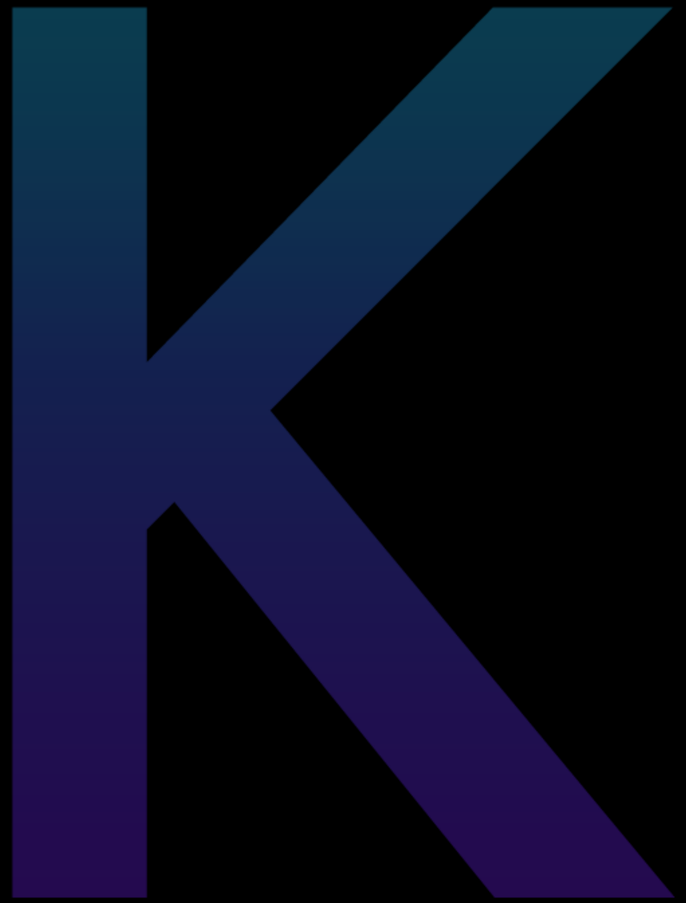
PROJECT K

BY KING BRIGHT

A REVOLUTIONARY VR TOTAL SOLUTION

World's smallest, lightest, with best image quality, screenless VR device.



01 BUSINESS STRATEGY

Since 2014, the global VR industry has been fast expanding. The overall market scale has reached tens of billions of dollars. Well-known global technology companies have invested much money and resources to support the development of various VR technologies. However, due to the technology barriers, technical difficulties and physics limitations, the customers are unsatisfied with all the existing VR products and VR solutions.

“ SOLVE THE PAIN POINTS / SET UP A NEW STANDARD / ESTABLISH AN ECO-SYSTEM ”

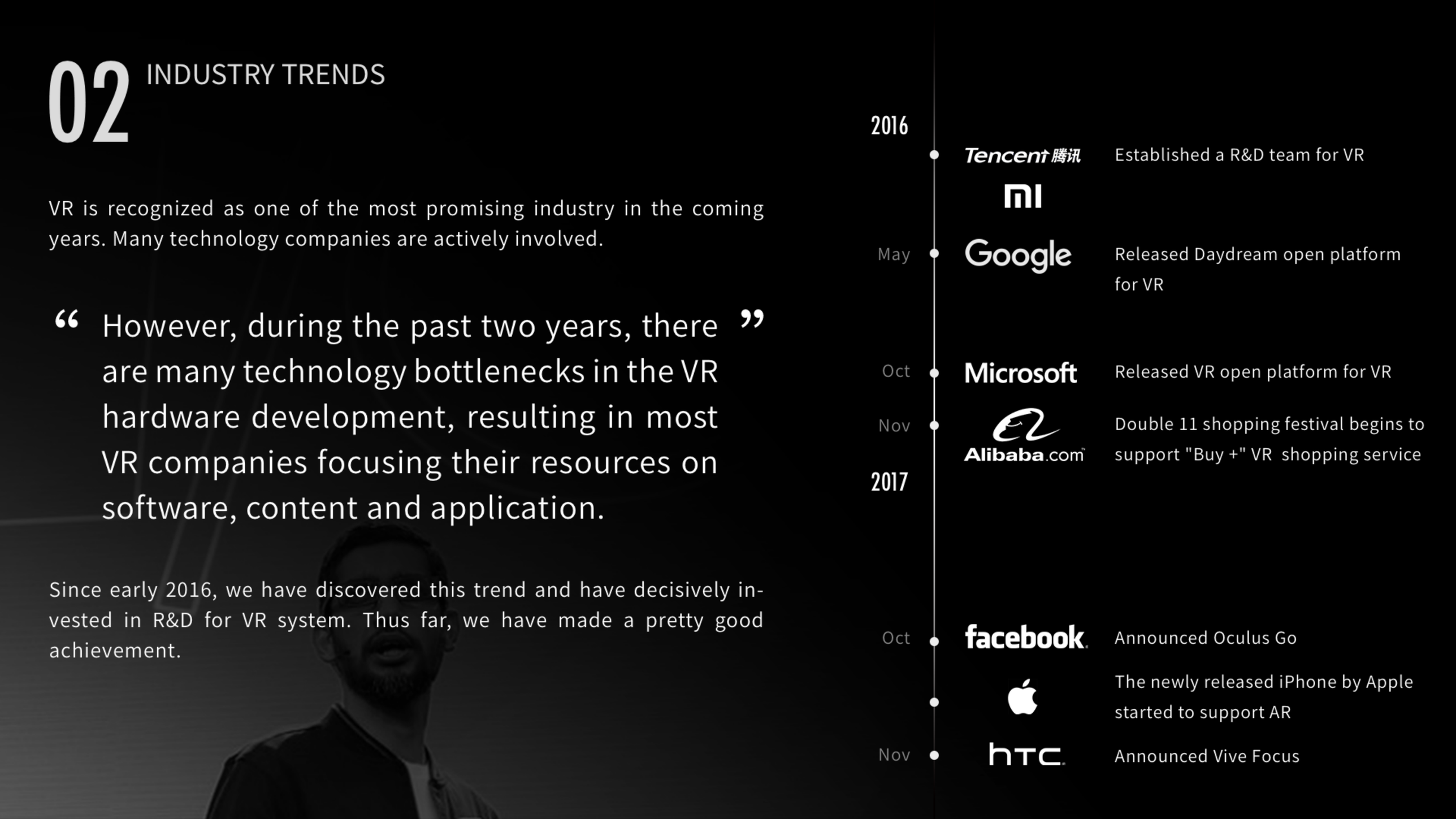
We have established an innovative technology company in Singapore, focusing on the development of Virtual Reality and related technologies. The main strategic goal is to create one of the world's best and most complete VR solutions. This revolutionary and innovative VR device will completely solve the pain points and drawbacks of all the existing VR devices in the market. With our core technology, we will set up a new standard for the VR industry, and will establish an eco-system for both hardware and software in VR industry.

02 INDUSTRY TRENDS

VR is recognized as one of the most promising industry in the coming years. Many technology companies are actively involved.

> “However, during the past two years, there are many technology bottlenecks in the VR hardware development, resulting in most VR companies focusing their resources on software, content and application.”

Since early 2016, we have discovered this trend and have decisively invested in R&D for VR system. Thus far, we have made a pretty good achievement.



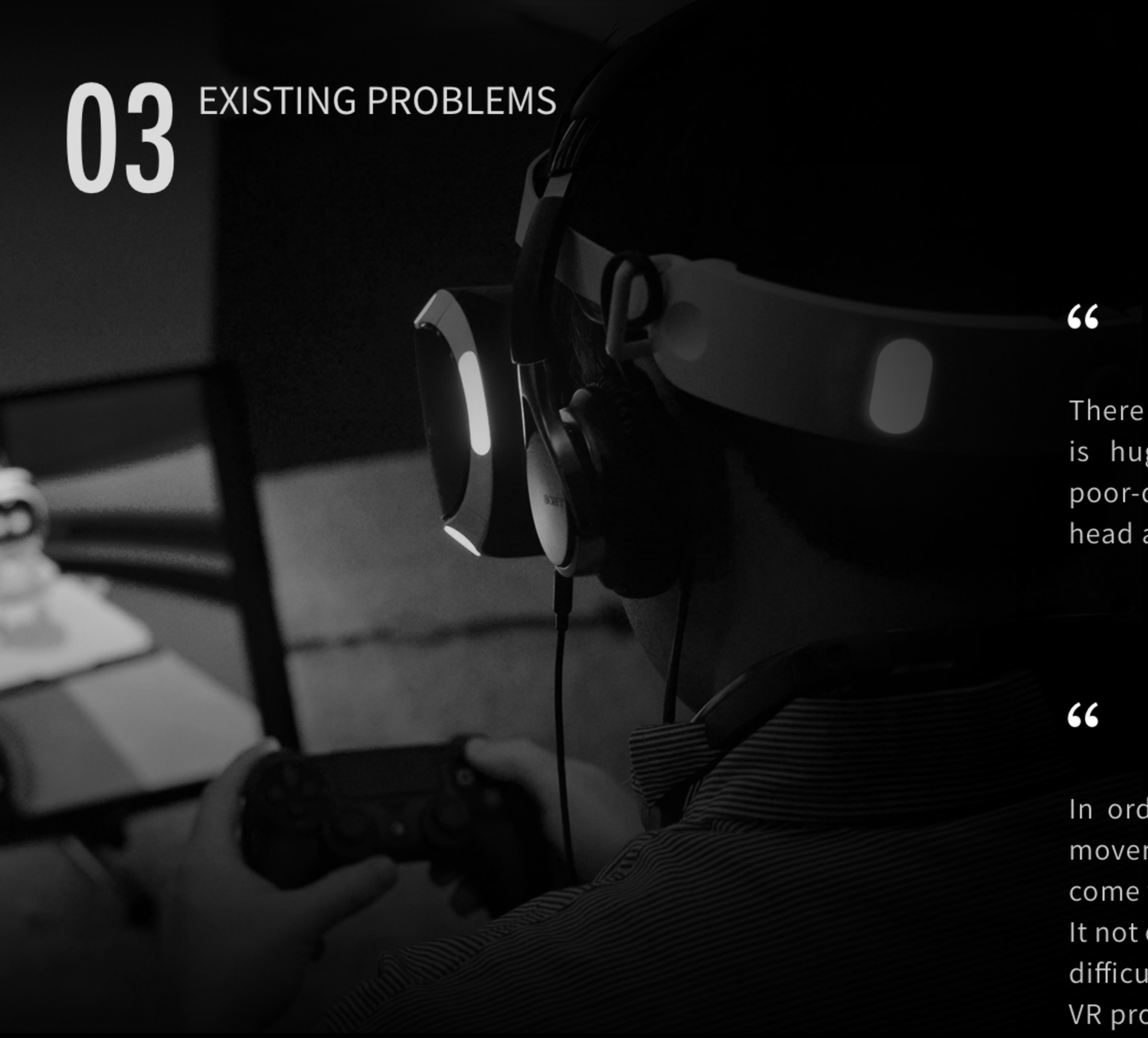
2016

- Tencent 腾讯 — Established a R&D team for VR
- MI
- May — Google — Released Daydream open platform for VR
- Oct — Microsoft — Released VR open platform for VR
- Nov — Alibaba.com — Double 11 shopping festival begins to support "Buy +" VR shopping service

2017

- Oct — facebook — Announced Oculus Go
- The newly released iPhone by Apple started to support AR
- Nov — htc — Announced Vive Focus

03 EXISTING PROBLEMS



“ HEAVY HMD ”

There are tons of problems in exist HMD devices, like the size is huge, uncomfortable to wear, center of gravity shift, poor-quality materials, glasses fog up, etc. It would cause head and neck pain as well.

“ LOTS OF PERIPHERALS ”

In order to make sure the image could keep up with head movement and avoid dizziness, most high-end VR products come with a set of complicated HMD position tracking system. It not only increases the limits of environment and installation difficulties, but would be an obstruction for users to purchase VR products.

03 EXISTING PROBLEMS

“ LOW RESOLUTION ”

Most of high-end VR products adopt new OLED panel to reduce dizziness, but the color saturation is not high enough to simulate natural light. Additionally, Screen Door Effect is a problem that VR companies try to solve it by adopting a higher resolution panel, but it’ s still not effective.

“ DIZZINESS ”

It’ s the biggest problem of current VR products. It’ s caused by the following reasons: the image that user sees doesn’ t keep up with body movement, and visual staying phenomenon. Although VR companies try to solve this problem by increasing panel resolution, but it still can’ t be overcome entirely.

03 EXISTING PROBLEMS

“ SPACE RESTRICTION ”

Cables of VR products restrict user’ s movement, but all exist VR products couldn’ t perform well without cables.

“ BAD CONTROL EXPERIENCE ”

Almost all VR products come with a hands set or a handle, it’ s hard for user to control while playing.

04 CORE TECHNOLOGIES

“ A REVOLUTIONARY VR TOTAL SOLUTION ”

We will develop a world's smallest, lightest, with best image quality, screenless VR device.

04 CORE TECHNOLOGIES - NEAR-EYE RETINA DISPLAY

NEAR-EYE RETINA DISPLAY

Small and Compact Size

Reduced size by half compare to the exist VR products. Small and compact system size makes glasses shape HMD product possible.

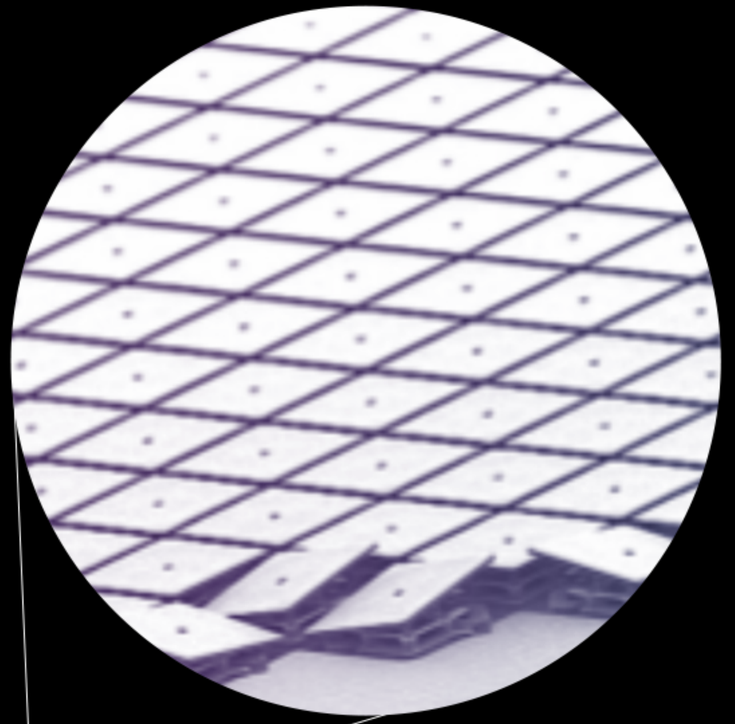
High Resolution

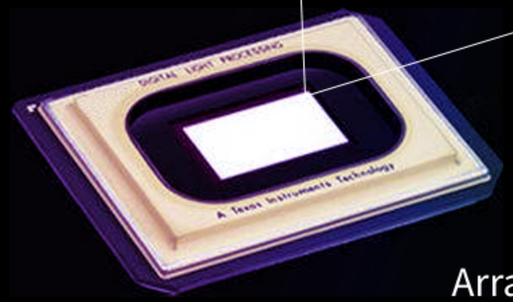
With lower lighting power and high-brightness displays, we build IMAX theater-class image quality and immersive scenery.

Without Dizziness

Solved the problem with high image refresh rate and low latency, further, to make wireless possible.

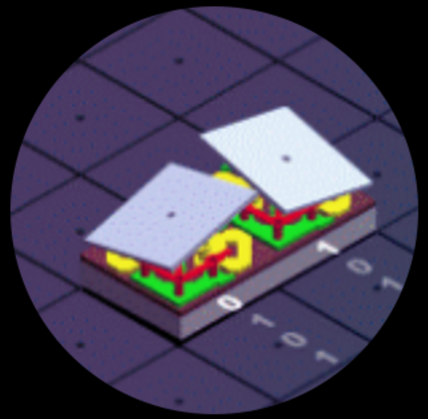
04 CORE TECHNOLOGIES - NEAR-EYE RETINA DISPLAY



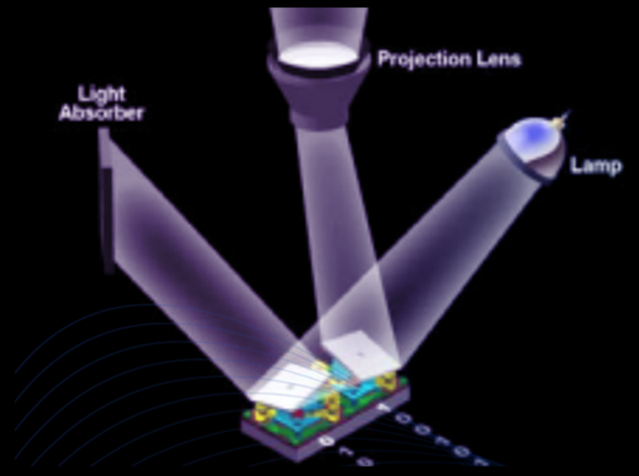


Array of micromirrors

MICRO-PROJECTOR CHIPSET & WORKING PRINCIPLES



Digital Switch (plus or minus)



To steer light

04 CORE TECHNOLOGIES - NEAR-EYE RETINA DISPLAY

Higher Optical Efficiency	We can use standard high efficiency LED to create brighter display, compared with the organic-nature OLED solution.
High Speed and Low Latency	DLP is the fastest display solution in the world. The micro-mirror is designed to switch at a speed of 2,000 Hz. The ultra-high color refresh rate and low latency are critical to VR display. This will remove the VR motion sickness issues fundamentally. This also makes the wireless VR solution possible. And any ordinary PC with 60Hz display could be used for DLP VR solution.
Perfect Display Compared with OLED	With 1920*1080 resolution/each eye, except the traditional RGB primary colors, we add extra yellow, cyan and magenta continuously middle spectrum color. The theater-level color saturation, contrast ratio > 2000:1 and non-screen window effect, all these combined can enhance the image quality, far exceeding image of LCD/OLED panel solution.

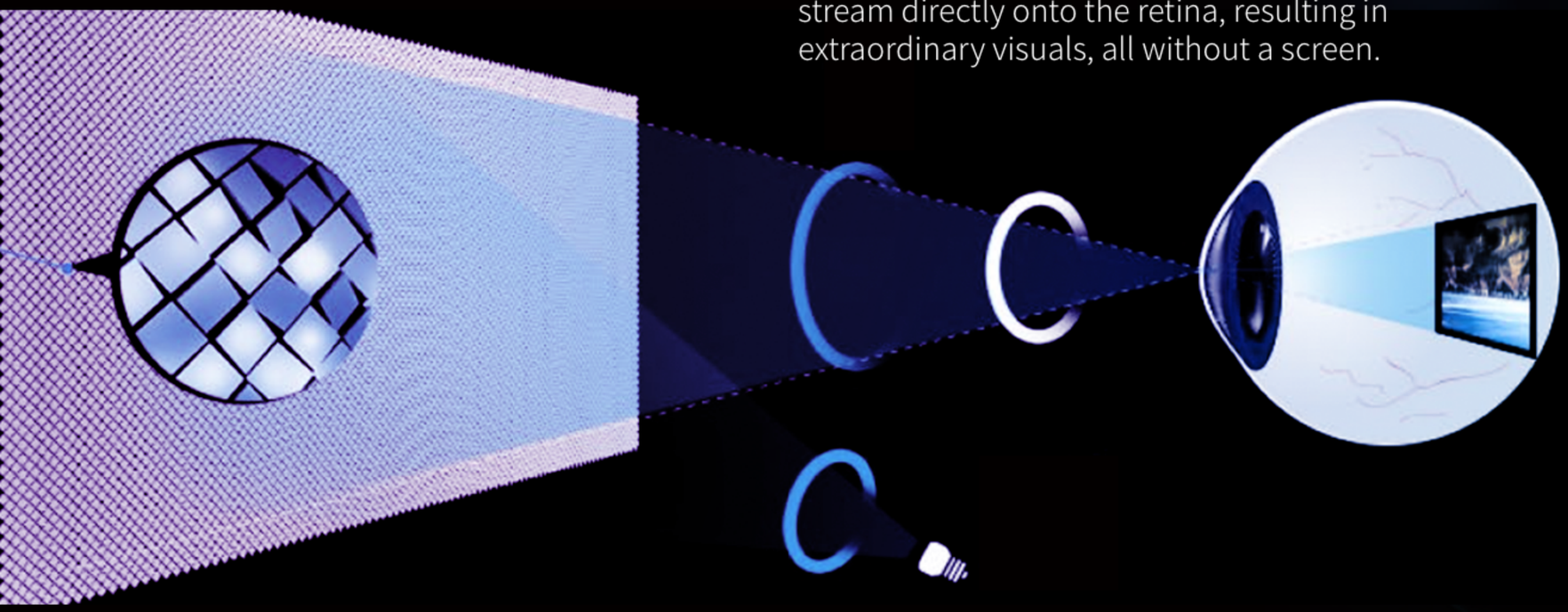
04 CORE TECHNOLOGIES - NEAR-EYE RETINA DISPLAY

	OLED PANEL	NEAR-EYE RETINA DISPLAY
Clearness	Large pixel gap, Mosaic effect, Some flickering	Little pixel gap, Clear image, No flickering
Brightness	Normal	High
Contrast	Optical fill ratio ~ 70%, Total light efficiency > 30%	Optical fill ratio ~ 90%, Total light efficiency > 60%
Color Fidelity	Normal (constrained by DA conversion)	High (digital image formation)
Gray Level	The sense of multi-level is not enough	High (1024 levels / 10 bit)
Color Uniformity	No color compensation circuit. Color deviation occurs as the OLED/LED aging.	> 90% (with color compensation circuit)
Brightness Uniformity	No compensation circuit. Possible “ Solar effect” (bright spot effect)	>95% (The digital controlled compensation circuit is used to make the brightness on screen more uniform)
Robustness to External Light Interference	External light will interfere the panel seriously, Clear display is not possible under external light source.	Near-Eye Retina Display is using modularized design with all optical components in a closed box.

04 CORE TECHNOLOGIES - NEAR-EYE RETINA DISPLAY

Optics

Patented optics focus and project the light stream directly onto the retina, resulting in extraordinary visuals, all without a screen.



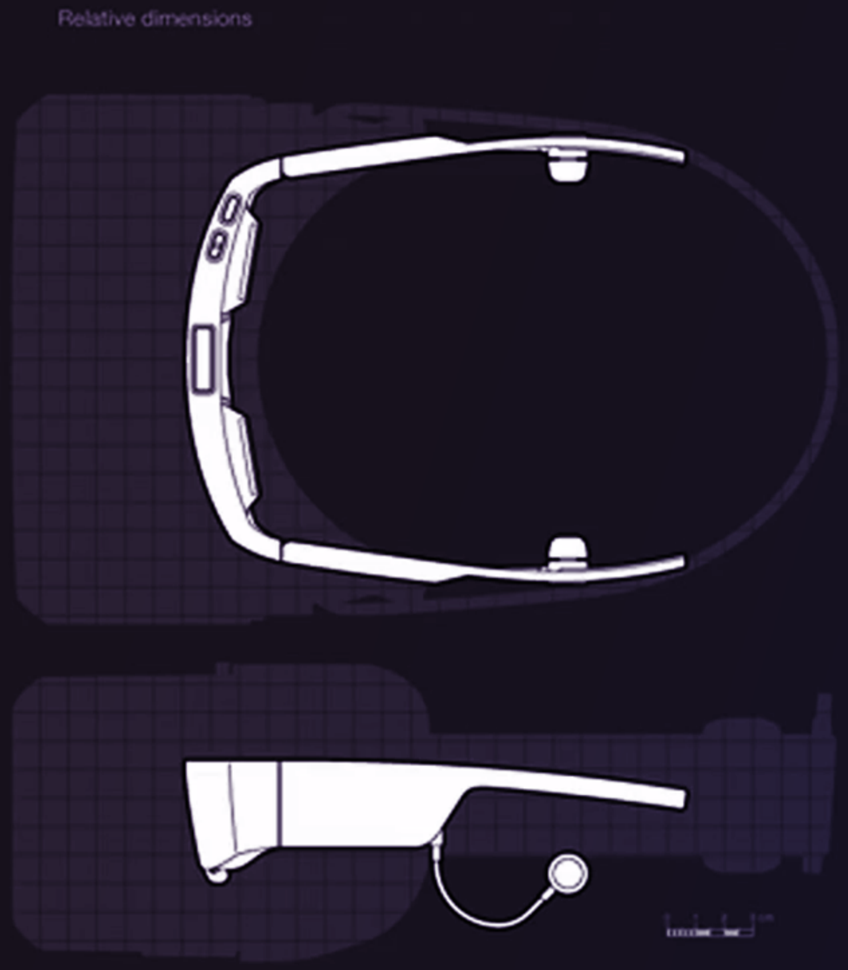
Micromirror Array

Two million mirrors reflect the conditioned light and shape it into an image fit for the eye with vivid clarity.

Low-Power LED

Light from a low-powered LED mimics natural light, eliminating fatigue so long-term usage is comfortable.

04 CORE TECHNOLOGIES - NEAR-EYE RETINA DISPLAY



04 CORE TECHNOLOGIES - PENETRATION WIRELESS VR SOLUTION

PENETRATION WIRELESS VR SOLUTION

Reduced visual delay effect, and controlled delay time within 15 ms.

	Panel + Cables	FFRD + Wireless
Detect Head Movement & transmit to computer	2 ms	3 ms
Image Processing	3 ms	6 ms
Transmit image to HMD	0 ms	5 ms
Display Image	14 ms	1 ms
TOTAL	19 ms	15 ms

04 CORE TECHNOLOGIES - PENETRATION WIRELESS VR SOLUTION

Low latency Near-Eye Retina Display display solution

In the VR image signal delay, “The panel display latency” contributes nearly 70% of the whole signal delay (13-15ms). Till today, the display latency issue can not be solved, and is also the main reason why the wireless transmission is impossible. On the contrary, one of the advantages of the DLP display solution is the ultra-low latency (< 1ms), which will save more than 10 ms, and the saved time could be reserved for wireless data transmission.

Only normal PC is required

With optimized architecture, the computing power could be reserved for graphics rendering. This will lower the PC specification required for VR solution.

04 CORE TECHNOLOGIES

HYPER-SLAM TECHNOLOGY

We adopt the new generation inside-out SLAM system to position HMD, it’ s no need to set up any other peripherals, there’ s no limit of environment.

Catch movement accurately

With a standalone embedded system, sensors and cameras, it can calculate the movement and posture of HMD in an environment.

Reduce loading of processing

It doesn’ t need a computer for processing, relatively it keeps the performance well.

Without any peripherals

No need to set up peripherals, so there’ s no limit of environment.

04 CORE TECHNOLOGIES

UNLIMITED GESTURE INTERACTIVE SYSTEM

We use a band with nine-axis sensor and depth camera for modeling user’ s hands and posture, it’ s wireless, power-saving and easy to wear, user can interact with free hands.

05 COMPETITIONS

	PROJECT K	FACEBOOK OCULUS	HTC VIVE	SONY PS VR
Weight	250 g	470 g	555 g	610 g
Resolution (Single Eye)	1920 * 1080	1080 * 1200	1080 * 1200	960 * 1080
Optical Image Formation Method	Near-Eye Retina Display	Bulky single lens for magnification of image	Bulky single lens for magnification of image	Bulky single lens for magnification of image
Image Refresh Rate	120 Hz	90 Hz	90 Hz	90 Hz
Brightness	Better	Medium	Medium	Medium
Color saturation	Perfect	Moderate	Moderate	Moderate
Method of Interconnecting to Computer	Wireless	HDMI + USB	HDMI + USB	HDMI + USB
HMD Positioning	SLAM	IR LED sensing method	Lighthouse laser positioning method	PSMove camera for positioning
Human-Machine Interaction Method	Unlimited Gesture Interactive system	Two separate handsets	Two separate handsets	Two separate handsets

06 TEAM COMPOSITION

CEO / FOUNDER

Mark Ma

Cavy Tech Founder & CTO
One of “2015 The most creative people of China business”
Possesses massive development experience and proactive technology management.

For a world-class VR solution company, multiple domain knowledge, such as electronics, mechanics, optics and software, are needed. The entry barrier for VR total solution is quite high. We have enlisted the world's professional optical team, the electronics team and the computer vision processing software team, to establish a group of the highest standards for VR total solution.

We are the only VR technology company in the market that has successfully developed the “ultra-thin”, “no-screen”, “super image quality” and “wireless interconnection” for VR solution. A lot of patents have been issued.

06 TEAM COMPOSITION

ELECTRONIC & MECHANISM DESIGN TEAM

DR. CHANG CHEN YI

Ph.D. in Physics at National Tsing Hua University. With 17-year experience in semiconductor assembly and test, SiP system model design and embedded system design.

OPTICAL DESIGN TEAM

DR. CHANG TSUNG MIN

Ph.D. in Optical Engineering at National Chiao Tung University. Focus on optical technology development. Former chief adviser in Code Corporation. Hold 14 patents in Taiwan & 7 patents in the US.

SOFTWARE DEVELOPMENT TEAM

WANG CHUAN CHANG

Graduated from National Taiwan University, majored in Civil Engineering. Former Director of multimedia lab in Next Digital Ltd. Focus on scientific visualization, animation and computer aided engineering.

07 BUSINESS MODEL

- “ Build own brand to sell VR Head Mount Device globally. ”
- “ Strategic business cooperation with other enterprise ”
- “ Create development tools. Establish software content platform. ”
- “ Technology license ”

08 R&D SCHEDULE

ALREADY DEVELOPED

Super high-quality image screenless HMD display system. Near-eye retina display technology (Near-Eye Retina Display)

Autonomous HMD positioning technology (Hyper-SLAM Technology)

Gesture interactive system (1st stage)
Smart wrist interactive system.
(Unlimited Gesture Interactive system)

Software Development Kit (SDK)

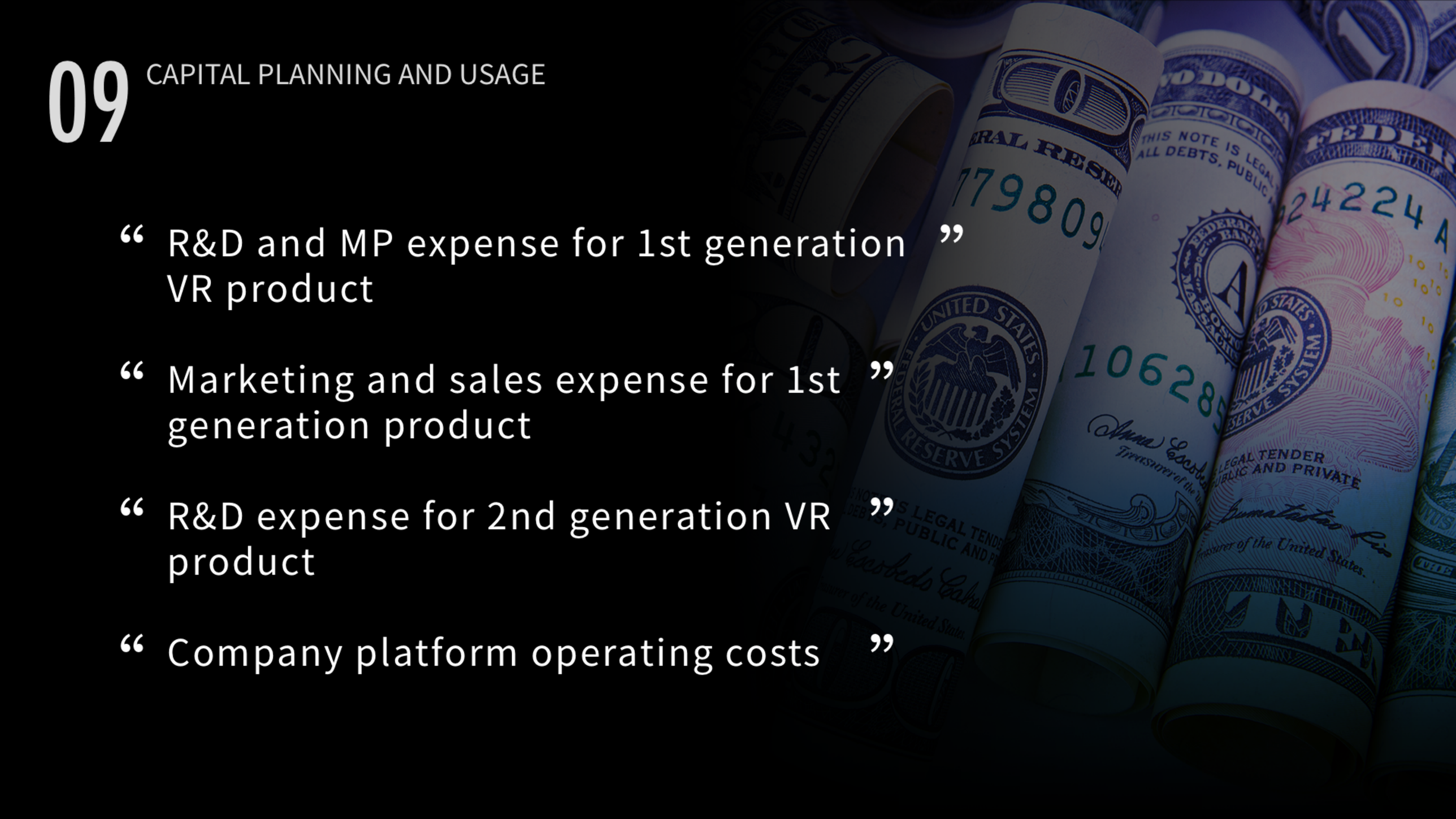
UNDER DEVELOPMENT

Based on the Free-form retina image formation technology, developing better image quality and more compact small size HMD device.

Wireless VR Solution

Gesture interactive system (2nd stage)
Hand-free interactive system.
(Unlimited Gesture Interactive system)

09 CAPITAL PLANNING AND USAGE



- “ R&D and MP expense for 1st generation VR product ”
- “ Marketing and sales expense for 1st generation product ”
- “ R&D expense for 2nd generation VR product ”
- “ Company platform operating costs ”


THANKS