

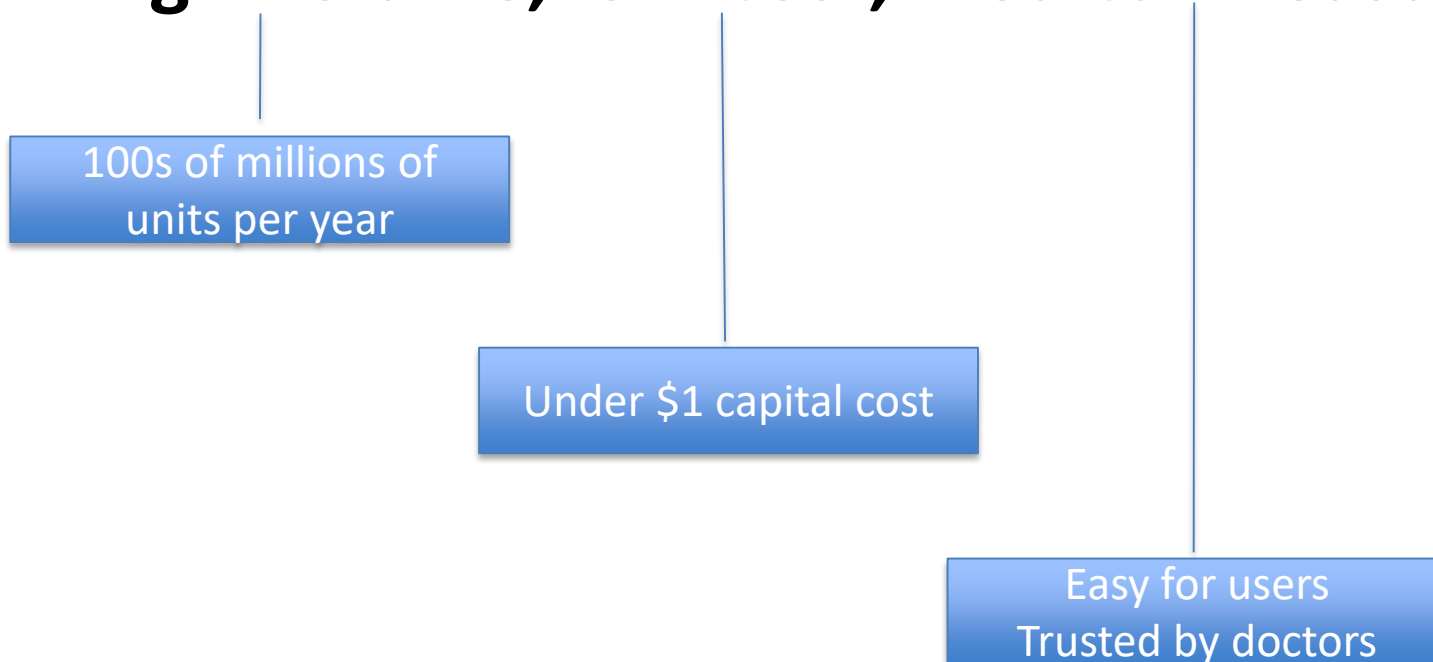
“An Ambitious Project”

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CADFEM & **ANSYS** User Group Meeting
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One Idea

High-volume, low-cost, medical measurements



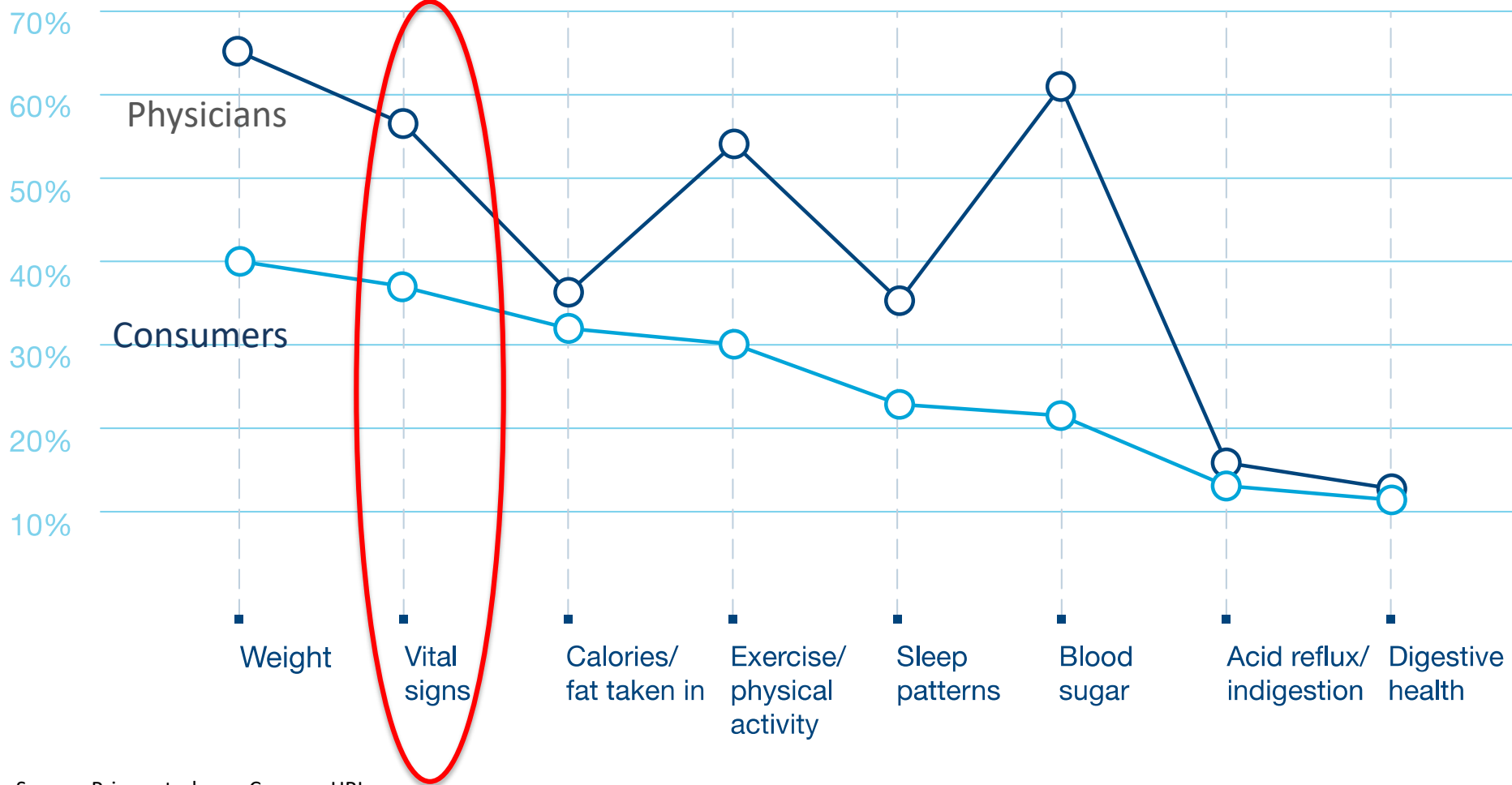
Three Questions

1. What is the most important thing for you?
2. How much money do you spend on electronics for your health?
3. How much money do you spend on electronics?

Six Beliefs

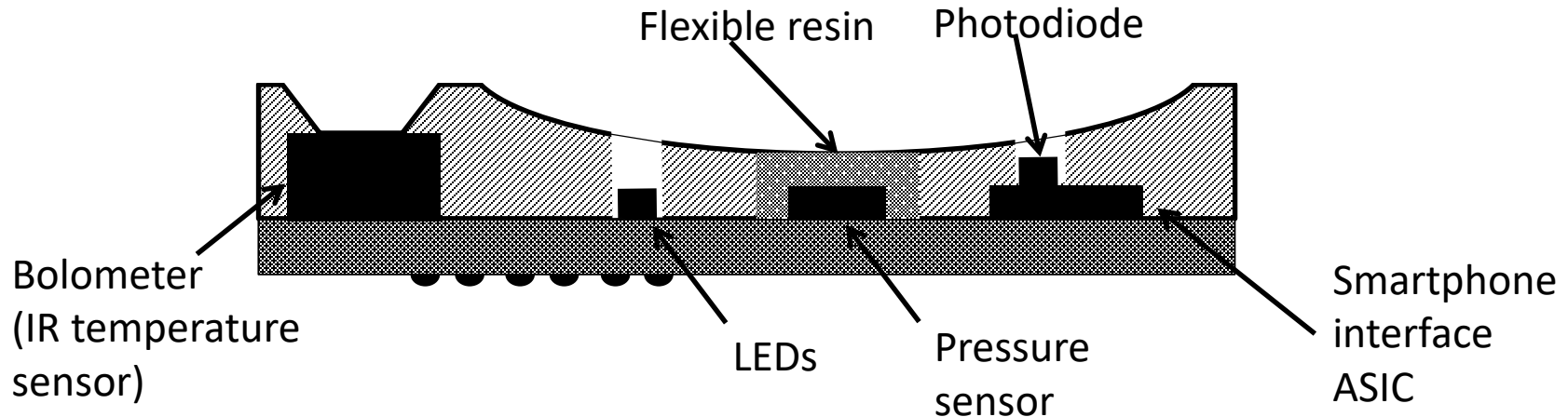
- Startups are hard work
 - Do something important
- Startups need to be fast
 - The 40/70 rule
 - Simulate before building
- Question everything
 - Argue fiercely
 - But constructively
- Plans should be challenging
 - Neither easy nor impossible
- Startups don't hedge
 - Place bets
 - Accept risks of failure
- Failures happen
 - Recover quickly from mistakes
 - Learn from mistakes

What Consumers and Physicians want to track



Source: PricewaterhouseCoopers HRI
Physician and Consumer Surveys, 2010

Principles of operation

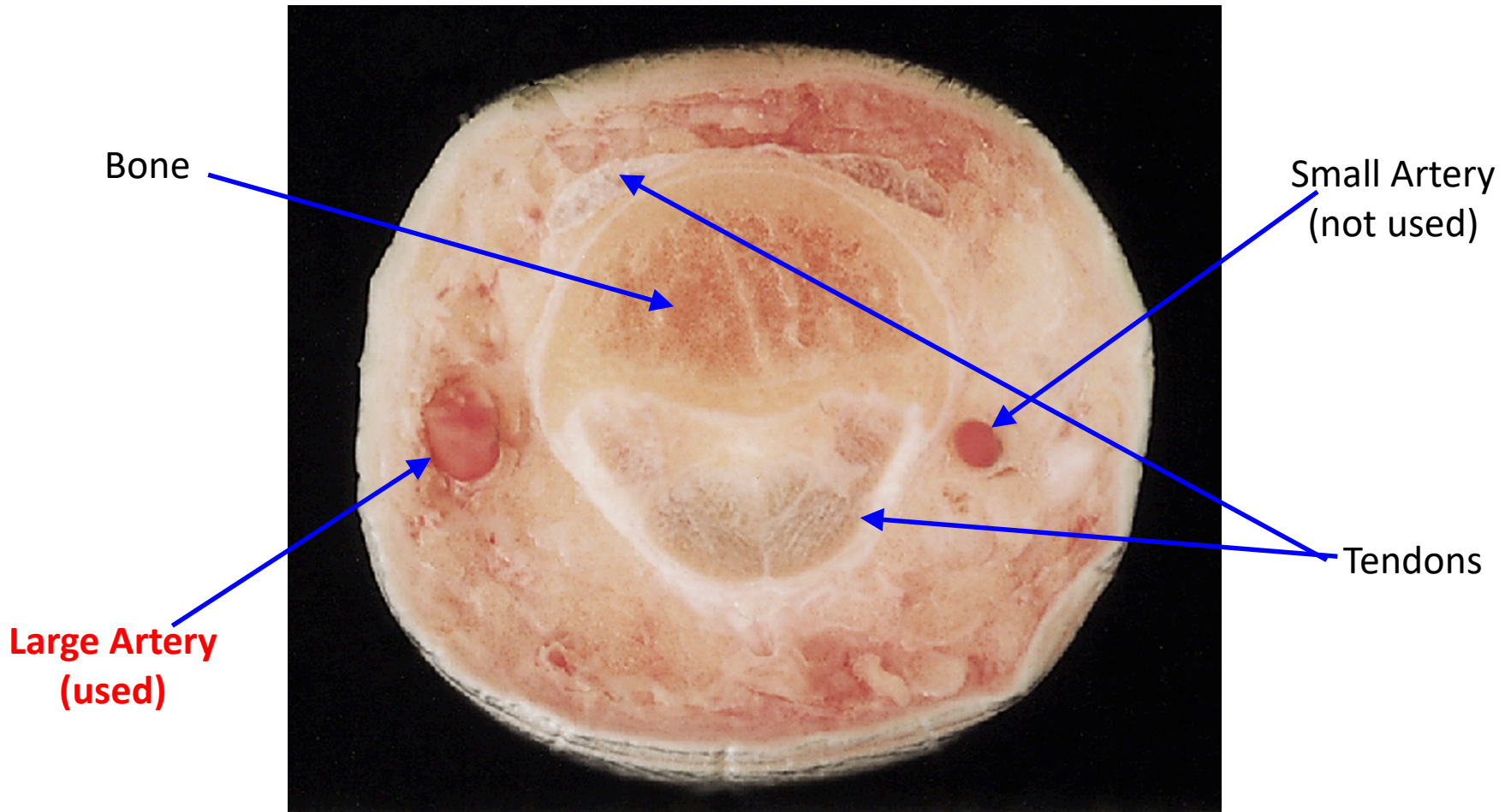


- V-Sensor uses well-proven science for each of the Vital sign measurements:
 - Arterial occlusion (Riva-Rocci) for blood pressure (1896)
 - Infra-red bolometry for non-contact temperature (1878)
 - Photo plethysmography (PPG) for heart and respiration rates (1938)
 - Pulse oximetry for blood oxygen (1972)
- The innovation is implementation of this well-established science in a solution compatible with smartphones while achieving medical accuracy

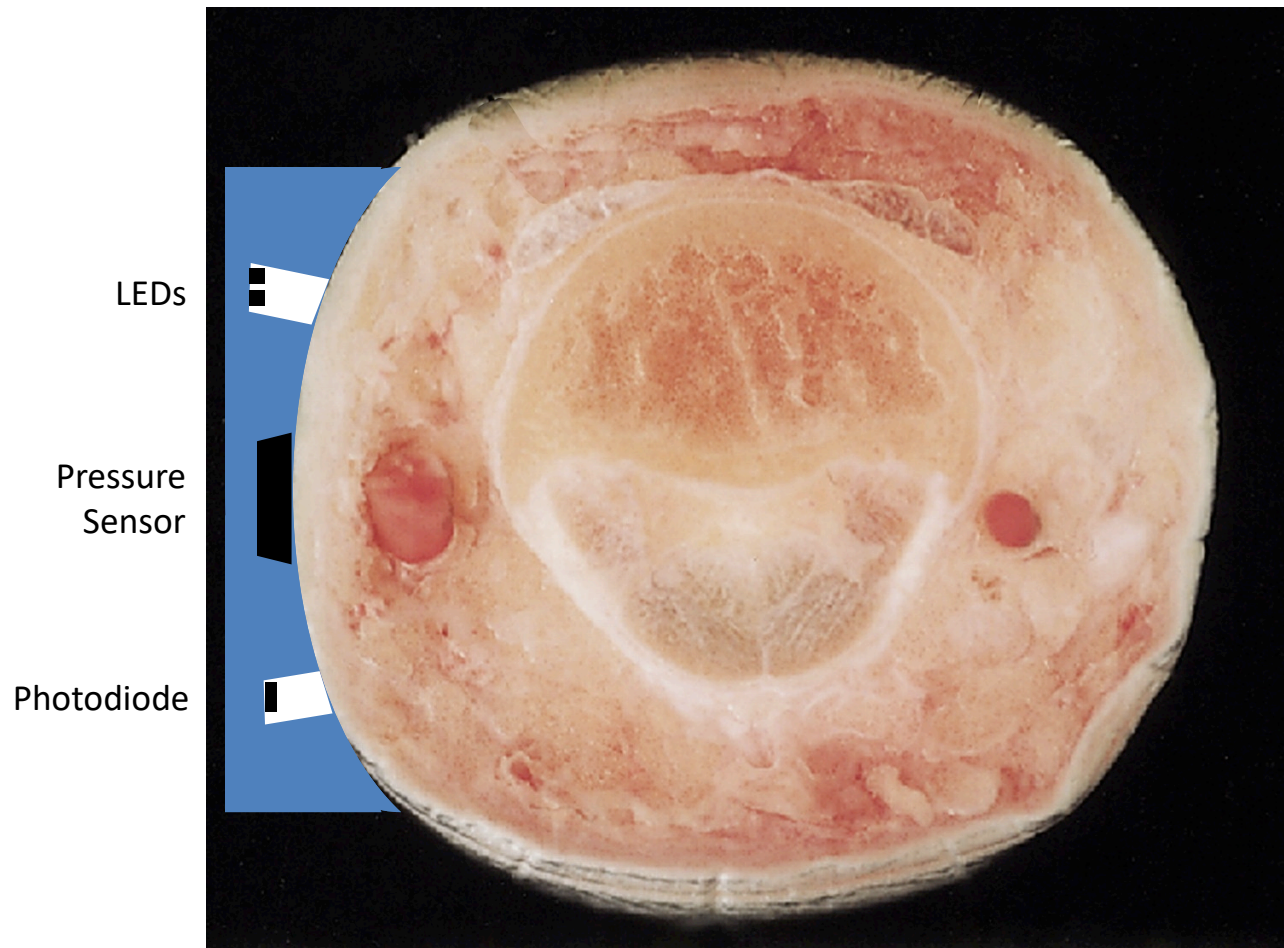
Blood Pressure Measurement

- Uses the same approach as the traditional cuff:
 - “Riva-Rocci arterial occlusion”
 - Apply an external pressure and vary over a range from below minimum Diastolic to above maximum Systolic blood pressures
 - Artery collapses when the external pressure is more than the blood pressure in the artery
 - Accurately measure the applied pressure that just causes the artery to collapse both at the Systole (heart contracting) and the Diastole (heart relaxed)
 - Collapse of artery sensed optically and by pressure sensor

Index finger cross-section



V-Sensor placement



Challenges

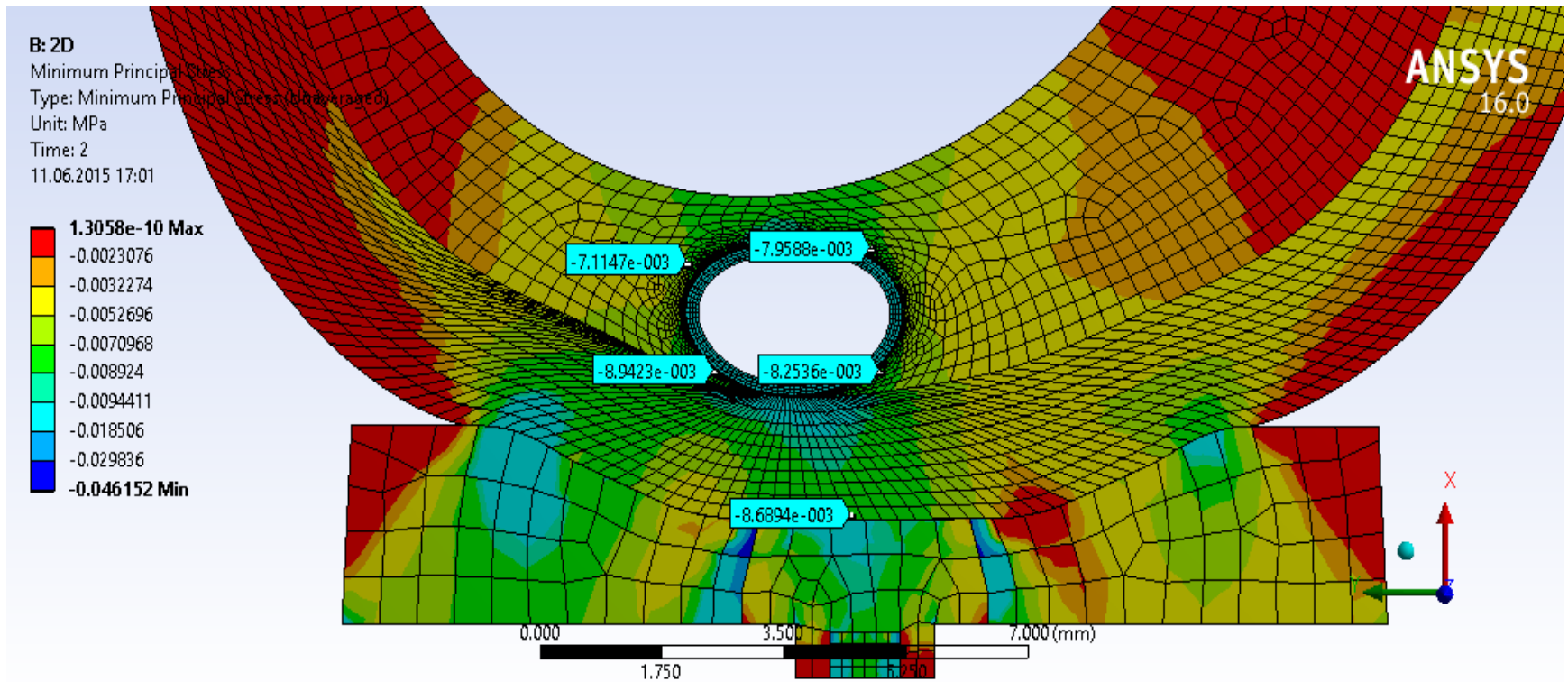
- Size constraints in smartphone
- Complexity of finger anatomy
- Variations between people
- Regulatory approvals and consumer markets
- Getting users to measure correctly

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Blue: Involved simulation

Finger Simulation



Summary

- We started with a simple idea
- We set important, ambitious targets
- We developed technology to achieve this
- We (and our investors) persevered after every setback
- LMD has now developed the (patented) V-Sensor which is small enough & cheap enough to integrate in all smartphones
 - Within five years every smartphone will be able to accurately measure your Vital Signs