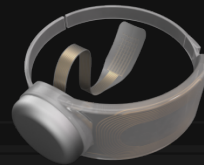


The Argus II Retinal Prosthesis System: *Clinical Trials and Real World Experience*



Usher Syndrome Coalition Conference Call

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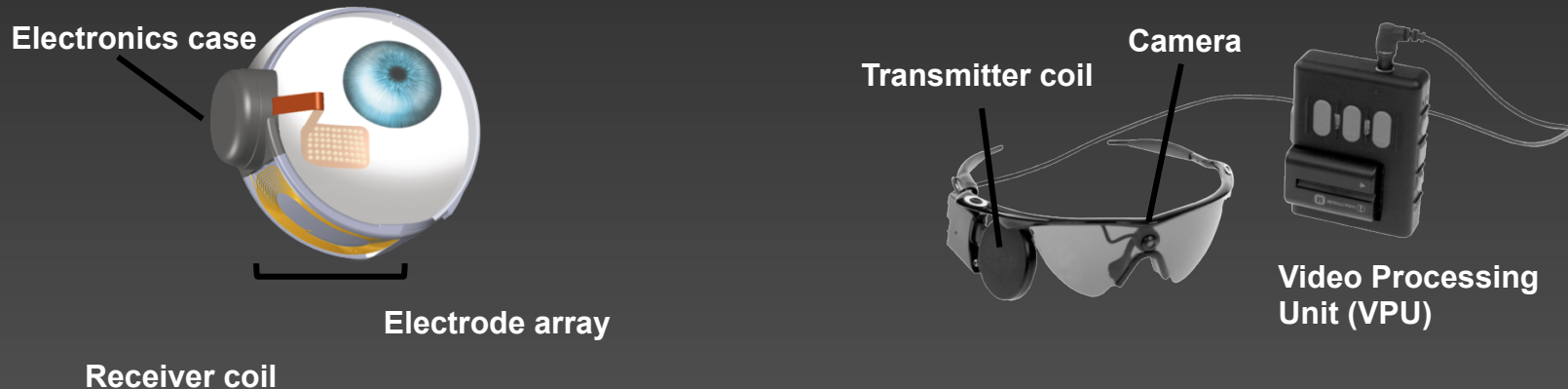
USC Keck School of Medicine

Retinitis Pigmentosa

- A genetic cause of progressive visual impairment; a feature of Usher Syndrome
- First symptoms
 - Night blindness & loss of peripheral vision
 - Rod cells damaged
- Vision loss can progress
 - Affect central and color vision, too
 - Cone cells damaged
- *Some patients (not all) will lose the ability to see motion or even light – these are the patients who can be helped by the **Argus II***

What is the Argus II?

- An “artificial retina” or “bionic eye” made by Second Sight
- US FDA approval in 2013 (European approval, CE Mark in 2011)
 - 12 US clinical centers for implantation
 - First commercial implants in USA: University of Michigan (Jan ‘14), University of Southern California (June ‘14)



Which Patients Could Benefit from the Argus II?

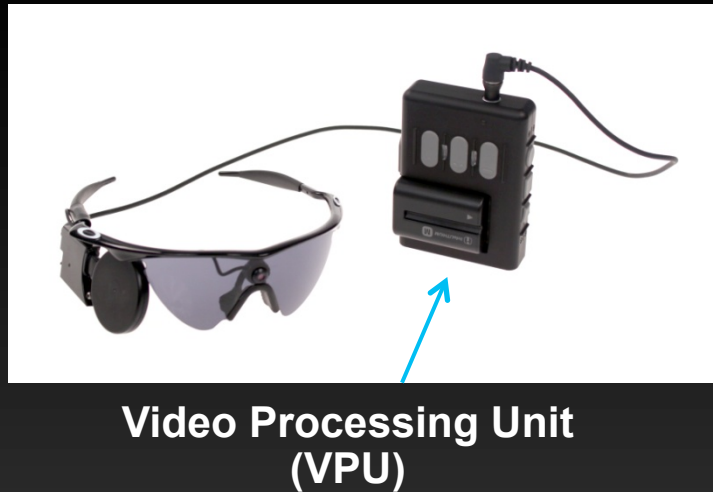
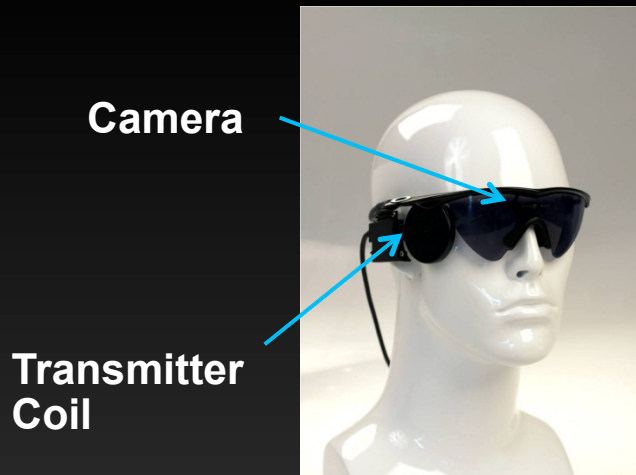
- Vision loss due to **retinitis pigmentosa** or related conditions (**photoreceptor loss**)
 - Won't work for patients with optic nerve damage
- **Profound vision loss** (bare light perception or worse) in **both eyes**
 - No current useful vision
- History of past useful vision, patients must be older than age 25

Why the Name Argus?

- **Argus Panoptes** is the name of a 100-eyed giant in Greek Mythology
- He was a watchman for the goddess Hera



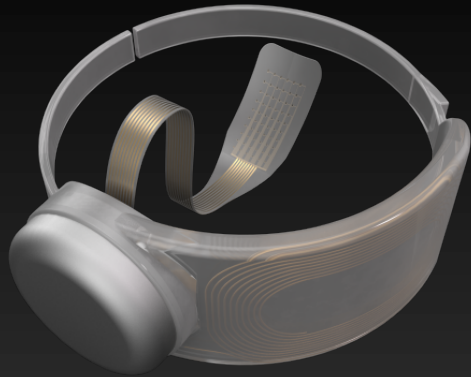
How Does the Argus II Work?



- Camera records real-time images
- Images are processed by a VPU (video processing unit)
- Signal is sent wirelessly to a coil implanted on the eye wall
- Coil is connected to an electrode array which lies on top of the retina; this must be implanted surgically in one eye
- Electrodes then stimulate remaining retinal cells and optic nerve transmits signal to visual cortex in brain

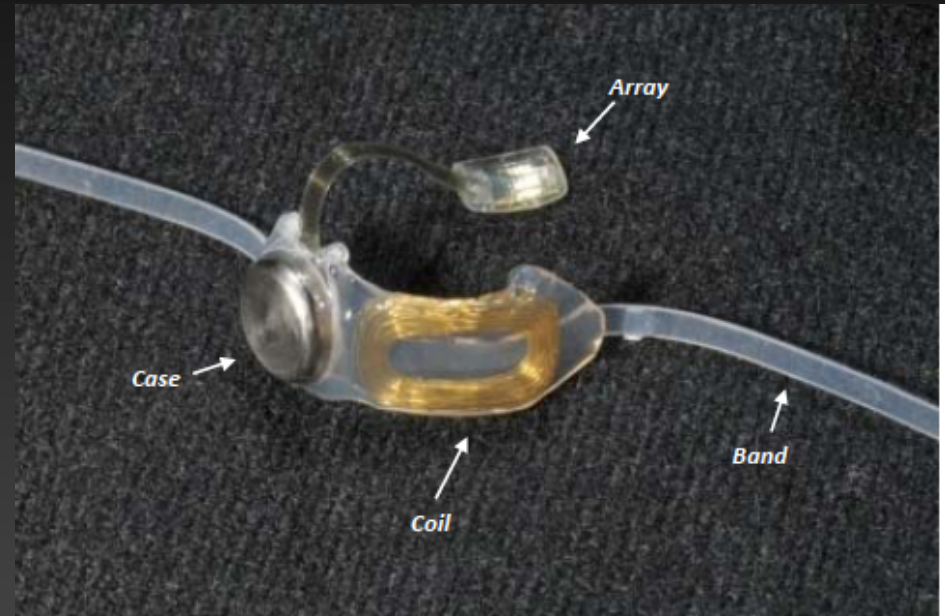
Second Sight

Argus II Retinal Prosthesis

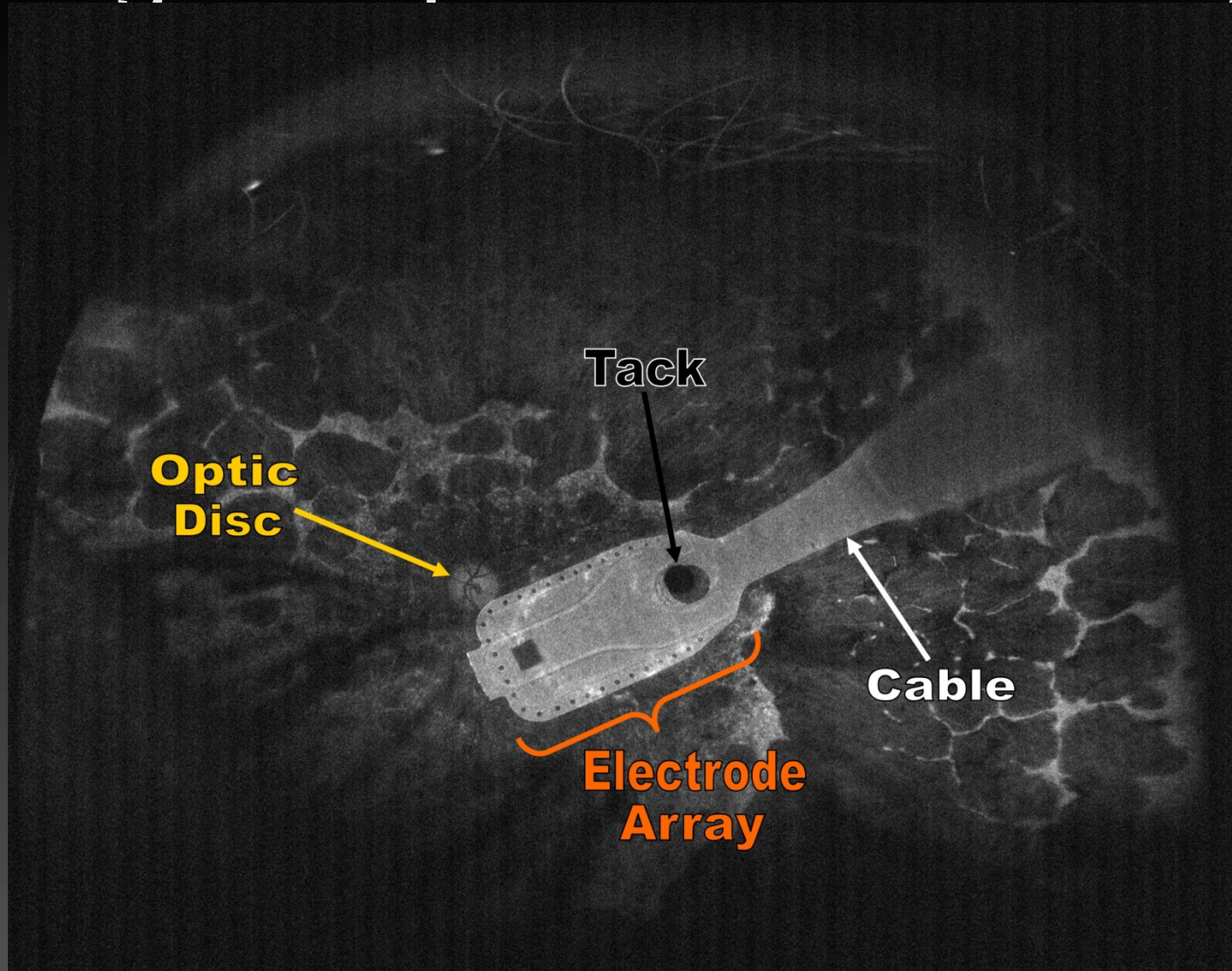


- Argus Device

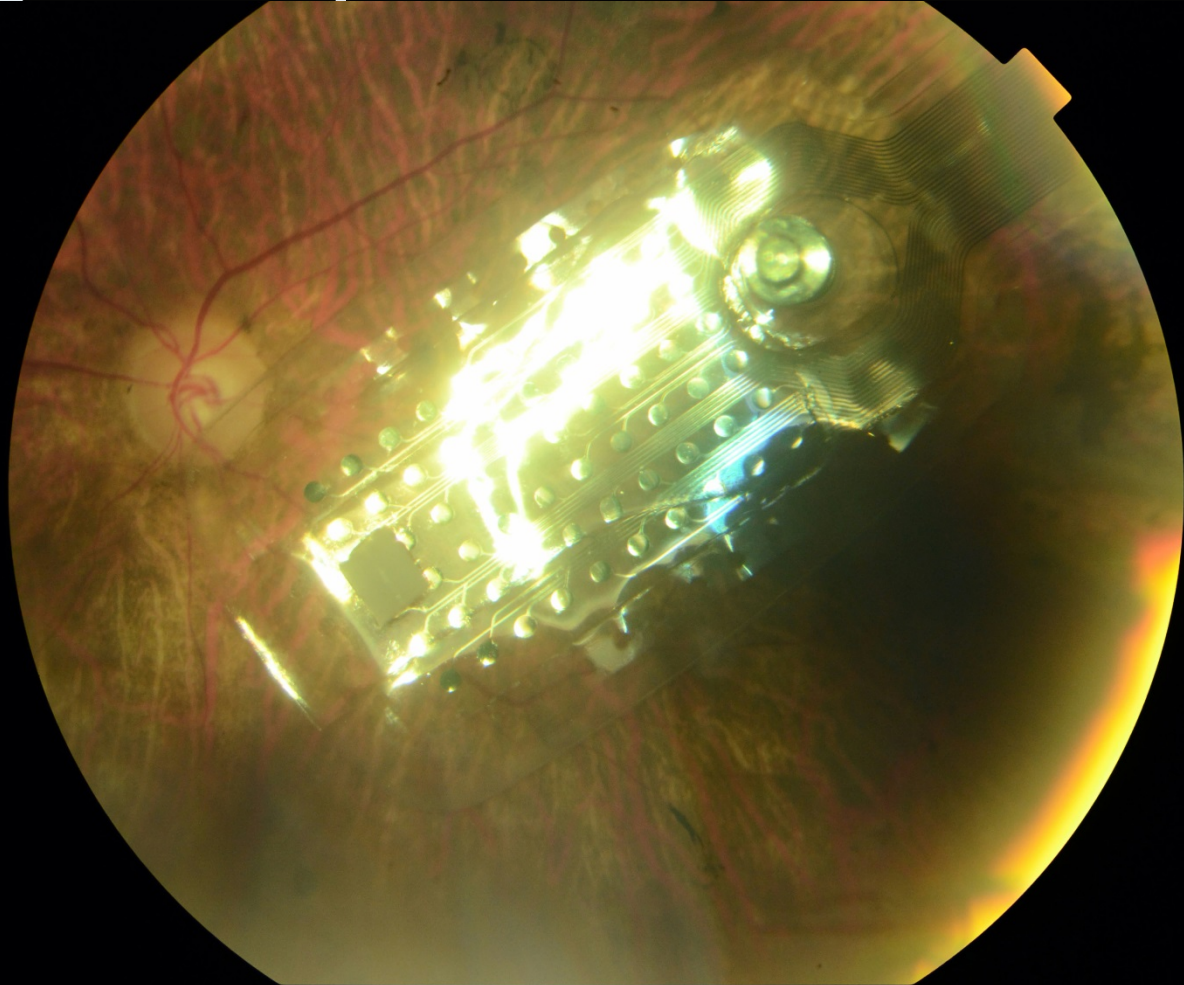
- Implanted surgically to hug the eye like a band aid or belt
- Electrode array with 60 electrodes is inserted in the eye to sit on top of the retina



View of the Argus Implant Inside the Eye



View of the Argus Implant Inside the Eye



Benefits of the Argus II System

- The Argus II System can improve patient's **orientation and mobility, activities of daily living, and well-being**:
 - Locate doors and windows
 - Sort light and dark clothes
 - Stay within a crosswalk
 - Avoid obstacles
 - Feel more socially connected
 - Enjoy being “visual” again
 - Read large letters slowly
 - Watch fireworks

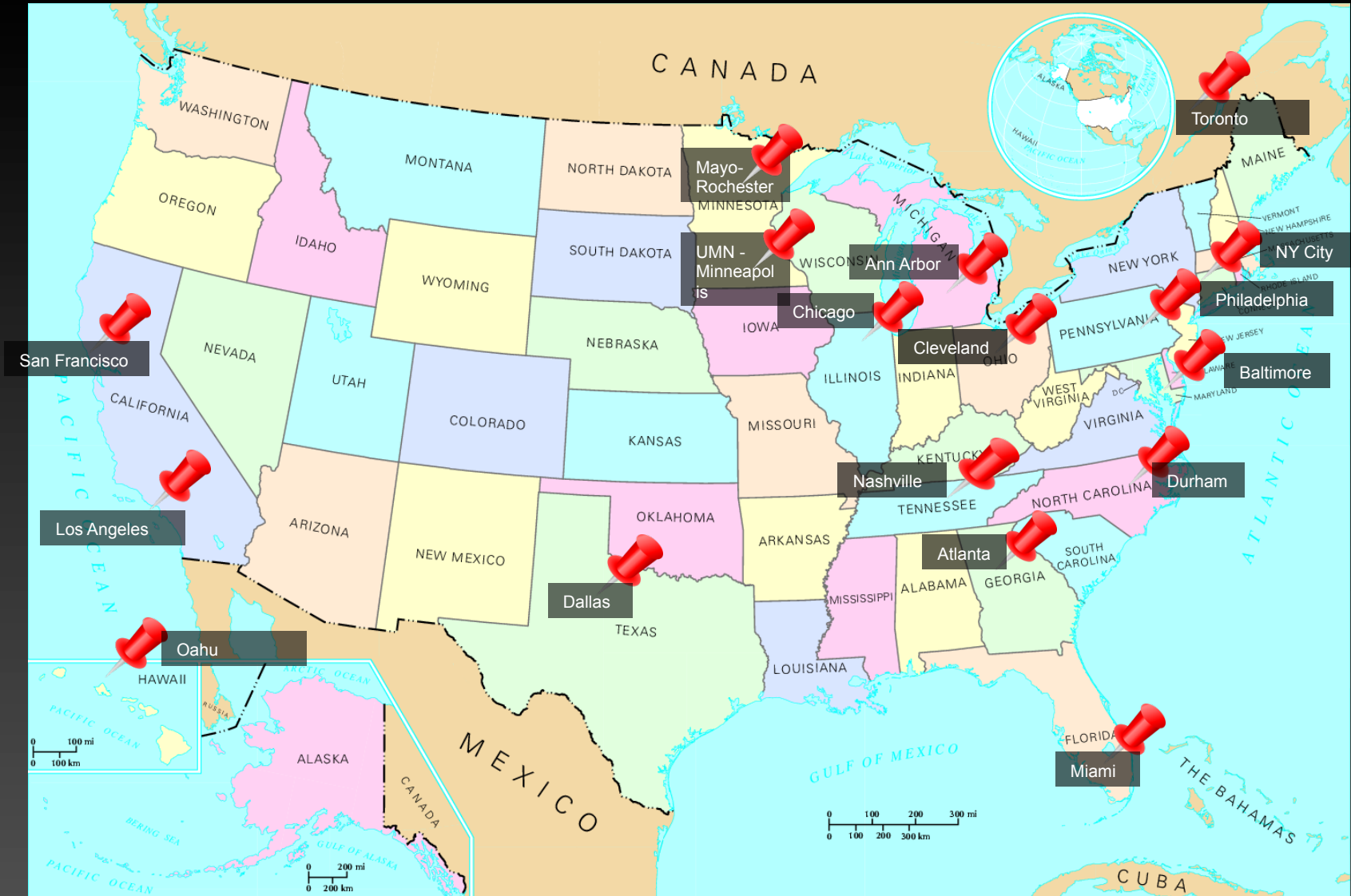
Patients CANNOT expect to:

- Recognize faces
- Read standard print at a normal pace
- Drive a car

What Can an Argus II Patient Expect?

- Surgery takes around **4 hours** under general anesthesia, in an outpatient procedure
- After about **1 week** of recovery, device programming can begin
- Vision is different from “normal” sight that patients used to have before RP progressed
- Patients see spots and lines of light that they learn to interpret as vision
- It is like **learning a new language**

Argus II Clinical Site Map



Concluding Remarks

- Argus II works by providing **electrical stimulation** of the retina to induce vision in blind individuals with severe to profound **retinitis pigmentosa**
 - Over 80 patients worldwide have been implanted
 - There are 12 US clinical centers for implantation
- Future software improvements are underway
 - Digital Zoom (20/200 with 8x mag)
 - Color vision