

What is X?

Google [X] was formed to apply Google's resources to 'the world's most intractable problems'. A diverse team of inventors and entrepreneurs were assembled, working on secretive pipe-dream projects, known as moonshots.

Alphabet



Now just called X (of parent company Alphabet), the moonshot factory is known for its 'graduated' projects, including Waymo [1], Makani [2], Loon [3] and Wing [4].



How might self-driving cars change the way we travel?



How might kites generate power in new places?

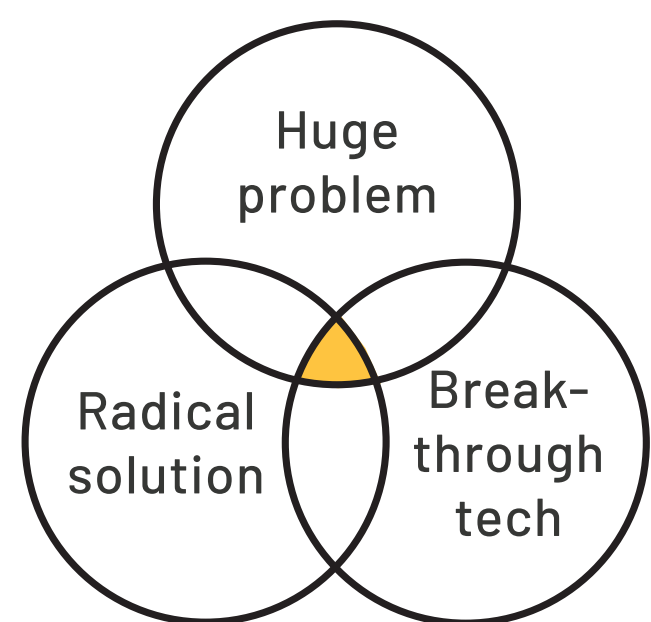


How might balloons internet connect remote areas?



How might drones change how we deliver goods?

What makes a moonshot?



Moonshots should have social purpose, *and* be profitable in order to be attractive to investors. Generally, every moonshot at X follows this recipe:

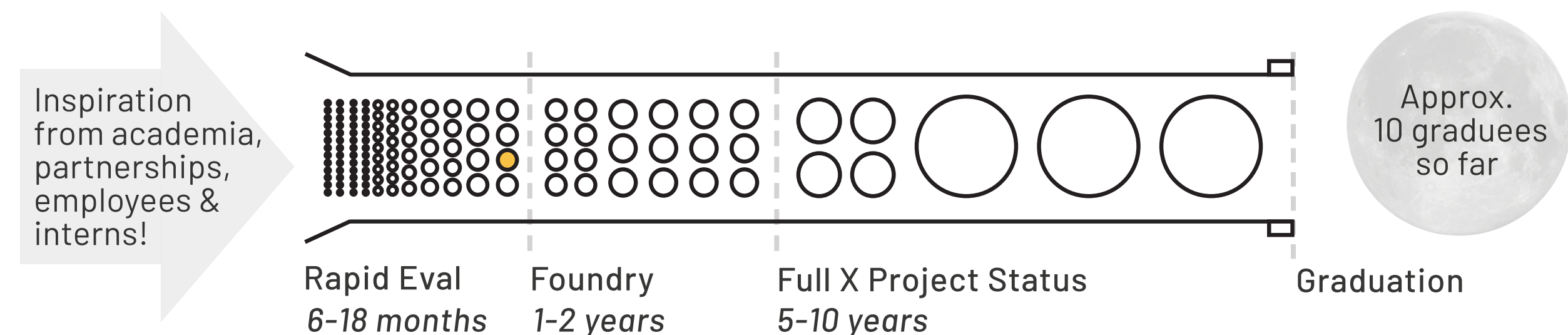
Huge Problem: Choose a massive problem that, if solved, would positively impact the lives of millions, even billions.

Radical Solution: Create and propose a radical new solution to the problem, no matter how ridiculous it sounds.

Breakthrough Technology: Search for emerging technologies that suggest the solution (though audacious today) might be possible in the future.

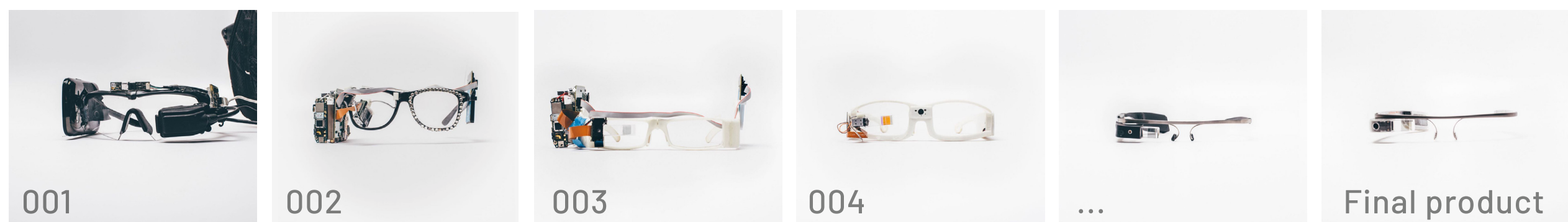
Rapid Evaluation

My team, Rapid Evaluation, is the start of the project pipeline. Since most crazy ideas never make it to the real world, Rapid Eval's job is to generate and try to kill ideas as quickly as possible, before the business risk becomes too high. Projects that defy death move through the pipeline, hoping to eventually 'graduate'.



Project

I was hired into a mature Rapid Eval project, derisking the hardware design of a novel sensor technology. Sadly my work is under NDA, but is comparable to prototype iterations of another X project, Google Glass:



I helped move from Generation 2, a proof-of-concept of off-the-shelf parts, to Generation 4, our first internal 'product' with custom hardware. If it survives, you'll see the final product in 5-10 years!

My role

I led software development, responsible for engineering the data pipeline; everything between sensor interrogation and cloud upload for ML. I co-designed a custom PCB, which enabled our first portable device [see right column].



Project lead
Strategy, resourcing & partnerships



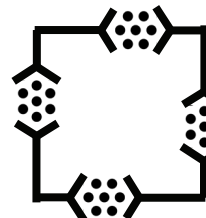
Mechanical Engineer
Hardware & sensor research



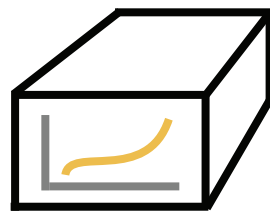
Machine Learning Expert
Data analysis & inference



Me - Design Engineer
Software & microcontrollers



Raw signals



Structured data



Hi, I'm Ben



I get excited by tech, making a positive impact on Earth, and anything that pushes the boundaries of what's possible.

I plan to die on Mars, hopefully not on impact! This summer, I moved to Mountain View, California for 6 months to intern at X.

My skillset

I work at the intersection of hardware and software, of design and development. I was hired as a generalist; invaluable in uncertain early-stage prototyping.

UI: Developed our first touchscreen interface

Code: Built backend in object-oriented Python

Firmware: Wrote board-level I2C protocol drivers

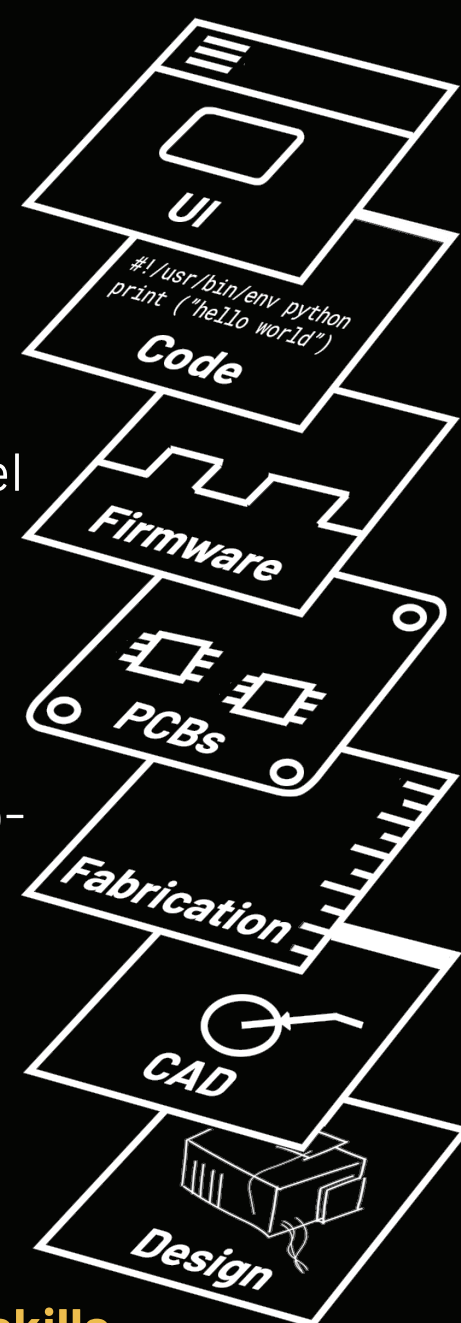
PCBs: Co-designed new feature-packed PCB

Fabrication: Prepared prototypes for outside world

CAD: Packaged device into tiny footprint

Design: Identified Gen 4. improvement opportunities

'Full-stack prototyping' skills



My impact

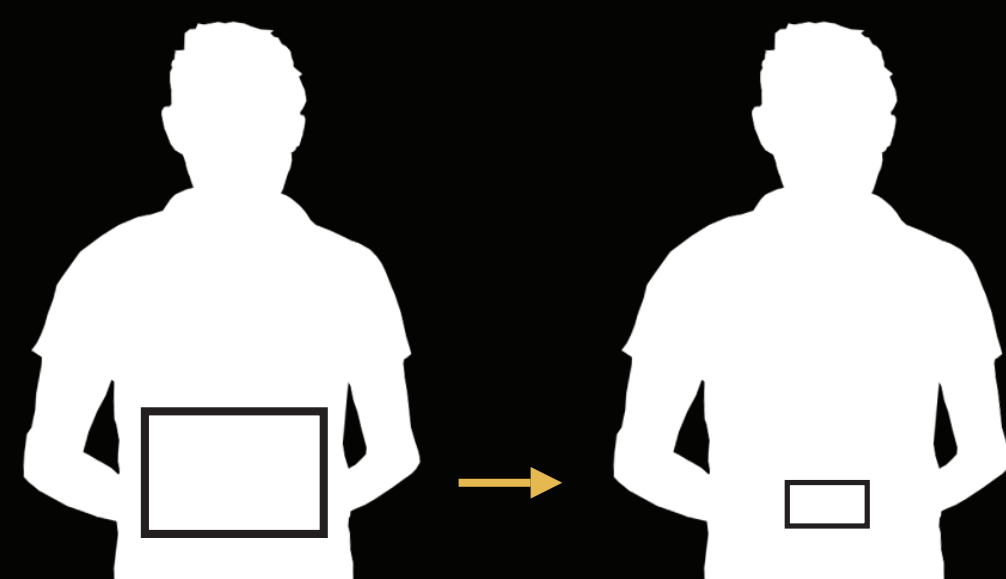
My most significant long-term impact will be technical leadership, pushing forward improvements in the latest generation:

4x smaller for equivalent no. of sensors

Modularly expandable, stacking **up to 8x**

2.5x higher sensor signal resolution

Portable and battery powered + **first UI**



Generation 2

Generation 4

Gen. 4 will become a data capture platform for significant future ML development. I started 3 patent applications for my work.

What next?

After graduation, I aim to build on my interdisciplinary prototyping skills in a startup or small organisation. Help me work on projects with social / sustainable purpose: Contact details and portfolio at bencobley.com