

Graphics in the Large

Panel Members

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The Short Story

Is Bigger Better?

Imagine the Possibilities

# of Display Devices	# and Location of Users
1	1
1	< 10, co-located
1	> 10, co-located
< 10	< 10, co-located
>= 2	1 per user, different locations

Panel Coverage

# Devices	# / location of users	Leader
1	1	Kasik
1	< 10, co-located	May
1	> 10, co-located	Carpenter
< 10	< 10, co-located	Streitz
>= 2	1 per user, different locations	Fisher

Single User, Single Device

- Appropriate device selection depends on task.
- Measuring human performance much harder than measuring frame rate.
- Bigger devices proved less effective for one task.

Experiment Summary

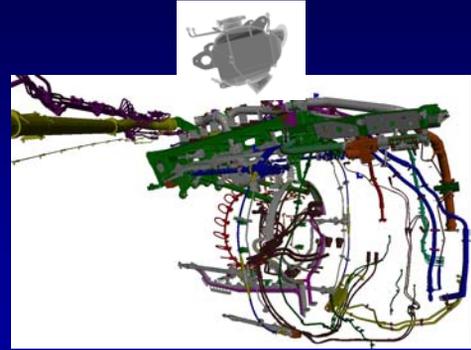
- Specified two variations of a single task
 - Find 1 object that occurs in
 - 6 sample virtual environments of highly structured data for
 - 3 different large screen graphics devices.

Navigation Tasks

→ Two types of navigation tasks

- *Visual Reference*. Given a black and white picture of a part, find it in the scene (Where's Waldo?).
- *Visual Memory*. Shown a path to a specific part, find the part again from the same starting position (Hansel and Gretel).

Where's Waldo? Example



Hardware Specifications

Device	Format	Size, in.	Area, in ²	FoV	Resolution
Monitor	Rect.	20 (diag)	192	48°	1280x1024
Plasma	Rect.	50 (diag)	1050	85°	1365x768
Elumens	Hemi.	60 ø	3460	135°	1024x768

- All driven by SGI Octane2 with V12 graphics option.

Devices



Elumens VisionStation



Plasma Panel

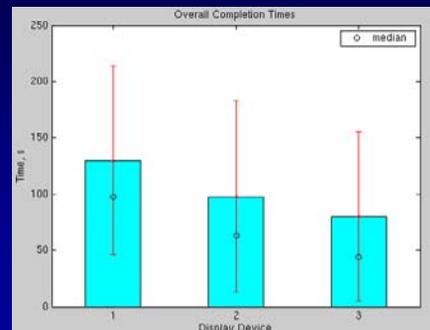
A Definition of 'Crispness'

Device	Brightness, Cd/m ²	Angle of Resolution	MAR Ratio*
Monitor	110	0.0398°	4.8
Plasma	88	0.0762°	9.1
Elumens	35	0.120°	14.4

* Minimum angle of resolution (MAR) = 0.00833°



Results: Completion Times



Conclusions

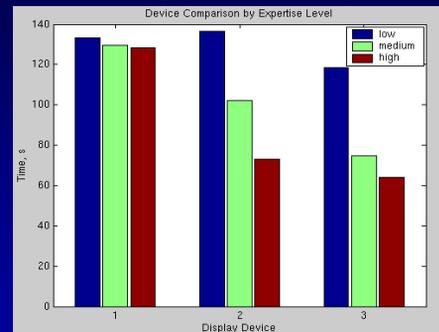
- Elumens frame rate was slower than rectangular screens because of additional rendering (early software release).
- Neither the plasma panel nor the VisionStation improved an engineer's ability to navigate and find a part.
- Results analysis shows
 - Frame rate is important (VisionStation rank)
 - Crispness is important (Plasma panel rank)

Single User, Single Device

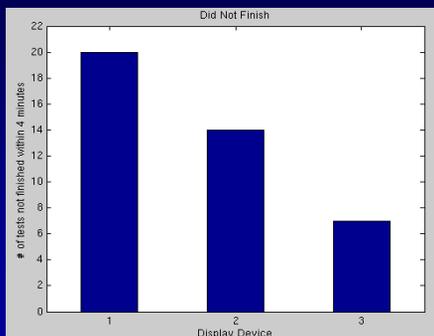
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Backup Material

Results: By Level of Expertise



Results: Did Not Finish



Confounding Factors

- No eye movement measurements were taken.
- Unclear about effect of foveal, macular, and peripheral vision.