Conversion of İstanbul M1 Metro Line From GoA1 to GoA4

İSTANBUL BÜYÜKŞEHİR BELEDİYESİ

METRO İSTANBUL

Metro
Istanbul

Metro İstanbul is an affiliate company of Istanbul Metropolitan Municipality operating the tram, metro, light rail, funicular and aerial cable cars in Istanbul.

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Transportation Modes

Istanbul

Road System	Rail System	Waterborne
%73,1	%25,2	%1,7
Buses Privately-owned public buses Private Buses Minibuses, Taxis	Metro Istanbul (Metro, tram) TCDD (Commuter line) IETT (Tunnel, heritage tram)	Sehir Hatlari (Public operator) Private Boats

Facts About
Metro Istanbul

The only city in the world where 10 metro constructions continue at the same time.

Number of Campus: 16

990
Passenger Information Systems

232
Digital Info Panels

Jan. - Oct. 2021
Vehicle km annual
72.336.929

Journeys
1.081.528

221.784
Equipment

189
Stations

8530
Cameras

Customer Satisfaction **% 84**

2021 Number of Passengers
474.572.442

951
Vehicles

Escalators
1495

%100
Accessibility

468
Lifts

58
Travellators

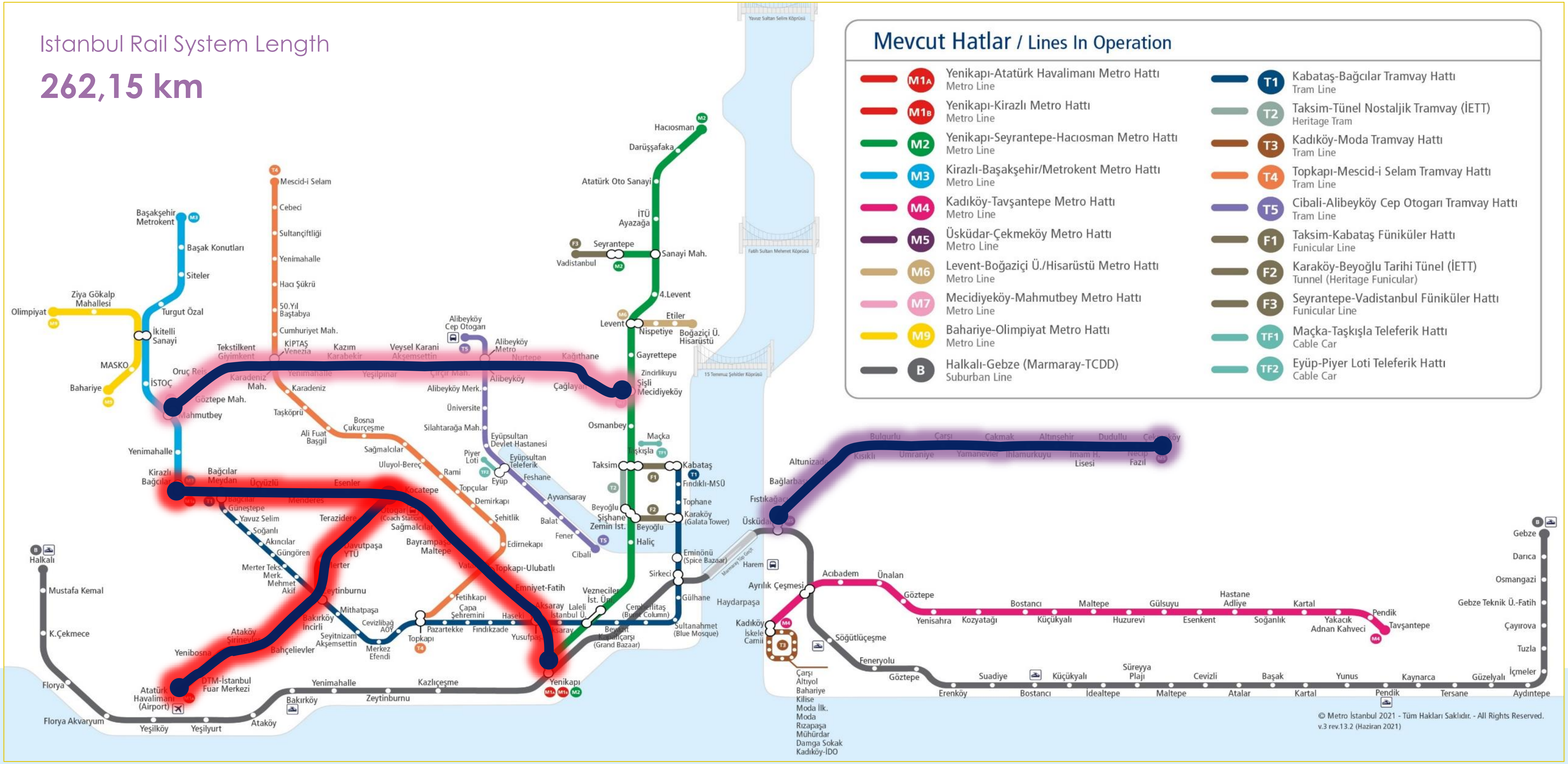
Network Length
183,15

16 Lines
9 Metro · 4 Tram · 1 Funicular · 2 Cable Car

Network **Map**

Istanbul Rail System Length

262,15 km



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Lines in Operation

		Line Length	Stations	Daily Pass.	Vehicles
M1A M1B	Yenikapı-Atatürk Havalimanı-Kirazlı Metro	26,80	23	470.000	105
M2	Yenikapı-Hacıosman Metro	23,49	16	500.000	180
M3	Kirazlı-Olimpiyat-Başakşehir Metro	12	9	75.000	80
M4	Kadıköy-Tavşantepe Metro	26,20	19	450.000	144
M5	Üsküdar-Çekmeköy Metro	20,00	16	200.000	126
M6	Levent-Boğaziçi Ü./Hisarüstü Metro	3,3	4	25.000	12
M7	Mecidiyeköy-Mahmutbey Metro	18	15	65.000	80
M9	Bahariye-Olimpiyat Metro	6	5	10.000	
T1	Kabataş-Bağcılar Tram	19,30	31	400.000	92
T3	Kadıköy-Moda Tram	2,60	11	3.000	6
T4	Topkapı-Mescid-i Selam Tram	15,30	22	150.000	82
T5	Cibali-Alibeyköy Cep Otogarı Tram	8,80	12	5.000	30
F1	Taksim-Kabataş Funicular	0,64	2	22.000	4
TF1 TF2	Cable Car	0,72	4	5.000	8
	Total	**183,15 km**	**189**	**2.380.000**	**949**

M1 METRO LINE PROJECT INFORMATION

M1B

OTOGAR-KİRAZLI
5 Stations
(1 Street Level – 4 Underground)

HALKALI DEPOT AREA AND MAİNTENANCE WORKSHOP

M1B

KİRAZLI-HALKALI
10,7km
9 Stations (Underground)

M1A

YENİKAPI-OTOGAR-HAVALİMANI
18 Stations
(11 Street Level – 7 Underground)

36 Km Line
32 Stations

Cause of Conversion

- ✓ The 9 station extension of M1 metro line will bring integration with other lines and increase number of passangers using M1 line.

- ✓ Passanger Exchange feasibility report shows that 613.800 daily usage and hourly 38.000 passanger.

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Cause of Conversion

- ✓ Low Operation Capacity
- ✓ High Passenger Demand
- ✓ High Headway Time
- ✓ Old and insufficient Signal System
- ✓ Old and insufficient Trains

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Cause of
Conversion

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Conversion

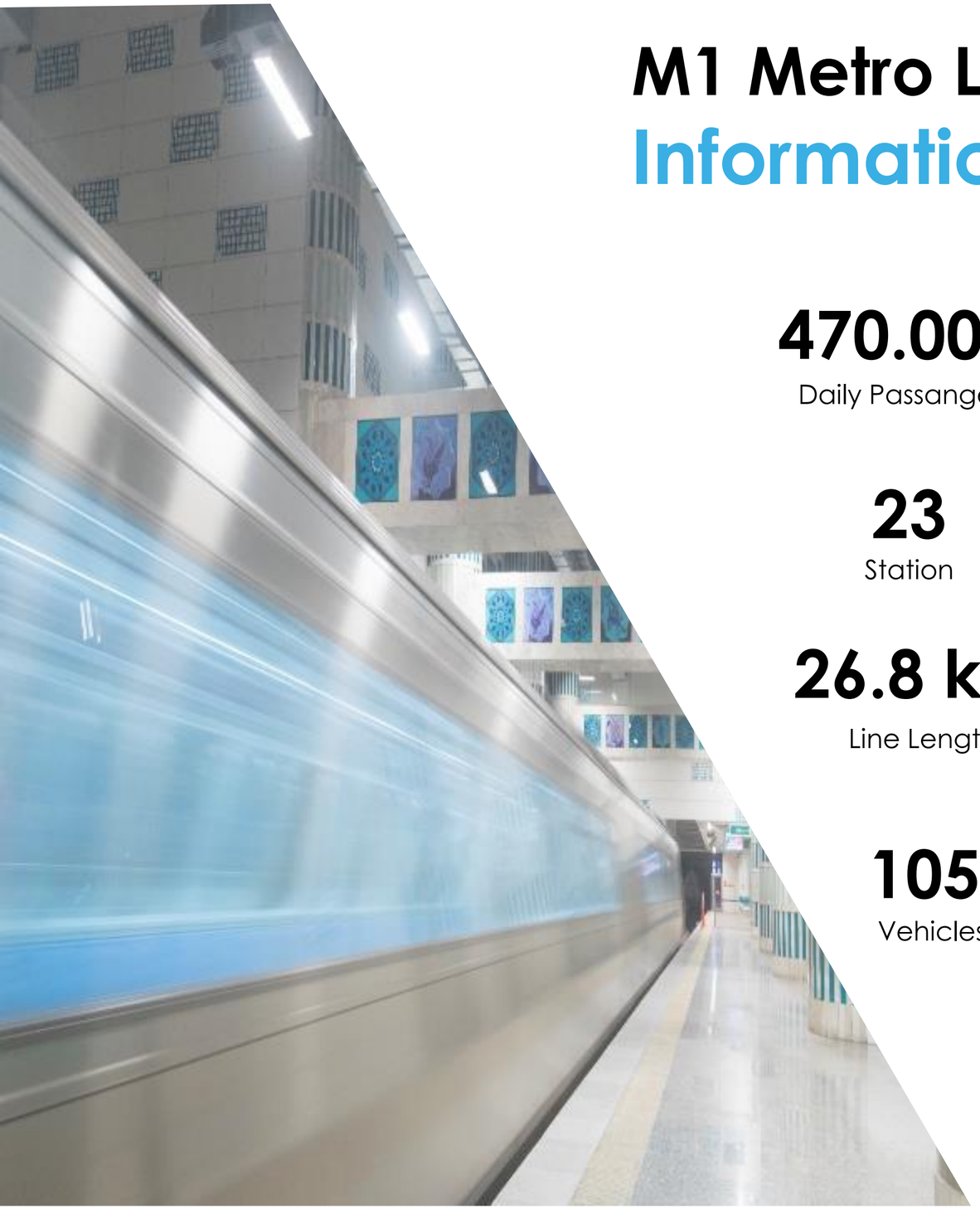
	Current Operation	After Conversion
Automation	GoA1	GoA4
Headway	180 sn	90 sn
Peak Hour Capacity	18.000 Passenger	36.000 Passenger
Train Operation	Driver	ATO
PSD	No	Yes

Grade of Automation

Grade of Automation	Type of train operation	Setting train in motion	Stopping train	Door closure	Operation in event of Disruption
GoA 1	ATP with driver	Driver	Driver	Driver	Driver
GoA 2	ATP and ATO with driver	Automatic	Automatic	Driver	Driver
GoA 3	Driverless	Automatic	Automatic	Train attendant	Train attendant
GoA 4	UTO	Automatic	Automatic	Automatic	Automatic

ATP - Automatic Train Protection

ATO - Automatic Train Operation



M1 Metro Line Information

Extension Line Information

470.000
Daily Passanger

+ 143.800
Daily Passanger

613.800
Daily Passanger Forecast

23
Station

+ 9
Station

32
Station

26.8 km
Line Length

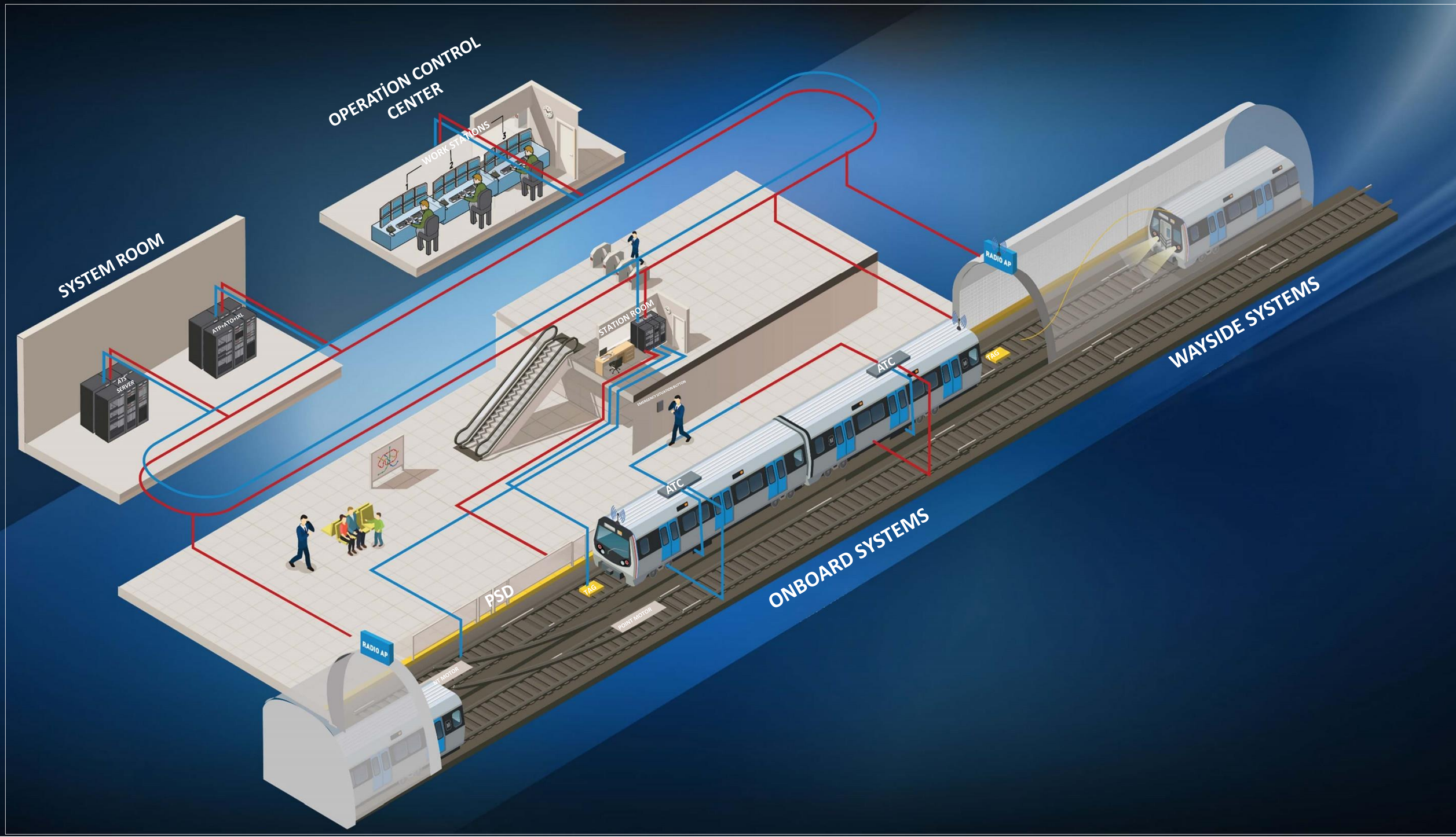
+ 9.36
Line Length

36.16 km
Line Length

105
Vehicles

+ 34
Vehicles

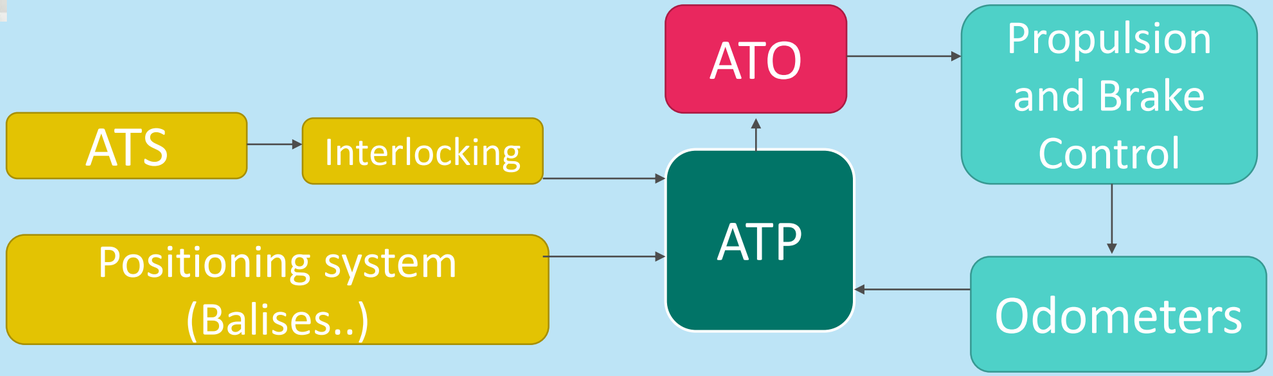
139
Vehicle(3 Car Train)


OPERATİON CONTROL CENTER
WORK STATIONS
SYSTEM ROOM
ATP+ATO+AXL
ATS SERVER
STATION ROOM
EMERGENCY SITUATION BUTTON
RADIO AP
ATC
TAG
WAYSIDE SYSTEMS
ATC
PSD
TAG
POINT MOTOR
RADIO AP
M MOTOR
ONBOARD SYSTEMS

Conversion Of Train

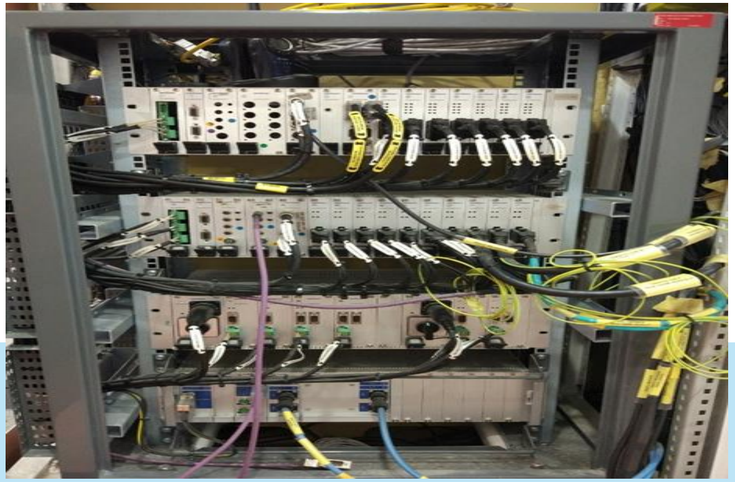
- ✓ Hot Standby Redundant Onboard ATP
- ✓ Hot Standby Redundant Onboard ATO
- ✓ Onboard Control and Communication System (OCS)

- ✓ Redundant Tacometers
- ✓ Conversion of Radar
- ✓ Conversion of Balise Reader

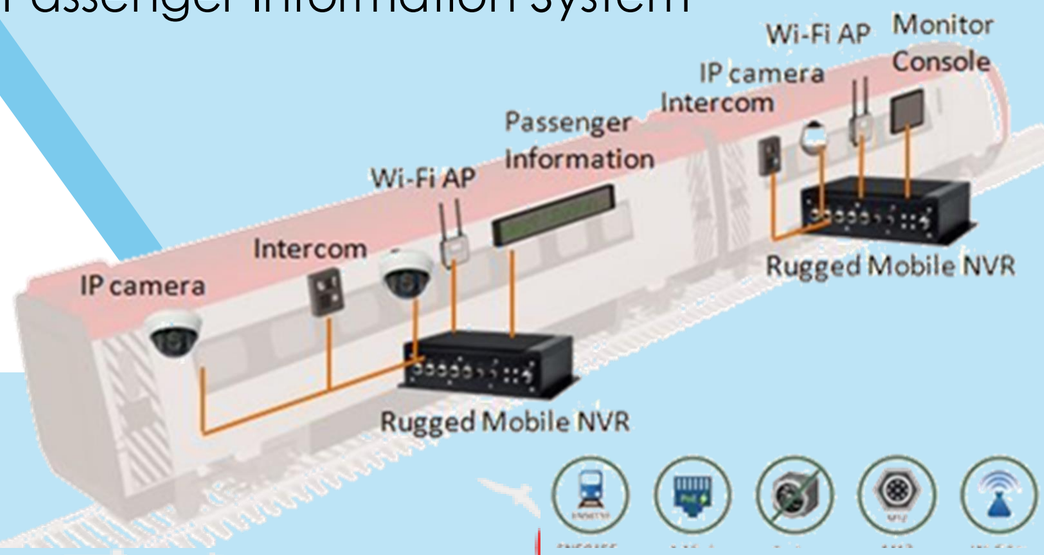


Conversion Of Train

- ✓ New Trains with TCMS support redundant onboard ATC
- ✓ Derailment Dedection System
- ✓ Obstacle Dedection System



- ✓ Intercom System
- ✓ Onboard CCTV System
- ✓ Train SCADA
- ✓ Passanger Annoucement System
- ✓ OCS Wi-Fi Network System
- ✓ Passenger Information System



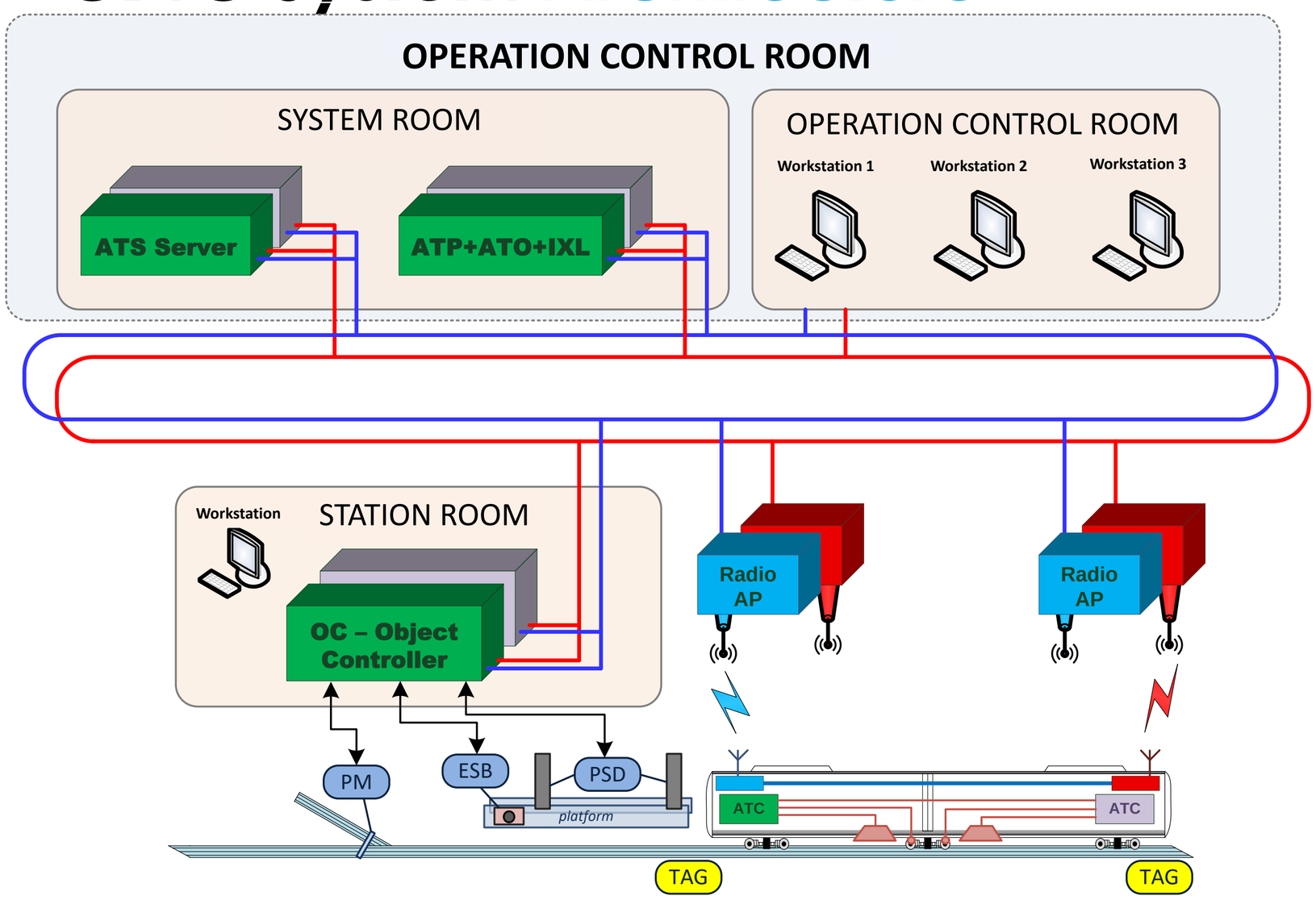
Conversion Of Wayside

- ✓ Conversion of Wayside ATP System
- ✓ Wayside ATO System for UTO Metro Operation
- ✓ Conversion of Point Machine
- ✓ Conversion of Balise
- ✓ PESB for Unauthorized Access to Track
- ✓ PSD System for UTO Metro Operation
- ✓ Wi-Fi Communication System for OCS

Conversion Of OCC

- ✓ Conversion of Signal Workstations
- ✓ OCS Workstations setup
- ✓ Installation Videowall System
- ✓ Maintenance Workstations
- ✓ Region wide stop buttons

CBTC System Architecture



ATS System

Wayside System
ATP- ATO

Onboard System
ATP-ATO

Thank You

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