THETA and Multi-imaging Technology

28th October, 2017
Ricoh company, Ltd.
Makoto Odamaki
The camera that shoots everything in 360 degrees
360-degree image at the summit of Mt. Everest

Photographed by Olivier Vriesendorp, VP of product marketing at Ricoh Europe

https://theta360.com/s/nf8Ygp3ZPwtz2Ft5hqms4eSzoW
360-degree video in the sky

https://www.youtube.com/watch?v=PIMn_BQeLXc
Ricoh is a market leader in 360-degree cameras

- Ricoh released in Oct. 2013
- MIT Tech Review selected 360-degree selfie as one of 10 Breakthrough Technologies of 2017
THETA-V

- 4k video shooting
  - 360-degree 30fps

- HEVC supported
  - Available in the future

- 360-degree spatial audio
  - 4ch build-in microphone
  - External 3D microphone
4k Cubic Example
Plug-ins for 360-imaging

- Android OS based system

Developers
Remote playback

Share and 360 scroll

360 Scroll
Keep pressing the shutter button & move the camera

Pre-installed Plug-in
2 fish eye lens system
- Over 180 degrees field of view
- Compact bending optical system to minimize parallax
How it works

- 2 fisheye lens is a good balanced system for consumer cameras
  - Compact camera body
  - Easy to stitch
360-degree image at Times Square
The limit of 360-degree image
What I really saw
Comparing Solid Angles

$2\pi$ [steradian]

0.78 [steradian]

28mm focal length
Multi-imaging technology

360-degree image

High resolution image

Multi-imaging
360-degree image
Zoomed 360-degree view
Multi-imaging result

Over-layered High-resolution image
The camera system of multi-imaging

360-degree camera with DLSR

Reduced disparity and blind spot
Algorithm flowchart

1. 360-degree image
2. High resolution images
3. Matching
4. Meta data
5. Multi-imaging Viewer
Multi-imaging movie

https://www.youtube.com/watch?v=w4sZLke-KJl