

EMISSION

THE GRID

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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”. Primary requirements are a $14m \times 18m$ area of unlit ground and access to mains power (approx $1.5kW$ peak).

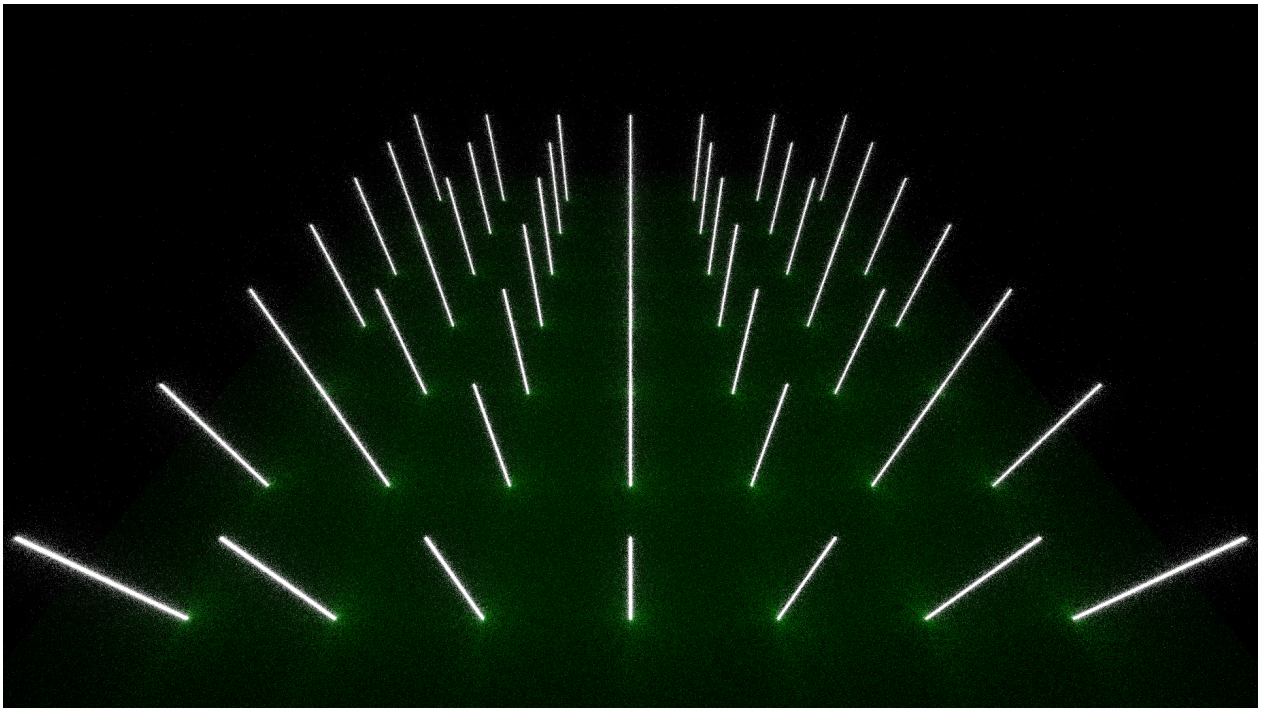


Figure 1: A computer graphics simulation of THE GRID.

1 Design

1.1 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.

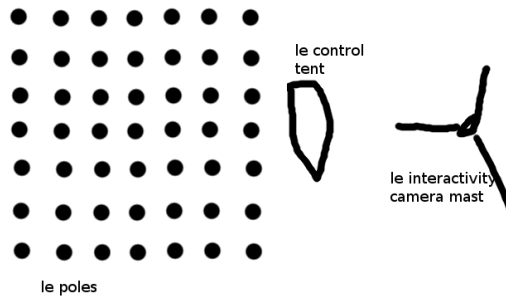


Figure 2: Plan schematic

1.2 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.

1.3 Electrical and Electronics

1.3.1 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.

1.3.2 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.

1.3.3 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.

1.4 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

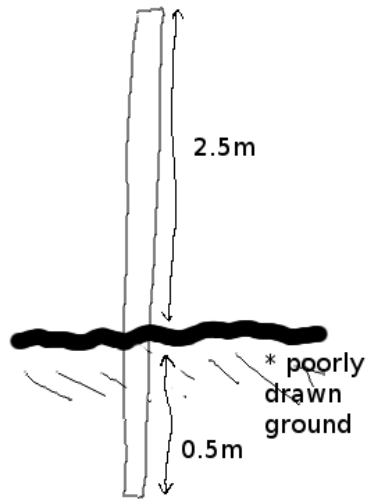


Figure 3: Side view of a single pole

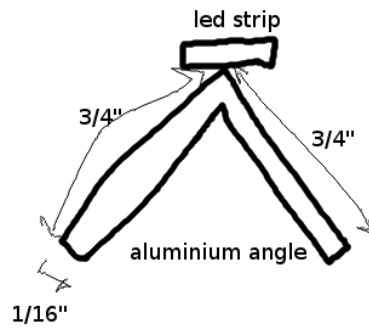


Figure 4: Top view of a single pole with LED strip