

Two weeks to Cyborg.

Building the bionic eye; Hacking the human.

By: Kosta Grammatis



I LIVE ON COUCHES.



I'm a travelling engineer. I build things for people.

MISSION: CRAM ALL THIS,



INTO THIS SPACE,



FOR CLOSE TO ZERO DOLLARS,

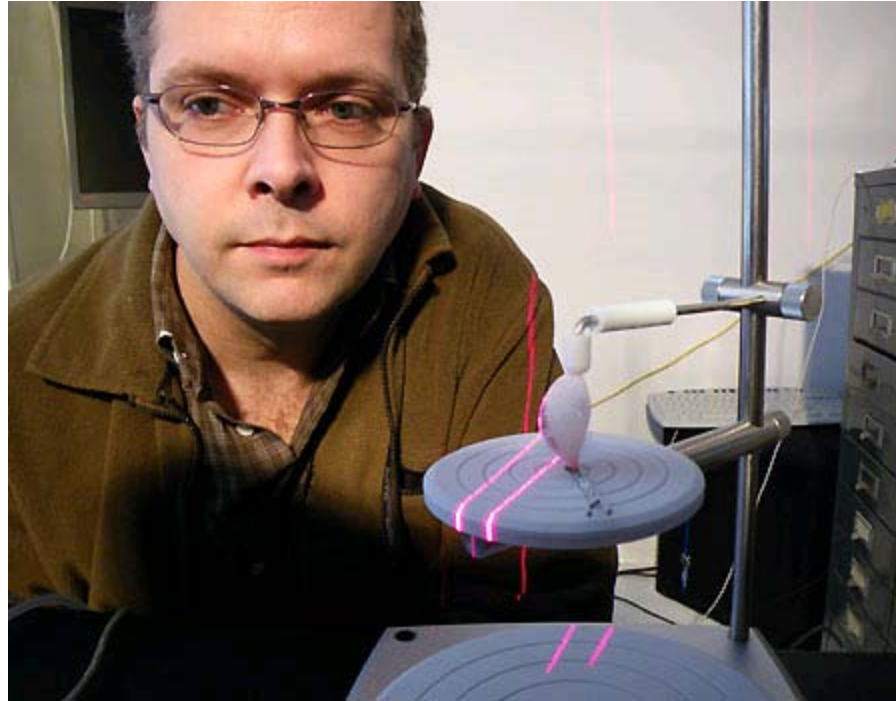


$\frac{234}{10,000}$

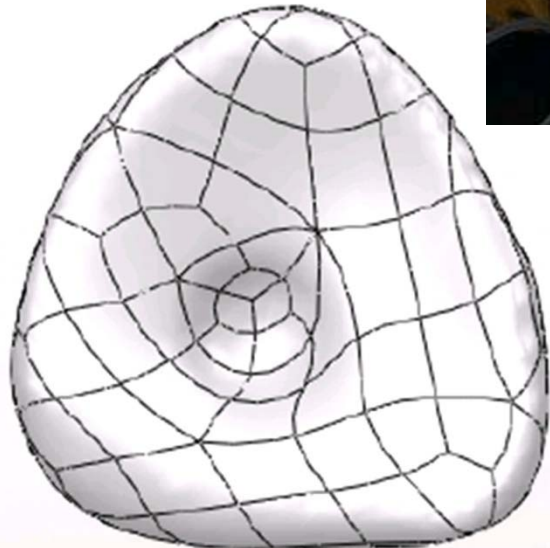
6/16/05

AND IN TWO WEEKS.

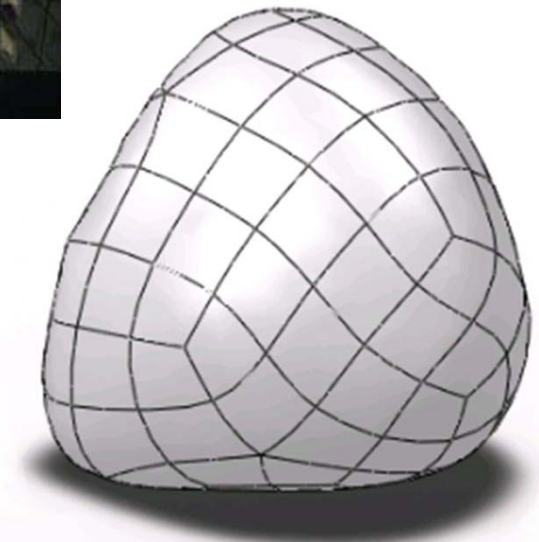
MECHANICAL



30mm Across
27.5mm Tall
12.35mm Thick
9mm tallest space inside
~2.5 cc usable space



<--- Laser Scan Models --->

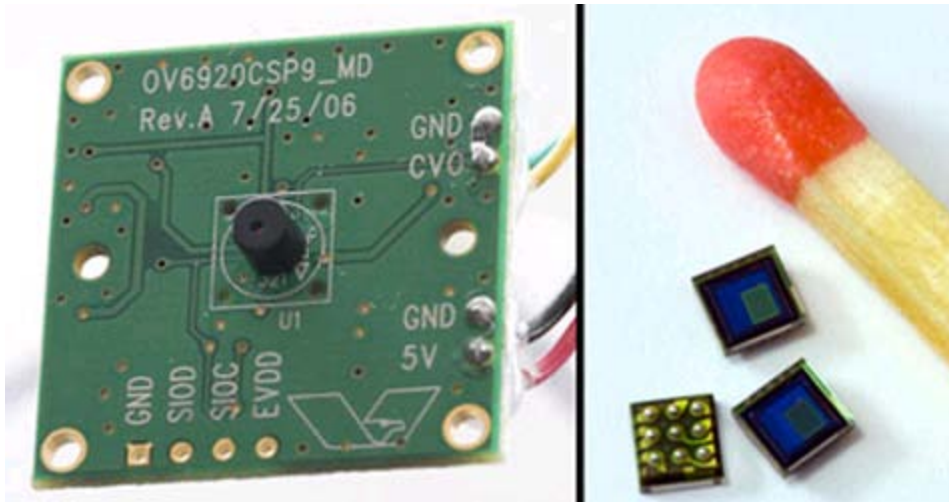


Molded Acrylic

- Utilizes a two part prosthetic.
- Two halves sealed with wax.
- As of yet no rapid prototyping materials are bio-compatible.



Camera



CMOS Sensor
3.2mm Square.
3.3v DC @ 20mA
328 x 250 Resolution
NTSC Output
Requires: Clock, power, some resistors

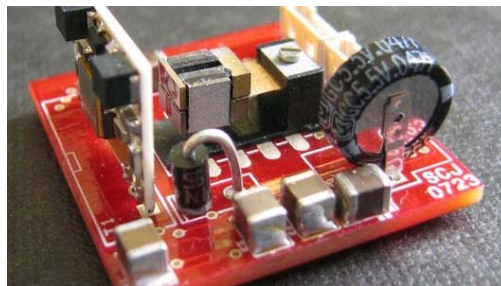


- Colonoscopy cameras are small for a reason.
- Exclusive relationship with Omnivision.
- The smallest sensor available.
- Never undress in public again

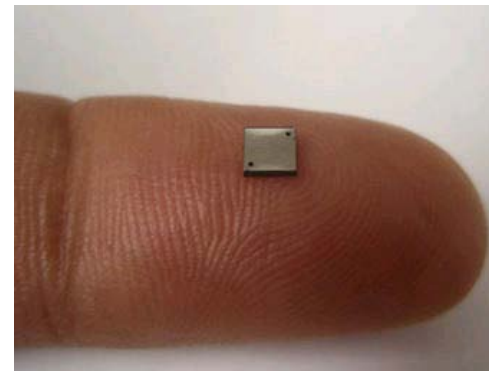
Power source

- Solar, kinetic, thermal, fuel cell, nuclear, induction...
- Induction is viable but Rob would have to wear glasses/hat.

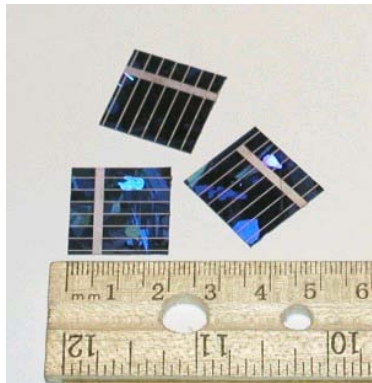
30% efficient vibration powered kinetic generator



3 mm Across hydrogen fuel cell. Univ. of Illinois



Miniature plutonium power for pacemaker



Battery Power



- Li-Poly technology
- 15mAH @ 3.3v
- Used in the worlds lightest RC Helicopter
- 5 x 9 x 10 mm
- Coin cell batteries can't supply enough current.



Wireless Transmission

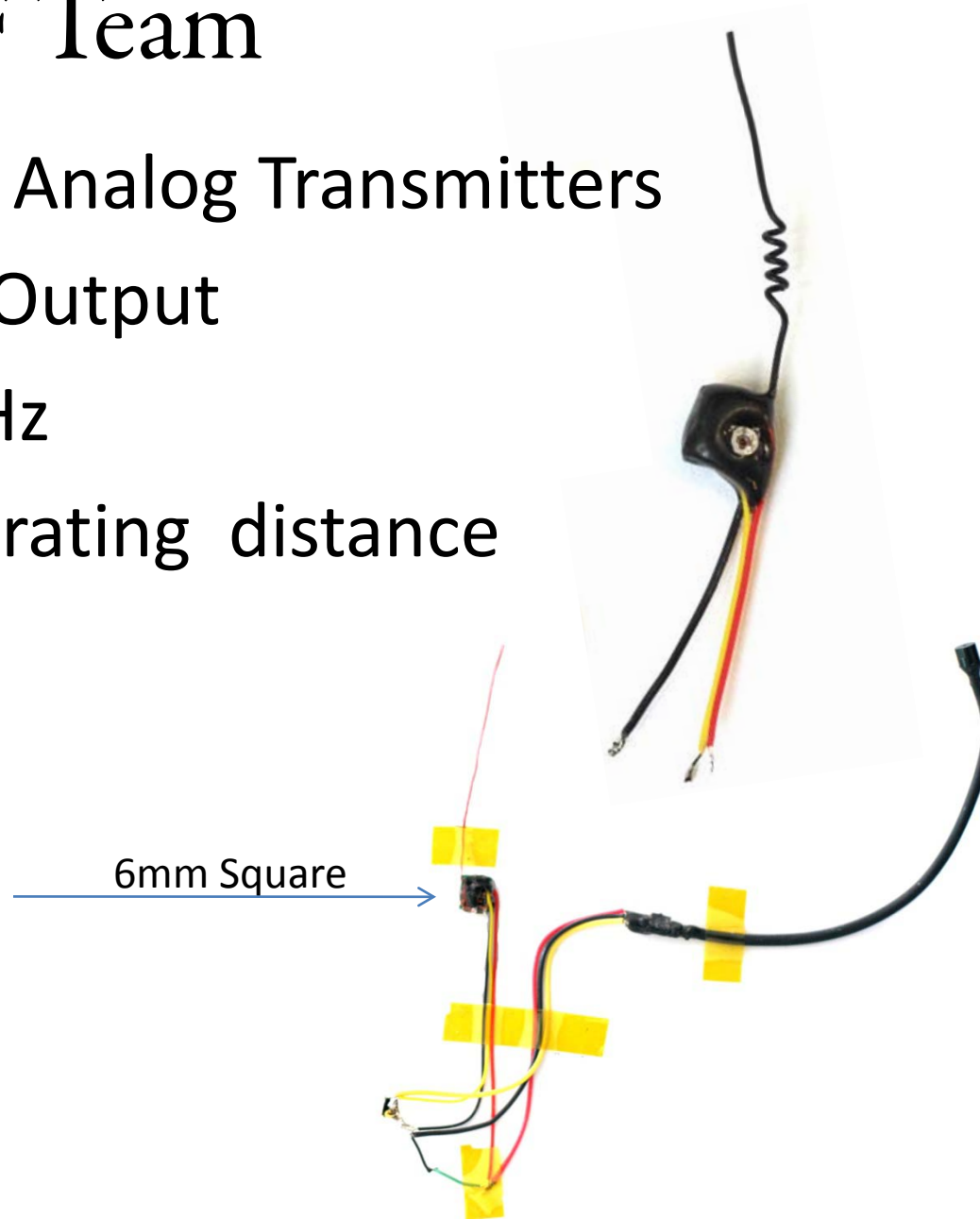
~~DIGITAL~~

- Raw output of Camera = 2.9Mb/S
- Zigbee 250 Kb/s = too low
- Bluetooth and WiFi are power hungry and require extensive software interfaces



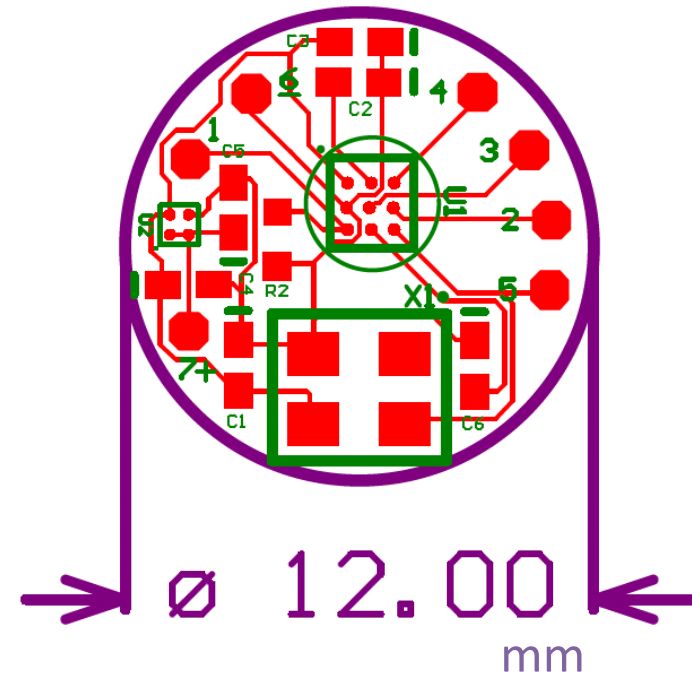
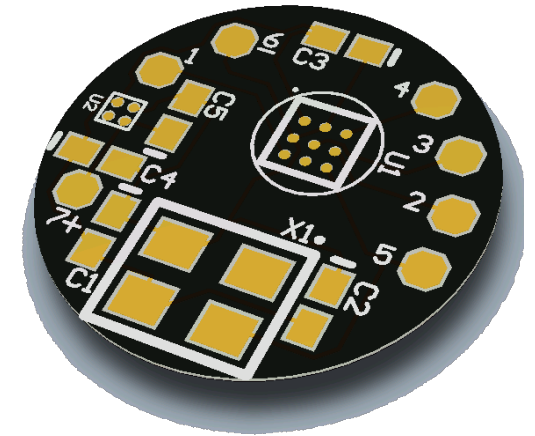
RF Team

- Builds Analog Transmitters
- NTSC Output
- 2.3 GHz
- 3' operating distance



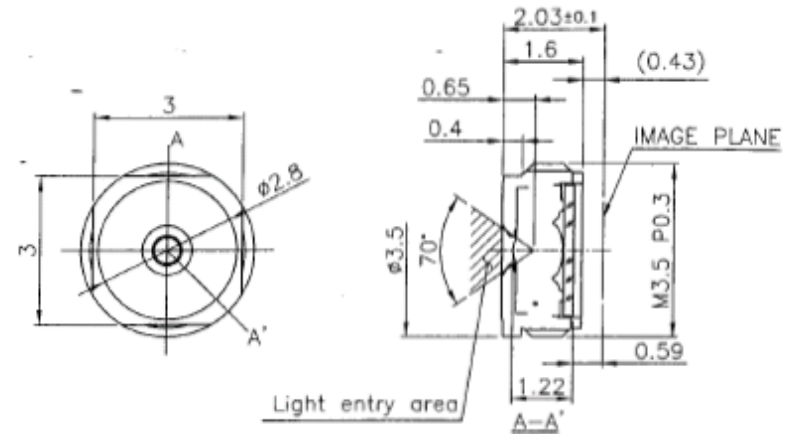
Camera PCB

- 0.01" thick
- BGA Packages
- Reflowing using a pan is really really hard.
- So we got someone else to do it.



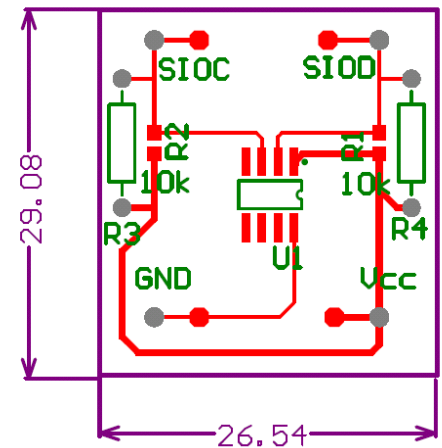
Lens

- Lens design is a magical world.
- Standard components are hard to find.
- Omnivision dug through desk drawers...

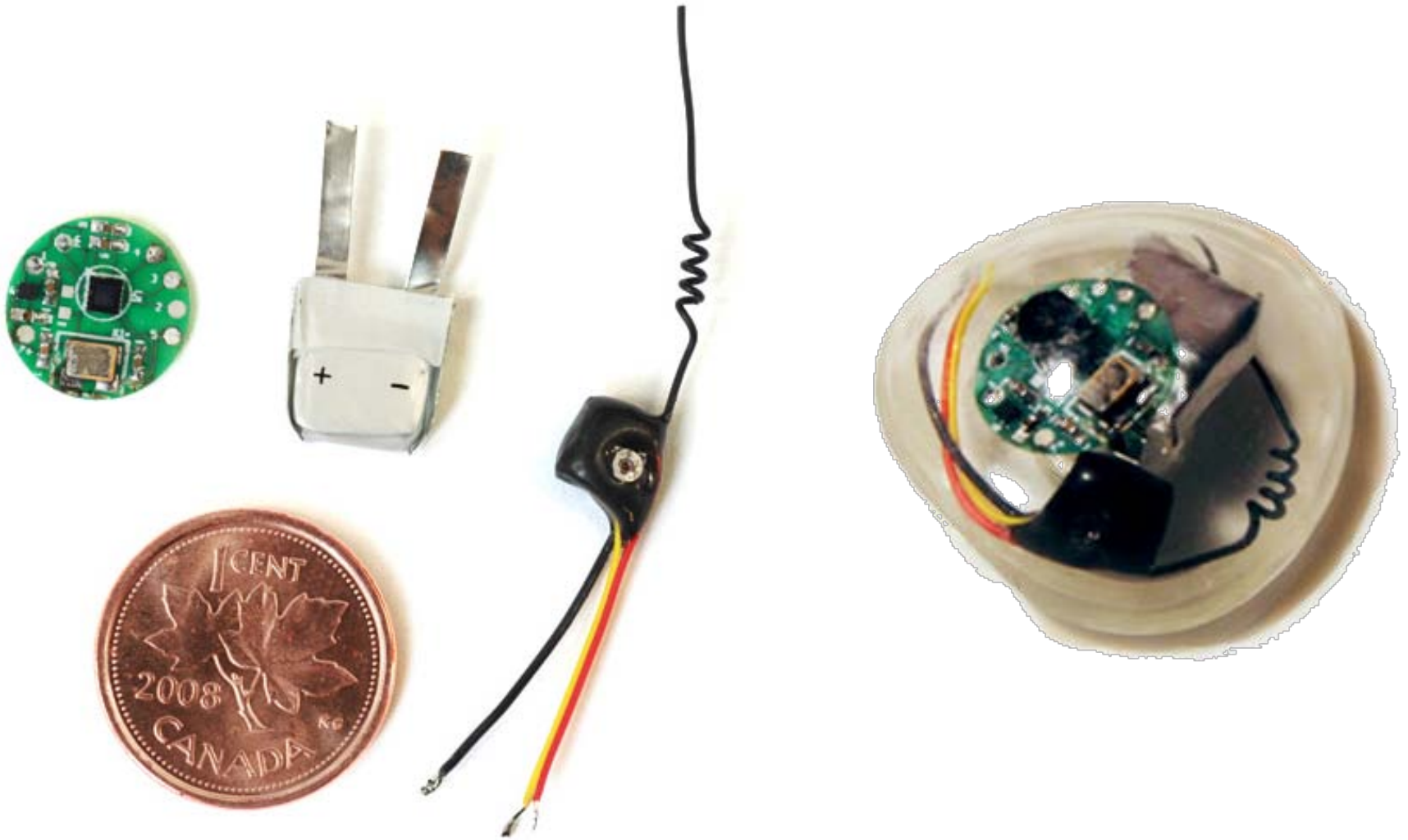


Control Board

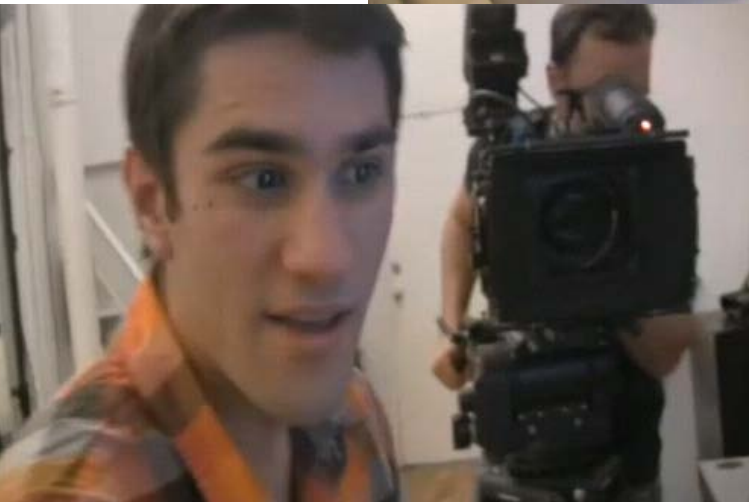
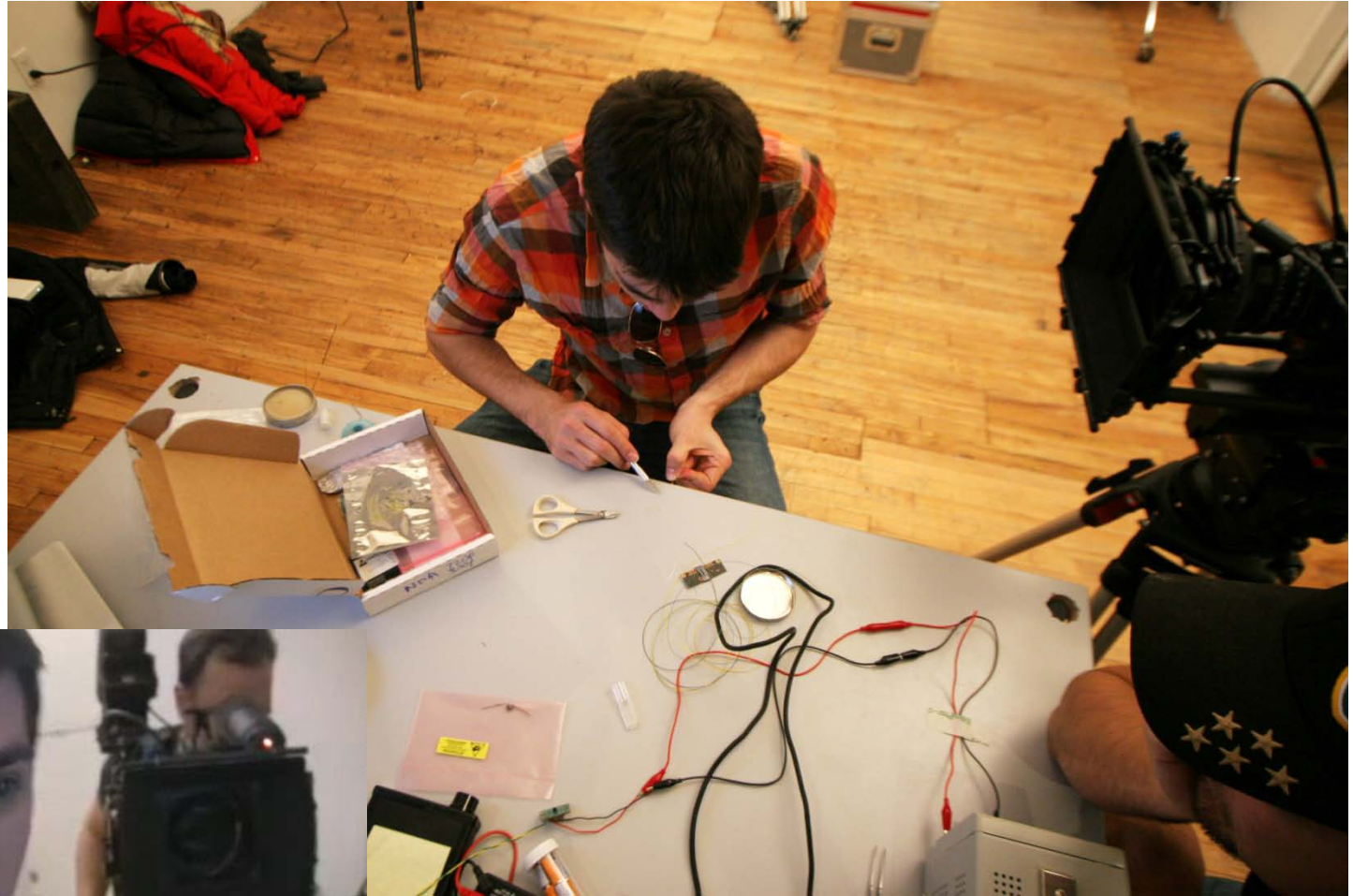
- Connected to camera board on startup, then removed after camera is setup.
- Sets registers on camera using a PIC Microcontroller.
- CCD cannot automatically adjust gains, saturation, etc.



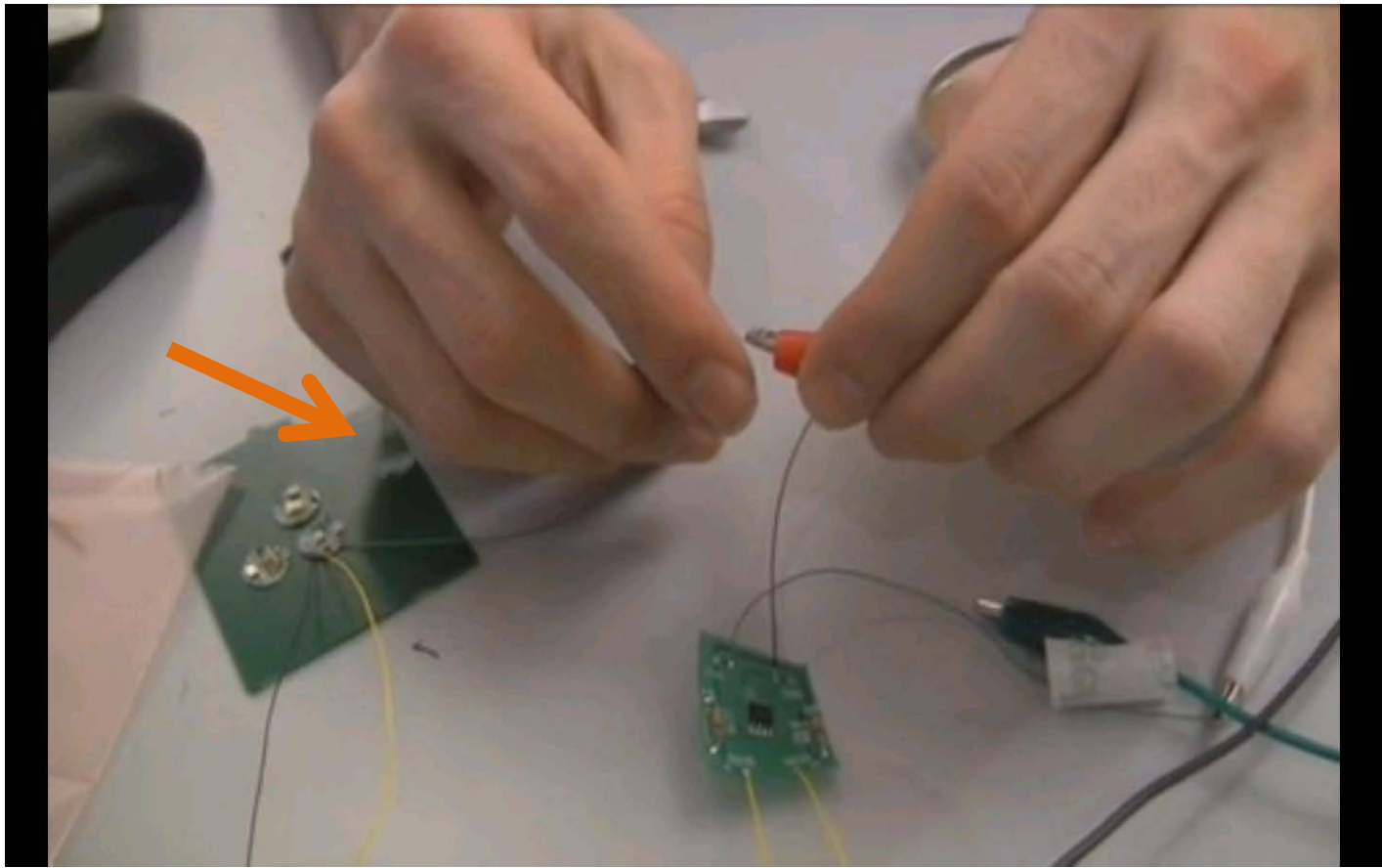
So connect everything together...



In a film studio...



...Let out the smoke



Rob goes to Brussels

for the “Future of Journalism Conference”

And the press goes wild.

Slashdot THE NUTS AND VOLTS OF NEWS FOR NERDS.

[Log In](#) | [Create Account](#) | [Help](#) | [Subscribe](#) | [Firehose](#) [Why Log In?](#) | [Why Subscribe?](#)

▼ Sections


- Main
- Apple
- AskSlashdot
- Books
- Developers
- Games
- Hardware
- IT
- Idle
- Index
- Interviews
- Linux
- Mnfile

Filmmaker Working On Eye-Socket Camera

Posted by Soulskill on Friday March 06, @07:09PM
from the take-two-they're-small dept.

An anonymous reader writes

"Wired has a story about Rob Spence, a Canadian filmmaker who [plans to have a mini camera installed in his prosthetic eye](#). 'A camera module will have to be connected to a transmitter inside the prosthetic eye that can broadcast the captured video footage. To boost the signal, he says he can wear another transmitter on his belt. A receiver attached to a hard drive in a backpack could capture that information and then send it to another device that uploads everything to a web site in real time. ... Even though his project is still in its early stages, Spence says many people have already told him they wouldn't be comfortable being filmed. "People are more scared of a center-left documentary maker with an eye than the 400 ways they are filmed every day at the school, the subway, the mall," he says. He hopes he will help get people thinking about privacy, how surveillance cameras and the footage they record are being used and accessed."



Spence [runs a blog for the 'Eyeborg Project'](#), as he calls it, and has recently posted a video about the progress they're making.

▶ goodeyeborg technology borg hardware robot story

Nickname

Password

Public Terminal

[\[Create a new account \]](#)

NewScientist Tech

Home News In-Depth Articles Blog Opinion Video Galleries Topic Guides Last Word E-Newsletter Jobs Subscribe

SPACE **TECH** ENVIRONMENT HEALTH LIFE PHYSICS&MATH SCIENCE IN SOCIETY

Home | Tech | Science in Society | News

Bionic eye cam to shine a light on society

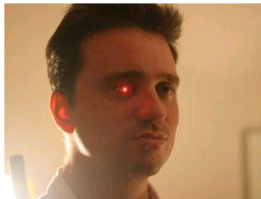
11:43 07 April 2009 by Colin Barras

[See a gallery of images from the project](#)

Canadian filmmaker Rob Spence damaged his right eye in a childhood accident and was later given a prosthetic replacement. Like any other false eye, it was designed to be purely an aesthetic replacement, but he realised that the vacant bit of face real estate could be put to better use in his art.

Now Spence is attempting to build a wireless video camera into his synthetic eye, turning himself into a self-proclaimed "Eyeborg".

The camera will record anything and anyone that enters Spence's field of vision and relay the footage back to a computer. That video will provide a unique perspective on the way video surveillance is becoming more popular in western societies, he told *New Scientist*.



Film maker Rob Spence has already fitted an LED

DRUDGE REPORT

[man...](#)

[PAPER: 'Israel seriously considering military action against Iran'...](#)

[ABCNEWS: Obama's 'mischaracterization of data'...](#)



[Anti-surveillance filmmaker plans eye-socket camera...](#)

[senate leader offers plan for...](#)

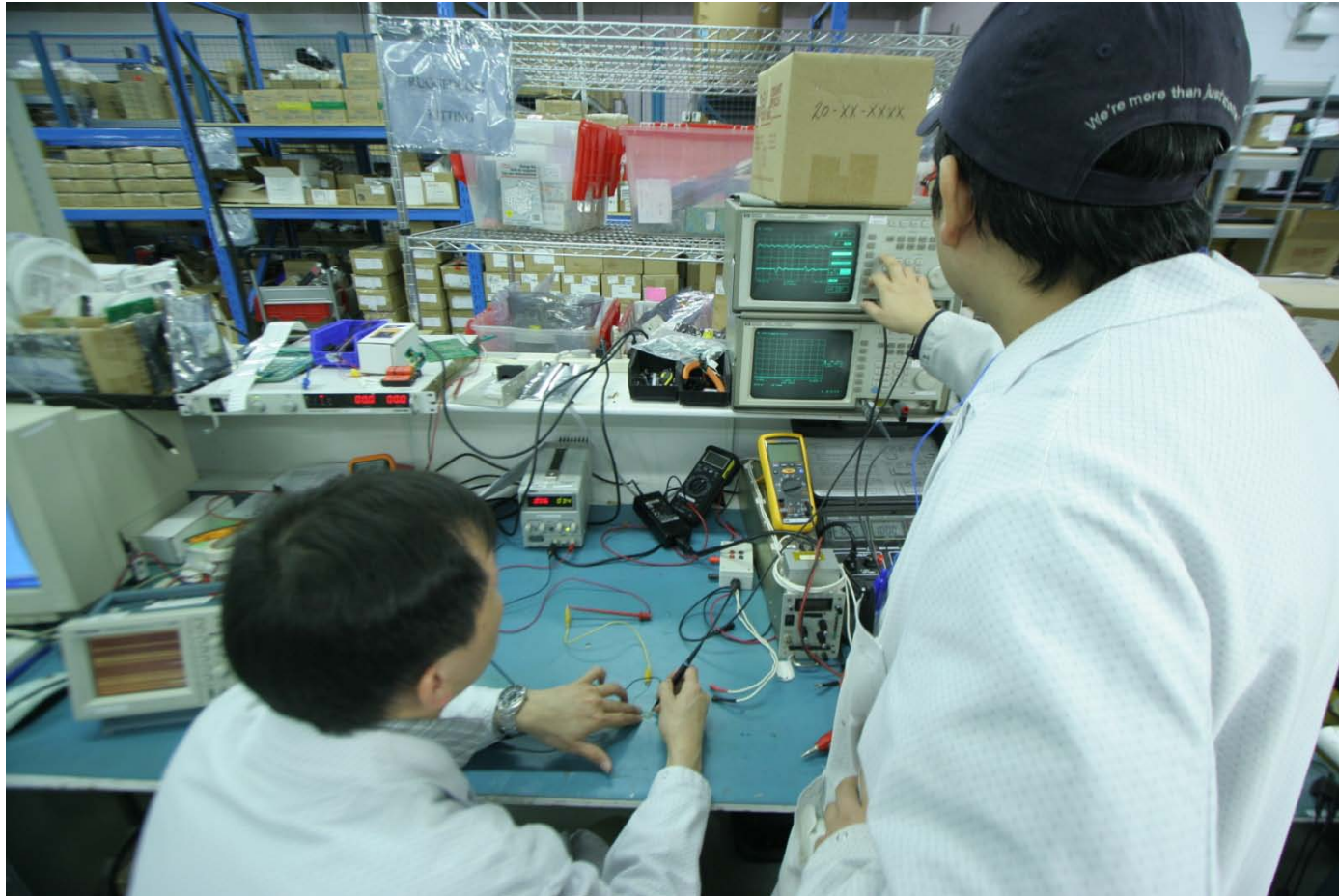
[UPDATE: Russia building anti-sa...](#)



...I get to explain eyeball fires to Fox News



Can I borrow your oscilloscope?



And finally make it work...

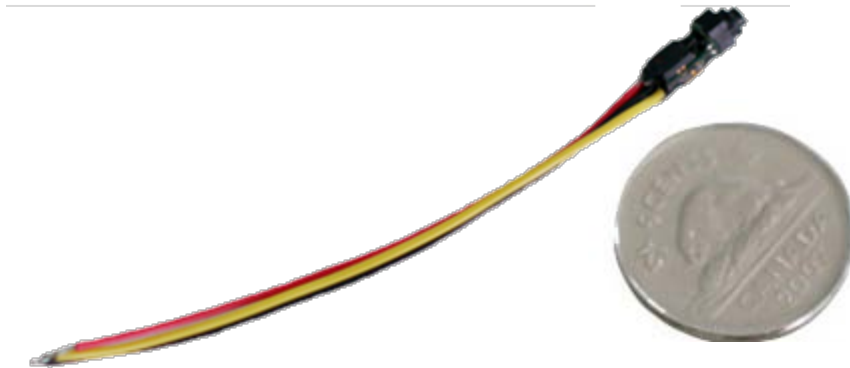


Movie Time

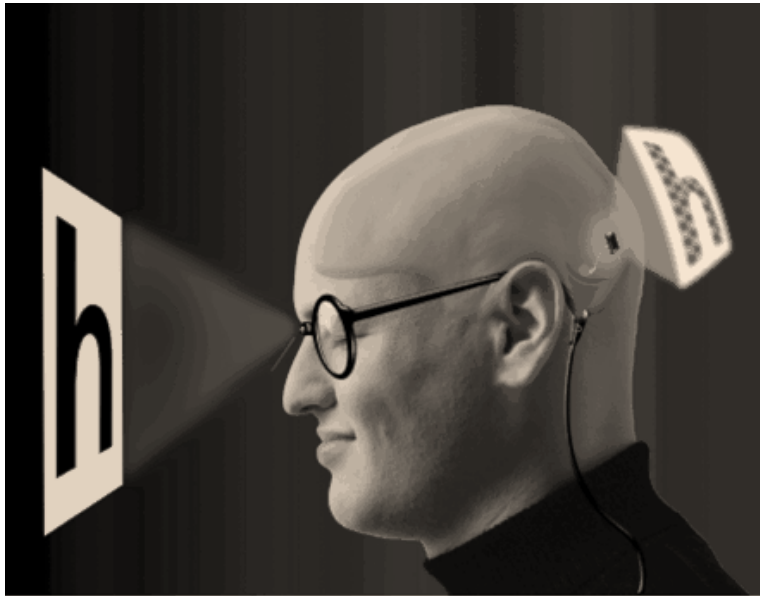
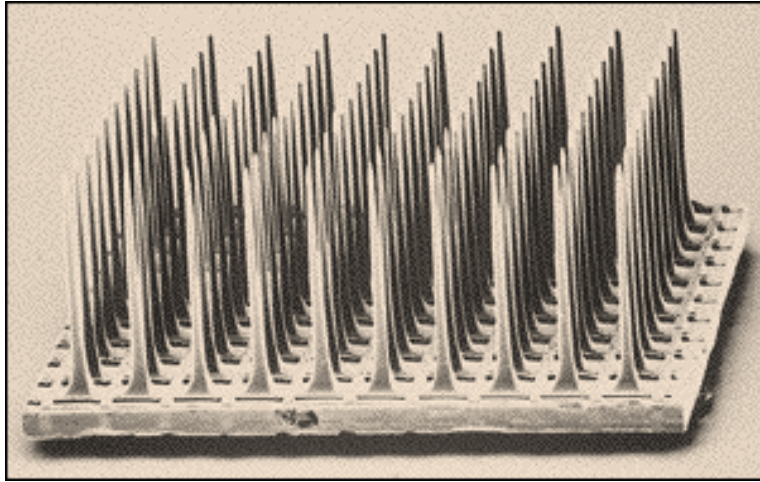


What's coming, maybe you can help.

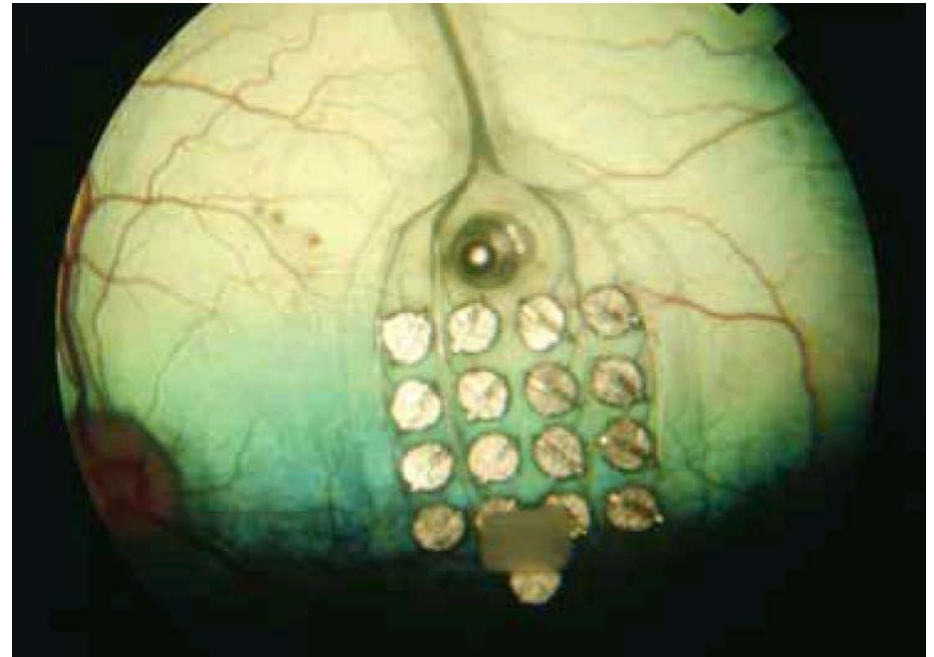
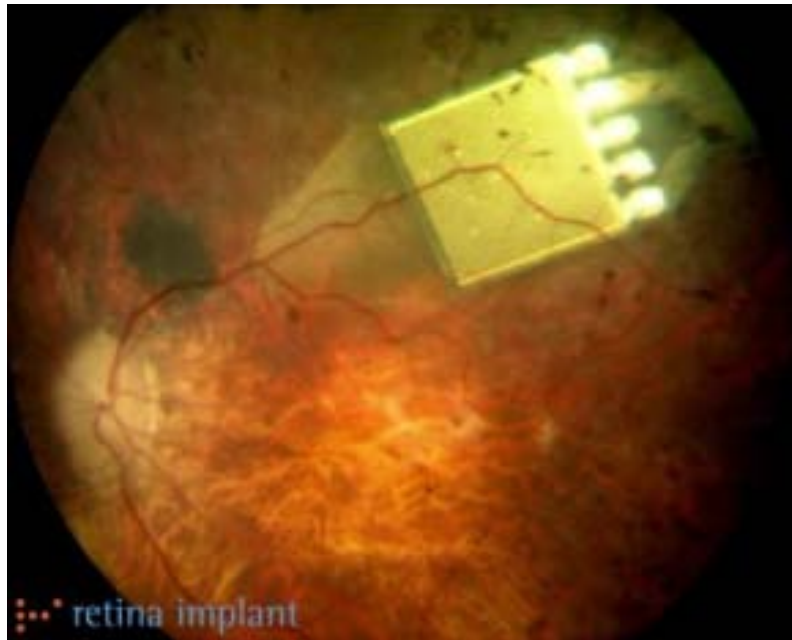
- Onboard storage: FPGA, Memory, and a completely digital camera.
- A better analog camera with 1 hour of battery life.
- A housing that snaps together instead of needing wax.
- Hopefully some funding...



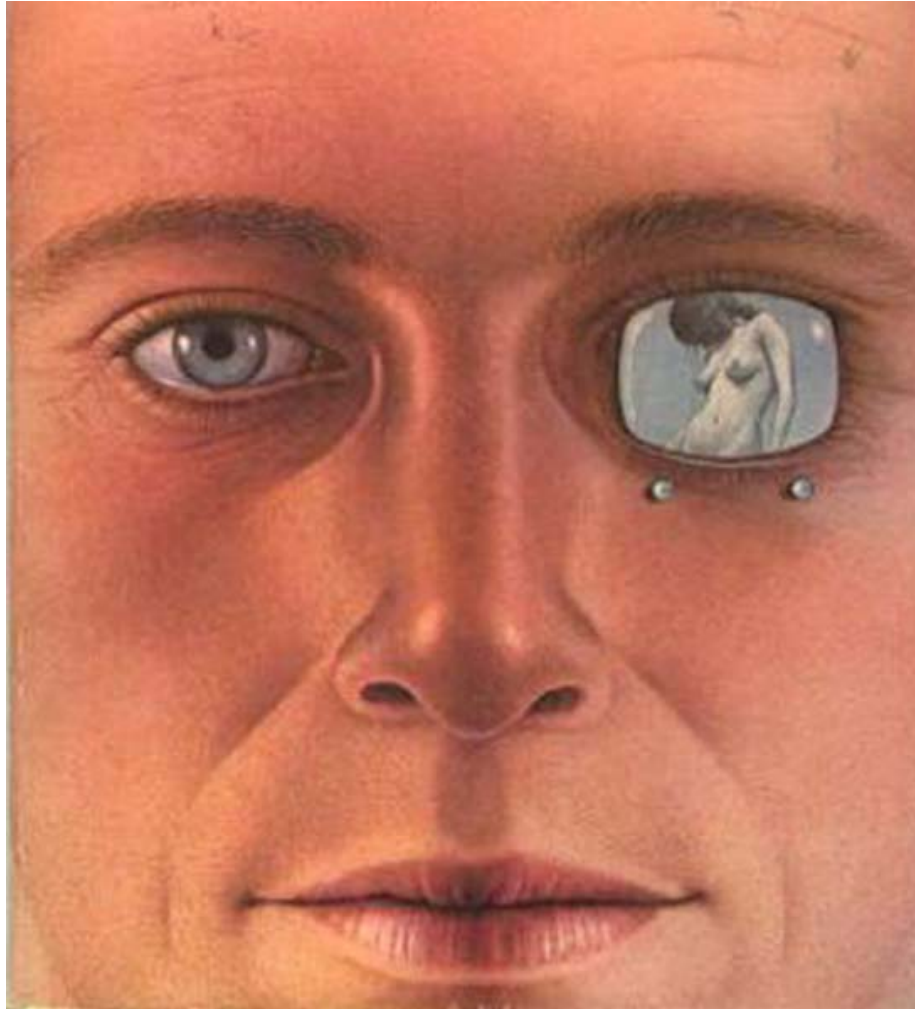
Bigger things.



Retinal Implant Projects



FIN



<http://eyeborgproject.com>

Steve Mann



