ESPCoR Phase (0) Project Review

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Vermont EPSCoR

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HEIGHTENED INNOVATION

Transcendev Company Overview

- Established in late 2009, began operation in 2010
- Located in Stockbridge, Vermont
- Focus is on development of sensors and instrumentation for monitoring the natural and manmade environment
  - Oceanic
  - Hydrologic
  - Geotechnical
  - Atmospheric
  - Transportation
  - Security
- Currently two employees

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Problem Addressed

- Unsaturated soil moisture dynamics control mobility and migration of vadose zone contamination
- Current in situ soil moisture sensing is inadequate
  - measurements are discrete
  - borehole profiling methods are expensive, complicated, involve nuclear sources
- In situ monitoring that could spatially resolve soil moisture in profile would be a substantial improvement
- Intent is to use TDR (waveguide radar) to sense media dielectric contrast
- Additional applications include slope stability monitoring and potentially aircraft icing detection

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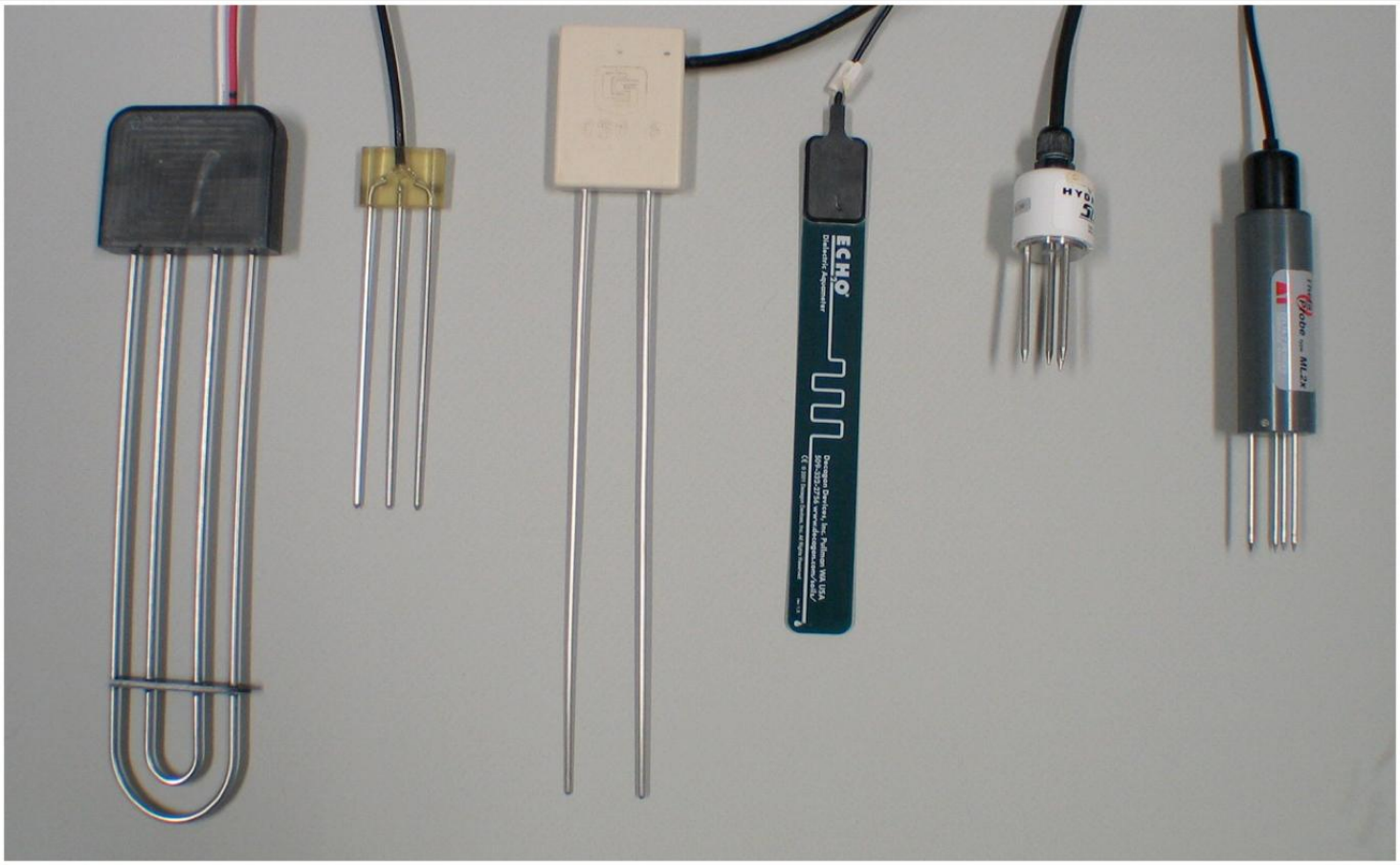
Conventional TDR Sensors



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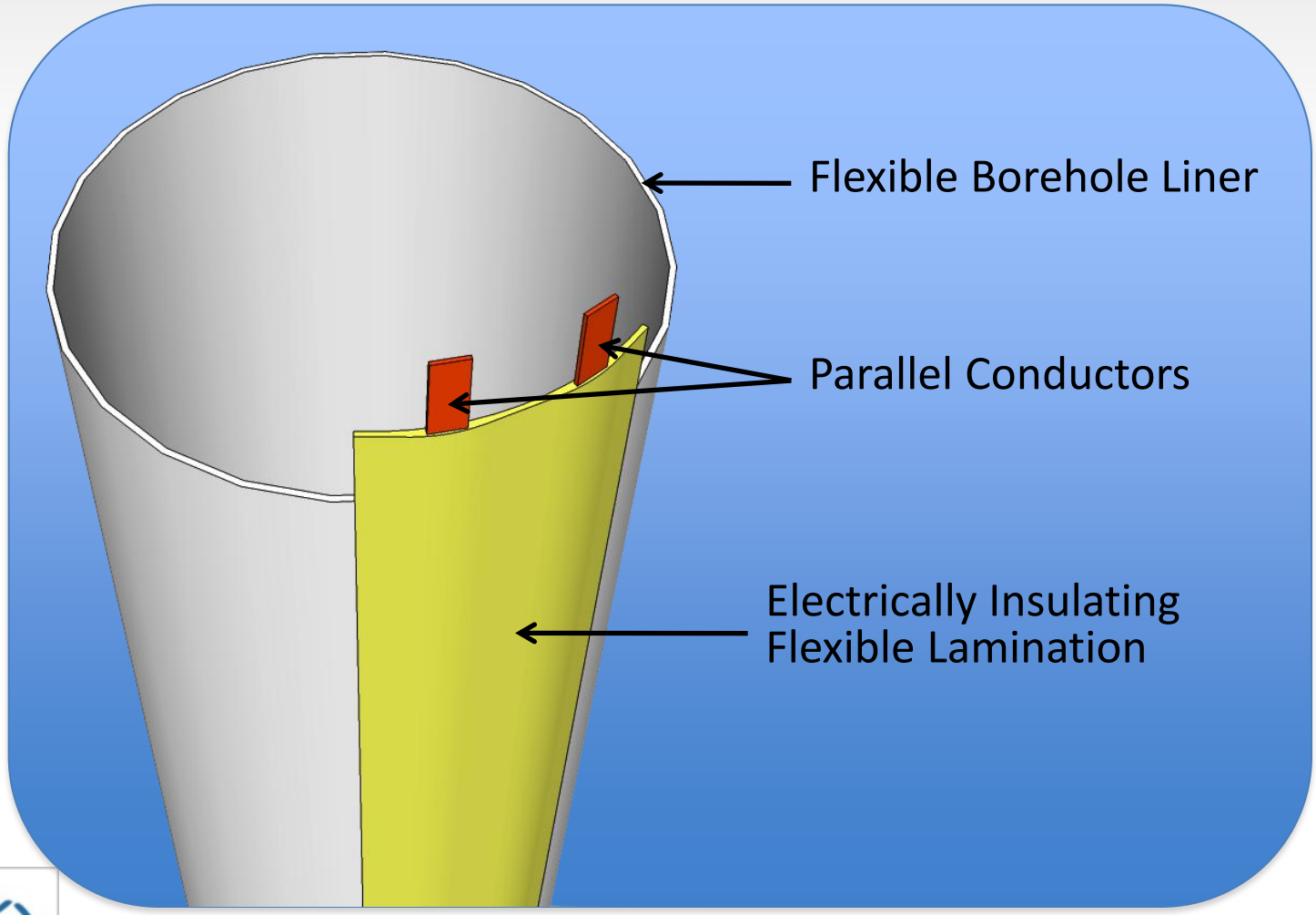
PRISMS - Profile Resolving In Situ Soil Moisture Sensor



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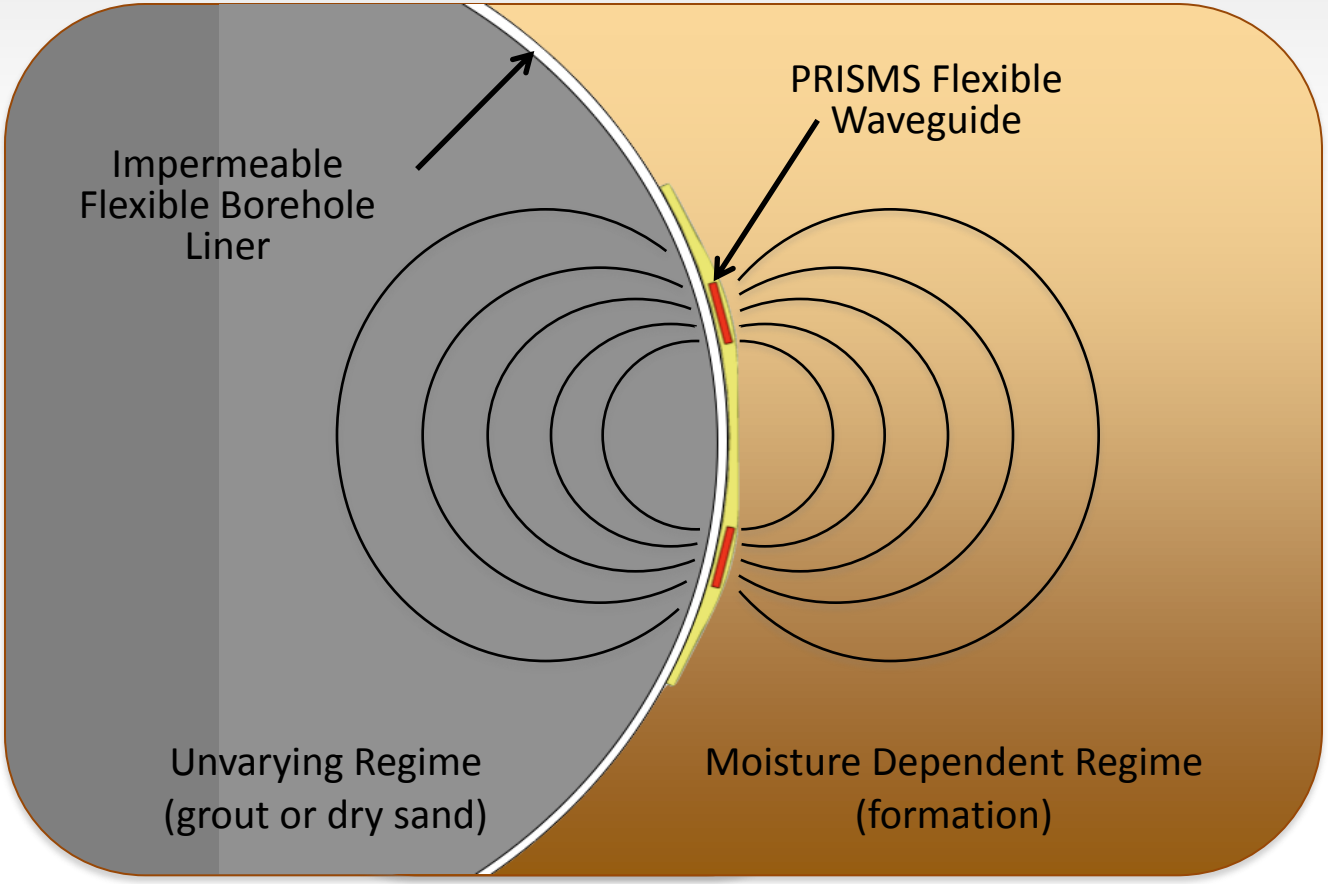
Soil Moisture in Profile



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Technology History

- **Applied for DOE Phase 1 SBIR in 2010**
- **Rejected for lack of quantitative data to substantiate sensitivity at low end of range**
- Applied for and received EPSCoR funding in 2011 to develop proof of principle data
- Improved sensitivity with custom waveguide geometry
- Currently preparing application to DOE for 2013 Phase 1 SBIR funding

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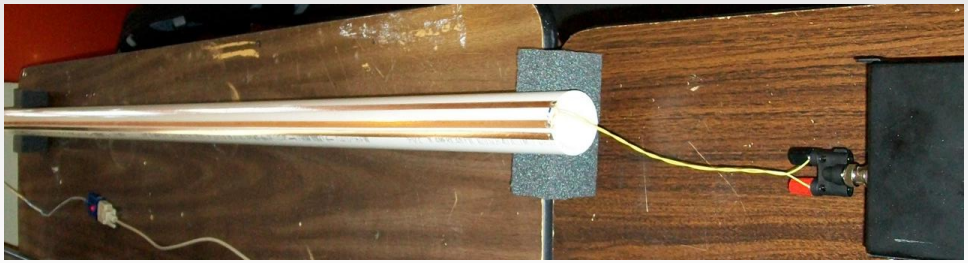
EPSCoR Funded Effort



- Bench tested different waveguide geometries, terminations, and baluns
- Constructed 225-cm soil column with two embedded waveguides and five conventional TDR moisture probes
- Varied moisture content and distribution in column and collected corresponding data
- Analyzed the data to include in SBIR Phase 1 application

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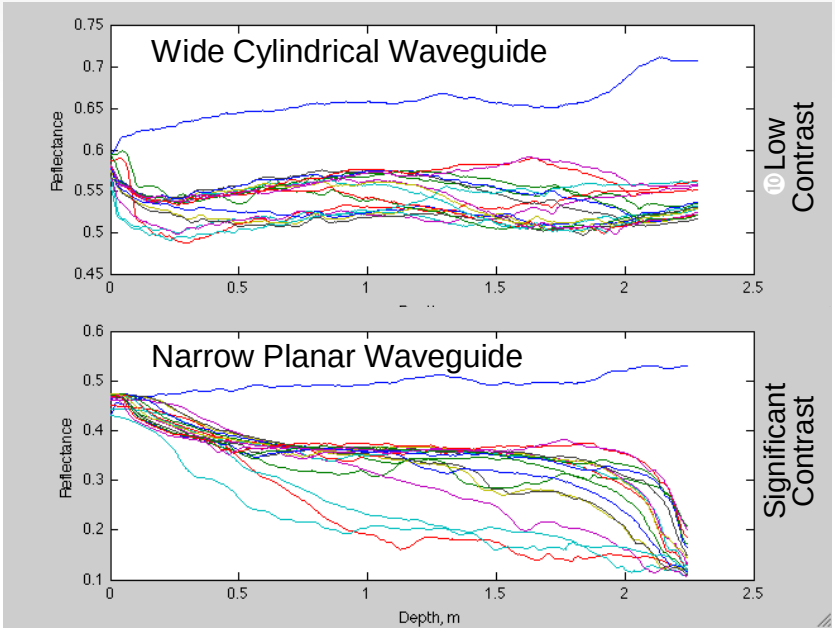
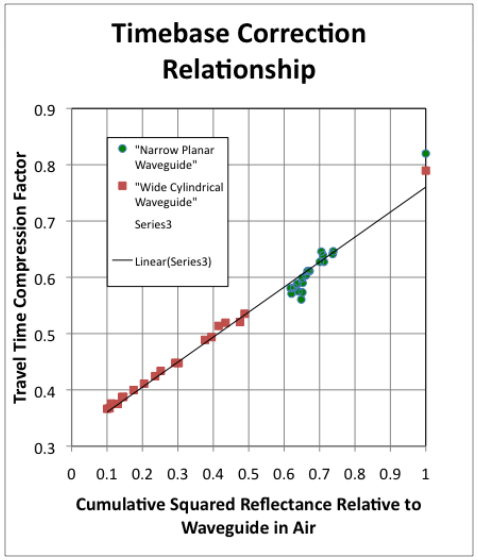
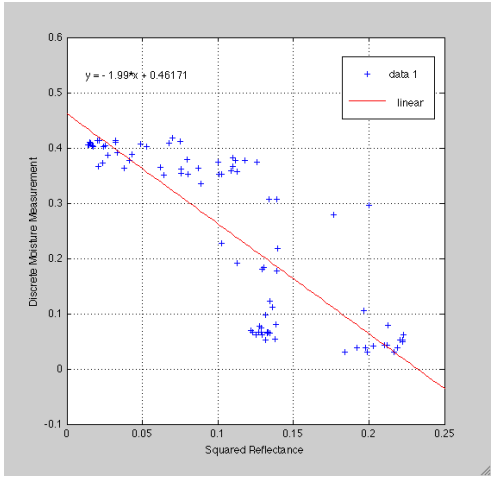
Phase (0) Preliminary Results

- Waveguide Design Comparison





Preliminary Fit



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Next Steps

- **Submit DOE SBIR Phase 1 grant application**
- Assess intellectual property potential
- Consider commercialization options: licensing versus production
- Investigate flex circuit technology for waveguides
- Conduct field demos for environmental management
- Explore related applications

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VtSBDC Involvement

- DId not consult directly with VtSBDC in past, but have had an active relationship
- Use VtSBDC partner, Vermont PTAC, for funding opportunity screening & notification
- Scott Holson has reviewed proposals and briefings – excellent at assuring the message gets through.
- Provided referrals for export issues and business formation conseling.

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Thank You,
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