PCC # Advancements in Low Vision Rehabilitation in more detail

Oregon Academy of Ophthalmology
Ophthalmic Technicians/Assistants Program
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Portland, Oregon

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I Have no financial interest in any product mentioned in this lecture.

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PCC # Students often ask me
Why do I talk to myself

Sometimes I need expert advice.

Bittle

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PCC # Macular Degeneration

- Primarily a loss of central vision
- Estimate > 20 million in US
  - Under 5% population age 40-50
  - 30% population by age 80 -84
- Around 2 million with advanced AMD
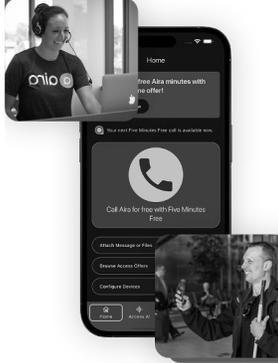- About 50,000 new cases of blindness each year from AMD

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Indoor Navigation and Shopping

- ARIA app - A free (usually) app for iPhone /android / tablets
- Walmart, Target, Gucci, Starbucks
- Professional visual interpreters to find & describe items, help checkout

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Indoor Navigation and Shopping

Walmart Live Aira In Stores & **Online** | Visual Interpreting On Demand

Paula Margeson
Walmart customer and Aira user

The more technology allows me to be independent.

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Indoor Navigation and Shopping

- ARIA Access Partners Include
  - Some airports
  - Some Universities – Western WA U.
  - Some museums
  - Some transportation agencies – C-Tran, Vancouver
  - Some government agencies
  - Some entertainment places

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Indoor Navigation and Shopping

- ARIA Cons
  - Some applications described as user-unfriendly, slow, and difficult to use'
  - Slow performance at times
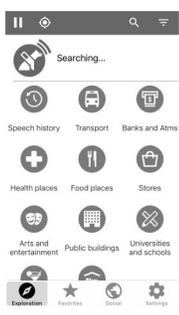 - Inconsistent support across services
  - Not in all major big stores

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Navigation

- Lazarillo app
  - Voice guidance for outdoor and indoor navigation
  - Interactive digital maps for navigation indoor and outdoor
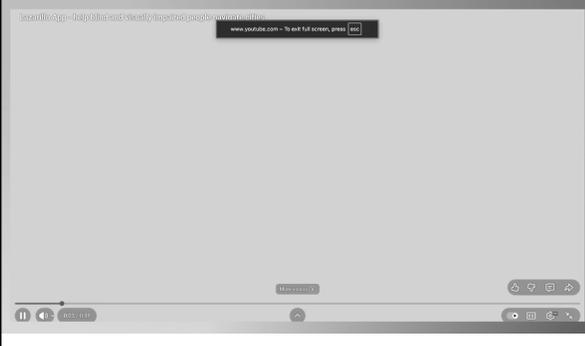 - Free for iPhone / androids

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Navigation

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Navigation

- Lazarillo app pros
  - Free for iPhone / androids
  - User friendly
  - Customizable – text to speech speed, amount of information available
  - Comprehensive guidance – turn by turn directions and announces street names, intersections, points of interest

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Navigation

- Lazarillo app cons
  - Internal voice conflicts making hard to understand in certain situations
  - Inaccurate business data –
    - some outdated/fictional
  - Limited external voice integration

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Envision

- Envision AI app for smart phones
  - OCR/Text to speech in many languages (>60)
  - Object recognition & identify previously taught faces
  - Scene descriptive – "there's a table…"

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Envision

- Envision AI app
  - Describe images
  - Find people in crowds
  - Scan barcodes
  - Answers questions about scene text, etc.

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Envision

- Envision AI app Cons
  - Not hands free
  - Depending on lighting, camera quality, recognition less reliable
  - Using camera + AI drains battery
  - Some features may require internet
  - Learning curve
  - Costs: **$40/yr** or **$200** lifetime, but some basic core features are free

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Envision app + Envision smart glasses

- Many versions: **$1900 – $3500**
  - Built in camera constantly "see" what is in front and describes it
  - Fully hands free
  - OCR Text to speech
  - Scene/object description
  - Face recognition (learned)
  - Light and color detection
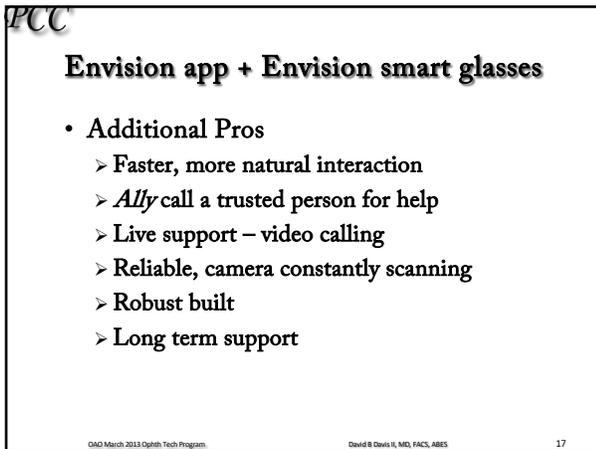 - AI is built on Chat GPT-4 base

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Envision smart glasses Video

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Envision app + Envision smart glasses

- Additional Pros
  - Faster, more natural interaction
  - *Ally* call a trusted person for help
  - Live support – video calling
  - Reliable, camera constantly scanning
  - Robust built
  - Long term support

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Envision app + Envision smart glasses

- Cons
  - Cost – expensive
  - Subscription features – for read and home edition, $200/yr
  - Size, comfort – might feel heavy or uncomfortable
  - Some features need Wi-Fi
  - Accuracy limits – color correction "poor' and text recognition struggles in poor lighting
  - Fragility – cheaper wire frame versions
  - Battery (inside frame) lasts 4-6 hrs. Continuous use also drains android/iPhone battery.
  - Cost of upgrades
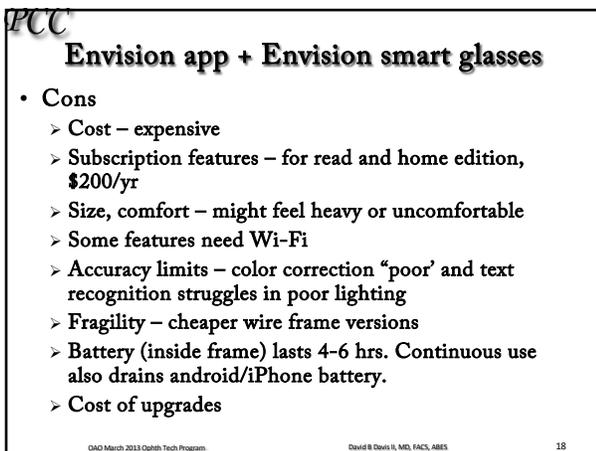
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Ally Solo Smart Glasses

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- A cheaper $700 ($599) lightweight, simpler smart glasses that is primarily designed for na... reads, object recognition.
- Compact, comfortable, wearable
- Long battery life
- AI assistant "Ally" runs via a companion smartphone ap
- Can use with envision AI, but not all of envision features work with it

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Ally Solo Smart Glasses

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Ally Solo Smart Glasses Cons

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This video was made by professionals under all the special hinges needed, support, Wi-fi, etc. Not that well developed yet.

- Mixed User experience / reliability issues
- Inconsistent AI results and occasional errors
- Dependence on voice/potentially awkward in noisy environment
- Learning curve and usability frictions
- Price
- Not a replacement for true vison – still limited. Not AR glasses that project vision. Don't' see the world, get descriptions.
- A promising but still evolving assistive tool

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Be My Eyes App

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- Be My Eyes Volunteers
  - ➢ This app connects users with volunteers or AI agents to describe images, read text, or provide visual support.
  - ➢ Totally free
  - ➢ Over 2m volunteers world-wide
  - ➢ For real time events – camera
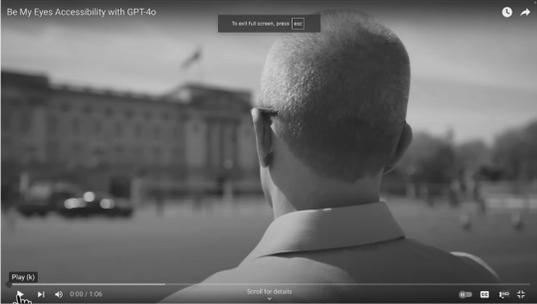 - ➢ Send fotos, text, etc. for reading
  - ➢ App Icon
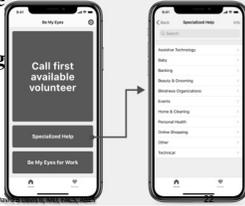
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AI Powered Apps – BeMyEyes Virtual Volunteer (Beta)

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Be My Eyes can be paired with Ray Ban Meta Smart Glasses
**Barilla cookings. 9.5m live volunteers**

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Bionic Vision System – for GA

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- Prima System – how it works
  - ➢ AR glasses camera captures visual scene
  - ➢ Small computer processes images
  - ➢ Converts into high contrast patterns >
  - ➢ Glasses Project as infrared light onto the impla chip (2 X 2mm) >

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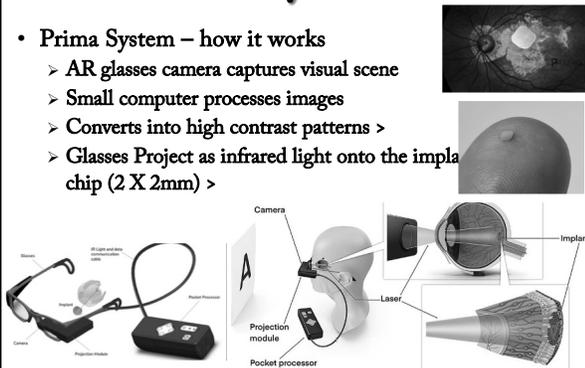
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Bionic Vision Systems

- Prima System for GA – how it works
  - Convert light into electrical impulses
  - Mimic the natural activity of retinal cells
  - Stimulating the remaining healthy inner retinal neurons (bipolar & ganglion cells) > optic nerve

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Prima System for GA

- 38 patients, VA ≤20/320 in at least one eye
- 84% patients had increase 5 lines vision
- Mean VA remained stable after implantation
- Takes many months for patient to learn to see with this
- The visual field GPT says about 7 degrees ????.
- No significant 12 moth complications

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Prima System for GA

- Prima System Update 10/25
  - Limited by only Black and white 100u pixels, 378/chip
- Future in development
  - New chip: 20u, up to 20,000/chip
  - Chip with full grayscale – allow facial recognition
  - Potential to 20/80 and with electronic zoom 20/20?
  - Awaiting FDA approval for next stage

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Other Aids

Time does not permit me to discuss other Low Vision Aids at this time. In your notes, at the end of this presentation are a few slides on optical and electronic magnification devices.

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What I have learned from 91 years of living

MY ENTIRE LIFE CAN BE SUMMED UP IN ONE Sentence...

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WELL, THAT DIDN'T GO as planned

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Questions?

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David B. Davis II, Retired old fool

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Optical & Electronic Magnification

- Merlin Elite Pro 24"
  - Large screen Magnifier – full HD 1080

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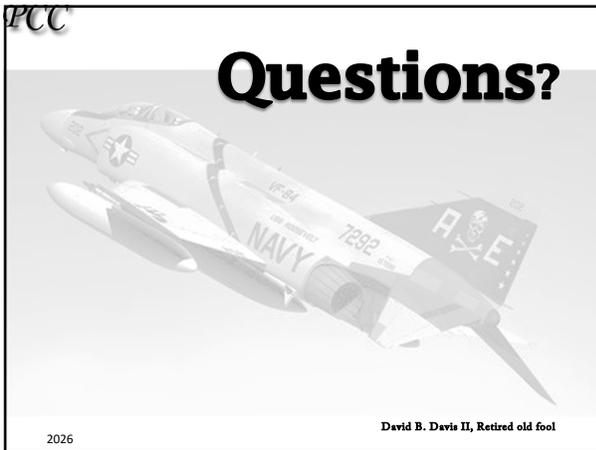
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PCC
Optical & Electronic Magnific

- Merlin Elite Pro 24"
  - Large screen Magnifier – full HD 1080
  - Zooms – up to 70x with autofocus
  - Change Contrast, background
  - Easily identified controls for visually handicapped
  - OCR / Text to speech - >30 languages
  - XY table easily movable
  - Can be used as monitor for computer or tablet

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Cons of Merlin

- Heavy - > 40 lbs - needs dedicated desk space
- Expensive – about $4650
- Learning curve for those not familiar with assistive tech
- Needs dedicated power outlet
- Latency – Like all CCTVs, there may be some small latency or lag compared to looking with your own eyes
- OCR can misread depending on quality of print and paper

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Others

- There are multiple types and sizes on the market
- There are lightweight portable optical& electronic magnifiers
- This is a rapidly changing environment now that AI is here.

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