

I SISTEMI PEOPLE MOVER



BOMBARDIER TRANSPORTATION

Divisione Sistemi (Turnkey Transportation Systems)

Automated Monorail



Automated People Mover



Driverless Linear Metros



Light Rail



Metro



Intercity



The BOMBARDIER *INNOVIA* Family

Sistemi Automatici



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INNOVIA BRAND

- ***BOMBARDIER INNOVIA***

comprende tutti I sistemi completamente automatici per trasporti urbani, sub-urbani ed aeroportuali.

- ***BOMBARDIER INNOVIA APM :***

I sistemi **A**utomated **P**eople **M**over generalmente sono utilizzati per Il trasporto urbano ed aeroportuale.

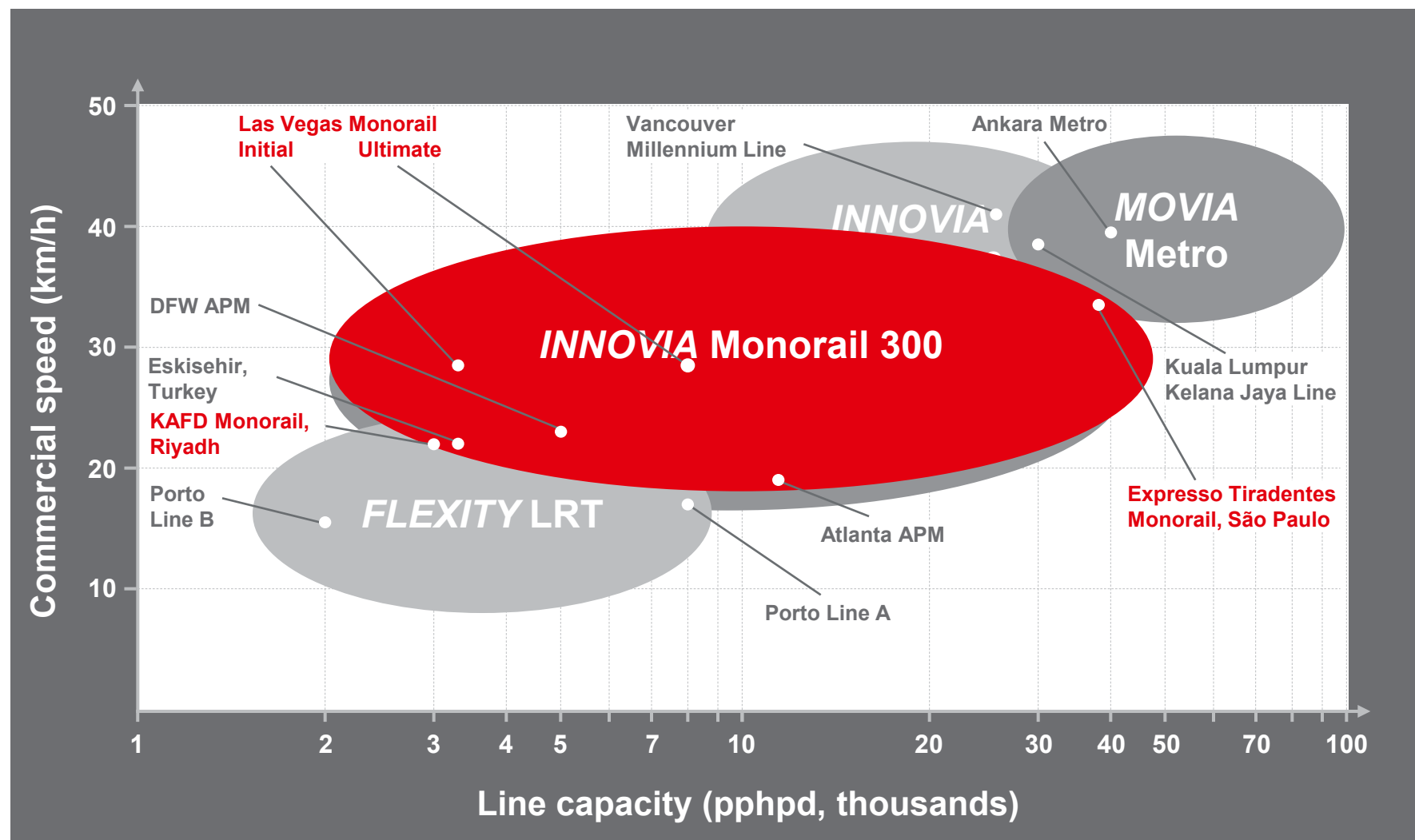
- ***BOMBARDIER INNOVIA METRO :***

I sistemi Metro generalmente sono utilizzati per un trasporto urbano e sub-urbano di media capacità.

- ***BOMBARDIER INNOVIA MONORAIL:***

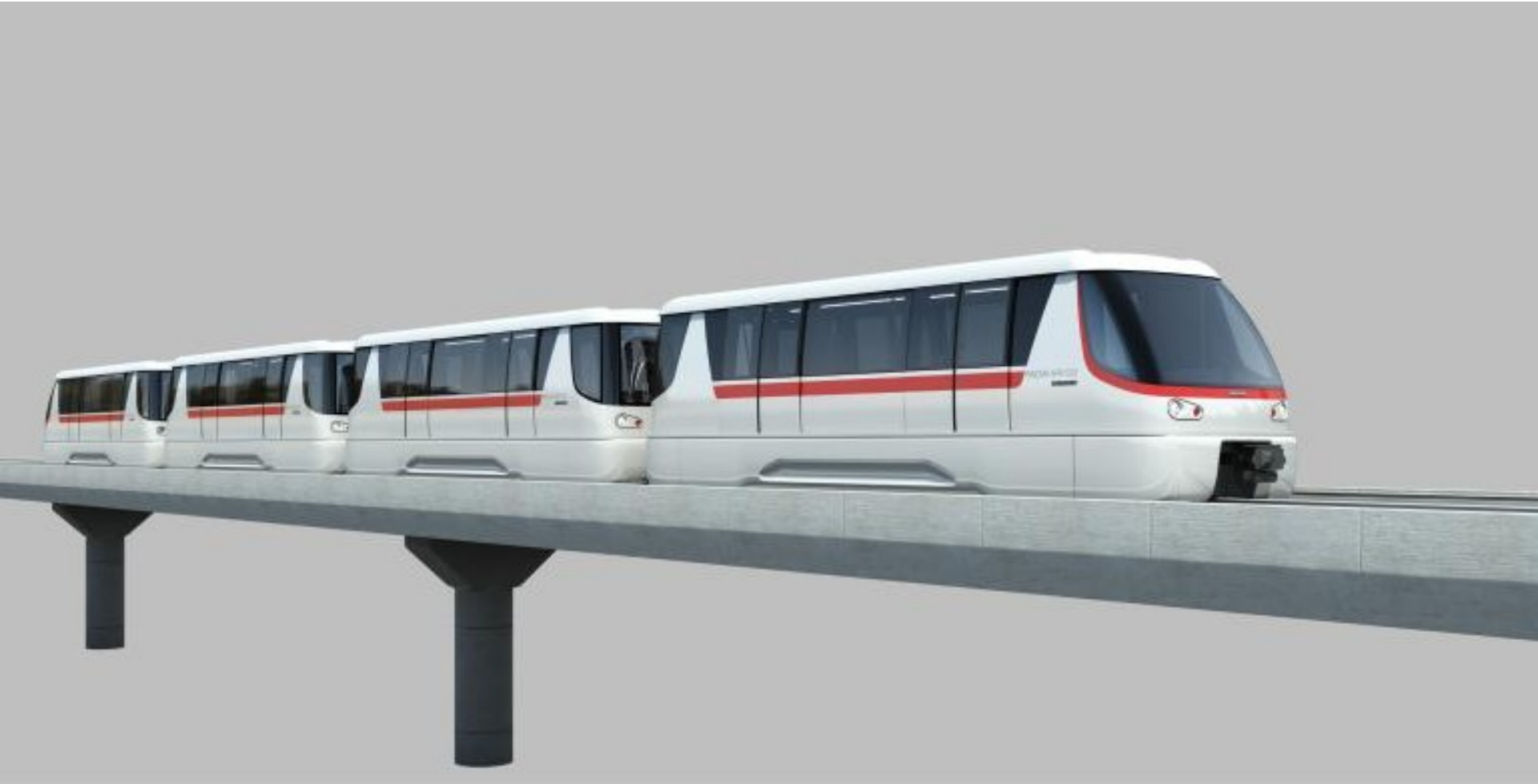
Questa soluzione viene scelta solitamente per l'eccellente design (estetica) del veicolo e per la sua struttura civile (viadotto) più snella rispetto agli altri sistemi.

La famiglia BOMBARDIER INNOVIA offre una soluzione per una vasta gamma di capacità e velocità. A seconda delle specifiche esigenze, il cliente può scegliere tra le varie tecnologie.



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INNOVIA APM 300: Esempi di sistemi People Mover



BOMBARDIER APM (1) NEL MONDO



- Tampa International Airport – USA 1971
- Seattle-Tacoma International Airport – USA 1973
- Miami International Airport – USA 1980
- Hartsfield-Jackson Atlanta International Airport – USA 1980
- Orlando International Airport – USA 1981
- **London Gatwick Airport – United Kingdom 1983**
- McCarran International Airport (Las Vegas) – USA 1985
- Miami Metro mover – USA 1986
- **London Stansted Airport – United Kingdom 1991**
- Pittsburgh International Airport – USA 1992
- Senate Subway (Washington) – USA 1994
- Denver International Airport – USA 1994
- **Frankfurt Main Airport – Germany 1994**
- Kuala Lumpur International Airport – Malaysia 1998



BOMBARDIER APM (2) NEL MONDO



-
- | | |
|---|-------------|
| – Leonardo da Vinci International Airport (Rome) – Italy | 1999 |
| – George Bush Intercontinental Airport (Houston) – USA | 1999 |
| – Bukit Panjang – Singapore | 1999 |
| – San Francisco International Airport – USA | 2003 |
| – Dallas/Fort Worth International Airport – USA | 2005 |
| – Madrid Barajas International Airport – Spain | 2006 |
| – London Heathrow Airport – United Kingdom | 2008 |
| – Beijing Capital International Airport – China | 2008 |
| – Guangzhou – China | 2010 |
| – Sacramento – USA | 2011 |
|
– IN COSTRUZIONE: | |
| – Phoenix Sky Harbor International Airport – USA | 2012 |
| – Jeddah King Abdulaziz International Airport – Saudia Arabia | 2014 |
| – Munich International Airport – Germany | 2014 |
-



BOMBARDIER

INNOVIA APM 100 automated people mover system

Tampa, USA



SYSTEM DESCRIPTION

0.9 mi. dual-lane guideway

8 stations

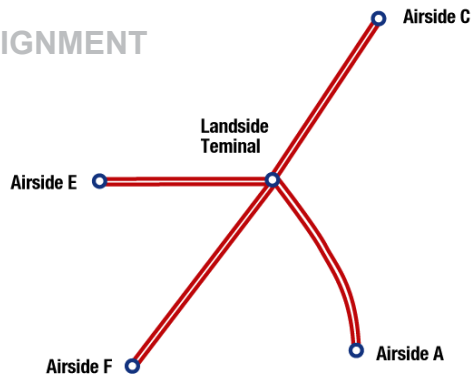
28 vehicles delivered

Design capacity: Satellites A, C & F: 8,000 pphpd
Satellite E: 12,000 pphpd

4.2% maximum grade

Links the landside terminal with 4 airside satellites at Tampa International Airport

SYSTEM ALIGNMENT



PROJECT DETAILS

Enters service: 1971

Airside C refurbished: 2005

Airside F refurbished: 2008

Maintenance services



INNOVIA APM 100 automated people mover system

Sacramento, USA



SYSTEM DESCRIPTION

1,100' dual-lane guideway

2 stations

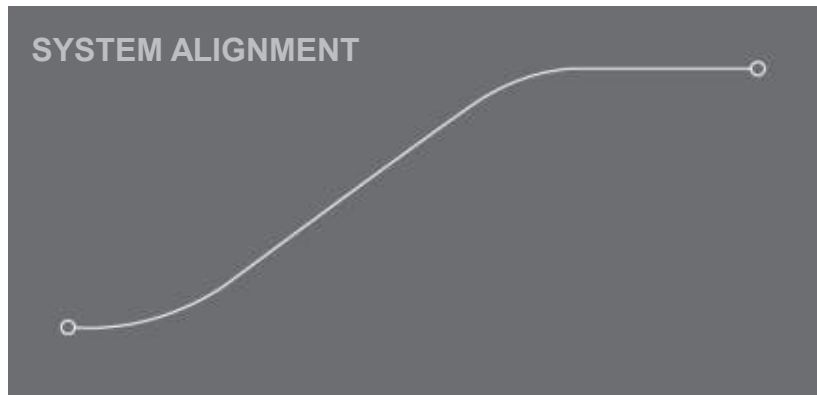
2 vehicles

Design capacity: 2,760 pphpd

5% maximum grade

Connects Central Terminal B with Concourse B at Sacramento International Airport

SYSTEM ALIGNMENT



PROJECT DETAILS

Enters service: 2011

Operations & maintenance services



INNOVIA APM 300 – Interno Veicoli



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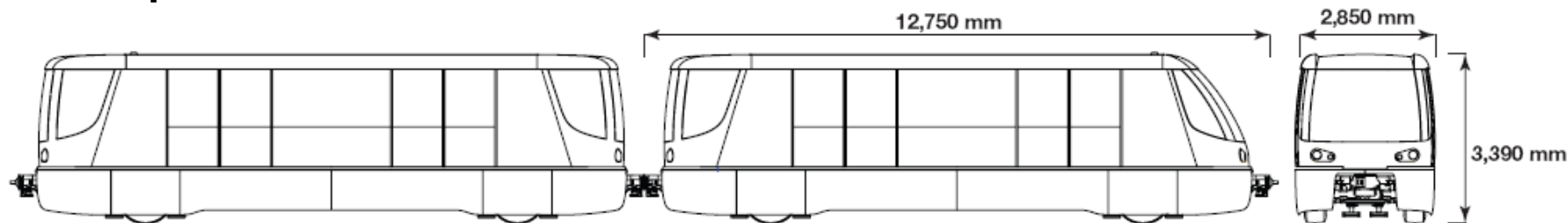
INNOVIA APM 300

è la soluzione ottimale per navette Aeroportuali e sistemi di massa senza conducente

Dettagli Tecnici:

- **Composizioni dei treni: 1-6 vetture**
- **Peso veicolo vuoto: 15,200 kg**
- **Pendenza massima consigliata: 6% in base a qualità di guida**
- **Raggio minimo di curva orizzontale: 22 m**
- **Velocità Max: 80 km/h**
- **Potenza: 750 Vdc**
- **Propulsione: Motori di Trazione AC**

Composizione	Capacità PPHPD a 75 sec di frequenza
2 car train	14,500
3 car train	29,000
6 car train	43,500



***INNOVIA* METRO 300: Esempi di sistemi METRO**



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BOMBARDIER Metro NEL MONDO

– Scarborough Rapid Transit System – CANADA	1985
– Vancouver Sky Train Expo Line – CANADA	1986
– Detroit Downtown People Mover – USA	1987
– Kuala Lumpur Kelana Jaya Line – MALAYSIA	1998
– Vancouver Sky Train Millennium Line – CANADA	2002
– Air Train JFK, JFK International Airport – USA	2003
– Beijing Airport Link – CHINA	2008
– Yongin Ever Line – SOUTH KOREA	2010



AirTrain Newark is a trademark of The Port Authority of New York and New Jersey

BOMBARDIER

INNOVIA ART 200 advanced rapid transit system

YongIn, South Korea



SYSTEM DESCRIPTION

18.5 km double-track alignment

15 stations

30 vehicles

Design capacity: 9,257 pphpd

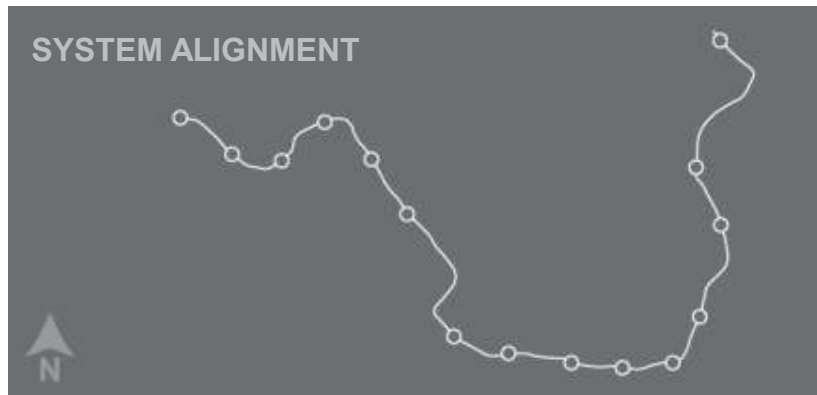
4.5% maximum grade

CITYFLO 650 automatic train control

Third rail power distribution

Will link Seoul subway system with Everland, the world's seventh largest amusement park

SYSTEM ALIGNMENT



PROJECT DETAILS

System delivered: 2010

Operations and maintenance services

Funding: Public-Private Partnership



INNOVIA ART 200 advanced rapid transit system

New York, USA



SYSTEM DESCRIPTION

8 mi. double-track alignment

10 stations

32 vehicles

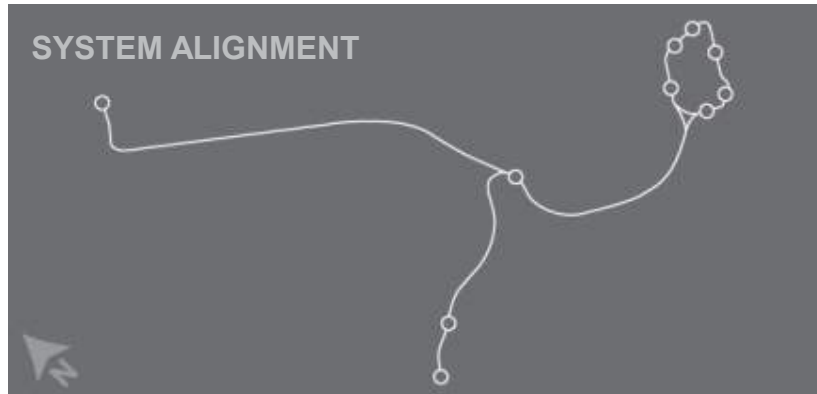
Passenger capacity: 205 per car

5.4% maximum grade

Third rail power distribution

Links all terminals at JFK International Airport to regional inter-modal hubs at Howard Beach Subway Station and Jamaica Transportation Center

SYSTEM ALIGNMENT



PROJECT DETAILS

Entered revenue service: 2003

Operations and maintenance services



INNOVIA Metro 300 – Interno Veicoli



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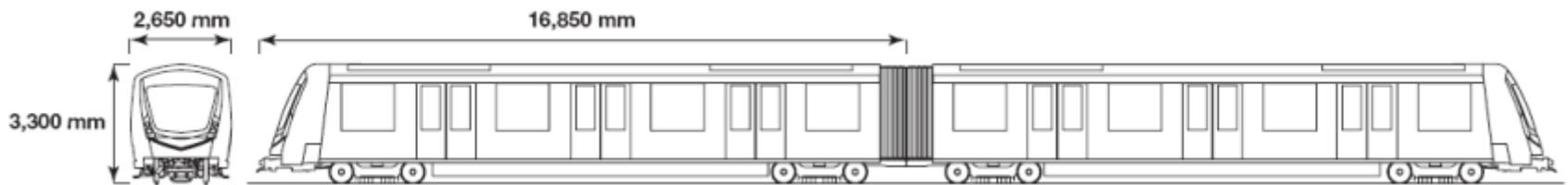
INNOVIA METRO 300

Dettagli Tecnici

Il sistema Metro è caratterizzato da prestazioni di operatività elevate, da veicoli leggeri e flessibili.

- **Composizione die treni: 1-6 vetture**
- **Peso veicolo vuoto: 20,500 kg**
- **Altezza pavimento: 825 mm¹**
- **Pendenza massima: 6%¹**
- **Raggio minimo di curva orizzontale**
 - Tracciato principale – 70 m
 - Zona Manutenzione – 35 m
- **Velocità Max: 100 km/h**

Composition	Capacità PPHPD a 75 sec di frequenza
2 car train	17,760
4 car train	35,520
6 car train	53,280



INNOVIA Monorail 300: Esempi di sistemi MONORAIL



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BOMBARDIER MONORAIL NEL MONDO

- Tampa International Airport Monorail System – USA 1991
- AirTrain Newark, Newark Liberty International Airport – USA 1996
- Jacksonville Skyway – USA 1998
- Robert N. Broadbent Las Vegas Monorail – USA 2004
- **IN COSTRUZIONE:**
- Riyadh Financial District – Saudi Arabia 2012
- San Paolo Expresso Tiradentes – Brazil 2015



INNOVIA Monorail 200 system

Las Vegas, USA



SYSTEM DESCRIPTION

4 mi. dual-beam alignment

7 stations

36 cars (9 four-car trains)

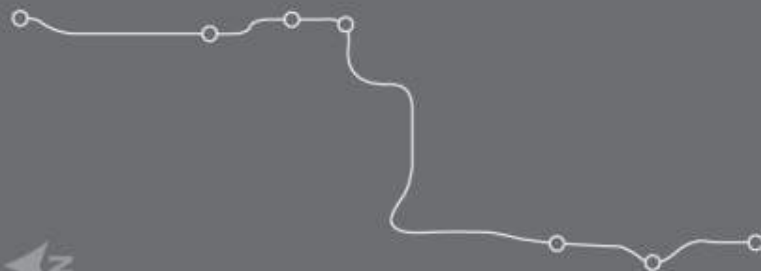
Design capacity: 3,200 pphpd

6.5% maximum grade

750 Vdc guideway-mounted power rails

Links 8 major resort properties and the Las Vegas Convention Centre

SYSTEM ALIGNMENT



PROJECT DETAILS

Entered service: 2004

Operations and maintenance

Funding: Public-Private Partnership



INNOVIA Monorail 300 system

São Paulo, Brazil



SYSTEM DESCRIPTION

24 km dual-beam alignment

17 stations

378 cars (54 seven-car trains)

Design capacity: 40,000 pphpd¹

CITYFLO 650 automatic train control

6% maximum grade

Will serve as an extension of the São Paulo Metro Line 2 between the Vila Prudente and Cidade Tiradentes urbanization

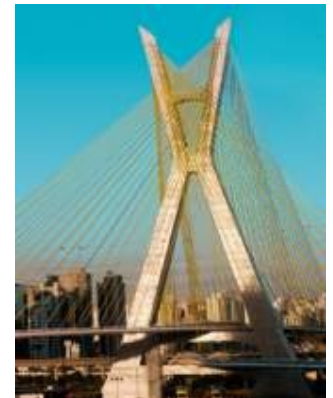
SYSTEM ALIGNMENT



PROJECT DETAILS

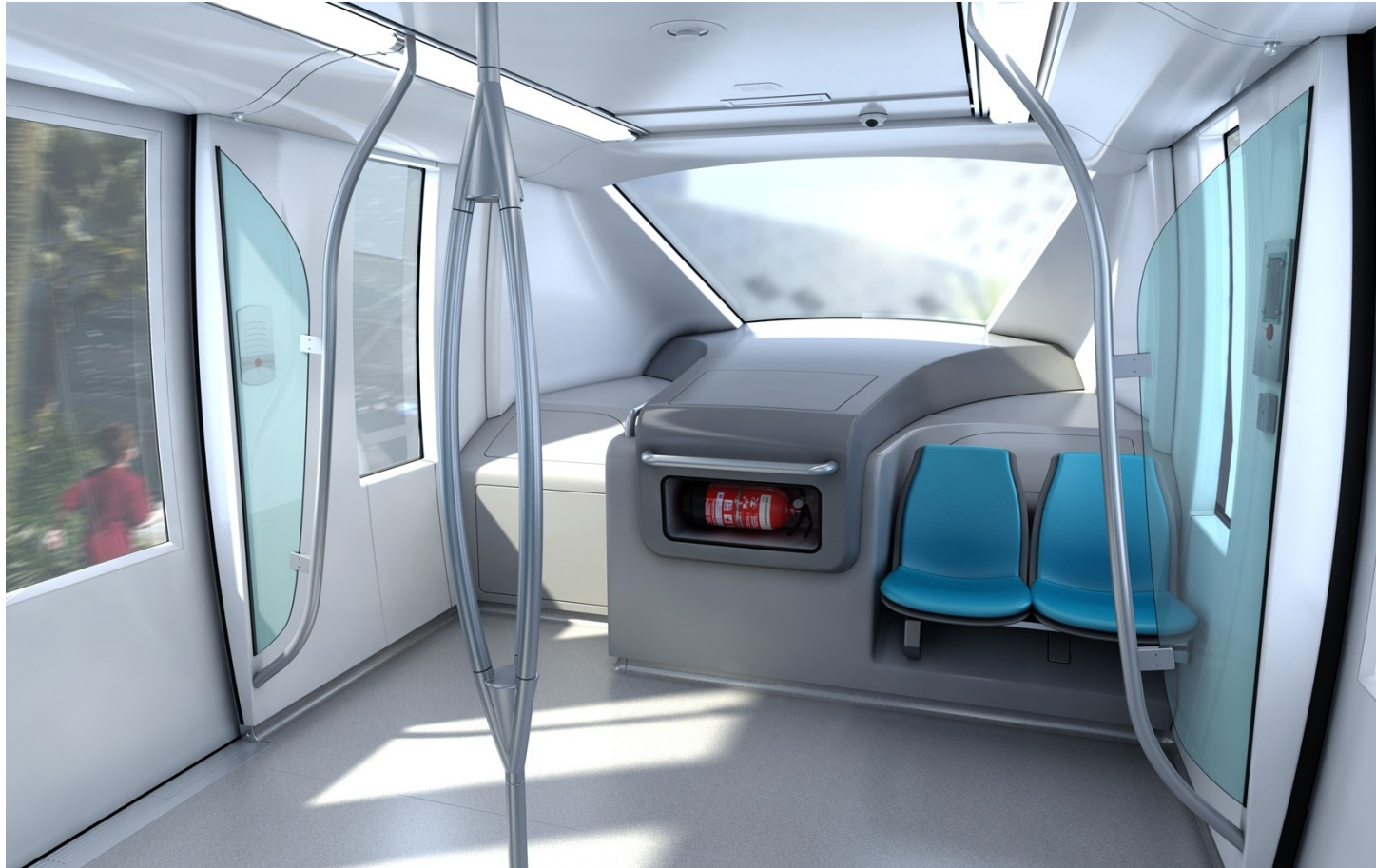
Contract awarded: September 2010

System completion: 2015



INNOVIA Monorail 300

Interno Veicolo



- **Un sistema completamente automatico garantisce ottime frequenze, un servizio veloce ed un ottima visuale.**

INNOVIA Monorail 300

Interno Veicolo



- Un veicolo spazioso, offre un sistema con capacità elevate.

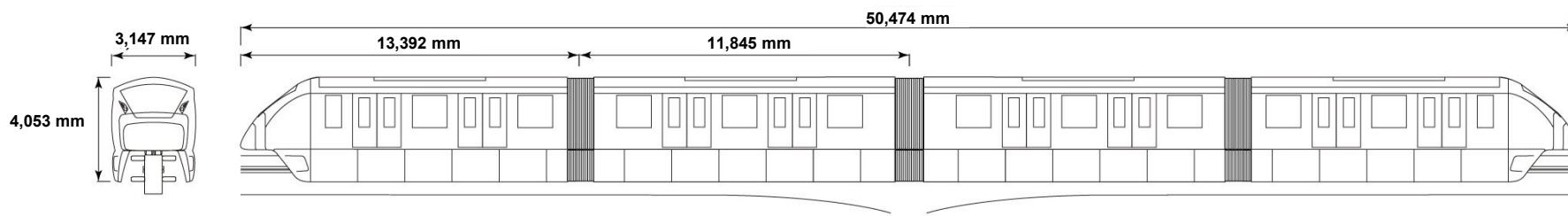
The *INNOVIA** Monorail 300

Dettagli Tecnici:

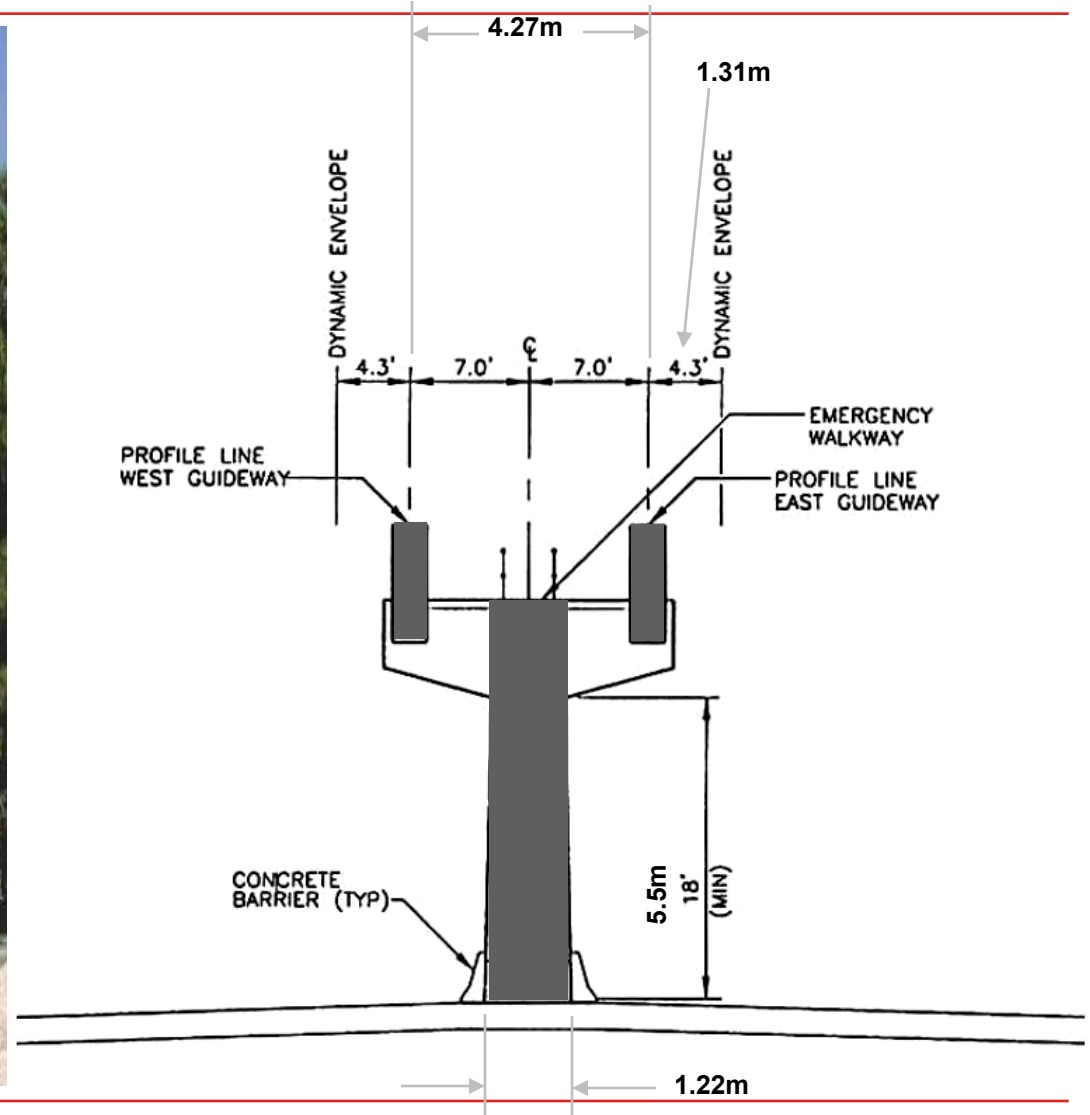
Ottimizzato per adattarsi ad un contesto urbano ed a sistemi di massa

- **Composizione dei treni: 2-8 vetture**
- **Peso Veicolo vuoto: 14.000 kg**
- **Pendenza massima consigliata: 6%**
- **Raggio minimo di curvatura orizzontale: 46 m**
- **Velocità Max: 80 km/h**
- **Potenza: 750 Vdc**
- **Propulsione: Efficiente Motore Rotativo a magneti permanenti**

Composition	Capacità PPHPD a 75 sec di frequenza
▪ 2 car train	▪ 11,300
▪ 4 car train	▪ 24,100
▪ 6 car train	▪ 36,850
▪ 8 car train	▪ 49,600



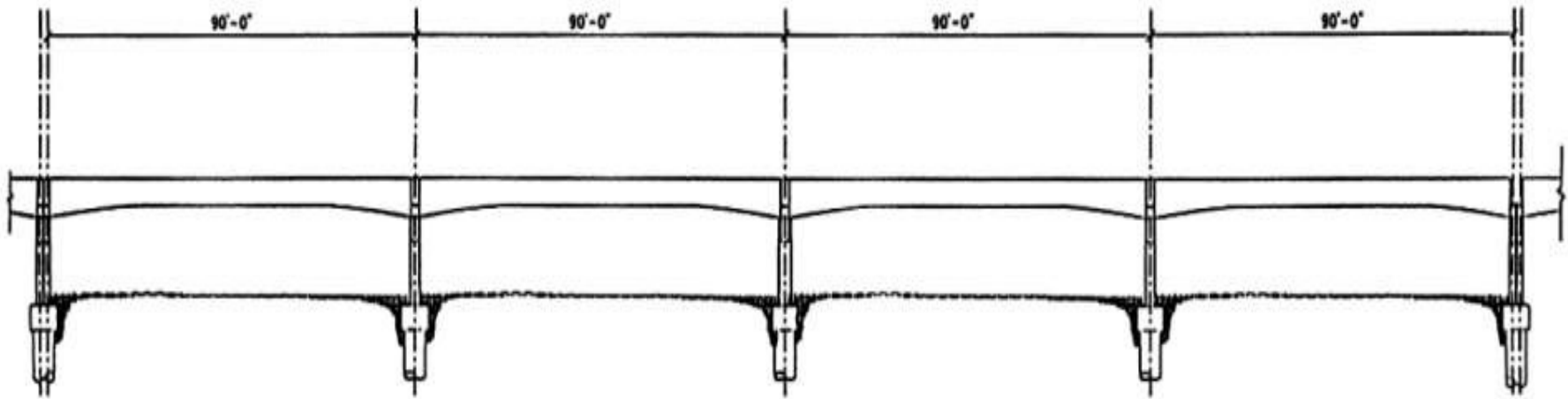
Tipico Pilastro INNOVIA MONORAIL 300 - Minimo disturbo alle infrastrutture esistenti e al flusso di traffico.



INNOVIA Monorail 300 – Impalcato

Distanza colonne Vie di corsa

- I parametri che influenzano la distanza delle colonne includono un'attenta scelta dei materiali ed il peso del veicolo.
- Mediamente la distanza tra una colonna e l'altra è pari a 90-100' (27,4 - 30,5m) con massimi di 120' (36,5m)
- Dimensioni travi guida - tipicamente 7 piedi (2,1 m) di profondità alle estremità e 5 piedi (1,5 m) a metà campata



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INNOVIA Monorail 300 – Travi guida

Las Vegas Monorail



- **Impianto realizzazione travi, nei pressi del cantiere.**

INNOVIA Monorail 300 – Travi guida

Forme flessibili, minimizzano i requisiti di fissaggio – Las Vegas Monorail



INNOVIA Monorail 300 – Travi guida

Installazione Travi guida – Las Vegas Monorail



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INNOVIA Monorail 300 – Travi guida

Installazione Travi guida – San Paolo (Brazil)



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INNOVIA Monorail 300 – Travi guida

Installazione Travi guida – San Paolo (Brazil)



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INNOVIA Monorail 300 – Travi guida

Basso impatto visivo – Las Vegas Monorail



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INNOVIA Monorail 300 – Travi guida

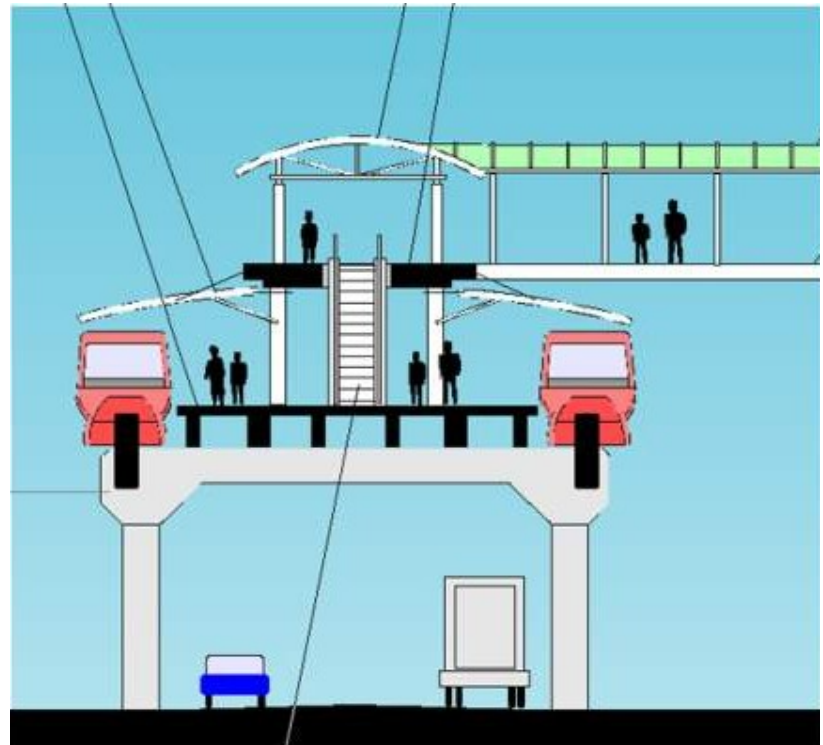
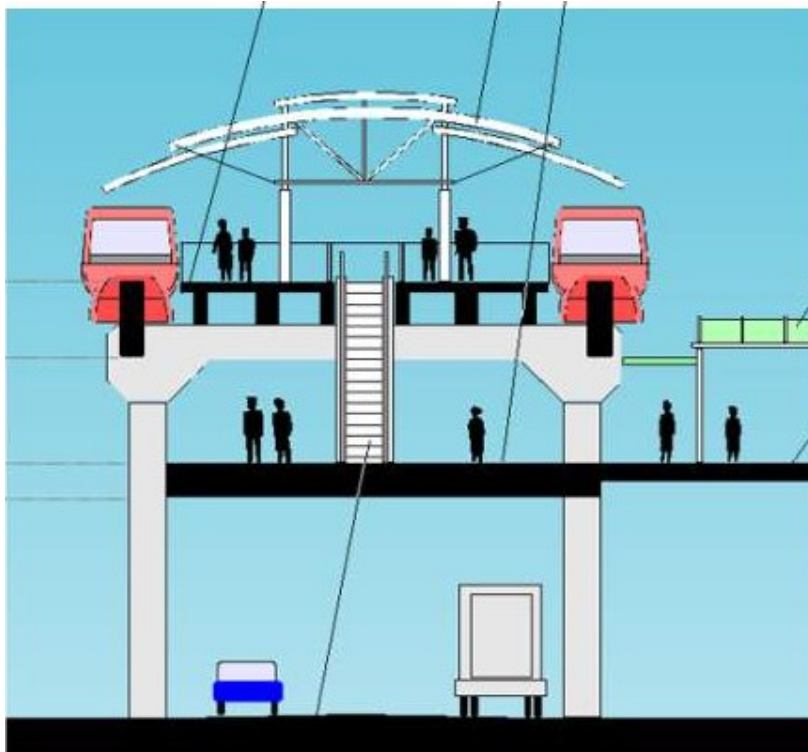
Basso impatto visivo – San Paolo (Brazil)



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INNOVIA Monorail 300

Stazioni – Soluzioni flessibili per la progettazione



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INNOVIA Monorail 300

Stazioni – San Paolo (Brazil)



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INNOVIA Monorail 300 – Scambio

Costruzione scambio – Las Vegas Monorail



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INNOVIA Monorail 300 – Scambio

Funzionamento scambio – Las Vegas Monorail



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INNOVIA Monorail 300 – Vie di Corsa

Passerella d'emergenza – Las Vegas Monorail



- **Passerella raccomandata da Bombardier per l'uscita sicura in casi di emergenza.**
- **Fornisce un rapido mezzo di evacuazione.**

Esercizio & Manutenzione

Assicurare una elevata disponibilità del sistema

Il coinvolgimento diretto nell'Esercizio & Manutenzione e la nostra competenza su tali sistemi ci permettono di garantire disponibilità elevate.

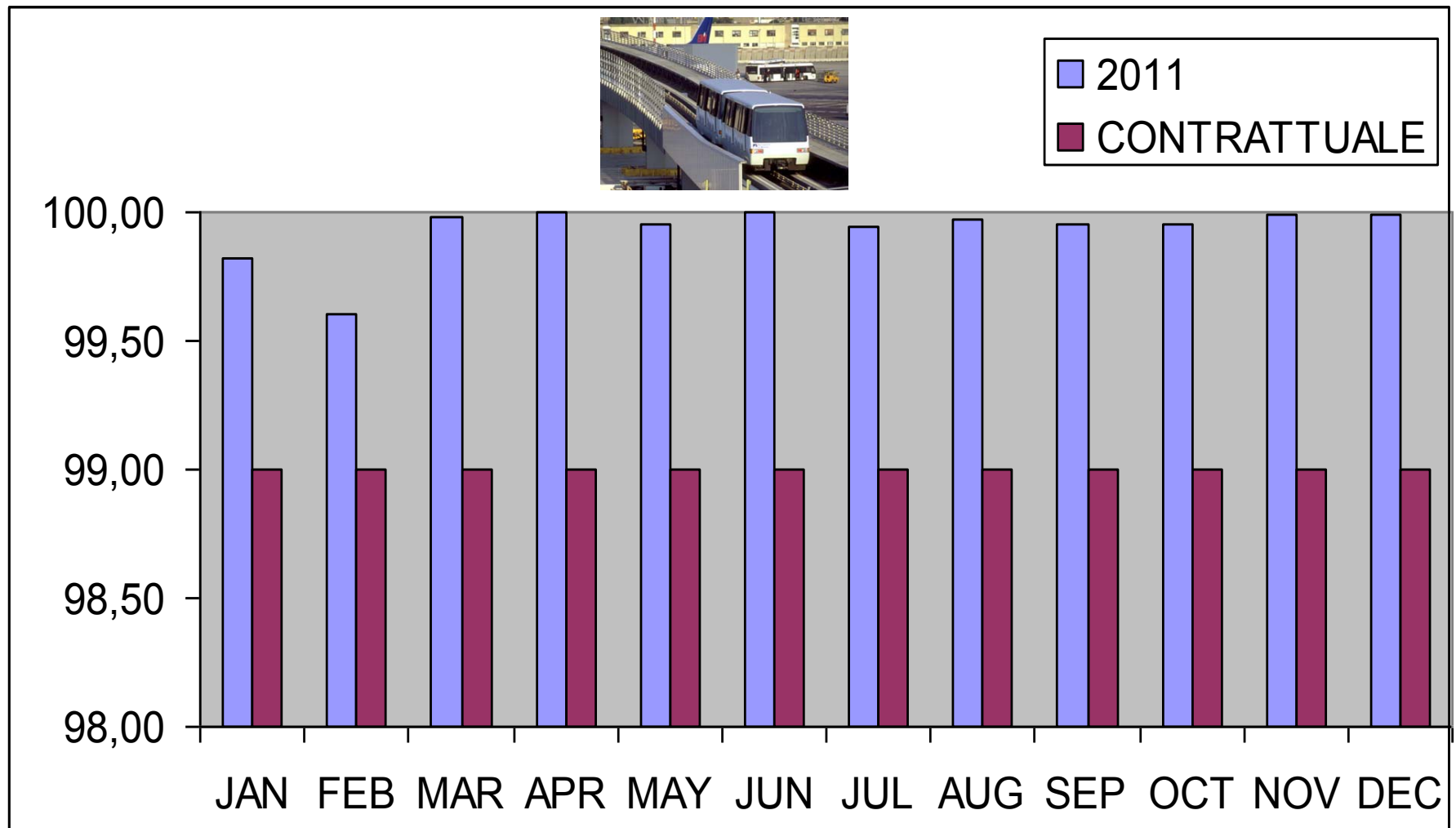
4 punti chiave per Esercizio & Manutenzione:

- Sicurezza passeggeri e dipendenti
- Servizio Clienti di livello mondiale
- Sistema & apparecchiature affidabili
- Rapporto costo- efficacia

Referenze Esercizio & Manutenzione

System	Type	No. of cars	Contract availability ¹	Contract type	In service
Madrid Barajas International Airport, Spain	APM	19	99.50%	Operations & Maintenance	2005
Las Vegas Monorail, USA	Monorail	36	99.00%	Operations & Maintenance	2004
AirTrain JFK, USA	ART	32	99.00%	Operations & Maintenance	2003
Leonardo da Vinci International Airport, Italy	APM	4	99.00%	Operations & Maintenance	1999
AirTrain Newark, USA	Monorail	108	99.20%	Operations & Maintenance	1996
Frankfurt Main Airport, Germany	APM	18	99.65%	Operations & Maintenance	1994
Tampa International Airport, USA	APM	16	98.50%	Maintenance	1971

ROME AIRPORT SDC – AVAILABILITY SYSTEM 2011



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Thank you

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