

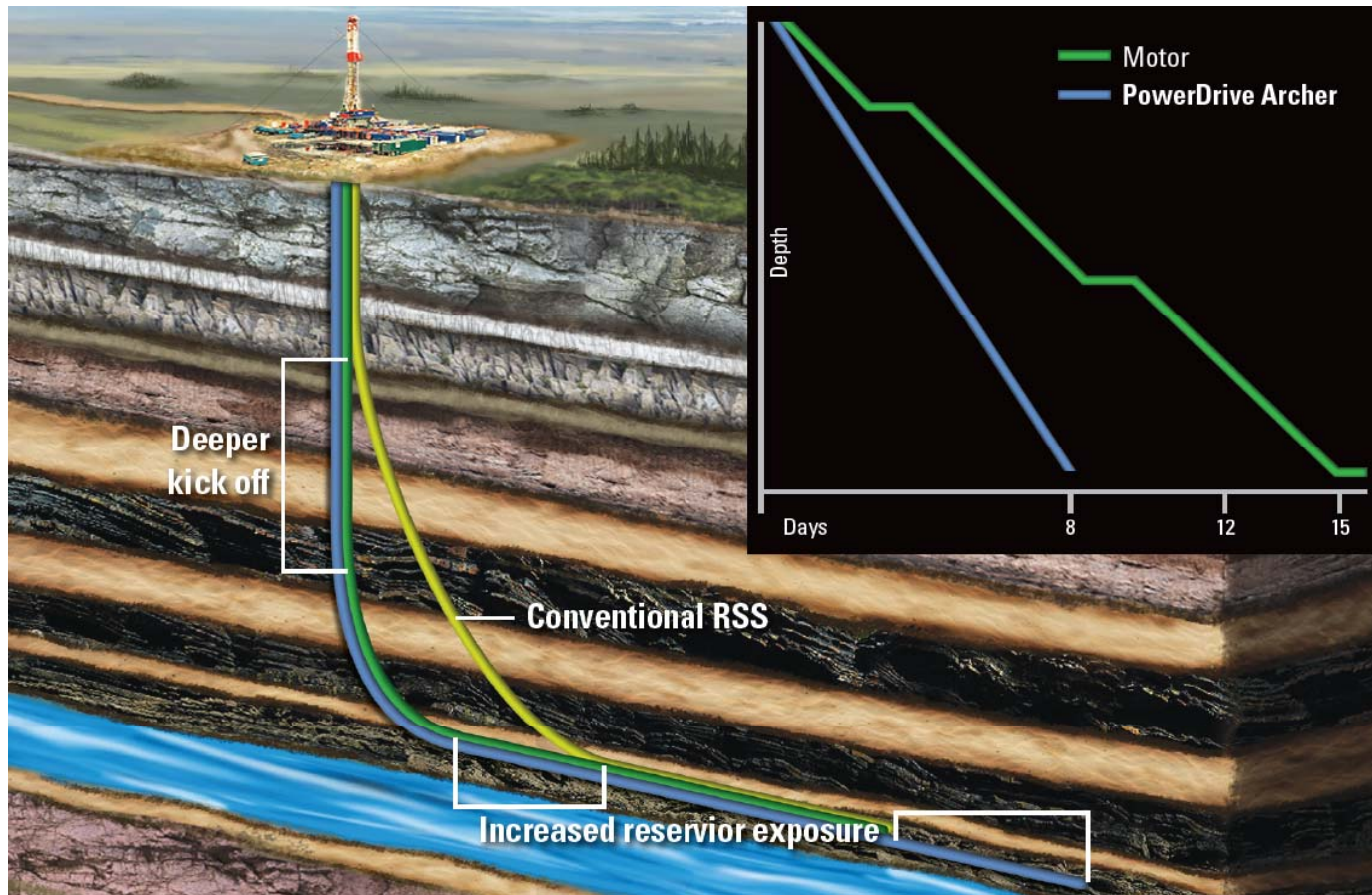


PowerDrive Archer

High Build Rate
Rotary Steerable System

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Why PowerDrive Archer?

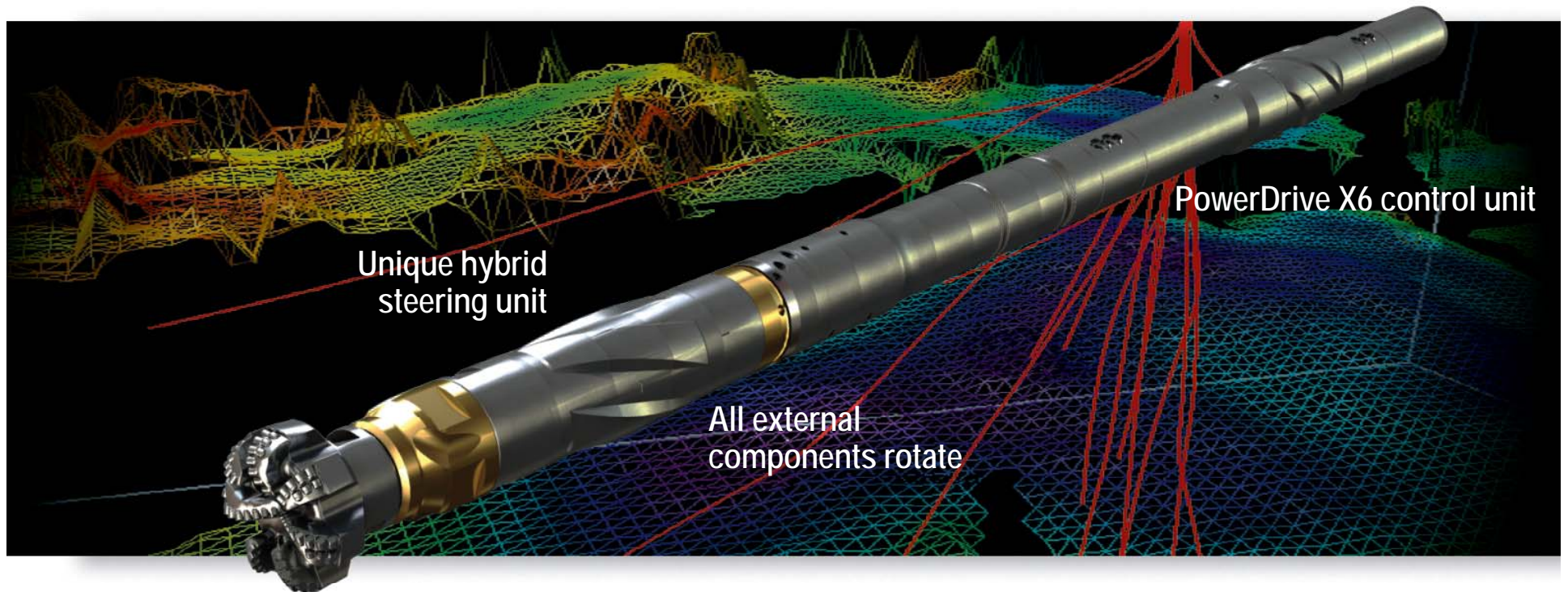


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PowerDrive Archer RSS

Delivers well profiles previously only possible with motors—yet with the ROP and wellbore quality of a fully rotating RSS

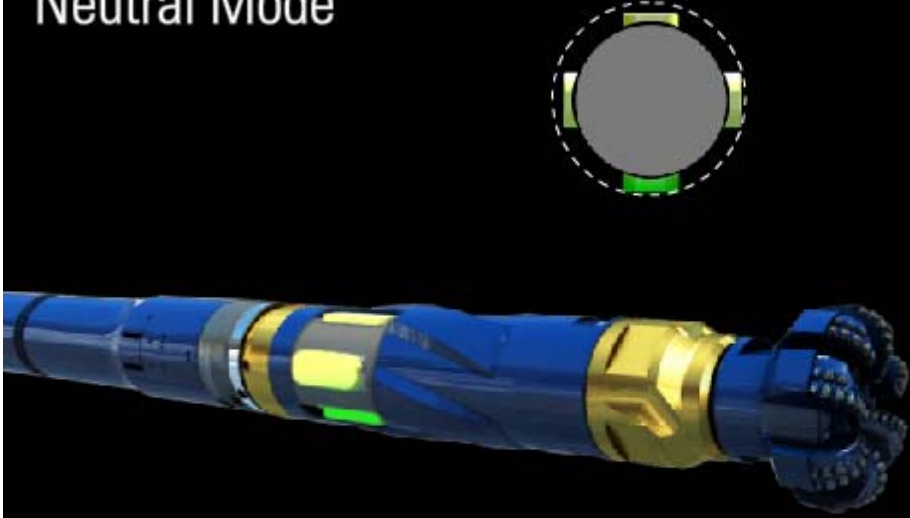


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Neutral Mode



Change Mode

Neutral Mode changes to Drill Straight

The geostationary electronics package rotates the control valve to ensure the pads inside the steering unit strike against the articulated sleeve evenly in all directions close to string RPM. This results in a truly straight steering head that can drill tangent sections.

PowerDrive Archer High build rate RSS

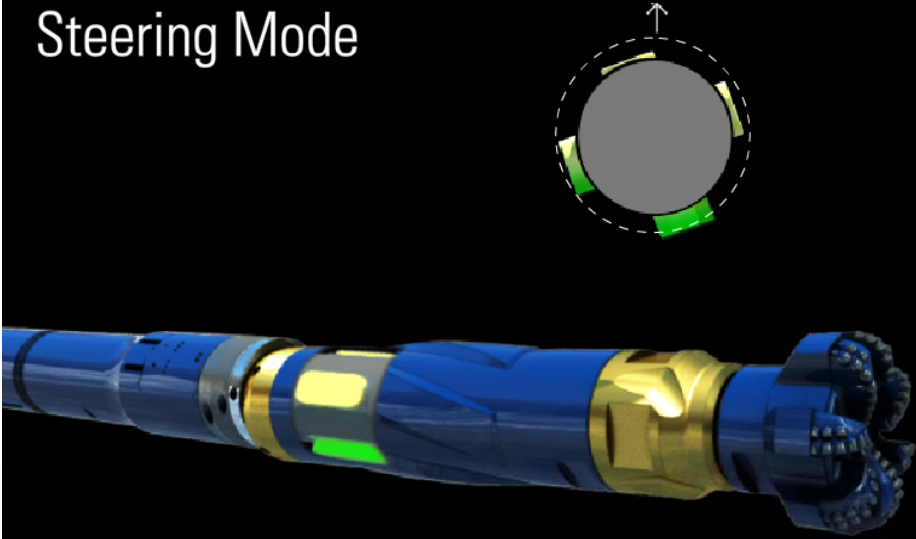
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Steering Mode



Change Mode

Steering Mode changes to Drill Curve

The geostationary electronics package stabilizes the control valve at the desired toolface and diverts a small percentage of flow to the steering unit. Pads internal to the steering unit strike against the articulated sleeve, which is pivoted on a universal joint close to the bit and points the bit in the direction required for building the curve.

PowerDrive Archer High build rate RSS

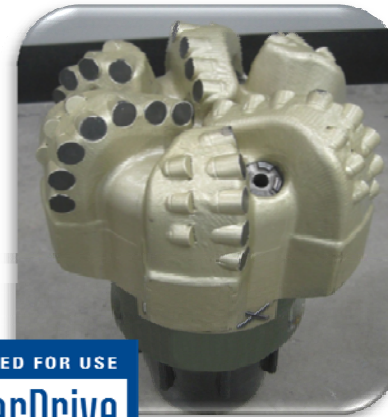
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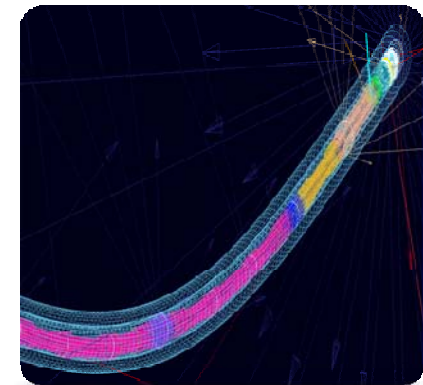
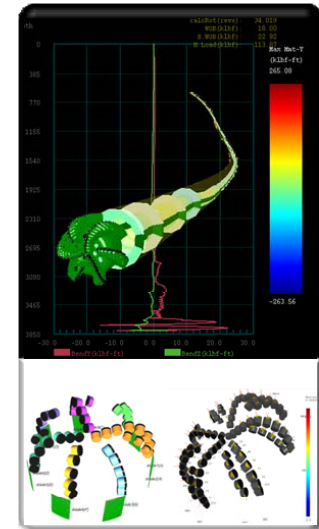
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Engineered Bits and BHAs

- High build curves demand high performance
- Engineered bit and BHA designs
 - IDEAS* modeling software
 - Drilling engineering; DOX* and i-Drill
- Designs tested
 - Horizontal wells at Schlumberger drilling technology center
 - Proven in the field
- Approved bit and BHA catalog



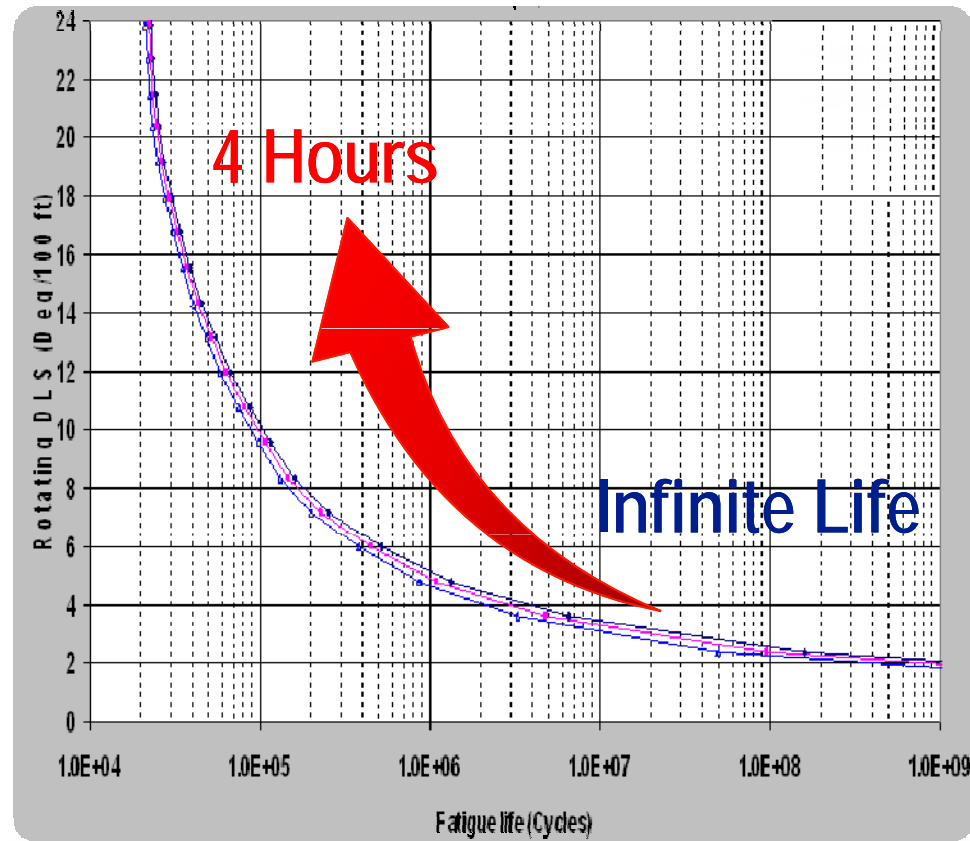
APPROVED FOR USE
**PowerDrive
Archer**



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An Invisible Danger—Fatigue

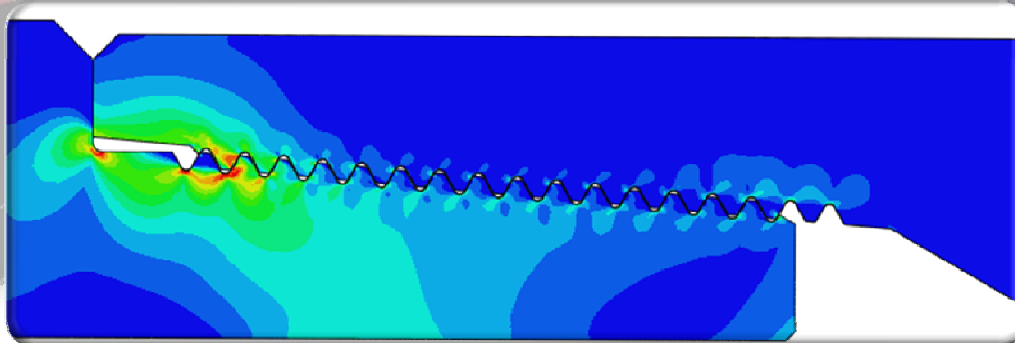
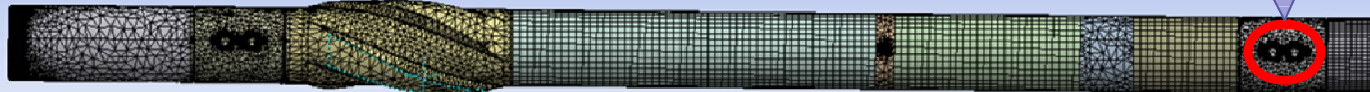
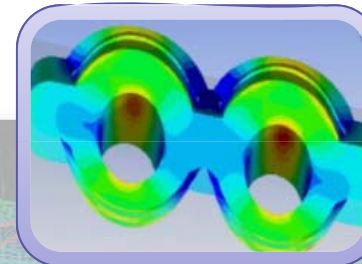


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Reducing Risk of Fatigue Through Engineering

PERFORM Toolkit



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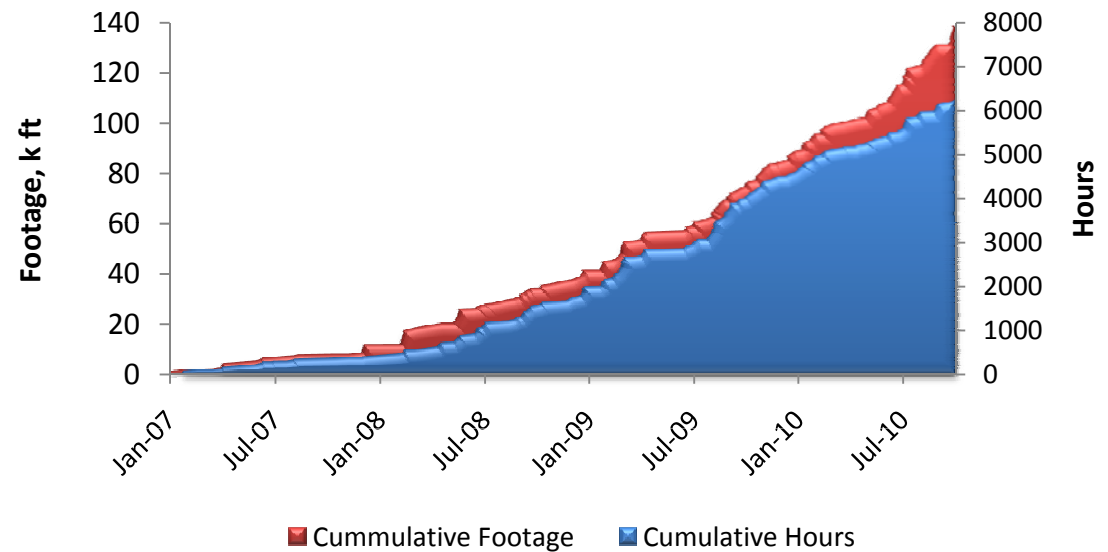
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PowerDrive Archer Features

- True hybrid of push and point the bit
- Accurately kicks off from vertical
 - Measures Magnetic Tool Face
- Delivers full build rate capability immediately
 - Up to 17°/100 ft DLS
- Drills complex 3D well profiles
 - Control system from new generation PowerDrive X6
- Openhole sidetrack at any point in the well

Extensive Field Test

- 100 wells
 - > 6300 hrs
 - > 13800ft drilled
- Collaboration with clients
 - Fine tune BHA & bit design
 - Overcome challenges
 - Experience built
- Proven service



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Case Studies

- Marcellus
 - \$1million USD saved
 - 170% increase in ROP
- Woodford
 - ROPs increased by 80%
 - Tortuosity reduced by 20%
 - 10 days saved
- Eagle Ford
 - ROPs increased by 85%
 - Cost per foot **reduced**
 - Casing run to bottom without rotation for **first time**
- Cotton Valley
 - **Halved** time to drill curve
 - 8 days down to 4 **days**



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PowerDrive Archer RSS



Delivers well profiles previously only possible with motors—yet with the ROP and wellbore quality of a fully rotating RSS

- Reduce risk
- Reduce cost
- Increase hydrocarbon production

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And finally.....



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The PowerDrive Archer Tour



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Initials 3/28/2011

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