 TV lines horizontal
- 1/3 Type CCD Sensor (379,000 pixel), .1 lux sensitivity

WHEELS OR TRACKS...IT'S ALL ABOUT CHOICE

TRANSTAR

The TranSTAR uses innovative technology in this six-wheeled, all gear driven transporter. A high-torque 1/8 hp rare earth PM motor lets the TranSTAR achieve speeds up to 60' per minute. The clutch allows rapid freewheel retrieval once the inspection is complete. TranSTAR is less than 19" in length, and weighs 27 lbs. It shares capabilities and options with the steerable version.

FEATURES

- All wheel drive with sealed hubs
- 1/8 Hp motor with 90 watts continuous power
- Ball bearings encased in brass
- Water resistant per ipx7 requirements
- Freewheel clutch
- Single conductor coax control

TRANSTAR STEERABLE

The TranSTAR Steerable Tractor for video pipeline inspection is a robust transporter equipped with two 90 watt rare earth permanent magnet motors making it the industry's highest power tractor of its size.

Designed to work with RS Technical Omni III, NovaSTAR and TrakSTAR zoom cameras, it provides inspection capability in sanitary or storm lines, ranging from re-lined 6" to 30" diameters and inspection runs up to 2,500' in length.

Options include: rear view camera, manual and motorized elevator systems and multiple tire options.



Steerable and Non-Steerable models available

Camera elevator systems available

FEATURES

- The TranSTAR can turn on its own axis
- Travel up to 80' per minute
- Capable of distances of 2,500' in a single run
- 3 forward speeds, reverse and freewheel

Two types of single conductor cable are now available. Our traditional .25" OD double steel armored cable with 5200 pound break strength and RST's new .34" OD Hytel jacketed cable. The new cable incorporates a braided Aramid strength member with 1500 pound break strength.



Smaller design
fits in re-lined
6" pipelines

Travels
up to 70'
per minute

Use with single or
multi-conductor
systems

TRAKSTAR CAMERA AND PROTRAK TRANSPORTER

Utilizing high-resolution video with 40:1 total zoom capabilities, the TrakSTAR operates in wet environments, such as, sanitary sewers and storm drains.

While designed for use on the heavy duty ProTRAK tractor transporter, the TrakSTAR can be mounted on any RST mainline or storm drain tractor. The ProTRAK incorporates the same features as the NovaSTAR camera.

PROTRAK FEATURES

- Fits in re-lined 6" pipes or larger
- High efficiency planetary gear train
- Precision rare earth servo motor
- Power to easily pull 2,500' of single conductor cable
- Ultra heavy duty treads use #40 chain for durability & strength and still fits in 6" pipeline
- Internal clutch release system for high speed retrieval

MAINLINE CRAWLER (NOT SHOWN)

Mainline crawler transporters are designed to carry the Omni EYE 3 Zoom Camera and are available in both single and multi-conductor configurations. They operate in line sizes from 6" to 30" with axle and driveline extensions.

The crawlers have three forward speeds, one reverse, a stop function and a freewheel mode for easy retrieval with travel speeds up to 55' per minute at full power. Specially designed, contoured pads, attached with dual stainless steel rivets on stainless steel chain, provide a large contact surface for maximum traction.

These crawlers are adaptable to all RST mainline systems.



THE STEERABLE STORM DRAIN TRACTOR

is a four wheel drive transporter for all RST mainline cameras in 24" and larger pipelines! Its remote controlled motorized camera lift enables the camera to be centered into pipelines up to 60". Its four wheel drive incorporates a highly efficient gear train.

- Supports all RST Mainline Cameras
- Remote controlled camera lift can center the camera in up to 60" pipe
- For pipelines from 24" and larger
- Dual 35 watt adjustable lights
- Four wheel drive with high efficiency gear train
- Speeds up to 80-85' per minute
- Large 11" tires (optional 13" tires available)

QUICK SPECS

Power: 90-120 volts DC

Dimensions: 36" L x 15" W x 15.5" H

Weight: 100 lbs

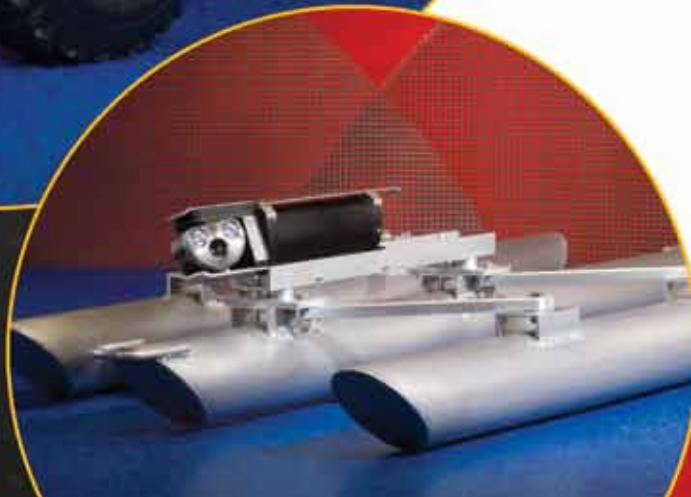
Sky crane recommended for safe insertion and removal



RST has also developed a wide variety of skids, floatation devices and winch accessories for applications where motorized transporters are not feasible or practical.

All of these accessories are compatible with the full range of RST Mainline cameras.

FROM LARGE DIAMETER APPLICATIONS



OMNISTAR PROBE

is the newest high tech pipeline camera from RST. Designed to fit in 3" or larger pipelines, the camera will mount on RST Single Conductor Push Rod and all RST transporters. The camera has a 360° continuous rotate capability and a 270° panning capability!

- **Micro Processor Control featuring a Home function to return camera head to upright and straight ahead position & pre-programmed "Lateral Find"**
- **Compact, rugged, aluminum & stainless steel housing**
- **4 High Intensity LEDs**
- **Fits in 3" pipes, use as a push camera or mainline camera**

MIGHTY MINI TRACTOR

The Mighty-Mini Tractor is designed to inspect 4" to 12" pipelines and has three forward speeds, reverse and freewheel for fast and easy retrieval.

The easily adjustable cantilevered camera mount and optional tire combinations allow for superior performance in small pipelines.

The Mighty-Mini Tractor is designed to transport the RST 1306 camera and the OmniSTAR Probe 2.4" diameter pan and tilt camera. Travel speeds are up to 40' per minute and the tractor has plenty of power generated by the Rare-Earth permanent magnet motor with a high efficiency planetary gear train coupled by a chain for a four wheel drive system.

The Mighty-Mini Tractor is compatible with all RST mainline and 1300 control systems.

FEATURES

- **Three forward speeds, one reverse, stop, and freewheel mode**
- **Speeds up to 40' per minute**
- **Remote controlled from desktop or hand held controller**
- **Adjustable cantilevered system for multiple camera positions**
- **All brass body housing**

Straight View or Pan & Tilt OmniSTAR Probe camera

Rare-Earth permanent magnet motor

Inspect 4" to 12" pipelines

TO NAVIGATING THE SMALLEST MAINLINES RST HAS THE SOLUTION.





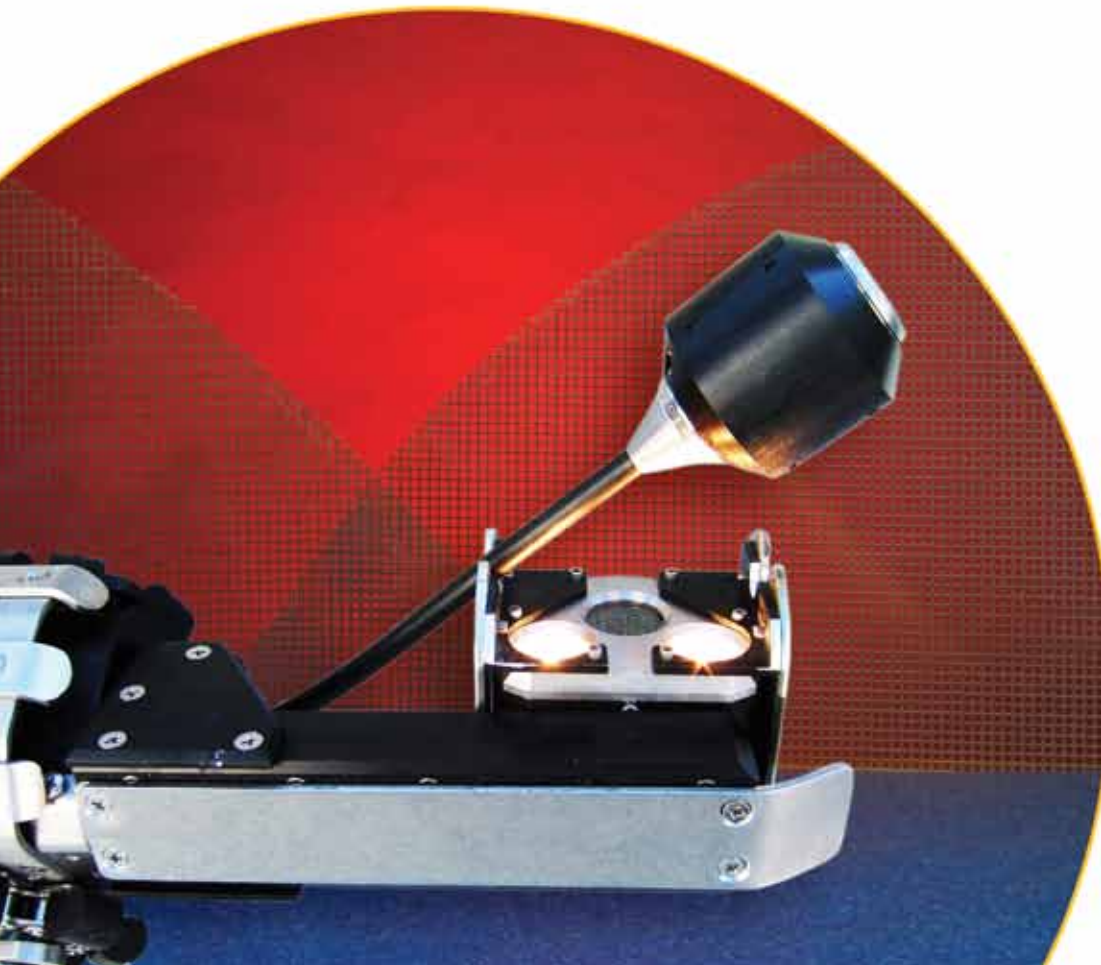
Inspect
8" to 24"
mainlines

80' length,
4" to 8" diameter
lateral capability

Pan & Tilt
Omni Eye III Zoom
for primary camera

LATERAL INSPECTION SYSTEM

The Lateral Inspection System performs mainline and lateral pipeline inspections from a single, fully integrated unit. The system utilizes picture-in-picture or dual video monitors allowing operators to view the mainline and lateral lines simultaneously.



FEATURES

- Inspect mainlines from 8" (20 cm) to 24" (61 cm) and 4" (10 cm) to 8" (20 cm) lateral lines
- High resolution 1545 camera, with auto up righting picture, extends and retracts at the rate of up to 30' per minute
- The system uses the rugged tough Omni Eye III Zoom camera producing high resolution images
- Capable of lateral inspections up to 80' at a distance up to 1,000' from manhole or other entry point
- Remote controlled using an auxiliary desktop controller for both cameras and self-propelled tractor crawler
- Picture-in-Picture format or dual video monitor format
- View mainline and lateral simultaneously
- Transporter features three forward and one reverse speeds, stop and freewheel
- Optional location sonde transmitters available

ON THE CUTTING EDGE...

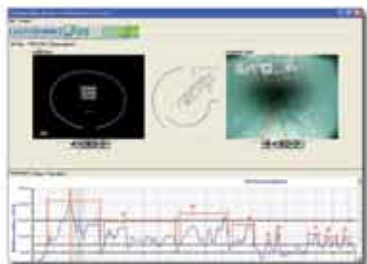
COOL VISION LASER PROFILER

ACHIEVE PRECISION, ACCURACY AND CONSTANT RELIABILITY

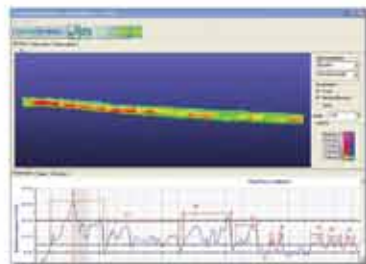
The Cool Vision Laser Profiler provides another method to accurately assess the condition of underground infrastructure through the combination of video images and precision laser measurements. The profile data captured by the unit is analyzed by a professional data analysis center. The data analysis center returns final reports in multiple formats that include Inspection Overview, Laser and Camera View and 3-D Color Visualization renderings of the asset with problem areas highlighted.

- Fixed optical and laser triangulation for +/- 0.25% accuracy
- 99.9% repeatability for inspection comparison
- 60,000 measurements taken per second
- Able to profile pipes that contain up to 45% water
- 2000 radial measurement points per profile
- Data analyzed and reports generated by professional data analysis center
- Capable of profiling 8" to 48" pipe
- Only requires a single pass through the pipeline to complete profile

Laser and Camera View

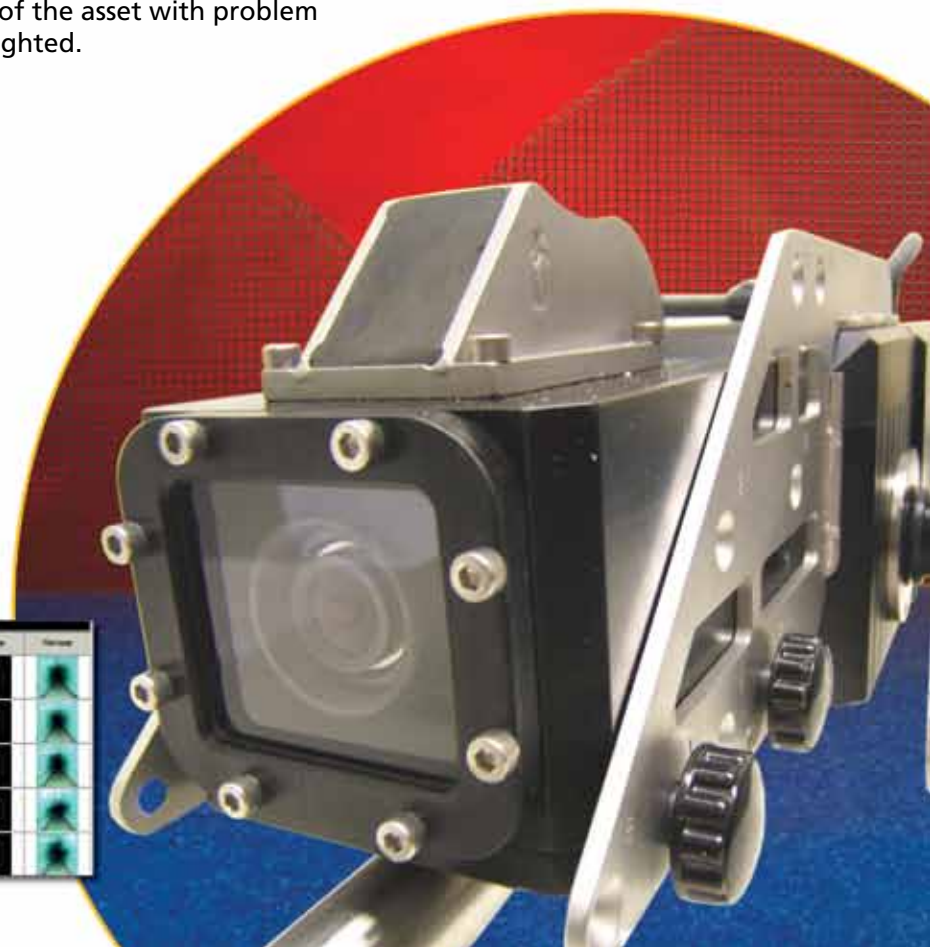


3-D Visualization



Inspection overview

Seq	Start	End	Depth	Defect	Defect Type	Severity	Remarks
1	0.0	0.0	17	0.0	10%		
2	0.0	0.0	10	0.0	10%		
3	0.0	0.0	10	0.0	10%		
4	0.0	0.0	10	0.0	10%		
5	0.0	0.0	10	0.0	10%		
6	0.0	0.0	10	0.0	10%		
7	0.0	0.0	10	0.0	10%		
8	0.0	0.0	10	0.0	10%		
9	0.0	0.0	10	0.0	10%		
10	0.0	0.0	10	0.0	10%		



PULLING IT TOGETHER



CONTROLLERS

The Mainline Controller provides all the necessary power to operate and monitor the television inspection System.

All circuits are solid state.

The back plate of the Mainline Controller contains all the required plug-ins for the various locking cable connectors, each of which are separately indexed and labeled.

The faceplate is permanently labeled designating the function or purpose of the various switches, meters and controls.

Controls are divided into three sections: POWER, CAMERA and REEL

POWER

controls the stop, start, and monitoring of the generator unit

CAMERA

provides a controlled NTSC (National Television System Committee) color signal at the video output connector as well as focus and iris control and camera and transporter adjustments

REEL

controls the mainline cable reel or the Power Remote II Winch

RST offers standard or custom designed vehicle mounted system configurations

- Trailer
- High-Cube
- Step Van
- Cargo Van
- ATVs and more





COMPACT PORTABLE REEL

A small maneuverable portable reel with up to 1,500' cable capacity designed for use in restricted access areas. Ideal for mainline pipe inspections when large vehicle mounted systems are not required. The CPR operates from either a portable generator or shore power cord.

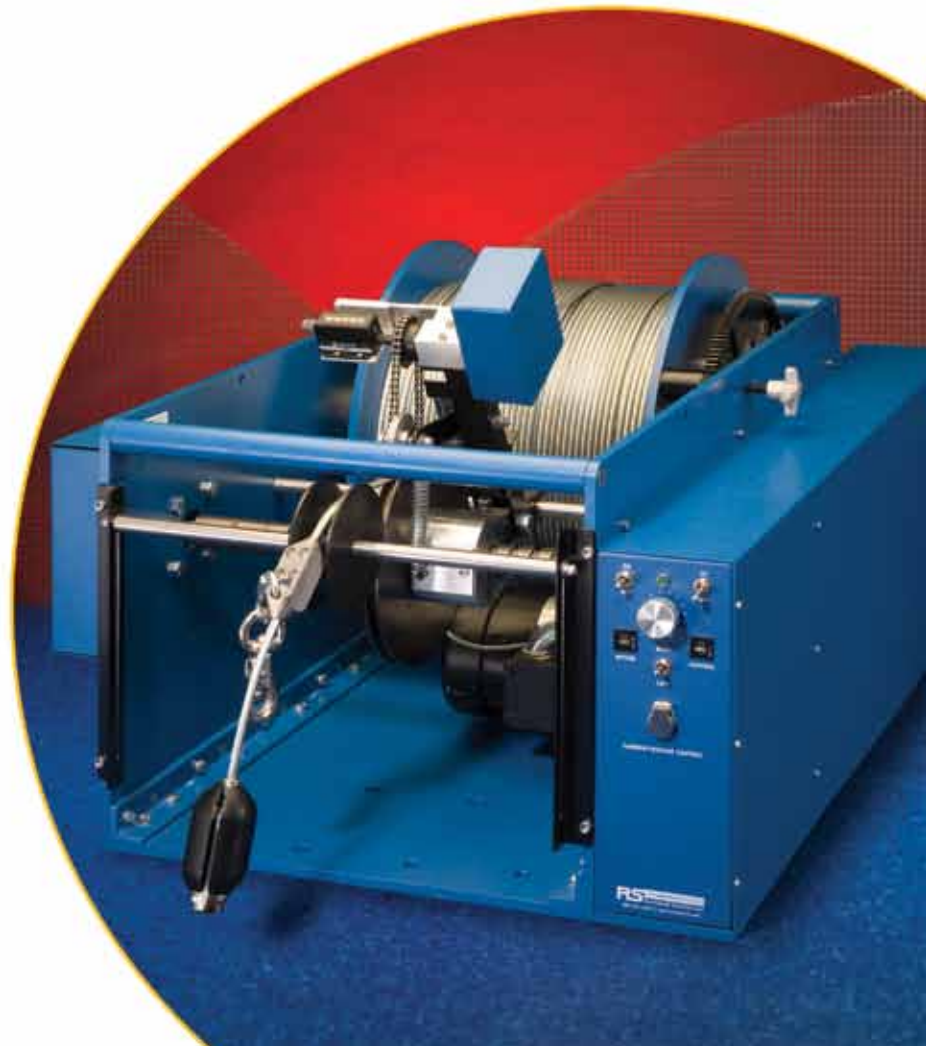
Offers maximum tractor footage by free-wheeling during cable pay-out, while the ½ horsepower motor provides quick, effortless retrieval of the camera system

MAINLINE CABLE REEL

This powerful reel offers a capacity of up to 2,500' of double-armored single conductor cable with automatic level wind and footage counter. Unit features a variable speed motor and dual gear ratios.

FEATURES

- Automatic level wind in the cable reel frame with heavy-duty, self aligning ball bearings
- Chain drive connects the level wind shaft to the cable drum shaft for accurate timing of the rewind operation.
- A mechanical footage counter is mounted on the level wind shaft to indicate cable travel in feet and tenths of feet.
- The footage counter wheel also controls an electronic sensor providing cable travel information that is compatible with a Data Display system that is located at the operator's station
- Cable measurement accuracy is $\pm 1.0\%$.
- The Mainline Cable Reel can be operated from the front panel of the reel itself, or from the system controller located at the operator's station.





In an industry where real customer service disappears a little more each day, RST takes pride in our commitment to keep you up and running. We know that word of mouth spreads far and fast. We want to make sure that when someone speaks of RST, they're recommending us for our commitment to service and our quality products.



Design and Manufacture of Video Pipeline Inspection Systems

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