

Newsco Electromagnetic Telemetry

EM Telemetry System

Leading-edge technology from surface to down hole

“Newsco developed a reliable, intelligent, flexible and configurable EM telemetry system that meets the challenges of the most demanding EM environments.”

Our Challenge:

Conventional EM Telemetry equipment has several inflexibilities: fixed frequency and data rate, constant power output, high power consumption, and one method of communication. Our redesign of this technology eliminates these shortcomings and significantly enhances performance and reliability.

Our Solution:

When we set out to redesign the EM Telemetry system we had several goals in mind: improved reliability and performance, operating flexibility, modularity, safety, compatibility with existing equipment, efficiency and contingency capabilities.

Adjustable frequency and data rate:

Conventional EM equipment operates on a fixed carrier, but sometimes extraneous noise can interfere with this frequency. The Newsco system has a variable output frequency from 2 to 12 Hz in 0.5 Hz increments to move the carrier to an interference-free frequency. Data rate is also variable from one to four bits per second to

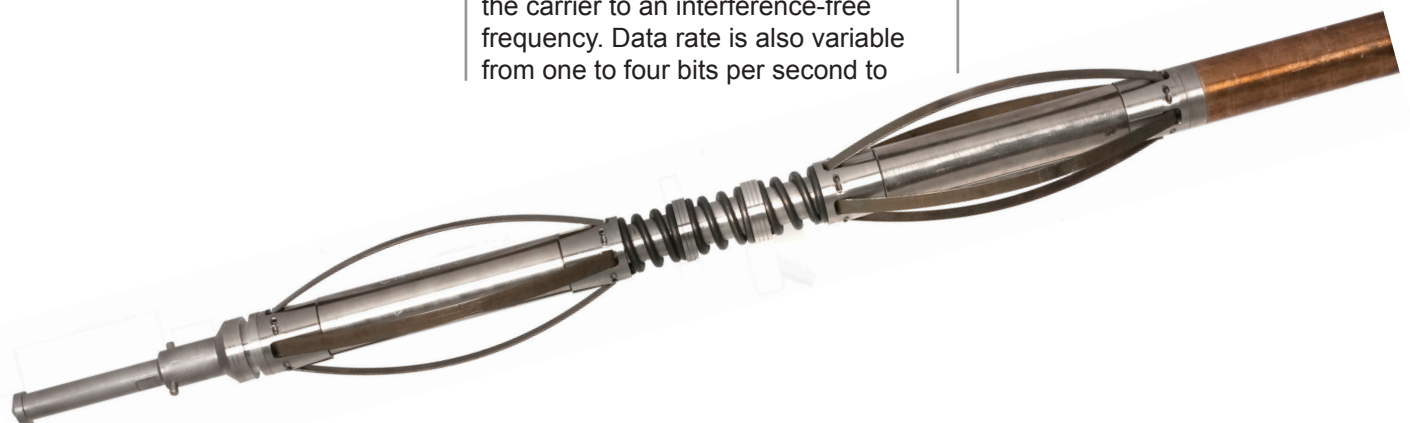
adjust for deep-hole reaches. Highly stable clocks accurately synchronize transmitting and receiving frequencies.

Adjustable power output:

Conventional equipment typically transmits a fixed power signal, which can unnecessarily drain batteries. Our EM device monitors the conductivity of the surrounding formation with every pulse transmitted and dynamically adjusts power output levels from 0.1 to 10 watts to ensure a strong signal at the surface while using minimal power from the batteries. The system also multiplies the current output, extending the life of the safe, moderate-rate batteries. A proprietary gap-sub design provides excellent formation contact.

Dual-mode operation:

The equipment contains a full-featured, positive mud-pulser system, as well as an EM system, for contingency purposes. If the drilling environment changes so that EM telemetry conditions are not optimal, the operator can switch operation to the mud pulser to continue down-hole monitoring.



Bidirectional communication:

Continuous synchronization with the surface gives increased flexibility when dealing with varying formations and drilling conditions that could interfere with data transmission. The operator can switch modes and request different information on command.

Operating Modes: When the EM tool string is assembled, the electronics are put in a low-power sleep mode to conserve batteries during transportation to the rig and to trip-in the hole. Once it's in position down hole the operator can waken the tool by bidirectional communication, and it can also be returned to sleep mode when drilling is temporarily stopped.

Expandable and modular: Future enhancements to the tool will include resistivity, PWD, and a suite of LWD modules.

Solar-powered surface receiver: The daylight-viewable display receives information wirelessly from the solar-

powered receiver, eliminating long cable runs and dependence on rig power. It is WAN capable and fully WITS compatible.

Remote access and control: When linked via WAN with the Remote Terminal, Newsco personnel can operate the EM telemetry tool from any remote location in the world. Tool-face monitoring is available on a 24-hour basis once activated. This eliminates the expense of an on-site MWD operator. Correction runs can be done with on-site equipment when adjustable motors are utilized, eliminating the need for costly deployment of additional men and equipment to the rig site.

Real-time surveys: Surveys are fast with our tool—approximately two minutes compared to an average of 20-40 minutes with conventional wireline equipment. This means that additional hours of drilling time can be packed into a day. This is a huge increase in efficiency and cost

savings. In addition, surveying while circulating helps keep the well bore in better condition. The tool also stores the surveys in its on-board memory. This records down-hole measurements to provide a detailed report to the client once on surface and allows drilling to continue even if communication with the surface terminal is temporarily lost.

Durable and reliable operation: This is a rugged and reliable tool, however, the entire tool is wireline retrievable and reseatable if problems occur down hole.

Re-engineered components:

Newsco never rests in its drive for improved performance and dependability, so we can continue to exceed our customers' expectations. Our proactive approach means that we take each failure seriously, carefully analyze the cause, and re-engineer parts to higher tolerances to increase strength and reliability.

Newsco EM-MWD Telemetry System Specifications	
Inclination	0° - 180°, 0.1° accuracy
Azimuth	0° - 360°, 1° accuracy
Tool face	0° - 360°, 0.1° accuracy
Gamma ray	0 - 500 AAPI, ± 2 AAPI
Annular pressure	0 - 10,000 psi, ± 4 psi
Down-hole pipe pressure	0 - 10,000 psi, ± 4 psi
Temperature	150 °C
Battery voltage range	0 - 30 VDC
Battery life	150 hours
Shock	1000 g, .05 ms, 0.5 sine
Vibration	20 g peak, 50 - 500 Hz
Pressure	15,000 psi max
Monel collar size	4 3/4" or 6 1/2" OD, 2 11/16" ID, 29' -31' length, 3 1/2" IF connection
Inner tool string	29' long, 1.75" OD, 200 lb
Gap sub	4 3/4" or 6 1/2" OD, 2 1/2" ID
Data transmission	2 - 12 Hz @ 1 - 4 bits/sec
Tool face update	≈ 15 to 20 seconds
Full survey update	≈ 60 seconds



EM Telemetry Terminal



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