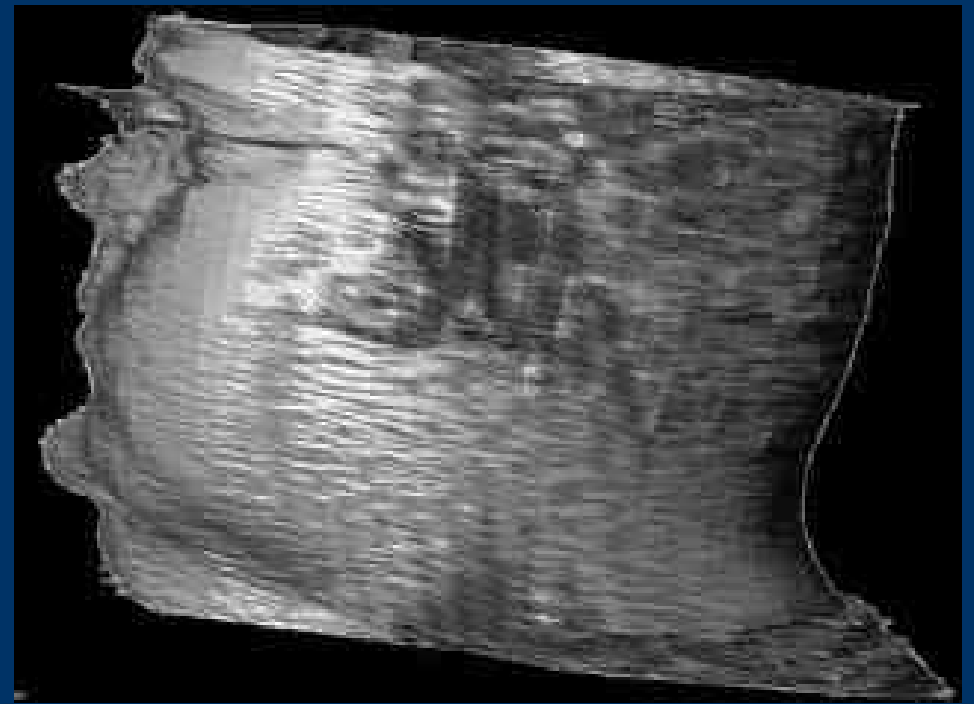
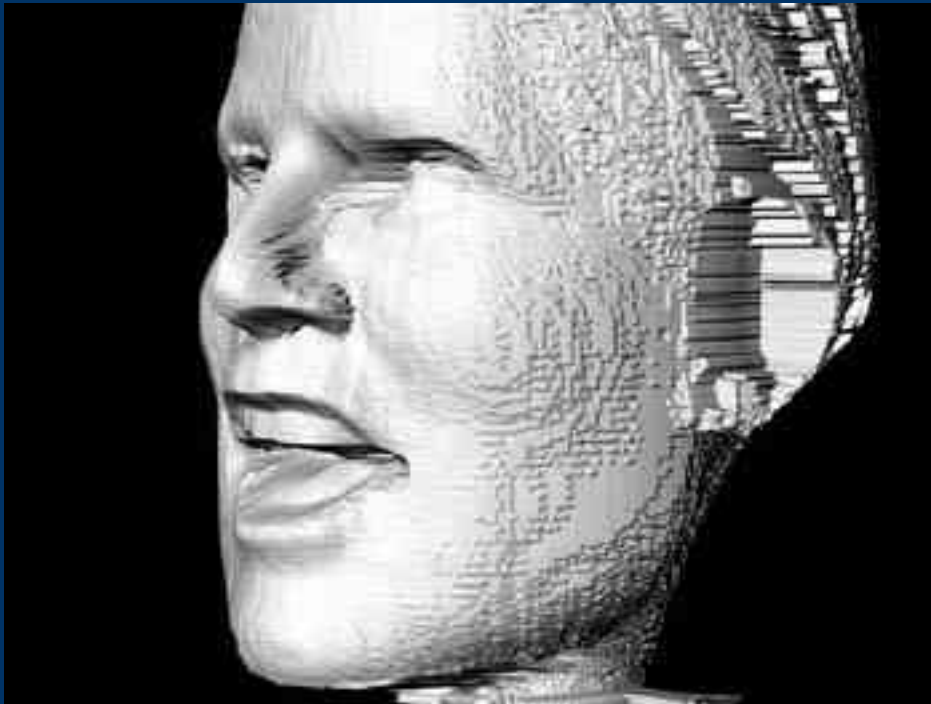


Homespun 3D Scanning



Andrew Lewis - Project Splinescan

What Is Project SplineScan?

- 3D Laser Line Scanner?
- Photogrammetric Model Builder?
- Binocular Scanner?

It's all of the above!

- Technology to match situation
 - Low cost – Why buy expensive?
 - Low Tech - Easy to build
-
-

Project Splinescan Ethos

- Platform Independent
- Low-Cost
- Provide Pathways, NOT Monolithic Solutions
- Multiple Technologies (Four pass scanning)



Platform Independence

- Many Users
 - Sculptors
 - Ceramicists
 - Game Designers
 - Industrial Users
 - Medical Users
 - Many Systems
 - Microsoft
 - Linux
 - Mac OS
 - SGI
-
-

Low Cost – Off the Shelf or Recycled

- Cost as little as £50 to make
 - Common Components
 - Widely Available
 - Buy New or Salvage
 - Not Design Critical
 - Variance in Design is Expected
 - Measurements are Relative
 - Scalable Solution
 - Basic Scanner - ½ a day in the shed
 - 'Deluxe Version' – 1 week in the workshop
-
-

Pathways - Lego Bricks not Monoliths

- Several Programs in a Chain

- Streamer
- PPM2BMP
- Scan.exe
- Blender

- Can be linked by script:

```
streamer -o /raw/face0000.ppm g-c /dev/video0 -r 25 -s 320x240
  -t 150 -n pal -i 1
for capfile in /raw/*.ppm
do
    ppmtobmp -windows -bpp 24 $capfile > $capfile.bmp
done
wine /scanner/scan.exe
blender
```

- Easy to Change

Four Pass Scanning (Next Gen Scan 1)

- **Luma Pass**
 - Captures the Laser Line
 - Uses Threshold Brightness Level
 - Can be Colour Range Specific
- **Chroma Pass**
 - Capture the Texture map
 - Trace Behind the Laser Line
 - Allows for Object Distortion



Four Pass Scanning (Next Gen Scan 1)

- **Keying Pass**
 - Capture the Background
 - Creates a 'Negative Object'
 - Boolean with Luma Model to Punch Holes
- **Blacklight Pass**
 - Capture the UV Map
 - Like Chroma Pass, but uses UV Light



Sample Setup – Linux Platform

HARDWARE

AMD XP 2.4
256Mb RAM
20Gb HDD
NV5200 GFX
V4L Capture Card

SOFTWARE

Ubuntu Hoary
Streamer
Wine
Blender
OpenDX

Sample Setup – Scanning Tools

HEAD SCANNER

Slide Projector
Video Camera
Chair
Black Screen

MODEL SCANNER

Turntable
Laser Line Generator
Video Camera
Blue/Green Screen

Sample Setup – 1 Pass Luma Scan

1. Sit the object on the center of the turntable / chair
2. Start the object spinning
3. Capture 1 full revolution of object with Streamer*
4. Load images into SplineScan
5. Click 'scan' button
6. Load the finished raw triangle file with Blender
7. Shrink to size and save

*In reality, sequence may need trimming

Important Notes for HW Hackers

Lasers are dangerous & you only have 2 eyes

Reflective surfaces and lasers do not mix

Lasers can still shine through black electrical tape

Shield your scattered beams

All electrical items should be fused, shielded and earthed where appropriate



More Info

Splinescan exhibition is here all day – come along and be scanned!

<http://www.splinescan.co.uk> is a portal for the scanner with forums, gallery, etc....

Feel free to email me for more information, or if you are interested in developing the project.

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PRODOTTO IN ITALIA