



Implementing the Public WiFi Service on the Dubai Metro

Dr Spencer Dando

Nomad Digital

spencer.dando@nomadrail.com

Railway Interiors Expo 2010 'Open Technology and Ideas Forum'

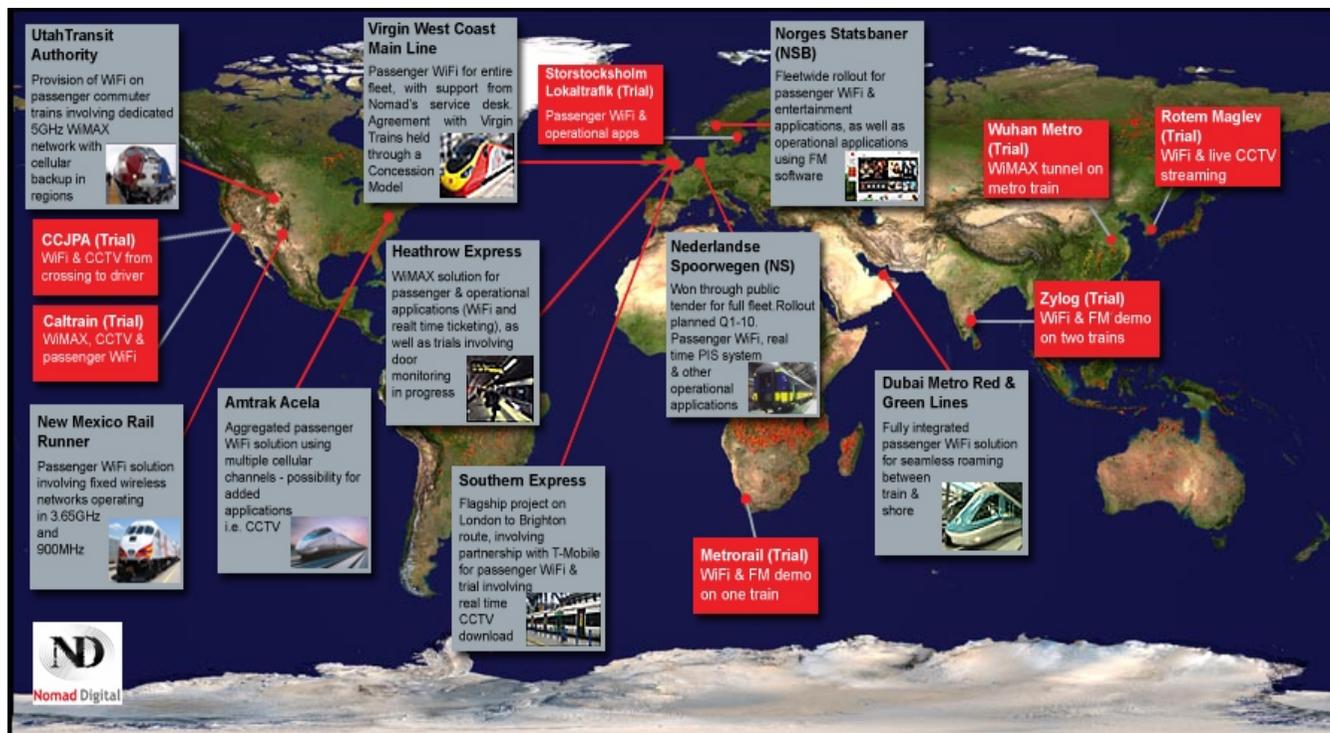
17th November 2010



Nomad Digital

- ❑ Broadband communications solutions to the rail industry
- ❑ Founded in 2002 – Newcastle, UK
- ❑ Deployed world's first genuine passenger WiFi deployment
- ❑ Projects across Europe, USA, Dubai, India, China, Australia, South Africa





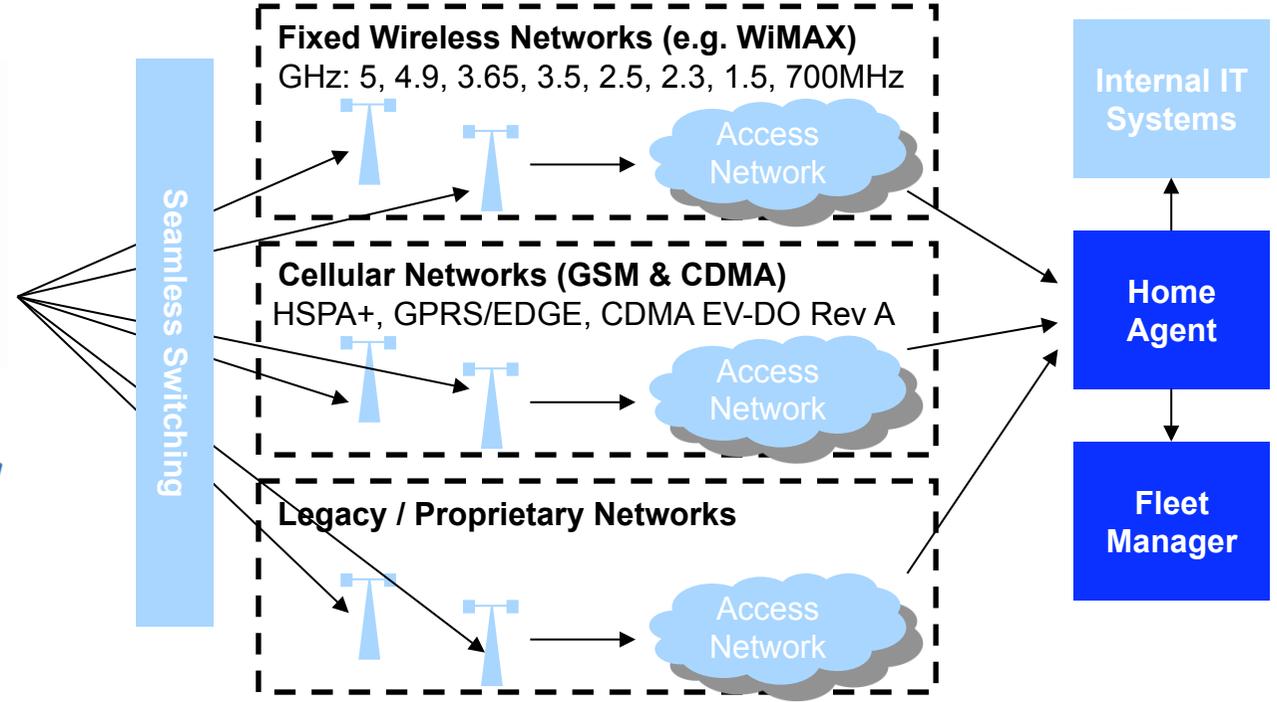
- Global Player
- 25+ projects
- Market Leader
- Passenger Solutions
- Operational Solutions



In-Vehicle

Wide Area Networks / Wayside

NOC / Shore





Passenger Solutions

Entertainment

- ❑ Multimedia
- ❑ Infotainment
- ❑ Internet Access
- ❑ Payment Services



Information

- ❑ Intelligent PIS
- ❑ Journey Portal
- ❑ Location Information
- ❑ Location Advertising

It's not always about the destination.

Welcome to **NSB INTERAKTIV**, a revolutionary service that allows you to make your time travelling an enjoyable experience.

Browse the web, enjoy the latest movies, games and music entertainment and keep the kids busy. Plus interact and explore your own personal journey map with "Your Journey".

This train is from Oslo S to Trondheim
Departure 15:00 Arrival 23:45

Your journey is from to

You will emit **70% less carbon** than travelling by car.
Total distance to cover **800 km**
7.45 hours journey duration

[Explore Your Journey](#)





Dubai Metro





Dubai Metro – Project Overview

- ❑ Customer – du (telecoms operator) on behalf of RTA
- ❑ Primary Application: passenger WiFi internet access
- ❑ TOC motivation: leading edge technology
- ❑ du motivation: revenue (under concession), customer loyalty & branding
- ❑ Fleets: 79 Kinki Sharyo trains (5 car)
- ❑ Routes: Red & Green lines (city of Dubai)
- ❑ Deployment: 18 months from design approvals
- ❑ Launch: Sep 2009





Dubai Metro – Nomad Role

- ❑ Train communications platform
- ❑ Train design, approvals & project mgt
- ❑ Interface with Kinki Sharyo (for partial factory pre-fitment)
- ❑ Station WiFi deployment (48 stations)
- ❑ Interface with Motorola (re mobile WiMAX CPE integration)
- ❑ Network Operations Centre (in du facilities)
- ❑ In-house train installation team
- ❑ Operate end-to-end solution





Dubai Metro – Passenger WiFi

- ❑ Service Availability: throughout train; all 3 classes
- ❑ Brand/Service Provider: du
- ❑ Pricing:
 - ❑ for-pay in all classes
 - ❑ approx Euro 1.25 / hour for pay as you go
- ❑ Access: via on-train landing page/portal
- ❑ Mobility: seamless station platform to on-train session mobility





Dubai Metro – Technology Deployed

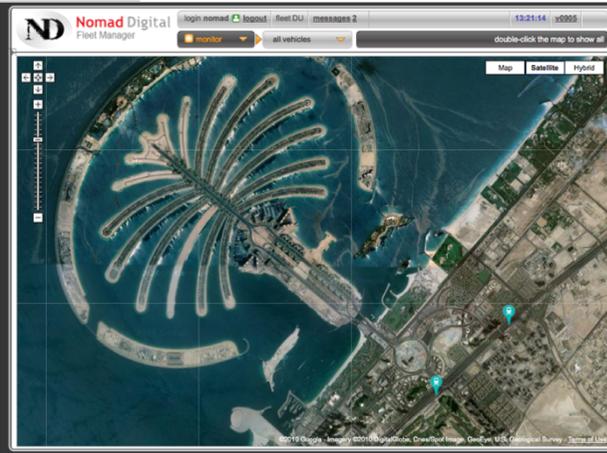
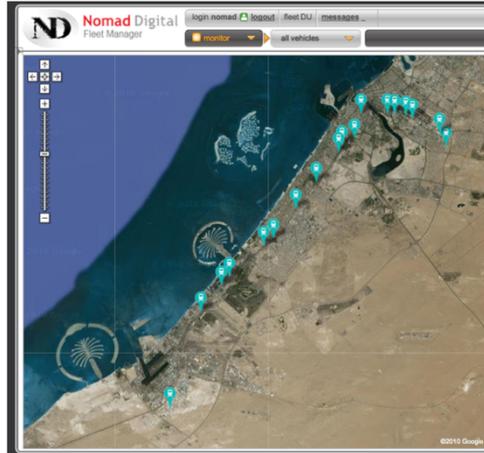
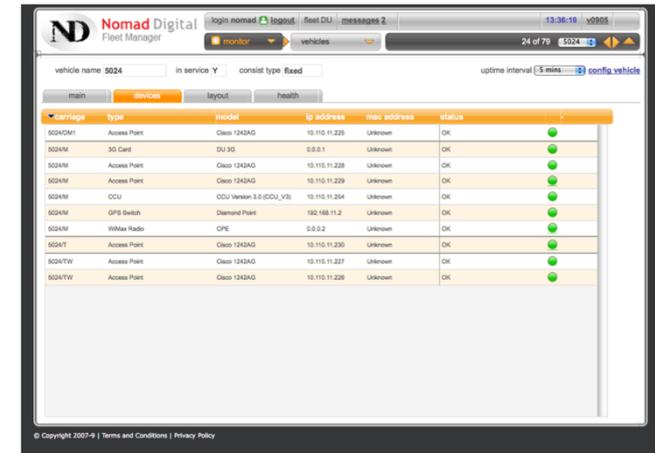
- ❑ On-Train
 - ❑ Nomad 3500 CCU
 - ❑ WANs: 3G & 802.16e (“WiMAX”)
 - ❑ LAN: Wireless inter-carriage links
 - ❑ Seamless station platform to on-train wireless handover
- ❑ Trackside:
 - ❑ Public 3G networks
 - ❑ Interface with du’s dedicated Mobile WiMAX network





Dubai Metro – Operation

- ❑ All equipment remotely monitored in real-time by Nomad service desk
- ❑ Nomad 2nd and 3rd line support in country

Carriage	type	model	ip address	mac address	status
5024M1	Access Point	Claco 12K2AG	10.110.11.225	Unknown	OK
5024M	3G Card	DU 3G	0.0.0.1	Unknown	OK
5024M	Access Point	Claco 12K2AG	10.110.11.228	Unknown	OK
5024M	Access Point	Claco 12K2AG	10.110.11.229	Unknown	OK
5024M	OCU	OCU Version 3.0 (OCU_V3)	10.110.11.254	Unknown	OK
5024M	GPS Switch	Diamond Point	192.168.11.2	Unknown	OK
5024M	WiFiMax Radio	CPE	0.0.0.2	Unknown	OK
5024T	Access Point	Claco 12K2AG	10.110.11.230	Unknown	OK
5024TV	Access Point	Claco 12K2AG	10.110.11.227	Unknown	OK
5024TV	Access Point	Claco 12K2AG	10.110.11.226	Unknown	OK

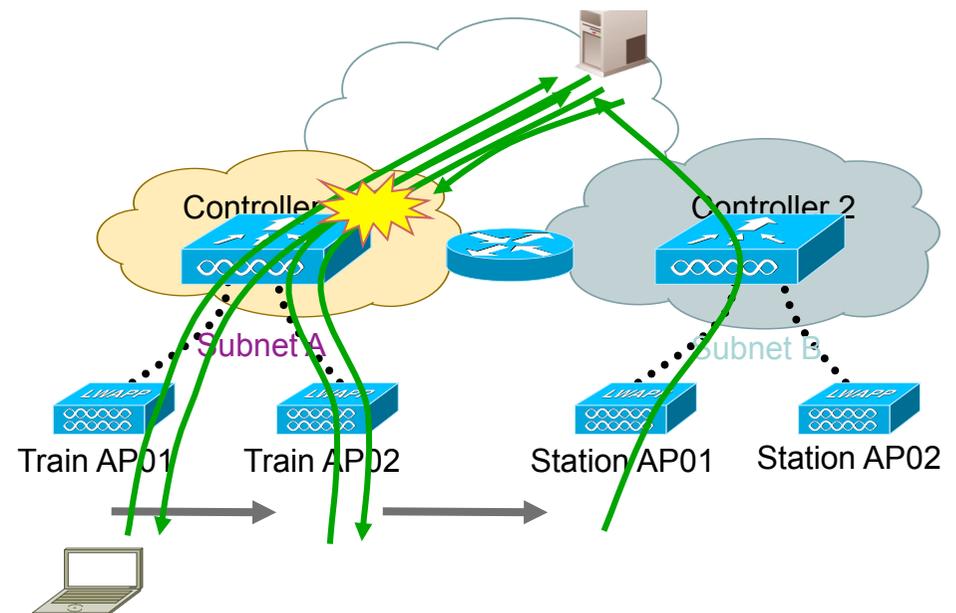


Brief overview of Seamless Mobility solution for the Dubai Metro



The need for Client Mobility

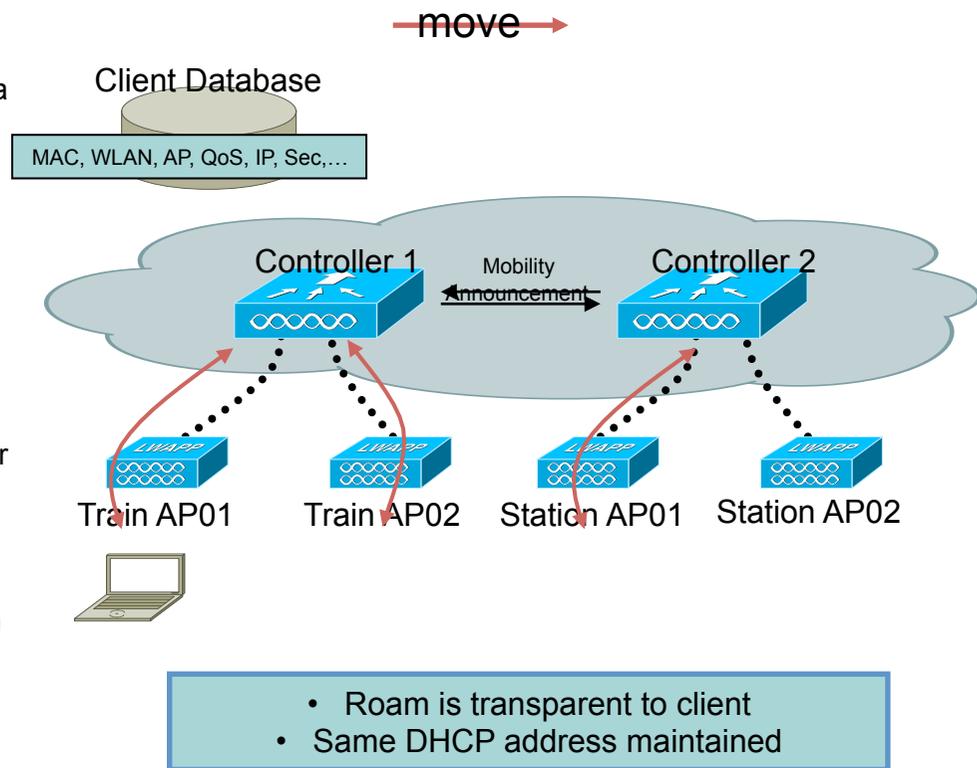
- ❑ Wireless LAN is not only about wire-less
- ❑ Need for mobility, and not only “hotspot” connectivity
- ❑ Mobility is when a client move from one Access Point to another
- ❑ Access points can be on a single controller or on different controllers
- ❑ Clients need to keep IP connectivity (same IP address)
- ❑ Client Mobility is mandatory for some applications (Voice, Video, Business Applications, ...)





Layer 2 Mobility

- ❑ Nomad were asked to design a network that would allow a user to roam seamlessly between Train and station and vice versa, maintaining their IP address and their session.
- ❑ To do this, all wireless controllers were put in the same Mobility Group
- ❑ In this example a wireless client on the Dubai Metro connects to Train AP01 on Controller 1, where a client database entry is then created on the controller.
- ❑ The wireless client then roams to Train AP02 on Controller 1 simulating moving from one car to another on board the train.
- ❑ Once the client steps off the train onto the station, they seamlessly roam from Train AP02 (Controller 1) to Station AP01 (Controller 2). The controller makes a mobility announcement to other controllers in the Mobility group stating that the client has now roamed. The client database entry for that client is then moved to controller 2.





What Next?



Train operational services – more everyday

Trains are becoming IP devices – but they are not yet on the corporate network....

- Analysing and minimising delay minutes
- Continual condition based monitoring – doors, a/c, brakes, wheels
- Driver performance analysis
- Staff communication
- Passenger information that works
- Remote starting
- OTMR and beyond

LIVETRAIN

Download and Analysis of Data from Trains

Heathrow **express**



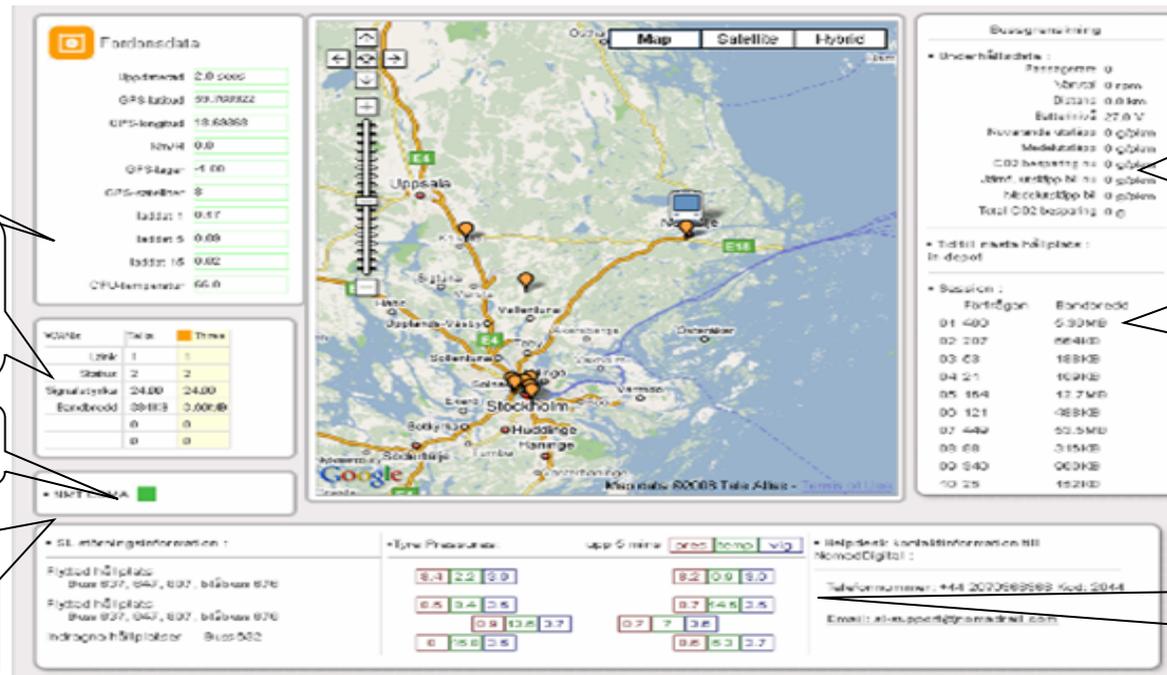
ALSTOM



BOMBARDIER



Fleet Manager – Screenshot (SL)



Speed + Location + CCU load

2 x 3G connections from Telia & Three

CDMA Modem status

Journey Delay information (Also notice orange icons on map relating to position)

Feedback from 3rd party devices – relating to CO2 emissions, environmental impact, etc.

Journey planner with updates in real-time – Using Nomad PIS system

Real-time information on tire pressure



Live Passenger Info

http://service.heuvelman.nl - NSiv - Microsoft Internet Explorer - [Working Offline]

State Train

Snelfeed: 9,99 km/h
 Ritnummers: 978
 Volgende rit: 978
 Totaal stoppen: 12
 Eindtijd train: 20:07:00
 Eindstation: Heerlen
 Actuele tijd: 20:05

Status Onboard pc's

Player 1: [Signal]
 Player 2: [Signal]
 Player 3: [Signal]

Volgend station voor speler:
Heerlen 20:07:00

Intercity naar Heerlen

Station: Haarlem

Vertrek 20:41 s-Hertogenbosch

Deze Intercity rijdt verder naar

Amsterdam Centraal	20:55
Amsterdam Amstel	21:05
Amsterdam Bijlmer	
Utrecht Centraal	21:12
s-Hertogenbosch	21:31
Eindhoven	22:02
Weert	22:24
Roermond	22:47
Sittard	23:01
Geleen-Oost	23:17
Heerlen	23:23

rt(457)

Plaatsnaam	Date	Time	Status
D 02.ams	2006-03-28	07:56:55	●
D 04.ams	2006-03-19	13:05:54	●
D 06.ams	2006-03-28	22:57:10	●
D 07.ams	2006-02-28	22:01:54	●
D 08.ams	2006-03-28	23:09:48	●
D 10.ams	2006-03-28	23:02:57	●
D 16.ams	2006-03-28	23:03:12	●
D 17.ams	2006-03-28	22:08:24	●
D 19.ams	2006-03-19	17:46:22	●
D 21.ams	2006-03-28	09:29:57	●
D 22.ams	2006-03-28	20:08:45	●
D 23.ams	2006-03-28	19:11:22	●
D 24.ams	2006-03-28	20:07:04	●
D 25.ams	2006-03-28	09:21:02	●
D 30.ams	2006-03-28	16:38:33	●



HEUVELMAN sound & vision
 FACILITATING YOUR SUCCESS

NSL@B



Operational Alerts

www.nomadrail.com/southern/omc

Alert Message Center:
Operator: Hubert Krulst

Alert Type	Severity	Time	Accepted	By Operator	Details Link
Excessive shocks					
Overspeeding		10:23	<input type="checkbox"/>		
Emergency Break		10:56	<input type="checkbox"/>		
Overspeeding		11:03	<input type="checkbox"/>		
Unusual Stop		11:32	<input type="checkbox"/>		
CCTV Alert		11:57	<input type="checkbox"/>		
Abnormal Heat		11:58	<input type="checkbox"/>		
Door Failure		12:02	<input type="checkbox"/>		
Excessive Shocks		12:10	<input type="checkbox"/>		
Smoke Detection		12:16	<input type="checkbox"/>		
Excessive Shocks		12:34	<input type="checkbox"/>		
Overspeeding		12:48	<input type="checkbox"/>		
Emergency Break		12:54	<input type="checkbox"/>		
Overspeeding		13:11	<input type="checkbox"/>		
Unusual Stop		13:12	<input type="checkbox"/>		
CCTV Alert		14:01	<input type="checkbox"/>		
Abnormal Heat		14:42	<input type="checkbox"/>		
Door Failure		15:49	<input type="checkbox"/>		
Excessive Shocks		15:55	<input type="checkbox"/>		
Smoke Detection		16:09	<input type="checkbox"/>		
Overspeeding		16:45	<input type="checkbox"/>		

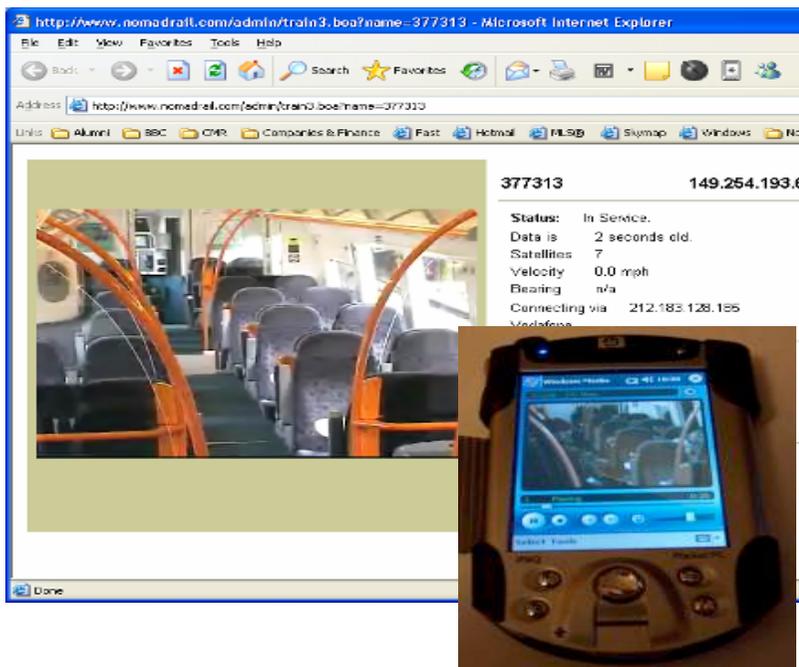


eTicketing





Live High Quality CCTV



http://www.nomadrail.com/admin/train3.boa?name=377313 - Microsoft Internet Explorer

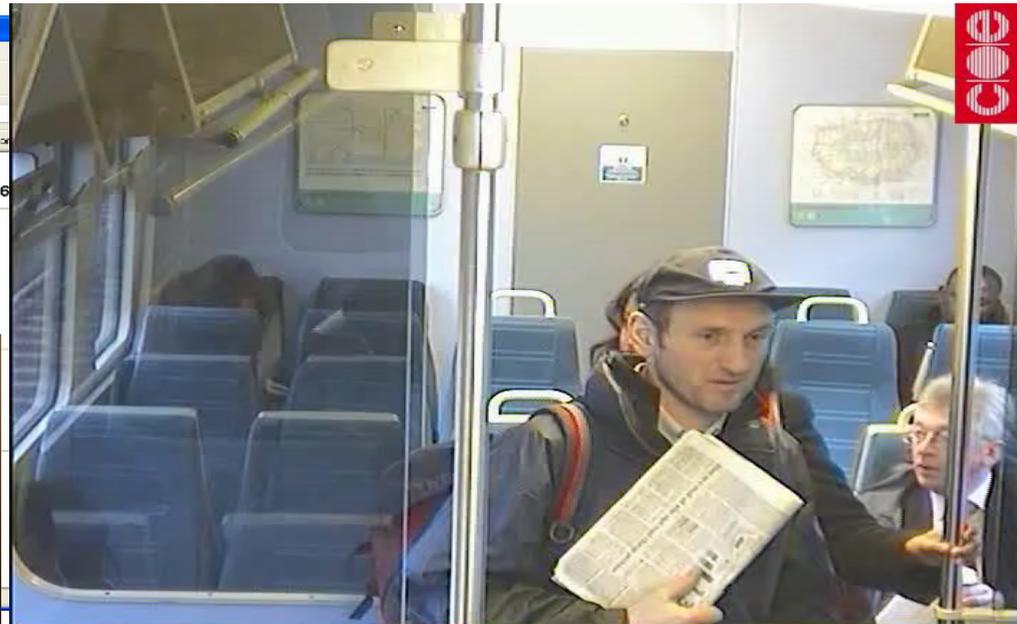
File Edit View Favorites Tools Help

Address http://www.nomadrail.com/admin/train3.boa?name=377313

Links alumni SEC CTR Companies & Finance Fast HTML FL5B Skymap Windows No

377313 149.254.193.6

Status: In Service.
Data is: 2 seconds old.
Satellites: 7
Velocity: 0.0 mph
Bearing: n/a
Connecting via: 212.183.128.185
Modem:





Live Two-Way Video





Other applications

- Energy Monitoring
- Seat Reservation Systems
- OTMR download
- TMS download
- Incident Management
- Door Monitoring
- Driver Monitoring
- On board entertainment



Thank You.

Dr Spencer Dando

Nomad Digital

spencer.dando@nomadrail.com