KeTech Systems Limited
The Challenge of Product Integration
Bridging the Gap






Introduction

- Development of High Integrity Systems that Bridge the Gap between Platform and Train
- This presentation is based on experience gained over many years and the delivery of complex, innovative products in the Rail market – using example of PtT

The Challenge

Technical

- Provide high integrity images from Platform to Train
- Real time picture displayed to driver from stopping point until last carriage has left the platform
- The benefits are:
  - Reduced operational costs
  - Increased safety
  - On train - no guards
  - Reduced dwell time – greater train throughput
  - On platform – reduced maintenance, elimination of headwall mirror systems

Legislative

- Standards Compliance
  - Train Builder
  - Railway
  - European
  - Environmental
- Safety
  - Safety Case
  - SIL Level
  - Assurance

- The Fire Precautions (Workplace) Regulations Act 1997 (as appropriate)
- The Fire Precautions (Sub-surface Railway Stations) Regulations 1989 (as currently amended)
- The Fire Precautions Act 1971
- Control of Substances Hazardous To Health Regulations 1994 (COSHH)
- Station Planning Standards And Guidelines (SPSG) Edition 4
- HSE – Railway Safety Principles And Guidance Part 1
- HSE – Railway Safety Principles And Guidance Part 2 Section B – Guidance On Stations.
- Electrical Supply Regulations 1998
- Electricity at Work Regulations 1989
- CED-ST-1107 - Safe Working in Confined Spaces
- CIBSE - Code of Lighting
- Building Regulations - Building Regulations Approved Document B, 2000 Edition Consolidated With 2000 And 2002 Amendments.
- DW/143 HVCA - Method of testing
- DW/144 HVCA - Specification for sheet metal ductwork - low, medium and high pressure/velocity systems
- E 4451 Station, Depot & Tunnel System Lighting (with respect to illumination levels)
- SPC-LAE-TM00-0550242: Parts 1 to 4 Lift standards
- SSL-S-1008 A1 Fire compartment standard
- BS EN 55014 Electromagnetic Compatibility. Requirements for Household Appliances, Electric Tools and similar Apparatus.
- BS EN 60034 Rotating electrical machines
- BS EN 60529 Specification for degrees of protection provided by enclosures

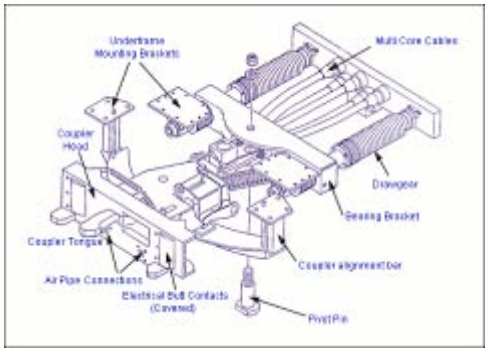
The Approach

The Design

- Requirements Analysis
  - Tracking the Standards
  - Interfaces
- Technology Assessments
  - Wi-Fi
  - Microwave
  - Optical
  - Leaky Feeder
- Environmental Compliance
  - Aggressive Environment
- EMC
  - e.g. Intermodulation Studies
  - Radiated / Conducted Interference Testing
- An Assured Design

The Train

- Space Constraints
- Train Builder Interface
  - Connectors Example
- Ergonomics
  - Operator's Acceptance
  - Unions

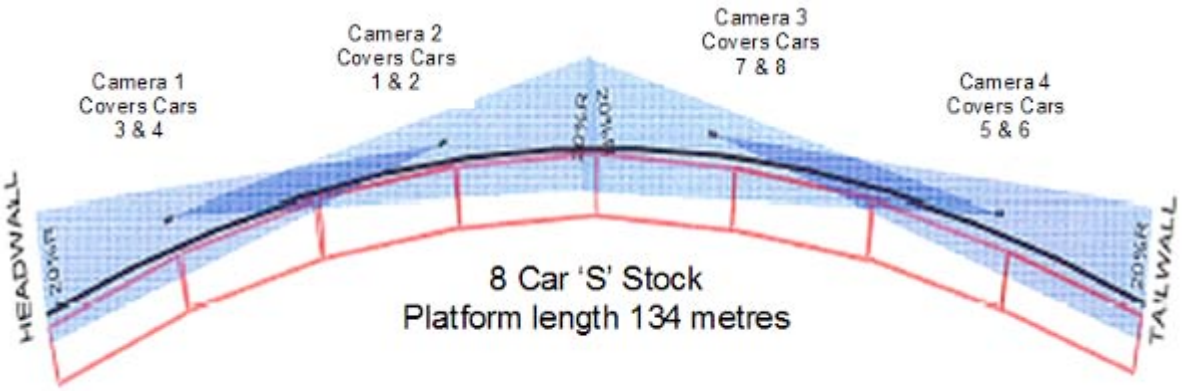


Testing

- Proof
  - Of Design
  - Of Safe Operation
- Trials
- Integration
  - With Train Systems
- Live Running
  - Dynamic Function

The Solution

- Cameras located on platform to view complete platform / train interface
- Images combined and transmitted to train via leaky feeder
  - Role of transmission system is crucial, excellent dynamic performance was a necessity
- Received and decoded
- Displayed to the driver in cab



Summary – Bridging The Gap

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