WARR Hyperloop
Streamlining design for the second competition

CADENAS Industry Forum 2018
8.3.18

Catriona Bruce
Levitation pod team lead
Three problems

1. EMISSIONS
2. NOISE
3. TRAFFIC
Mid-distance aviation

Over half of border crossings made by air

4.4% global annual growth - total passenger miles

Domestic India +350%
Domestic China +250%
Domestic within South America +150%
Domestic USA +50%

Airbus Global Market Forecast report– Growing Horizons 2017/2036
...convenient
...fast
...quiet
...safe
...green
...weather-proof
Disrupting infrastructure

- Disruption seen in other sectors hard to translate
- Large number of small groups huddled under ‘Hyperloop’ banner
- Time the crucial factor, resources are scarce
Disrupting infrastructure

“What Mr Musk has done is act as our chief marketing officer.”

“It’s less open-source, more like an open-air swimming pool with everyone trying to stay above water and compete. In some ways if we were all developing the concept together it may have been better.”

Ryan Janzen, founder at Transpod
COMPETITION I, 2016/17
Design development

NOV. 2015
7 TEAM MEMBERS

JAN. 2016
15 TEAM MEMBERS

MAR. 2016
35 TEAM MEMBERS
Changing goalposts

First design iteration

Team expansion

Cash injection

Final design iteration

Shipping

Testing

Construction

Manufacturing
Lessons learned

PROJECT BOUNDARIES
- High personnel turnover
- Changing requirements

DESIGN PROCESS
- “ Majority of my time spent analyzing alternatives”
  - No design review to check for feasibility
  - Hard to determine best # of iterations

CAD ORGANIZATION
- No revision control or meaningful CAD standard
  - Poor file organization

PURCHASING & MANUFACTURING
- No centralized BOM to plan/track manufacturing
  - Lack of centralized purchasing
  - Lack of time and experience in machining
COMPETITION II, 2017
Strategy

Clear set of goals
• Win competition
• Minimize design effort

Design focus
• Lightweight and simple
• Onboard propulsion
• Gain testing week advantage

Process improvement
• Fewer self-made parts
• Widen & standardize part searches
Working with CADENAS

Installed modules:

✅ PARTsolutions
✅ eCATALOGsolutions product catalogs
✅ PARTstatistics
✅ CATIA

Web platform:

✅ PARTcommunity
FROM SKETCH TO REALITY
WITH INTELLIGENT PART SEARCH
Intelligent search – WARR style

- Identify needed component
- Search on PARTcommunity
- Rough design (typical commercial part)
- Refined design (‘dream’ part)
- Download appropriate eCatalogs
- 3D or 2D search on PARTsolutions
- Find ‘dream’ part
6 subsystems

78 parts or part assemblies

1 ‘false start’

Designed in 2 months

Finished product in 6 months
Pod mass: 80 kg
Pod size: 0.4 x 0.4 x 2.3 m
Max. Velocity: 360 kmh
Max. Acceleration: 1.1 g
Max. Deceleration: 2.4 g
"I love deadlines. I love the whooshing noise they make as they go by."

— Douglas Adams
SUBSYSTEM OVERVIEW

Propulsion unit  Electronics  Battery  Pneumatics

Main structural beam  Brakes
Race video
Thank you

hyperloop.warr.de
WARR Hyperloop
hyperloop@warr.de

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