**NuTEM™ Airborne Electromagnetic System**

Welcome to the next generation of helicopter EM systems designed for Very High Resolution (VHR) and Intermediate Depth.

*Image of Loop Transmitter System with Helicopter. Features on-board power generation and ease-of-flight for low noise and high signal quality*

**OVERVIEW**

Nu-TEM is a versatile, novel time-domain helicopter electromagnetic system well suited for mineral exploration. The system is a special Slingram configuration which provides results that are largely free of the transmitter dipole moment – remaining effects are ideally removed in software.

**FEATURES**

NUVIA Dynamics’ NuTEM™ system features:

- Powerful, compact transmitter with smooth-fly characteristics for low noise
- Three axis receiver with X, Y and Z components fully resolved and noise-free
- Digital data acquisition via the NUVIA Dynamics’ IMPAC system with full system control
- Lightweight for easy transport and operation with streamlined vertical lift
- Full wavelength recorded data for custom extraction and processing
- Windows configurable for different geologic targets

**BENEFITS -- GENERAL**

This powerful form of Electromagnetic prospecting delivers a number of unique benefits:

- Enhanced geologic resolution for finely detailed conductors and structure
- Intermediate depth penetration suitable for many prospective exploration sites
- Light weight and low-noise profile in flight and in measurement of X, Y and Z responses
- Comprehensive software capabilities for data extraction and initial windowing

**BENEFITS – RUGGED TERRAIN**

- Compact footprint for better defined anomaly positioning
- Stable, rigid platform for noise reduction in X, Y and Z data
- Optimal loop size for exploring in rugged terrain
NuTEM™ SYSTEM DESCRIPTION

Transmitter
The transmitter delivers a half-sine wave pulse of a quarter duty cycle (25% pulse length) with a peak magnetic dipole moment to 220,000 NIA. The system can support two base frequencies, for example, 30 Hz and 90 Hz for a 60 Hz environment or 25 Hz and 75 Hz for 50 Hz environment. The transmitter current is fully monitored at all times.

Receiver
Nu-TEM features a powerful and compact three-axis receiver that records in X, Y and Z channels for effective mapping of anomalies (Z channel) as well as mapping of structure (X channel). Data are clean and well-behaved for transmitter off times.

System Characteristics

The NuTEM™ system has been fully tested at the Reed Mahaffey test site in northern Ontario – a well-known area flown by all major airborne contractors. NUVIA Dynamics’ flights in 2019 established new milestones for very high resolution (VHR) and mapping of individual conductors.

Comparison of NuTEM™ Z channel responses for a range of windows.

The Latest in Proven Electromagnetic Surveys and Technology
# NuTEM™ Specifications

<table>
<thead>
<tr>
<th>Technical Specifications</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>NuTEM</td>
</tr>
<tr>
<td><strong>Standard Survey Speed</strong></td>
<td>55 to 60 Knots</td>
</tr>
<tr>
<td><strong>Sensor Configuration</strong></td>
<td>Slingram</td>
</tr>
<tr>
<td><strong>Surface Area</strong></td>
<td>55 sq m</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>300 kg</td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td>Rigid Loop with Aluminum Frame</td>
</tr>
<tr>
<td><strong>Estimated Resistance</strong></td>
<td>15 mOhm</td>
</tr>
<tr>
<td><strong>Transmitter Power</strong></td>
<td>Generation in Centre of Loop</td>
</tr>
<tr>
<td><strong>Suspension</strong></td>
<td>Single Point</td>
</tr>
<tr>
<td><strong>Integrated Systems</strong></td>
<td>Magnetics (Radiometrics – Optional)</td>
</tr>
<tr>
<td><strong>Aircraft Type</strong></td>
<td>Bell 206 Ranger, MD 500, AS350 or Similar</td>
</tr>
<tr>
<td><strong>Sampling Rate</strong></td>
<td>90 kHz, Each Sample ~10 μs</td>
</tr>
</tbody>
</table>

## Transmitter

<table>
<thead>
<tr>
<th>Description</th>
<th>4 Turn Nonagon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diameter</strong></td>
<td>8.6 m</td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td>1000 A Peak</td>
</tr>
<tr>
<td><strong>Dipole Moment</strong></td>
<td>220,000 NIA</td>
</tr>
<tr>
<td><strong>Waveform Type</strong></td>
<td>Half Sine; Vertical Dipole</td>
</tr>
<tr>
<td><strong>Pulse Length</strong></td>
<td>25 % of Full Cycle</td>
</tr>
<tr>
<td><strong>Base Frequency</strong></td>
<td>25 / 75 Hz in 50 Hz Environment; 30 / 90 Hz in 60 Hz Environment</td>
</tr>
<tr>
<td><strong>Waveform</strong></td>
<td>On Time from 451.1 to 1655.4 Microseconds</td>
</tr>
<tr>
<td><strong>Power Source</strong></td>
<td>Onboard generator</td>
</tr>
<tr>
<td><strong>DC Power Generation</strong></td>
<td>400 Hz 125VAC Helicopter Generation</td>
</tr>
<tr>
<td><strong>Mean Ground Clearance</strong></td>
<td>30 m</td>
</tr>
</tbody>
</table>

## Receiver

<table>
<thead>
<tr>
<th>Axes</th>
<th>X, Y and Z component measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Position</strong></td>
<td>Offset to TX</td>
</tr>
<tr>
<td><strong>Diameter</strong></td>
<td>28.5 cm</td>
</tr>
<tr>
<td><strong>Number of Turns</strong></td>
<td>240 Turns on Each Component</td>
</tr>
<tr>
<td><strong>Orientation</strong></td>
<td>Z Axis</td>
</tr>
<tr>
<td><strong>Preamplifier</strong></td>
<td>3 Channel</td>
</tr>
<tr>
<td><strong>Configuration</strong></td>
<td>Offset to TX (Front and Above TX)</td>
</tr>
<tr>
<td><strong>Sampling</strong></td>
<td>90 Hz</td>
</tr>
<tr>
<td><strong>Time Gates</strong></td>
<td>Configurable with text file - 52 gates</td>
</tr>
<tr>
<td><strong>Measurements</strong></td>
<td>dB/dT &amp; integrated B field</td>
</tr>
<tr>
<td><strong>Mean Ground Clearance</strong></td>
<td>60 m</td>
</tr>
</tbody>
</table>
# NuTEM™ Specifications

## Acquisition System
- **Type**: NUVIA Dynamics’ IMPAC
- **CPU**: I7 Generation 2 Quad Core
- **Operation Temperature**: Degrees Celsius (-35 to 45)
- **Standard Sampling Rate**: 20 Hz

## Magnetometer Counter
- **Magnetometer**: NUVIA Dynamics’ MMS8
- **ADC inputs**: 0.707 V Peak to Peak - 2 Second Polarization
- **Magnetometer Inputs**: 8 Inputs
- **Recording Rate**: Up to 100 Hz
- **Analog to Digital Conversion**: 24 Bit
- **Noise Envelope**: 0.002 nT peak-to-peak and 0.1 to 1 Hz bandwidth

## Base Station Magnetometer
- **Type**: CS-3
- **Manufacturer**: Scintrex
- **Range**: 15,000 nT to 105,000 nT
- **Sensitivity Recording Rate**: 0.0006 nT Root(Hz) RMS @ 1 Hz

## GPS
- **Type**: Hemisphere R330
- **Differential Correction**: Real Time
- **Number of Satellites**: 25+
- **Recording Rate**: 10 Hz

## Temperature
- **Type**: NUVIA Dynamics P-DES
- **Full Scale**: -20 to 85 Degrees C
- **Resolution**: 0.036 Degrees C
- **Recording Rate**: 1 Hz

## Barometer
- **Type**: NUVIA Dynamics P-DES
- **Full Scale**: 0.1600 hPa
- **Temperature Compensated Range**: 10.90%
- **Accuracy**: +/- 0.25%
- **Resolution**: 0.39 hPa
- **Recording Rate**: 1 Hz

## Radar Altimeter
- **Type**: FreeFlight Systems’ RA-4000 mounted on aircraft
- **Operating Range**: 0 to 2500 feet
- **Accuracy (0 to 100 ft)**: 3%
- **Accuracy (100 to 500 ft)**: +/- 3%
**NuTEM™ Specifications**

**Radar Altimeter (Cont.)**
- Accuracy (500 to 2500 ft) +/− 5%
- Recording Rate 1 Hz

**Laser Altimeter**
- Type LDM302A
- Range 0.5 m to 200 m for low reflectance targets; otherwise up to 3 km
- Resolution 1 mm
- Recording Rate 1 Hz

**Humidity**
- Full Scale 0 to 100%
- Temperature Compensated Range 10.90%
- Accuracy +/− 1.7% RH
- Resolution 0.04%
- Operating Temperature -40 to 125 Degrees C
- Unit of Measure %

**Software**
- Data Acquisition NuTEM™ Console
- Survey Control & Data Storage NUVIA Dynamics’ IMPAC Data Acquisition Unit
- Windowing & TX Loop Removal EMDATAView (proprietary)
- Processing and Display Geosoft

**Deliverables**
- Map of Z- and X-Component B-field profiles with Magnetics
- Map of Z- and X-Component dB/dt profiles with Magnetics
- Map of selected B-Field Time Gate images and contours
- Map with TAU, contours and calculated magnetic vertical derivative
- Image of Power Line Monitor (new feature 2019)
- Total field magnetic map with contours
- Maps of dB/dt with early, middle and late time windows
- Digital Terrain Model

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