Hopping Telemetry
THE NEXT-GENERATION STANDARD FOR DOWNHOLE COMMUNICATION

Speaker Information

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Sep 18, 2025

Applications

- RSS – most common application
- Near-Bit or in-motor sensors
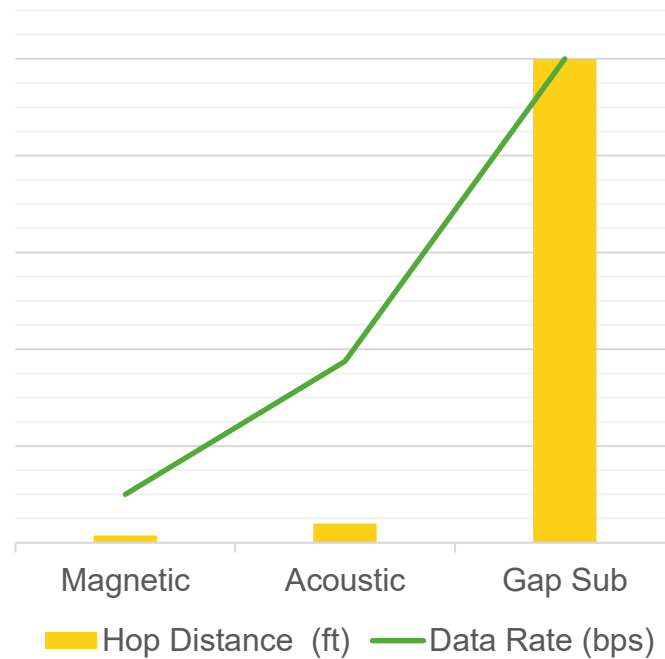- LWD Suite (Resistivity + Deep Reservoir Tools)

Why Hop?

- Remove dependency on wired motors
- Stay adaptable as motor technology rapidly evolves
- Unlock fully configurable BHA design
- Enable reliable two-way communication
- Leverage EM downlinking during drill-ahead operations

iadd | International Association Of Directional Drilling

Types of Hops

- **Magnetic** | Short Range, Low Data Rate

  Uses magnetic field coupling across collars; simple, low-power, but limited by attenuation.

- **Acoustic** | Medium Range, Higher Data Rate

  Uses sound waves transmitted through the drill string; performance depends on collar geometry and mud properties.

- **Gap Sub** | Long Range, Highest Data Rate

  Uses an electrically isolated gap in the string to transmit EM signals; enables full high-speed comms across long BHAs.

Magnetic   Acoustic   Gap Sub

Hop Distance (ft)   Data Rate (bps)

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# Hop Reach & Data Strategy

▪ Hop Length = Flexibility

- Longer hops allow optimal sensor placement anywhere in the BHA
- Greater resilience to motor or tool changes

▪ Hop Speed = Smarter Data Flow

- Higher data rates mean richer logs and faster decision-making
- Prioritized packaging ensures critical data gets through first
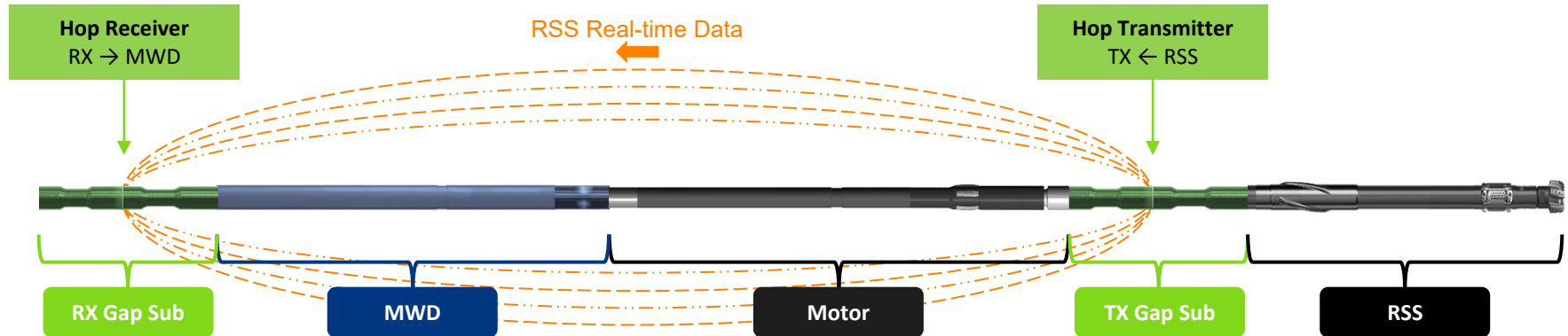- Independent of surface telemetry method (mud pulse, EM, wired pipe)

MWD | Below Motor Hop

- **Average Hop Distance:** 25 ft
- **Data rate:** 100 to 1000 bps
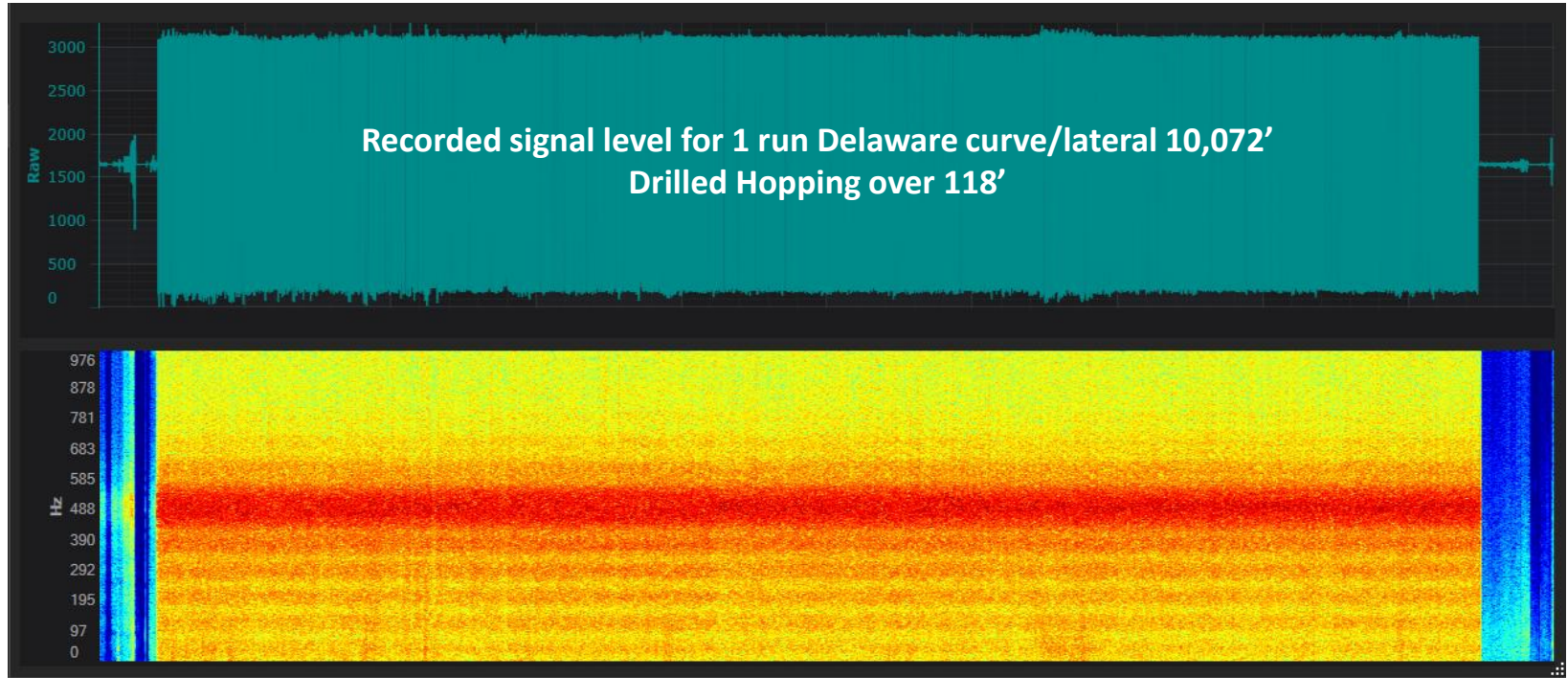- **Communication:** One-way – RSS Real-time Data
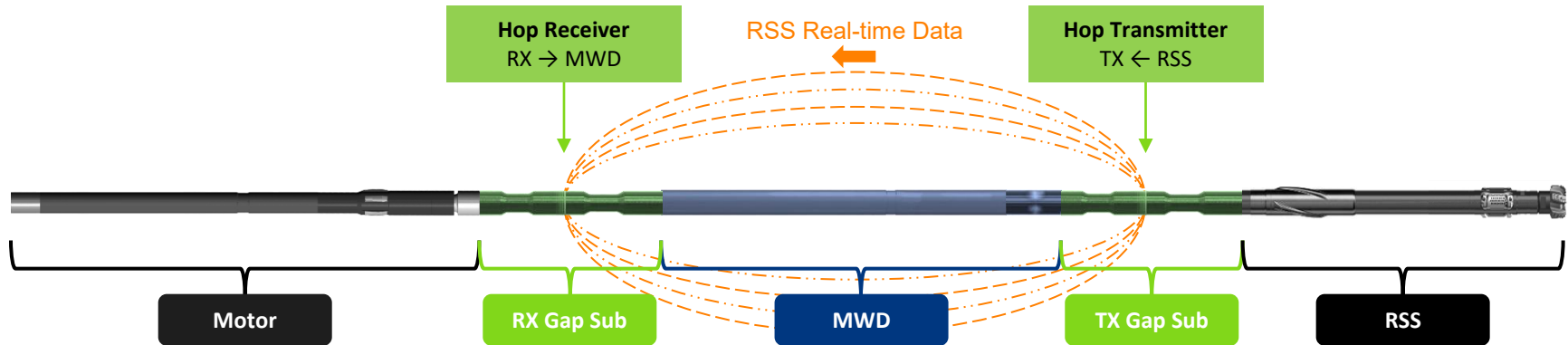
MWD | Above Motor Hop

- **Average Hop Distance:** 125 ft
- **Data rate:** 100 to 1000 bps
- **Communication:** One-way – RSS Real-time Data

Hop Receiver
RX → MWD

RSS Real-time Data

Hop Transmitter
TX ← RSS

RX Gap Sub | MWD | Motor | TX Gap Sub | RSS

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LWD | Above Motor Hop

Recorded signal level for 1 run Delaware curve/lateral 10,072'
Drilled Hopping over 118'
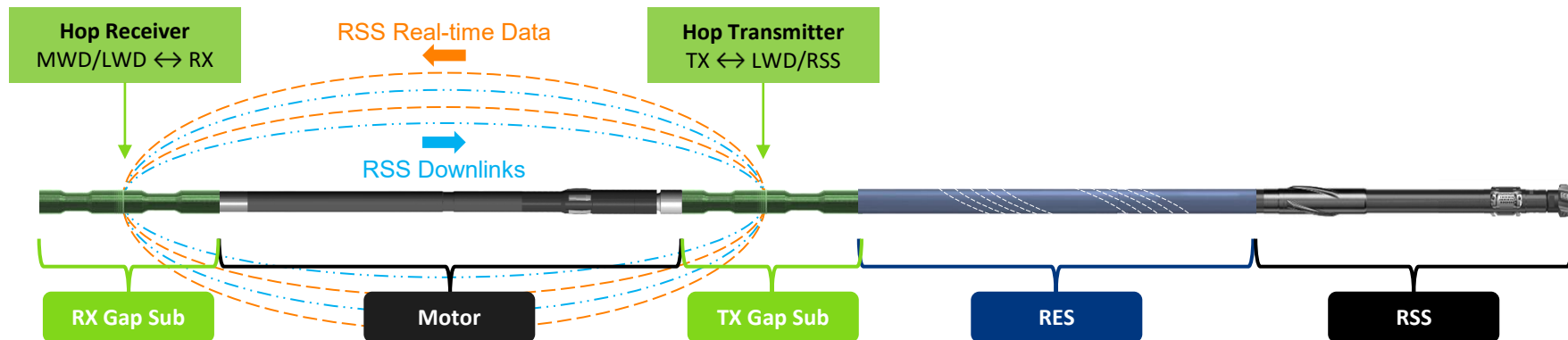
LWD | Above Motor Hop

- **Average Hop Distance:** 35 ft
- **Data rate:** 500 to 2000 bps
- **Communication:** Two ways – RSS Real-time Data and Downlinks

RSS Real-time Data

Hop Receiver
MWD/LWD ⟷ RX

Hop Transmitter
TX ⟷ LWD/RSS

RSS Downlinks

RX Gap Sub

Motor

TX Gap Sub

RES

RSS

Conclusion

- Flexibility, speed, and resilience in data transfer
- No dependence on wired motors
- Configurable BHAs for any well design
- Richer real-time data for smarter decisions

Path Forward

- Bulk & Azimuthal Gamma Integrated into the transmitter.
  - Positioning this key deliverable directly above the RSS
- EM Downlinking to Rotary Steerable Systems
  - Eliminating the need for traditional Downlinking methods

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