

## Motivation

- **Visual impairment:**
  - 285 million worldwide, 7 million in US
  - Requires navigational assistance
- **Current navigational aids have limitations:**
  - **White cane:** Limited reach and resolution
  - **Guide dog:** Very expensive (>\$40,000)
  - **State of the art solutions:** Impedes daily tasks, limited resolution

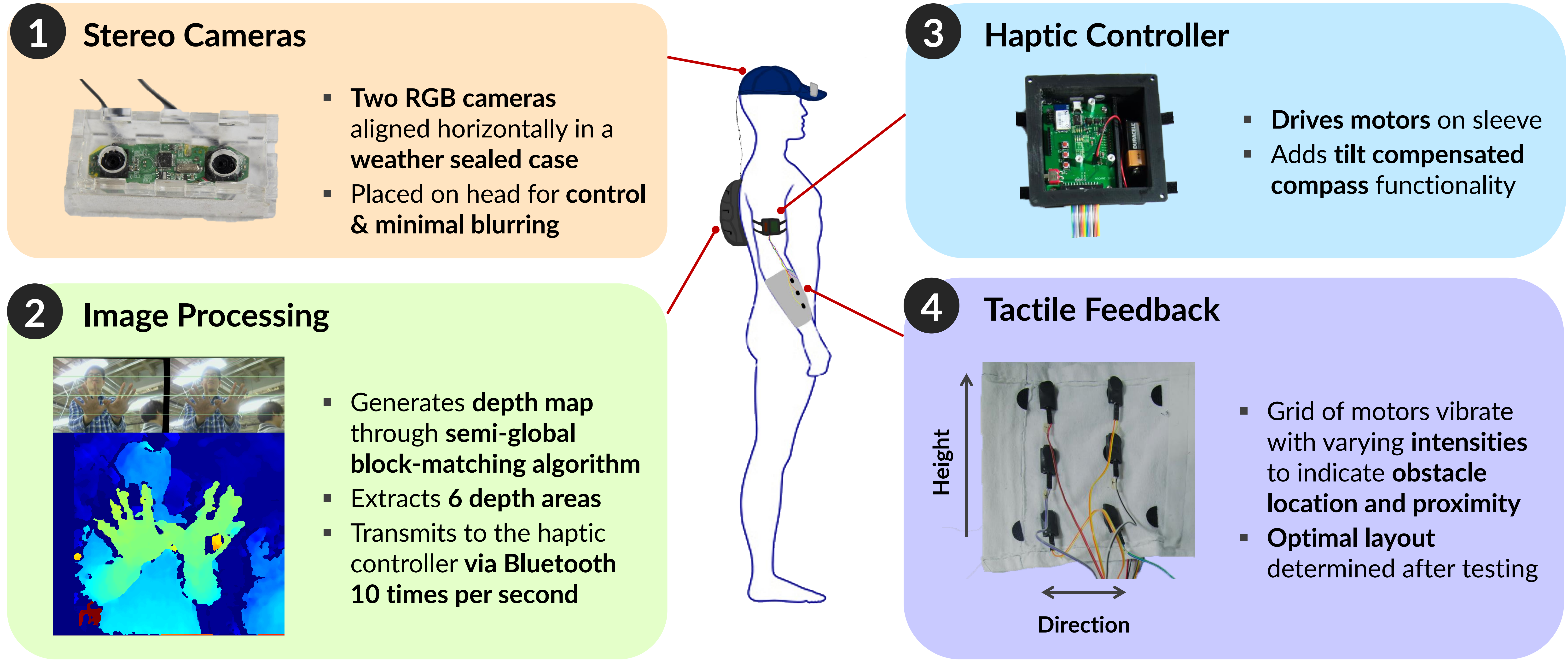
### Mission:

Supplement the white cane to warn users of otherwise undetected hazards

### Key Design Criteria

Ability to detect objects	Detects objects >12 feet away & 1-7 feet high	✓
Ease of use	< 5 minutes to equip	✓
Versatility	Works outdoors and indoors	✓
Durability	Withstands everyday use	✓
Lightweight	< 5 pounds	✓

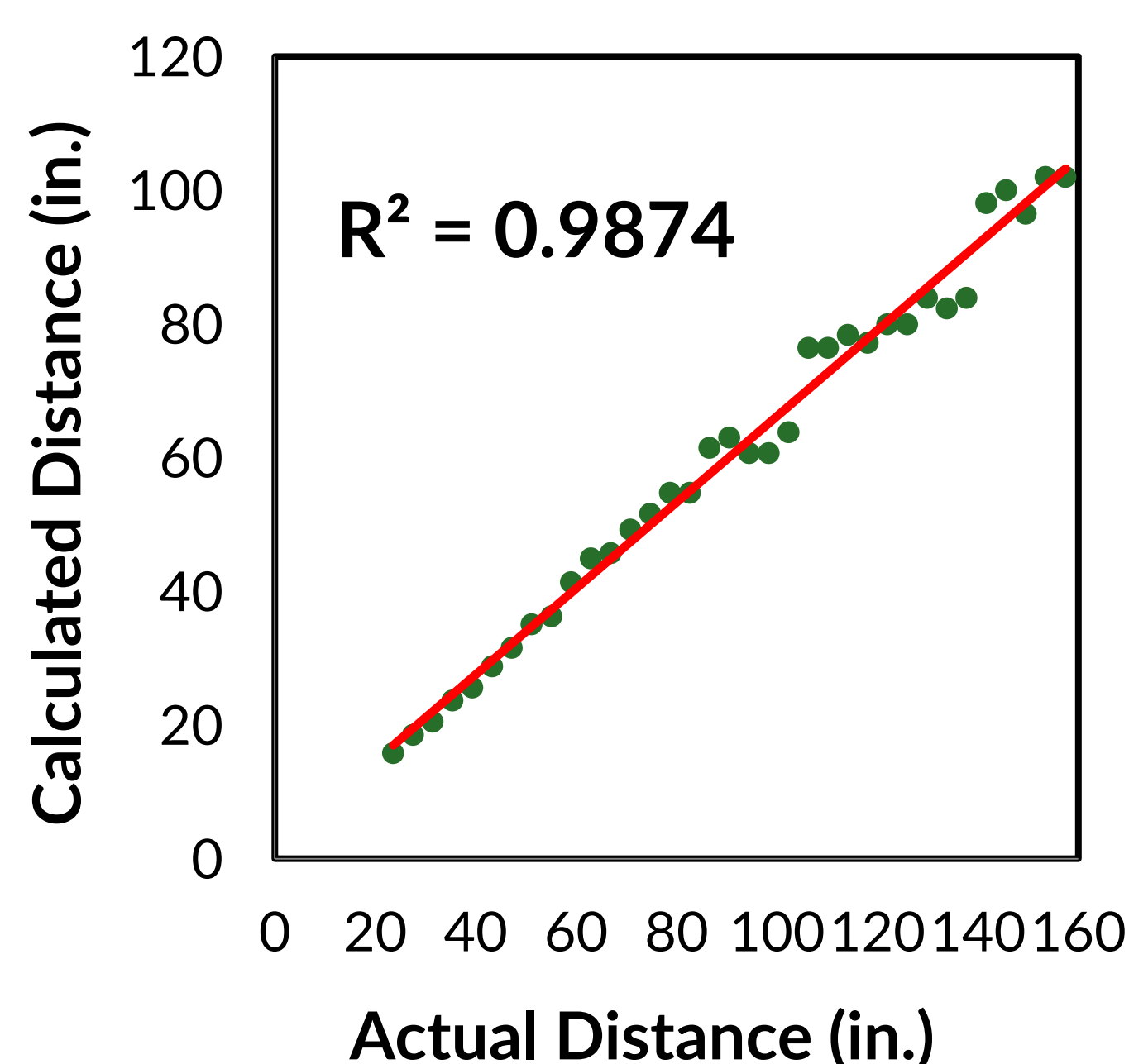
## The ARCANE Seamlessly Portrays your Surroundings



## Benefits of Portable Stereovision

- **Stereovision** presents major advantages:
  - Works in **outdoor settings** vs. structured light
  - Provides **higher resolution** vs. ultrasonic sensors

### Stereovision Accuracy



### Stereovision Resolution

Distance from cameras	Smallest identifiable object
9 feet	
6 feet	
3 feet	

## Testing Results

### % Accuracy Map of Vibration Layout

93% (26/28)	83% (25/30)
86% (25/29)	57% (16/28)
66% (19/29)	79% (23/29)

- Conducted tests on **7 blind-folded individuals**
  - 2 minutes of training
  - Vibrated individual motors
  - User identified location of vibration
- **78% success rate** of identifying object location
- Users gained **confidence and accuracy** over time

## ARCANE: The Future of Visual Aids

The ARCANE enables users to:

- **Detect obstacles** that they might not be able to identify (e.g. overhead obstacles)
- Gain **additional time** to react to surroundings
- **Overcome the shortcomings** of the white cane and guide dog

**Team ARCANE looks forward to making this design more compact and portable for everyday use.**

## References & Acknowledgements

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