A Story of Discovery, Development & Design

ROVER.MICRO-X.COM
X-RAY GENERATION

Traditional Thermionic Tube Vs Nano Electronic X-Ray (NEX Technology™)

**THERMIonic**
- Liberation of electrons from an electrode by virtue of its high temperature

**FILAMENTS**
- Heat
- HOT

**CONVENTIONAL X-RAY TUBE**
- Imprecise electron generation
- Power usage
- 29 kilograms

**OLD**
- Heated tungsten filament cathode emits streams of electrodes which accelerate into the anode.
- The impact on the anode generates massive heat and x-rays.
- The heat generated adds complexity:
  - needs cooling – a rotating anode, oil bath, lead casing
  - adding weight.
- Need ramp-up time to switch x-rays on and off.

**ELECTRONIC**
- Liberation of electrons from a cold source material controlled by a small voltage

**CARBON NANOTUBES**
- Electric
- Cold

**CARBON NANOtube X-RAY TUBE**
- Precise electron generation
- Power usage
- 2.35 kilograms

**NEW**
- Cold cathode carbon nanotubes emit a precisely controlled electron stream to anode.
- The impact on the anode, produces x-rays.
- Low heat enables simplification of tube, improving efficiencies:
  - no rotating anode or oil bath
  - light weight due to reduction in size.
- X-rays can be switched on and off instantaneously with no ramping up time.

Traditional cathodes use heated filaments (similar to lightbulbs). Energy inefficient and accelerates the degradation of filament electrode. Can fail suddenly without warning.

Electronic cathodes contain millions of microscopic hairs that emit electrons with voltage control instead of heat. Controlled and no sudden failures. Energy efficient, stable and long life span.
The next generation of Imaging Solutions

Micro-X has created proprietary Intellectual Property (IP) for the design and manufacture of electronic x-ray tubes, based on Carbon Nanotubes (CNT). We are calling this the Nano Electronic X-ray (NEX) Technology.

Micro-X is the first company in the world to introduce NEX Technology into medical imaging systems. NEX Technology is a simple, non-glass based x-ray tube, with no moving parts that generate minimal heat with no oil required for cooling. It uses carbon nanotubes to offer full medical imaging performance, in a smaller, lighter, and more reliable x-ray tube.

Micro-X’s patented technology is set to revolutionalize the potential of x-rays in a variety of industries and is currently being used as a development platform for all of our future products.
SPECIFICATIONS

Rover Features

**Head and Tusks**
- **NUDGE BUTTON**
  - Bed side brake release during positioning
- **HEAD**
  - Easy access pediatric filter
  - x2 protractor
  - LED collimator
  - DAP
  - Tape measure
- **TUSKS**
  - Fingertip collimator controls
  - Integrated LBD button
  - Ensure minimum SID
- **BARCODE READER**
- **FULLY PORTABLE STORAGE**
  - Bucket for exposure cord
  - 3x grid detector slots (63x43, 25x30, 43x36)
  - Wipes, bags and documents
  - Unique design for easy bagging/battery exchange
- **WHEELIE PLATE**
  - Crossing large thresholds (50mm)
  - Designed for comfortable foot clearance
  - Manual break release

**Counterpoise Arm**
- **COUNTERPOISE ARM**
  - Self balancing set and forget
  - 0.4m to 2.1m height x 750mm reach
  - 270 degrees rotation
- **ERGOKNOBS**
  - Allows operator to stand in any position
  - Palm or finger brake release
- **TOUCH SCREEN DISPLAY**
  - Can be used with gloves (capacitance)
  - Separate charge and exposure LEDs
- **CUT AWAY FRONT**
  - Improve field of view
- **USER ACCESS PORTS**
  - Elevated recessed plug, easier to pull and retract, less damage
  - USB, Ethernet and tether ports
- **POWER**
  - Mains or 5x LiPO4 batteries
  - Motorless drive, very quiet
  - No on/off buttons required - always 'on' design for convenience
The Rover is designed to perform radiographic X-ray examinations for disease/injury detection, diagnosis, medical and surgical treatment planning, and therapy monitoring, where patient condition contraindicates transport to a fixed X-ray unit. The Rover can be used on pediatric and adult patients, in all patient treatment areas. To adapt to these different circumstances, we have different options available upon request.

**Options**

**DOSE AREA PRODUCT (DAP)**

**PEDIATRIC**
- Filters
- Colourful wraps

**RUGGEDISED**
- Higher ground clearance with reinforced undercarriage to assist with easy movement over uneven surfaces and to avoid damage to internal workings.
- Modified battery tray to enable a fast, easy exchange, so it can be replaced on the go.
- The battery box is built with thicker aluminium (2.5 mm) to aid robustness.
- Rounded wheelie bar, which behaves more like a handle than the standard square design, to help with movement over uneven surfaces.
- Handles in the front carriage provide good grip for a second operator over uneven surfaces.

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**KEY SPECIFICATIONS**
*All information refers to Rover Model RV-19 and Rover Plus Model RV-35, unless specified.*

### PHYSICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>1300 mm (51.2 in), head in docked/transport position, exc. cable</td>
</tr>
<tr>
<td>Width</td>
<td>Wheel base: 583 mm (22.9 in) Main chassis: 500 mm (19.7 in)</td>
</tr>
<tr>
<td>Length</td>
<td>1371 mm (53.9 in), head in docked/transport position</td>
</tr>
<tr>
<td>Weight</td>
<td>Rover: 95 - 105 kgs (209 lbs) Rover Plus: Approx. 112 kgs</td>
</tr>
<tr>
<td>Drive handle height</td>
<td>1000 mm (39.37 in)</td>
</tr>
<tr>
<td>Operating specifications</td>
<td>Temperature range: +10° C to +30° C Relative humidity range: 30% to 60% Atmospheric pressure range: 70 kPa to 106 kPa</td>
</tr>
<tr>
<td>Technical output</td>
<td>Rover: max. <a href="mailto:110kV@12.5mAs">110kV@12.5mAs</a> or 70kV@20mAs Rover Plus: max. 120kV@50mAs or 70kV@80mAs</td>
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### DRIVE CHARACTERISTICS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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<tbody>
<tr>
<td>Drive type</td>
<td>Manual</td>
</tr>
<tr>
<td>Speed</td>
<td>Walking speed</td>
</tr>
<tr>
<td>Brakes</td>
<td>Dead Man Braking controlled through buttons located on the drive controls</td>
</tr>
<tr>
<td>Maximum incline</td>
<td>5 degrees (head in docked/transport position)</td>
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### KEY SPECIFICATIONS

#### ELECTRICAL / CHARGE CAPACITY

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Number of batteries</td>
<td>5</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>LiFePO₄, also called LFP for Lithium Ferro-Phosphate</td>
</tr>
<tr>
<td><strong>Nominal voltage</strong></td>
<td>14.4 Vdc each, total battery bank of 72 Vdc</td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>7.5 Ah each</td>
</tr>
<tr>
<td><strong>Charge power requirements</strong></td>
<td>100 to 240 Vac, 50/60 Hz, 11 A to 5.5 A (110 W max.)</td>
</tr>
<tr>
<td><strong>Battery LED</strong></td>
<td>Light indicator displays battery charge level</td>
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#### DETECTORS - VAREX IMAGING

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<tbody>
<tr>
<td><strong>Scintillator</strong></td>
<td>Csᵢ: Ti (Cesium)</td>
</tr>
<tr>
<td><strong>Field of View</strong></td>
<td>17”x17” (43cm x 43cm)</td>
</tr>
<tr>
<td><strong>Pixel Array</strong></td>
<td>3072 x 3072</td>
</tr>
<tr>
<td><strong>Pixel Size</strong></td>
<td>139 micron</td>
</tr>
<tr>
<td><strong>A/D Conversion</strong></td>
<td>16 bit</td>
</tr>
<tr>
<td><strong>kVp Range</strong></td>
<td>40-150</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>18.1” x 18.1” x 0.6”</td>
</tr>
<tr>
<td><strong>Weight (without battery)</strong></td>
<td>3.3kg (7.28lbs)</td>
</tr>
<tr>
<td><strong>Data interface</strong></td>
<td>WiFi 802.11n/ac (5GHz)</td>
</tr>
<tr>
<td><strong>Battery (Two incl.)</strong></td>
<td>1600 images for 8 hours</td>
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**TUBES FOR LIFE PROGRAM**

We are so confident in the performance of our NEX Technology, we are providing a "Tubes for Life" program for all Micro-X Mobile DR systems. This means a non-transferable guarantee for the lifetime of the x-ray product, ensuring Micro-X customers enjoy and benefit from cutting edge technology with the assurance of long-lasting performance.

* *Lifetime of the x-ray product* is defined by Micro-X as 10 years. This offer is subject to the Micro-X Inc Product Warranty Terms and Conditions.

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*Rx Only*  
*Rover and Rover Plus may not be available in all markets*