

THETA and Multi-imaging Technology

RICOH
imagine. change.



28th October, 2017
Ricoh company, Ltd.
Makoto Odamaki



RICOH THETA

RICOH
imagine. change.

- The camera that shoots everything in 360 degrees





360-degree image at the summit of Mt. Everest

RICOH
imagine. change.



<https://theta360.com/s/nf8Ygp3ZPwtz2Ft5hqm4eSzoW>

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



360-degree video in the sky

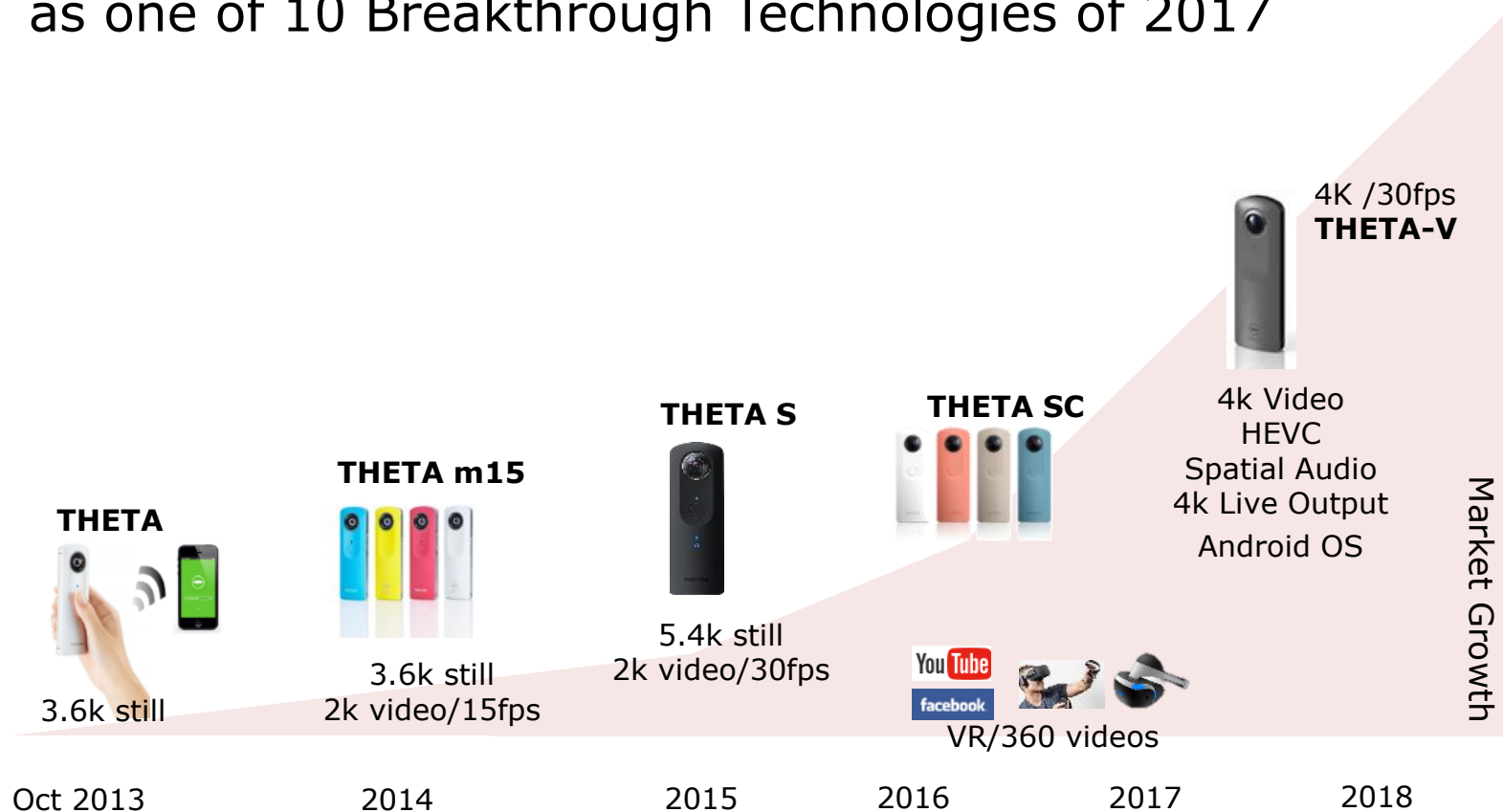
RICOH
imagine. change.



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

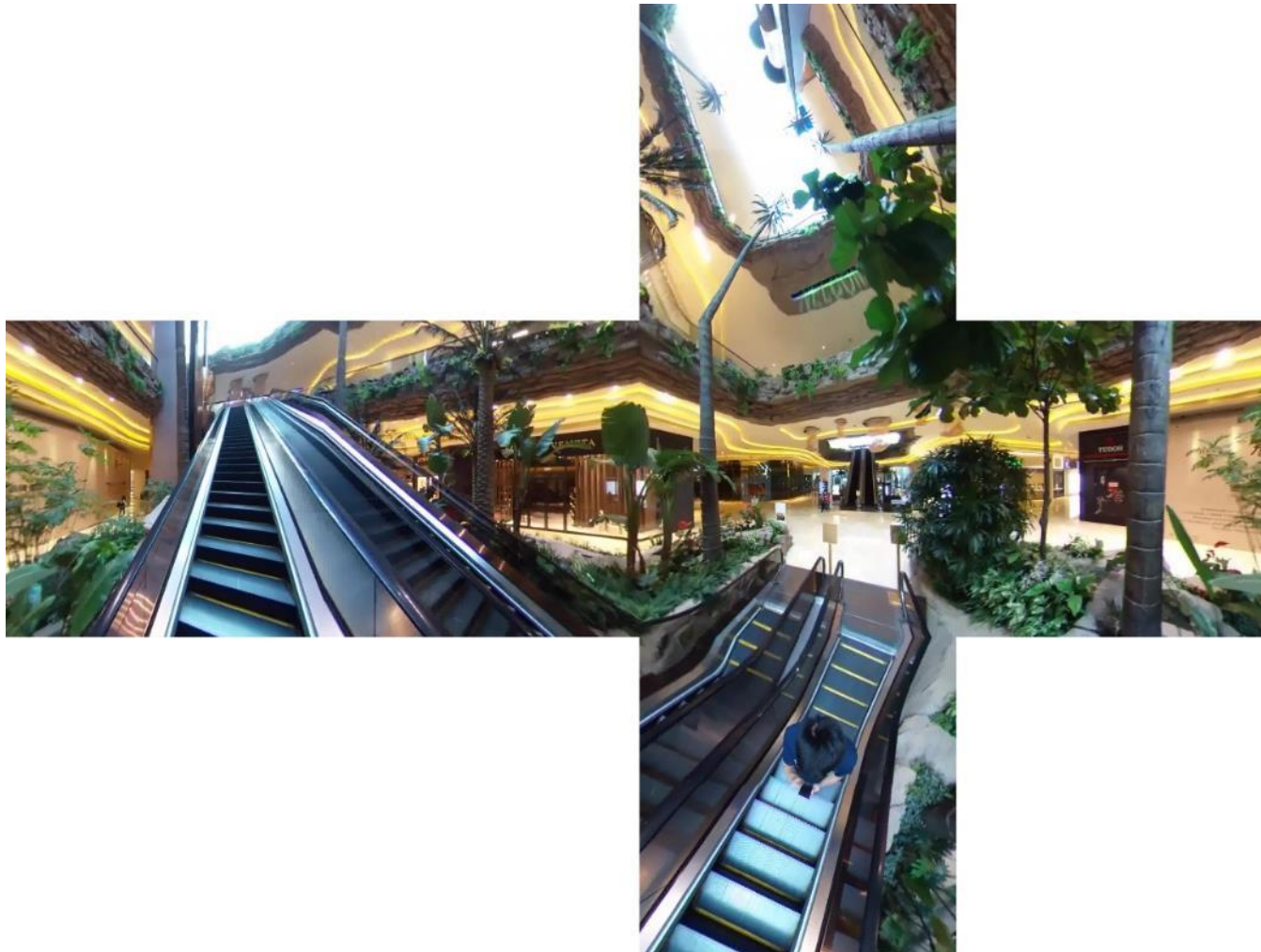




- 4k video shooting
 - 360-degree 30fps
- HEVC supported
 - Available in the future
- 360-degree spatial audio
 - 4ch build-in microphone
 - External 3D microphone

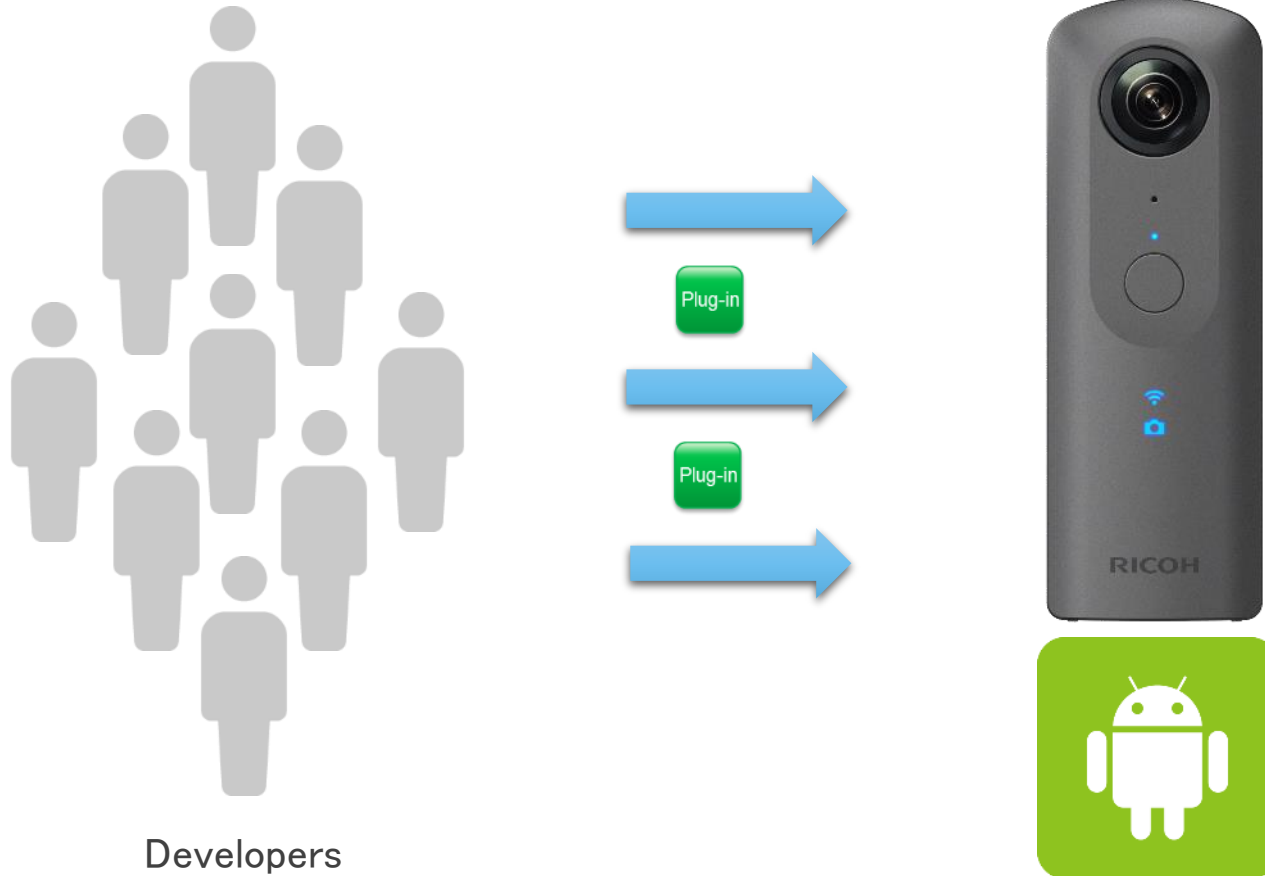


4k Cubic Example



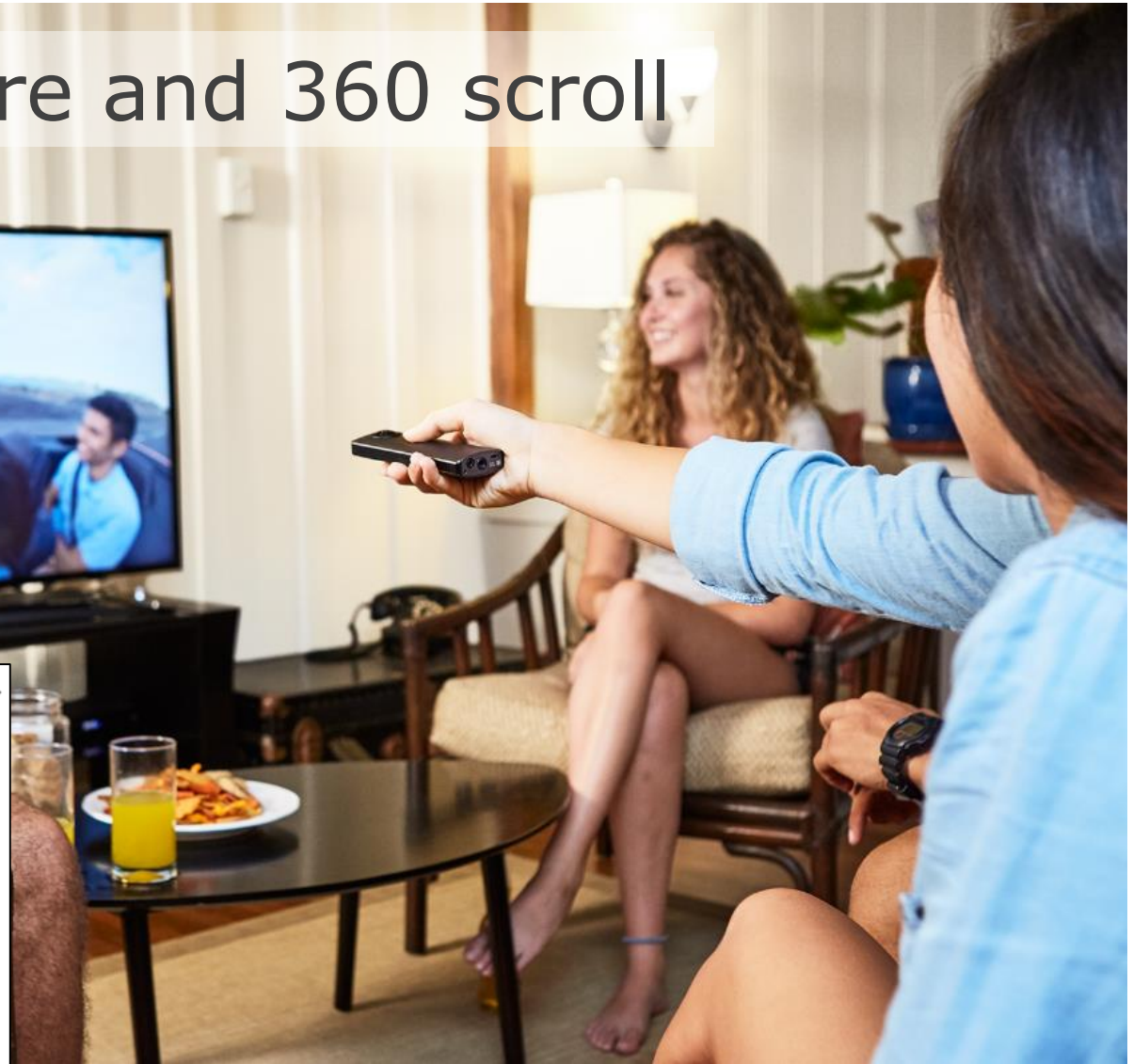


■ Android OS based system



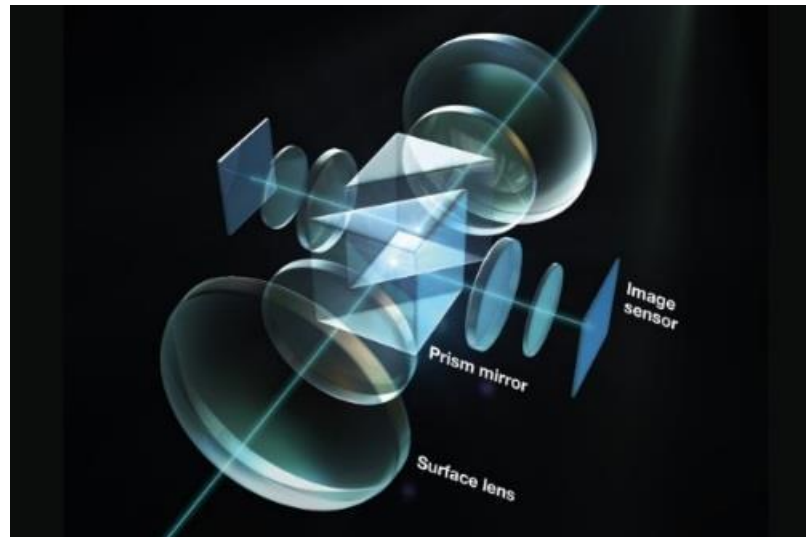


Share and 360 scroll





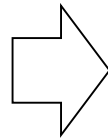
- 2 fish eye lens system
 - Over 180 degrees field of view
 - Compact bending optical system to minimize parallax





- 2 fisheye lens is a good balanced system for consumer cameras
 - Compact camera body
 - Easy to stitch

Two fisheye lens



Equirectangular



360-degree image at Times Square





The limit of 360-degree image



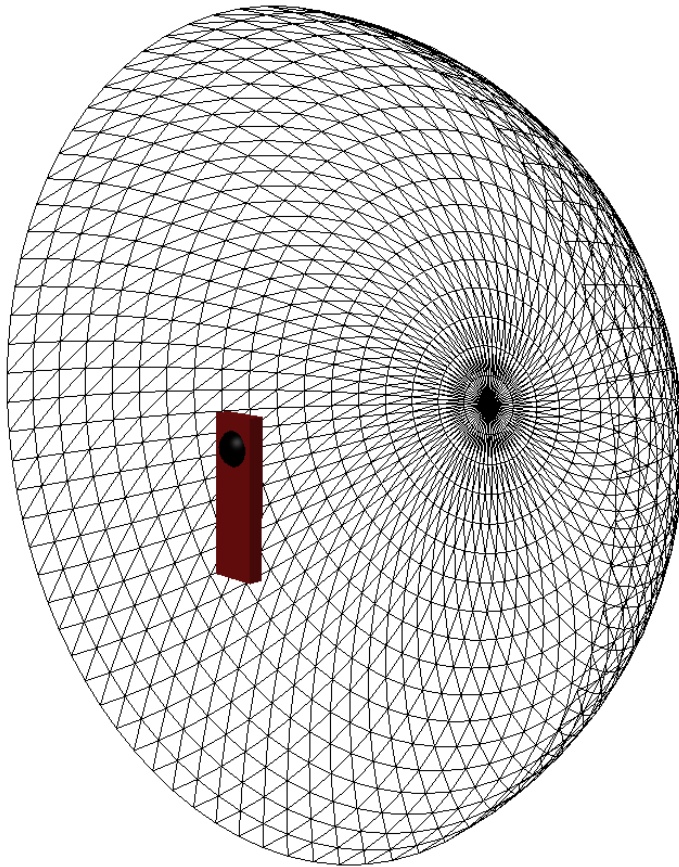
What I really saw



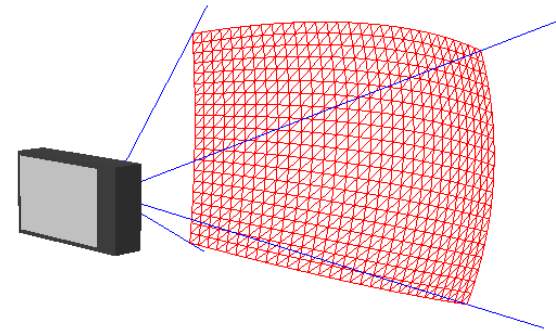


Comparing Solid Angles

2π [steradian]



0.78 [steradian]



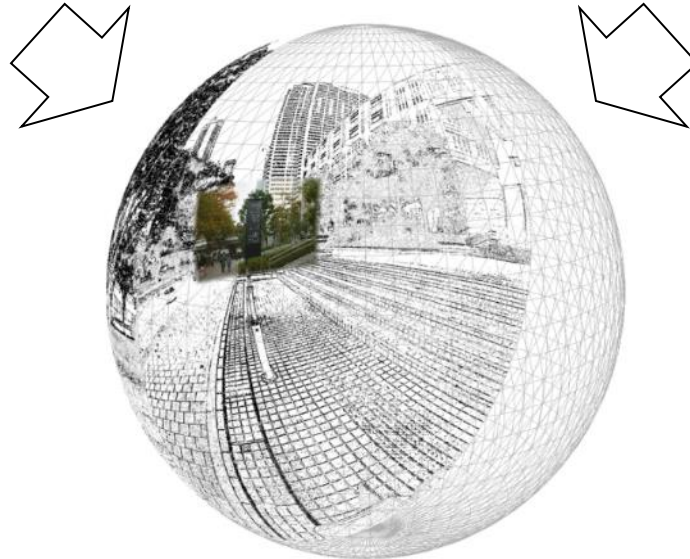
28mm focal length



360-degree image



High resolution image



Multi-imaging



360-degree image





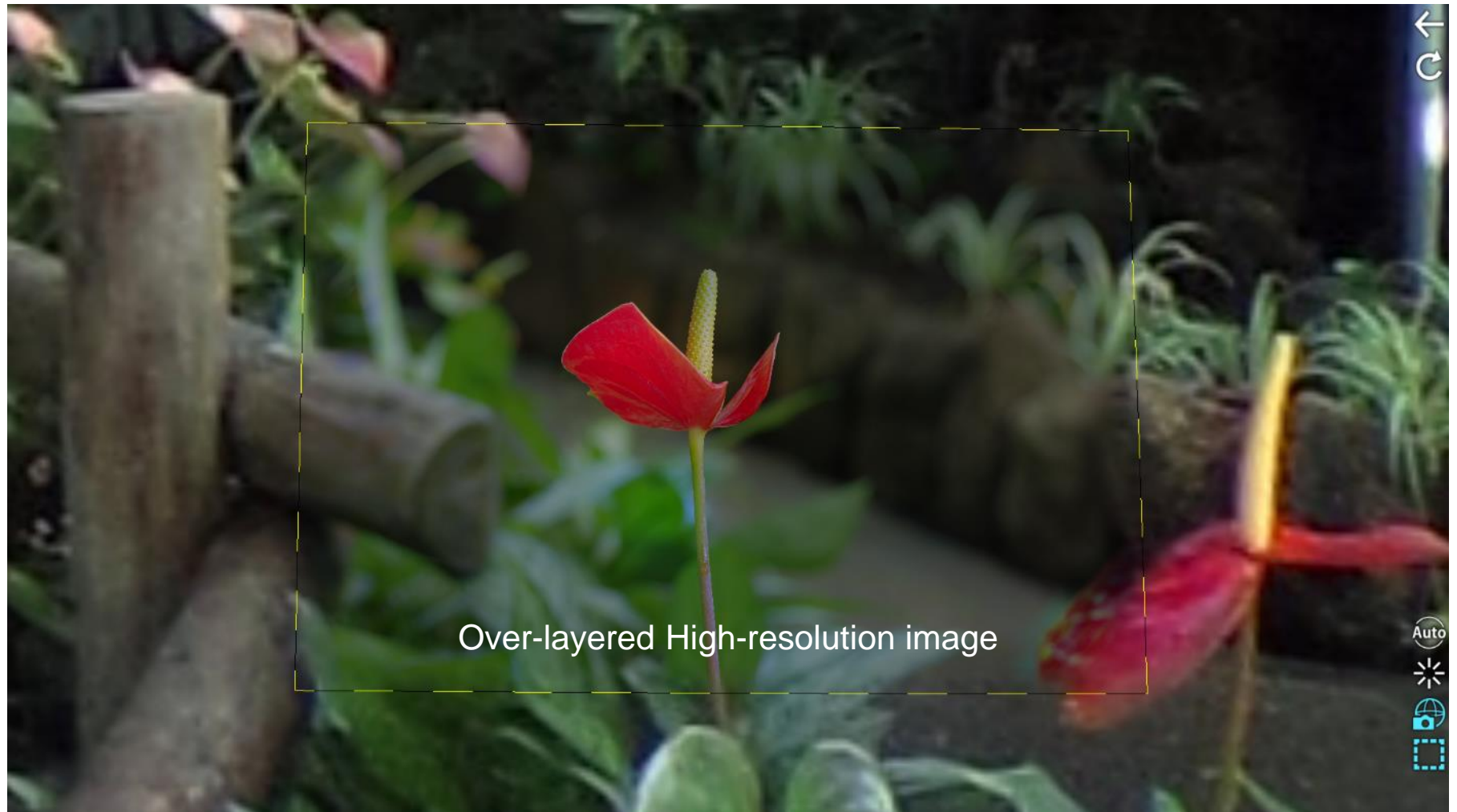
Zoomed 360-degree view

RICOH
imagine. change.





Multi-imaging result



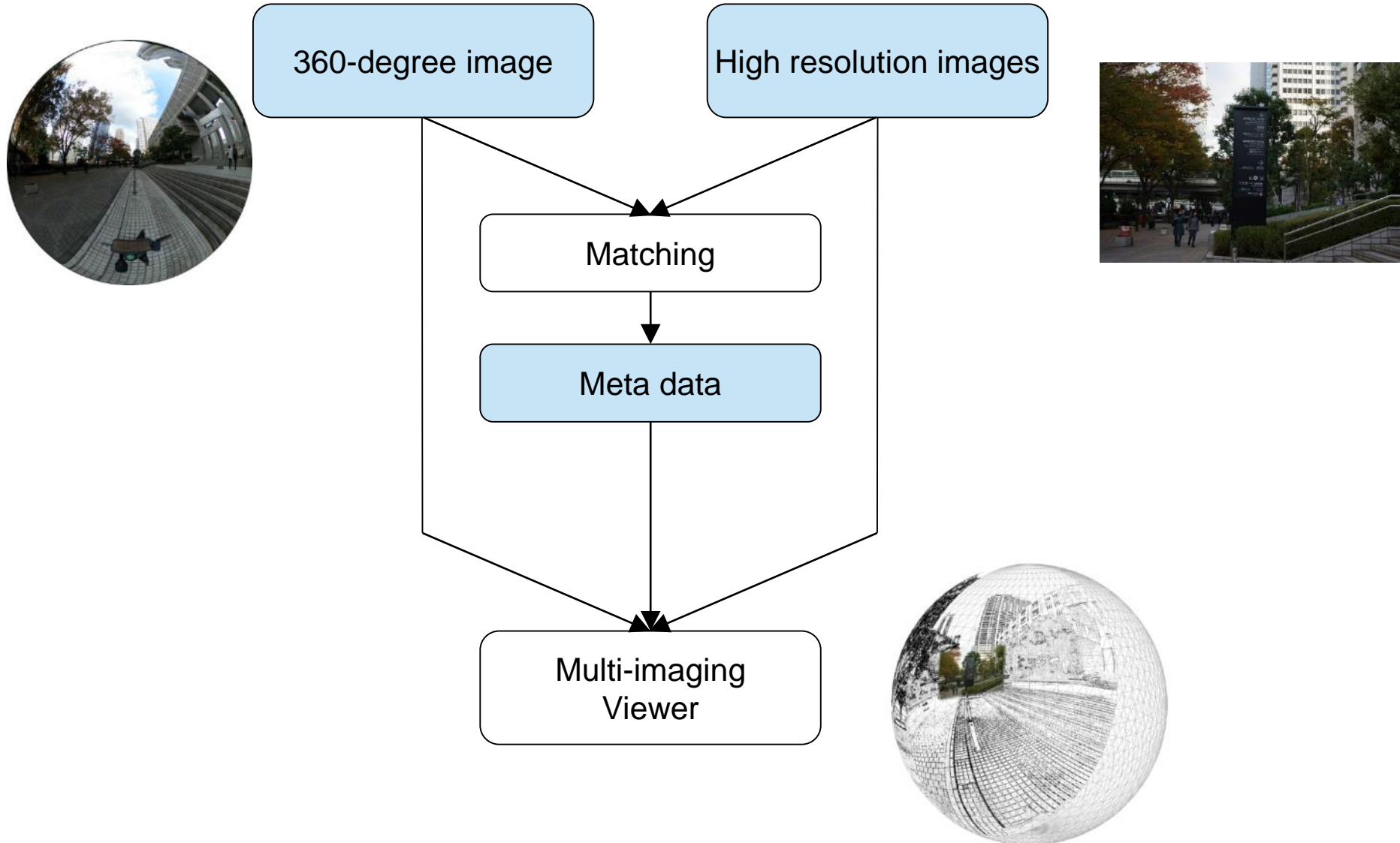


The camera system of multi-imaging

360-degree camera with DLSR



Reduced disparity and blind spot





<https://www.youtube.com/watch?v=w4sZLke-kJI>

RICOH
imagine. change.