



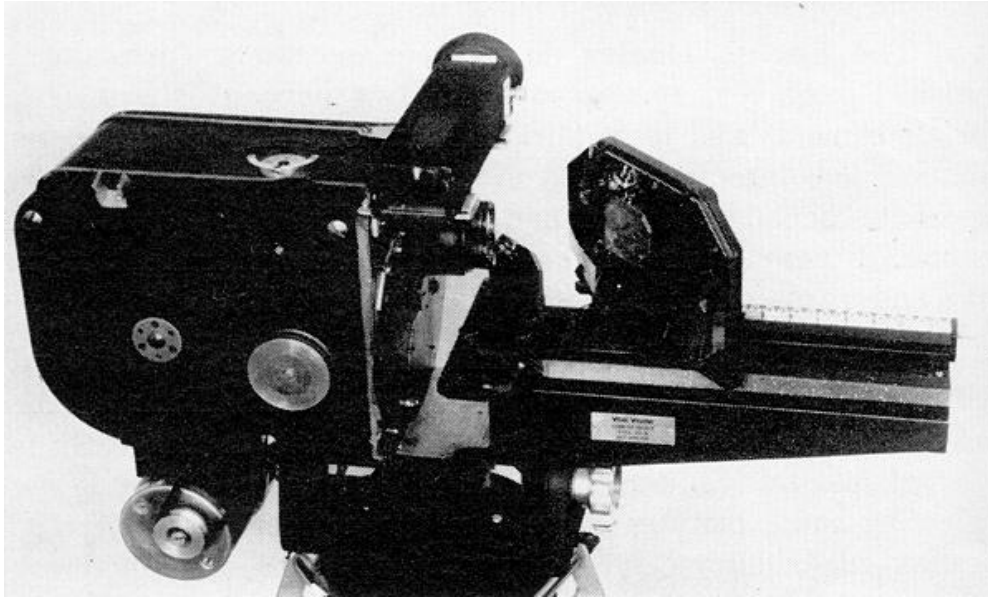
History and Possibilities...

Single-Camera and Single-Lens
3D Capture, from before the
“Golden Age” to the future of 3D

It Began in the Golden Age...



- 1948: Dutch Veri-Vision system, “Queen Julianna” success begins Golden Age of 3D.
 - First prism/mirror single-camera system



- Spottiswoode brothers soon come out with superior 2-camera system. 2-cam rigs dominate Golden Age.

...Was the Age of Single-Camera 3D

- 1966: Robert Bernier and SpaceVision
 - Over/under L/R images on one film strip for projection
 - Bernier realized same thing could be done in camera
 - Trioptiscope lens adaptor for over/under shooting on Mitchell camera
- Marks Polarized 3-Deepix etc.
- Condon and Silliphant: StereoVision and “The Stewardesses”
- Arrivision systems and “Friday the 13th Part 3D,” “Jaws 3D” etc.
- Dimension 3 (Daniel Symmes)
- Digital Cyberscope (Douglas Trumbull)
- DOTS (Jimmy D. Songer Jr.)

Single-Camera 3D was typical of '60s movies ethos: hand-holdable, independent production

Bernier's Trioptiscope

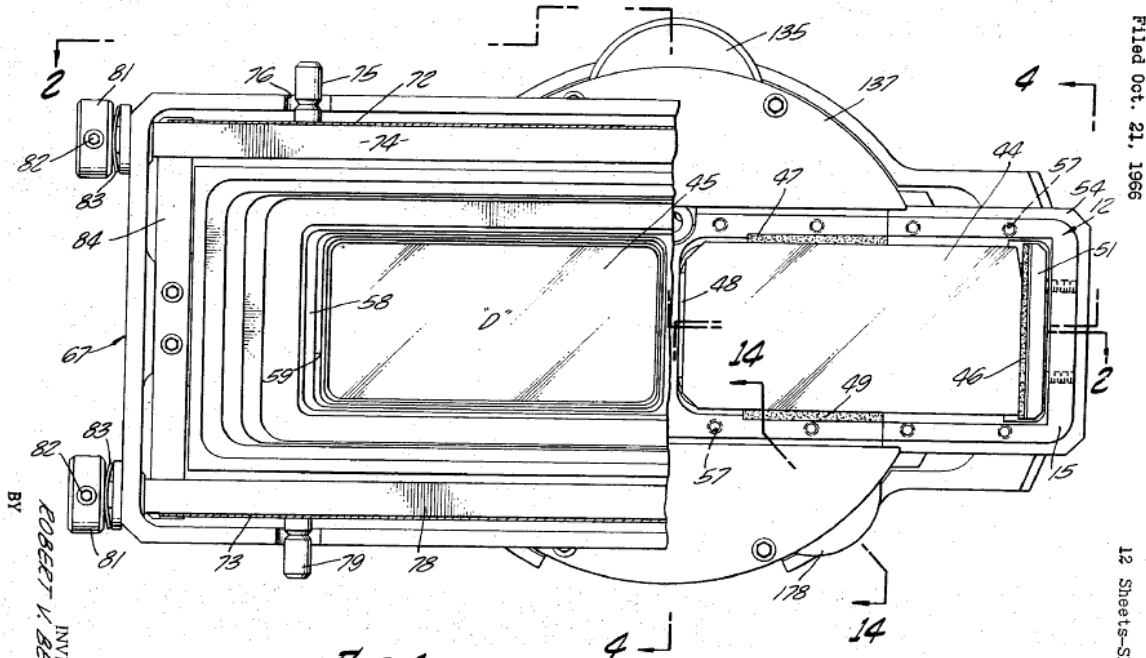
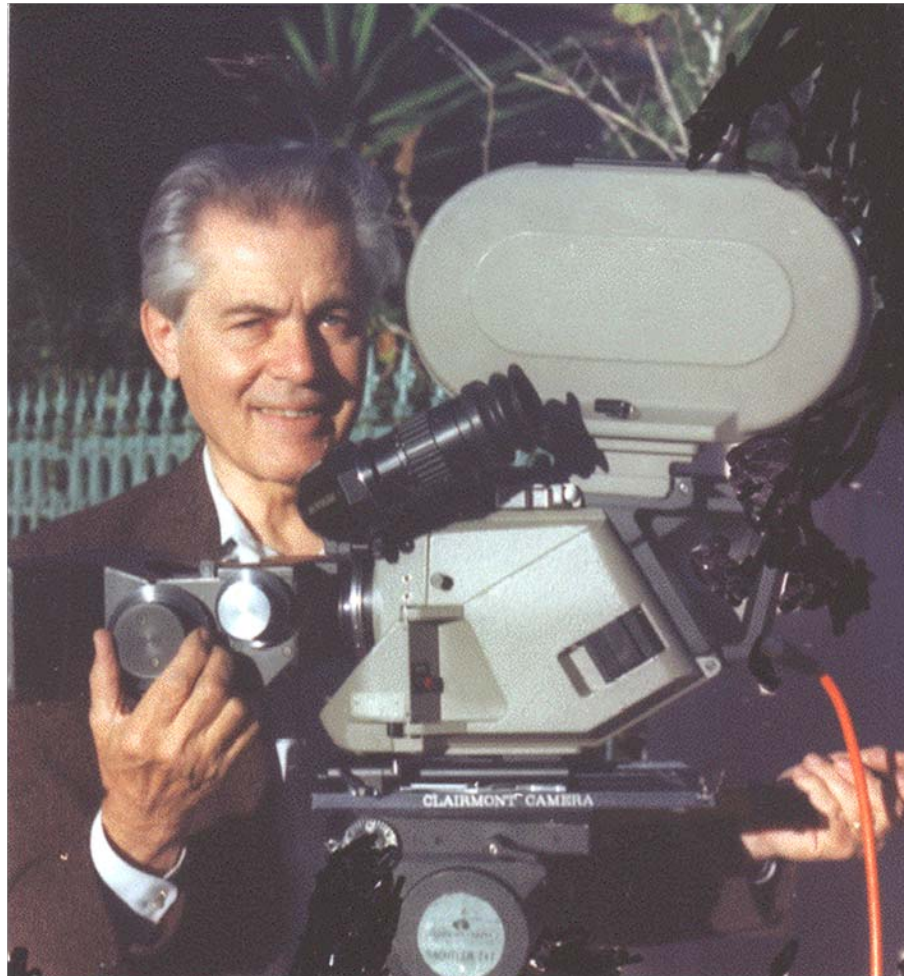


FIG. 1.

INVENTOR
 ROBERT V. BERNIER
 BY
 ATTORNEYS

Sept. 29, 1970
 Filed Oct. 21, 1966
 R. V. BERNIER
 THREE DIMENSIONAL CINEMATOGRAPHY
 3,531,191
 12 Sheets-Sheet 1

Chris Condon & Stereovision



Stereovision



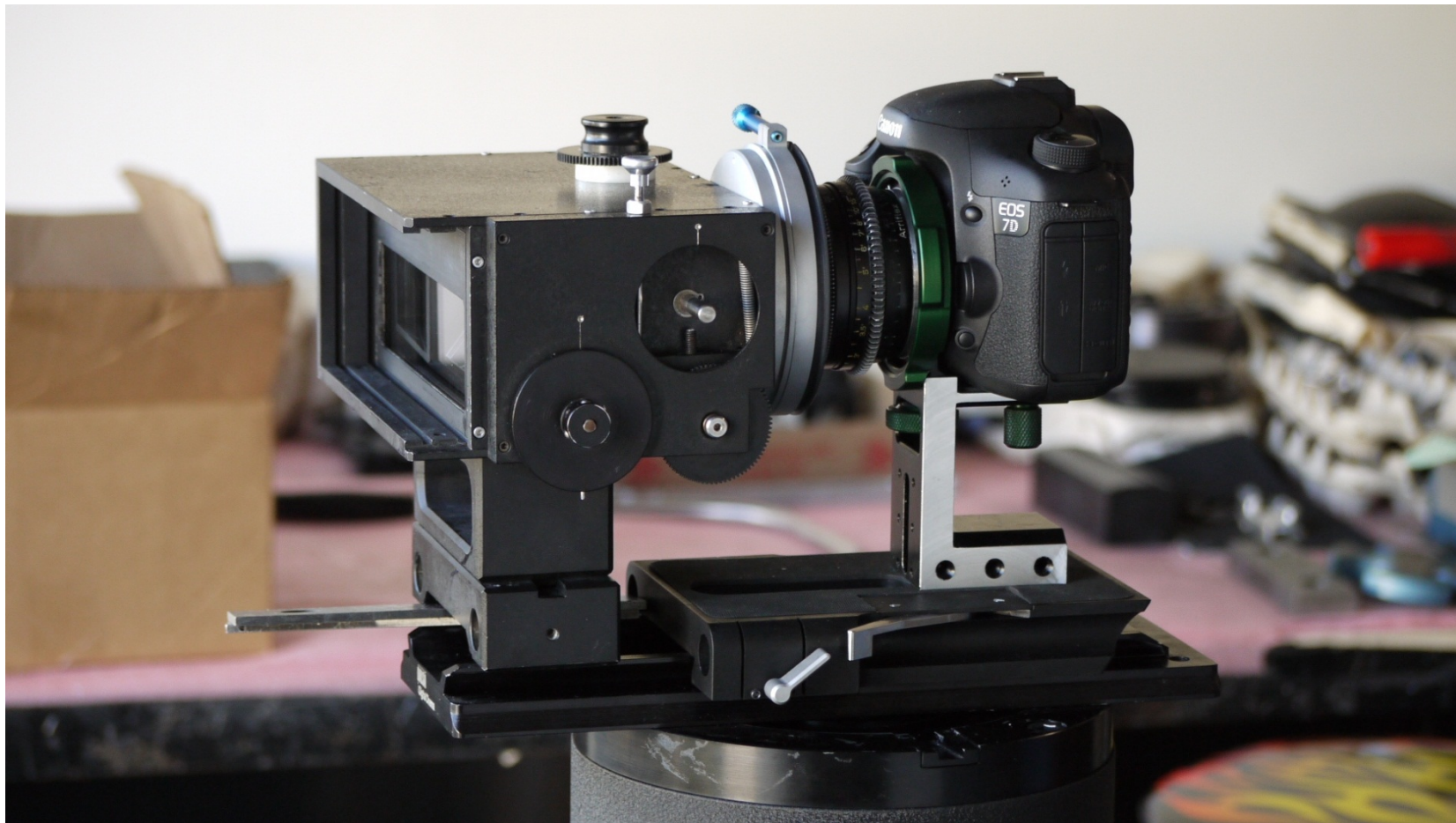
Daniel Symmes & Dimension 3



Arrivision, “The International Stewardesses”



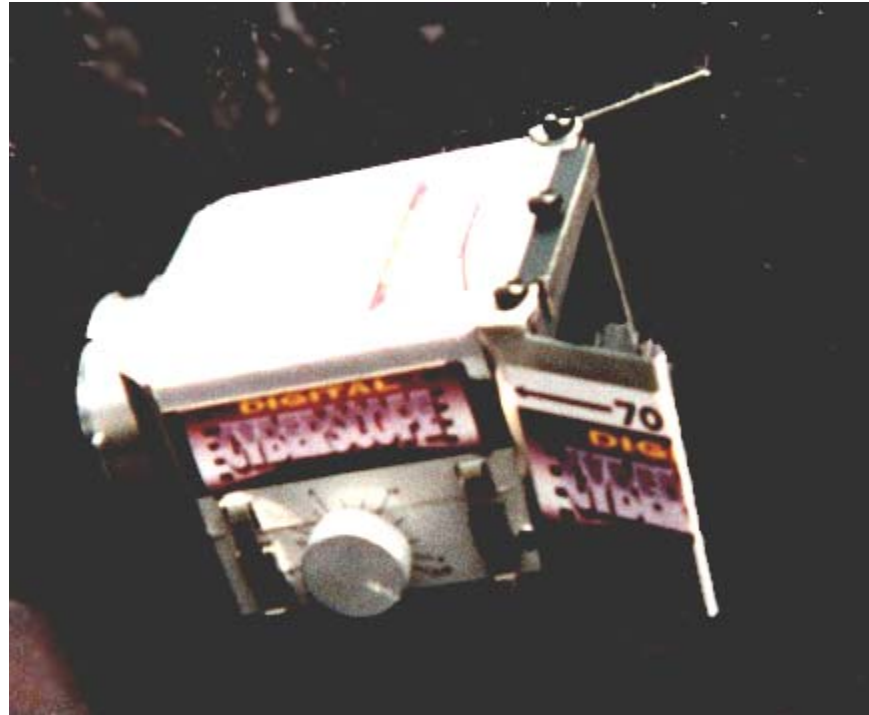
Arrivision, "Friday the 13th Part 3D"



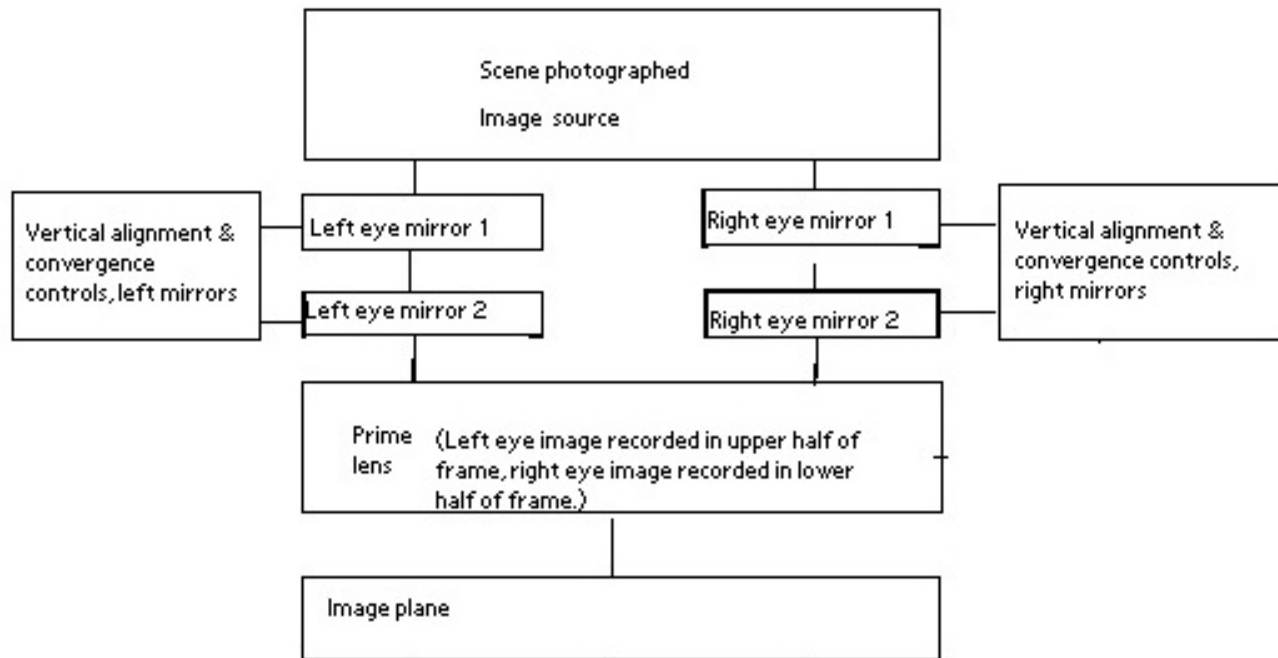
2-Lens Arrivision



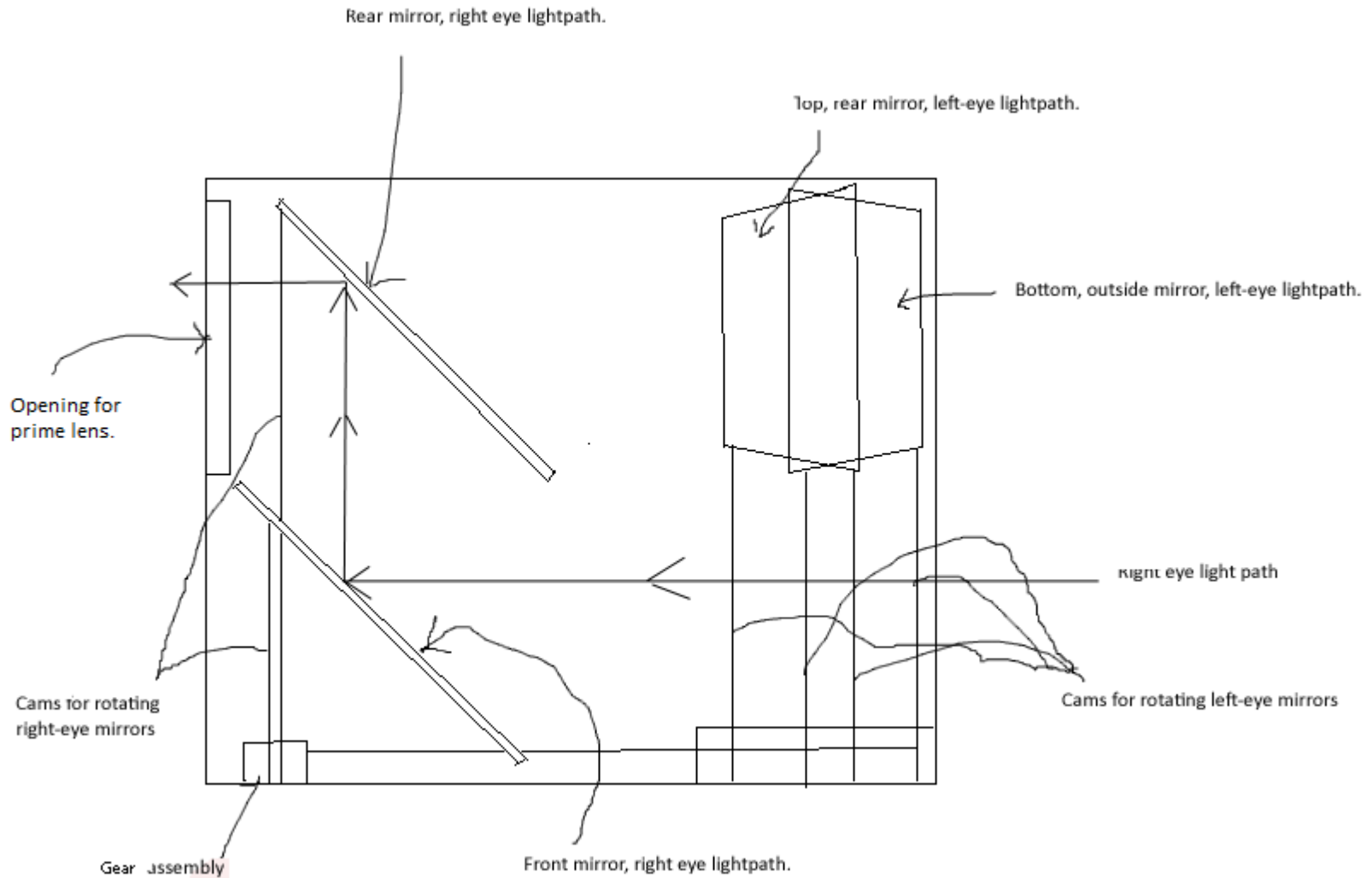
Digital Cyberscope



Typical Light Paths



Typical Mirror/Prism Design



Problems with the Classic Designs... { solidddd

- Keystoning
- Vignetting
- Sensor utilization
- Stray light bounces
- Repositioned focal length and focal distance of prime lens
- Light sensitivity
- Eyeballing alignment

Basic Advantages of Single Lens 3D { solidddd

- No lens alignment issues
- Lighter weight, smaller package
- “Matched cameras & lenses” promises frequently broken
- Theoretically easier to rack focus, convergence, intraocular, integrate control of all with zoom
- “Silver Age” devices were used with film; shooting 3D on film would be nice

Some of the Problems Have Gone Away...



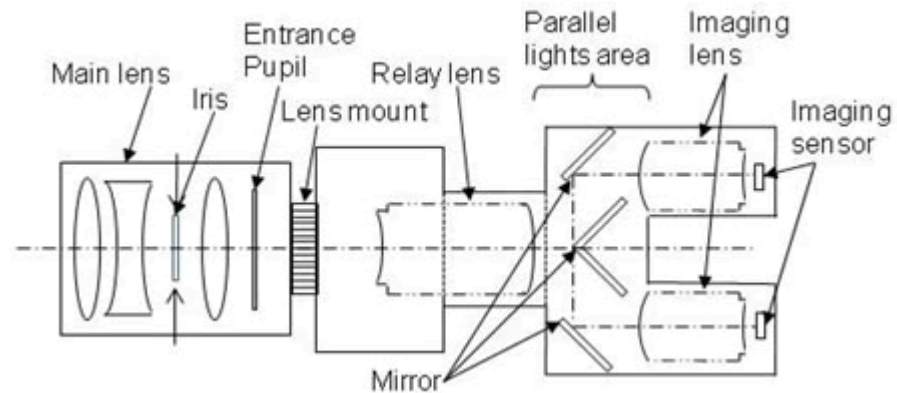
- C-mount lenses
- Tough design issues without optical design software
- Existing 3D rig infrastructure, general camera tech advances make for available standard components, precision controls

And then there's the new problem: lots of very different sensors.

Current Attempts

■ Sony

- Single lens followed by split light paths to 2 sensors
- Specialized camera



Current Attempts

■ ISee3D

- Single camera and single lens
- Shuttered alternating views for right and left
- Specialized camera
- Showed consumer prototype at CES



Current Attempts



- Loreo
 - 2-lens attachment for consumer cameras
 - Over/under or side-by-side



LOREO 3D MACRO

Single camera 3D/HD video



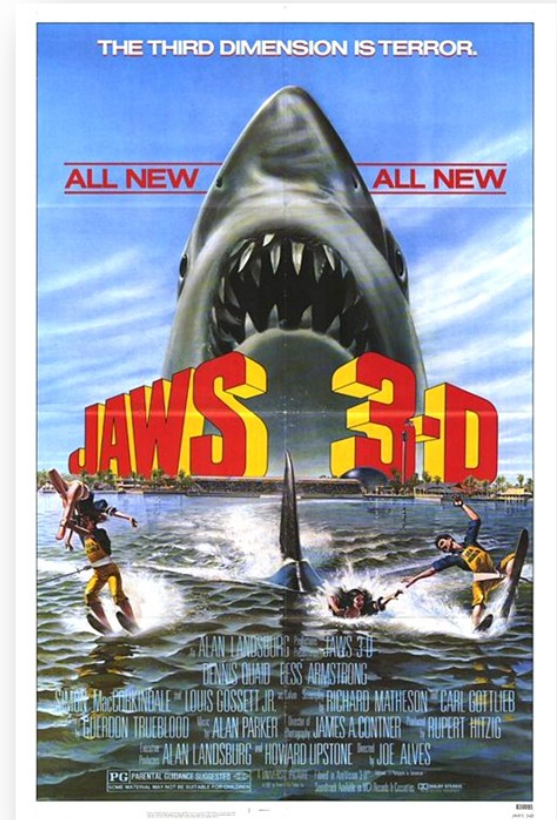
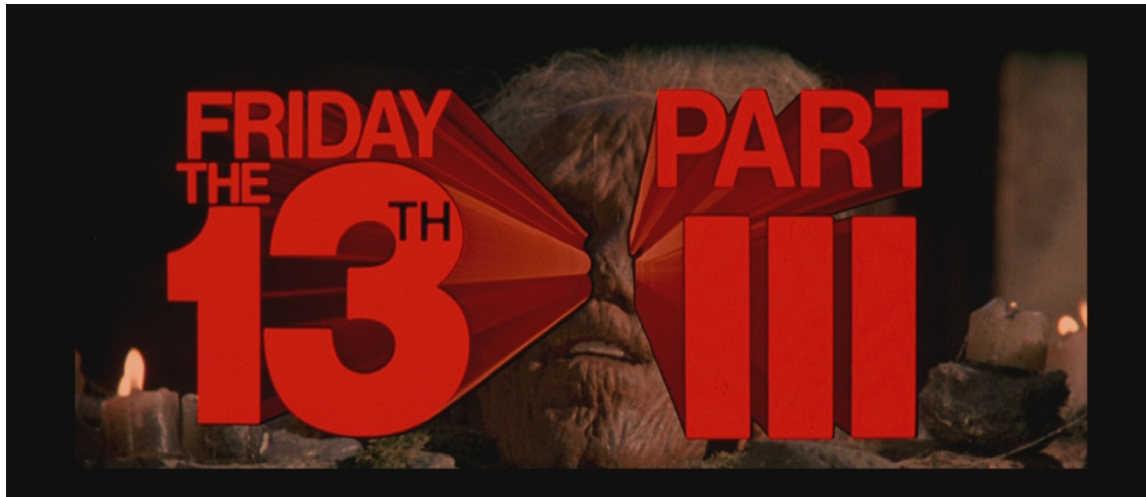
LOREO 3D with WIDE ANGLE CONVERTERS

Current Attempts



- Things we know we can achieve ...
 - Single camera/single standard lens as preferred by DPs
 - Minimal light loss vs. 2D
 - Adjustable intraocular, convergence in concert with focus and zoom
 - Precise optics with unnoticeable keystoneing, vignetting, stray light flares, misalignment
 - No polarizing effects
 - Minimal resolution loss vs. 2-sensor/camera systems
 - Use with film
 - Light weight, easy maneuverability
 - Output RT data in standard format for graphics, switching, multicamera integration.

3D Features Shot Single-Camera: We Can Do It Again!



... But this time it won't hurt... much...



Thank-you

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