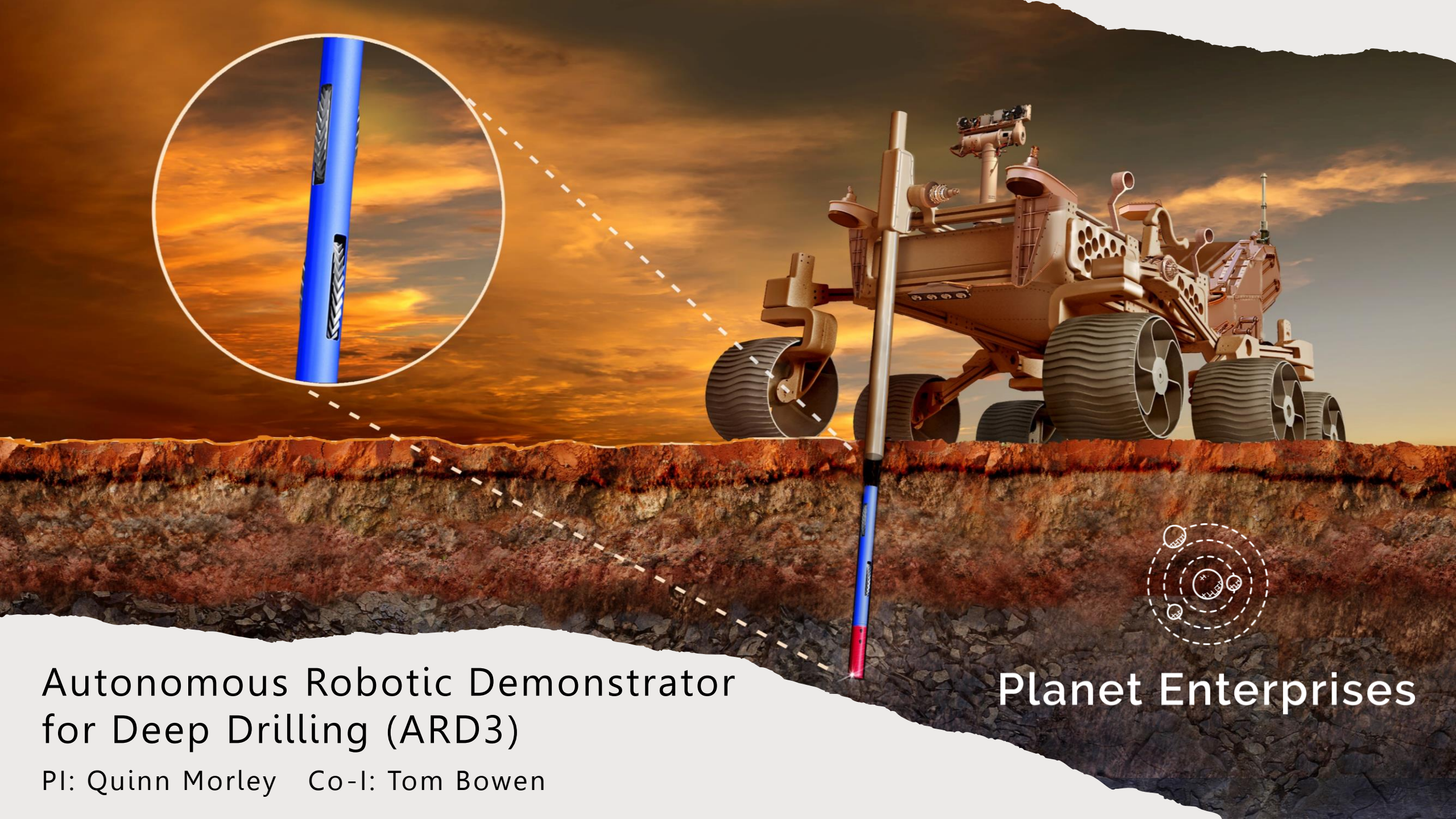


Autonomous Robotic Demonstrator for Deep Drilling (ARD3)

PI: Quinn Morley Co-I: Tom Bowen

Planet Enterprises

Mission:

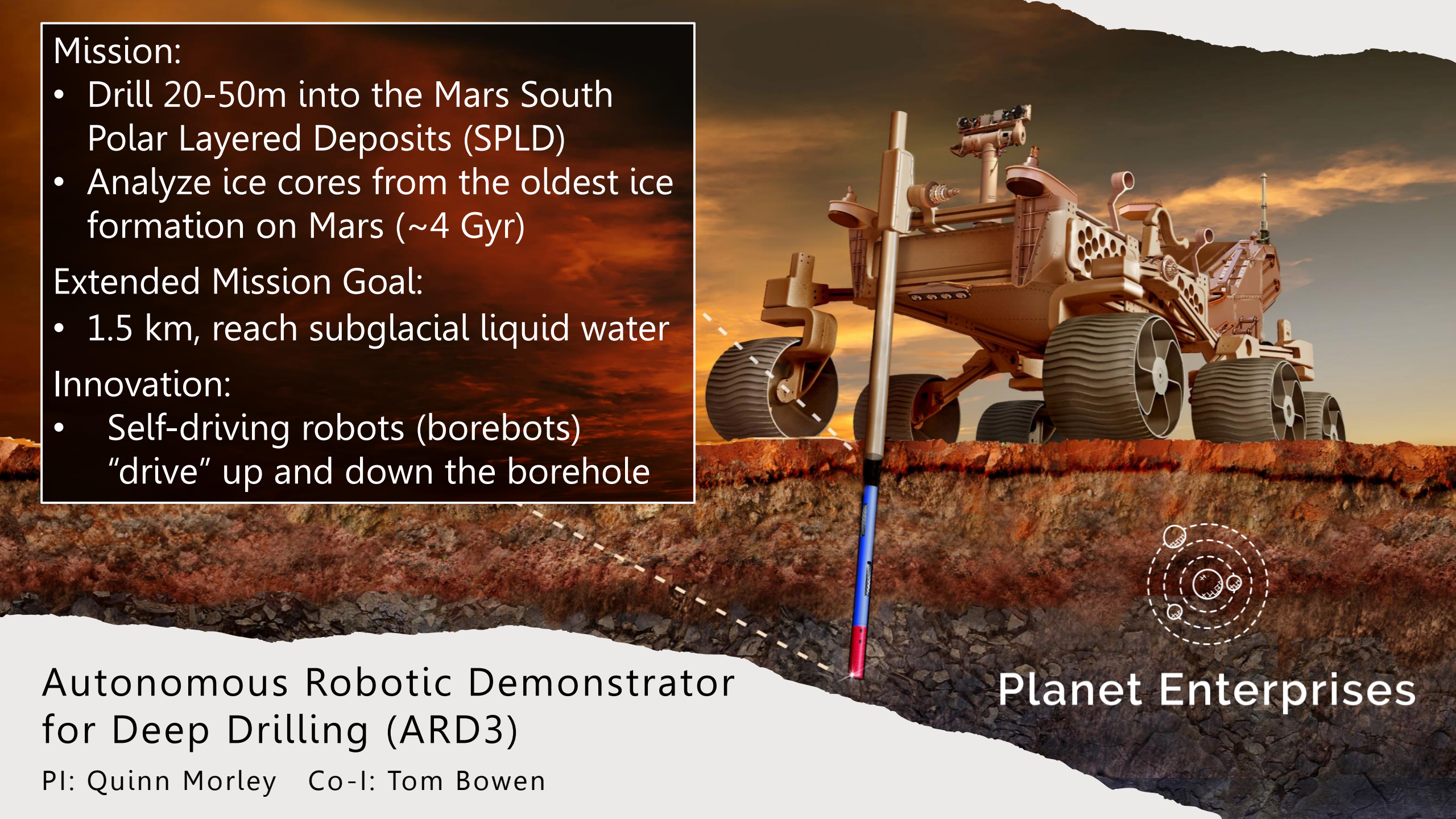
- Drill 20-50m into the Mars South Polar Layered Deposits (SPLD)
- Analyze ice cores from the oldest ice formation on Mars (~4 Gyr)

Extended Mission Goal:

- 1.5 km, reach subglacial liquid water

Innovation:

- Self-driving robots (borebots) “drive” up and down the borehole



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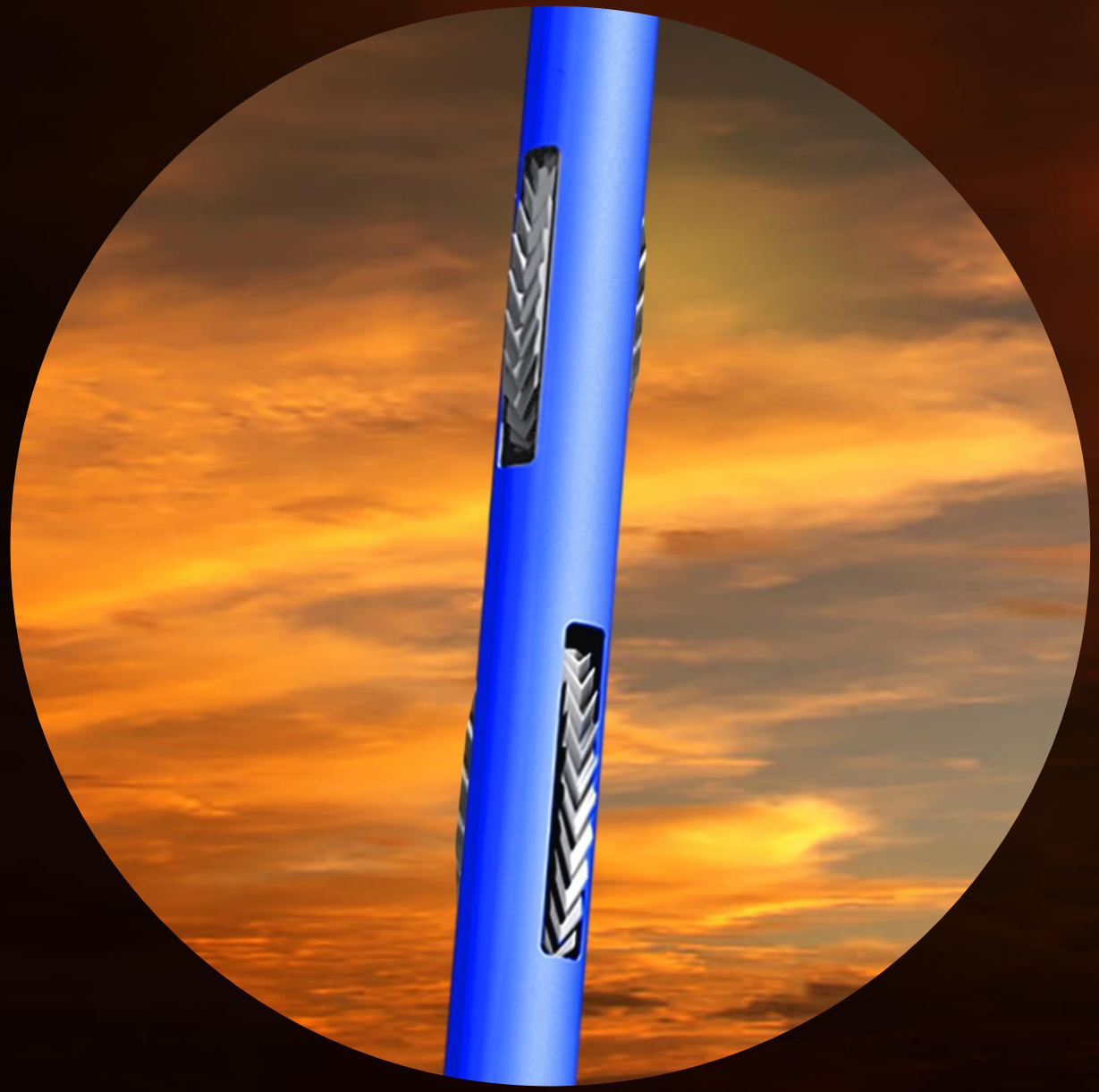
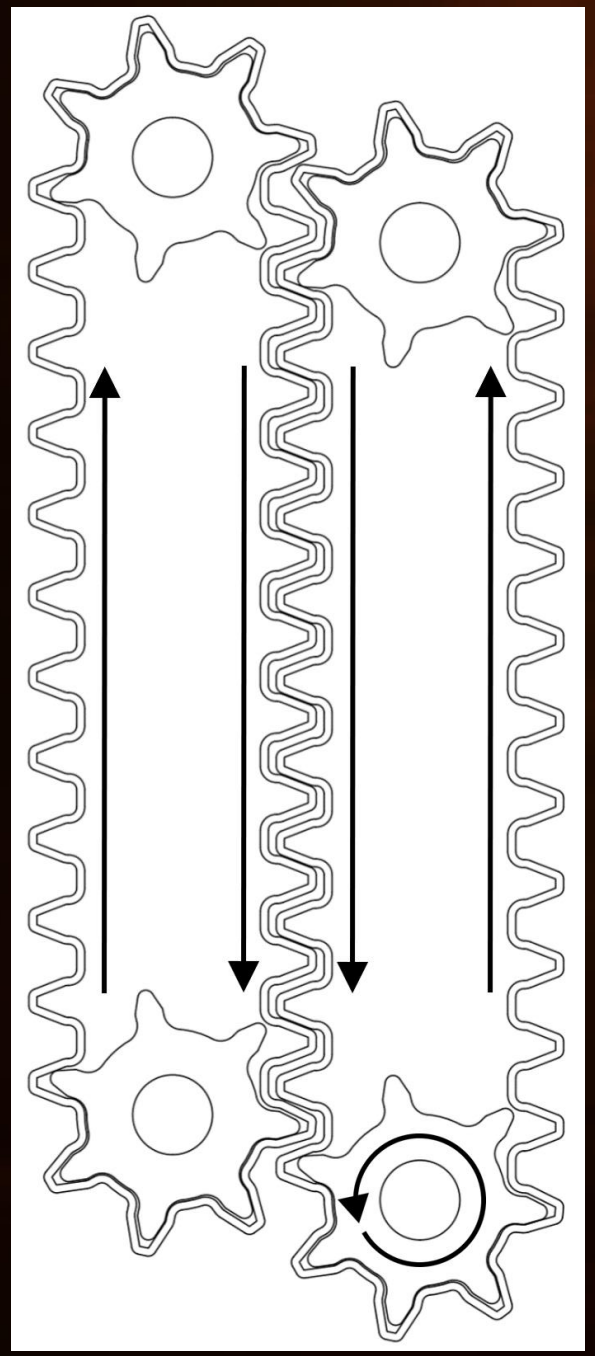
Borebot Drivetrain



- Tank tracks shown are actually flexible ring gears
- As prototyped, the entire drive system is made of flexible components: small chunks of ice or rock could pass through without causing binding or failure
- The study will evaluate whether independent control of each tank track is desirable, and if multiple sets of tracks provide a benefit
  - Think “steering” to keep hole straight during deep drilling



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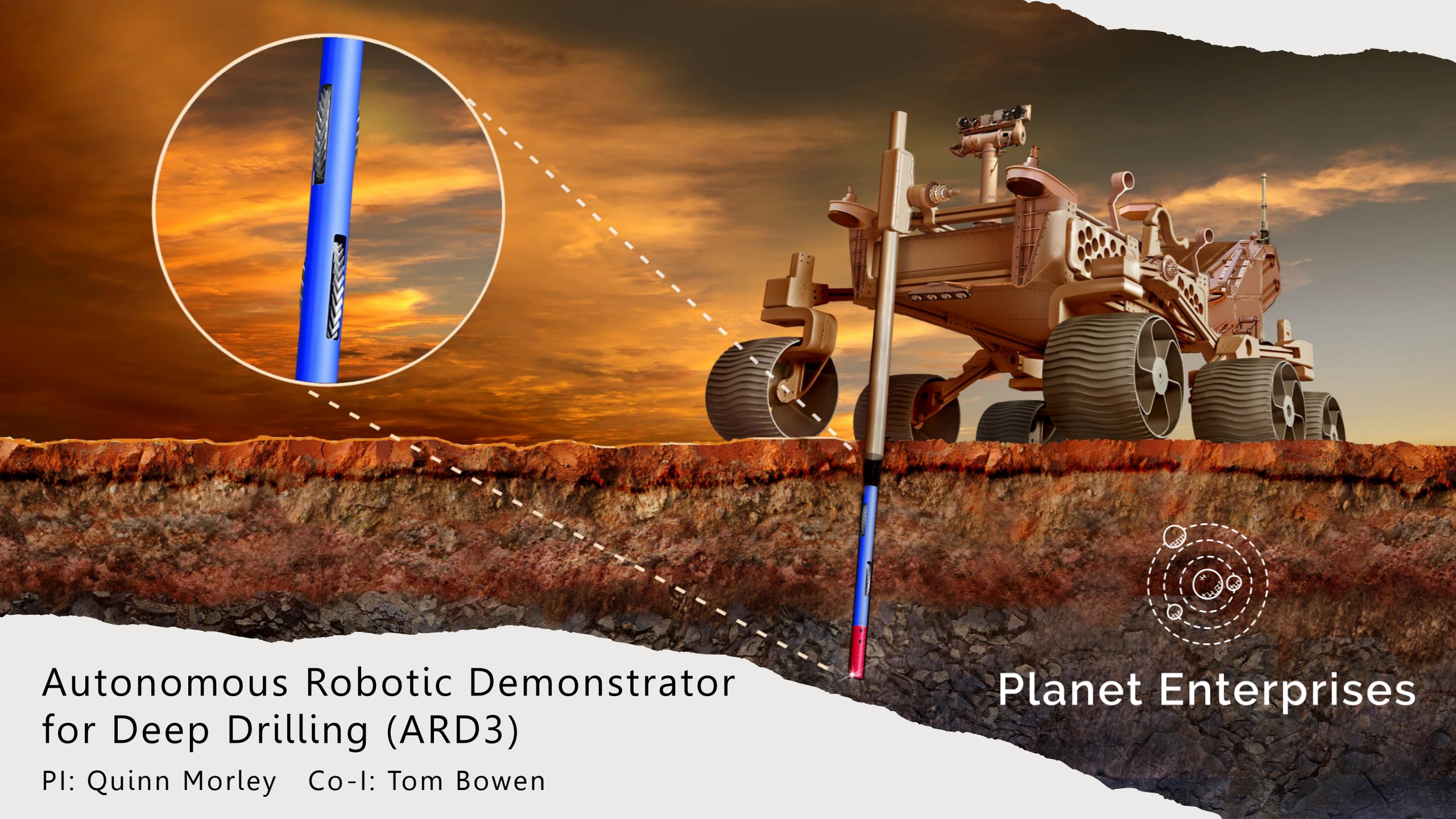

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