

Obstacle Detection Technologies

> Threat Prevention Track Session

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DOT PHMSA

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Obstacle Detection Projects Focused on Damage Prevention

- > Obstacle Detection System Using Ground Penetrating Radar
- > Integration of an Acoustic-Based Obstacle Detection System

Both of these are projects are for horizontal direction drilling applications when installing new gas distribution pipe

Obstacle Detection System Using Ground Penetrating Radar

Industry Requirements (HDD - GPR)

- > Detect obstacles in advance of horizontal directional drilling operations
 - Maximum range on order of 2 m
- > Sense both ahead of and adjacent to the drill bore
- > Minimize illumination 'blind spot'
- > 7x11 HDD class machine



Radar mounted on 18x22 drill

Obstacle Detection System Using Ground Penetrating Radar

Industry Requirements (Components and Electronics)

- > Data acquisition and display must be rapid
 - Simple display
 - Real time processing and display
 - Data display must be rapid and clear
- > Cost of downhole components must be minimized in case of tool loss
- > Maximum 1 inch width of all electronics boards
- > Simplify any physical wire connections from surface to radar



Obstacle Detection System Using Ground Penetrating Radar

Status

- > Currently undergoing hardware, software and physical packaging enhancements
- > Field testing is next
- > License has been signed with the commercializer; they are very involved

Integration of an Acoustic-Based Obstacle Detection System

Industry Requirements (HDD – Acoustic)

- > Detect obstacles in advance of horizontal directional drilling operations
 - Maximum range in order of 6-10 ft
- > Sense both ahead of and adjacent to the drill bore
- > Smaller size HDD machine



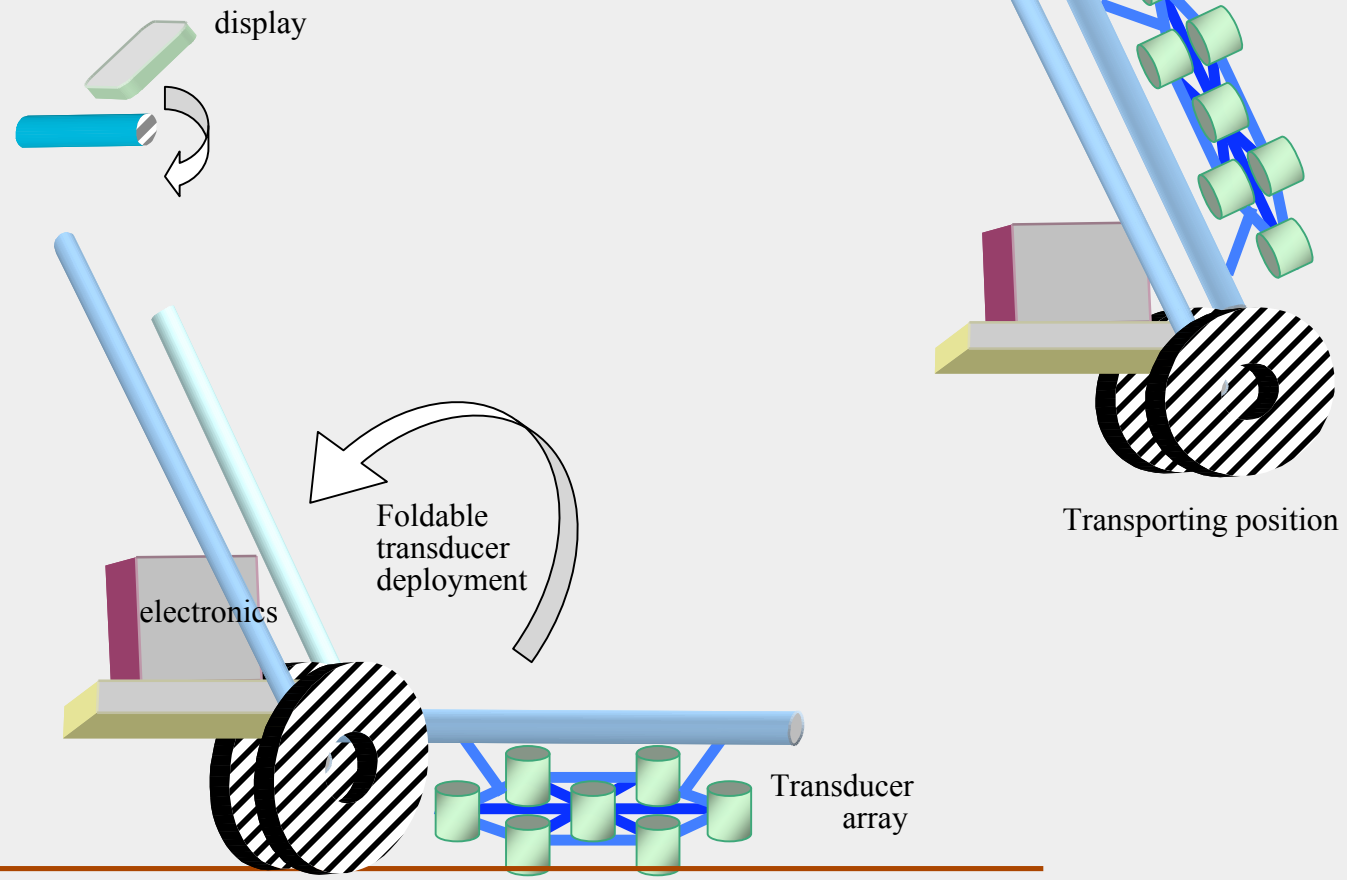
Integration of an Acoustic-Based Obstacle Detection System

Industry Requirements (HDD – Acoustic)

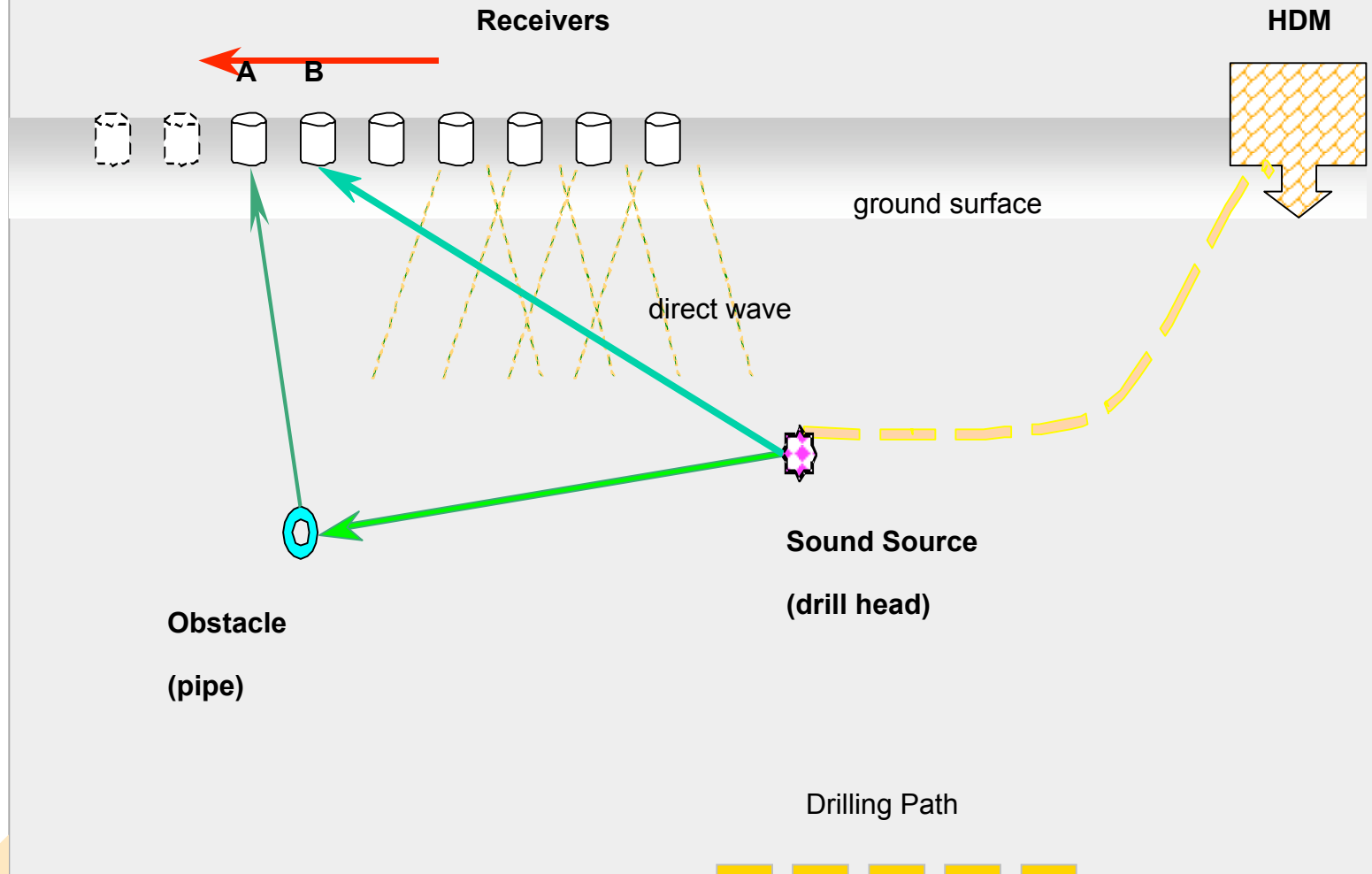
- > Data acquisition and display must be rapid
 - Simple display
 - Real time processing and display



Expected HDD Acoustic System Prototype



Integration of an Acoustic-Based Obstacle Detection System -System



Integration of an Acoustic-Based Obstacle Detection System

Status

- > Finalizing the acoustic receiving system design
- > Conduct field test of the prototype
- > Complete the licensing terms with the commercializer

Key Challenges

- > Locating buried plastic pipe.
- > Active monitoring of critical lines during construction activities (can be temporary, must be cost effective.)
- > Evaluate satellite imagery for pipeline ROW monitoring.
- > Be able to identify the various buried utilities (gas, electric, water, telecom, etc.) Possible solution is to induce standardized frequencies on each pipe such that operators could detect them with a pipe locator or metal detector. (As they do now, locating the pipe by hand before the next scoop.) This could be done through a rectifier for steel, but PE and cast iron are still problems.