

The Federative Republic of Brazil
Rio de Janeiro State Secretariat of Transportation - SETRANS Rio
Rio de Janeiro Municipal Secretariat of Transportation – SMTRio
Federal District Secretariat of Transportation - SETRANS-DF
Traffic Department of Federal District - DETRAN DF

Study On
The Introduction of Intelligent Transport Systems
In The Federative Republic of Brazil

FINAL REPORT

APPENDIX

May, 2013

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.
NIPPON KOEI LATIN AMERICA - CARIBBEAN Co., Ltd.

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APPENDIX

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APPENDIX 1
STUDY TOUR IN JAPAN

APPENDIX 1 STUDY TOUR IN JAPAN

1.1 OBJECTIVES AND OUTLINE OF THE STUDY TOUR IN JAPAN

1.1.1 Objectives

The objectives of the study tour in Japan are the following:

- Understand the Japanese urban/interurban traffic/transport operation and management using intelligent transport system (ITS);
- Understand the current status and future potential of ITS service development in Japan by various stakeholders including public, private, and third sectors;
- Understand the advanced Smart City Project based on ITS; and
- Experience the Japanese traffic/transport and its use of ITS.

1.1.2 Outline

- 1) Tour Name: Intelligent Transport System
- 2) Period: 26 November 2012 (Monday) – 8 December 2012 (Saturday)
- 3) Number of Trainees: 15

1.1.3 Participants

The participants of the study tour are shown in Table 1-1 below.

Table 1-1 Participants of the Study Tour

No	Institution	Name	Position
1	Rio de Janeiro State Secretariat of Transportation - SETRANS Rio	Rugero Peres, Waldir	Superintendent - Metropolitan Urban Transport Agency
2	Rio de Janeiro State Secretariat of Transportation - SETRANS Rio	Dornelas Abelha Futuro, Henrique	Assistant Engineer - Metropolitan Urban Transport Agency
3	Rio de Janeiro Municipal Secretariat of Transportation - SMTRio	Nogueira Nygaard, Alberto	Operational Control Coordinator
4	Rio de Janeiro Municipal Secretariat of Transportation - SMTRio	Tognozzi E Rocha, Marcos	Regional Transportation Coordinator
5	Rio de Janeiro Municipal Secretariat of Transportation - SMTRio	Rodrigues Borborema, Rubens	Manager of Traffic Monitoring
6	Federal District Secretariat of Transportation - SETRANS-DF	Martins Leal, Carlos Chagastelis	Traffic Policy Coordinator

7	Federal District Secretariat of Transportation - SETRANS-DF	Menezes Filho, Umberto Rafael de	System Manager
8	Traffic Department of Federal District - DETRAN DF	Da Silva Geraldini, Yara	Traffic Analyst - Traffic Engineering Directory/Project Division
9	Núcleo de Gerenciamento de Transportes Metropolitanos - NGTM	Okano Morotomi, Igor Masami	Project Coordinator - Planning Department
10	Núcleo de Gerenciamento de Transportes Metropolitanos - NGTM	Xavier Ferreira, Cléia Lúcia	Civil Works Coordinator - Civil Works Department
11	Transport and Transit Company of Belo Horizonte - BHTRANS	Couto, Daniel Marx	Director of Development and Implementation of Projects
12	Sao Paulo Municipal Secretariat of Transportation - SETRANSP	Vendramini, Valter Luiz	Chief of the Strategic Advisory Information
13	Sao Paulo University	Seriana Pokorny, Melissa	ITS Consultant
14	Metro Rio Concessionaire	Galego Guimaraes Werneck, Newton	Chief of Information Executive
15	SuperVia Concessionaire	Das Neves Dias, Julia	Operation Planning and Control

Source: JICA Study Team

1.1.4 Schedule

In this study tour, the trainees visited ITS-related organizations (public and private sections), and were lectured about ITS by responsible staff of each organization. The schedule of the study tour is shown in Table 1-2 below.

Table 1-2 Schedule of the Study Tour

Date	Time	Contents	Cooperation	Place	
1	26 Nov. (Mon)	-	Arrival in Japan	-	
2	27 Nov. (Tue)	9:30-11:00	Briefing	-	JICA Tokyo (TIC)
		11:00-12:00	Orientation	-	JICA Tokyo (TIC)
		14:00-16:00	VICS Introduction	VICS Center	VICS Center
3	28 Nov. (Wed)	9:00-17:00	Traffic Control, O&M for Expressway	E-NEXCO	Control Center, SA, Tokyo Aqua-line
4	29 Nov. (Thu)	10:00-12:00	Operation Control Center of Tokyo Metropolitan Subway	Tokyo Metro	Control Center of Tokyo Metro
		14:00-16:00	Introduction of Activity and Research by ITS-Japan	ITS Japan	JICA Tokyo (TIC)
5	30 Nov. (Fri)	8:00-11:00	Travel from Tokyo to Osaka by Shinkansen	-	-
		11:00-12:00	Travel from Osaka to Kobe	-	-
		13:00-15:00	ITS Development by Private Manufacturer	Mitsubishi Heavy Industries (MHI)	MHI Kobe Factory

		15:00-16:00	Travel from Kobe to Osaka	-	-
		16:00-17:00	Lecture on Public Transportation Priority System	Universal Traffic Management Systems (UTMS) Society of Japan	JICA Kansai
6	1 Dec. (Sat)	9:30-17:00	Experience of ITS Spot	-	-
7	2 Dec. (Sun)	-	Holiday	-	-
8	3 Dec. (Mon)	9:00-10:00	Travel from Osaka to Nara	-	-
		10:30-12:00	ITS Utilization for Suburban Area	Nara National Road Office	Nara National Road Office
		12:00-16:00	Travel from Nara to Osaka via Meihan National Road	-	-
		16:00-19:00	Travel from Osaka to Tokyo by Shinkansen	-	-
9	4 Dec. (Tue)	10:00-12:00	Introduction of ITS Strategy by the Government	Ministry of Land, Infrastructure, Transport and Tourism (MLIT)	MLIT
		13:30-14:30	Traffic Control in Metropolitan Tokyo	Metropolitan Police Department	Metropolitan Tokyo Traffic Control Center
		16:00-18:00	ITS Development by Private Manufacturer	Panasonic	Panasonic Center Tokyo
10	5 Dec. (Wed)	9:00-12:00	Introduction of ITS Strategy by the Government	Ministry of Internal Affairs and Communications (MIC)	MIC
		13:30-17:00	ITS Development by Private Manufacturer	Hitachi	Hitachi Cyber-Government Square
11	6 Dec. (Thu)	9:00-11:30	Smart City Development by Local Government	Yokohama City	JICA Yokohama, Nissan Showroom
		13:00-17:00	ITS Development by Private Manufacturer	Nissan	Nissan Oppama Factory
12	7 Dec. (Fri)	9:00-12:00	Preparation for Presentation	-	JICA Tokyo (TIC)
		13:00-16:00	Presentation and Discussion	-	JICA Tokyo (TIC)
13	8 Dec. (Sat)	-	Departure from Japan	-	-

Source: JICA Study Team

1.1.5 Outcome of the Study Tour

(1) Study Tour Outcome

The comments of participants regarding the outcome of the study tour are the following:

- 1) About the understanding of Japanese urban/interurban traffic/transport operation and management using ITS
 - A) Advanced ITS services, such as vehicle information and communication system (VICS), ITS Spot, variable message sign (VMS), and various display of public transportation facilities for the user are widely available in Japan. The participants felt the need to change consciousness

- about ITS because there are a lot of ITS in Brazil that needs to be managed.
- B) The ITS related to information gathering, such as closed-circuit television (CCTV), control center, etc., is refined in terms of accuracy and efficiency. It plays a major role as the basis for taking various measures.
 - C) The participants were very impressed that the system, which is consistent up to collecting, analyzing, and offering of information by various stakeholders, is highly structured, considering that there is no or even little integration between stakeholders in Brazil.
 - D) It was found that various services are needed in order to promote the use of public transport and ease traffic congestion, such as mutual entry of subway and public transport priority systems (PTPS).
 - E) The participants felt that the goal to further reduce accidents is set in spite of the very small number of accidents, and very high level of road safety in Japan.
- 2) About the understanding of the current status and future potential of ITS service development in Japan by various stakeholders and the advanced Smart City Project based on ITS
- A) The participants found that further advancement of ITS is achieved by promoting it well in the country such as the introduction experiment of ITS Spot by MLIT.
 - B) The level of ITS service development of manufacturers is very high, and they are supporting the high accuracy of the entire ITS in Japan.
 - C) The participants would like to implement the Smart City initiatives such as Yokohama City in the near future in Brazil, especially in the city and state of Rio de Janeiro. They were very useful information.
- 3) About the experience of Japanese traffic/transport and its use of ITS
- A) The participants found that the connection between the transport modes, such as rail and bus in public transport facilities, is progressing well.
 - B) The guide of the public transportation facility is easy to understand and is a user-friendly device.
 - C) The VICS provides very useful information to the driver, and the system was introduced to almost all the vehicles in Japan. These efforts have contributed significantly to the optimization of traffic flow.
 - D) Rich information provided by ITS Spot, VMS, etc. led to traffic safety.
 - E) The participants felt the exceptional ability of Japanese manufacturers through their advanced technology that has great social significance, such as the safe driving support system of passenger cars which they developed.
 - F) The participants also felt that the orderly transportation behavior of citizens has contributed to smooth traffic.

- 4) Others
 - A) Valuable opportunities to make several networks with traffic personnel and organizations in Brazil can be attained through this study tour.
- (2) Utilization of the Outcome of the Study Tour
 - In the debriefing session of the study tour, the participants shared the lessons learned in the study tour in Japan with each organization and institution to build and improve the ITS system in each city.
 - The participants from the state and city of Rio de Janeiro showed great interest on the related services of Smart City. They are aiming on the implementation of Smart City in Rio de Janeiro while exchanging information with manufacturers and Yokohama City.
 - They also confirmed that they are taking advantage of the networks established in this study tour, and will help in the development of each city while exchanging information with other participants.

1.1.6 Condition of the Study Tour

The facilities of each cooperating institution, corporation, and JICA were utilized for this study tour. All the facilities provided good environment for learning.

1.2 SUMMARY OF THE STUDY TOUR IN JAPAN

In this study tour, trainees were able to understand the current status of ITS from public and private organizations, and expand their insight into the state-of-the-art ITS-related public transport. Trainees were also active in asking questions and engaging the concerned staff of each organization. The study tour was successfully completed.

APPENDIX 2
SEMINAR 01

APPENDIX 2 SEMINAR 01

2.1 OBJECTIVES AND OUTLINE OF THE ITS SEMINAR

2.1.1 Objectives

The objectives of Seminar 01 are:

- 1) To present the ITS Master Plan for Rio de Janeiro, and
- 2) To discuss the plan's outcome.

The distributed materials on the ITS master plan are shown in Appendix 4.

2.1.2 Outline

- 1) Seminar Name: Seminar Presentation of ITS Master Plan
- 2) Period: 13 November 2012 (Tuesday) at Casa Civil Auditorium
- 3) Number of Participants: 97



Source: JICA Study Team

Figure 2-1 Participation Situation and VIP Attendees (Right Side Photo)

2.2 SUMMARY

The ITS seminar was successfully completed. The stakeholders expressed high expectations on the study results and outcome. Approximately 100 people attended the seminar, which shows a high level of interest on ITS in Brazil. In addition, the seminar materials (ITS Master Plan for Rio de Janeiro) and list of participants are shown in Appendix 4.

APPENDIX 3
SEMINAR 02

APPENDIX 3 SEMINAR 02

3.1 OBJECTIVES AND OUTLINE OF SEMINAR 02

3.1.1 Objectives

The objectives of Seminar 02 are:

- 1) To present the Preliminary ITS Master Plan for Federal District,
- 2) To present the basic design of short-term ITS projects for Rio de Janeiro, and
- 3) To discuss the outcome of the seminar.

The distributed materials on the preliminary ITS master plan and basic design for Rio de Janeiro are shown in Appendix 5.

3.1.2 Outline

- 1) Seminar Name: Seminar on the DF Preliminary ITS Master Plan
- 2) Period: 9 April 2013 (Tuesday) at CNTC
- 3) Number of Participants: 204



Source: JICA Study Team

Figure 3-1 Participation Situation and VIP Attendees (Right Side Photo)

3.2 SUMMARY

The seminar on the DF Preliminary ITS Master Plan was successfully completed. The stakeholders expressed high expectations on the study results, outcome, and recommendations. Approximately 200 people attended the seminar and vigorously engaged in the discussions, which shows the high level of interest on ITS in Brazil. The seminar materials (Preliminary ITS Master Plan for the Federal District and Basic Design of Short-term ITS Projects for Rio de Janeiro) and the list of participants are shown in Appendix 5.

APPENDIX 4
SEMINAR 01 Seminar Material

*Study
on
The Introduction of Intelligent Transport Systems
In
The Federative Republic of Brazil*

*Volume I
Role of ITS to tackle with issues in RMRJ*

2012

0. Table of Contents Volume I

- 1. Study Background***
- 2. Objectives***
- 3. Methodology***
- 4. Current Conditions, Issues and Needs***
- 5. Comparative Analysis of Olympic Cities***
- 6. Policy Setting for ITS Master Plan***
- 7. ITS Architecture -User Service Bundles and Service Packages-***
- 8. Functional Requirement for ITS***
- 9. ITS Projects for RMRJ***
- 10. Deployment Schedule***
- 11. ITS Evaluation***
- 12. Short Term ITS Projects***
- 13. Conclusion***

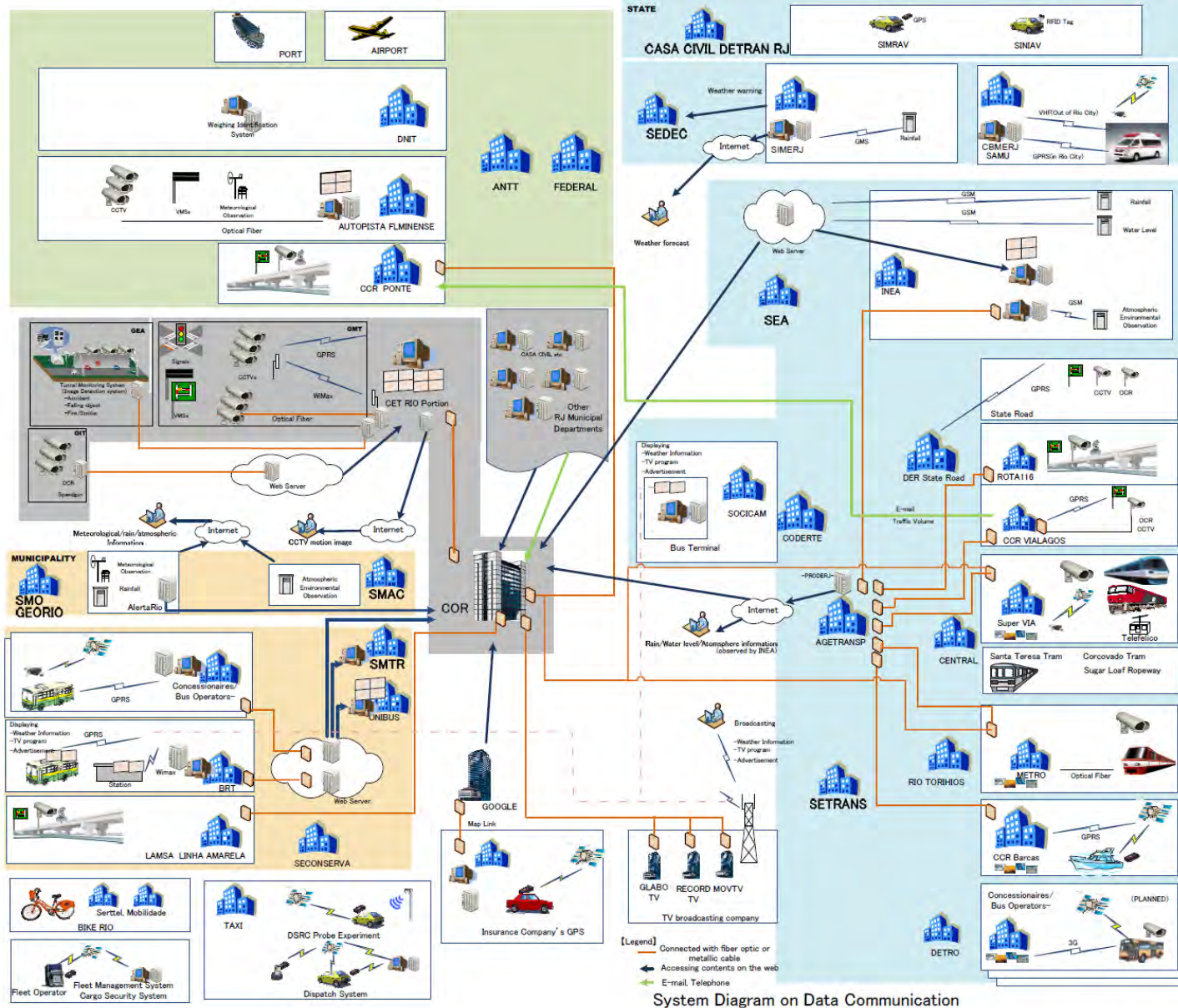
1. Study Background

- 1. Rising economic activities and urbanization has lead to significant congestion on transportation network*
- 2. Transportation networks are more complex*
- 3. Organizations are more interrelated and exchange of information is essential*
- 4. Systems are more interconnected and interdependent*
- 5. Travelers expect consistent services*



Unified Policy for ITS Required

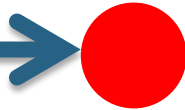
1. Study Background



2. Objectives

To Assist Rio De Janeiro Metropolitan Area to Improve and Modernize Transportation System by;

ITS Master Plan in RMRJ



13th Nov. Hoje

25th Nov. to 9th Dec

Study Tour to Japan

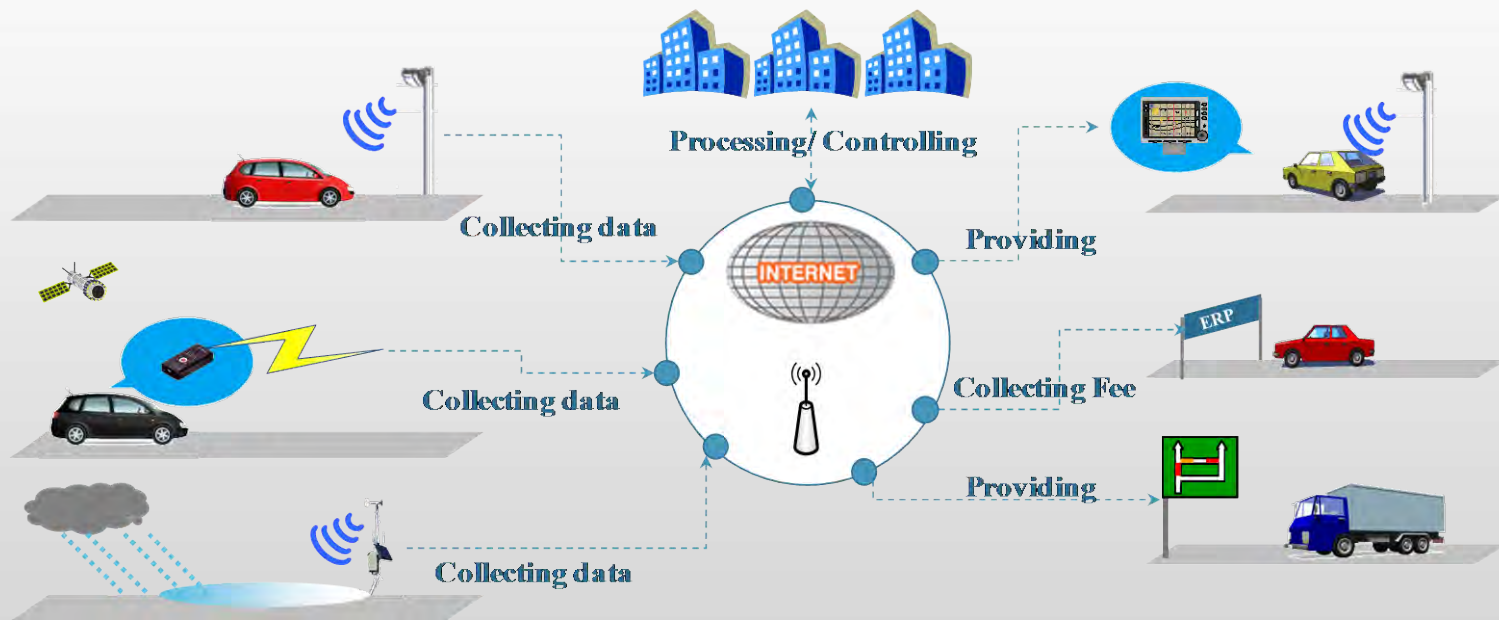


January to April

Preliminary Design for Short Term Project

ITS; Intelligent Transport System

- optimizes traffic flow.
- reduces environmental effect in transportation section
- reduces traffic accident.
- helps efficiency in traffic/transportation operation and management.

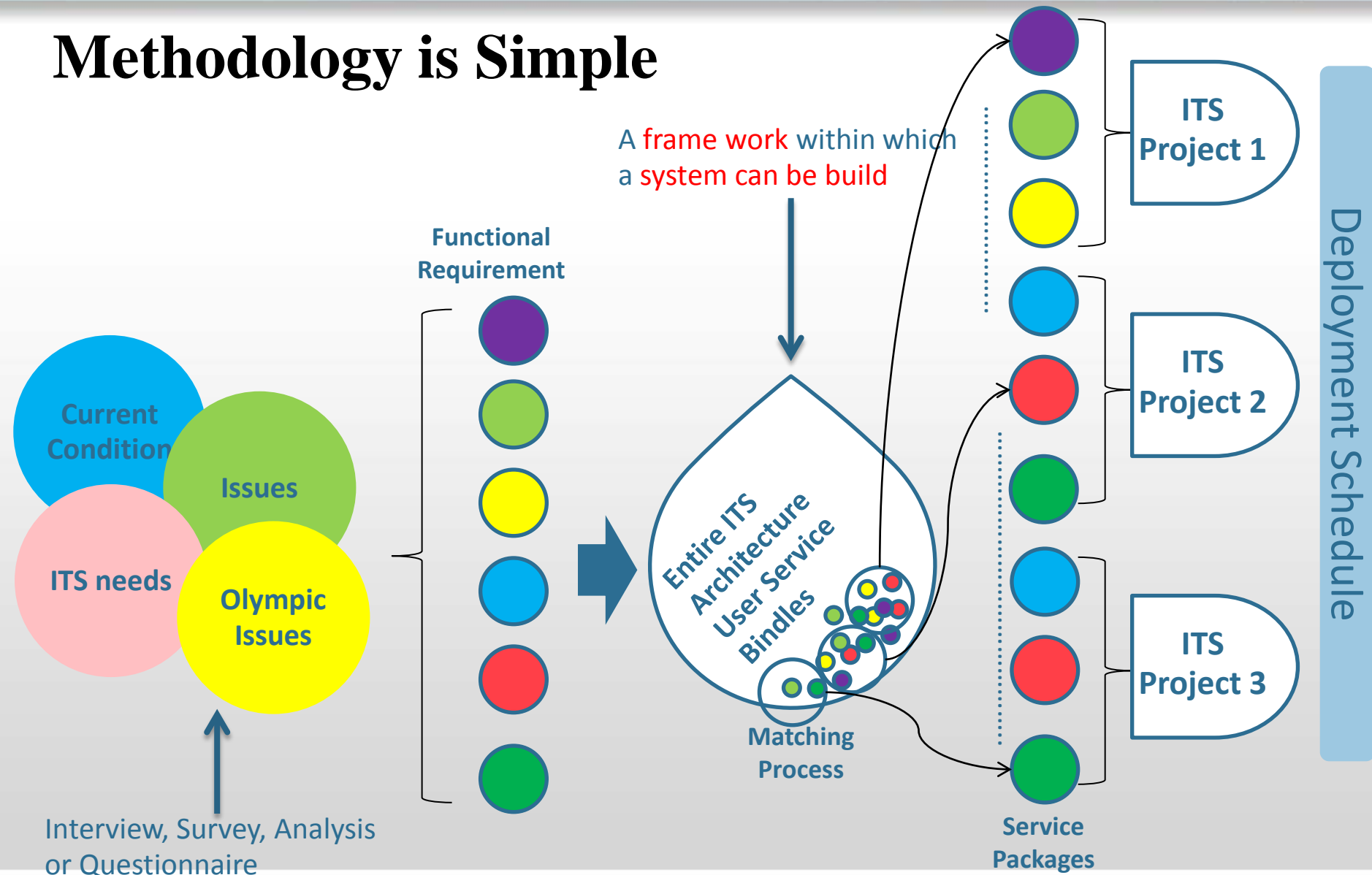


Digitalization of Transport

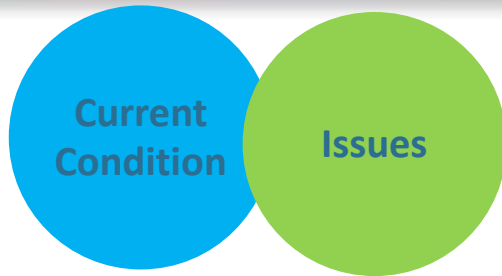
ITS Master Plan

- 1. is Basic Policy for Development of ITS in RMRJ***
- 2. Provides Future Direction of Development for ITS in RMRJ***
- 3. Defines Entire Picture and Coverage of ITS***
- 4. Recommends Standard ITS Related Area***

Methodology is Simple



4. Current Condition, Issues and Needs



1. Regional Characteristics

- *Economics*
- *Population*
- *Tourism*
- *Disaster*
- *Environment*

2. Road Traffic Characteristics

- *Network*
- *Traffic Volume and Travel Speed Survey*
- *Traffic Accident*

3. Mass Transit Characteristics

- *Network*
- *Passengers*
- *Survey for Accessibility and Information*

4. Current Condition, Issues and Needs

Key issues from Regional Characteristics

- Population Increase and High Density
- High Rate of Growth of GDP

→ “Growth of Competitiveness of the City”
To Avoid Congestion Caused by Expansion

- International City

→ “Hospitality Improvement”
To Collect and Provide Useful Travel Information

- Risk of Natural Disaster

→ “Keep People in Safe”
To Detect and Provide Weather and Disaster Information

4. Current Condition, Issues and Needs

1. Regional Characteristics

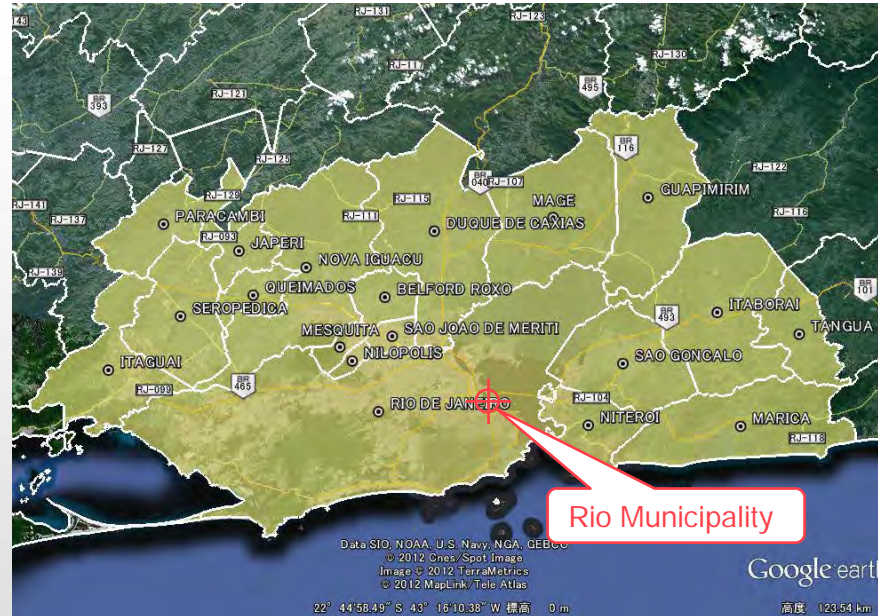
✓ Location

The State of Rio



Source: Google earth

The Metropolitan Region of Rio (RMRJ)



No. of Municipalities in the State of Rio: 92

No. of Municipalities in RMRJ: 19

According to IBGE

Municipalities in RMRJ

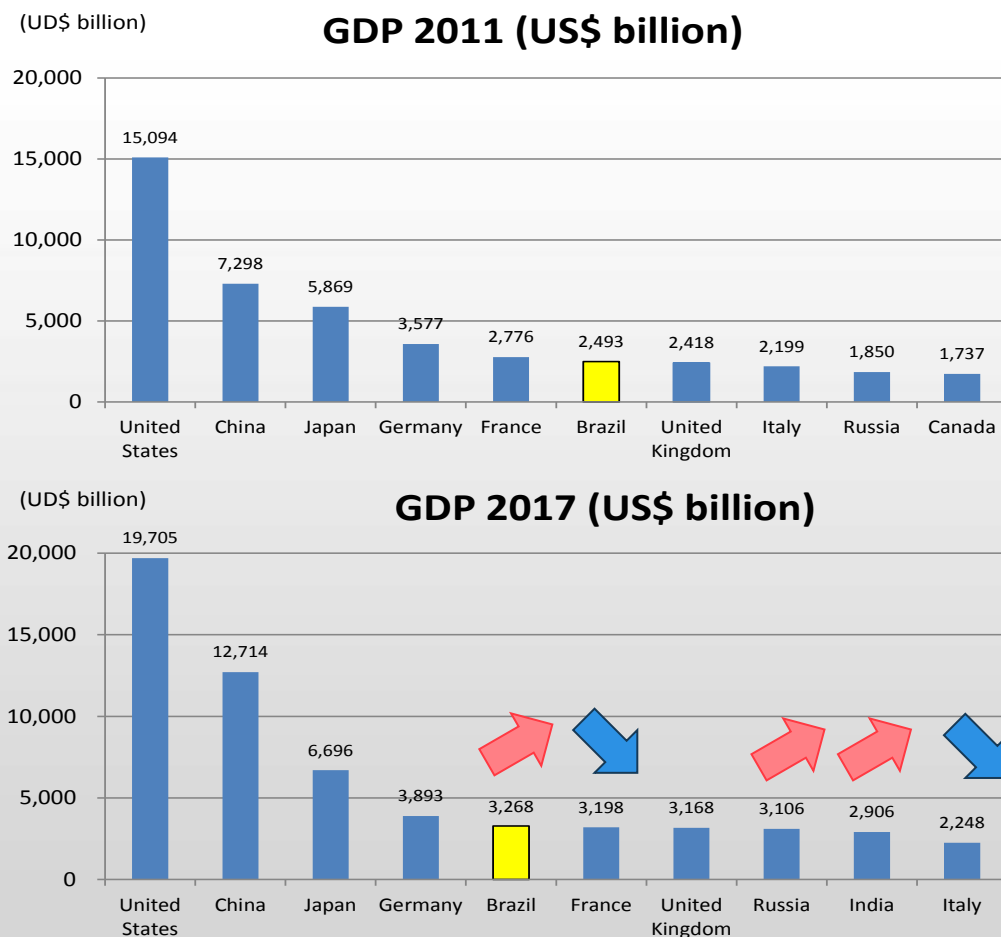
Belford Roxo
Duque de Caxias
Guapimirim
Itaboraí
Japeri
Magé
Maricá
Mesquita
Nilópolis
Niterói
Nova Iguaçu
Paracambi
Queimados
Rio de Janeiro
São Gonçalo
São João de Meriti
Seropédica
Tanguá
Itaguaí

4. Current Condition, Issues and Needs

1. Regional Characteristics

✓ GDP

GDP (current prices) in 2011 and 2017 (estimated)



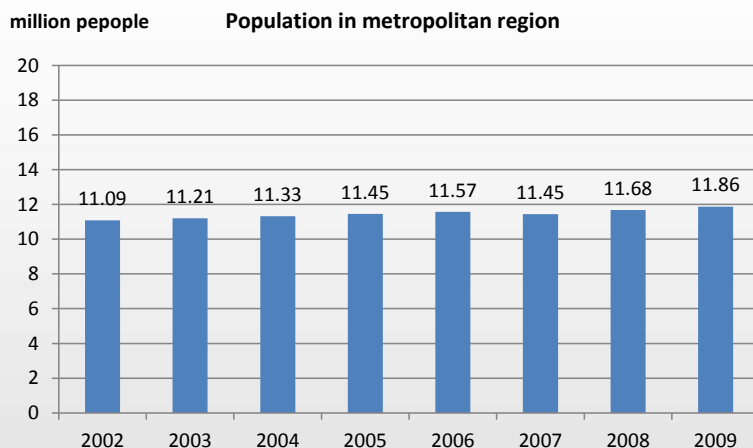
Source: Economic Outlook database April 2011 (IMF)

4. Current Condition, Issues and Needs

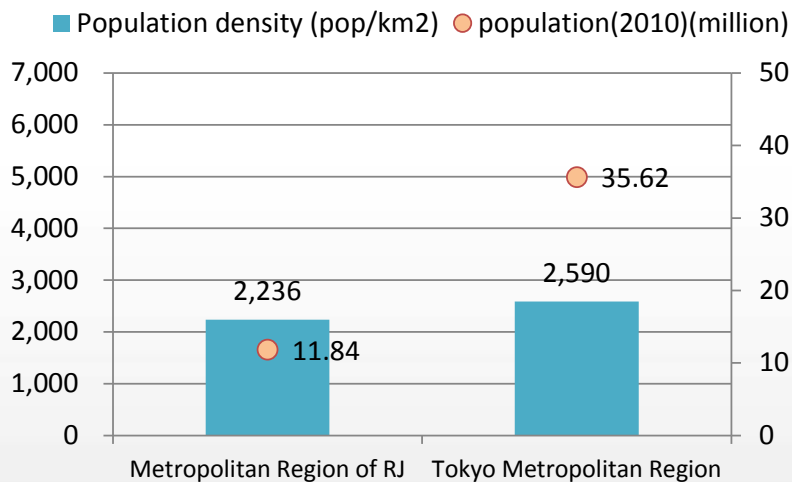
1. Regional Characteristics

✓ Population

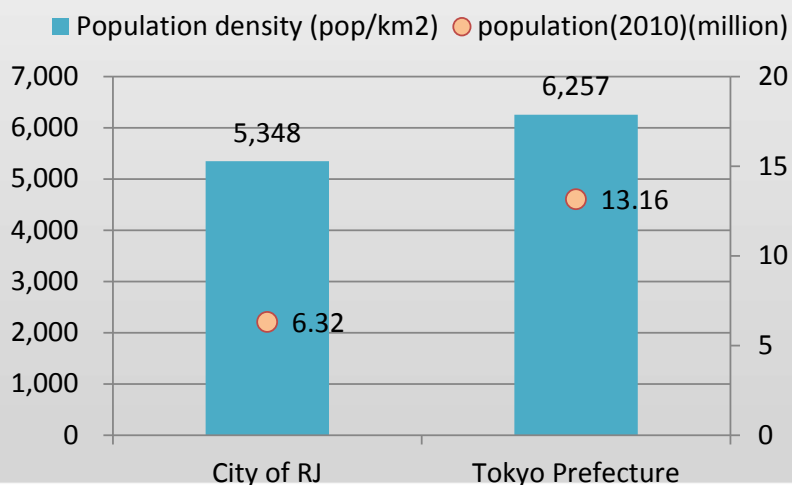
Trend in RMRJ



Density in RMRJ



Density in RJ City



Source: IBGE and The Statistics Bureau, Ministry of Internal Affairs and Communications of Japan

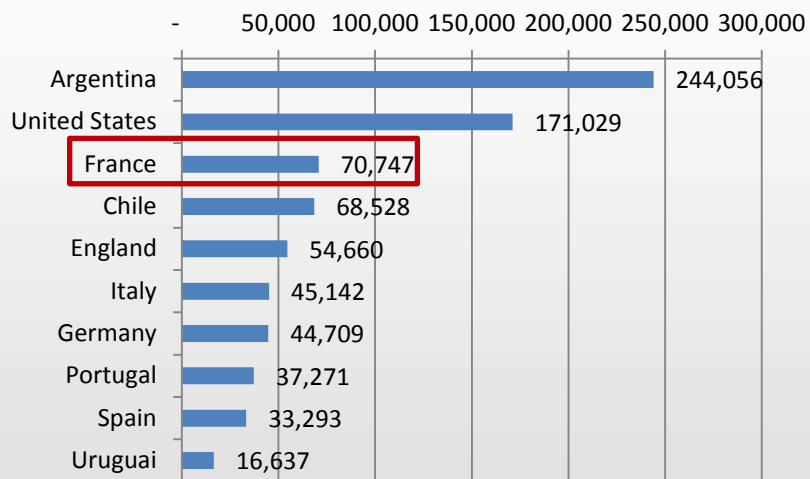
4. Current Condition, Issues and Needs

1. Regional Characteristics

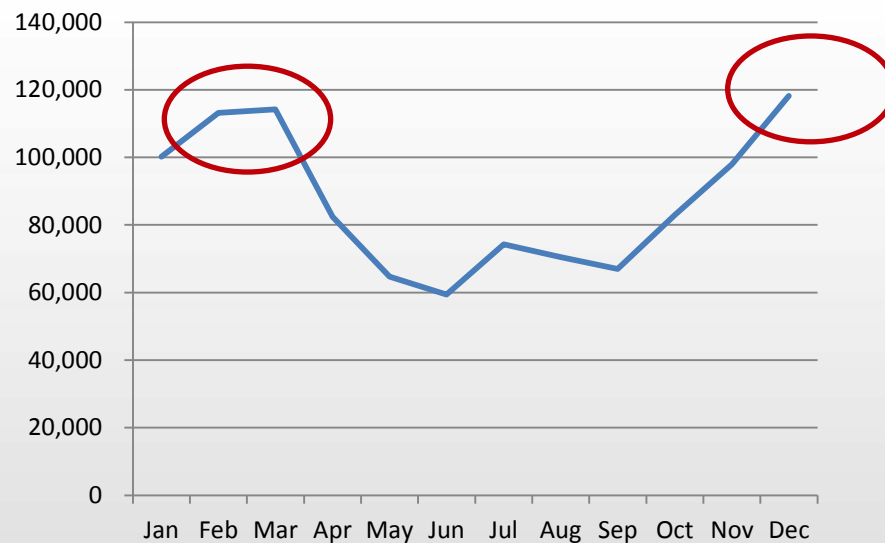
✓ Tourism

Tourist Residence to Rio State

Total Tourists by Residence (2011)



Monthly Number of Tourists to Rio State



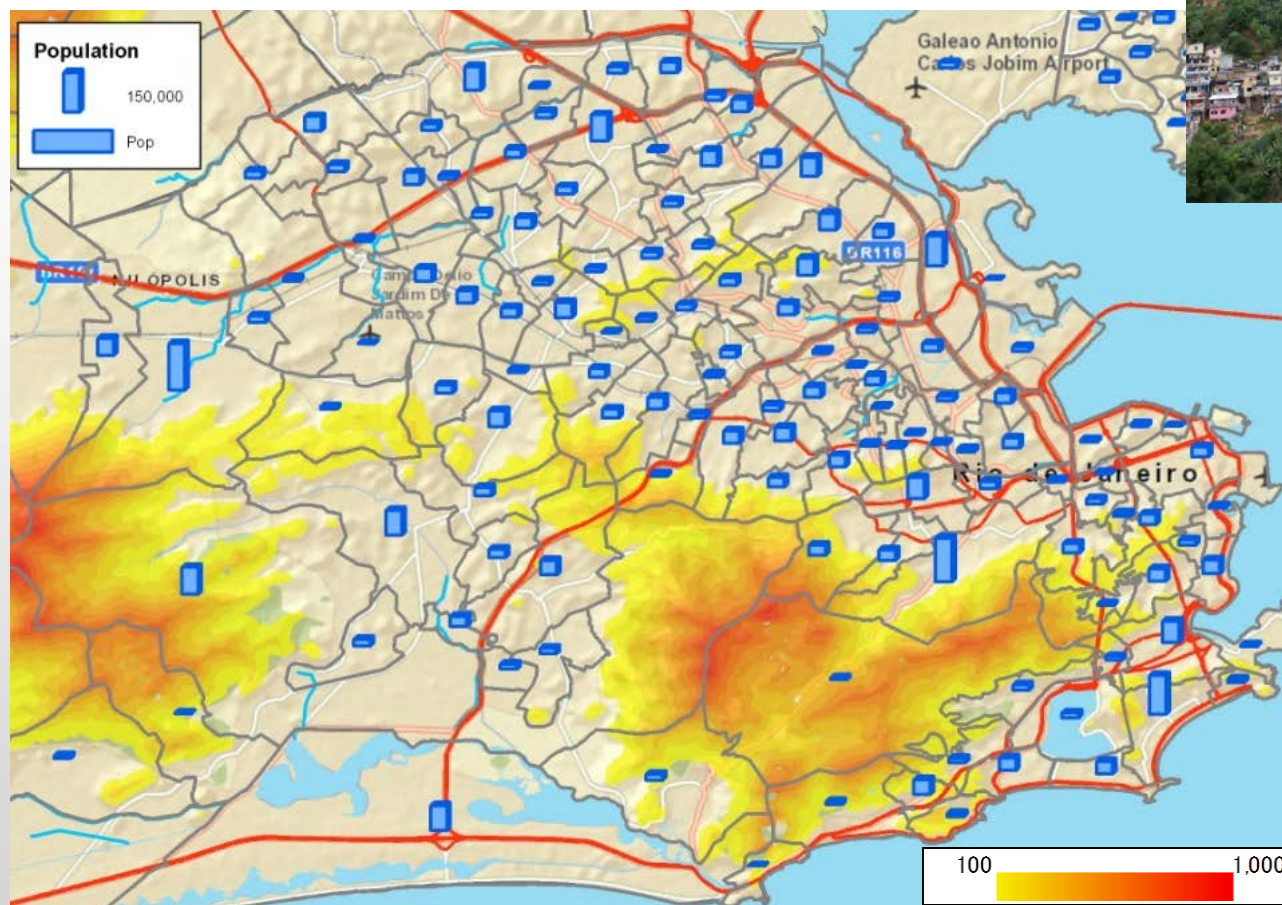
Source: Ministério do Turismo

4. Current Condition, Issues and Needs

1. Regional Characteristics

✓ Topography

History of Landslides



Geography Data: The Shuttle Radar Topography Mission (SRTM) (<http://www2.jpl.nasa.gov/srtm/>)

Population data: prepared based on the data provided by SMTR

4. Current Condition, Issues and Needs

Key issues from Traffic Characteristics

- Rio City Attracts People from Surrounding Cities
- Lack of Ring and Radial Road Network

→ “Traffic Demand Management”
To Utilize Existing Road Network

- Heavy Traffic and Traffic Jam on Arterial Road in North and South Areas

→ “Advanced Traffic Control”
To Provide Congestion Information, Optimize Signal Timing and so on

- Traffic Accident Trend: Collision on Arterial Road

→ “Road Safety”
To Promote Road Safety

4. Current Condition, Issues and Needs

2. Road Traffic Characteristics

✓ Road Network in RMRJ

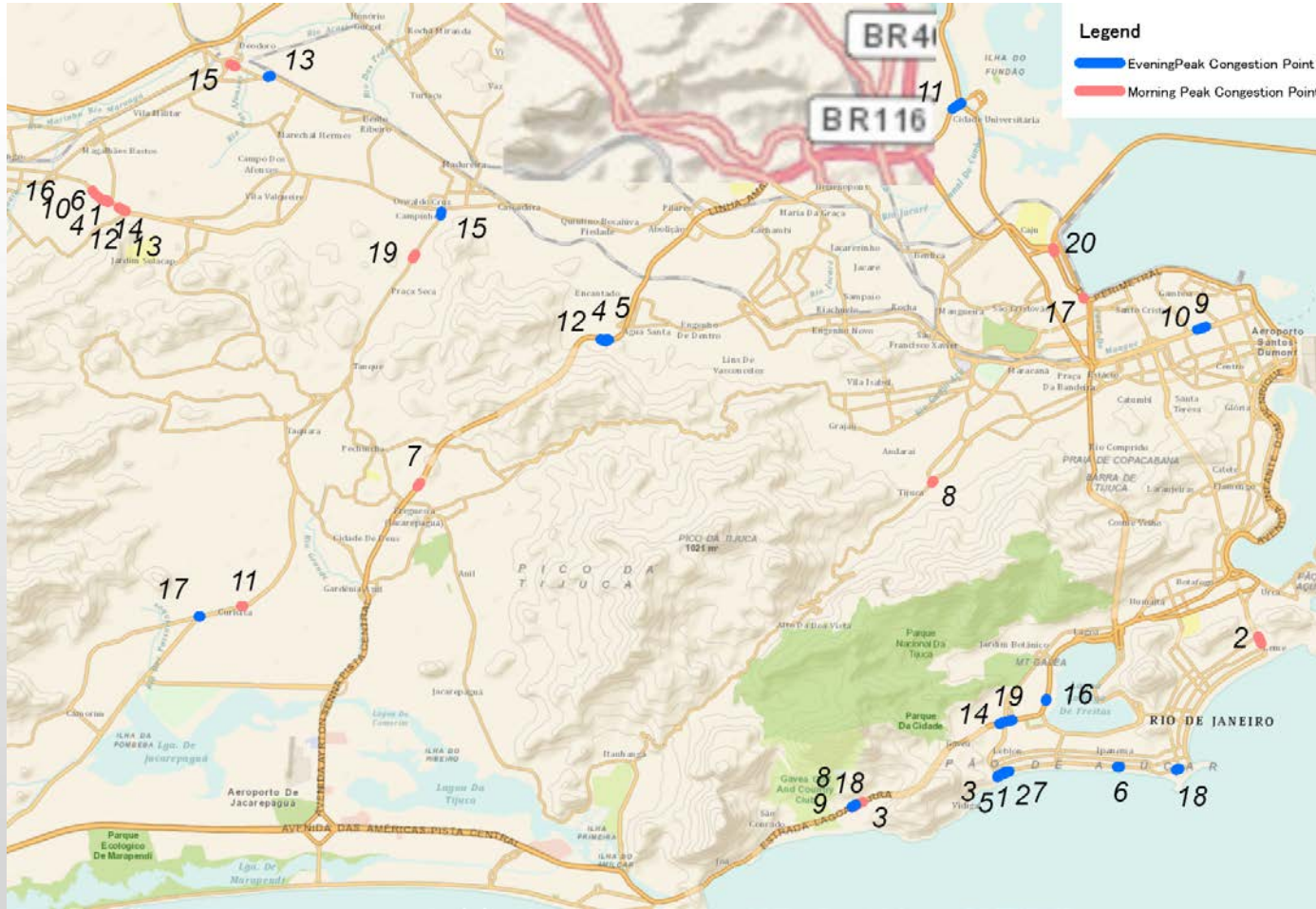


Source: Road network map of DER-RJ

4. Current Condition, Issues and Needs

2. Road Traffic Characteristics

✓ Congestion Point from Travel Time Survey



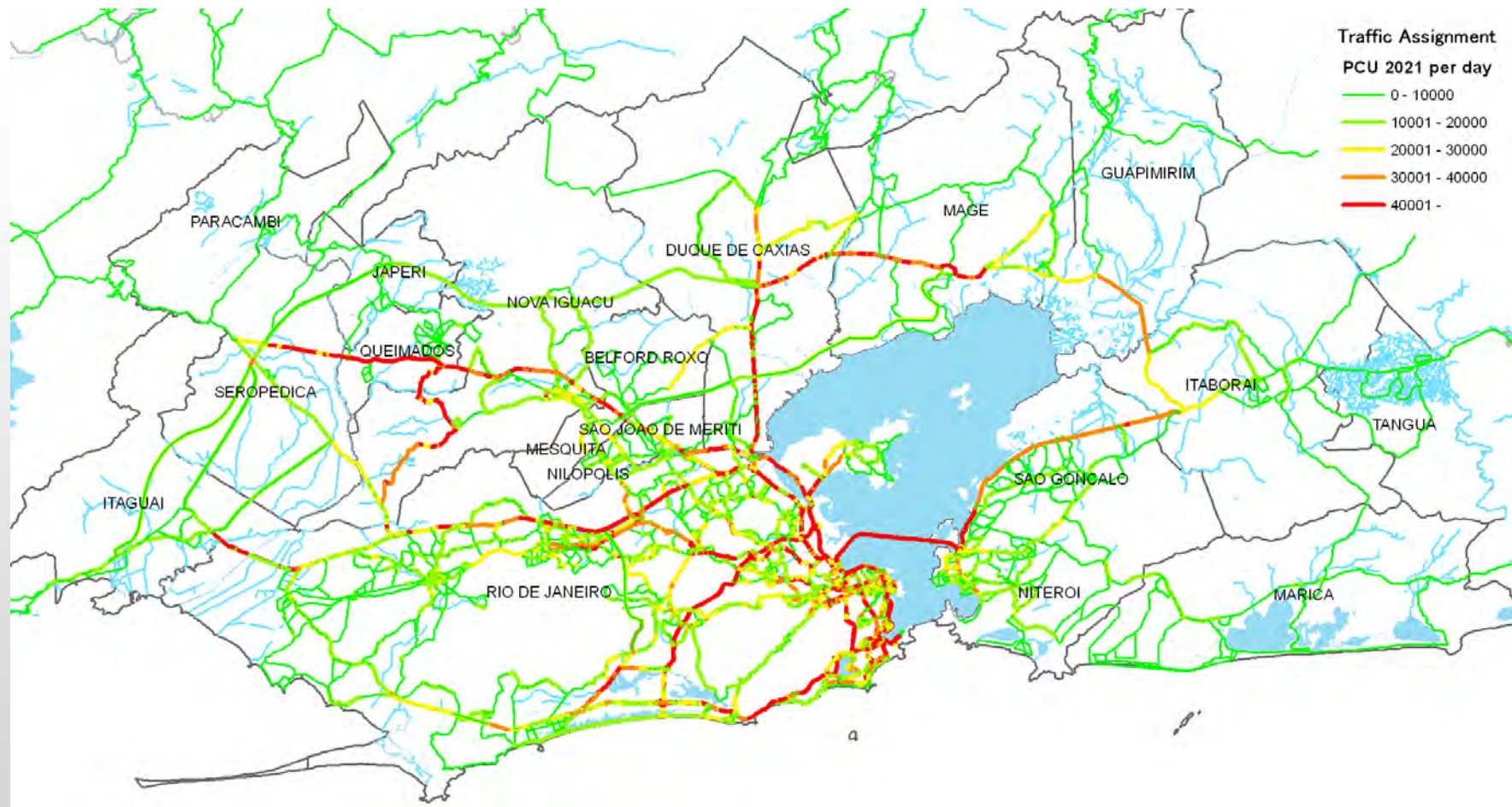
Congestion Point	Morning	Evening
ESTRADA DOS BANDEIRANTES	0	0
ESTRADA LAGOA BARRA	0	0
LINHA AMARELA	0	0
RUA CANDIDO BENICIO	0	0
RUA JOAO VICENTE	0	0
AVENIDA MARECHAL FONTENELE	0	0
AVENIDA PRINCESA ISABEL	0	0
RUA CONDE DE BONFIM	0	0
VIADUTO CAPITAO SERGIO DE CARVALHO	0	0
VIADUTO DO GASOMETRO	0	0
AVENIDA BENTO RIBEIRO DANTAS	0	0
AVENIDA BORGES DE MEDEIROS	0	0
AVENIDA CESARIO DE MELO	0	0
AVENIDA DELFIM MOREIRA	0	0
AVENIDA PADRE LEONEL FRANCA	0	0
AVENIDA PRESIDENTE VARGAS	0	0
AVENIDA VIEIRA SOUTO	0	0
RUA FRANCISCO OTAVIANO	0	0
RUA MARIO RIBEIRO	0	0

Source: Travel speed survey conducted by study team

4. Current Condition, Issues and Needs

2. Road Traffic Characteristics

✓ Traffic Assignment Result in RMRJ



4. Current Condition, Issues and Needs

2. Road Traffic Characteristics

✓ Traffic Assignment Result in Central RJ

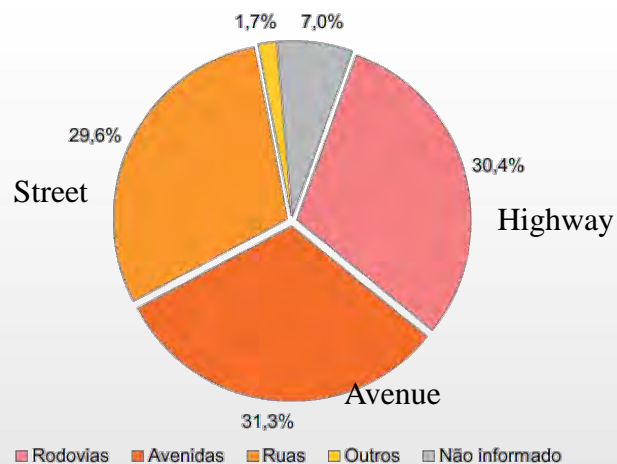


4. Current Condition, Issues and Needs

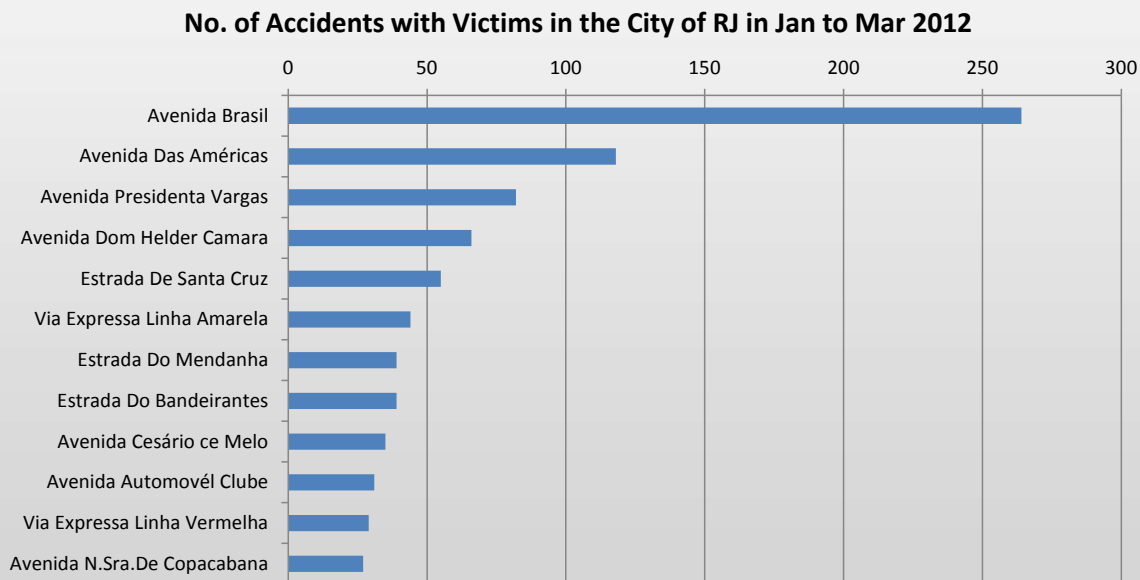
2. Road Traffic Characteristics

✓ Traffic Accident

Number of Accident by Road Type



Number of Accident by Road



4. Current Condition, Issues and Needs

Key issues from Traffic Characteristics

- Bus has Large Share of Modal Split
- BRT Corridors are under Construction.

→ “Coexistence between Cars and Buses”
To Control Bus Efficiently for Smooth Traffic / Transit

- Mass Transit Network Consist of Rail, Metro and Bus

→ “Mass Transit Integration”
To Improve Connection by Integrating Information

- Lack of Traveler Information in the Use of Mass Transit

→ “Universal and Secure ”
To Provide Essential Information at Stations and inside Vehicles

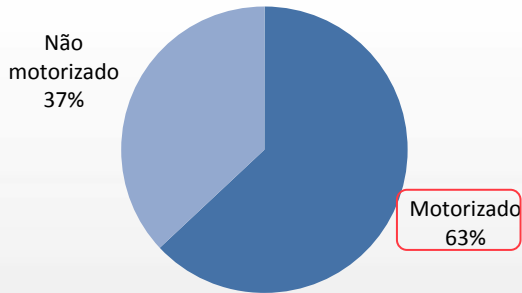
4. Current Condition, Issues and Needs

3. Mass Transit Characteristics

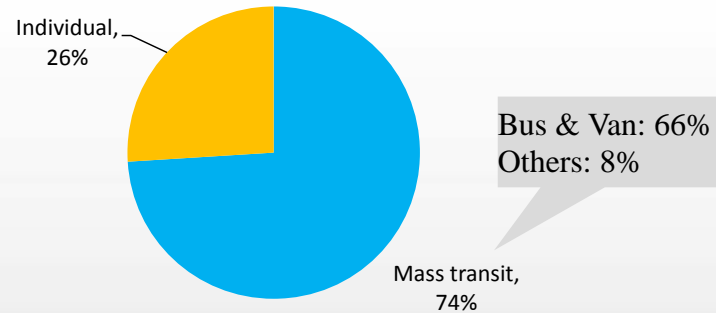
✓ Share of Mass Transit (especially Bus)

RMRJ

Modal Share (Main Mode)



Distribution of motorized mode



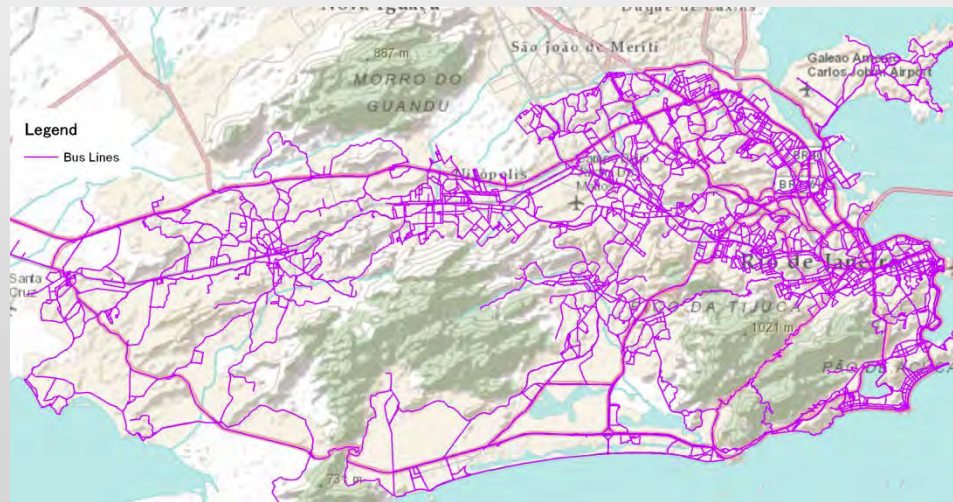
Source: PDTU RJ

✓ Local Bus Network in Rio City

Local Bus Data

No. of Lines in Rio City	891
Average Length of Services (km)	26
Total Length of Services (km)	41,200
Average Daily Passengers in May 2012	3,500,000

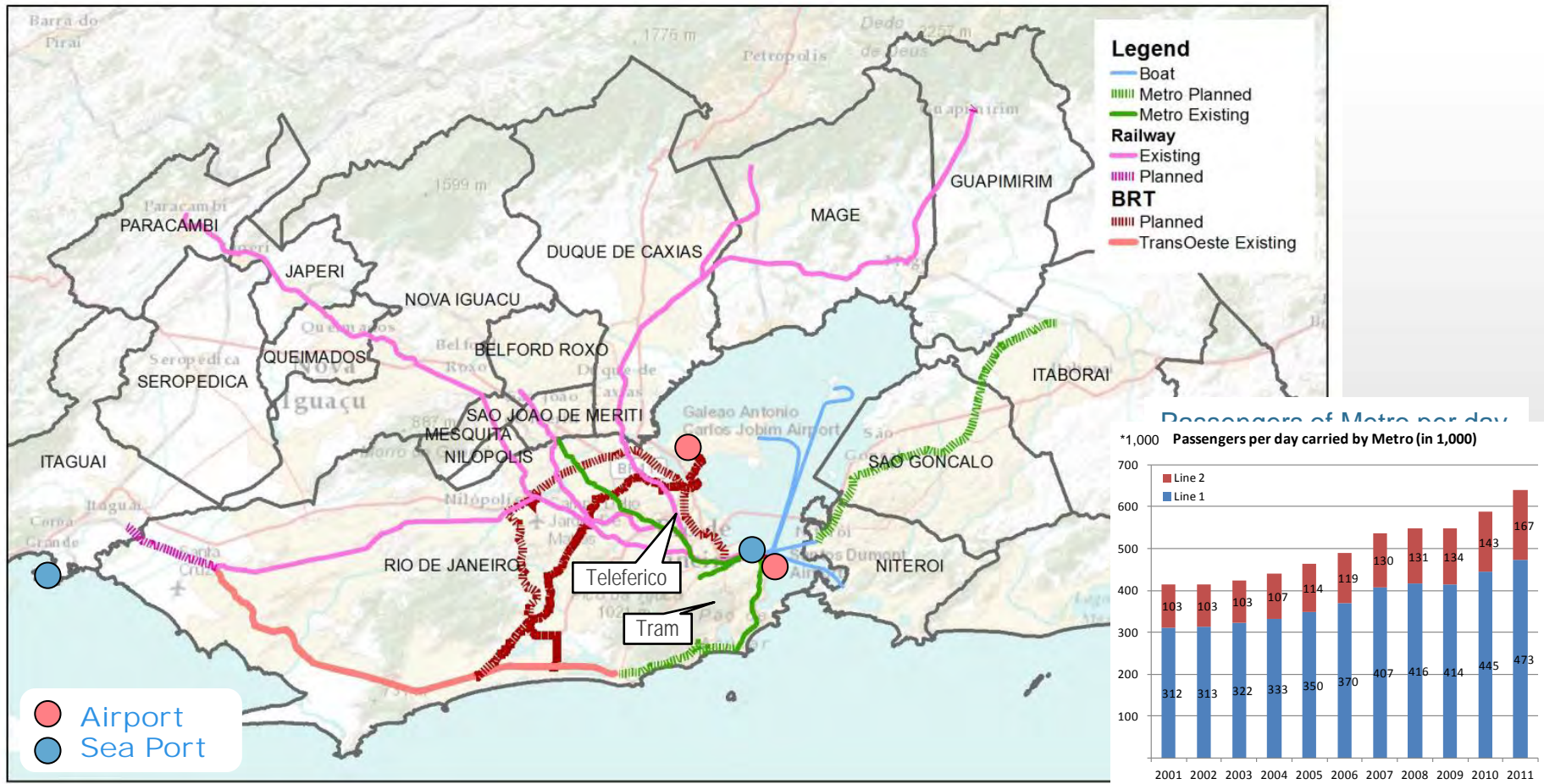
Source: Provided by SMTR



4. Current Condition, Issues and Needs

3. Mass Transit Characteristics

✓ Mass Transit Network in RMRJ



Source: Provided by SMTR

Source: <http://www.amazemdados.rio.rj.gov.br>

4. Current Condition, Issues and Needs

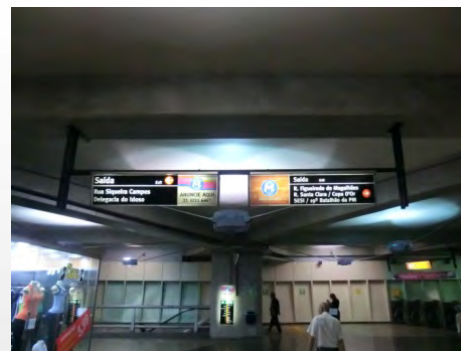
3. Mass Transit Characteristics

✓ *Accessibility and Information for Public Transport Users*

✗ *Approaching and Operation Info.*



✗ *Visitor info. (road names only and small)*



✗ *Ticket Barrier Accessibility*



✗ *Lack of essential information*



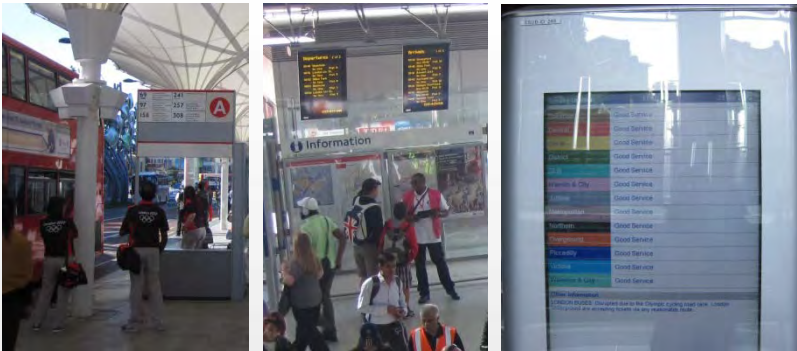
Source: Photos taken by study team

4. Current Condition, Issues and Needs

3. Mass Transit Characteristics

✓ Accessibility and Information for Public Transport Users - London Example -

○ Approaching and Operation Info.



○ Visitor info. and Access info.



○ Automatic Ticket Barrier



○ Traveler Info. at Stations and Vehicles



4. Current Condition, Issues and Needs

3. Mass Transit Characteristics

✓ Survey for "Accessibility and Information" in RJ

Issues

Mode

Accessibility

Information Availability

Signs and Directions

Safety

ITS Services

Rail



Metro



Ferry



Cable Car



Bus



BRT Examples



Source: Survey is conducted by study team

ITS needs

1. *Travelers*

- *Interview Survey for 3,000 Users*
- *Car Users and Public Transport Users*

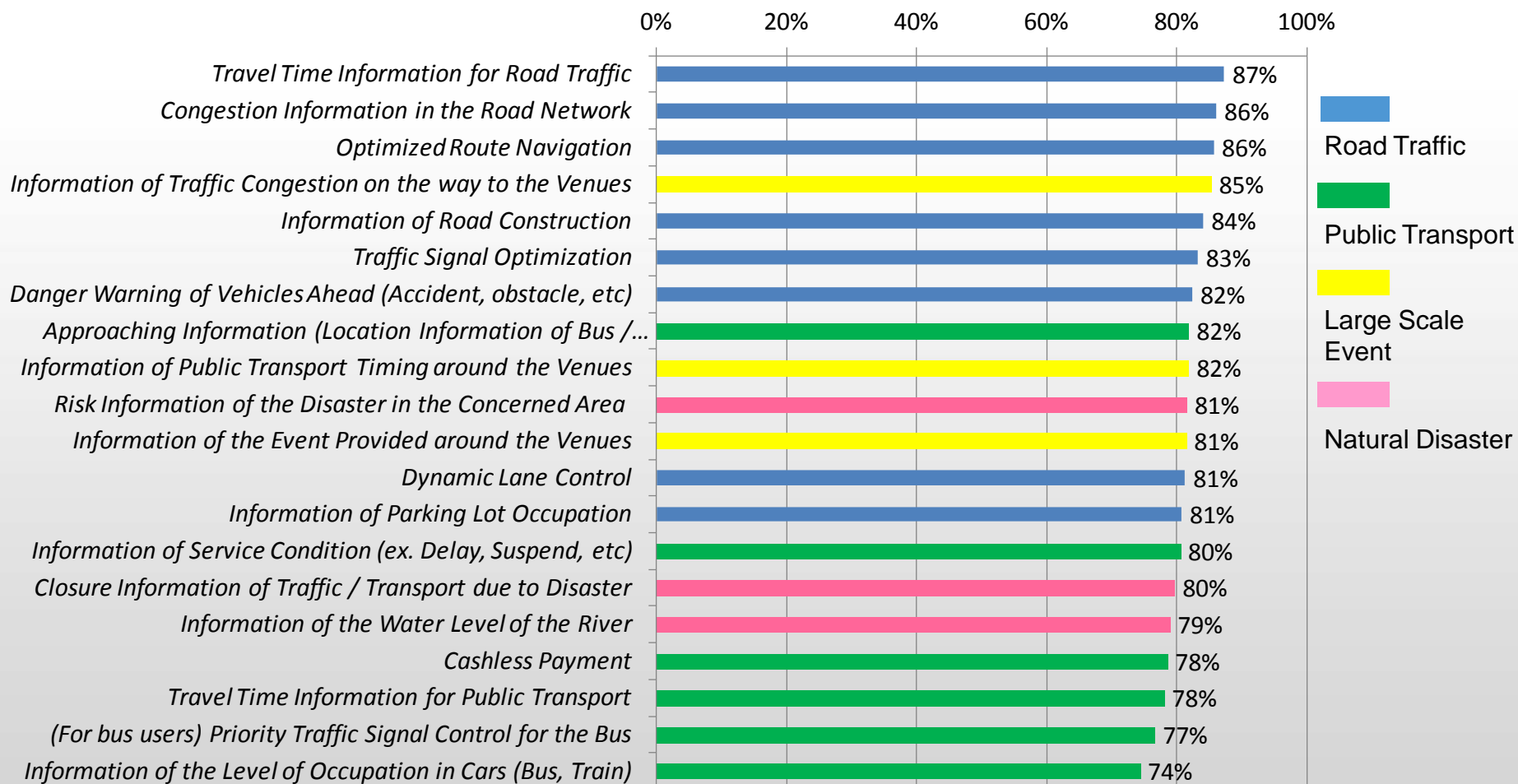
2. *Traffic / Transport Entities*

- *Interview for 40 Stakeholders*
- *Traffic Agencies*
- *Transportation Agencies*
- *Transport Operators*
- *Freight Operators*
- *Public Safety Agencies*
- *Others*

4. Current Condition, Issues and Needs

1. Travelers

Survey Result (Percentage of Samples who answered the ITS service is Important)



Source: ITS needs survey conducted by study team

4. Current Condition, Issues and Needs

1. Travelers

- ❖ *Collected about 3,000 samples by Site Interviews*
- ❖ *ITS Services for*
 - > *Road Traffic*
 - > *Mass Transit*
 - > *Large Scale Event*
 - > *Natural Disaster*
- ❖ *The Needs for ITS services:*
 - > *Important = 80%*

4. Current Condition, Issues and Needs

2. Traffic and Transport Entities

Survey Target

Traffic Agencies

Public/Government al Company	<ul style="list-style-type: none">• ANTT• DENATRAN• DNIT• DETRAN-RJ• DER-RJ• CET-RIO
Private	<ul style="list-style-type: none">• CCR PONTE• Autopista Fluminense• CCR VIA LAGOS• ROTA116• LAMSA

Transportation Agencies

Public	<ul style="list-style-type: none">• CENTRAL-SETRANS• RIO TORIHOS-SETRANS• DETRO-SETRANS• CODERTE-SETRANS• AMTU-SETRANS• SETRANS• SMTR• COR• NITTRANS
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Transport Operators

Syndicate/ Consortium	<ul style="list-style-type: none">• Rio Onibus• Central Coop etc.
Private	<ul style="list-style-type: none">• Super VIA• METRO• CCR Barcas• Private Bus Companies (208)• Socicam• Taxi Companies

Freight Operators

Syndicate	<ul style="list-style-type: none">• Syndicargo
Private	<ul style="list-style-type: none">• Utilissimo Transportes LTDA etc.

Public Safety Agencies

Public	<ul style="list-style-type: none">• Civil Defense-SEDEC• SAMU-CBMERJ• BOMBEIRO-CBMERJ• SESEG• Civil Defense-SMSDC
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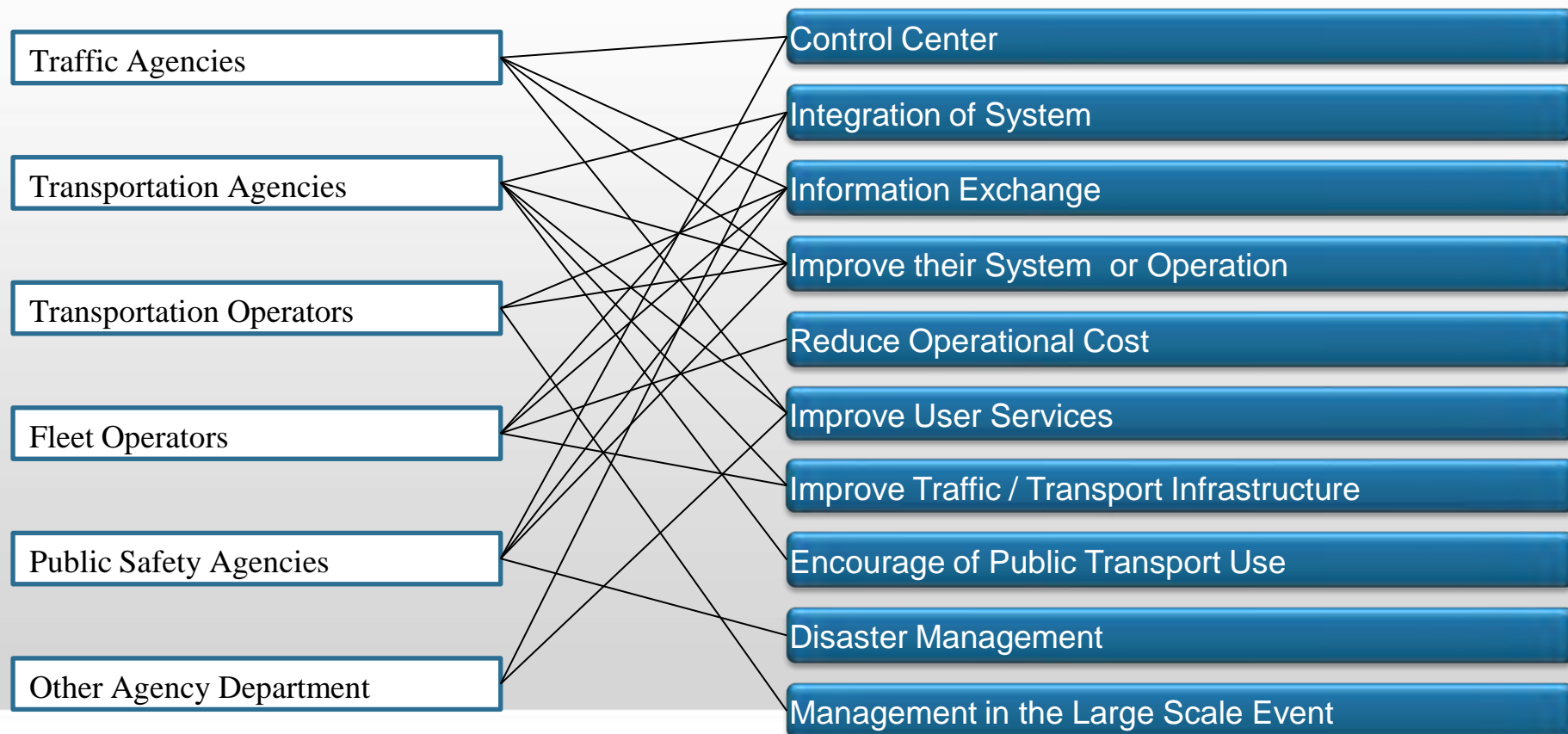
Other Agency Department

Other Agency Department	<ul style="list-style-type: none">• INEA-SEA• SIMERJ-SEDEC• SMAC• AGETRANSP• FETRANSPOR
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4. Current Condition, Issues and Needs

2. Traffic and Transport Entities

- ❖ *Conducted interviews with about 40 stakeholders*
- ❖ *ITS Needs of Transportation Agencies are*





Olympic
Issues

- 1. Comparison of Olympic Cities**
 - Overall Condition
 - Transportation
 - ITS
- 2. Demand Characteristics for Rio 2016**
 - Games Family Demand
 - Spectators Demand
 - Transportation around Venues

5. Comparative Analysis of Olympic Cities

1. Comparison of Olympic Cities

Security and Transport are Key for Olympic Success

				 *2	 *3
Spectators	340,000/Day	400,000/Day	410,000/Day *1	440,000/Day	500,000/Day
Athletes participating	10,651	10,684	10,942	10,931	15,000 *Athletes and officials
Main Transit as Olympic Preparation	Rail/Metro Bus	Metro/Tram Bus	Rail/Metro Bus	Metro - improvement- Bus	4 BRT Metro –line4- Rail-new vehicle
Dedicated Lane for Buses	Some	3 Routes	34 Routes 285.7km	240km	More than 150km
Other	Congestion Charge at Main Corridor	Roads International Airport	More than 300km roads Rebuild or build	Cycle lane and Doc Integration for Transport and Transit	To be prepared?

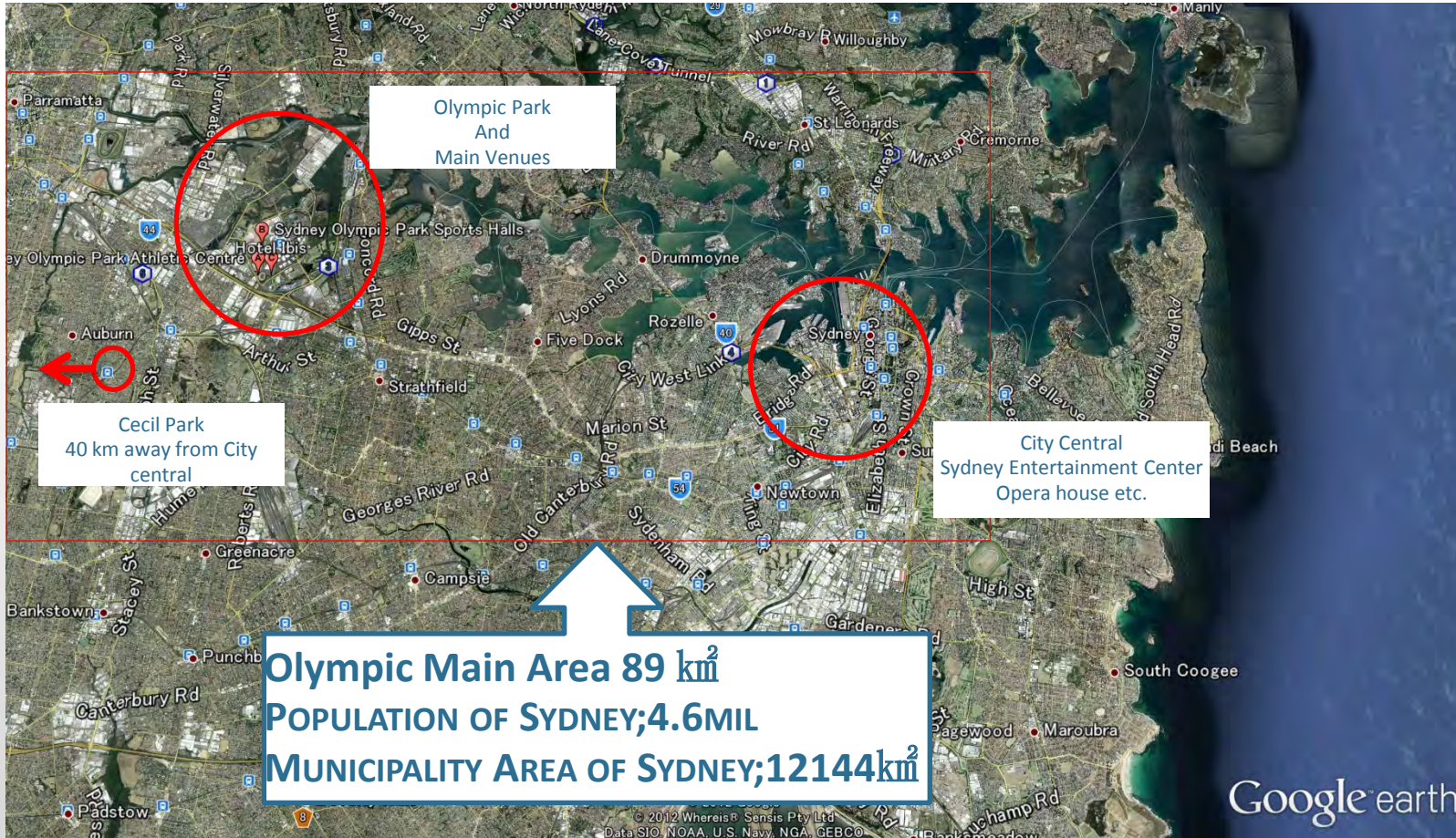
Source: Official Report Olympics each City *1 Estimated by Study Team

*2 From Olympic Candidate File

*3 Transport Strategic Plan 2016

5. Comparative Analysis of Olympic Cities

❑ Sydney



5. Comparative Analysis of Olympic Cities

❑ Prepared ITS Systems for Sydney 2000 Olympic

For ORTA, the Olympic Games began 13 days before the Opening Ceremony. Saturday 2 September 2000 signaled the start of transport for an estimated 22 000 athletes and officials.

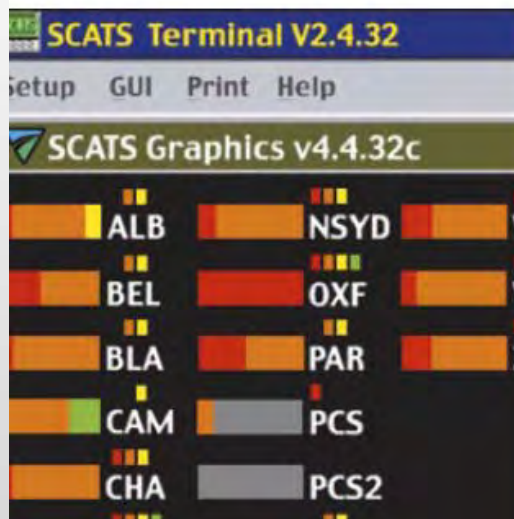
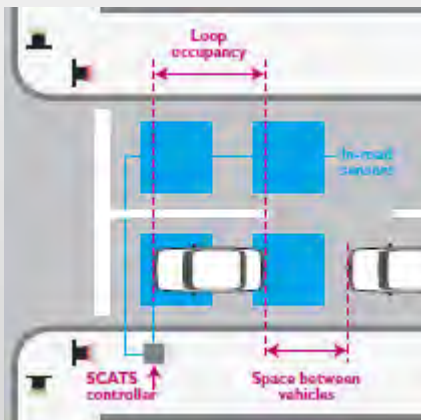
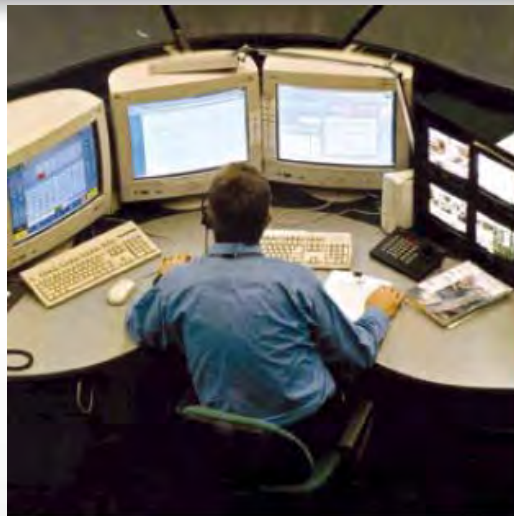
ORTA was required to transport athletes and team officials by bus to the Olympic Village via an accreditation center at Sydney Olympic Park. Transport to training venues commenced the following day. On 5 September, official transport also began for an estimated 17 600 accredited media. The Olympic Transport Operations Centre (TOO) was located at the RTA's Transport Management Centre (TMC) in the suburb of Eveleigh, immediately south of Sydney's CBD. The **A\$30 million TMC opened about a year before the Games**, included some of the world's most sophisticated transport management facilities.

While the RTA continued its core road management tasks in the TMC, ORTA coordinated Olympic transport from a **special incident management room** overlooking the control room. The TOC linked with a wide range of other centers, including the main Olympic command centre, Sydney's train control centre, the Common Domain Operations Centre at Sydney Olympic Park, and police.

A\$30Million = R\$61.5 Million

Sydney prepared Traffic Control Center for Olympic Games

5. Comparative Analysis of Olympic Cities



Total Cost : A\$30Million = R\$61.5 Million

Source: Sydney Organizing Committee, The Sydney integrated transport strategy and RTA website

5. Comparative Analysis of Olympic Cities



TMC manages;

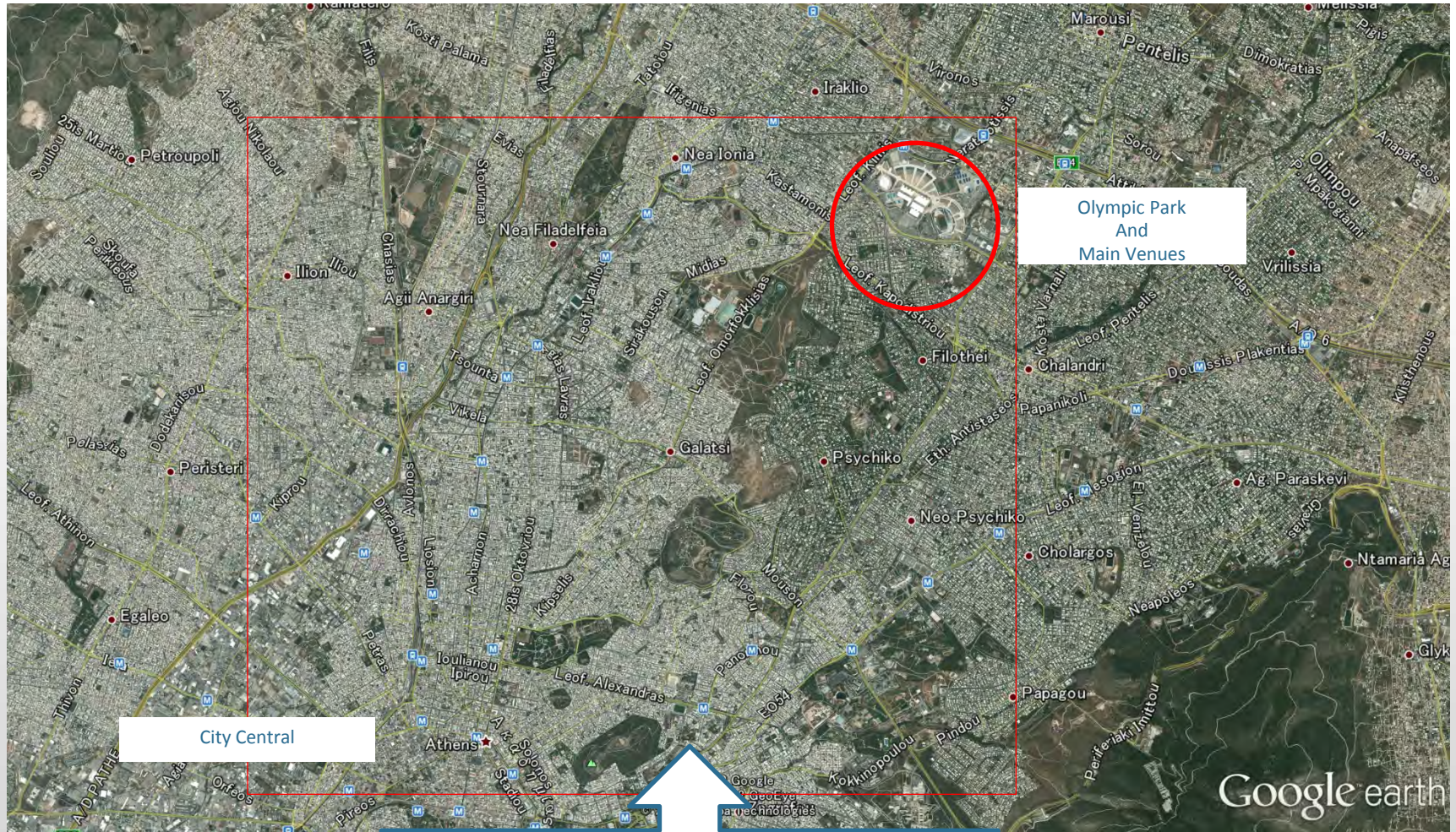
CCTV;700 for
-detecting traffic flow
-incident management
VMS;200
SCATS;250 to 8192
ELCS-Electric Lane
Changing System-;
Variable speed limits sign
Web Based Info
Traffic Info

Total Cost : A\$30Million = R\$61.5 Million

Source: Sydney Organizing Committee, The Sydney integrated transport strategy and RTA website

5. Comparative Analysis of Olympic Cities

□ Athens



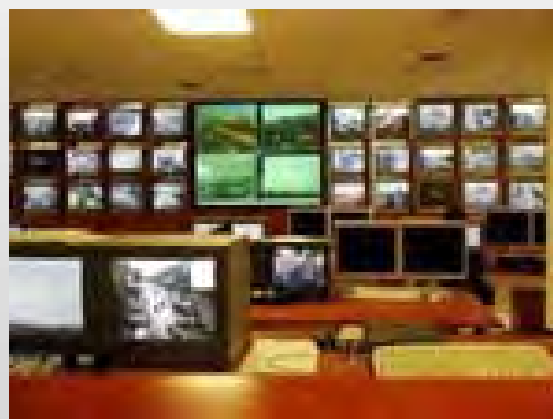
Olympic Main Area 128km²
POPULATION OF CENTRAL ATHENS; 3MIL
CENTRAL AREA OF ATHENS; 411.717km²

5. Comparative Analysis of Olympic Cities

❑ Prepared ITS Systems for Athens 2004 Olympic



Traffic Management and Control Centre (THEPEK) and other Olympic related centers like security monitoring center cooperate to achieve successful Olympic management.

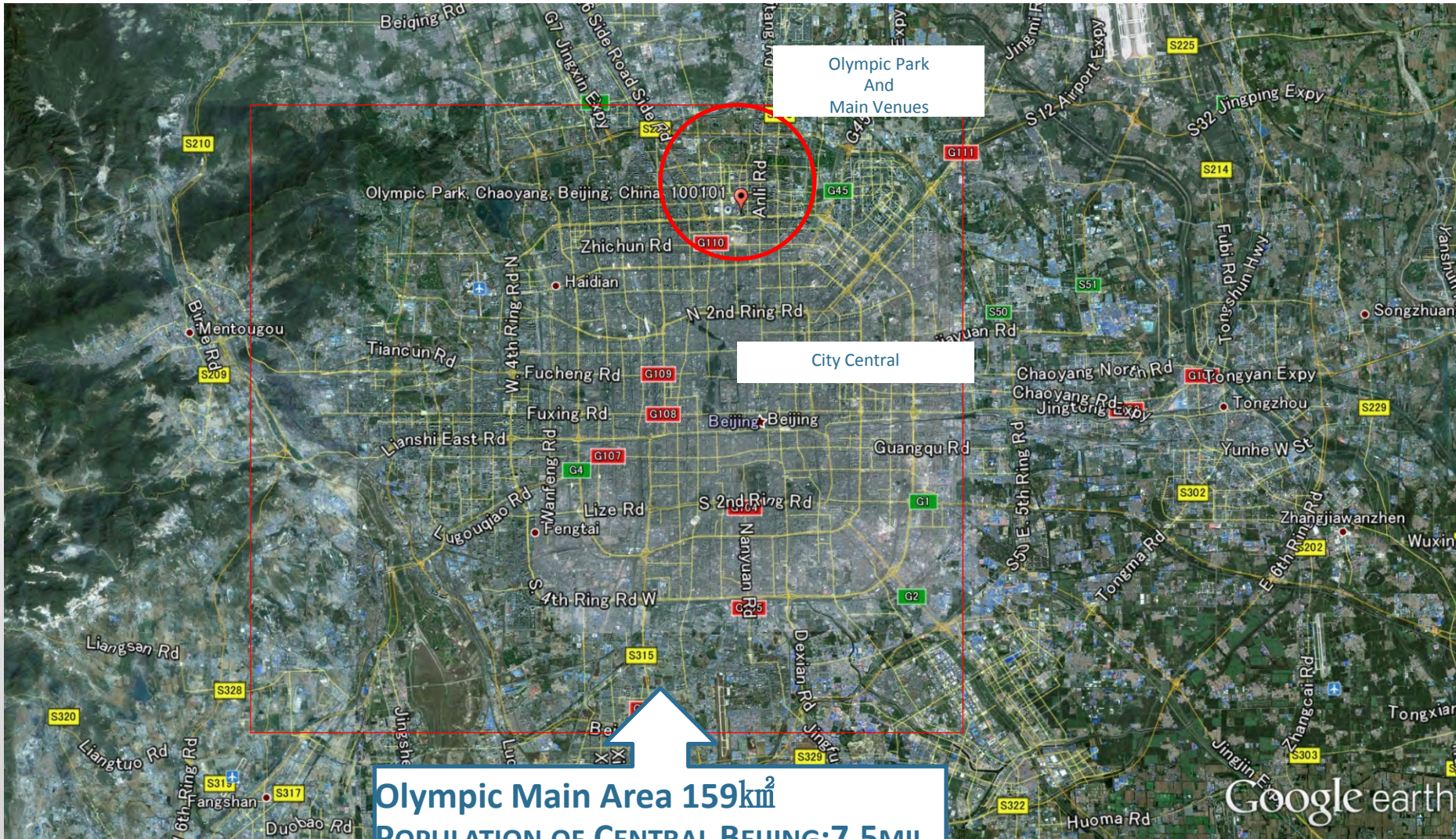


Total Cost : is not mentioned

Source: Athens Olympic report

5. Comparative Analysis of Olympic Cities

□ Beijing



5. Comparative Analysis of Olympic Cities

❑ Prepared ITS Systems Beijing 2008 Olympic



Traffic Control Center



VMS



- Bus Priority
- Dynamic Signal
- Real Time Congestion
- Lane Management
- Bus Passenger Counting etc.

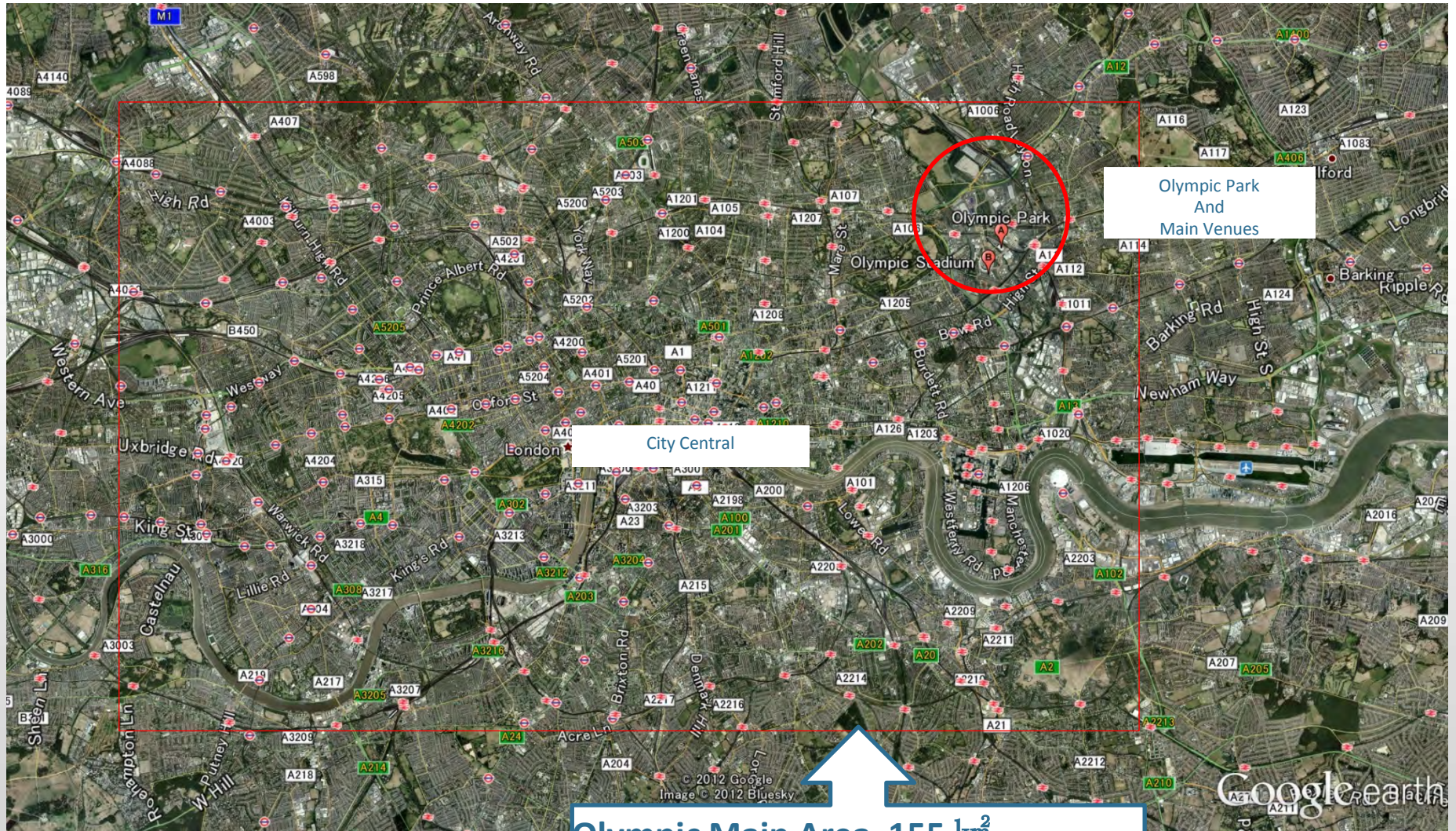
Traffic Volume, Enforcement and Accident

Total Cost : Not Mentioned

Source: Beijing Olympic Report and ITS Japan Report

5. Comparative Analysis of Olympic Cities

□ London



Olympic Main Area 155 km²
POPULATION OF GREATER LONDON; 8.2 MIL
AREA OF GREATER LONDON; 1577.3 km²

5. Comparative Analysis of Olympic Cities

❑ Prepared ITS Systems for London 2012 Olympic

Traffic signal timings will be developed for the Games to provide greater capacity and journey reliability for Games vehicles. These measures will be carefully developed taking into account, and mitigating as far as possible, the impacts on other road users. These Games-time plans will conform to current road safety standards. London benefits from having one of the most advanced technological traffic management systems in the world. The London Streets Traffic Control Centre (LSTCC) is a fully integrated traffic control centre responsible for controlling London's road traffic. The LSTCC has been co-located alongside CentreComm, London Buses' emergency command and control centre, and MetroComm, part of the Metropolitan Police's operational command unit.



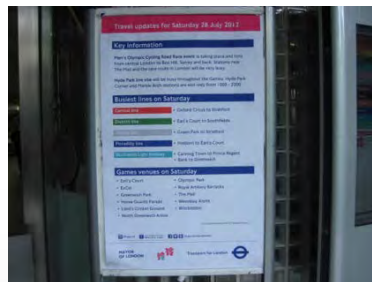
**London Transport Coordination Centre
Road, Rail, Games and Security**

Source; Candidate file, Photos from SMTR

5. Comparative Analysis of Olympic Cities



London Broadcasting Centre



Visible Signs



VMS – Lane Management

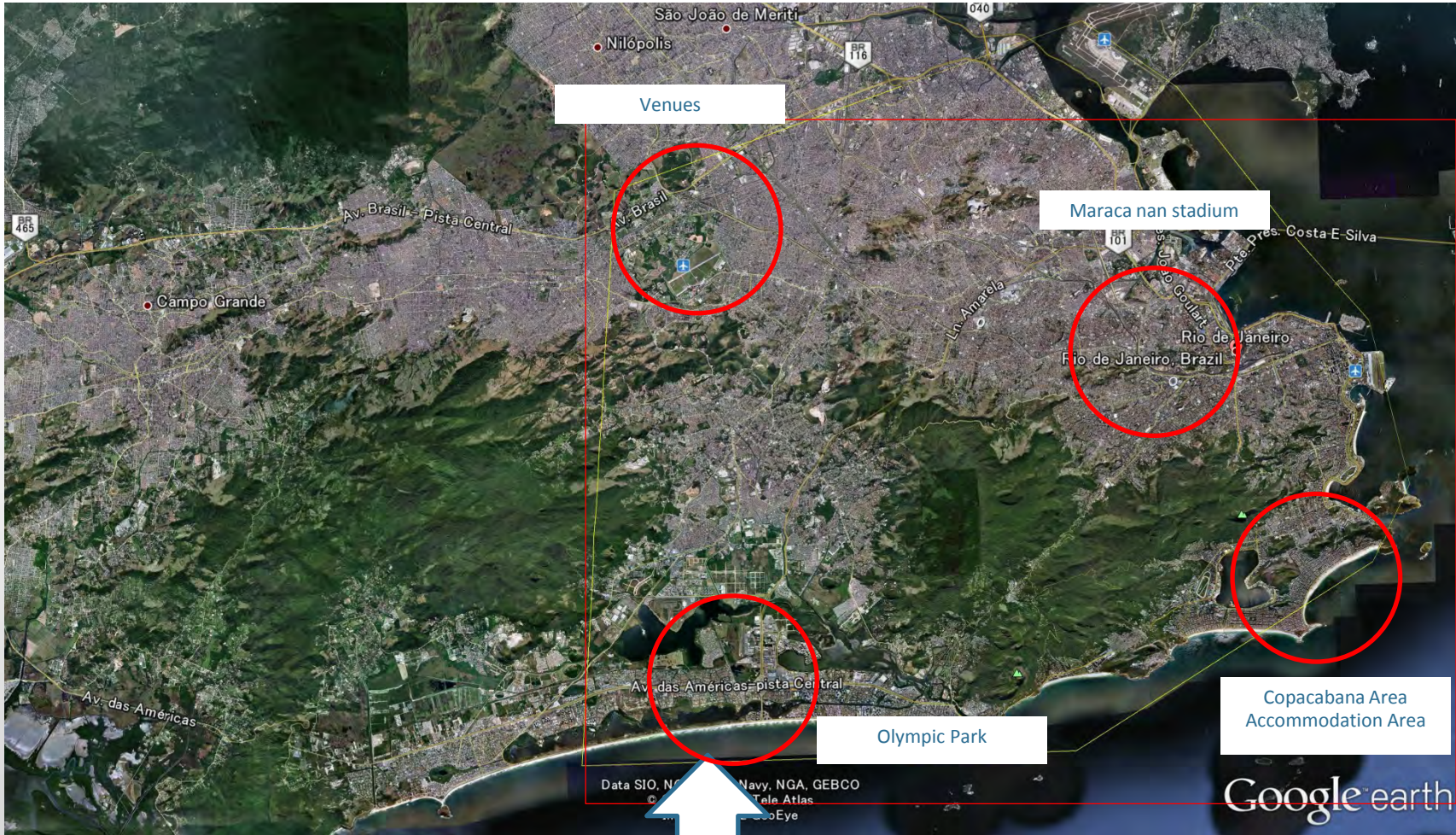


Surveillance Systems

Source; SMTR

5. Comparative Analysis of Olympic Cities

□ Rio de Janeiro



Olympic Main Area 511 km²
POPULATION OF RIO MUNICIPALITY; 6.3 MIL
AREA OF RIO MUNICIPALITY; 1260 km²