

# Volume II Plano Diretor de ITS da Região Metropolitana do Rio de Janeiro

13 de Novembro, 2012  
JICA Equipe de Estudo



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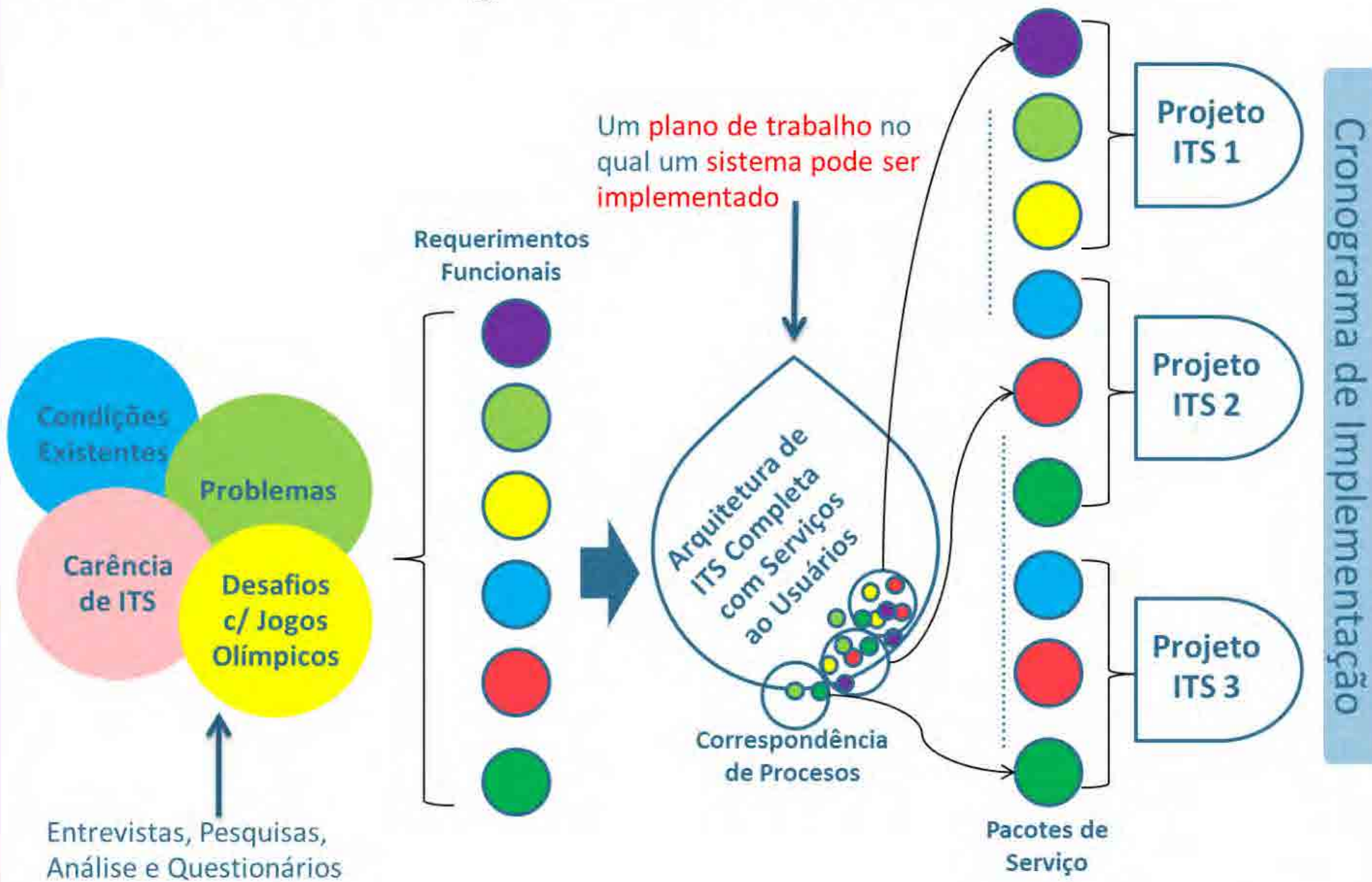


# Volume II

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# Nossa Metodologia de Estudo - Revisão



## 7. Arquitetura ITS

### -Serviços aos Usuários e Pacotes de Serviço do Sistema-



- **Serviços aos Usuários** documentam o que o ITS deveria fazer do ponto de vista dos usuários do sistemas.
- Os pacotes de Serviços do Sistema fornecem uma perspectiva acessível e orientada ao serviço em si sobre a Arquitetura ITS. Eles são moldados para se encaixarem, isolados ou em conjunto, em problemas e necessidades do mundo real dos transportes

# 7. Arquitetura ITS

-Serviços aos Usuários e Pacotes de Serviço do Sistema-

## 8 Pacotes e 33 Serviços

*Travel  
and  
Traffic  
Management*

*Public  
Transport  
Management*

*Electric  
Payment*

*Commercial  
Vehicle  
Operations*

*Emergency  
Management*

*Advanced  
Vehicle  
Safety  
Systems*

*Information  
Management*

*Maintenance  
and  
Construction  
Management*

**\*Security and HAZMAT are included Emergency Management**

**\*\*Entire ITS architecture is based on U.S. National ITS Architecture,  
Because U.S. Architecture**

**is the World Newest ITS Architecture (Updated at 10/3/2012)**

**is aligned ISO 14813-1 User Service Reference, means its adaptive ISO 14813-1**

## **7. Arquitetura ITS**

**-Serviços aos Usuários e Pacotes de Serviço do Sistema-**

### **Ex)1.6 Controle de Tráfego**

**The Traffic Control user service provides for the integration and adaptive control of the freeway and surface street systems to improve the flow of traffic, give preference to transit and other high occupancy vehicles, and minimize congestion while maximizing the movement of people and goods. This service gathers data from the transportation system, fuses it into usable information, and uses it to determine the optimum assignment of right-of-way to vehicles and pedestrians. The real-time traffic information collected by the Traffic Control service is also disseminated for use by many other user services.**

## 7. Arquitetura ITS

-Serviços aos Usuários e Pacotes de Serviço do Sistema-

## 8 Áreas de Serviço e 97 Pacotes de Serviço

*Achieved  
Data  
Management*

*Public  
Transportation*

*Traveler  
Information*

*Traffic  
Management*

*Vehicle  
Safety*

*Commercial  
Vehicle  
Operations*

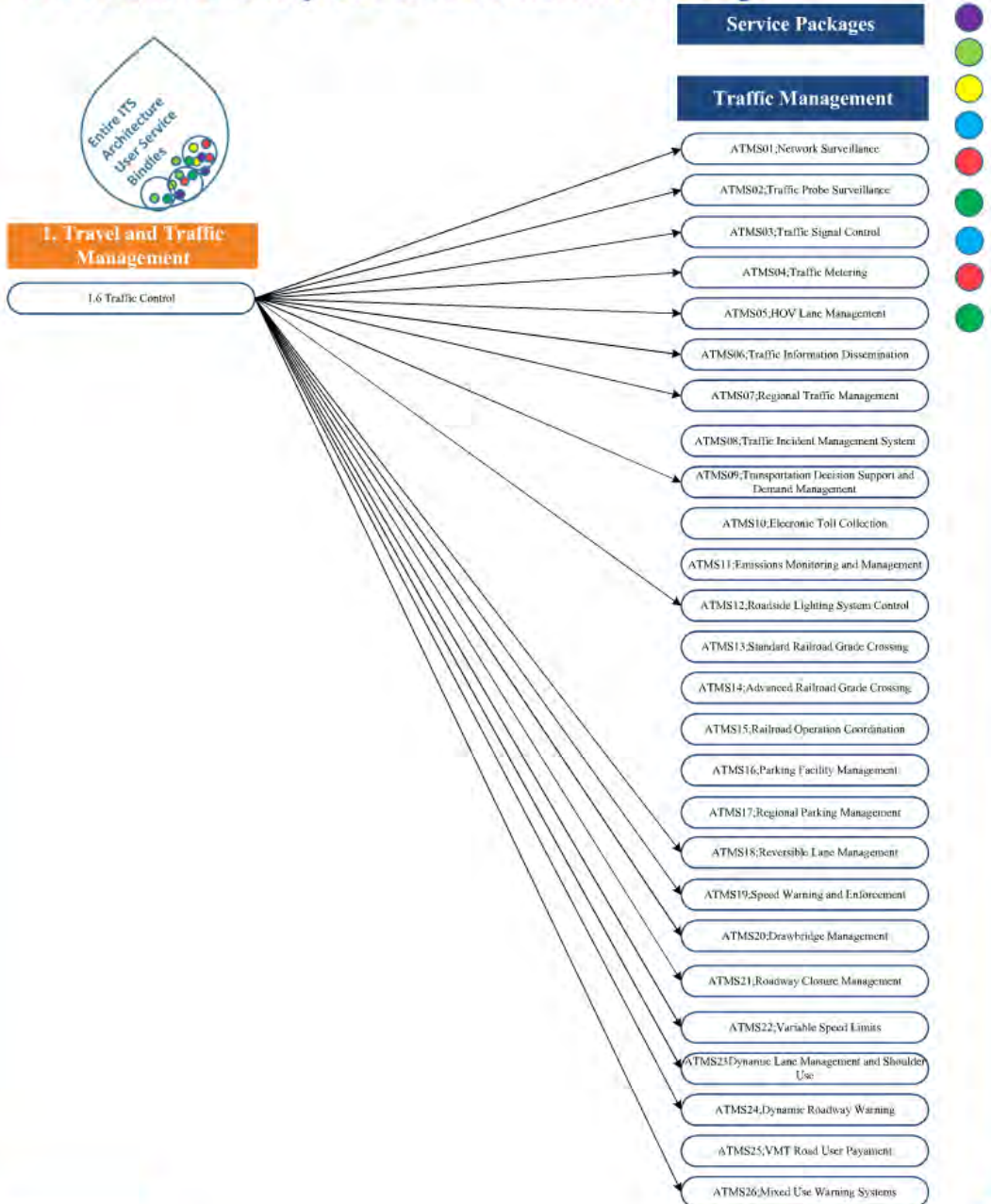
*Emergency  
Management*

*Maintenance  
and  
Construction  
Management*

# 7. Arquitetura ITS

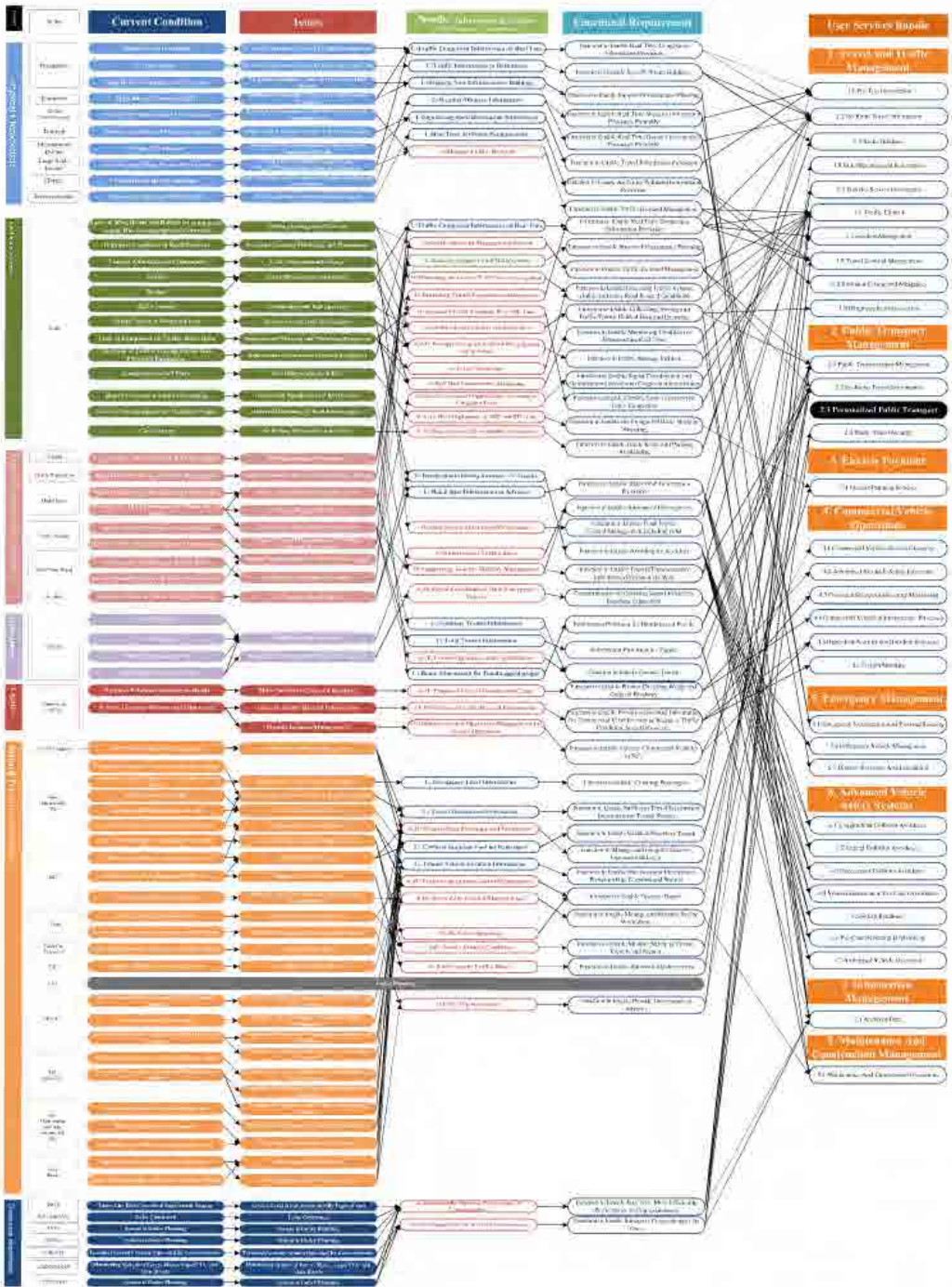
## -Serviços aos Usuários e Pacotes de Serviço do Sistema-

### Ex) Relação entre o Serviço ao Usuário 1.6 Controle de Tráfego e o Pacote de Serviços de Gerenciamento de Tráfego





# 8. Requerimentos Funcionais do ITS

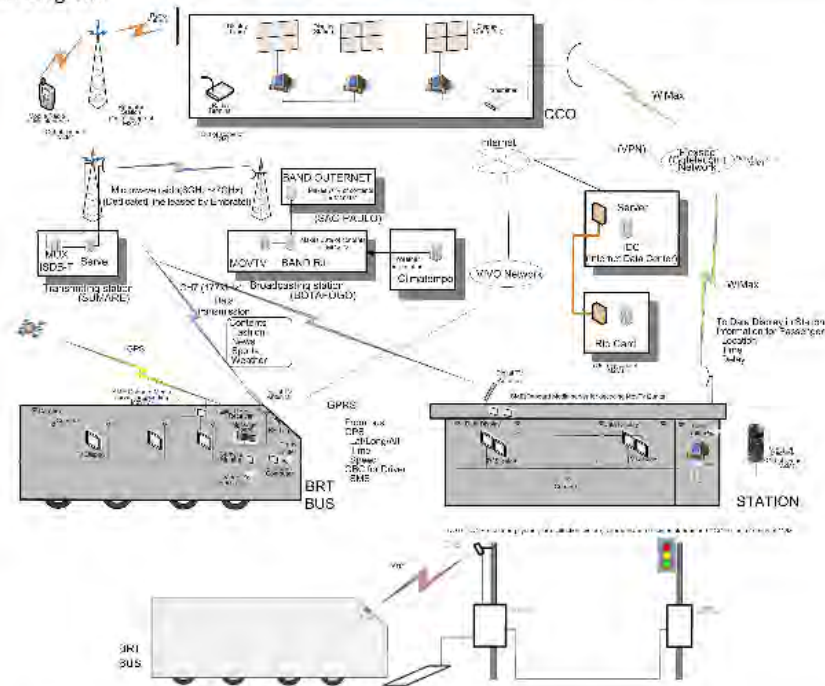


# 8. Requerimentos Funcionais do ITS

## ex) Avaliação de Sistema Existente 1

Name of Agency or Entity: **BRT RIO ONIBUS - BRT Operator (Concessionaire)-**

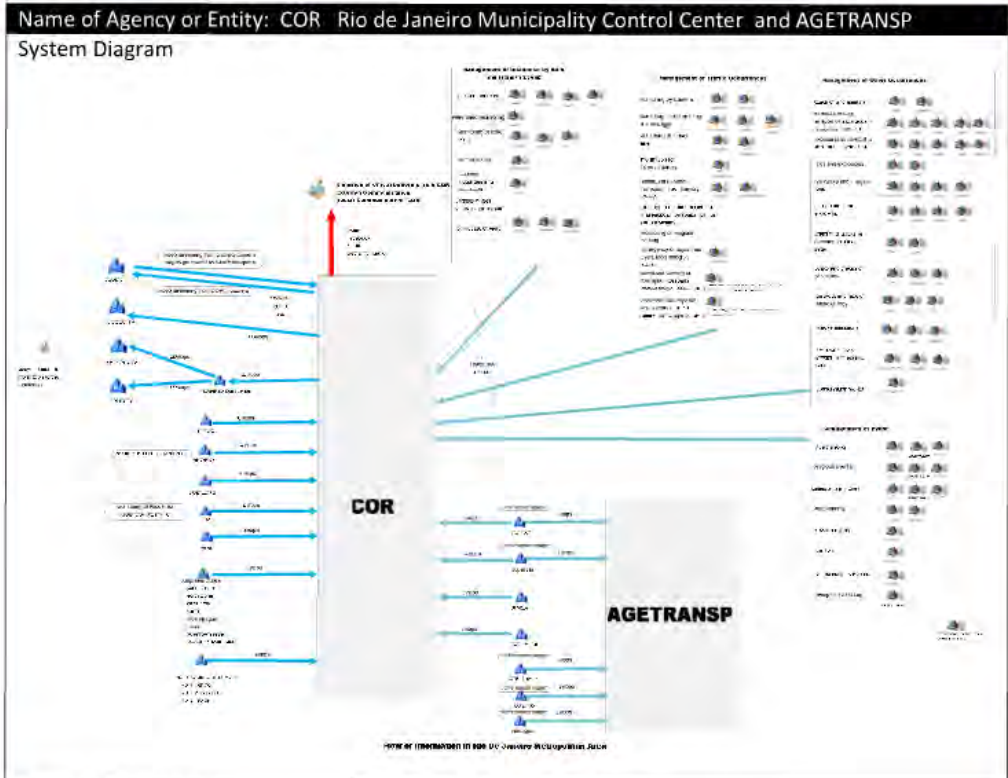
System Diagram



System Composition	<ol style="list-style-type: none"> <li>1. Vehicle Tracking System</li> <li>2. Transit Operation and Management</li> <li>3. Electric Ticketing System</li> <li>4. BRT Approaching Information</li> <li>5. Security Monitoring in Bus</li> </ol>	<ol style="list-style-type: none"> <li>6. BRT Priority Signal</li> <li>7. On Board Computer for Communication with Driver and CCO</li> <li>8. Radio Communication for Maintenance Vehicles</li> </ol>
Equipment	Station IC-Card Charging, -Display BUS - Display; -GPS Receiver -CCTV - OBC -RF Tag - Road -RFID Reader/Writer Control Box Signal and Signal Control Box	
Inter-Connecting Other Systems	It's connected to CET-Rio Signal to prioritize BRT via RFID tag but it is untouchable from BUS operator side.	
Communication Network	GPRS, Wimax, Internet Network Private Company, Digital Broad Casting	
Keys for Further Development	-System Integration with Municipality Road Operator (CET-Rio) -Travel Time Information for Destination shall be disseminated -Passenger Counting System shall be deployed for information dissemination -Other Transit Information shall be disseminated in the future	
Keywords	INTEGRATION, MORE INFORMATION, INFORMATION EXCHANGE	

# 8. Requerimentos Funcionais do ITS

## ex) Avaliação de Sistema Existente 2



System Composition	<ol style="list-style-type: none"> <li>1. Weather Forecasting System</li> <li>2. Browser based Integration System</li> <li>3. CCTV Information Exchange</li> </ol>
Equipment	At COR -Display, Servers and Desktops
Inter-Connecting Other Systems	<ul style="list-style-type: none"> <li>-Weather Monitoring Agencies Traffic Operator(CET-Rio) Traffic operators (CCTV only like CCR PONTE) -Transit Operators(CCTV only) - Media</li> <li>-Hazard Monitoring Agencies -Infrastructure Management and Monitoring Agencies</li> </ul>
Communication Network	Fixed line, Internet, Cell Phone, e-mail
Keys for Further Development	<ul style="list-style-type: none"> <li>-All data from agencies shall be integrated one place in the COR</li> <li>-Land Transport on the road such as Bus, Van and Taxi control shall be integrated. (Currently, Traffic Control System and Transit Control System are separated.)</li> <li>-Air pollution information can be utilized for TDM (ex; ERP)</li> </ul>
Keywords	INTEGRATION, ITS DATABASE



## **8. Requerimentos Funcionais do ITS**

### **Principais Problemas**

- **Integração e Utilização da Informação**
- **Integração Operacional**
- **Disseminação de Equipamentos ITS**
- **Expansão**

## **9. Projetos de ITS recomendados para a RMRJ**

**-Palavras-chave;**

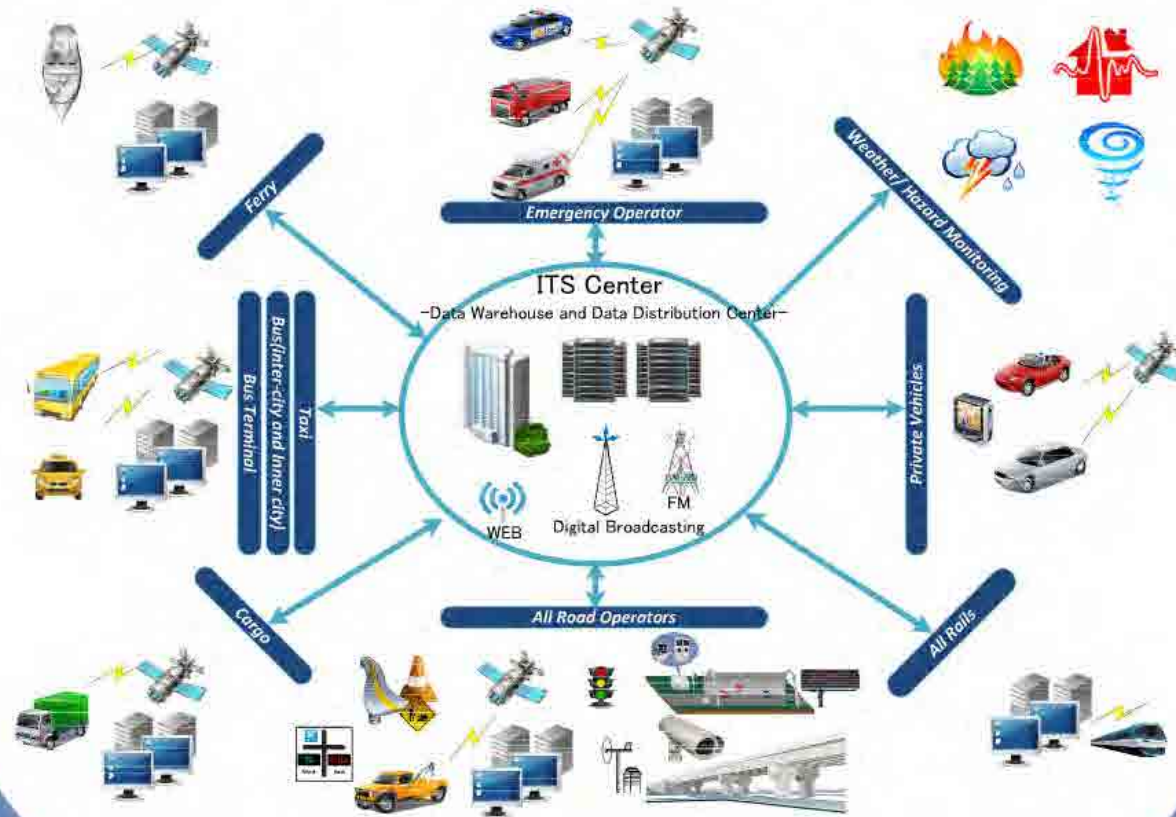
**Integração, Troca de Informação, Utilização,  
Disseminação, Cooperação**

**- Os Projetos de ITS recomendados consistem em  
vários Pacotes de Serviços**

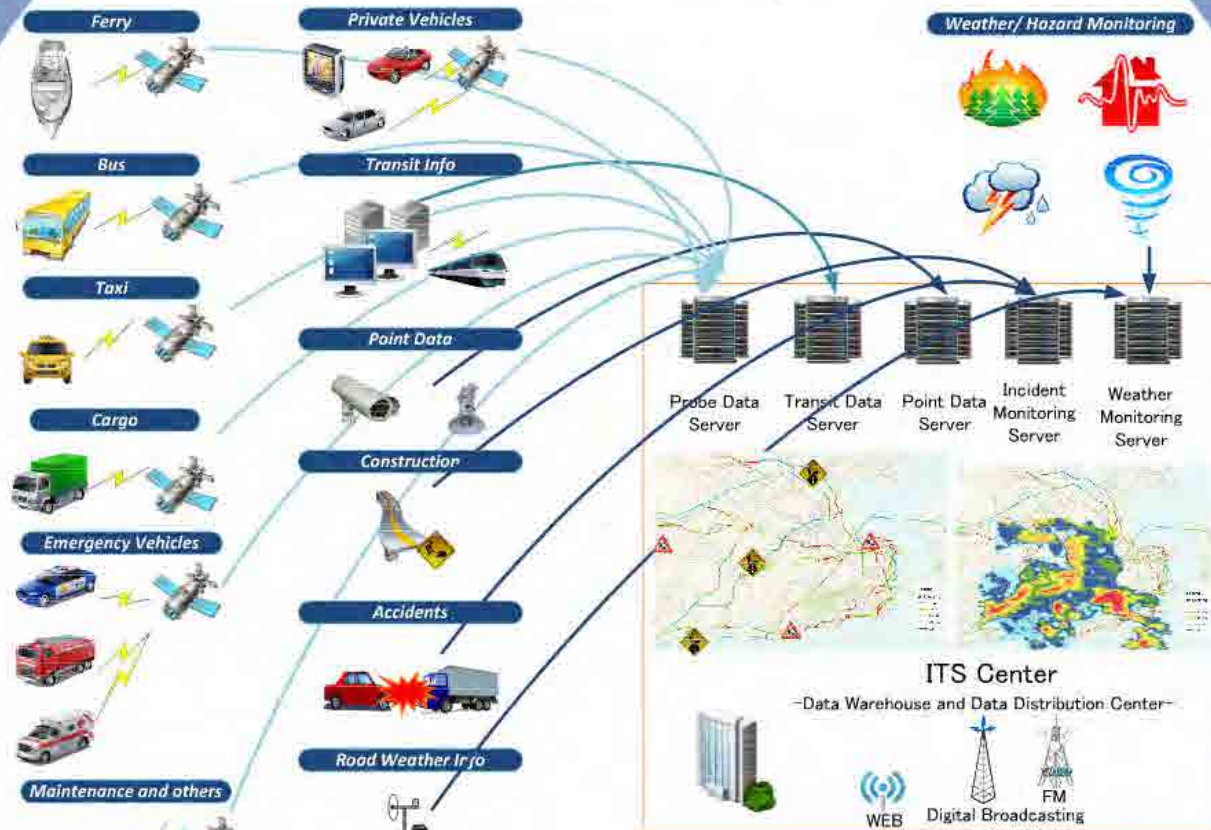
**Ver também o anexo - ITS PROJECT ARCHITECTURE -**

# CENTRO ITS

para integração e disseminação da informação



# PROCESSAMENTO em TEMPO REAL das CONDIÇÕES DE TRÁFEGO/TRANSPORTES





# COORDENAÇÃO entre SEGURANÇA e TRANSPORTES nas OLIMPIADAS



Security Monitoring/Emergency Control



CICC

Entire Traffic Condition and Transit Operational Condition info from ITS Center



ITS Center

Dissemination of All Modes of Transportation Information

**!! Need to be Improved  
Connection between Traffic Operators and  
Transit Operators !!**



COR



Entire Traffic Condition and Transit Operational Condition Info from ITS Center

Entire Traffic Condition Delay and Passenger Occupancy Ratio of BRT



Signal ↔ BRT

Next Bus Info at Bus Stop and Terminal from ITS Center

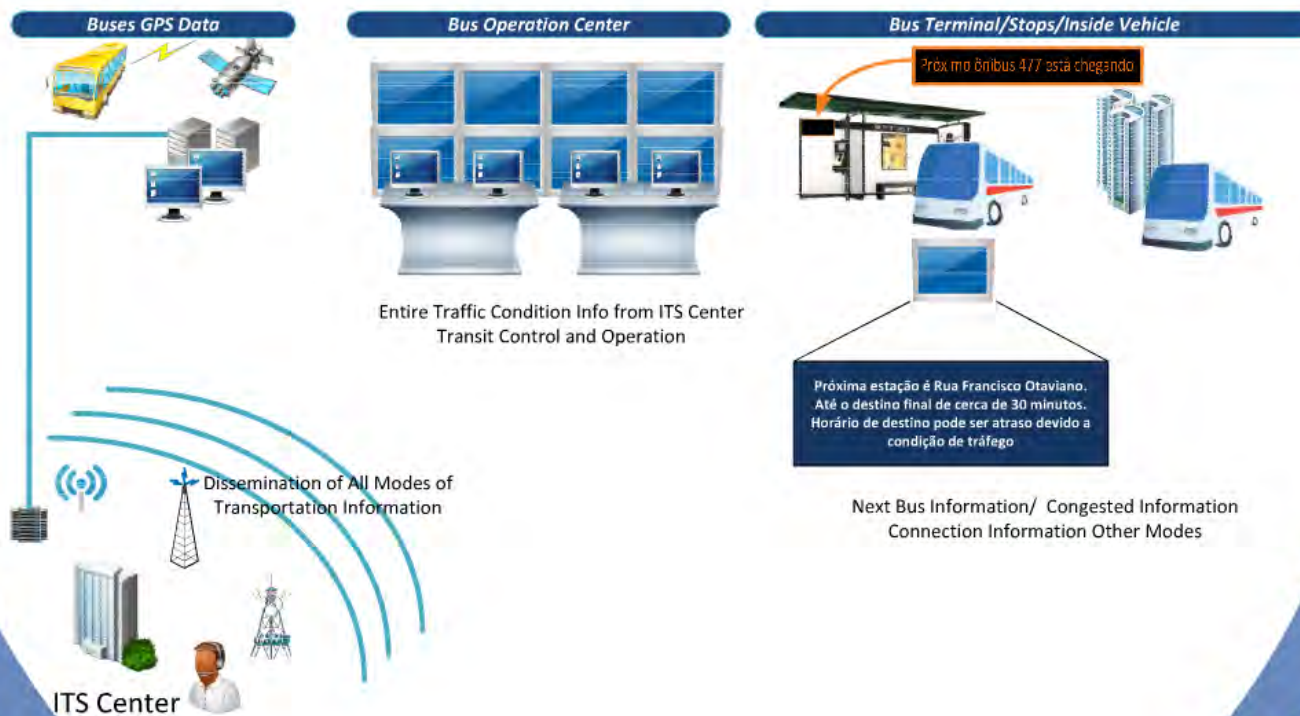


Next Bus, Train or METRO Information Exchange And Provision is necessary for Users

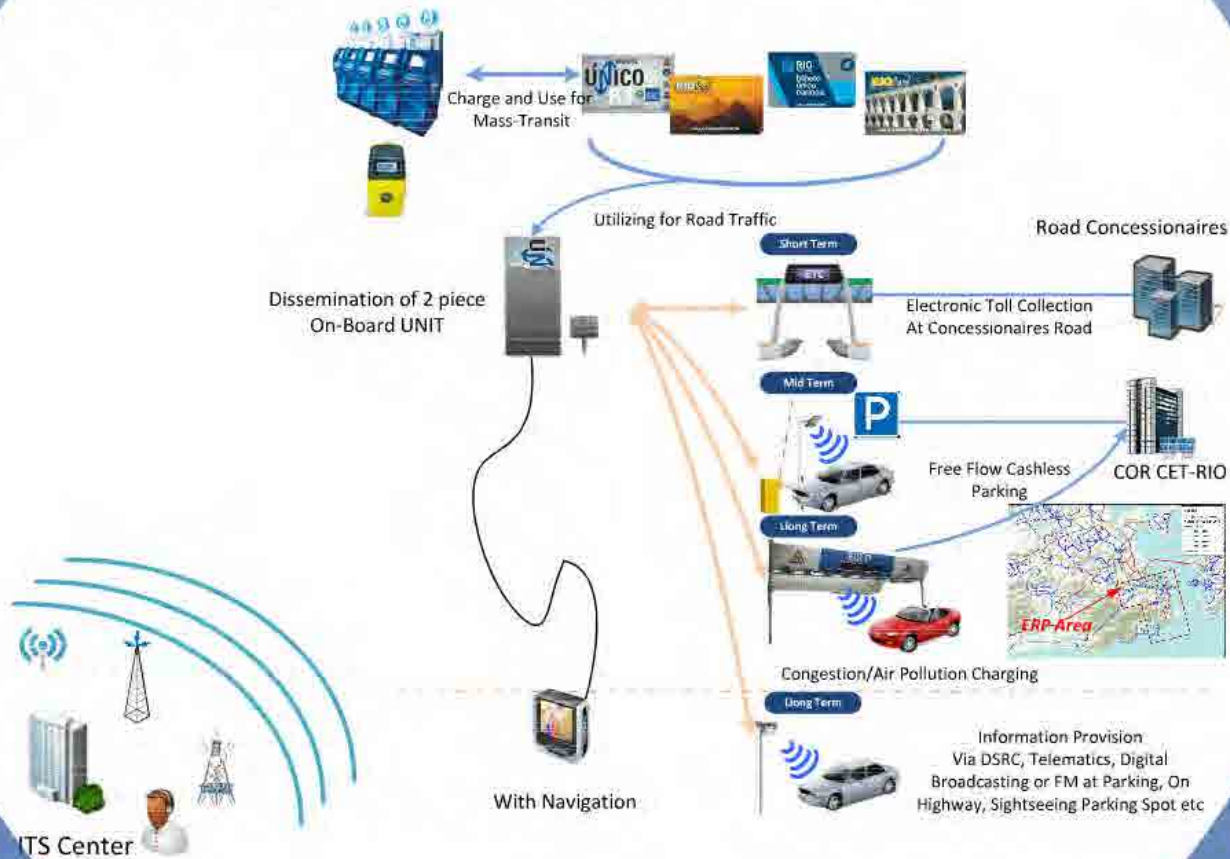


Train Approaching Info Shall be provisioned at each platform

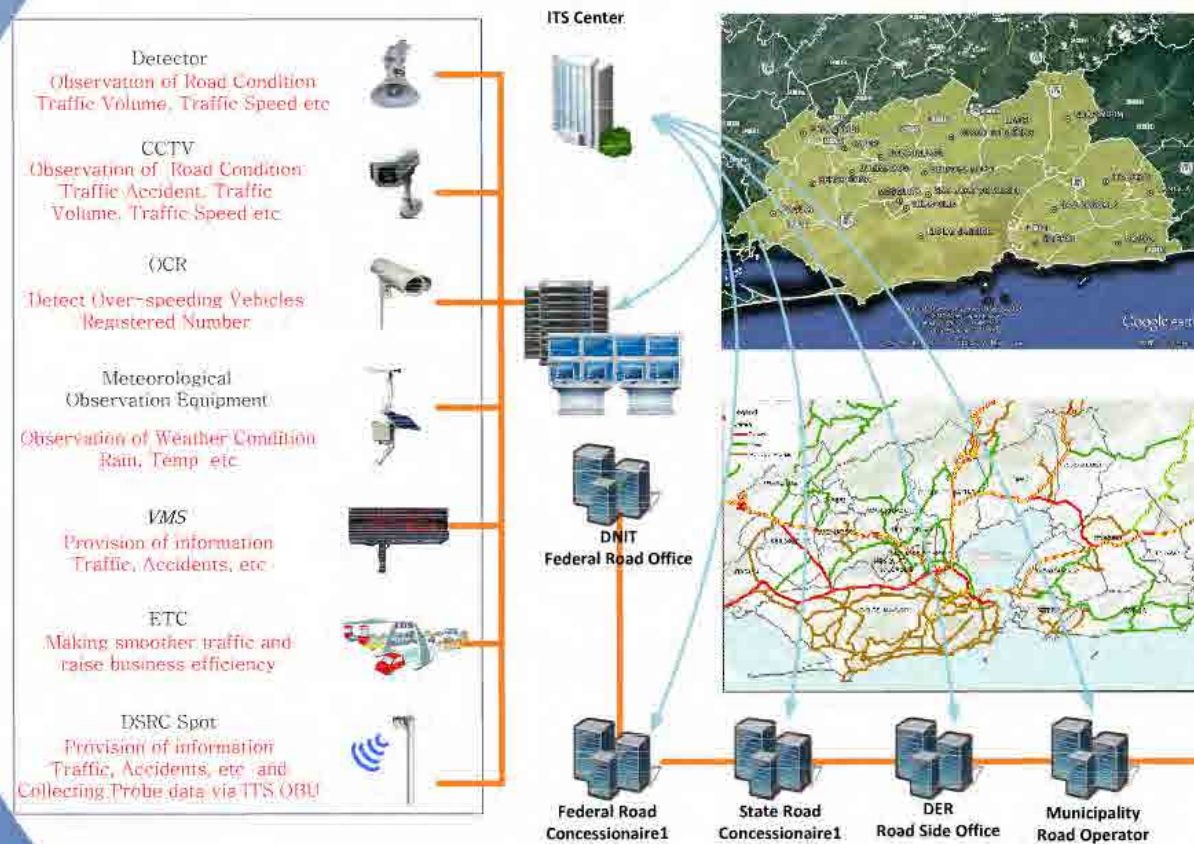
# INFORMAÇÕES de LOCALIZAÇÃO e CONDIÇÕES de TRÁFEGO nos ÔNIBUS



# DISSEMINAÇÃO de UNIDADES A BORDO para MAIOR INTEGRAÇÃO dos TRANSPORTES



# TROCA de INFORMAÇÃO entre OPERADORES de TRANSPORTES



# TROCA de INFORMAÇÃO entre MUNICÍPIOS via CENTRO ITS



ITS Center

Municipality  
Traffic/Transit Operator  
Rio de Janeiro  
Municipality  
CET-RIO(at COR)  
SMTR  
Bus Operators

Municipality  
Traffic/Transit Operator  
Sao Concalo  
Bus Operators

Municipality  
Traffic/Transit Operator  
Duque de Caxias  
Bus Operators

Municipality  
Traffic/Transit Operator  
Nova Iguacu  
Bus Operators

Municipality  
Traffic/Transit Operator  
NITTRANS  
Bus Operators

Municipality  
Traffic/Transit Operator  
Belford Roxo  
Bus Operators

**Further Deployment**

- Adaptive Signal Control**  
For Smoother Traffic
- OCR for Enforcement and Monitoring Traffic Condition**
- CCTV for Infrastructure Monitoring**
- MOE for Weather and Air Monitoring**
- VMS for Information Provision**
- Concentrated Infrastructure Monitoring**
- Work Zone Monitoring** for Safer Road Work and Information Provision
- Maintenance Vehicle Monitoring**
- Bus Related ITS** for Vehicle tracking, Bus Location Info, Passenger Counting, IC-card
- Taxi Dispatching for** Response to Taxi Customers, Monitoring Traffic Condition
- TOC** for smoother Traffic/Transit Operation

# MODERNIZAÇÃO do CENTRO DE OPERAÇÕES DE TRÁFEGO com a IMPLEMENTAÇÃO de EQUIPAMENTOS DE ITS na CIDADE DO RIO



## Further Deployment

**Adaptive Signal Control**  
For More Smoother Traffic

30/2265  
1400/2265

ITAKA is already installed 30 locations, more expansion is needed for more smoother traffic

**VMS for More Information Provision**

Gathered information from several systems shall disseminate via VMSs

34  
100

**CCTV for Infrastructure Monitoring**

CCTVs for ITAKA are installed 120, Other 585 CCTVs installed already. Utilizing CCTV's Motion Picture Analysis Software shall be added.

585+120  
585+350

**OCR for Enforcement and Monitoring Traffic Condition**

OCR and other systems are separated. The data shall be utilized as centralized management for traffic metering, real time point speed data monitoring

387  
487

**Work Zone Monitoring for Safer Road Work and Information Provision**  
SECONSERVA

All of Work Zone Information shall be gathered in advance and disseminate information users and operators

None  
Prepared

**Parking Availability Information Provision**  
SECONSERVA and Private Companies

Parking Availability Information shall be collect and provision via VMS, Web, Car Navigation

None  
Prepared

**Concentrated Infrastructure Monitoring**

Accuracy improvement for detecting incidents

Existing  
Improved

**MOE for Weather and Air Monitoring**

Road side weather information shall be gathered operators to provision road side weather information to users

None  
Installed

**DYNAMIC LANE MANEGAMENT**  
For More Utilization of Existing Road Network

Traffic Detector shall deploy to count traffic volume to determine lane direction dynamically

10 location Manual  
Dynamic Operation

**Bus Related ITS** for Bus Location Info, Passenger Counting, Travel Time Info.

Bus related information disseminate via ITS Center BRT Operation shall be integrated traffic operation for comfortable journey

Not Integrated  
Need to be installed

**Taxi Dispatching for Response to Taxi Customers, Monitoring Traffic Condition**

GPS data shall be utilized for monitoring current traffic condition on time

Some operators already installed  
Utilization

**Rail Crossing Management**  
for More Safer and Secure Traffic With SUPERVIA

Rail Crossing shall be controlled by Rail Operator and also coordinated with Traffic Operator

None  
Prepared

# MODERNIZAÇÃO do CENTRO DE OPERAÇÕES DE TRÁFEGO com a IMPLEMENTAÇÃO de EQUIPAMENTOS DE ITS na RMRJ

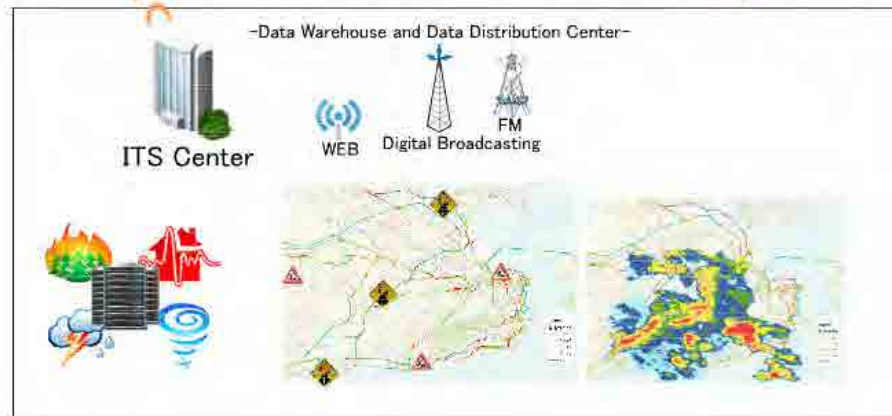


NITTRANS and other municipalities almost same condition

## Further Deployment

 <p><b>Adaptive Signal Control</b> For More Smoother Traffic</p> <p>None</p> <p>Should be Prepared</p>	 <p><b>MOE for Weather and Air Monitoring</b></p> <p>None</p> <p>Road side weather information shall be gathered operators to provision road side weather information to users</p> <p>Should be Prepared</p>
 <p><b>VMS for More Information Provision</b></p> <p>None</p> <p>Should be Prepared</p>	 <p><b>DYNAMIC LANE MANEGAMENT</b> For More Utilization of Existing Road Network</p> <p>None</p> <p>Traffic Detector shall deploy to count traffic volume to determine lane direction dynamically</p> <p>To be determined</p>
 <p><b>CCTV for Infrastructure Monitoring</b></p> <p>None</p> <p>Should be Prepared</p>	 <p><b>Bus Related ITS</b> for Bus Location info, Passenger Counting, Travel Time Info.</p> <p>None</p> <p>Bus related information disseminate via ITS Center. BRT Operation shall be integrated traffic operation for comfortable journey</p> <p>Should be Prepared</p>
 <p><b>OCR for Enforcement and Monitoring Traffic Condition</b></p> <p>None</p> <p>Should be Prepared</p>	 <p><b>Taxi Dispatching for</b> Response to Taxi Customers, Monitoring Traffic Condition</p> <p>None</p> <p>GPS data shall be utilized for monitoring current traffic condition on time</p> <p>Should be Prepared</p>
 <p><b>Work Zone Monitoring</b> for Safer Road Work and Information Provision</p> <p>None</p> <p>All of Work Zone Information shall be gathered in advance and disseminate information users and operators</p> <p>Should be Prepared</p>	 <p><b>TOC</b> for smoother Traffic/Transit Operation</p> <p>Not Sufficient</p> <p>Improvement of Traffic Operation Control center need to be improved. Transit Operation Center shall be established in near future</p> <p>Exchange and Integration</p>
 <p><b>Parking Availability Information Provision</b></p> <p>None</p> <p>Parking Availability Information shall be collect and provision via VMS, Web, Car Navigation</p> <p>Prepared</p>	 <p><b>Rail Crossing Management</b> for More Safer and Secure Traffic With SUPERVIA</p> <p>None</p> <p>Rail Crossing shall be controlled by Rail Operator and also coordinated with Traffic Operator</p> <p>Prepared</p>

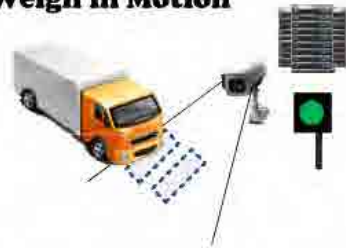
# GERENCIAMENTO da OPERAÇÃO de VEÍCULOS DE EMERGÊNCIA





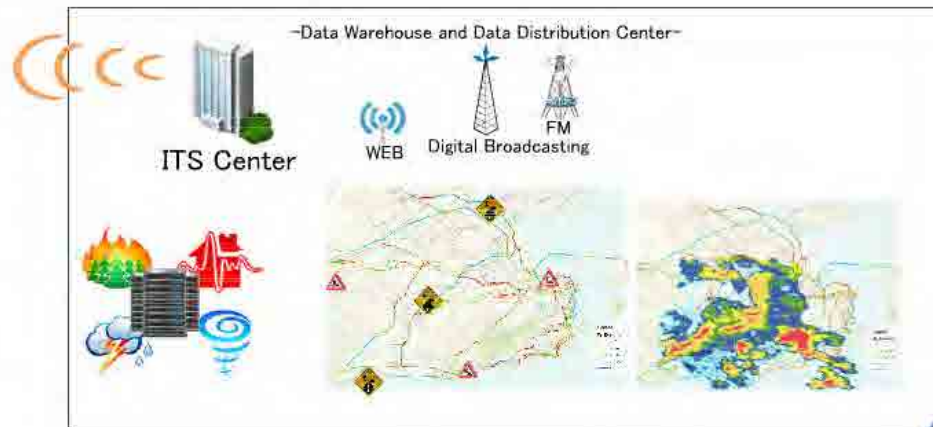
# GERENCIAMENTO e OPERAÇÃO de VEÍCULOS COMERCIAIS

## Weigh in Motion



More ITS Projects will be considered in next phase

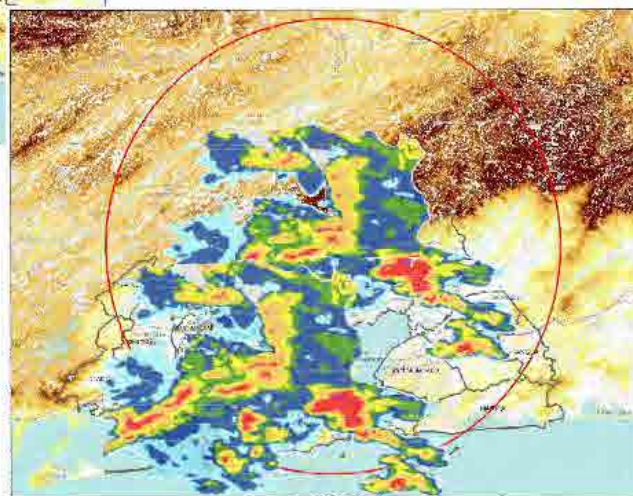
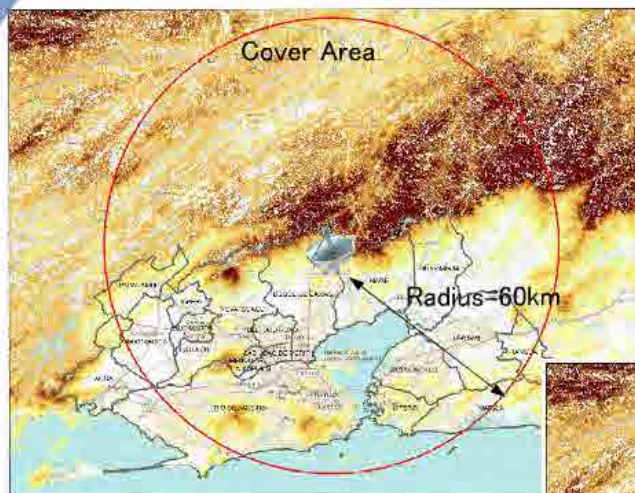
## Information Provision via On-Board UNIT



# SISTEMAS AVANÇADOS de SEGURANÇA em VEÍCULOS



# IMPLANTAÇÃO de RADARES X-BAND para MAIOR PRECISÃO sobre CONDIÇÕES CLIMÁTICAS



# 10. Cronograma de Implementação

ITS Project Name	2013				2014				2015				2016				2017				2018				2019			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
1 ITS Center	PQ,TENDERING/ DD				Construction/Deployment																							
2 Real Time Traffic/Transport Condition Information Processing	PQ,TENDERING/ DD				Construction/Deployment																							
3 Olympic Security and Transport Coordination Center	PQ,TENDERING/ DD				Construction/Deployment																							
4 Bus Condition Information Provision	PQ,TENDERING/ DD				Construction/Deployment																							
5 Dissemination of On-Board UNIT for more Integrated Transport	PQ,TENDERING/ DD				Construction/Deployment																							
6 Information Exchange of Road Operator									PQ,TENDERING/ DD				Construction/Deployment															
7 Information Exchange via ITS Center between Municipalities	PQ,TENDERING/ DD				Construction/Deployment								PQ,TENDERING/ DD				Construction/Deployment											
8 Improvement of Traffic/Transit Operational Center with Essential ITS Equipment at Rio de Janeiro Municipality Area	PQ,TENDERING/ DD				Construction/Deployment																							
9 Improvement of Traffic/Transit Operational Center with Essential ITS Equipment at Other Municipality Area in RMRJ									PQ,TENDERING/ DD				Construction/Deployment															
10 Emergency Vehicle Operating Management	PQ,TENDERING/ DD				Construction/Deployment								Construction/Deployment															
11 Commercial Vehicle Operation and Management									PQ,TENDERING/ DD				Construction/Deployment															
12 Advanced Vehicle Safety Systems	Car Maker's Technological Development Field																											
13 Deployment of X-band Radar	Need to confirm development policy for weather monitoring in RMRJ																											

- Construction/Deployment :Priority Project
- Construction/Deployment :Secondary Project
- :Further Expansion and Integration for Interaction Projects

# 11. Avaliação Econômica dos Projetos ITS

## Projetos Avaliados

- Centro ITS
- Centro Olímpico de Coordenação de Segurança e Transportes
  - Sistema de Prioridade para o BRT
  - Sistema de Informações para Ônibus
    - Sistema de Localização de Ônibus
  - Disseminação de unidades a bordo para maior integração dos transportes
    - Coleta Automatizada de Pedágio (ETC) e Cobrança Eletrônica em Áreas Especiais (ERP)

em Vermelho: Sistemas Avaliados

# 11. Avaliação Econômica -Metodologia-

O impacto de cada sistema resultará em:

- Redução dos Custos de Tempos de Viagem **-TTC-**
- Redução dos Custos de Operação dos Veículos **-VOC-**

Cenários de Simulação:

**-com** projeto, **sem** projeto-

**DCF** - Método para análise econômica de projetos ITS

DCF; Discount Cash Flow

# 11. Avaliação Econômica - Simulação -



# 11. Avaliação Econômica - Resultados -

PROJECTS	NPV	B/C	EIRR
ITS CENTER	233.13	4.92	43.0%
BRT PRIORITY SYSTEM	216.13	6.64	61.9%
BUS LOCATION INFORMATION PROVISION	197.80	4.21	32.7%
ETC	75.28	5.89	52.0%
ERP	724.09	6.18	23.2%

**NPV; Net Present Value**

**B/C; Cost Benefit**

**EIRR; Economic Internal Rate Return**



# 12. Projetos de ITS para Curto-Prazo e Olimpíadas

ITS Project Name	2013				2014				2015				2016				2017				2018				2019			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
1 ITS Center					PQ,TENDERING/ DD				Construction/Deployment																			
2 Real Time Traffic/Transport Condition Information Processing					PQ,TENDERING/ DD				Construction/Deployment																			
3 Olympic Security and Transport Coordination Center					PQ,TENDERING/ DD				Construction/Deployment																			
4 Bus Condition Information Provision					PQ,TENDERING/ DD				Construction/Deployment																			
5 Dissemination of On-Board UNIT for more Integrated Transport					PQ,TENDERING/ DD				Construction/Deployment																			
6 Information Exchange of Road Operator									PQ,TENDERING/ DD				Construction/Deployment															
7 Information Exchange via ITS Center between Municipalities					PQ,TENDERING/ DD				Construction/Deployment								PQ,TENDERING/ DD				Construction/Deployment							
8 Improvement of Traffic/Transit Operational Center with Essential ITS Equipment at Rio de Janeiro Municipality Area					PQ,TENDERING/ DD				Construction/Deployment																			
9 Improvement of Traffic/Transit Operational Center with Essential ITS Equipment at Other Municipality Area in RMRJ									PQ,TENDERING/ DD								Construction/Deployment											
10 Emergency Vehicle Operating Management					PQ,TENDERING/ DD				Construction/Deployment								Construction/Deployment											
11 Commercial Vehicle Operation and Management									PQ,TENDERING/ DD								Construction/Deployment											
12 Advanced Vehicle Safety Systems	Car Maker's Technological Development Field																											
13 Deployment of X-band Radar	Need to confirm development policy for weather monitoring in RMRJ																											

Construction/Deployment :Priority Project  
Construction/Deployment :Secondary Project  
 :Further Expansion and Integration for Interaction Projects

Projetos de ITS selecionados para Curto-Prazo:  
 1,2,3,4,5,7,8 and 10

# Conclusão

- Integração / Troca de Informações
- Integração Operacional de Tráfego e Transportes Público
- Interoperabilidade entre Segurança, Transportes Público e Tráfego
- Alto Benefício Econômico das Soluções ITS
- 8 Projetos de ITS selecionados para Curto-Prazo



**Tempo é Curto!! BUT Keep Calm and Carry On**

# ITS PROJECT ARCHITECTURE

*ITS Master Plan of  
Rio de Janeiro*



**GOVERNO DO  
Rio de  
Janeiro**

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**1. ITS PROJECT ARCHITECTURE**

**2. EXISTING SYSTEM EVALUATION**

**3. SERVICE PACKAGES REFERENCE**

## **1. ITS PROJECT ARCHITECTURE**

## List of ITS Projects and Deployment Schedule

No.	ITS Project Name
1	ITS Center
2	Real Time Traffic/Transport Condition Information Processing
3	Olympic Security and Transport Coordination Center
4	Bus Condition Information Provision
5	Dissemination of On-Board Unit for more Integrated Transport
6	Information Exchange of Road Operators
7	Information Exchange via ITS center between Municipalities
8	Improvement of Traffic/Transit Operational Center with Essential ITS Equipment at Rio de Janeiro Municipality Area
9	Improvement of Traffic/Transit Operational Center with Essential ITS Equipment at Other Municipality Area in RMRJ
10	Emergency Vehicle Operating Management
11	Commercial Vehicle Operation and Management
12	Advanced Vehicle Safety Systems
13	Deployment of X-Band Radars

ITS Project Name	2013				2014				2015				2016				2017				2018				2019			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
1 ITS Center																												
2 Real Time Traffic/Transport Condition Information Processing																												
3 Olympic Security and Transport Coordination Center																												
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13 Deployment of X-band Radar	Need to confirm development policy for weather monitoring in RMRJ																											

Construction/Deployment : Priority Project  
Construction/Deployment : Secondary Project  
 : Further Expansion and Integration for Interaction Projects

1Q; From January. \*\*PQ; Procurement DD; Detailed Design

ITS Project Name	1.ITS Center -for Information Integration and Dissemination-
Objectives	Is to integrate all transport/transit related information in one place, Is to process for making useful information all of stake holders, Is to disseminate information various way of media for everyone
<p>Graphic</p>	
Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area
Required System	1. Information Exchange System 2. ITS Center Building (COR or CICC or New building)
Rough order of magnitude estimate	R\$ 59.900.000/JPY 2,371,000,000
Implementation Period	From short-term to long-term -Stepwise development-
ITS Service Packages Reference No.	AD area, ATIS area, ATMS06, ATMS09
Remarks	Intensively, quickly development shall be done in a short term for Olympic preparation. After Olympic games, it shall expand and improve in a stepwise manner along with other related system development.



ITS Project Name	2.Real Time Traffic/Transport Condition Information Processing
Objectives	Gathering information and processing to monitor actual real time condition of Rio de Janeiro Metropolitan Area
Graphic	
Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area
Required System	<ol style="list-style-type: none"> <li>1. Probe Data System</li> <li>2. Transit Data System</li> <li>3. Point Data System</li> <li>4. Incident Monitoring System</li> <li>5. Weather Monitoring System</li> </ol>
Rough order of magnitude estimate	R\$45.900.000/JPY1,815,000,000
Implementation Period	Short Term; RJ municipality area Long term; step wise development
ITS Service Packages Reference No.	AD area, ATIS area, ATMS06, ATMS09
Remarks	For fulfillment of Traffic/Transit management, real time traffic/transit data shall be gathered, processed and supervised intensively. Weather, Disaster information is also important.





ITS Project Name	3.Olympic Security and Transport Coordination Center
Objectives	Expand and Improve Function of Existing ITS Equipment for more Smoother and Smarter Transportation and Transit
<p>Graphic</p>	
Target Area (Area to be applied)	Rio de Janeiro Municipality Area
Required System	<ol style="list-style-type: none"> <li>1. System Integration for Olympic Security and Transport Coordination</li> <li>2. Information Exchange System</li> </ol>
Rough Order of Magnitude Estimate	R\$48.900.000/JPY1,936,000,000
Implementation Period	Short Term
ITS Service Packages Reference No.	ATIS01, APTS 05,06,07,08,09,10 and 11 ATMS06 and EM area
Remarks	Integration of Traffic/Transit and Security for Olympic success. The project shall be commenced immediately.

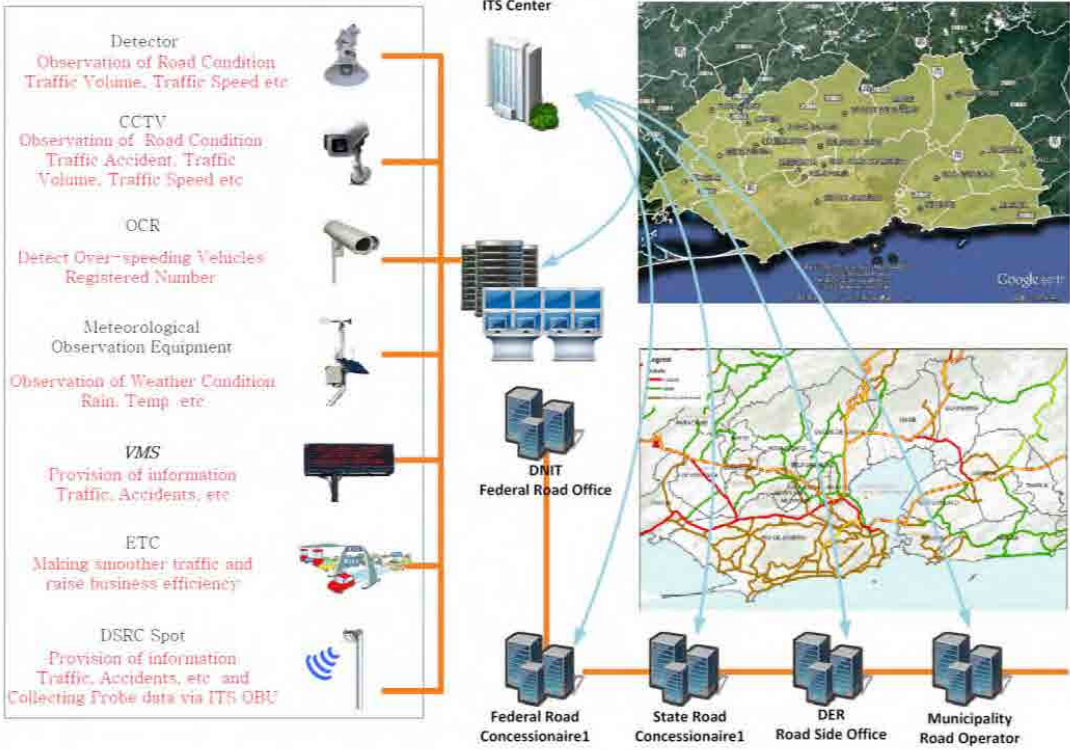


ITS Project Name	4. Bus Condition Information Provision
Objectives	Is to enhance passenger satisfaction,
Graphic	
Target Area (Area to be applied)	Rio de Janeiro Municipality Area to RMRJ
Required System	<p>1. Bus Condition Provision System</p> <ul style="list-style-type: none"> <li>- Bus Information Panel for Bus stop (500 Bus stops)</li> <li>- Information Display in Bus Terminal (44 Bus Terminal)</li> <li>- Information Display in Bus (3000 Buses)</li> <li>- Bus Operation Center (3 Bus Operation Centers)</li> <li>- GPS for Bus (8000 Buses)</li> </ul>
Rough order of magnitude estimate	R\$122.300.000/JPY4,840,000,000
Implementation Period	Short-term; RJ municipality area Long-term; other municipalities and inter buses
ITS Service Packages Reference No.	APTS05,06,07,08,09,10 and 11
Remarks	<p>Bus arrival information is useful for every bus user. This project is also important for spectators of Olympic games.</p> <p>More precisely deployment planning shall be done before installing equipment each bus stops.</p>

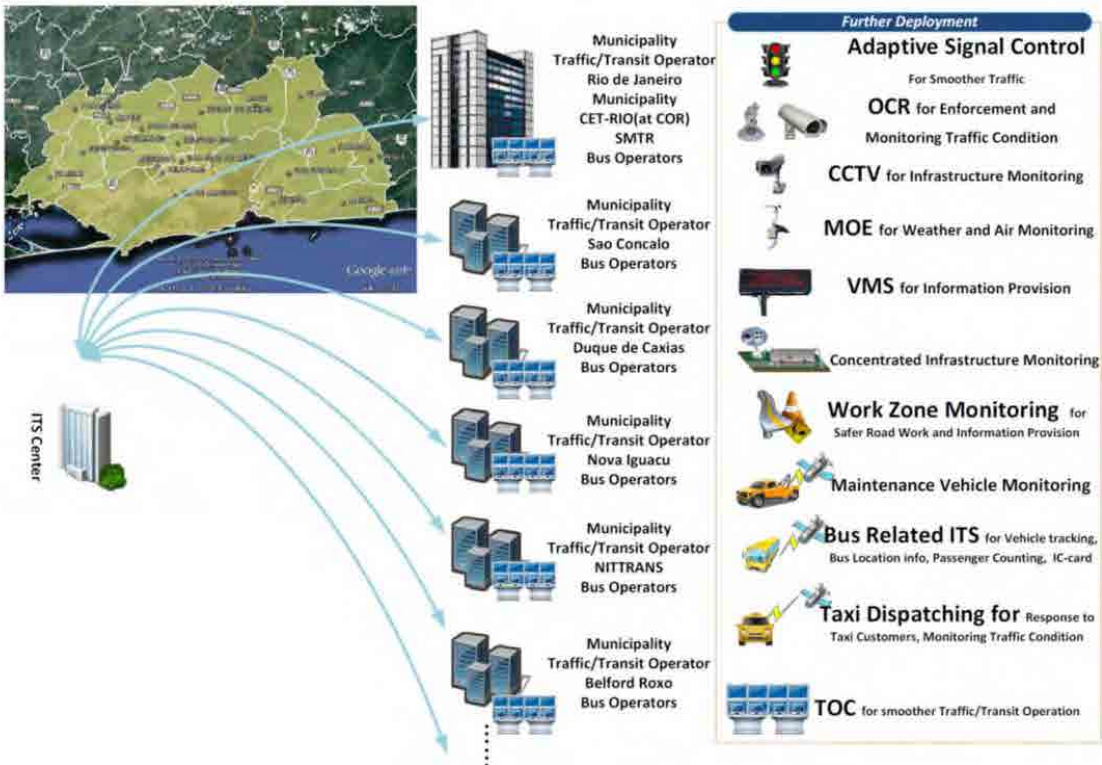


ITS Project Name	5.Dissemination of On-Board Unit for more integrated Transport
Objectives	<p>Is to reduce congestion at toll gate</p> <p>Is to manage traffic demand</p> <p>Is to enhance more connectivity of all of modes of transport</p>
Graphic	
Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area
Required System	<ol style="list-style-type: none"> <li>1. ETC system (8 locations)</li> <li>2. Free Flow Cashless System (50 parking areas)</li> <li>3. ERP System (35 locations)</li> <li>4. On-Board Unit (200000 vehicles)</li> </ol>
Rough order of magnitude estimate	R\$344.900.000/JPY13,643,000,000
Implementation Period	<p>Short-term; OBU Dissemination, ETC promotion of utilization, Parking DSRC electronic payment and integration of IC-Card.</p> <p>Long-term; ERP and DSRC information dissemination.</p>
ITS Service Packages Reference No.	ATMS10,ATIS04 and 10
Remarks	It is important for to disseminate on-board unit for further utilization of traffic/transport information systems.



ITS Project Name	6.Information Exchange of road operators							
Objectives	Is to connect road operators in terms of traffic information Is to enhance essential information provision for road users Is to ensure more smoother traffic flow							
Graphic	 <p>The diagram illustrates the ITS architecture. On the left, various sensors and equipment are listed: Detector (Observation of Road Condition, Traffic Volume, Traffic Speed etc), CCTV (Observation of Road Condition, Traffic Accident, Traffic Volume, Traffic Speed etc), OCR (Detect Over-speeding Vehicles, Registered Number), Meteorological Observation Equipment (Observation of Weather Condition, Rain, Temp. etc), VMS (Provision of information, Traffic, Accidents, etc), ETC (Making smoother traffic and raise business efficiency), and DSRC Spot (Provision of information, Traffic, Accidents, etc and Collecting Probe data via ITS OBU). These sensors feed data into the ITS Center, which is connected to the DNIT Federal Road Office. The DNIT Federal Road Office then distributes information to four levels of road operators: Federal Road Concessionaire1, State Road Concessionaire1, DER Road Side Office, and Municipality Road Operator. Two maps are shown: a Google Earth satellite map and a network map of roads.</p>							
Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area							
Required System	<table border="0"> <tr> <td data-bbox="563 1417 1002 1451">1. Information Exchange System</td> <td data-bbox="1010 1417 1374 1451">4. OCR (21 sets)</td> </tr> <tr> <td data-bbox="563 1453 1002 1487">2. VMS (36 sets)</td> <td data-bbox="1010 1453 1374 1487">5. MOE (10 sets)</td> </tr> <tr> <td data-bbox="563 1489 1002 1523">3. CCTV (11 sets)</td> <td data-bbox="1010 1489 1374 1547">6. Rail Crossing Management (4 sets)</td> </tr> </table>		1. Information Exchange System	4. OCR (21 sets)	2. VMS (36 sets)	5. MOE (10 sets)	3. CCTV (11 sets)	6. Rail Crossing Management (4 sets)
1. Information Exchange System	4. OCR (21 sets)							
2. VMS (36 sets)	5. MOE (10 sets)							
3. CCTV (11 sets)	6. Rail Crossing Management (4 sets)							
Rough order of magnitude estimate	R\$55.400.000/JPY2,193,000,000							
Implementation Period	From mid-term to long-term							
ITS Service Packages Reference No.	AD1,2,3 ATIS06 ATMS01,02,04,06,07,08,10,23							
Remarks	Highways related information shall be exchanged to manage and control traffic. Other essential equipment shall be installed on federal and state government road.							



ITS Project Name	7.Information Exchange via ITS center between municipalities
Objectives	Is to monitor traffic and transit for more secure transport Is to control traffic and transit for more smoother transport
Graphic	 <p>The diagram illustrates the ITS Project Architecture. On the left, an 'ITS Center' is shown as a server rack. Arrows point from this center to several municipalities, each with its own Traffic/Transit Operator and Bus Operators. The municipalities listed are: Rio de Janeiro (Municipality CET-RIO(at COR) SMTR), Sao Concalo, Duque de Caxias, Nova Iguacu, and Belford Roxo. To the right, a box titled 'Further Deployment' lists various services: Adaptive Signal Control (for smoother traffic), OCR for Enforcement and Monitoring Traffic Condition, CCTV for Infrastructure Monitoring, MOE for Weather and Air Monitoring, VMS for Information Provision, Concentrated Infrastructure Monitoring, Work Zone Monitoring (for safer road work and information provision), Maintenance Vehicle Monitoring, Bus Related ITS (for vehicle tracking, bus location info, passenger counting, IC-card), Taxi Dispatching for response to taxi customers and monitoring traffic condition, and TOC for smoother traffic/transit operation.</p>
Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area
Required System	1.Information Exchange System
Rough order of magnitude estimate	R\$58.100.000/JPY2,299,000,000
Implementation Period	Short-term; Rio de Janeiro municipalities Mid-term to long-term; other municipalities in RMRJ
ITS Service Packages Reference No.	AD1,2,3 ATIS06, ATMS06
Remarks	All municipalities share information and cauterized data is processed at ITS center. After processing, center of all municipalities in RMRJ can receive traffic/transit related information via ITS center.



ITS Project Name	8.Improvement of Traffic/Transit Operational Center with Essential ITS Equipment at Rio Municipality Area											
Objectives	Expand and Improve Function of Existing ITS Equipment for more Smoother and Smarter Transportation and Transit											
Graphic												
Target Area (Area to be applied)	Rio Municipality Area											
Required System	<table border="0"> <tr> <td>1. Adaptive Signal Control (400 Intersections)</td> <td>6. MOE (5 sets)</td> </tr> <tr> <td>2. VMS (58 sets)</td> <td>7. Dynamic Lane Management (10 locations)</td> </tr> <tr> <td>3. CCTV (5 sets)</td> <td>8. Taxi Dispatching System(10 system)</td> </tr> <tr> <td>4. OCR (68 sets)</td> <td>9. Rail Crossing Management (11 sets)</td> </tr> <tr> <td>5. Parking Availability Information Provision (10 system)</td> <td></td> </tr> </table>		1. Adaptive Signal Control (400 Intersections)	6. MOE (5 sets)	2. VMS (58 sets)	7. Dynamic Lane Management (10 locations)	3. CCTV (5 sets)	8. Taxi Dispatching System(10 system)	4. OCR (68 sets)	9. Rail Crossing Management (11 sets)	5. Parking Availability Information Provision (10 system)	
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3. CCTV (5 sets)	8. Taxi Dispatching System(10 system)											
4. OCR (68 sets)	9. Rail Crossing Management (11 sets)											
5. Parking Availability Information Provision (10 system)												
Rough order of magnitude estimate	R\$ 245.600.000/JPY9,716,000,000											
Implementation Period	Short-term; Data integration and adaptive signal expansion and VMS Mid-term; others											
ITS Service Packages Ref No.	ATMS area, MC area, AD1, APTS01,02,04,05,06,07,08,09,10 and11											
Remarks	System integration, new VMSS, data utilization is necessary.											





ITS Project Name	9.Improvement of Traffic/Transit Operational Center with Essential ITS Equipment at Other Municipality Area in RMRJ													
Objectives	Expand and Improve Function of Existing ITS Equipment for more Smoother and Smarter Transportation and Transit													
Graphic	<p style="text-align: center;"><b>Further Deployment</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> <p><b>Adaptive Signal Control</b> For More Smoother Traffic</p> <p>None Should be Prepared</p> </td> <td style="width: 50%; padding: 5px;"> <p><b>MOE for Weather and Air Monitoring</b></p> <p>None Should be Prepared</p> <p>Road side weather information shall be gathered operators to provision road side weather information to users</p> </td> </tr> <tr> <td style="padding: 5px;"> <p><b>VMS for More Information Provision</b></p> <p>None Should be Prepared</p> </td> <td style="padding: 5px;"> <p><b>DYNAMIC LANE MANEGAMENT</b> For More Utilization of Existing Road Network</p> <p>None To be determined</p> <p>Traffic Detector shall deploy to count traffic volume to determine lane direction dynamically</p> </td> </tr> <tr> <td style="padding: 5px;"> <p><b>CCTV for Infrastructure Monitoring</b></p> <p>None Should be Prepared</p> </td> <td style="padding: 5px;"> <p><b>Bus Related ITS</b> for Bus Location info, Passenger Counting, Travel Time Info.</p> <p>None Should be Prepared</p> <p>Bus related information disseminate via ITS Center. BRT Operation shall be integrated traffic operation for comfortable journey</p> </td> </tr> <tr> <td style="padding: 5px;"> <p><b>OCR for Enforcement and Monitoring Traffic Condition</b></p> <p>None Should be Prepared</p> </td> <td style="padding: 5px;"> <p><b>Taxi Dispatching for</b> Response to Taxi Customers, Monitoring Traffic Condition</p> <p>None Should be Prepared</p> <p>GPS data shall be utilized for monitoring current traffic condition on time</p> </td> </tr> <tr> <td style="padding: 5px;"> <p><b>Work Zone Monitoring</b> for Safer Road Work and Information Provision</p> <p>None Should be Prepared</p> <p>All of Work Zone Information shall be gathered in advance and disseminate information users and operators</p> </td> <td style="padding: 5px;"> <p><b>TOC for smoother Traffic/Transit Operation</b></p> <p>Not Sufficient Exchange and Installation</p> <p>Improvement of Traffic Operation Control center need to be improved. Transit Operation Center shall be established in near future</p> </td> </tr> <tr> <td style="padding: 5px;"> <p><b>Parking Availability Information Provision</b></p> <p>None Prepared</p> <p>Parking Availability Information shall be collect and provision via VMS, Web, Car Navigation</p> </td> <td style="padding: 5px;"> <p><b>Rail Crossing Management</b> for More Safer and Secure Traffic With SUPERVIA</p> <p>None Prepared</p> <p>Rail Crossing shall be controlled by Rail Operator and also coordinated with Traffic Operator</p> </td> </tr> </table>		<p><b>Adaptive Signal Control</b> For More Smoother Traffic</p> <p>None Should be Prepared</p>	<p><b>MOE for Weather and Air Monitoring</b></p> <p>None Should be Prepared</p> <p>Road side weather information shall be gathered operators to provision road side weather information to users</p>	<p><b>VMS for More Information Provision</b></p> <p>None Should be Prepared</p>	<p><b>DYNAMIC LANE MANEGAMENT</b> For More Utilization of Existing Road Network</p> <p>None To be determined</p> <p>Traffic Detector shall deploy to count traffic volume to determine lane direction dynamically</p>	<p><b>CCTV for Infrastructure Monitoring</b></p> <p>None Should be Prepared</p>	<p><b>Bus Related ITS</b> for Bus Location info, Passenger Counting, Travel Time Info.</p> <p>None Should be Prepared</p> <p>Bus related information disseminate via ITS Center. BRT Operation shall be integrated traffic operation for comfortable journey</p>	<p><b>OCR for Enforcement and Monitoring Traffic Condition</b></p> <p>None Should be Prepared</p>	<p><b>Taxi Dispatching for</b> Response to Taxi Customers, Monitoring Traffic Condition</p> <p>None Should be Prepared</p> <p>GPS data shall be utilized for monitoring current traffic condition on time</p>	<p><b>Work Zone Monitoring</b> for Safer Road Work and Information Provision</p> <p>None Should be Prepared</p> <p>All of Work Zone Information shall be gathered in advance and disseminate information users and operators</p>	<p><b>TOC for smoother Traffic/Transit Operation</b></p> <p>Not Sufficient Exchange and Installation</p> <p>Improvement of Traffic Operation Control center need to be improved. Transit Operation Center shall be established in near future</p>	<p><b>Parking Availability Information Provision</b></p> <p>None Prepared</p> <p>Parking Availability Information shall be collect and provision via VMS, Web, Car Navigation</p>	<p><b>Rail Crossing Management</b> for More Safer and Secure Traffic With SUPERVIA</p> <p>None Prepared</p> <p>Rail Crossing shall be controlled by Rail Operator and also coordinated with Traffic Operator</p>
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Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area													
Required System	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; border-right: 1px solid black; padding: 2px;">1. Adaptive Signal Control (150 Intersections)</td> <td style="width: 33%; border-right: 1px solid black; padding: 2px;">5. MOE (3 sets)</td> <td style="padding: 2px;">6. Taxi Dispatching System (5 system)</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">2. VMS (13 sets)</td> <td style="border-right: 1px solid black; padding: 2px;">7. Rail Crossing Management (88 sets)</td> <td></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">3. CCTV (2 sets)</td> <td></td> <td></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">4. OCR (8 sets)</td> <td></td> <td></td> </tr> </table>		1. Adaptive Signal Control (150 Intersections)	5. MOE (3 sets)	6. Taxi Dispatching System (5 system)	2. VMS (13 sets)	7. Rail Crossing Management (88 sets)		3. CCTV (2 sets)			4. OCR (8 sets)		
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2. VMS (13 sets)	7. Rail Crossing Management (88 sets)													
3. CCTV (2 sets)														
4. OCR (8 sets)														
Rough order of magnitude estimate	R\$204.700.000/JPY9,716,000,000													
Implementation Period	From mid-term to long-term													
ITS Service Packages	ATMS area, MC area, AD1, APTS01,02,04,05,06,07,08,09,10 and11													
Reference No.														
Remarks	Objective cities shall be determined with considering trend of population increasing, production of OD.													




ITS Project Name	10.Emergency Vehicle Operating Management
Objectives	-Prioritize all of emergency vehicles for more quick emergency response
Graphic	
Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area
Required System	1. Traffic Light Prioritizing System for Emergency Vehicle (for 200 Vehicles)
Rough order of magnitude estimate	R\$18.500.000/JPY733,000,000
Implementation Period	Short-term
ITS Service Packages	ATIS10,ATMS06,08, AVSS12 and EM area especially EM02
Reference No.	
Remarks	CICC will be in charge of emergency and hazardous information management center. CICC, is a core of emergency management, and Traffic/Transit center and ITS center shall coordinate several systems for more efficient operation.



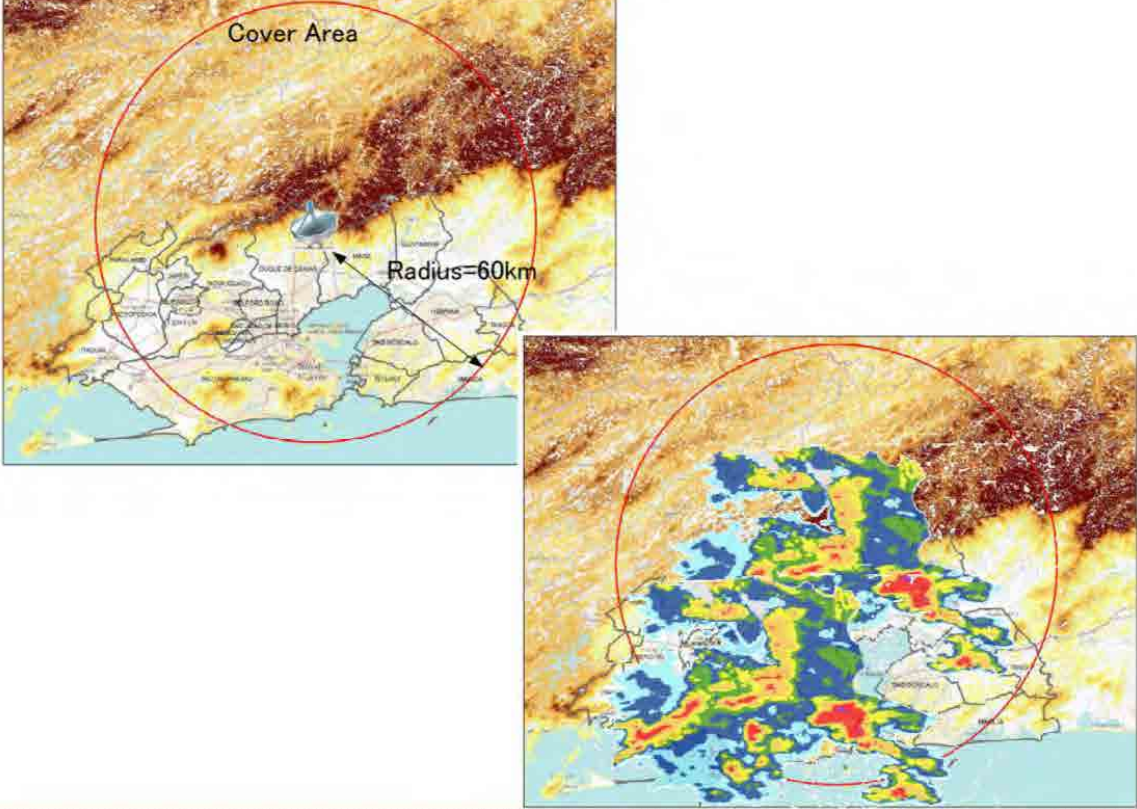


ITS Project Name	11.Commercial Vehicle Operation and Management
Objectives	<ul style="list-style-type: none"> <li>-Enhance automated monitoring for overloaded commercial vehicles</li> <li>-Disseminate traffic related information for more efficient logistics</li> </ul>
<p>Graphic</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><b>Weigh in Motion</b></p>  </div> <div style="border: 1px solid black; background-color: #003366; color: white; padding: 5px; text-align: center;"> <p><b>More ITS Projects will be considered in next phase</b></p> </div> </div> <div style="margin-top: 20px;"> <p><b>Information Provision via On-Board UNIT</b></p>  </div>	
Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area
Required System	<ol style="list-style-type: none"> <li>1. Weigh in Motion System</li> <li>2. On-Board Unit to obtain traffic/transport related information</li> </ol>
Rough order of magnitude estimate	<p>R\$17.600.000/ JPY696,000,000</p> <p>WIM 6 locations and OBU 1000 vehicles</p>
Implementation Period	From Mid-term to long term
ITS Service Packages	CVO Service Area
Reference No.	
Remarks	Needs of information, operation and supervision are shall be clarified more clearly and precisely in January (in study team's next assignment)



ITS Project Name	12. Advanced Vehicle Safety Systems
Objectives	<ul style="list-style-type: none"> <li>- Prevent traffic accident</li> <li>- More comfortable driving</li> </ul>
Graphic	 <p>The graphic contains two diagrams. The top diagram, titled 'Vehicle to Roadway Communication', shows a truck moving at 120km/h towards a car. A red arrow indicates the truck's path. A speech bubble with three exclamation marks '!!!' is above the car. Below the car, there is a control panel with an 'OBU' (On-Board Unit) and a screen displaying a warning: 'High Speed Vehicle Approaching'. The bottom diagram, titled 'Vehicle to Vehicle Communication', shows a green truck performing 'Sudden Breaking' and a red car performing 'Automatic Cruising for Crash Avoidance'. A speech bubble with three exclamation marks '!!!' is above the red car. A 'Milliwave Radar' is shown emitting waves towards the truck. Below the car, there is a 'Video Chatting Communication Between Vehicles' interface showing two screens with human figures.</p>
Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area
Required System	<ol style="list-style-type: none"> <li>1. Vehicle to Roadway Communication System</li> <li>2. Vehicle to Vehicle Communication System</li> </ol>
Rough order of magnitude estimate	Up to car industrial maker's technological development
Implementation Period	Up to car industrial maker's technological development
ITS Service Packages Reference No.	AVSS01 to 12
Remarks	Up to car industrial maker's technological development



ITS Project Name (Actually not ITS Project)	13.Deployment of X-Band Radars
Objectives	<p>Is to grasp more accurate nimbus condition real-time</p> <p>Is to get a date for more precise simulation and weather forecasting</p> <p>Is to provide information for transportation related agencies, entities and concessionaires</p> <p>Is to prepare hazardous incident in advance</p>
Graphic	
	
Target Area (Area to be applied)	Rio de Janeiro Metropolitan Area
Required System	1. X-Band Radar for Rainfall Measurement
Rough order of magnitude estimate	R\$4.600.000/JPY182,000,000
Implementation Period	Implementation shall be coordinated development policy of weather monitoring in RMRJ.
ITS Service Packages Reference No.	Part of ATIS01 (as terminator) MC03,04,06,07 and 11
Remarks	C-band radar is wide area for rainfall observation. X-band MP radar even tough observation area is narrower than C-band radar but can detect rain fall condition more precisely. In addition, X-band radar can information delivery cycle is 1min.

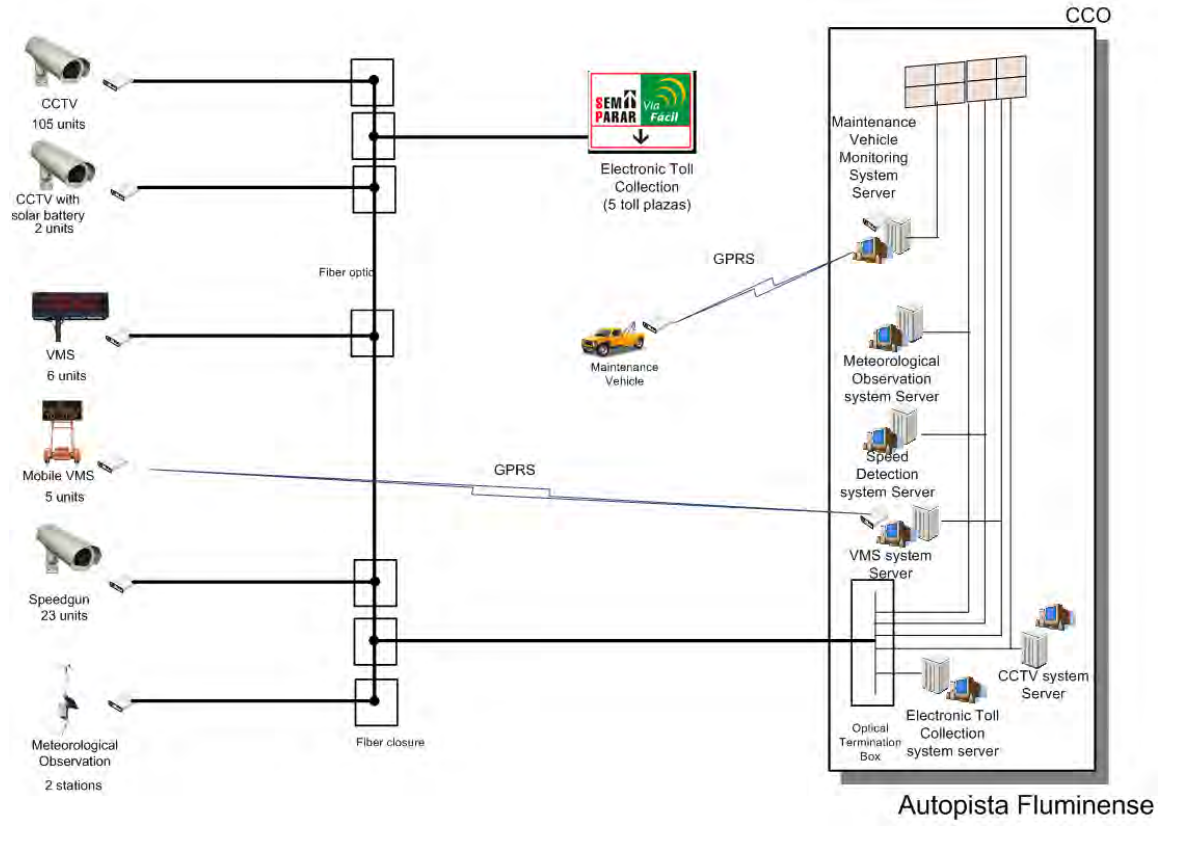


## **2. EXISTING SYSTEM EVALUATION**

## Existing System Evaluation

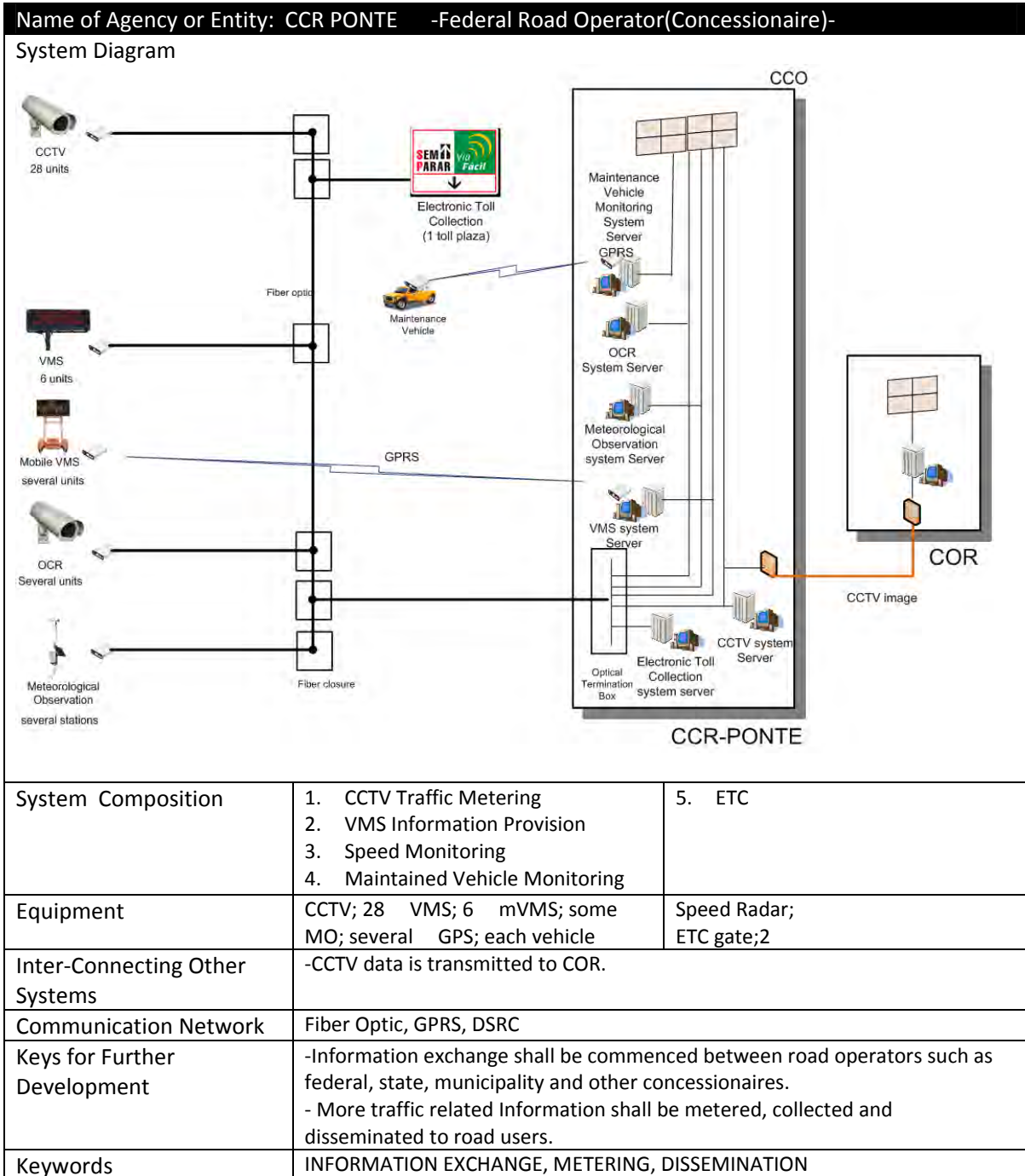
Name of Agency or Entity: Autopista Fuluminense 101 -Federal Road Operator(Concessionaire)-

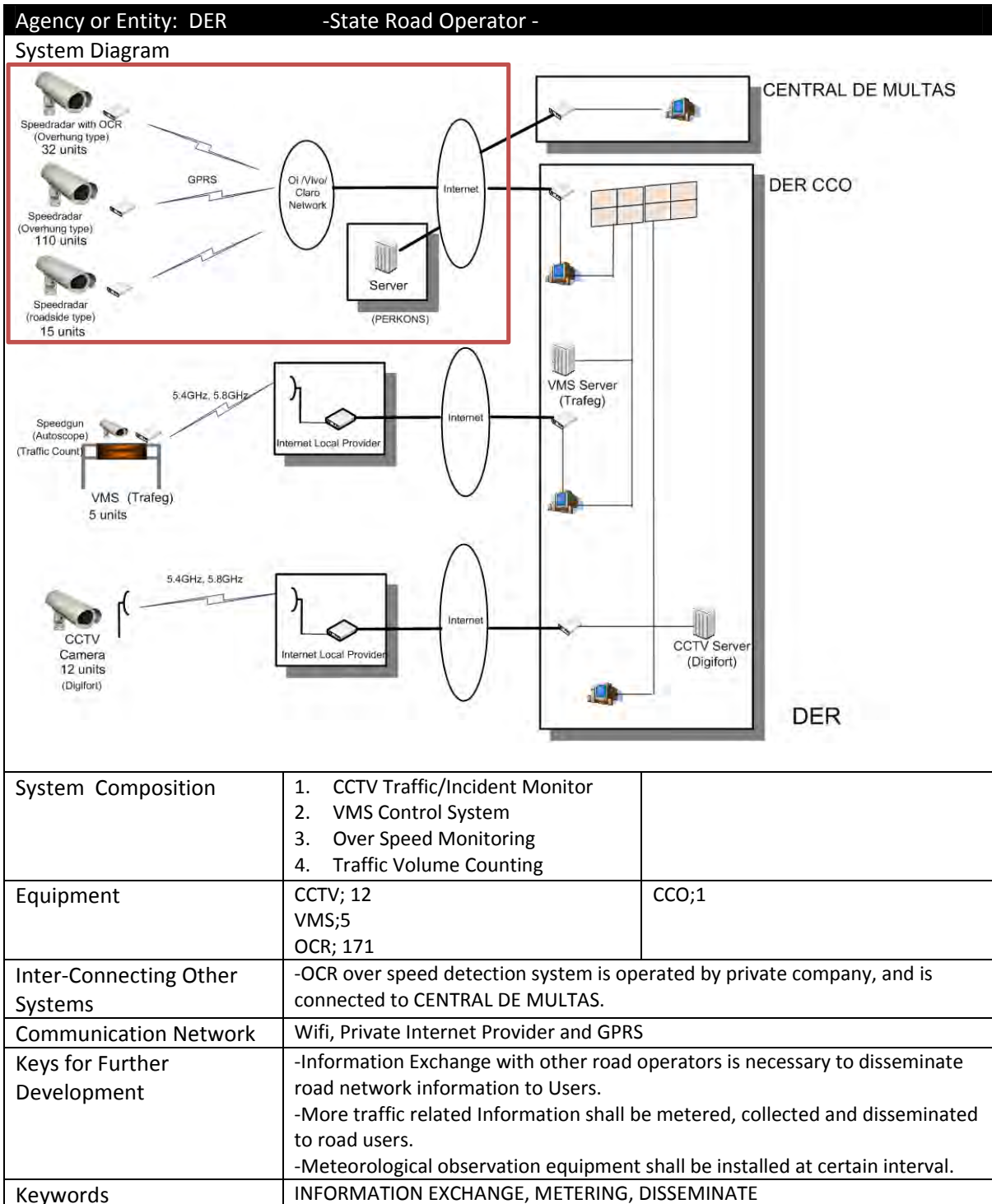
### System Diagram



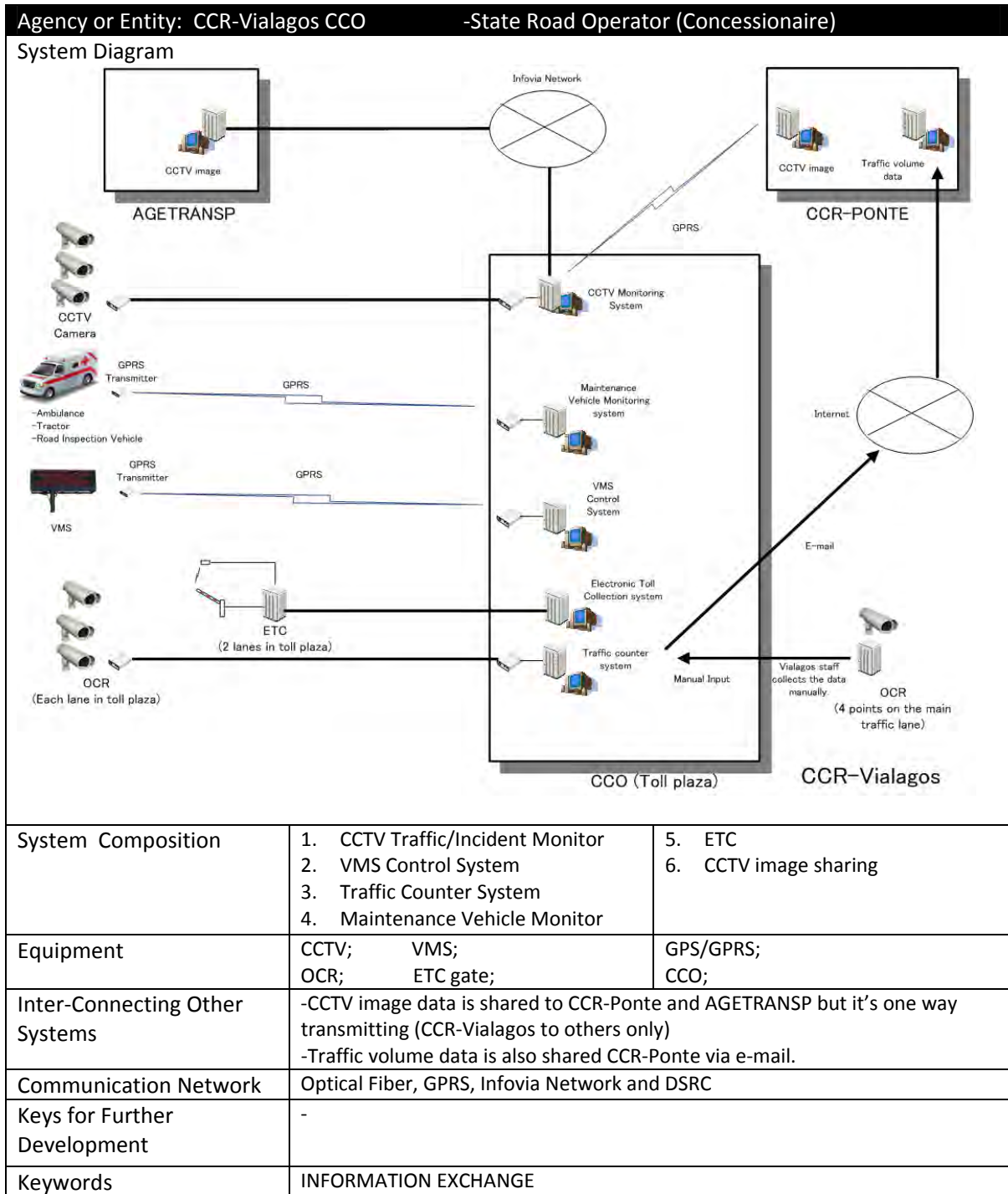
System Composition	1. CCTV Traffic Metering 2. VMS Information Provision 3. Speed Monitoring 4. Maintained Vehicle Monitoring	5. ETC
Equipment	CCTV;107 VMS; 6 mVMS;5 MO;2 GPS; each vehicle	Speed Radar;23 ETC gate;5
Inter-Connecting Other Systems	-CCTV data is transmitted to Autopista (Spain) occasionally.	
Communication Network	Fiber Optic, GPRS, DSRC	
Keys for Further Development	-Information exchange shall be commenced between road operators such as federal, state, municipality and other concessionaires. - More traffic related Information shall be metered, collected and disseminated to road users.	
Keywords	INFORMATION EXCHANGE, METERING, DISSEMINATION	

## Existing System Evaluation



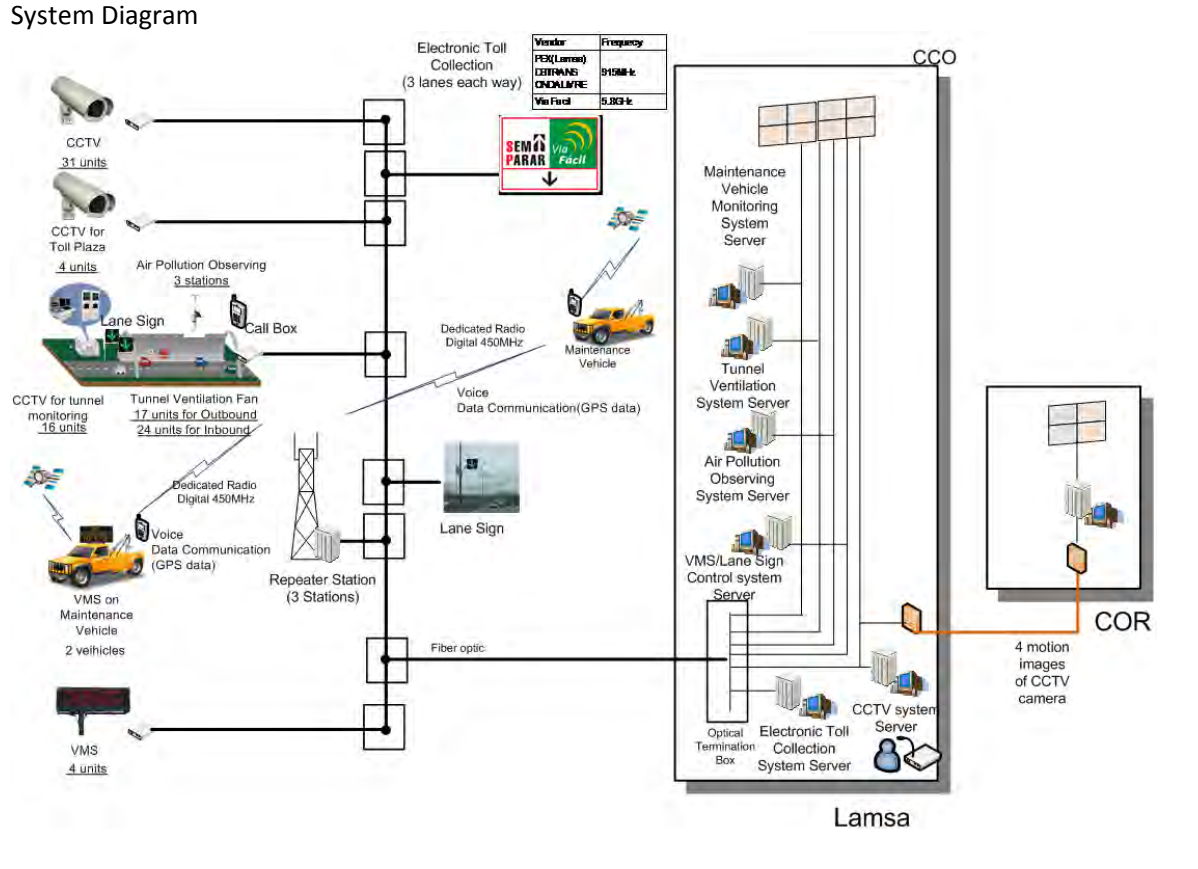


## Existing System Evaluation





Agency or Entity: CCR-Vialagos CCO -State Road Operator (Concessionaire)

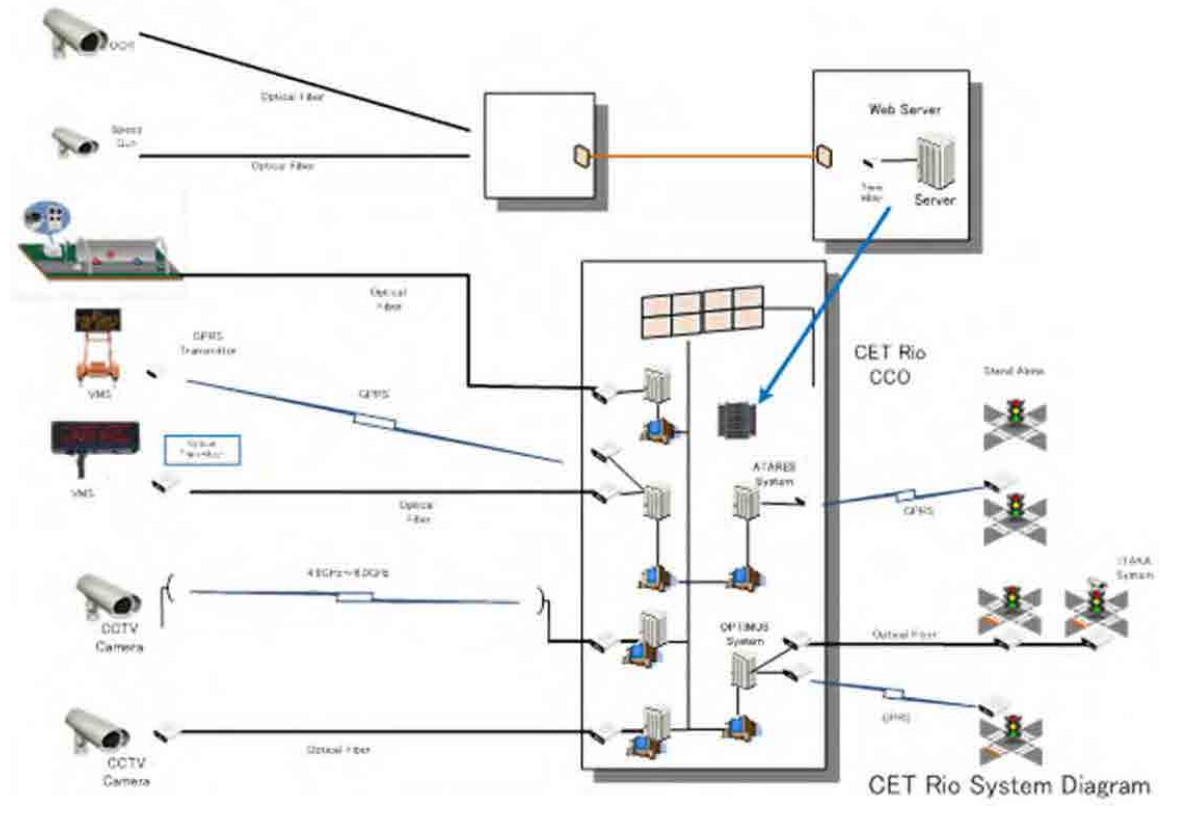


System Composition	1. CCTV Traffic/Incident Monitor 2. VMS Control System 3. Maintenance Vehicle Monitor 4. Arrow Signal System	5. ETC 6. CCTV image sharing
Equipment	CCTV; 6 VMS; 3 OCR; 5 ETC gate; 1 lane each way	GPS/GPRS; each vehicle CCR; 1
Inter-Connecting Other Systems	-4 CCTVs image data is shared to COR	
Communication Network	Optical Fiber, GPRS	
Keys for Further Development	-Important road information such as Av. Brazil which is connected to LAMSA shall exchange for road users and their effective maintenance operation -Traffic volume monitoring is important to maintain important road infrastructure such as Raised Road and Tunnel. Especially Raised Road proper maintenance and monitoring is needed to prevent salt erosion.	
Keywords	INFORMATION EXCHANGE, TRAFFIC METERING, MAINTENANCE/ INFRASTRUCTURE MONITORING,	

## Existing System Evaluation

Name of Agency or Entity: CET-Rio CCO -Municipality Road Operator-

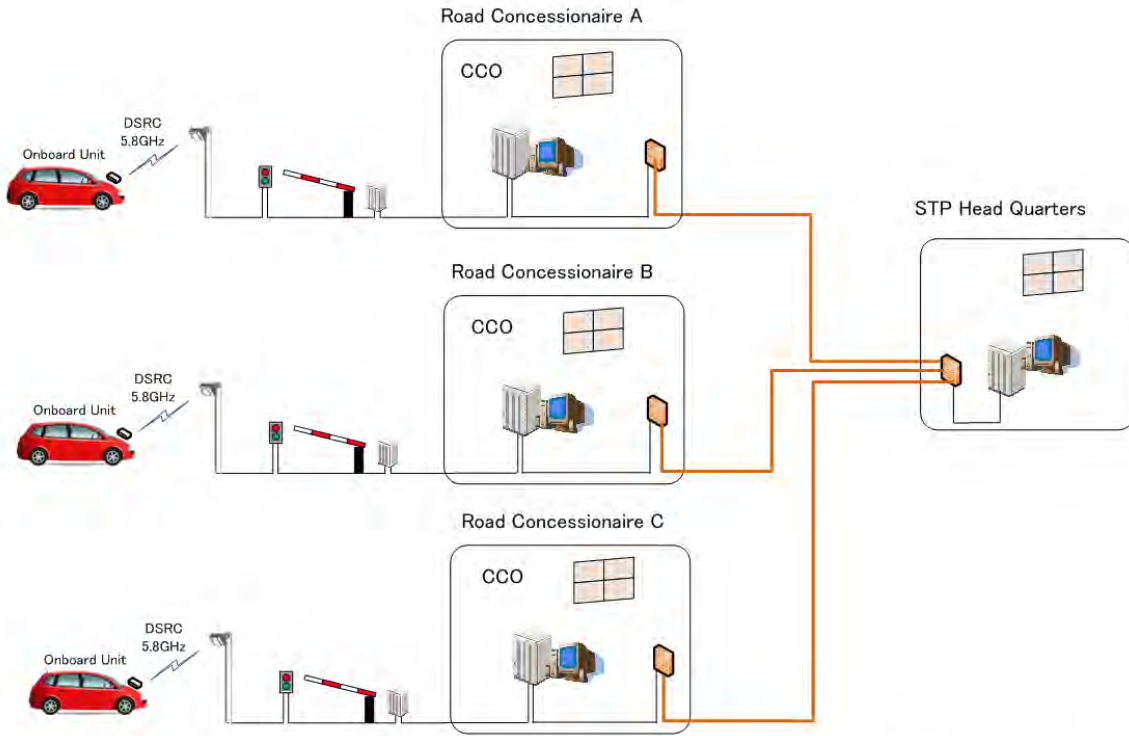
System Diagram



System Composition	<ol style="list-style-type: none"> <li>1. CCTV Traffic Metering</li> <li>2. Signals</li> <li>3. VMS Information Provision</li> <li>4. Speed Radar and OCR</li> </ol>	<ol style="list-style-type: none"> <li>5. Tunnel Monitoring(CCTV Incident Detection, Arrow Signals)</li> <li>6. CET-Rio CCO</li> </ol>
Equipment	CCTV; 705 VMS;34 mVMS;14 Signals;2265	Speed Radar;387
Inter-Connecting Other Systems	This CCO is Located in COR. Physically gathered but not Integrated. Systems in CCO are respectively developed. Each system is independent.	
Communication Network	Optical Fiber, Wimax and GPRS	
Keys for Further Development	<ul style="list-style-type: none"> <li>-CCO shall be integrated other road operators (Federal, State and concessionaires), transit operators for cooperating land transport.</li> <li>-Expand a function of traffic/transport and transit information dissemination via broad casting FM or other media.</li> <li>-Dedicated short range communication also shall be utilized for information dissemination, traffic demand management etc.</li> </ul>	
Keywords	INTEGRATION, COOPERATION, DISSEMINATION	

Name of Agency or Entity: STP (Via Facil) -ETC Operator-

System Diagram



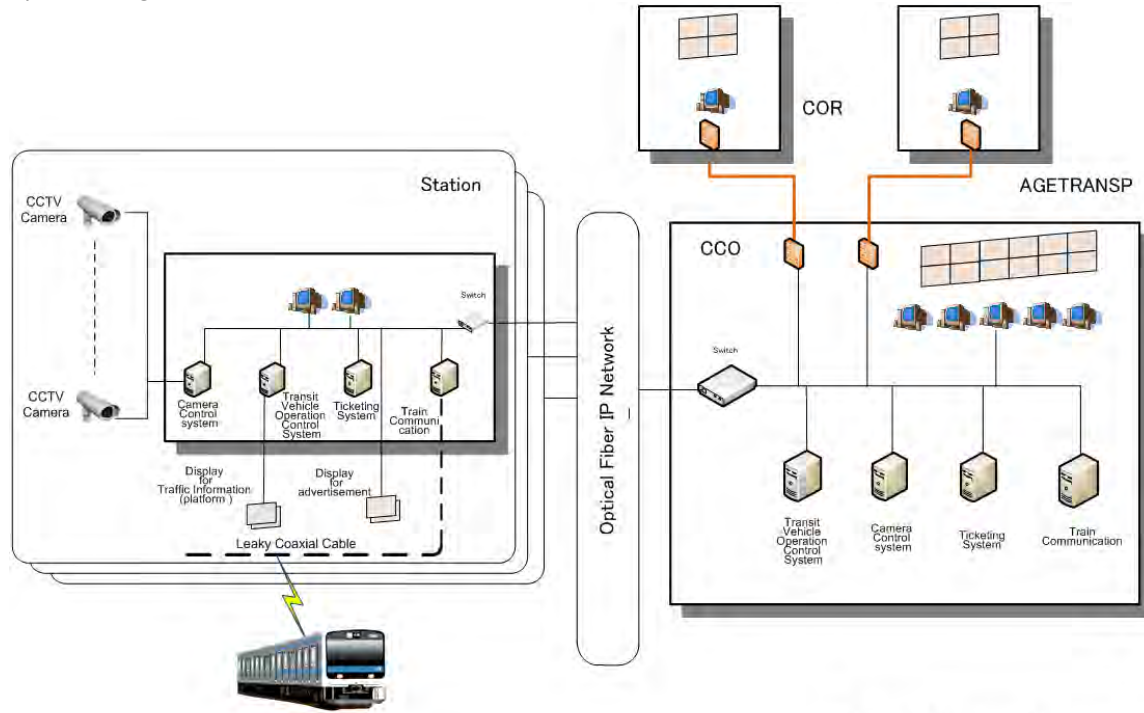
STP (Via Facil) System Diagram

System Composition	1. Electric Payment System Via DSRC	
Equipment	-DSRC 5.8 Passive Antenna -OBU(Rental) -Signal	-Gate Pole -Data Server
Inter-Connecting Other Systems	-This system is connected from road concessionaire roadway to STP headquarters to verify electronic payment	
Communication Network	Fiber Optic, DSRC	
Keys for Further Development	-OBU rental system might be obstruction to spread ETC OBU -It is an one piece type of OBU which can be only dedicated for electric payment and has no room for functional expansion -Two piece OBU unit shall disseminate for further development to integrate electric payment system. -Active DSRC shall be installed for security and further development	
Keywords	DISSEMINATION RATE OF OBU/ETC, TWO PIECE ON-BOARD UNIT, FUNCTIONAL EXPANSION , ACTIVE DSRC	

## Existing System Evaluation

Name of Agency or Entity: METRO -Subway Operator (Concessionaire)-

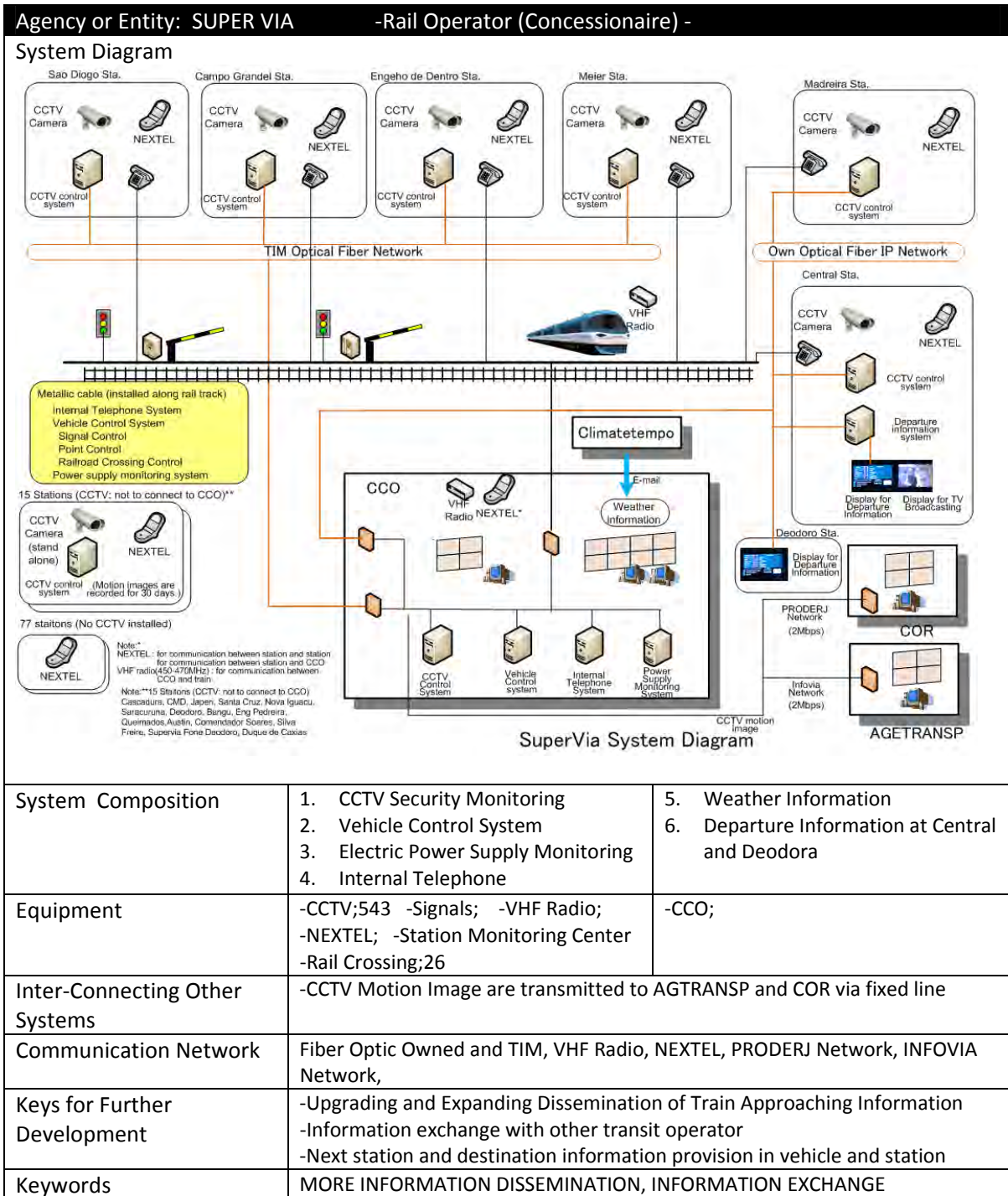
### System Diagram



METRO System Diagram

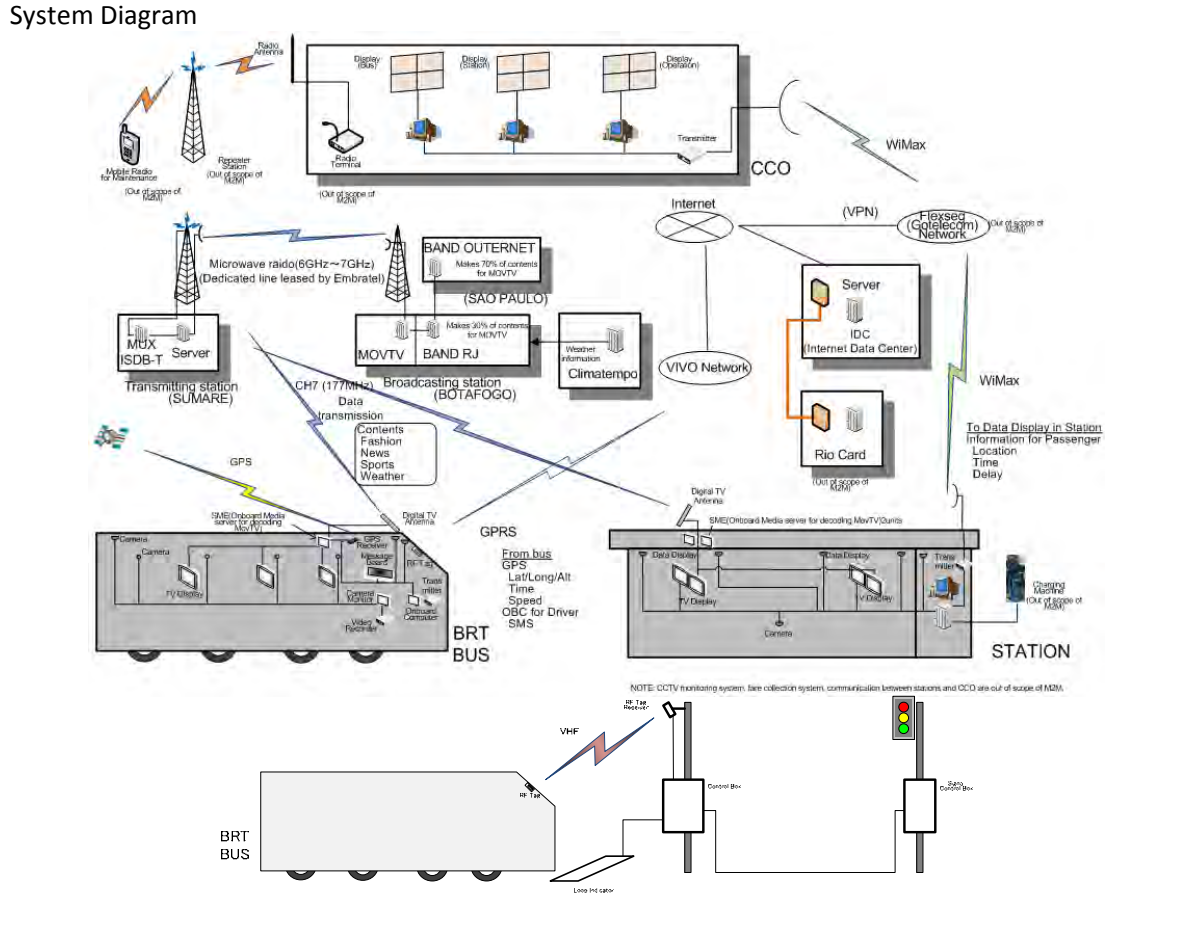
System Composition	<ol style="list-style-type: none"> <li>1. CCTV Security Monitoring</li> <li>2. Transit Vehicle Operation and Control</li> <li>3. Ticketing System</li> </ol>	<ol style="list-style-type: none"> <li>4. Train Communication</li> <li>5. Train Approaching Information Provision</li> <li>6. Ads Dissemination</li> </ol>
Equipment	CCTV;1050(Average30/station) VMS; Ticketing Machine; each station Sub Control Center; each station	CCO;1
Inter-Connecting Other Systems	-CCTV image data is shared to COR and AGETRANSP	
Communication Network	Fiber Optic,	
Keys for Further Development	-More information dissemination like train approaching information each station, other mode connect information for transit users. -Information exchange to other transit operator	
Keywords	-INFORMATION DISSEMINATION, EXCHANGE	

## Existing System Evaluation





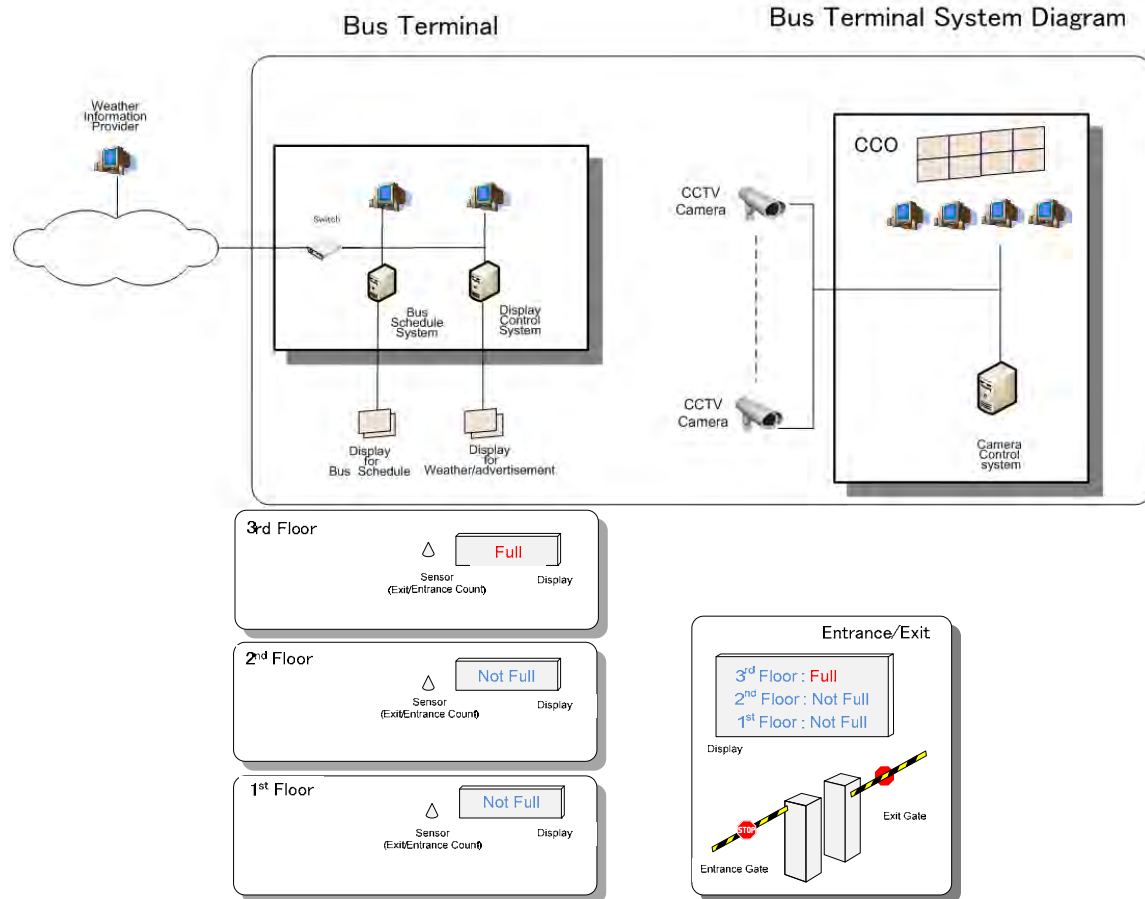
Name of Agency or Entity: BRT RIO ONIBUS - BRT Operator (Concessionaire)-



System Composition	<ol style="list-style-type: none"> <li>1. Vehicle Tracking System</li> <li>2. Transit Operation and Management</li> <li>3. Electric Ticketing System</li> <li>4. BRT Approaching Information</li> <li>5. Security Monitoring in Bus</li> </ol>	<ol style="list-style-type: none"> <li>6. BRT Priority Signal</li> <li>7. On Board Computer for Communication with Driver and CCO</li> <li>8. Radio Communication for Maintenance Vehicles</li> </ol>
Equipment	Station IC-Card Charging, -Display	BUS - Display; -GPS Receiver - CCTV - OBC -RF Tag - Road -RFID Reader/Writer Control Box Signal and Signal Control Box
Inter-Connecting Other Systems	It's connected to CET-Rio Signal to prioritize BRT via RFID tag but it is untouchable from BUS operator side.	
Communication Network	GPRS, Wimax, Internet Network Private Company, Digital Broad Casting	
Keys for Further Development	-System Integration with Municipality Road Operator (CET-Rio) -Travel Time Information for Destination shall be disseminated -Passenger Counting System shall be deployed for information dissemination -Other Transit Information shall be disseminated in the future	
Keywords	INTEGRATION, MORE INFORMATION, INFROMATION EXCHANGE	

## Existing System Evaluation

Agency or Entity: NOVO RIO SOCICAM -Inter City Inter State International BUS Terminal Concessionaire-  
System Diagram

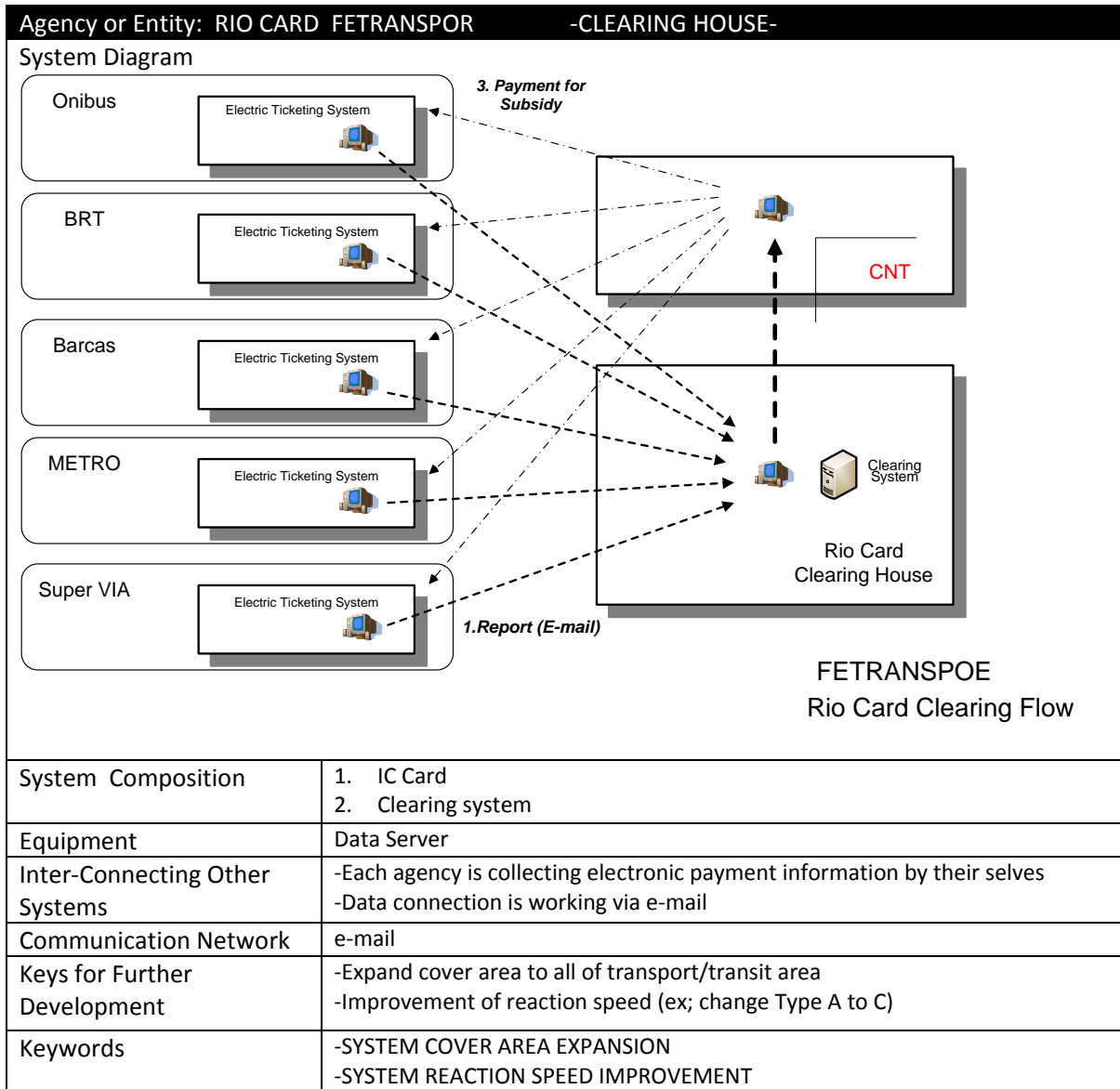


NOVO RIO Car Park System Diagram

System Composition	1. Bus Terminal Security Monitoring 2. Parking System Management
Equipment	-CCTV;56      Display;      CCO;1 -Parking Gate;      VMS for Parking;
Inter-Connecting Other Systems	-Stand Alone
Communication Network	Fixed Line
Keys for Further Development	-Bus positioning information for provision of bus arrival -Electric Payment System via DSRC -Information exchange with other transit operator
Keywords	-VEHICLE TRACKING INFORMATION, ELECTRIC PAYMENT FOR PARKING, INFORMATION EXCHANGE

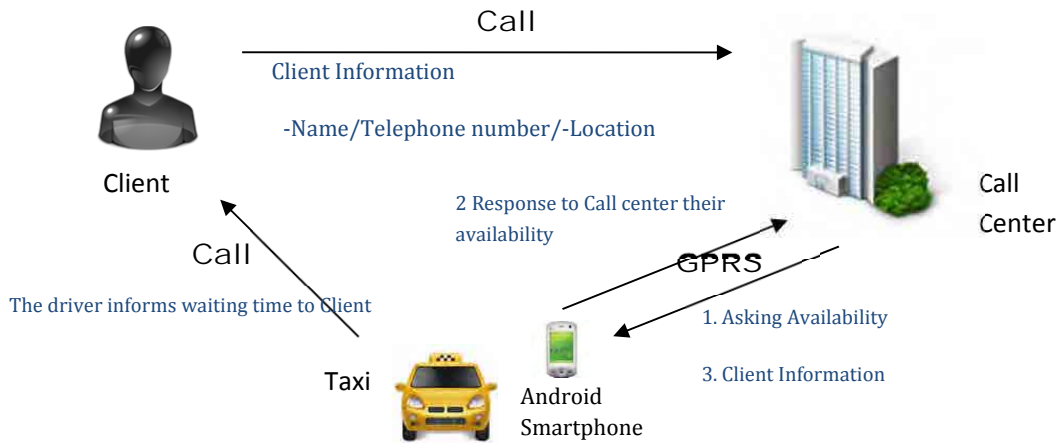


## Existing System Evaluation



Agency or Entity: TAXI service in Rio de Janeiro Municipality -RADIO TAXI-

System Diagram

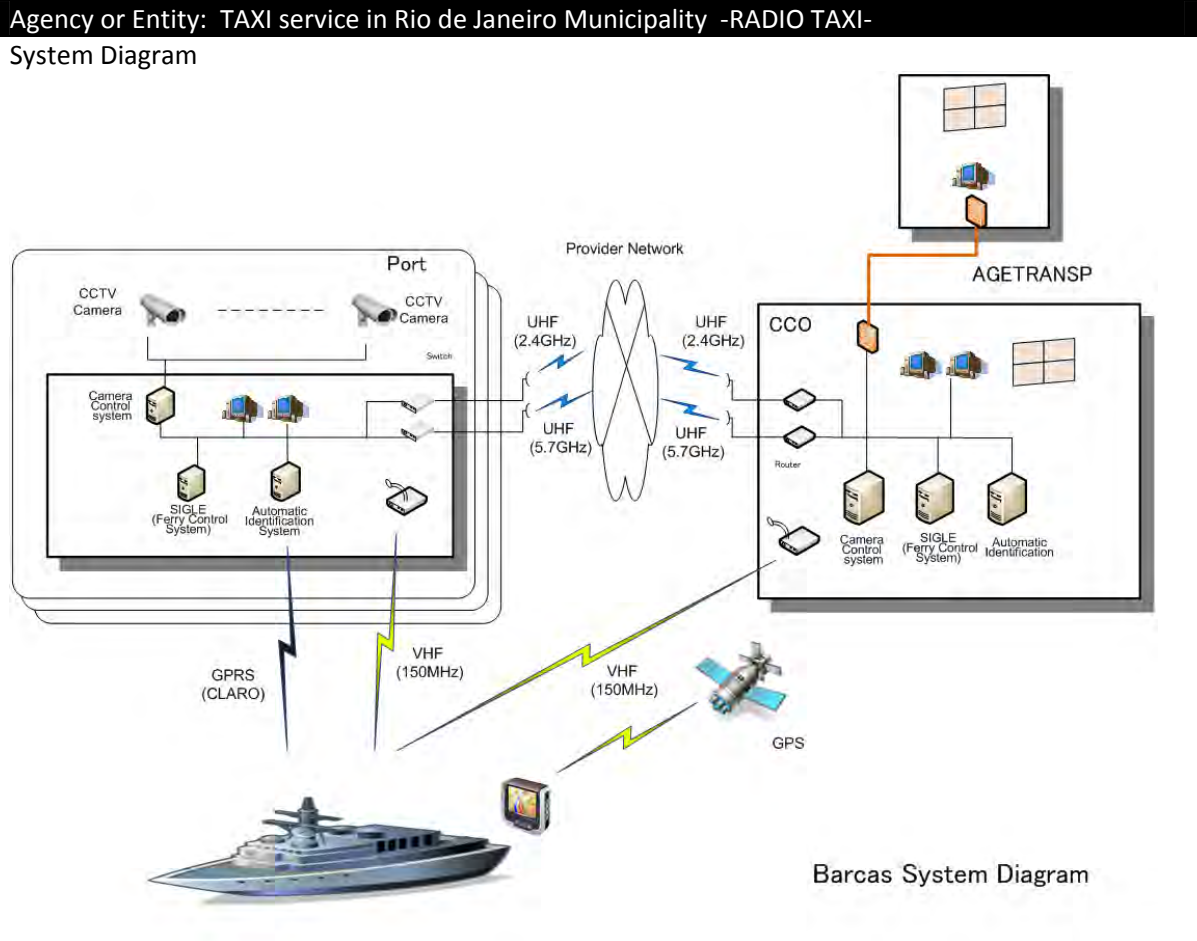


AUTOCAB is the system for android smartphone based automatically taxi dispatching system. Basic flow of the system is below;

1. Client call to taxi with their location and call center input location information AUTO CAB system
2. Call Center asks availability of the nearest taxi from client via SMS automatically
3. Taxi driver respond to call center their availability, if yes; call center send client information to driver, if no; call center send a request to 2<sup>nd</sup> nearest taxi from client

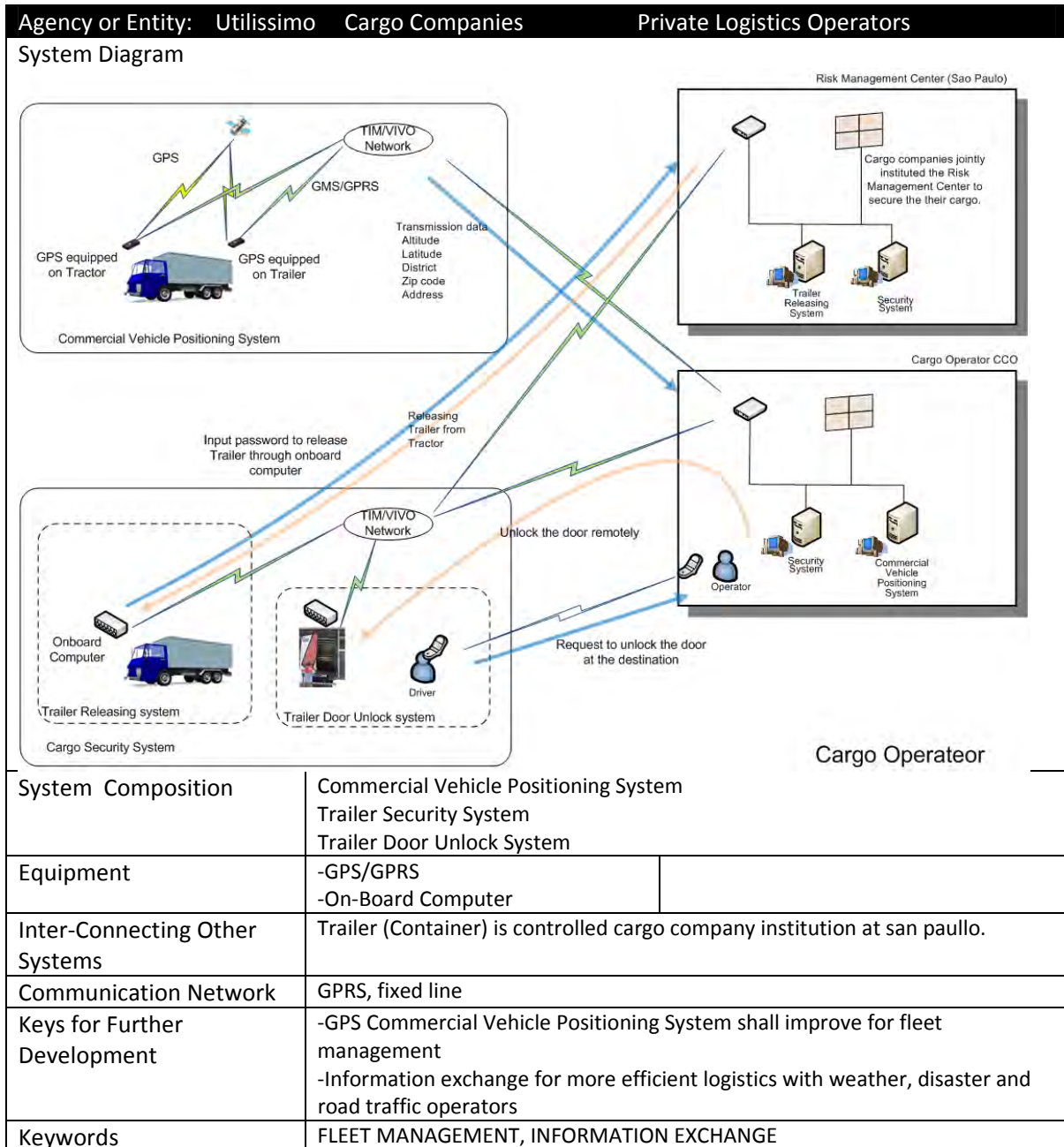
Conceptual Diagram of Autocab Dispatching system

System Composition	1. Taxi Dispatching System
Equipment	-Android Smartphone; -Call Center -GPS data Server
Inter-Connecting Other Systems	None
Communication Network	GPRS
Keys for Further Development	-Data utilization for monitoring current road traffic condition
Keywords	-UTILIZATION



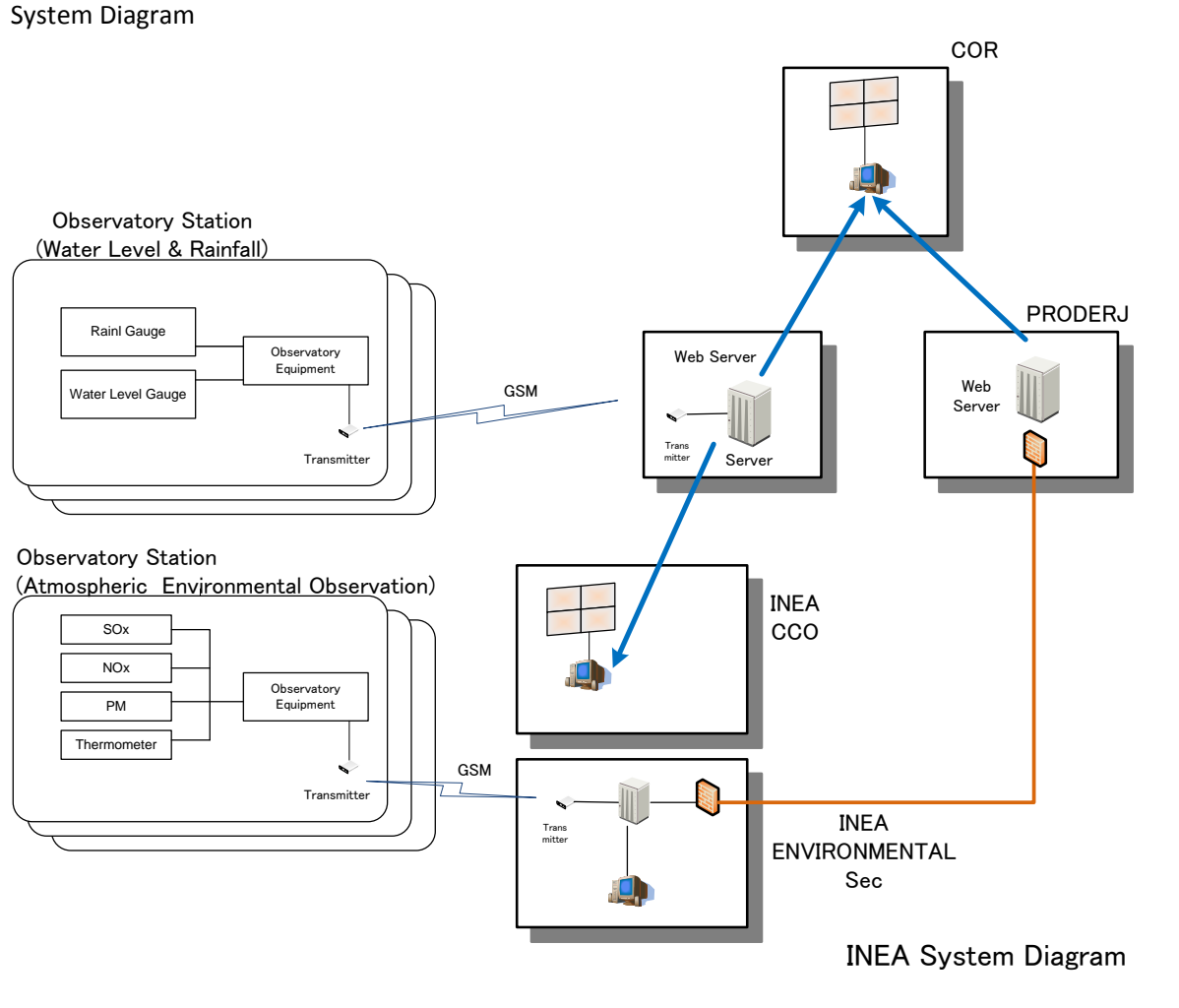
System Composition	Ferry Positioning/Collision Avoidance System	
Equipment	Ferry -GPS; each ferry -VHF Radio; each ferry	Port -CCTV; 157 -Electric Ticketing System; each port CCO;1
Inter-Connecting Other Systems	Location information and CCTV image are shared to AGETRANSP	
Communication Network	GPRS, VHF, UHF and Fixed Line	
Keys for Further Development	-Information provision to advantage of mass transit than private transport -Information exchange with CCR-PONTE to disseminate information for Niteroi Residential	
Keywords	INFORMATION PROVISION, INFORMATION EXCHANGE	

## Existing System Evaluation

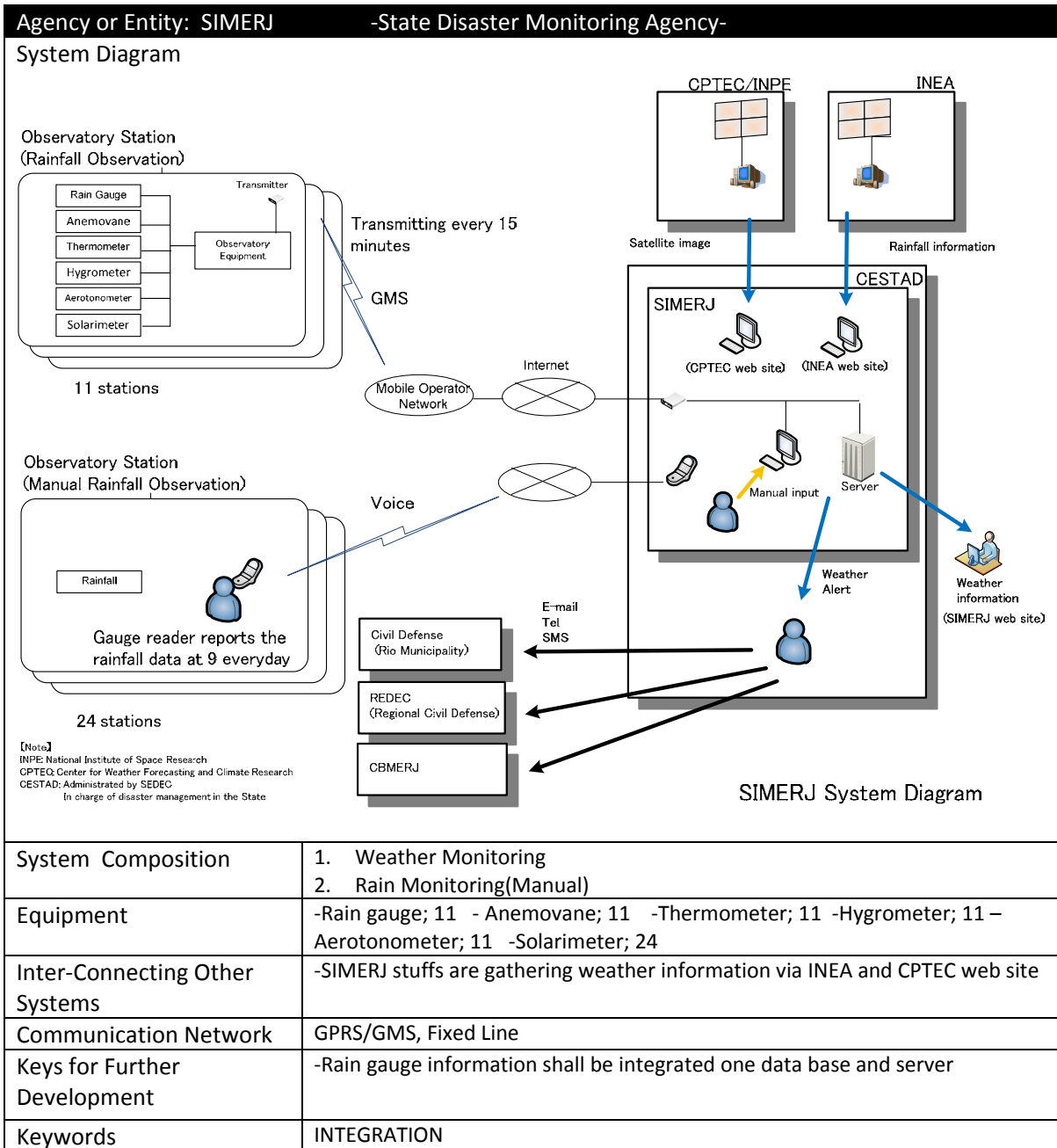


## Existing System Evaluation

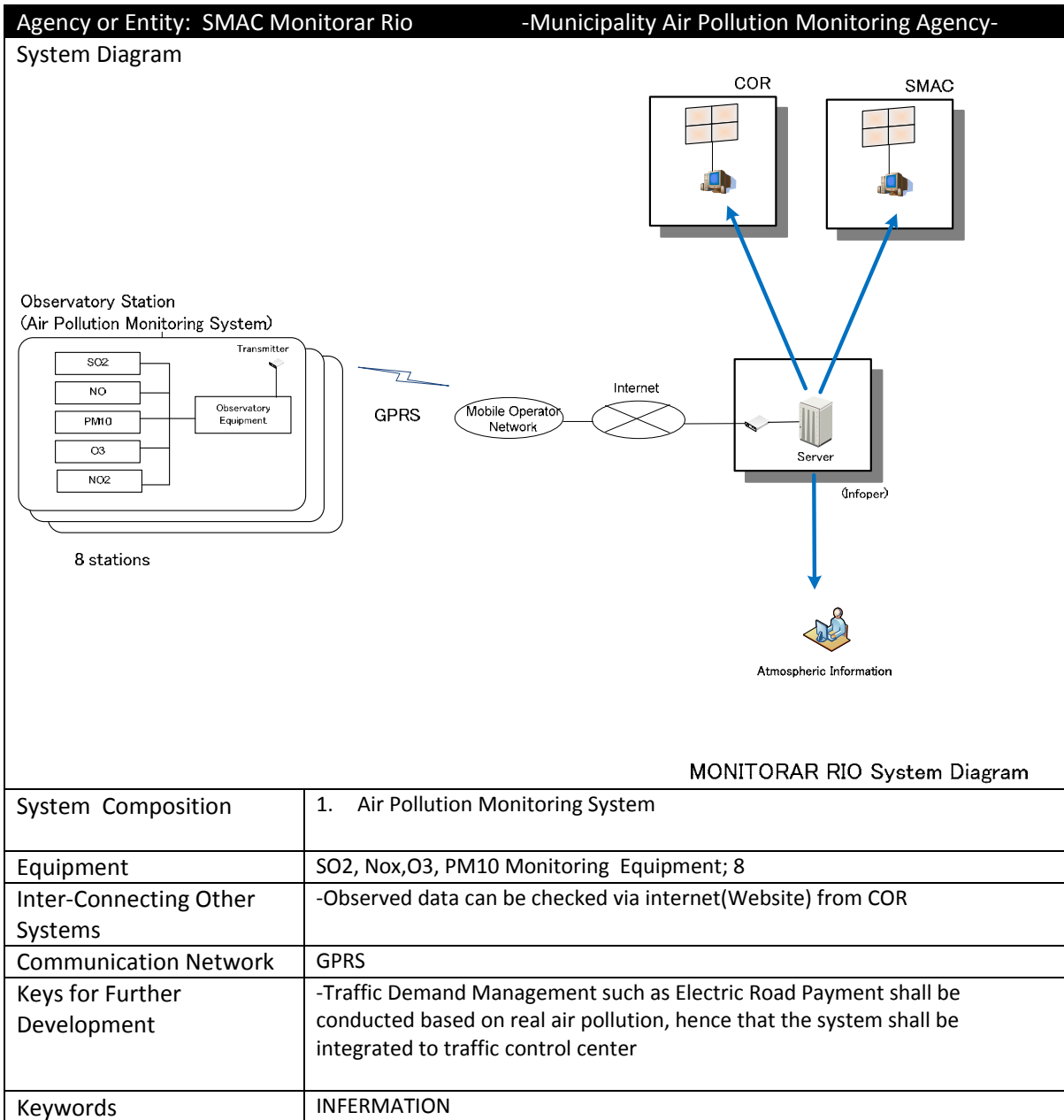
Name of Agency or Entity: INEA State Government River, Environment Agency



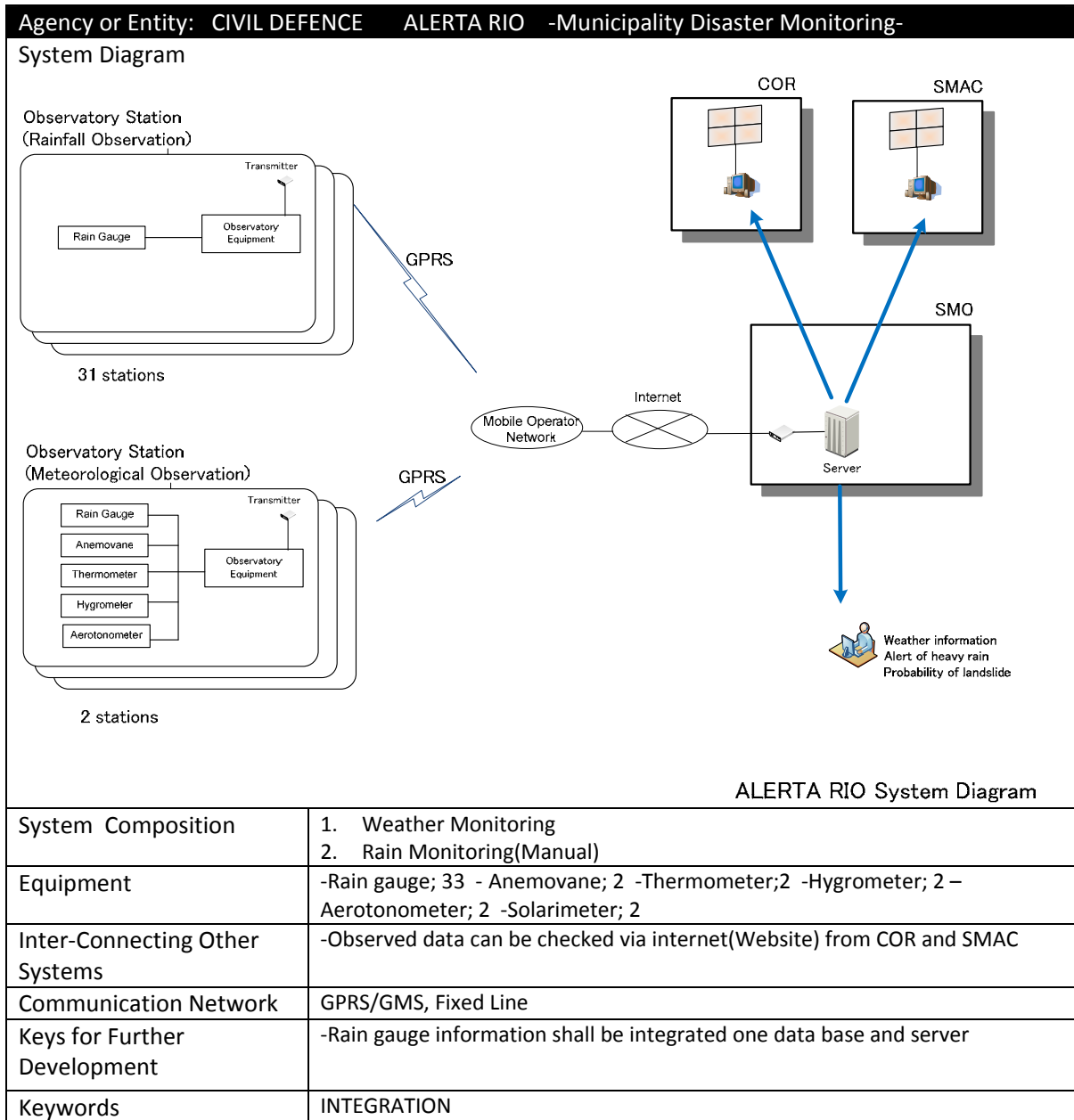
System Composition	1. Air Monitoring 2. River Level Monitoring
Equipment	-Air Pollution Monitoring Equipment ; 37      -Thermometer; 37 -Rain Gauge ; 11                                      -Water level Gauge; 11
Inter-Connecting Other Systems	-COR
Communication Network	GSM, fixed line
Keys for Further Development	-River Level Monitoring system is developed and administered by Infoper. System Integration is important in same agency.
Keywords	INTEGRATION



## Existing System Evaluation



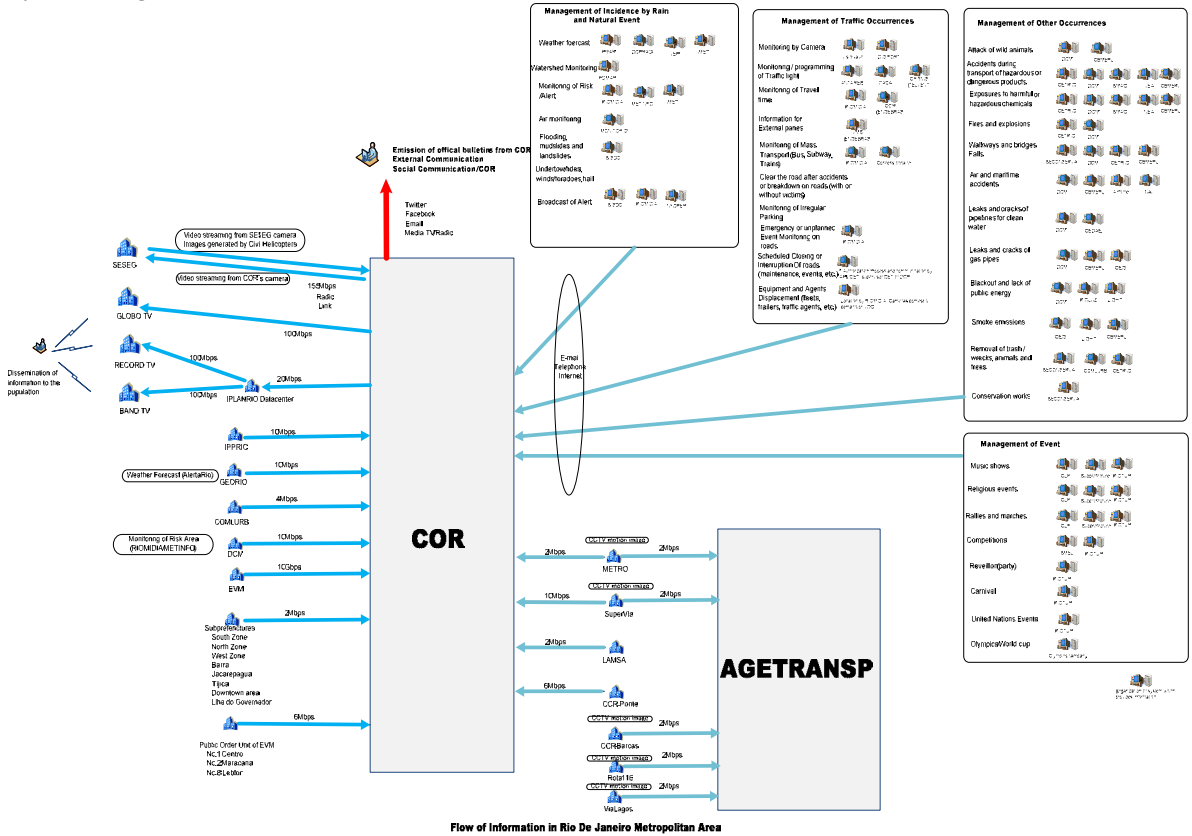
## Existing System Evaluation





Name of Agency or Entity: COR Rio de Janeiro Municipality Control Center and AGETRANSP

System Diagram

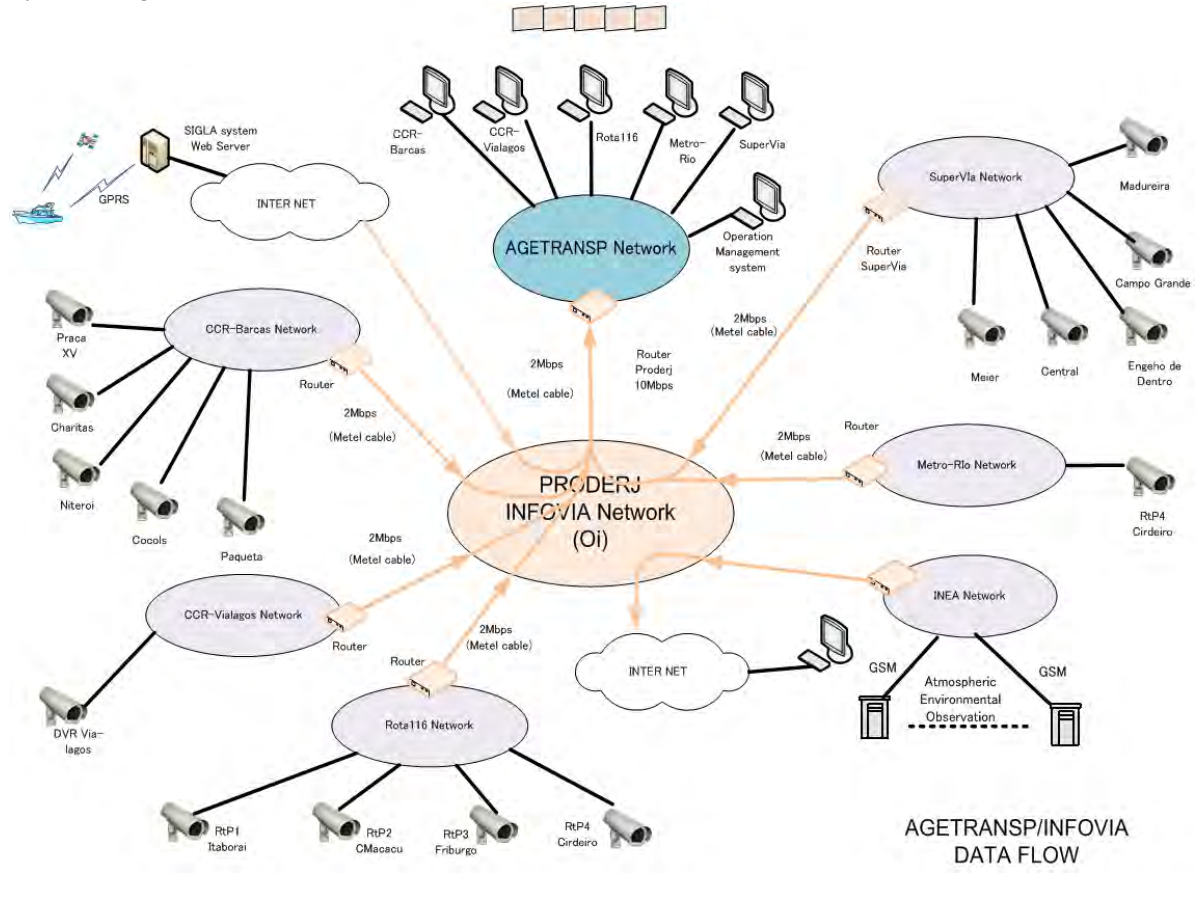


System Composition	<ol style="list-style-type: none"> <li>1. Weather Forecasting System</li> <li>2. Browser based Integration System</li> <li>3. CCTV Information Exchange</li> </ol>
Equipment	At COR -Display, Servers and Desktops
Inter-Connecting Other Systems	-Weather Monitoring Agencies Traffic Operator(CET-Rio) Traffic operators (CCTV only like CCR PONTE) -Transit Operators(CCTV only) - Media -Hazard Monitoring Agencies -Infrastructure Management and Monitoring Agencies
Communication Network	Fixed line, Internet, Cell Phone, e-mail
Keys for Further Development	-All data from agencies shall be integrated one place in the COR -Land Transport on the road such as Bus, Van and Taxi control shall be integrated. (Currently, Traffic Control System and Transit Control System are separated.) -Air pollution information can be utilized for TDM (ex; ERP)
Keywords	INTEGRATION, ITS DATABASE

## Existing System Evaluation

Agency or Entity: AGETRANSP and PRODERJ NETWORK -State Concessionaire Monitoring-

### System Diagram



System Composition	1. Concessionaire Monitoring System
Equipment	-Display, Desktop
Inter-Connecting Other Systems	-INFOVIA NETWORK (Oi)
Communication Network	GPRS/GMS, Fixed Line
Keys for Further Development	-To monitor and supervise concessionaires effectively, quantitative indicators shall be gathered and checked automatically. *now under planning as SITRANS
Keywords	AUTOMATED CHECKING INDICATORS, INTEGRATION