

AFCS

Automatic Fare Collection System

MiTAC Information Technology Corp.
Myriad Ticketing & Open Payment Solutions



Agenda

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- 06 | System Design & Product Maturity
- 07 | System Reference

01

PART 1 AFCS Automatic Fare Collection System Introduction to MiTAC AFCS Services

Part 1 Services



MiTAC AFCS Product Services



Taipei Rapid Transit
AFC System



Taiwan High Speed Rail
AFC & Reservation



HK MTR AEL
QR-Code eTicket



MRT Jakarta
AFC System

Software

- AFC Equip. Software
- Station Computer System
- Central Computer System
- CCHS for ePurse Cards
- Back-End Sys. for ePayment (CSC-Cards, QR Code & EMV Credit Cards)

Open Payment System

Fare Media Used-

Before '19 : RFID Token, e-Purse (EasyCard like Octopus, Suica)
Since '19 : Mobile NFC 、 Multiple e-Purse 、 Mobile QR-Code Ticket
After '20 : EMV credit cards (Visa , Master , Discovery Credit Cards
Line-pay, Samsung-pay QR Code, 3rd party pays on Mobile)

Hardware

- Auto Gate
- Enquiry Machine
- Ticket Vending Machine
- Ticket Office Machine
- Station Computer (SCS)
- Central Computer (CCS)
- Backend CCHS/ Open Payment Server System

MiTAC AFCS

02

PART 2 AFCS Automatic Fare Collection System Product Trend

Part 2 Product Trend

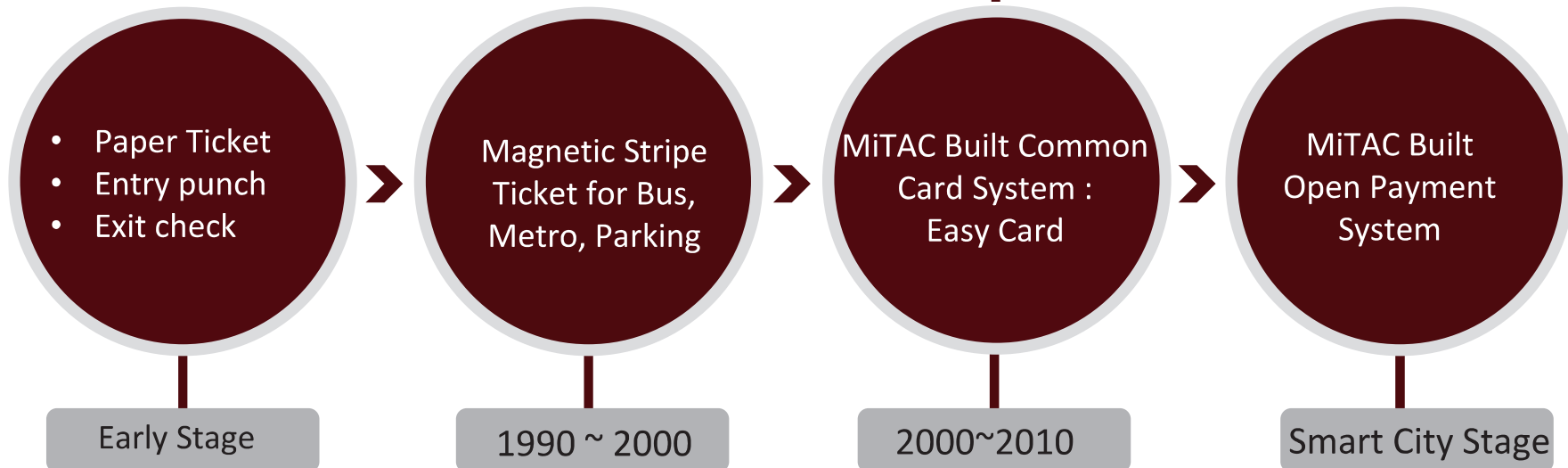


Transport Ticketing System Trend



MiTAC start the eTicketing System Development since Year 1990s till now.

Ticketing System Development



03

PART 3 AFCS Automatic Fare Collection System MiTAC Product Briefing

Part 3-1 Product Brief



MTAC AFCS System Product

1. MCS Main Computer System

- **Ticketing & Reservation System**
 - Ticketing & Seat Reservation
 - Fare & Operation Rules Management
- **Financial & Equip. Management**
 - Cash & Revenue Reporting
 - Maintenance Management
- **KMS – Key Management System**
CCHS – Central Clearance House Sys.
 - Ticket Issuance & Transaction Clearance
 - Key Management

2. SCS Station Computer System

- Gate、EQM、TVM、TWE interfacing.
- Ticketing, Financial & Revenue mgmt.

3. Auto Gate (Departure Control)

- Ticket Validation & Entry/Exit Control
- Gate Normal (Aisle Width 500/700mm)
Handicap(Aisle Width 1100mm)

4. Ticket Enquiry Machine

- CSC Card Content Checking
- CSC Card Validity extension

5. Ticket Vending Machine

- Ticket Vending / Add Value
- Multiple Payment Method

6. Ticket Office Machine

- Ticket Sale, Refund, Change...
- Problem Ticket Handling

7. Auxiliary Facilities

- Cash Counting & bagging
- RFID Cash Box
- RFID Ticket Box



Part 3-2 Product Brief



Auto Gate

- Passage Control & Myriad Ticket Type Validation, may operate in standalone.
- Accept Operator Issued Cards, QR Code Ticket , or 3rd Party e-Purse Cards: Easy Card, Beep Card, Octopus, etc.
- Accept EMC credit cards (wireless), 3rd Party QR Code on Mobile App.
- With ISO 14443 Type A, Type B, Felica Standard CSC Reader.
- May accept Smart Tokens & capture it in exit Gate
- With Open Payment features.
- Detects Children profile by height detection sensors.
- With LCD passenger display.
- May detect passenger profiles and display in top indicator.
- Aisle with is 500mm or 700mm, Housing Stainless ASTM 304 standard.
- Size : L1900×H 101×W300mm °



Part 3-3 Product Brief



Handicapped Auto Gate

- Designed for handicapped passengers , with aisle width 1100mm.
- Bi-directional passage.
- With Service bell, voice guidance and braille plate.



Part 3-4 Product Brief



Ticket Vending Machine

- Issues different type of ticket or cards e.g. CSC card, Token, or magnetic ticket with reserve seat number and departure time etc. , provides card add value functions.
- With difference type of payment method: bank notes, coins, credit card, 3rd party QR Code on mobile ...
- With CSC Readers follows ISO 14443 Type A, Type B, & NFC standards.
- With Card, Smart Token Container or Ticket Printing Devices.
- Passenger LCD Display 15 " TFT-LCD or larger, with touch screen.
- Standard Size W900mm × H1800mm ×D630mm, or custom made.
- Housing : Stainless Steel ASTM304, or custom made.
- Provide handicapper TVM for disabled passengers.
- Provide Ticket Collection Feature for ticket booked and paid in Mobile App or Internet Web.



Part 3-5 Product Brief



Ticket Enquiry Machine & Self Service Kiosk



- With CSC reader fulfills ISO 14443 Type A, Type B or NFC standards.
- Communicate with host via LAN, TCP/IP.
- May operate in stand alone mode.
- Passenger GUI:
 - LCD 15 “ colored TFT-LCD with voice output.
 - May display the transaction histories and cards information.
- Self Service Kiosk provide functions for card enquiry, card refund, re-charge, information checking functions.

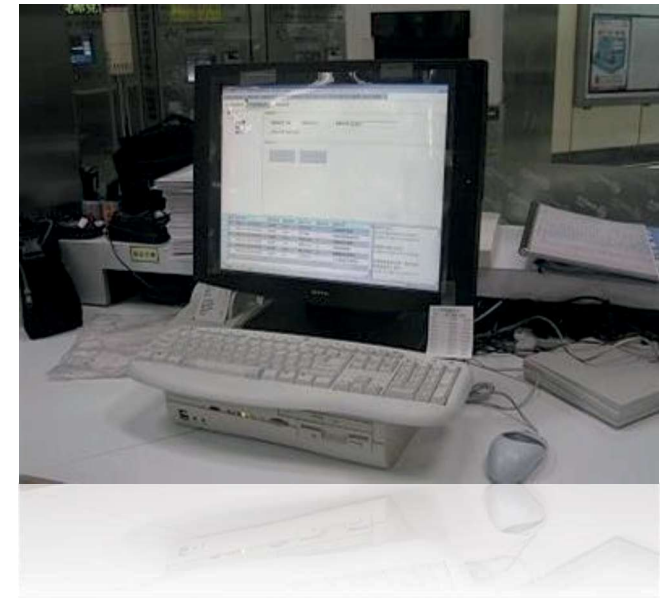


Part 3-6 Product Brief



Ticket Office Machine

- Provide different type of ticket selling, refund, change, replacement function.
- Analyze ticket information and transaction history.
- Collect payment via cash, credit cards (with EDC), or 3rd party QR Code on mobile App.
- With Computer LCD display and LED PID passenger display.
- With CSC Reader fulfills ISO 14443 Type A, Type B, Felica standards.
- TWE computers with LAN, interface to host via LAN, TCP/IP.
- With receipt printer.
- With UPS.



Part 3-7 Product Brief



Station Computer System



- Installed in each rail/metro station / or harbor, port.
- Interface to Main Computer for information exchanges.
- Interface to Station Level Equipment for information exchange, or monitoring & control.
- With LINUX (RED HAT) OS · PostgreSQL Database °
- With Ethernet LAN for communication with equipment and central system.
- With UPS and communication facilities.



Part 3-8 Product Brief



Central Computer System



- With LINUX - RED HAT enterprise Operating System, include AP servers, and DB servers, and SAN storages, Database System.
- May include a separated Seat Reservation System.
- Interfaces to local computers and external systems like card issuers, 3rd party QR Code issuers, banks etc.
- Provide Ticketing & Reservation, Financial & Revenue Management, Operation & Maintenance Management, Operation Strategy System, KMS and Card Issuance Systems, etc.
- With a separated Key Management System for generating and maintaining the keys and issue SAM card for readers.
- May include EMV & 3rdPart Payment Processing (PCI-DSS certified)



Part 3-9 Product Brief



Special Functions



Reserved Seat Booking & Billing

- May provide Internet Booking for train ticketing.
- Provide QR Code Ticket system for ticket selling – outside of the stations / sea port.



QR Code Ticket & EMV Ticketing

- HK MTR Airport Express Line uses mobile App QR Code Ticketing.
- Taipei DanHai Light Rail use LinePay & Master Card Open Payment System



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PART 4 AFCS Automatic Fare Collection System Potential Customers

Part 4 Customers



MiTAC AFCS Potential Customers



Rail & Shipping Line Ticketing – Fare Collection & Booking



City Transportation – Inter Modal e-Ticketing System



05

PART 5 AFCS Automatic Fare Collection System Product Features

Part 5 Product Features



Product Features



Equipments are Design , Development, Manufactures by MiTAC

MiTAC developed key component :

- CSC readers fulfills ISO 14443
- KMS key management system
- Smart Token Issuing and Collection modules
- DIO board.
- DC-DC UPS board on equipment.
- QR Code / EMV Ticket Controller – direct link to QR Code Backend Server

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PART 2 AFCS Automatic Fare Collection System Design Capability & Maturity

Part 6-1

Engineering Capabilities

System Engineering Capabilities

Project Management PMP

- PMs are with PMP certification.
- Skillful in initial, plan, monitoring & control, leading, and project closure
- Skillful in 9 PM BOK.

System Engineering CMMI L3

- MiTAC is certified with CMMI Level 3 in software/hardware integration

Project
Manngement
Integration

Project
Time
Manngement

Project
Quality
Manngement

Project
Scope
Manngement

Project
Communcations
Manngement

Project
Procurement
Manngement

Project
Human Resource
Manngement

Project
Cost
Manngement

Project
Risk
Manngement

Part 6-2

Quality Assurance



Quality Assurance



Process Quality & Product Quality

- Follow MiTAC QA process
- Follows V&V process
- Equipment manufacturing IQC 、IPQC, OQC process
- Certified for EMC/EMI, IP .



System Reliability Reference :

- Taipei Metro 2015.12.31 6 a.m.to 2016. 1.1. 6 a.m. · transaction 3.02 million.
- System are ranked in Nova, CoMET as no. 1 in 24 members.

Part 6-3

MiTAC Strength



MiTAC Strength



Product
Quality

Finance
Stability

Rich
Experience

Mature
Engineering

Contract
Management

Project
Management

Part 6-4

Design Capabilities



MiTAC produces software and hardware



- MiTAC develop software and manufacture hardware.
- ODM for HITACHI-OMRON-TERMINAL SYS. Industrial PC.
- Manufacture AFC equipment for Taipei Metro, Taiwan High Speed Rail, Taiwan Bus Ticketing , Taiwan Rail , HK MTR AEL QR validator, Philippine eGATE ...



Part 6-5 System Maturity

Mature System Engineering

PMI Certified PM with PMP 9 PM BOK 、CMMI Level 3 project management and system engineering maturity,

With certificate of ISO9001 , ISO27001 security standard.

Capable to provide High-Rel product compliant with EN50126 、EN50128 、SIL-II, and customer required RAMS criteria.



Integrated Quality Process

Business
Development

Project
Management

System
Engineering

Product
Delivery

Training &
Support

Warranty &
Maintenance

ISO 9001

ISO 27001

ISO 20000

SEI CMMI-3

MIL-STD

RAMS

SIL-II

07

PART 2 AFCS Automatic Fare Collection System MiTAC Product Reference

Part 7-1 Product Reference

Easy Card System Design & Construction – by MiTAC on 2000

MiTAC built the Taipei Easy Card System , and invested with Taipei City Government for founding the Easy Card Corporation in Year 2000.

The Easy Card issued increased from less than 1 million in 2001 to now over 50 million cards today.

Easy Card application area expands from Bus, Metro, Parking of Taipei Municipal Area to now Convenient Stores, Chain Stores, Retail Shops, Taiwan Rail, High Speed Rail, and many government and private owned services over the island.

□ Taipei IC Card System (Easy Card System) Features Equipment – for MRT, buses , parking and add value

Add value POS



Add Value Machine



Part 7-2 Product Reference



Taiwan Easy Card System



Taipei Easy Card – One Card System (2002.6 Revenue Service)

- For Metro Ticketing
- For Taipei 6000 buses
(13 bus companies)
- Taipei Parking Lot
- Add Value Systems
- Card Issue and CCHS



Easy Card System Services

- For Parking System
- For AVM System
- For POS System



Part 7-3 Product Reference



Taiwan High Speed Rail – N201 AFCS



Taiwan High Speed Rail (AFCS & Reservation since 2007.2)

- North to South 12 stations
- Integrate seat reservation & ticketing



THSRC AFCS 10 Years Services

- CVS QR-Code Ticketing
- Easy Alliance Card integration 2012.1
- New Type of TVM
- System enhancement for T-Express App. & many new features.



Part 7-4 Product Reference



MiTAC Metro AFC System



Taipei Metro AFC System

- DORTS CU307 AFC 64 stations
- DORTS XYSS AFC
- DORTS Circle Line AFC
- Totally 134 Stations (100%)



Tai Chung Metro AFC

Go-live 2021.April



New Taipei Metro & LRT AFC

- SY Line AFC
(under construction)
- DH Light Rail AFC
RSD 2020 . Jan.



ASIAN & HK Metro AFC

- HK MTR AEL QR-Code Ticketing
- China Fuzhou Metro Line1 AFC
- India Chennai AFC - CCHS
- Jakarta Metro AFC
- Bangkok Metro Red-Line AFC
- HoChiMin Metro AFC



THANK YOU!

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