Interport 20

A2A Solution

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# The Team

# General Description

## Outline of Solution

## general reasons for Choice

More detail can be gone into in individual sections, just give general ideas here

# Planning & Environment

## Idea Refinement

Show thought process, initial route ideas, etc

## Route Outline

Inc. why this is better than alternatives

### Geophysical

…

### Greenfield use

…

### Appearance, noise, pollution

Briefly describe appearance even though design is discussed later

### Access to the System

This was on Rob’s doc, idk why

## Future Expansion

# Mechanical & Electrical Engineering

## Idea refinement

### Show that trains are essential

### High speed rail vs maglev

Discuss why we haven’t used mechanical rail on short segments

## Maglev system in detail

### Halbach array

### Basically, everything relevant

### Control system

### discuss regenerative braking

### Power requirements

Inc. power supply implementation

### Safety systems

## baggage loading system

# Civil Engineering

## Overground Track

### Idea Refinement

…

### Overground Track Support

…

### housing

Mention consideration of roofing, & fact that it is a an eyesore

## Specific Track Sections

### Motorway Crossing

…

### Intersection Point Design

(At Luton-City/Stansted-Heathrow intersection)

### etc.

…

## Underground

### Concerns about tunnels

Our design requires multiple tunnels, ranging in length from 1.26km to 30.2km. Having a train enter a tunnel at over 300km/h presents several issues (2):

#### Micro-pressure waves

Also known as sonic booms, micropressure waves can if the tunnel is designed unfavourably. Air in tunnels cannot escape like it does in open air, and is instead forced to move around the train when it enters. The train acts like a piston entering the tunnel, pushing a large mass of air forwards and increasing its pressure. A pressure wave is formed that can steepen as it moves through the tunnel. On exit, the high-pressure air meets low-pressure air again, and in extreme cases the micro-pressure wave detonates with a loud noise. Another, more moderate micro-pressure wave can form when the train exits the tunnel.

These waves present multiple issues. A sonic boom would unacceptable to nearby residents, but even if the intensity of the wave is lower, vibrations of doors, windows and walls is a large issue that should be mitigated as much as possible.

#### pressure comfort

Sudden changes in pressure can cause discomfort or even for the ears of passengers and staff. There are strict international criteria (1) regarding pressure comfort.

#### Air Resistance

There is a large amount of work done by the train in pushing air down the tunnel. This slows the train down and requires lots of additional energy to be supplied to the train.

In addition to pressure, major concerns about tunnels include methods of dealing with crashes and fires as well as ability to evacuate from any point along the length.

### Tunnel design

The tunnels can either be designed as two tubes each with a single one-way track, or a single tube with a double track.

There are benefits and drawbacks to each.

### Safety measures

# Reliability

## Redundancy

## Breakdown recovery

We need to do A LOT of work on this section

# Finance & Implementation

## Cost breakdown

## Project construction programme

## Long-term prediction

# Bibliography

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