EMISSION
The Grid

David Turner (david@dwt27.co.uk)
Adam Greig (adam@adamgreig.com)

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Abstract

An art/engineering installation consisting a grid of poles illuminated by white LED strips. Interactivity is provided through a Computer Vision system utilising a night vision camera. Applications include display patterns and a virtual "maze".

1 Summary of Requirements

- $18m \times 14m$ of unlit ground which can have cables dug in

- Mains power, $1.5kW$ peak usage.

2 Design

2.1 Layout

THE GRID would occupy a space of approximately $18m \times 14m$. Of this, $12m \times 12m$ is the grid itself, consisting of a 7×7 grid of poles with $2m$ spacing. A backstage area holds the power and control tent as well as the camera mast.
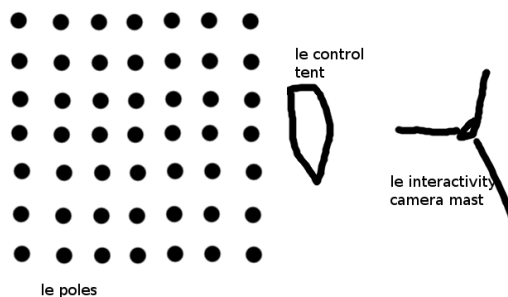

le control tent

le interactivity camera mast

le poles

Figure 1: Plan schematic

2.2   Structural

Each pole will protrude $2.5m$ from the ground. The total length is $3m$, with $50cm$ being inserted into the ground. The poles are constructed from $\frac{3}{4}$" $\times$ $\frac{3}{4}$" $\times$ $\frac{1}{16}$" aluminium angle section. See Appendix A for detailed drawings.

The interactivity camera will be mounted $8m$ above the ground on a $10m$ fishing pole, guyed for rigidity.

2.3   Electrical and Electronics

2.3.1   Cabling

Each LED strip will consume around $2A$ when active. The wiring for one strip will consist of twin core cable carrying power and return between the strip and the control tent. Additionally, a coaxial connection will run from the interactivity camera to the control tent.

All cabling inside THE GRID will be buried slightly below ground to avoid a trip hazard.

2.3.2   Switching

Each LED strip will be controlled using a BD679 Darlington pair as a driver. The drivers will be switched by six 8-output shift registers, themselves controlled by the CPU.

2.3.3   Power

The maximum power consumption of THE GRID will be $100A$. This will be provided by four $550W$ ATX power supplies, each rated for $32A$ on the $+12V$ rail.

2.4   Software and Control

A laptop in the control tent will generate display patterns and handle interactivity. It will transmit lighting data via a serial link to an Arduino. Upon receiving each frame, the Arduino will clock the data into the shift registers, then activate the output latch.
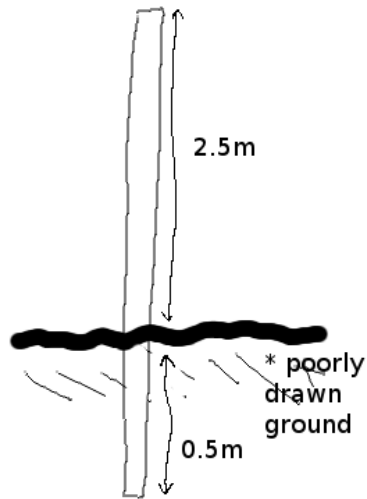
A Engineering Drawings

2.5m

* poorly
drawn
ground

0.5m

Figure 2: Side view of a single pole
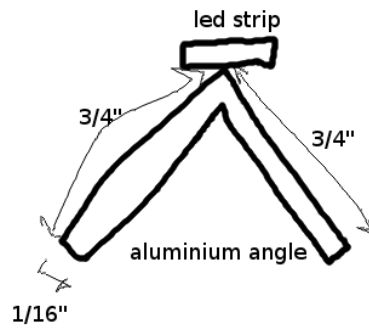
led strip

3/4"

3/4"

aluminium angle

1/16"

Figure 3: Top view of a single pole with LED strip