



## Information Accessibility Lab

Last updated: 14 February 2003      Revision: 03

### Project Objectives

- Develop assistive instructional technology tools to aid sensorily impaired students. Specifically:
  - Create software that audibly describes graphs of mathematical functions.
  - Create software that sonically presents complex, multi-dimensional time-series data.
- Determine the limits of this technology's ability to provide an alternative and meaningful view of natural systems.

### Sample Use Cases

- A student enters an algebraic equation into a graphing calculator equipped with this technology. The calculator responds with an audible, natural language description of the equation's curve, e.g., "The curve is a parabola. It rises progressively more steeply to both left and right. It's lowest point is ..."
- A software application interactively presents multi-dimensional time-series data using pitch, spatial direction, intensity and timbre to provide a highly descriptive representation of the data to an exploring student or other investigator.

### Customers

- Vision impaired secondary school students and their teachers.
- Researchers attempting to elicit information from complex, multi-dimensional, time-series data.

### Deliverables for Phase 1

- 2D graph description prototype.
- Original research findings related to sonic representation of scientific data.
- Prototype data-sonification software.
- Demonstration application using the developed sonification technology to provide an interactive simulation of a natural system.

### Milestones for Phase 1

	<i>When</i>	<i>What</i>	<i>Confidence</i>
ET.2-L.2-IAL.1	Dec 31 02	MDE <sup>†</sup> requirements.	Green
ET.2-L.2-IAL.2	Mar 31 03	Initial research done.	Green
ET.2-L.2-IAL.3	Sep 30 03	MDE prototype.	Green
ET.2-L.2-IAL.4	Sep 30 03	Sonification prototype specification.	Green
ET.2-L.2-IAL.5	Sep 30 03	Sonification prototype.	Green

<sup>†</sup> Math Description Engine

### People

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### Partnerships

- Research, Rehabilitation and Training Center (RRTC) on Blindness and Low Vision at Mississippi State University.

### Technologies

- Artificial intelligence. Computed fuzzy reasoning.
- Emerging multi-sensory technology.
- Data mining research and techniques.
- Acoustical displays.

### Quality Assurance

- Informal project team testing of all Phase 1 deliverables.

### Dependencies

- Ready availability, low cost and good team understanding of the core technologies expected to comprise the system.

### Assumptions

- Adequacy of commercial commodity computers to process the required data and algorithms.
- Effective rendition of sonic output and control of a dynamic simulation is possible using the precision available in current computer systems.