

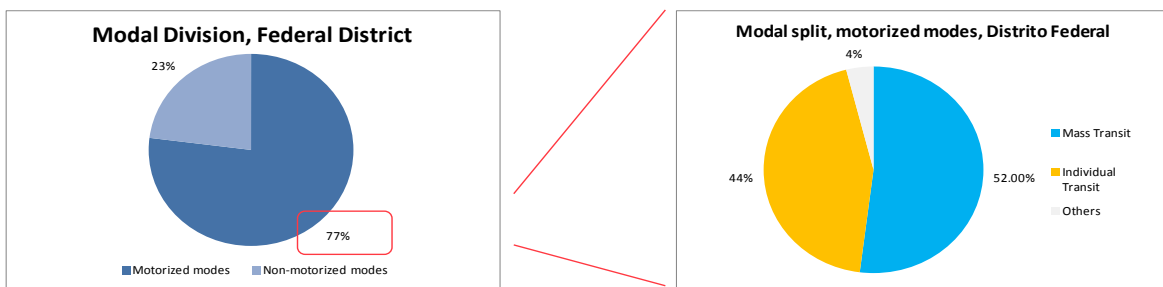
10.2 TRAFFIC/TRANSPORT CHARACTERISTICS IN THE DF

10.2.1 Overall Condition

(1) Modal Share

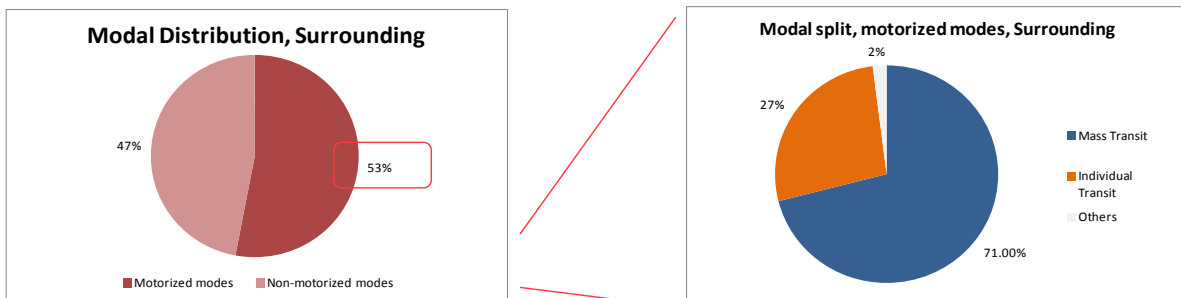
According to the 2010 Transport Master Plan (Plano Diretor de Transportes Urbanos: PDTU) of the DF and surrounding areas, about 52% of all motorized trips are made by mass transit in the DF and 71% in the surrounding cities. Comparing to the case of Tokyo, in which 51% of motorized trips are made by mass transit, public transport is an important component for RIDE network users. In addition, individual transport users also have a large proportion of trips in the DF.

[DF]



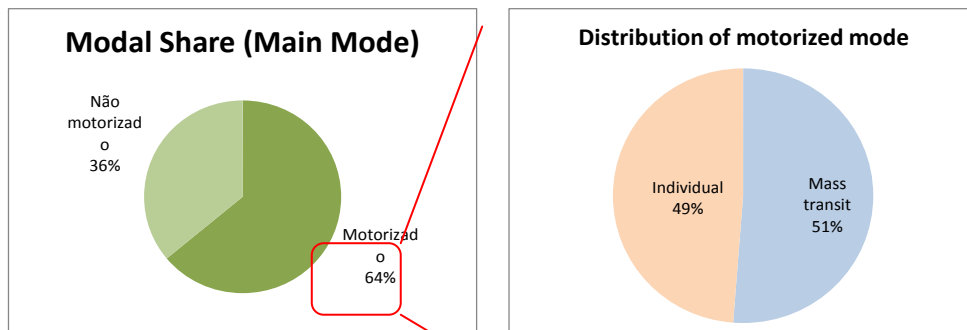
Source: PDTU-DF 2010

[Surrounding cities]



Source: PDTU-DF 2010

[Tokyo Metropolitan Region]



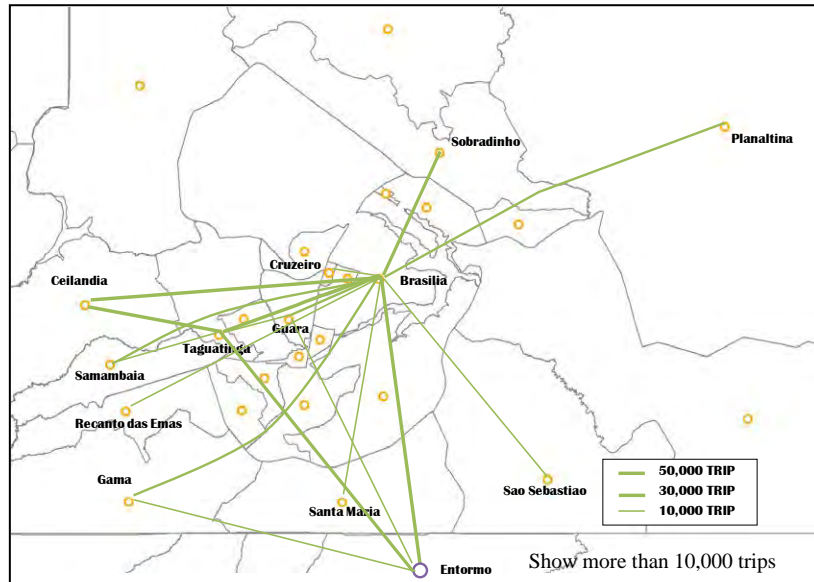
Source: Tokyo Metropolitan Person Trip Survey

Figure 10-21 Modal Split in RIDE and Tokyo

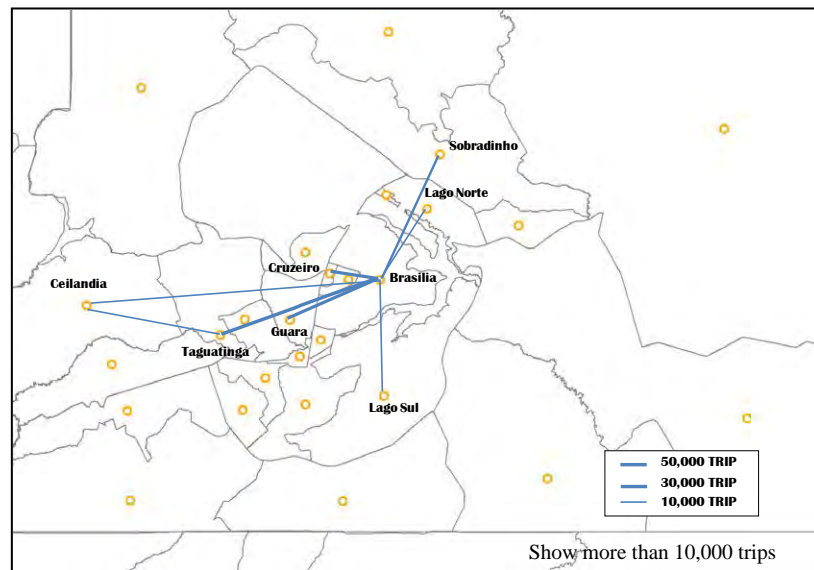
(2) Transport Demand

Figure 10-22 shows that transport demand is concentrated in Brasilia coming from the surrounding cities, especially by public transport.

[Public transport per day - 2009 data]



[Automobile per day - 2009 data]



Source: JICA Study Team

Figure 10-22 Transportation Demand Related to the DF

The trip concentration in Brasilia can be explained through the population and job spatial distribution. Brasília holds only 8.2% of DF's population and almost 48% of the total jobs. On the other hand, Ceilândia (the most populated RA), which holds almost 16% of DF's population, only has 6.7% of the total jobs. Table 10-4 further details this comparison – RAs with population above 100,000 were highlighted. Table 10-5 compares trip production and trip attraction of each RA (the top four RAs in

terms of production and attraction were selected). Brasília, Ceilândia, Taguatinga, and Guará are the most active RAs.

Table 10-4 Population x Job Comparison

Regiões Administrativas	Population 2011	% Population	2011 Jobs	% Jobs
Distrito Federal	2,556,149	100%	999,947	100%
RA I – Brasília	209,926	8.21%	477,169	47.72%
RA II – Gama	127,475	4.99%	29,892	2.99%
RA III – Taguatinga	197,783	7.74%	89,576	8.96%
RA IV – Brazlândia	49,418	1.93%	10,869	1.09%
RA V – Sobradinho	59,024	2.31%	21,973	2.20%
RA VI – Planaltina	161,812	6.33%	30,550	3.06%
RA VII – Paranoá	42,427	1.66%	9,419	0.94%
RA VIII – Núcleo Bandeirante	22,569	0.88%	9,930	0.99%
RA IX – Ceilândia	404,287	15.82%	67,244	6.72%
RA X – Guará	107,817	4.22%	25,209	2.52%
RA XI – Cruzeiro	31,230	1.22%	7,843	0.78%
RA XII – Samambaia	201,871	7.90%	30,602	3.06%
RA XIII – Santa Maria	119,444	4.67%	16,467	1.65%
RA XIV – São Sebastião	77,793	3.04%	14,594	1.46%
RA XV – Recanto das Emas	124,755	4.88%	15,423	1.54%
RA XVI – Lago Sul	29,677	1.16%	18,089	1.81%
RA XVII – Riacho Fundo	35,268	1.38%	7,967	0.80%
RA XVIII – Lago Norte	33,526	1.31%	7,312	0.73%
RA XIX – Candangolândia	15,953	0.62%	2,746	0.27%
RA XX – Águas Claras	109,935	4.30%	22,623	2.26%
RA XXI – Riacho Fundo II	37,051	1.45%	5,702	0.57%
RA XXII – Sudoeste/Octogonal	51,565	2.02%	7,888	0.79%
RA XXIII – Varjão	9,021	0.35%	1,328	0.13%
RA XXIV – Parque Way	19,648	0.77%	2,680	0.27%
RA XXV – SCIA (estrutural)	32,148	1.26%	6,161	0.62%
RA XXVI – Sobradinho II	94,279	3.69%	8,825	0.88%
Jardim Botânico	23,856	0.93%	1,850	0.19%
RA XXVIII - Itapoá	56,360	2.20%	4,937	0.49%
S I A ¹	2,448	0.10%	26,940	2.69%
Vicente Pires	67,783	2.65%	8,594	0.86%
Fora do Distrito Federal			9,545	0.95%

Source: CODEPLAN

Table 10-5 Auto and Public Transport Attraction and Production

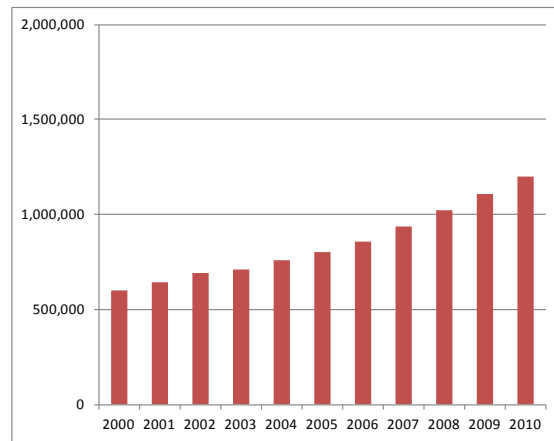
Region	Individual Transport Mode (Vehicles)		Public Transport Mode (Bus, Metro, etc.)	
	Trip Attraction	Trip Production	Trip Attraction	Trip Production
Brasília	358,543	358,414	391,448	389,503
Gama	25,322	25,300	67,532	67,376
Taguatinga	135,344	135,444	215,004	214,320
Brazlândia	5,574	5,559	17,454	17,454
Sobradinho	35,222	35,203	69,015	68,916
Planaltina	15,719	15,719	52,361	52,331
Paranoá	6,332	6,332	12,014	12,014
Núcleo dos Bandeirantes + Candangolândia	25,221	25,204	32,135	32,137
Ceilândia	53,133	53,154	143,028	142,837
Guará	63,088	63,033	93,803	93,649
Cruzeiro	51,850	51,833	43,586	43,511
Samambaia	21,177	21,139	67,028	66,985
Santa Maria	10,854	10,839	34,011	33,909
São Sebastião	14,558	14,574	23,062	22,945
Recanto das Emas	6,953	6,937	35,922	35,897
Lago Sul	30,528	30,525	25,169	24,734
Riacho Fundo	7,949	7,949	22,006	21,977
Lago Norte	18,434	18,416	11,759	11,684
Entorno	62,343	62,569	215,580	219,736

Source: 2010 DF PDTU

(3) Fleet Size

The number of vehicles in the DF has been increasing in recent years. The rate of increase of vehicles is higher than that of the population as illustrated in Figure 10-24. In the surrounding cities, motorization rate is increasing so quickly that traffic management will be one of the key issues for a better urban transport planning in the near future.

[Number of vehicles]



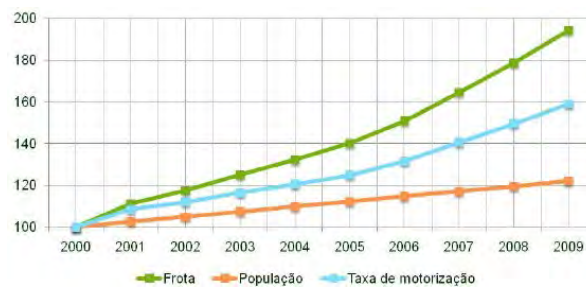
Type: Car, Tram, Truck, Coach, Mini-bus, Motorcycle, Bus, Trailer, Tricycle, etc.

Source: DENATRAN

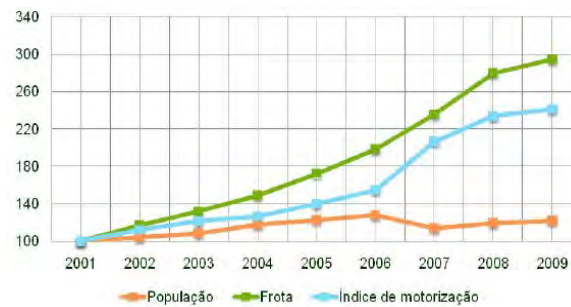
Figure 10-23 Number of Vehicles

[Increase of vehicles]

DF



Surrounding cities



Source: PDTU/DF (2010)

Figure 10-24 Increase in the Number of Vehicles per Year

10.2.2 Traffic Condition

(1) Road Network

The DF road network consists of federal (BR), state (DF), and local roads. The BR roads are administrated by the federal government, in which DNIT is the designated agency. The DF roads are administrated by the DF government, in which DER-DF is the designated agency, and local roads are also administrated by the DF government, in which DETRAN-DF is the designated agency.

Based on the interview conducted with the DER-DF staff, the key problems observed on the road network in the DF are:

- > Congestion (Excess of vehicles on the highways in DF);
- > Absence of investments for expansion of road infrastructure such as widening of bridges, construction of walkways, and maintenance of existing road network; and
- > Lack of resources to monitor traffic conditions and make improvements to the road network plan.

In addition, the current road network has been gradually implemented over several decades since the network plan was conceived at the beginning of the DF (the decade of 1960). Several changes to the inclusion and exclusion of roads, as well as the road classification (according to its importance and increase of daily average volume) have been made.

Table 10-6 Federal Road (BR Road) in DF

Road (km)	Paved	Not Paved	Planned	Total
Federal	240.1	-	115.7	355.8

Source: DNIT (2011 data)

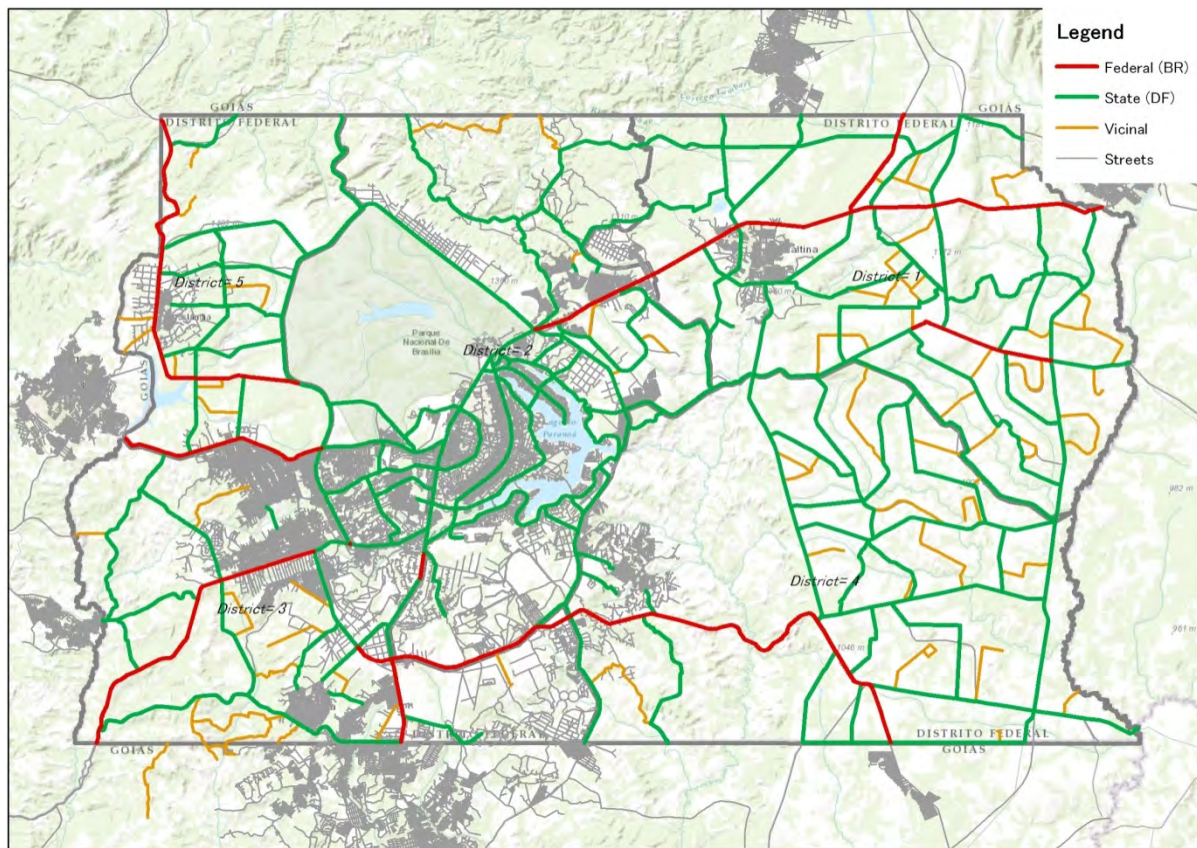
Table 10-7 State Road (DF Road) in DF

	Planned	Not Paved	Paved	Total
State Coincident (with Federal Road)	0	14.6	197.7	212.3
DF Road	78.8	521.4	640.1	1,240.3
Access, Rings, Contours, and Arch	0	0	55.4	55.4
Subtotal	78.8	536.0	893.2	1,508.0
Vicinal	9.3	294.3	10.7	314.3
Total	88.1	830.3	903.9	1,822.3

Source: DER DF

Figure 10-8 shows the road network map in DF. Gray lines are local roads which are administrated by DETRAN-DF. The length of the local network is about 9,000 km long. The figure also shows that federal, state, and local jurisdictions are fragmented and discontinued.

Road density in the DF is about 1.9 km/km² as shown in Table 10-11, which is 1/5 of road density in Tokyo, Japan. On the other hand, the road length per capita of the DF is twice that of Tokyo, showing a high percentage of roads for the population. In addition, the road density in the DF is not uniform due to topographical constraints. Therefore, more radial roads are needed, especially around Brasilia.



Source: DER- DF

Figure 10-25 Road Network in DF

Table 10-8 Road Density and Road Length per Capita

	Road Length(km)	Area (sq km)	Population (person)	Road Density (km/km ²)	Road Length per capita (m/person)
DF	11,178	5,802	2,556,149	1.93	4.37
Tokyo	24,342	2187.7	11,823,029	11.12	2.06

In the DF road network, bridges are built across Lago Paranoa. Thus, infrastructure monitoring for bridge conditions is also necessary.

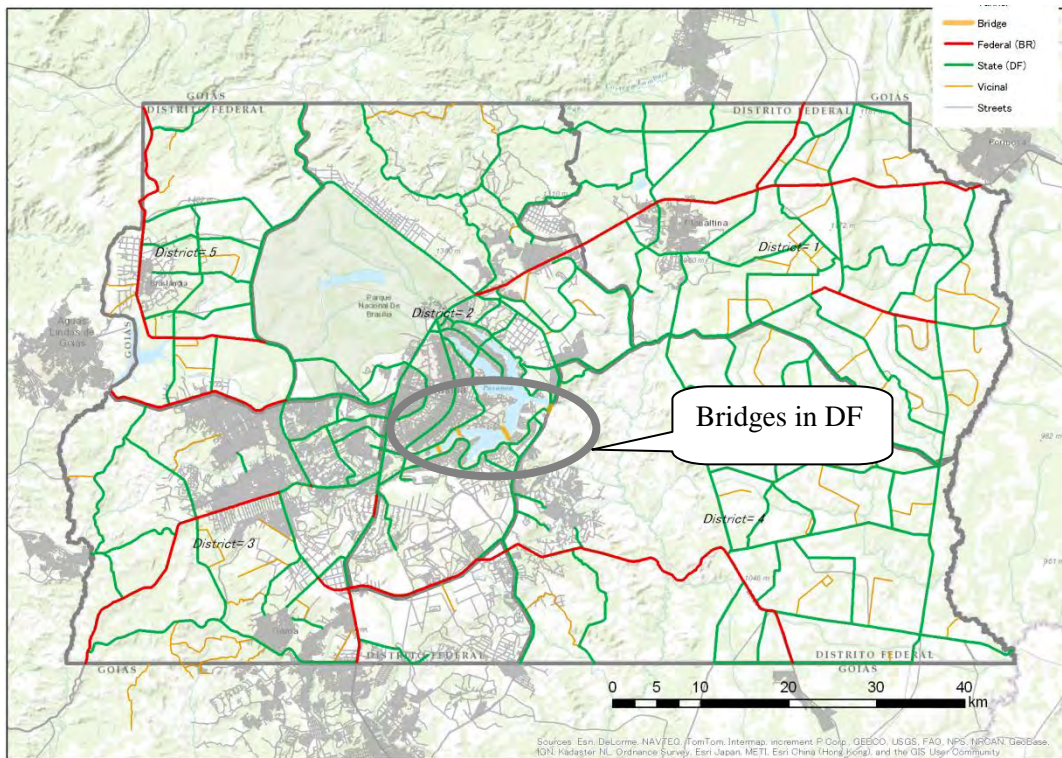


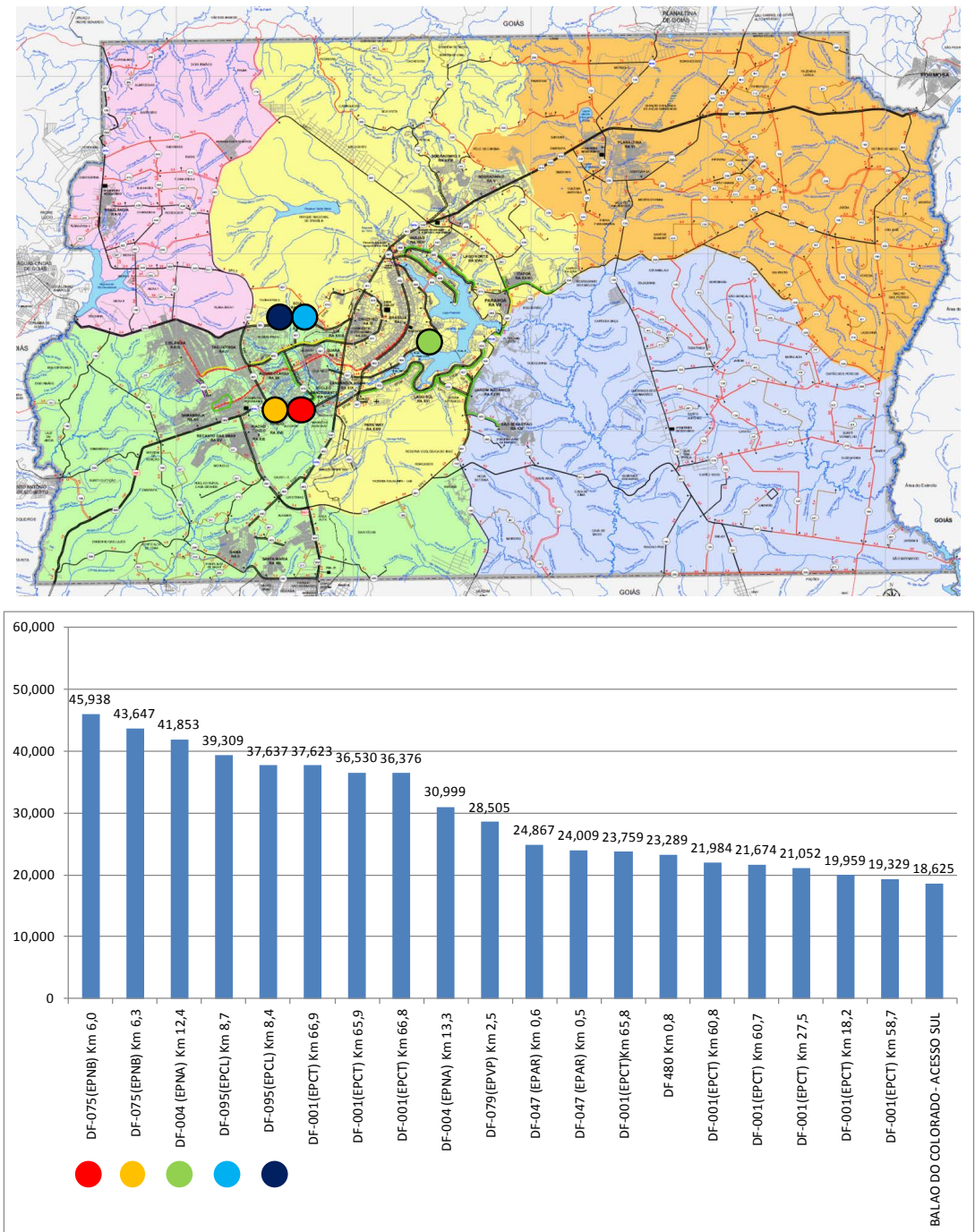
Figure 10-26 Bridges in DF

Source: JICA Study Team

(2) Traffic Volume

1) State Roadways - Counted by Electronic Barrier

In the state road network (maintained by DER-DF), traffic volume data was obtained by the existing roadside equipment (electronic barrier for traffic monitoring). Maximum traffic volume observed was around 45,000 vehicles per direction per day. Roads surrounding the central business district like DF-075 and DF-095 have high traffic volume records as shown in Figure 10-27.

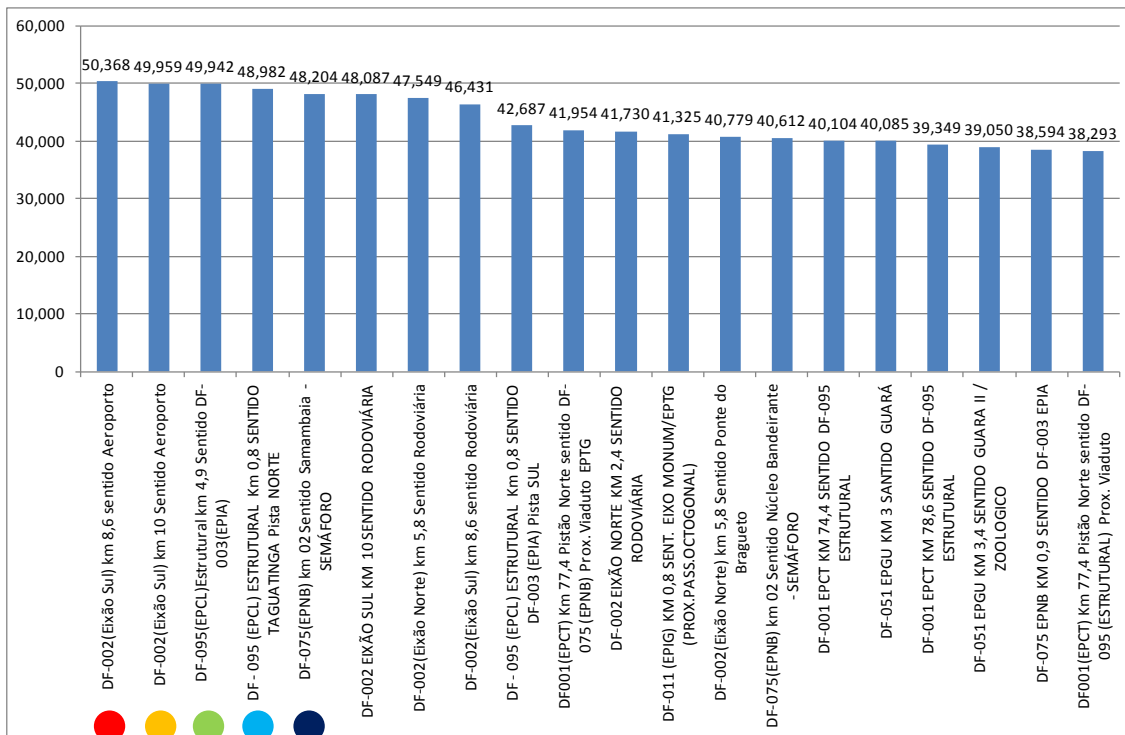
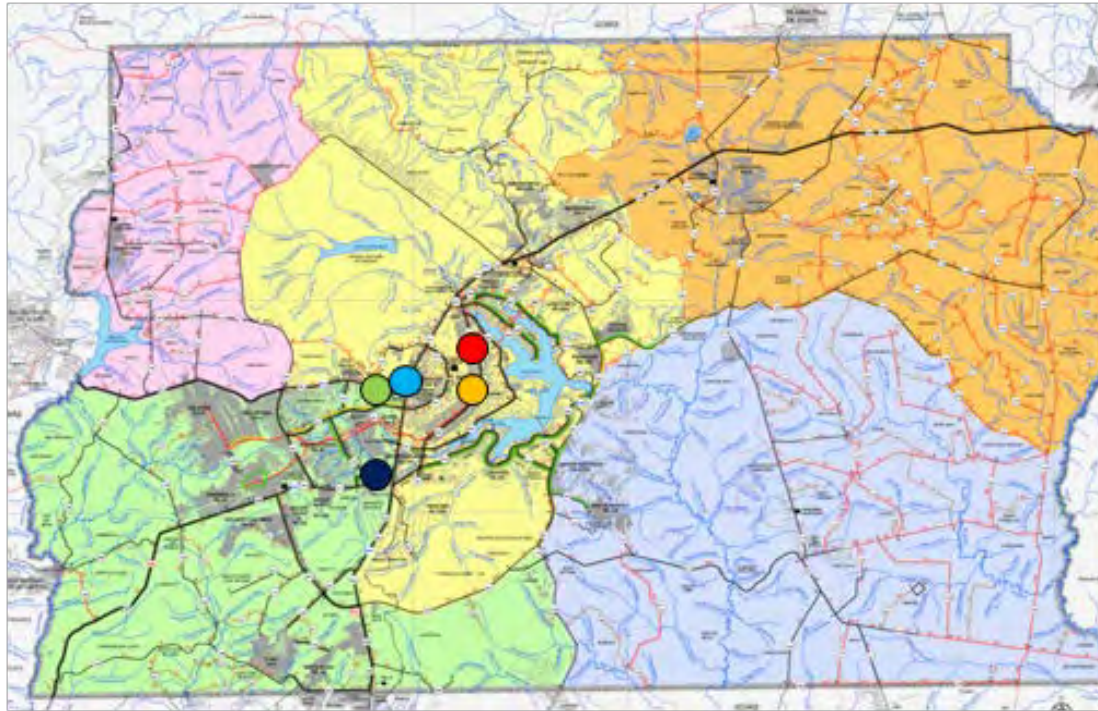


Source: DER-DF data

Figure 10-27 Traffic Volume Counted by Electronic Barrier

2) State Roadways - Counted by Electronic Surveillance

In addition to the electronic barrier data, additional traffic volume information was obtained by the existing electronic surveillance equipment (*pardais*) for traffic monitoring. Maximum traffic volume observed was around 50,000 vehicles per direction per day. Corridors from north to south in the central business district like DF-002 recorded high traffic volume.

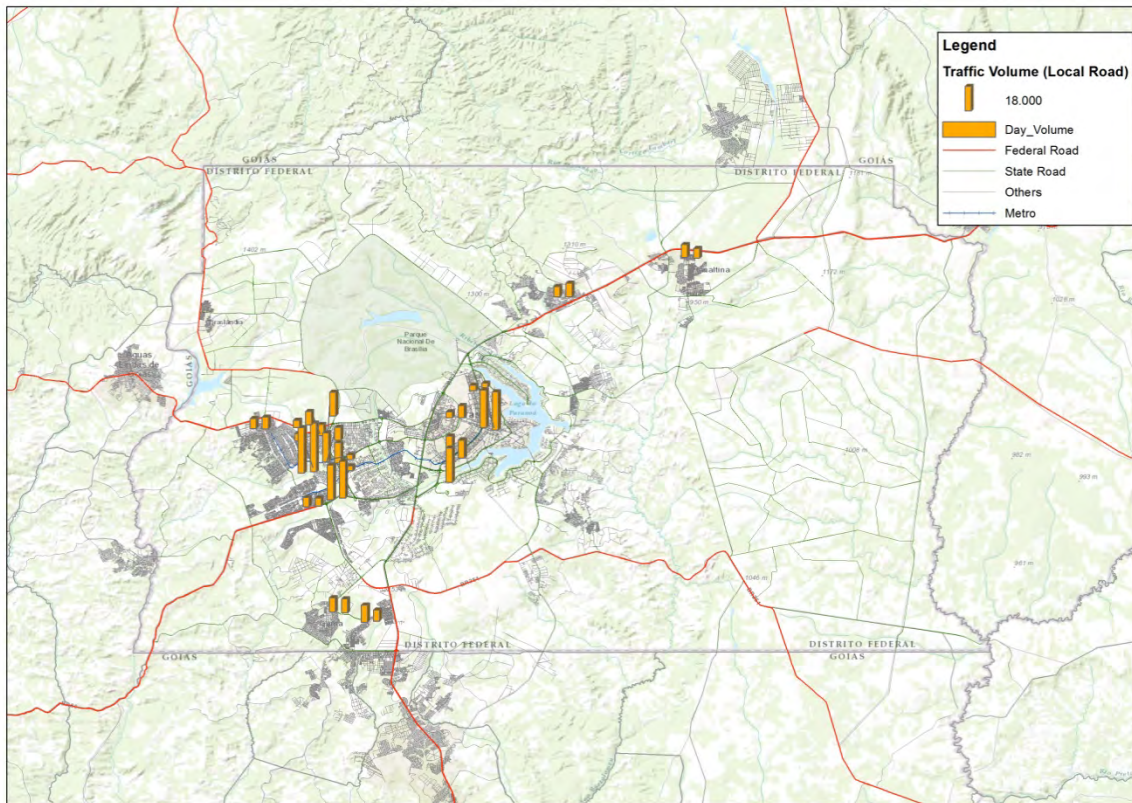


Source: DER-DF data

Figure 10-28 Traffic Volume Counted by Electronic Surveillance

3) Local Road Traffic Volume

In the local road network (maintained by DETRAN-DF), traffic volume data was obtained through the existing roadside equipment (electronic barrier, speed meter, and red light running camera). Maximum traffic volume observed was around 37,000 vehicles per direction per day. The Taguatinga area has a high traffic volume record as shown in Figure 10-29.



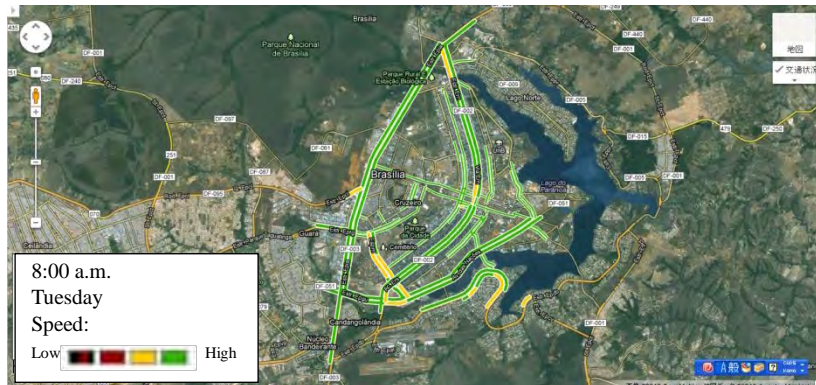
Source: DETRAN-DF 2011 data

Figure 10-29 Traffic Volume of Local Road

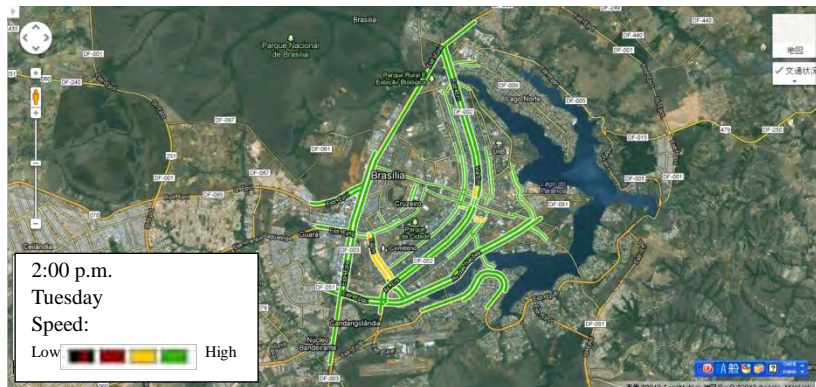
(3) Travel Speed

Traffic conditions are not provided by the public sector in the DF. Therefore, travel speed data from Google Map was the only information available to clarify current traffic conditions. Based on the traffic condition data published by Google, travel speed is low in some sections along DF-003 and DF-251. These sections have important intersections on the DF road network. However, the data provided by the website was not enough to understand the area-wide traffic problems in the DF. Thus, a monitoring system is needed to implement ITS user services such as travel time information.

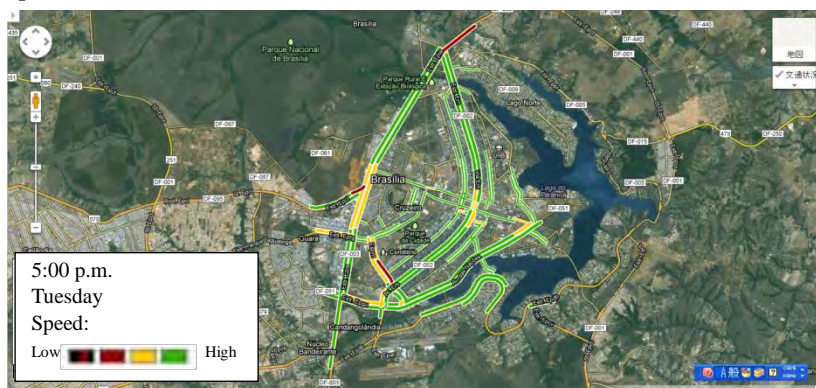
[Tuesday 8:00 a.m.]



[Tuesday 2:00 p.m.]



[Tuesday 5:00 p.m.]



Source: Google Map

Figure 10-30 Travel Speed in DF

(4) Traffic Accidents

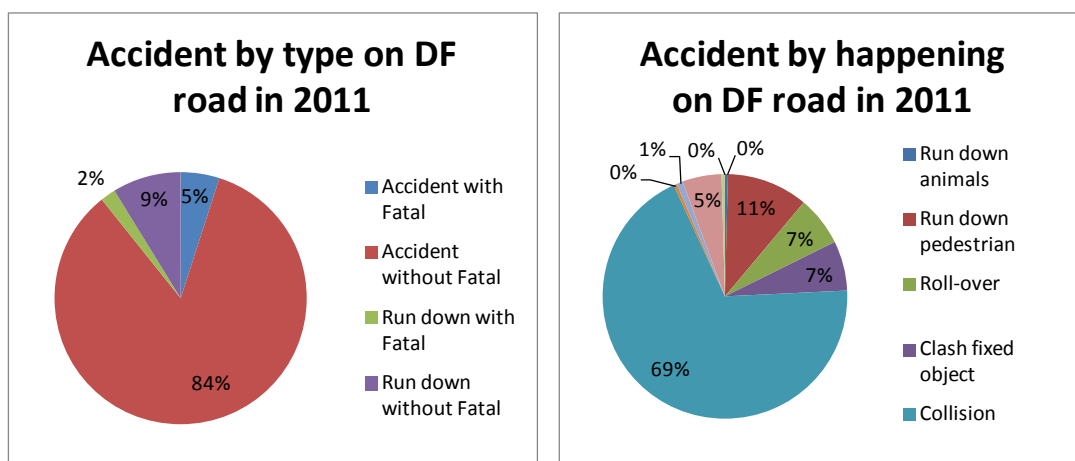
The frequency of traffic accidents has been gradually decreasing over the past decade. Figure 10-31 shows the rates of death per 10,000 vehicles and per 100,000 inhabitants. This trend should be kept.



Source: PDTIU/DF (2010)

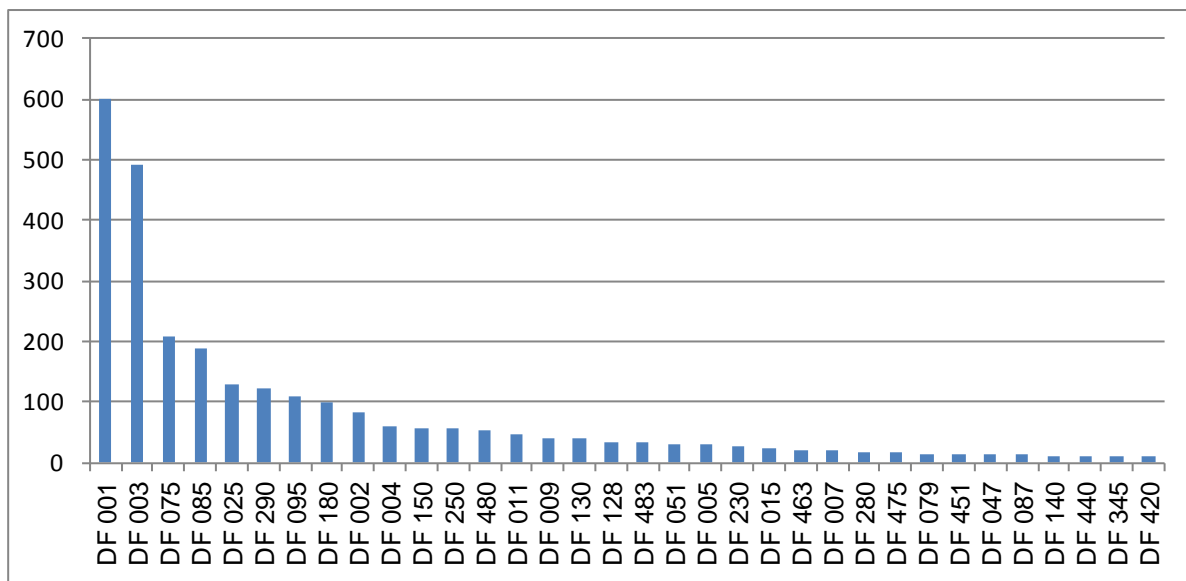
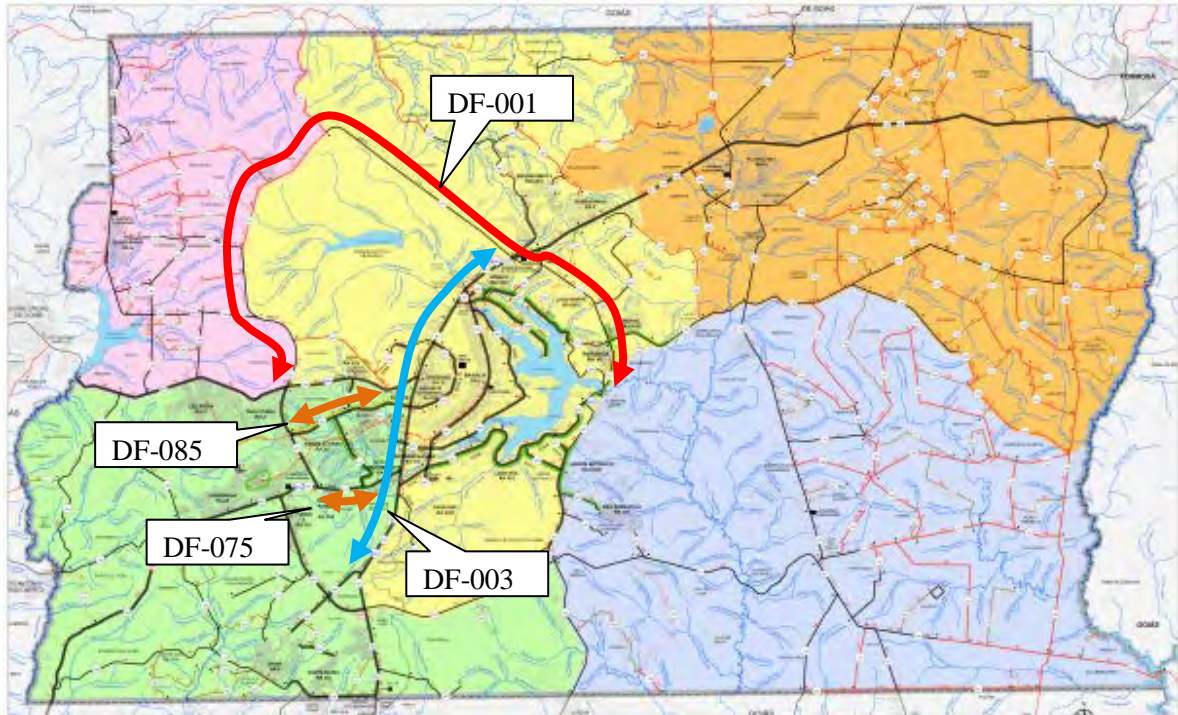
Figure 10-31 Rates of Traffic Accidents in the DF

As for the type of traffic accidents, “collision” is the dominant type with 69% of the total accidents in 2011. Therefore, road safety driving assistance for vehicle drivers is important.



Source: DER-DF

Figure 10-32 Traffic Accidents in the DF by Accident Type and by Road Type



Source: DER-DF

Figure 10-33 Traffic Accidents in the DF by Road

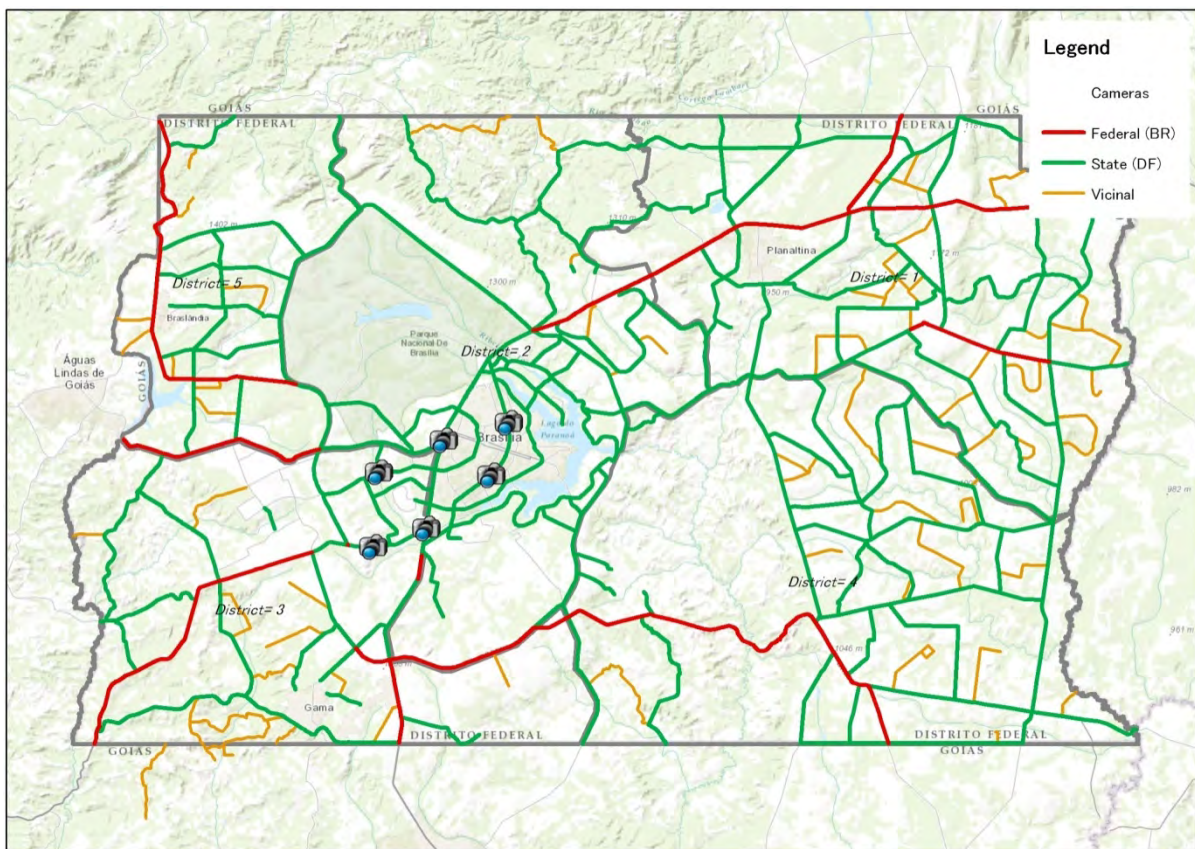
(5) Equipment

The DNIT do not deploy its own equipment on federal roads, but have a plan to install new speed monitoring equipment in the near future. It should be noted that traffic lights are managed by the local government. Therefore, only equipment managed by DER-DF and DETRAN-DF are shown in this section.

1) State Roads (DER-DF)

i) Cameras

Six real time cameras are located along the DF state roads, as shown in Figure 10-34.

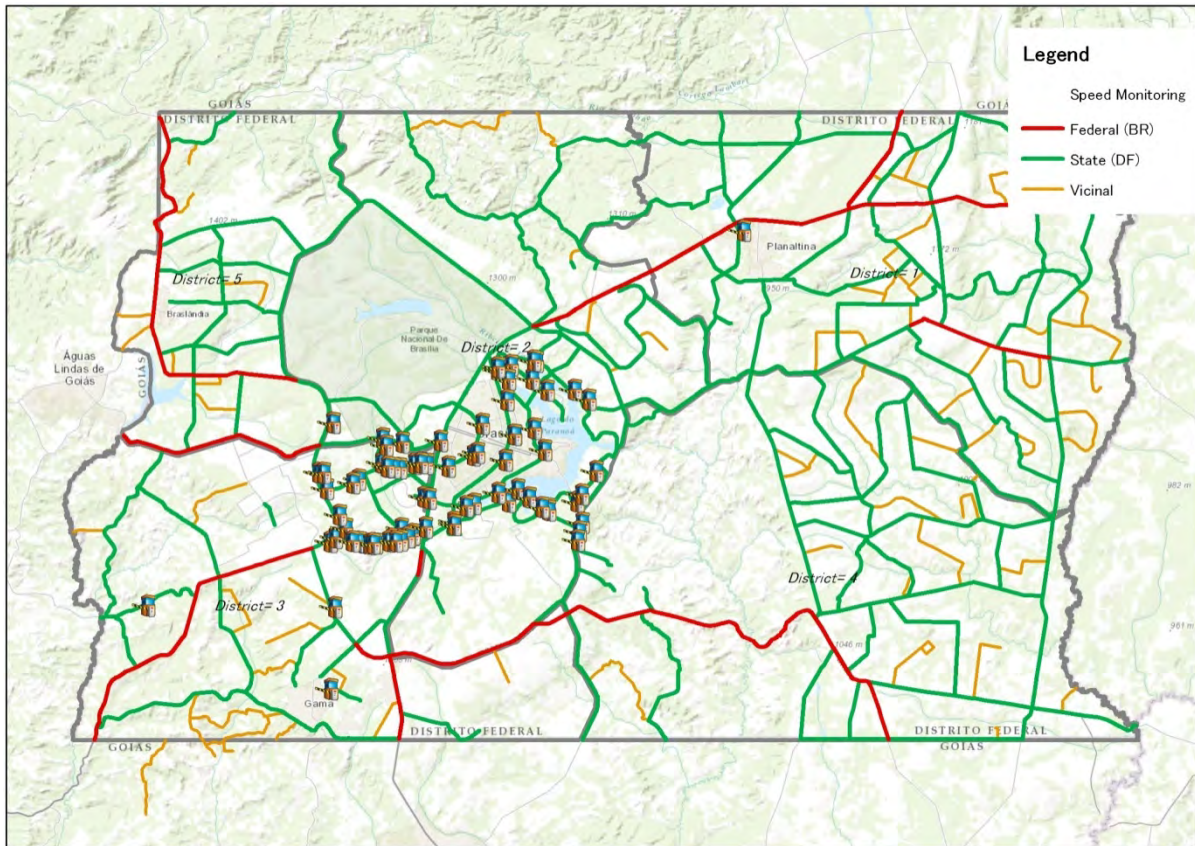


Source: DER-DF 2012

Figure 10-34 Location of Cameras in the DF

ii) **Speed Monitoring**

There are 101 speed monitoring equipment located along the DF state roads.

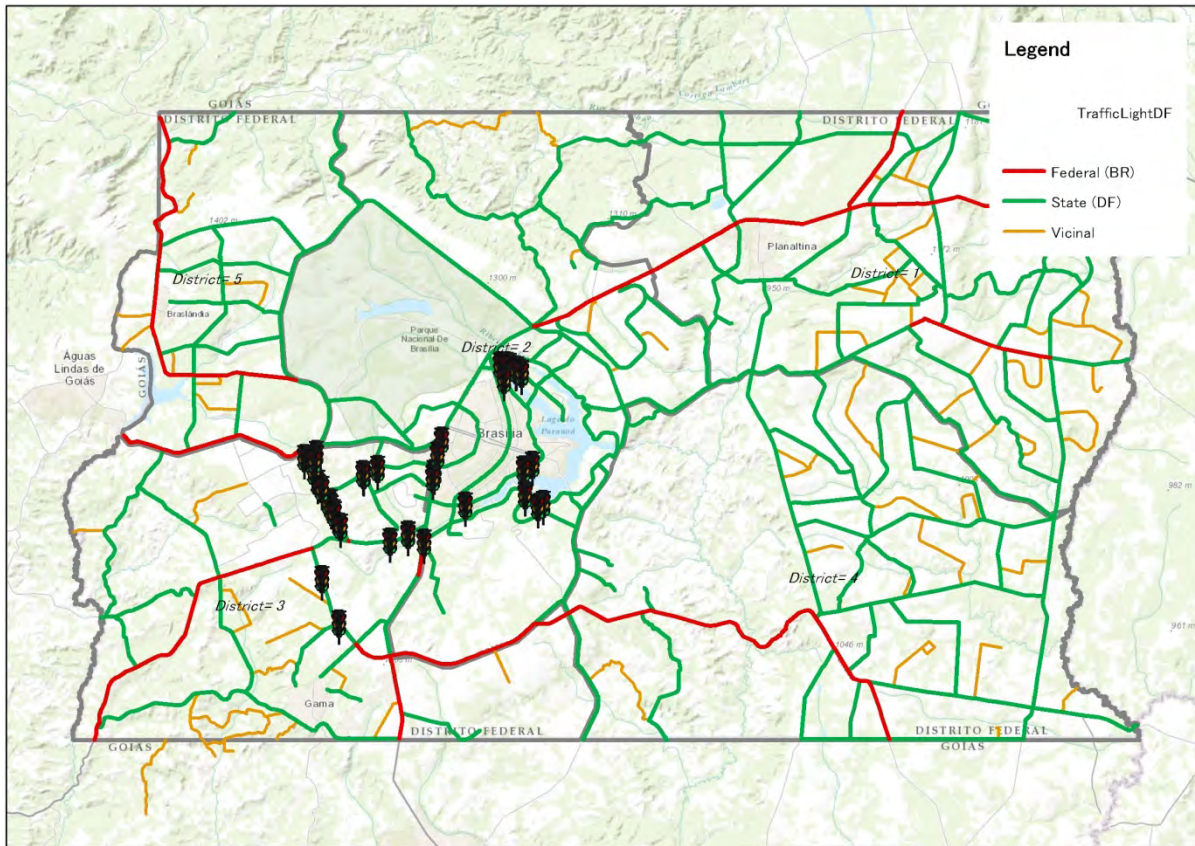


Source: DER-DF 2012

Figure 10-35 Location of Speed Monitoring Equipment in the DF

iii) **Traffic Signals**

There are 40 traffic signals located along the DF state roads.



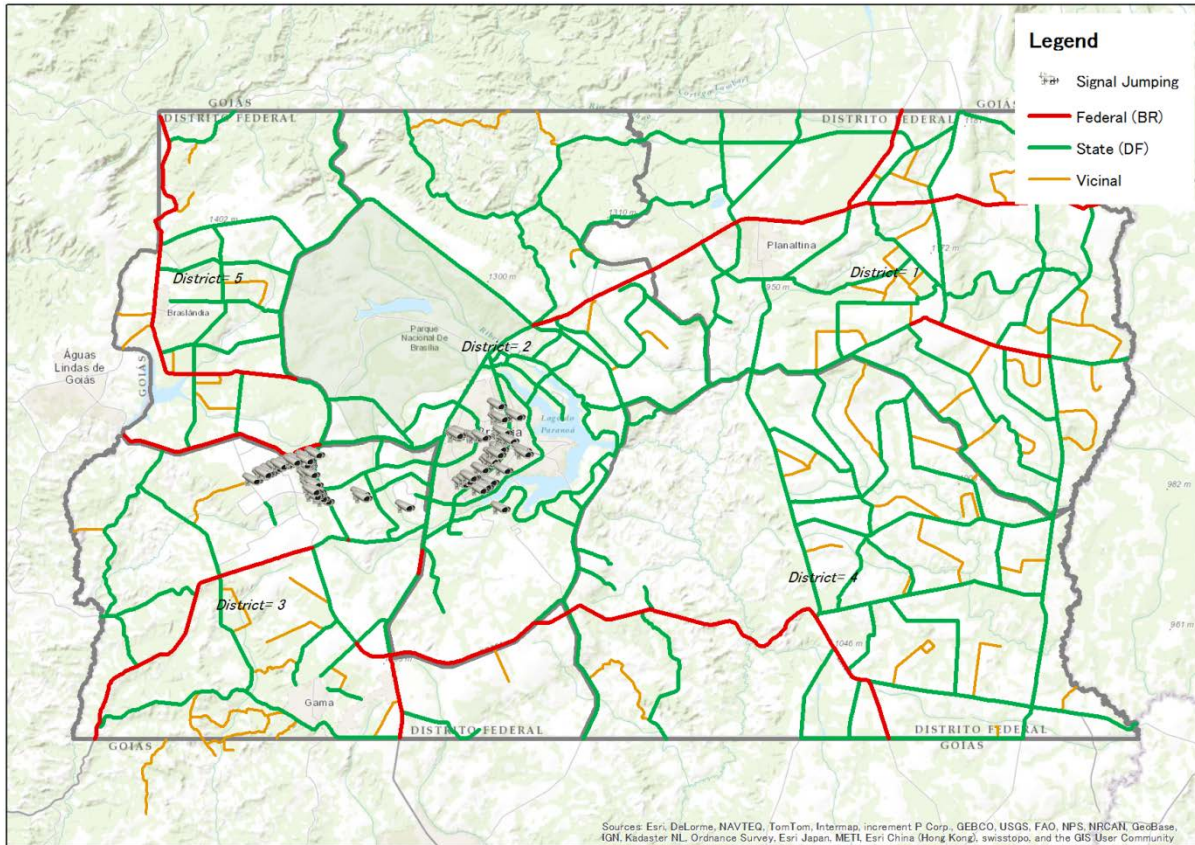
Source: DER-DF 2012

Figure 10-36 Traffic Light Locations in the DF

2) Local Roads (DETRAN-DF)

i) **Red Light Running Camera**

There are 151 signal red light running camera equipment located along the DF local roads, as shown in Figure 10-37.

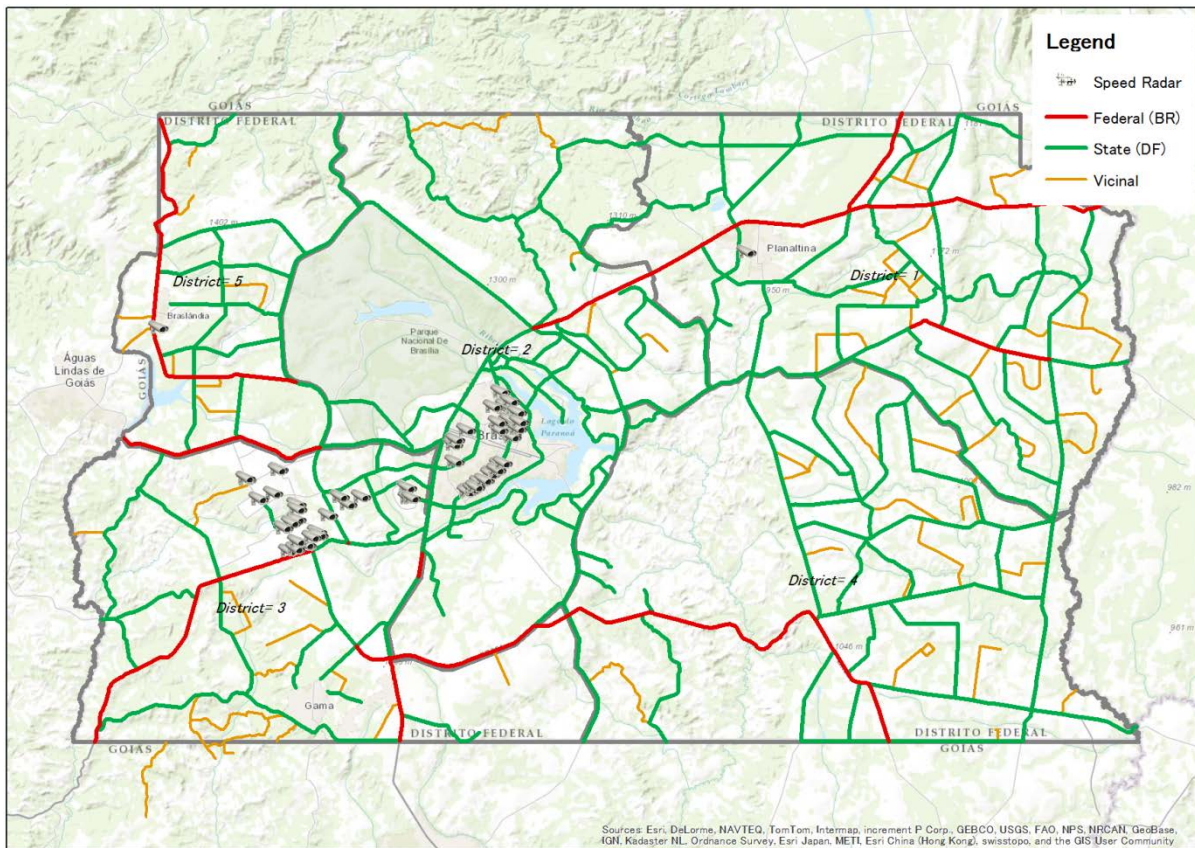


Source: DETRAN-DF 2012

Figure 10-37 Red Light Running Camera Locations in the DF

ii) Speed Meters

There are 193 speed meter equipment, also known as *pardais*, located along the DF local roads.

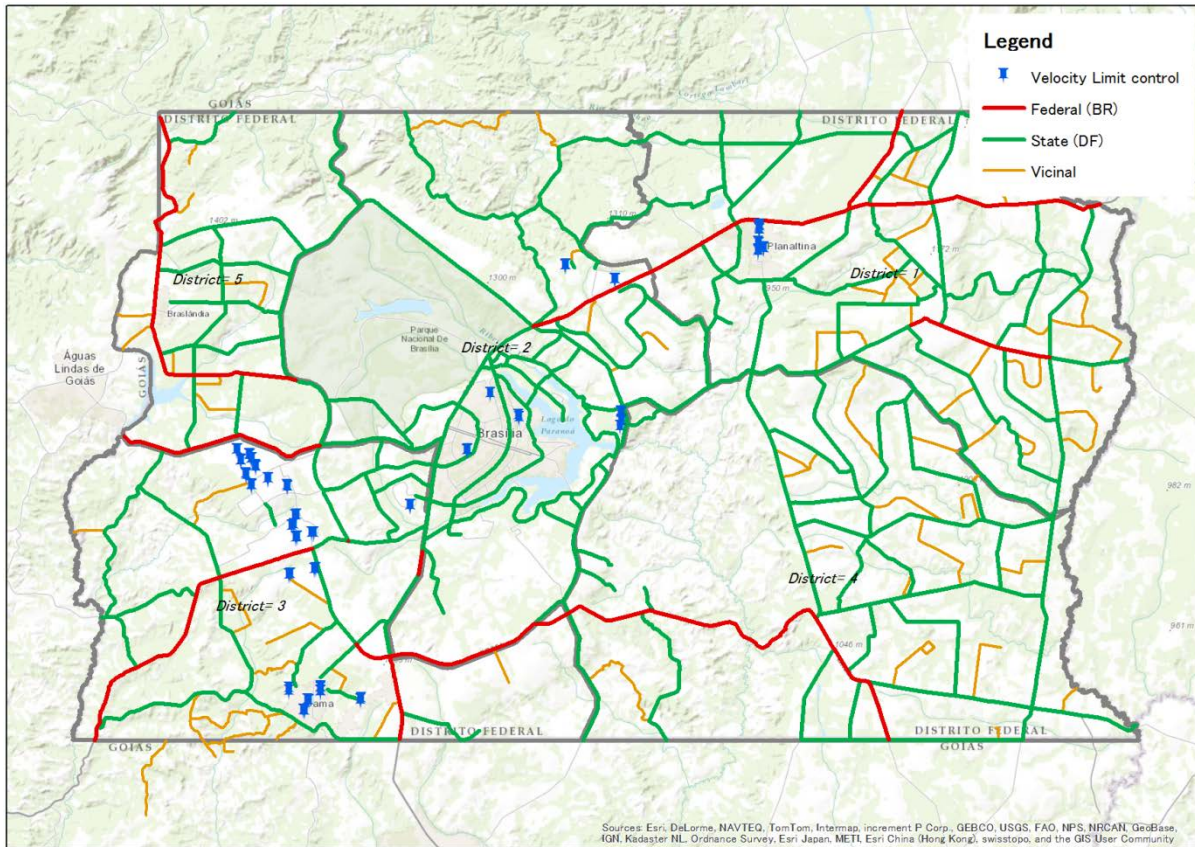


Source: DETRAN-DF 2012

Figure 10-38 Speed Radar Locations in the DF

iii) **Electronic Barrier**

About 104 electronic barrier (to monitor speed limit) equipments are located along DF local roads.



Source: DETRAN-DF

Figure 10-39 Locations of Electronic Barriers in the DF

(6) Car Parking

The demand for car parking is high because public transport network is not fully developed in DF. Most cars are parked on lots around buildings and on some local streets. Therefore, parking information is important in order to avoid traffic jam due to car parking search around trip generators.



Source: JICA Study Team

Figure 10-40 Photos of Cars Parked around Buildings

(7) Stakeholders ITS Needs

Based on the interviews conducted with the main stakeholders in the DF, their ITS needs are enumerated in Table 10-9, as follows:

Table 10-9 Stakeholders ITS Needs

Entity	Purpose	Needs Related to ITS
DER-DF	Management of state roads, traffic control and monitoring	> Solve traffic jams due to the lack of road network capacity > Maintain road infrastructure > Deploy more CCTV and VMS units > Upgrade signal control system > Utilize OCR data for license monitoring
DETRAN-DF	Vehicle registration and licensing, traffic control and monitoring for local roads	> Plan to build operation control center > Plan to deploy new CCTVs and VMSs > Upgrade the traffic signal control system > Use the OCR data for monitoring vehicles > Simulation system that uses data from the control center allowing to evaluate the impact of interventions pole generators and roads, as well as the effectiveness of possible mitigation measures

10.2.3 Public Transport Conditions

(1) Overall Condition

Available public transport services in the DF are shown in Table 10-10.

Table 10-10 Public Transport Services in the DF

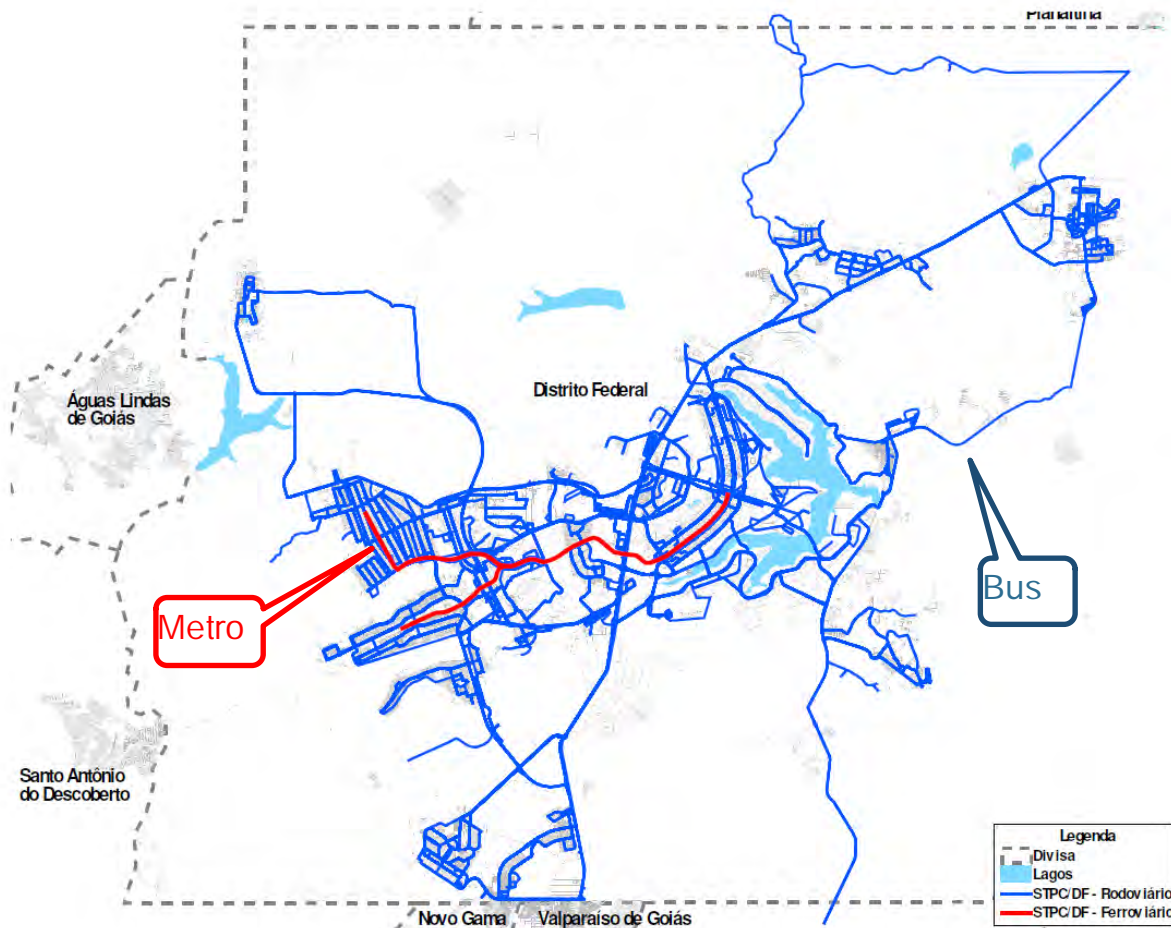
Mode	Operation	Supervision	Stations/ Stops	Fleet	Line
International and Interstate Bus (Based on PDTU)	-	Federal (ANTT)	-	-	30 lines enter DF
Local Bus (DF)	Concession (about 22 companies) - Caniedo -Constantino ,etc.	DF (DFTRANS)	To be confirmed	About 3,000 vehicles	About 1,000 lines (Basic and Supplementary)
	Government Company (TCB)	DF (DFTRANS)	To be confirmed	40 buses	8 lines 3 lines for airport
RIDE Local Bus (Other 8 Municipalities) (Based on PDTU)	Permission Authorization Freelance	Each Municipality	590 stops	78 Buses/ Microbuses 215 Vans	-
Terminals	SETRANS	DF (SETRANS)	33 terminals (+ 20 planned)	-	-
Subway	Government Company (Metro DF)	DF (SETRANS)	24 Stations (+ 5 in Construction)	32 Fleets	42.38 km
Taxi	Permission	DF (SETRANS)	-	-	-
Airport	Federal Government	-	-	-	-

Source: JICA Study Team

(2) Types of Mass Transportation and Operating Agencies in the DF

1) Urban Transport Network

In the DF, buses and the metro are the main public transport services. The network is shown in Figure 10-41.

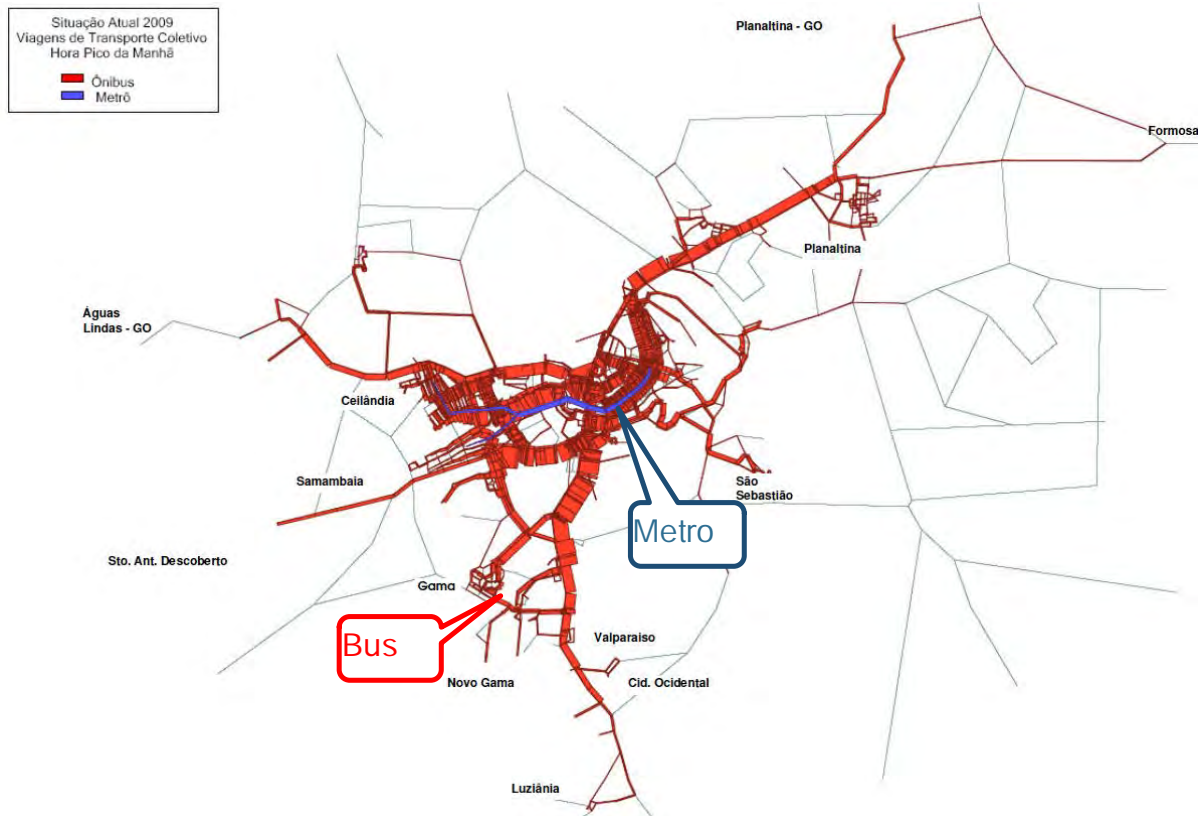


Source: PDTU DF 2010

Figure 10-41 Public Transport Network in the DF

2) Transportation Demand for Urban Transport

Public transport demand in the morning peak hour based on 2009 data is shown in Figure 10-42. Bus is the main transport mode in the DF as highlighted by the red lines. The highest demand for bus service is observed in the radial lines towards Planaltina, Luziania, Ceilandia, and Samambaia. Interstate movement from surrounding areas to DF can also be observed.

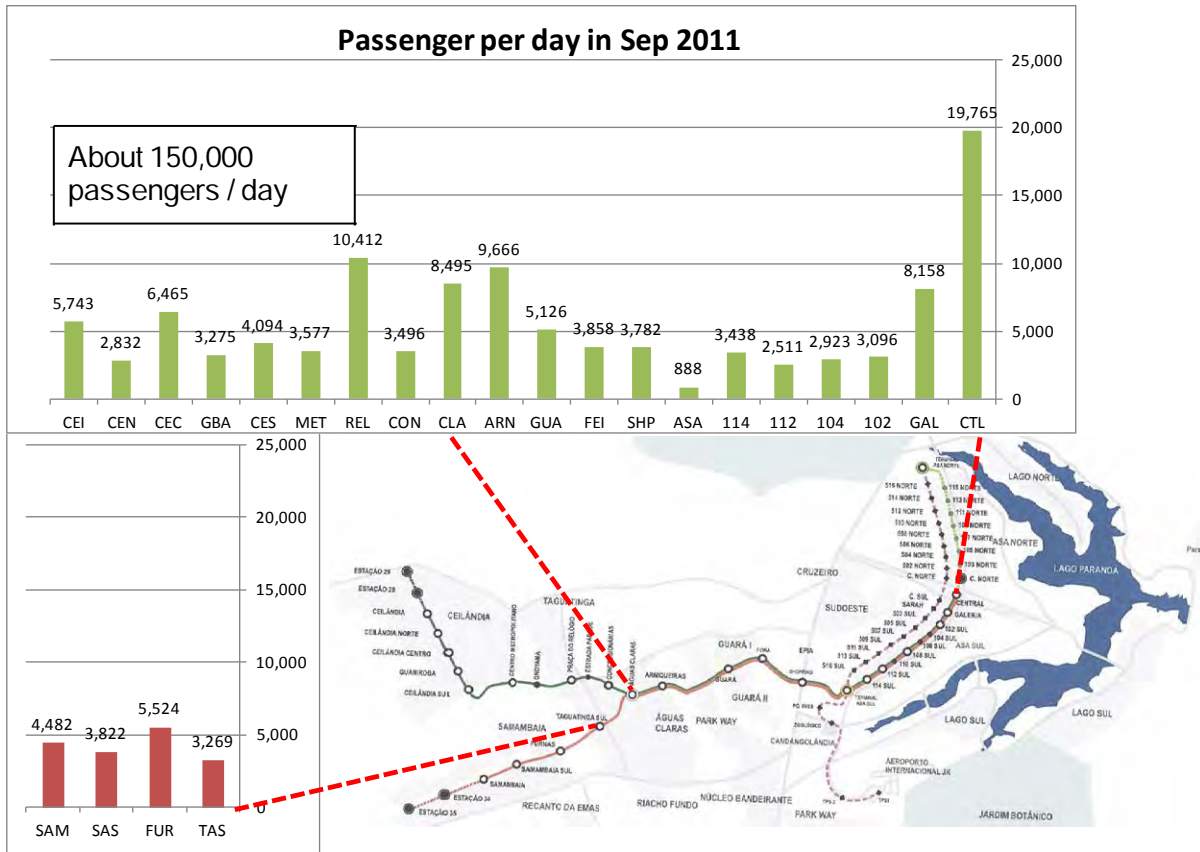


Source: PDTU DF 2010

Figure 10-42 Public Transport Demand in the DF

3) Metro Operation

The number of metro passengers per station in the DF is shown in Figure 10-43. About 150,000 passengers use the metro system daily. The central station recorded the highest number of metro passengers among all stations in the DF. Stations located in suburban areas such as Aguas Claras and Taguatinga also have a high demand for passengers.

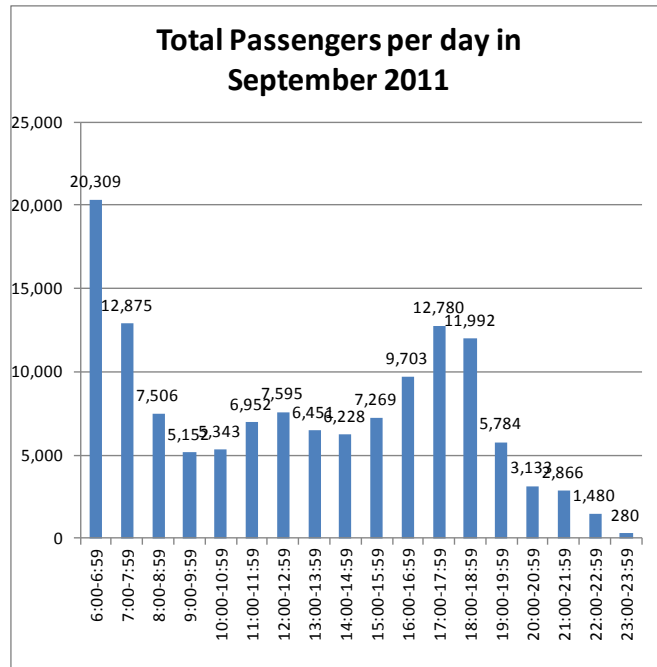


Source: Metro-DF

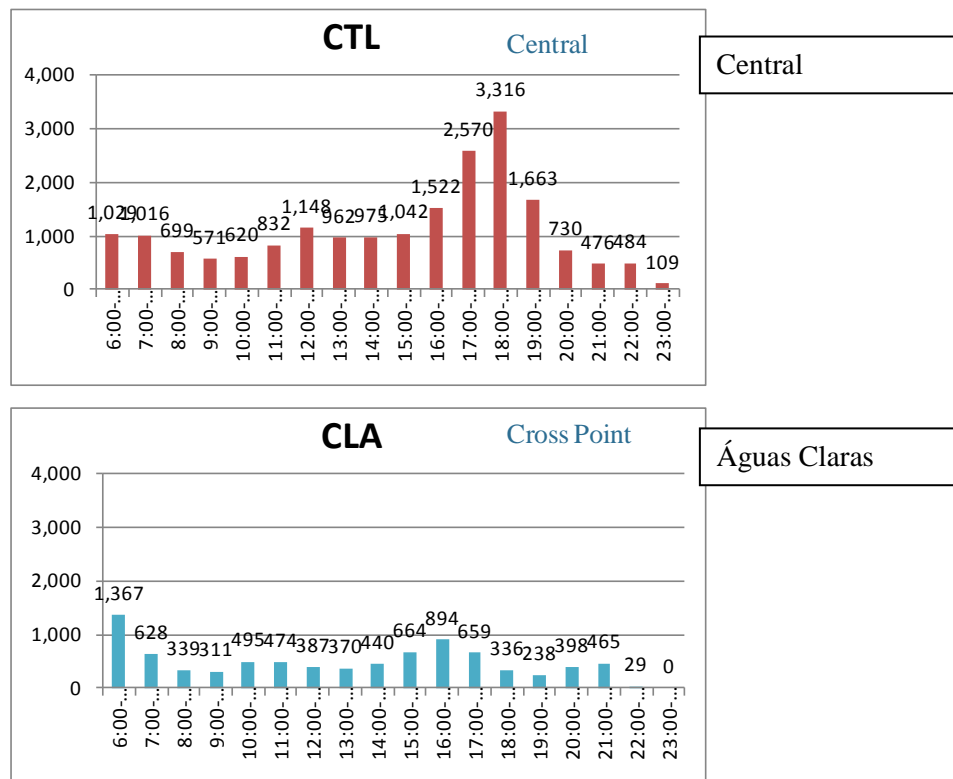
Figure 10-43 Metro Passengers per Day by Station

Figure 10-44 shows hourly characteristics of metro passengers. Morning peak is from 6:00 to 8:00 and evening peak is from 17:00 to 19:00. Central station has the evening peak characterized by passengers leaving the downtown area of Brasilia.

[Total]



[Main stations]



Source: Metro DF

Figure 10-44 Metro Passengers per Hour

4) Local Bus in the DF

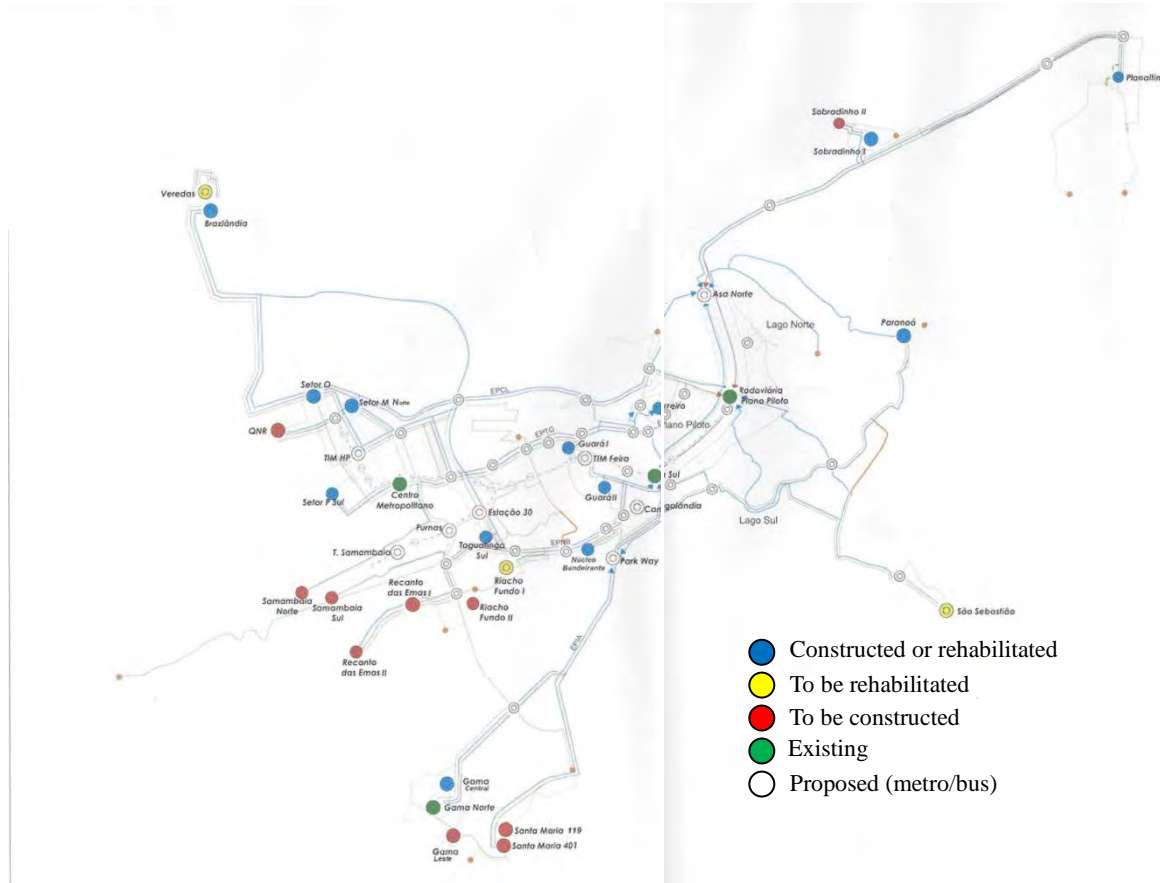
Currently, more than 1,000 bus lines are being operated in the DF. According to DFTRANS, several bus companies can operate on the same line, therefore, the current bus service system is not efficient. It is necessary to make a simpler and more efficient bus service network and provide better user information and services.

Table 10-11 Number of Bus Lines in DF

Starting Year	No. of Lines
~2000	33
2001	19
2002	16
2003	35
2004	20
2005	23
2006	29
2007	175
2008	88
2009	260
2010	240
2011~	160
Total	1,098

Source: DFTRANS

About 30 bus terminals are currently in operation and about ten terminals are under construction in the DF. The locations of existing and planned bus terminals is shown in Figure 10-45. A list with details of each bus terminal is shown in Table 10-12.



Source: SETRANS DF

Figure 10-45 Location of Bus Terminals

Table 10-12 List of Bus Terminals in the DF

	Terminals	Localization	Platform	Storage	Condition
1	Rod. Plano Piloto	S.Central/ A.Especial-P.Piloto	58	30	Existing
2	Asa Norte	Av. W3 Norte - Q. 716 -Plano Piloto	38	33	Construction
3	Asa Sul	-	30	32	Existing
4	Park Way	Trecho DF - 025 (EPDB) / RFFSA	24	24	Existing
5	SQS 116 - Posto de Controle	ERS/W-Plano Piloto	1	0	Existing
6	SHLS 716 - Posto de Controle	Av. W3 Sul-Plano Piloto	1	0	Existing
7	Cruzeiro Novo	SHCE 1603-Cruzeiro Novo	8	10	Existing
8	Guará I (André Luiz)	A.Especial-QE 16-Guará I	4	9	Existing
9	Guará II	A.Especial 10-Lote B-Guará II	6	6	Existing
10	Guará III		-	-	Construction
11	Paranoá	Av. Paranoá-Q.33-Paranoá	8	28	Existing
12	Itapoã	-	16	66	Construction
13	Núcleo Bandeirante	A.Esp.8-1ª Avenida N.Band.	6	16	Existing
14	Setor "M" Norte	A.Esp.3-QNM 42-Taguatinga	6	30	Existing
15	Setor "O" Norte	A.Esp.C-QNO 14-Ceilândia	36	54	Existing
16	Setor "P" Norte	A.Esp.1-QNP 19-Ceilândia	7	9	Existing
17	Setor "P" Sul	A.Esp.1-QNP 24-Ceilândia	8	18	Existing
18	Taguatinga Norte	A.E.n.QNL9-P.Estádio-Taguatinga	7	26	Existing
19	Taguatinga Sul	A.E.9-QSF-Setor D-Taguatinga	8	15	Existing
20	Gama (Rodoviária)	S.Central-A.Especial-Gama	10	22	Existing
21	Gama Oeste	S. Oeste, Área Especial	10	40	Construction
22	Planaltina	SND-Proj. "O" A.E.-Av. Independência	19	11	Existing
23	Sobradinho (Rodoviária)	A.E.-Centro-Rua3-Sobradinho	13	21	Existing
24	Sobradinho Q.18 - P. de Controle	Quadra 18 - Sobradinho	1	0	Existing
25	Sobradinho II	A.R. 25 - conjunto 1 - lote 02	10	43	Construction
26	Brazlândia Setor Veredas	Setor Veredas - Praça Central - Lote 01	6	20	Existing
27	Brazlândia Tradicional	A.E.-EQN-1ª Av.Norte-Samambaia	6	18	Existing
28	Brazlândia (V.S.José)	Área Especial	-	-	Construction
29	Samambaia Norte	Av. Noroeste-QS427-Samambaia	16	66	Construction
30	Samambaia Sul	1ª Av. Sul-Q.127-Samambaia	16	70	Construction
31	Santa Maria Q. 119	QR 119-Conj.E-Lote19-Santa Maria	8	50	Construction
32	Santa Maria Q. 401	QR 401-Conj.A-Lote1-Santa Maria	12	23	Construction
33	Riacho Fundo I	Av. Riacho Fundo - Q. AC 04 - Lotes 6 a 8	4	20	Existing
34	Riacho Fundo II	Quadra QS. 18 - Área Especial	10	40	Construction
35	Recanto das Emas I	Área Especial	10	45	Construction
36	Recanto das Emas II	DF135 Área Terminal de ônibus	8	22	Construction
37	São Sebastião	EDF -135 - Área Especial	10	40	Existing
38	QNR - Ceilândia	QNR /Expansão, Área em frente à CNR 01	12	35	Construction

Source: SETRANS-DF

Also, based on the passenger data of each bus route, the daily number of average bus passengers is about 60. Although the number of the passengers varies widely by route, bus occupation is almost reaching the capacity (75 passengers for a standard bus).

Some IC card (SBA/Fácil) readers are available in DF buses, but based on the field observations of the JICA Study Team, the IC card is not widely used.

Table 10-13 Number of Bus Passengers

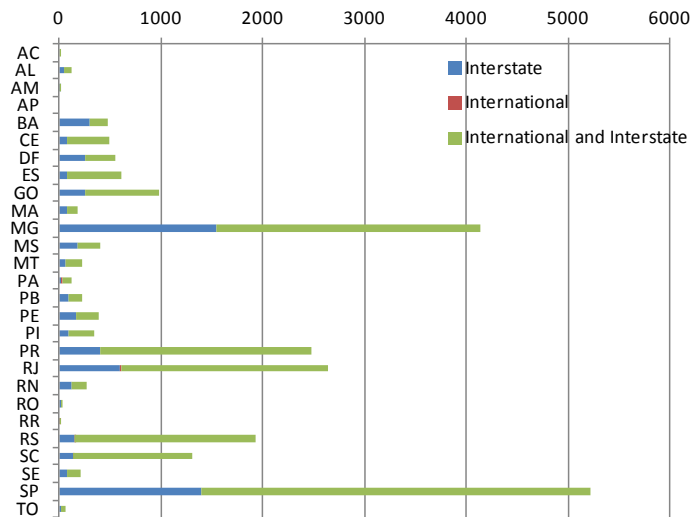
Line	Total passengers carried		Frequency weekday	Number of Passenger per day	Line	Total passengers carried		Frequency weekday	Number of Passenger per day
	Month	Year				Month	Year		
AL-01-001	12,789	153,469	11	39	PL-14-002	4,523	54,276	5	30
AL-01-002	26,993	323,914	15	60	PL-14-003	5,763	69,150	5	38
AL-01-003	16,787	201,443	12	47	PL-14-004	747	8,969	4	6
AL-01-004	14,156	169,877	11	43	PL-15-001	1,386	16,627	3	15
AL-01-005	14,443	173,310	10	48	PL-15-002	5,560	66,714	6	31
AL-01-006	13,228	158,739	10	44	PL-15-003	2,697	32,369	3	30
AL-01-007	10,889	130,671	8	45	PL-15-004	2,952	35,422	5	20
AL-01-008	69,624	835,487	36	64	TC-01-001	5,362	64,345	6	30
AL-01-009	38,451	461,406	27	47	TC-01-002	22,259	267,105	10	74
AL-01-010	33,755	405,055	19	59	TC-01-003	61,389	736,663	19	108
AL-01-011	142,977	1,715,718	79	60	TC-01-004	49,353	592,238	17	97
AL-01-012	50,523	606,271	29	58	TC-01-005	3,736	44,837	6	21
AL-01-013	3,577	42,923	4	30	TC-01-006	45,438	545,255	14	108
AL-01-014	7,425	89,105	10	25	TC-01-007	71,921	863,047	23	104
AL-01-015	7,547	90,560	5	50	TC-01-008	63,786	765,436	20	106
AL-01-016	80,558	966,699	51	53	TC-01-009	6,270	75,239	6	35
AL-01-017	25,880	310,561	16	54	TC-01-010	24,898	298,774	10	83
AL-01-018	67,901	814,810	36	63	TC-01-011	26,334	316,003	2	439
AL-01-019	8,995	107,935	13	23	TC-01-012	30,468	365,618	7	145
AL-01-020	286,601	3,439,217	76	126	TC-01-013	864	10,362	2	14
AL-01-021	27,699	332,383	21	44	TC-01-014	43,207	518,479	14	103
AL-01-022	36,419	437,026	14	87	TC-01-015	38,369	460,433	12	107
AL-01-023	111,848	1,342,171	69	54	TC-01-016	50,856	610,275	18	94
AL-01-024	4,879	58,553	8	20	TL-01-001	1,947	23,362	4	16
AL-01-025	36,427	437,122	23	53	TL-01-002	163,276	1,959,306	26	209
AL-01-026	36,427	437,122	23	53	TL-01-003	74,759	897,113	16	156
AL-01-027	76,311	915,731	47	54	TL-01-004	131,209	1,574,510	25	175
AL-01-028	83,559	1,002,705	51	55	TL-01-005	3,051	36,606	4	25
AL-01-029	3,078	36,936	5	21	TL-01-006	141,992	1,703,901	36	131
AL-01-030	12,992	155,900	10	43	TL-01-007	32,287	387,440	12	90
AL-01-031	20,971	251,654	14	50	TL-01-008	3,908	46,895	3	43
AL-01-032	6,928	83,131	6	38	TL-01-009	2,874	34,489	3	32
AL-01-033	58,070	696,839	37	52	TL-01-010	18,334	220,013	9	68
IS-01-001	159,596	1,915,147	81	66	TL-01-011	21,178	254,141	10	71
IS-01-002	40,395	484,735	27	50	TL-01-012	10,462	125,540	5	70
IS-01-003	49,100	589,198	29	56	TL-01-013	7,000	83,996	5	47
IS-01-004	16,967	203,607	12	47	TL-01-014	11,030	132,365	7	53
IS-01-005	37,735	452,817	26	48	TL-01-015	55,782	669,388	13	143
IS-01-006	33,898	406,772	21	54	TL-01-016	1,725	20,700	4	14
IS-01-007	53,234	638,809	35	51	TL-01-017	3,784	45,402	5	25
IS-01-008	78,353	940,235	50	52	TL-01-018	2,851	34,217	5	19
IS-01-009	64,577	774,929	42	51	TL-01-019	4,006	48,072	5	27
IS-01-010	59,048	708,571	37	53	TL-01-020	18,674	224,093	8	78
IS-01-011	62,377	748,529	34	61	TL-01-021	2,346	28,149	4	20
IS-01-012	5,384	64,607	7	26	TL-01-022	16,979	203,744	6	94
IS-01-013	12,335	148,025	8	51	TL-01-023	5,500	66,002	6	31
IS-01-014	67,804	813,647	38	59	TL-01-024	2,570	30,843	4	21
IS-01-015	29,569	354,829	22	45	TL-01-025	53,370	640,437	16	111
IS-01-016	18,206	218,466	15	40	TL-01-026	20,503	246,036	10	68
IS-01-017	63,231	758,766	39	54	TL-01-027	4,352	52,228	5	29
IS-01-018	40,738	488,857	13	104	TL-01-028	8,574	102,890	4	71
IS-01-019	49,924	599,084	15	111	TL-01-029	110,467	1,325,599	30	123
IS-01-020	2,249	26,988	3	25	TL-01-030	4,357	52,288	6	24
IS-01-021	16,285	195,419	12	45	TL-01-031	4,320	51,845	6	24
IS-01-022	13,318	159,818	10	44	TL-01-032	4,285	51,419	6	24
IS-01-023	27,188	326,261	19	48	TL-01-033	9,496	113,952	6	53
IS-01-024	1,942	23,306	4	16	TL-01-034	7,826	93,913	4	65
PC-12-001	8,833	105,998	4	74	TL-01-035	89,231	1,070,768	29	103
PC-14-001	82,876	994,512	22	126	TL-01-036	28,062	336,744	10	94
PL-12-001	8,191	98,296	4	68	TL-01-037	5,341	64,095	7	25
PL-12-002	2,333	27,991	4	19	TL-01-038	3,904	46,844	5	26
PL-12-003	25,518	306,218	11	77	TL-01-039	3,614	43,373	6	20
PL-12-004	5,616	67,395	5	37	TL-01-040	139,450	1,673,403	35	133
PL-12-005	8,245	34,140	4	69	TL-01-041	10,142	121,702	6	56
PL-13-001	1,421	17,049	5	9	TL-01-042	38,619	463,431	13	99
PL-14-001	1,396	16,747	3	16				Average	62

Source: SETRANS-DF

5) Long Distance Bus

Long distance bus services such as interstate and international routes are managed and authorized by the federal government. ANTT is the designated agency in charge of the administration of these services. The frequency of buses and passengers for long distance services from the DF is small when compared to other states such as Sao Paulo and Rio de Janeiro.

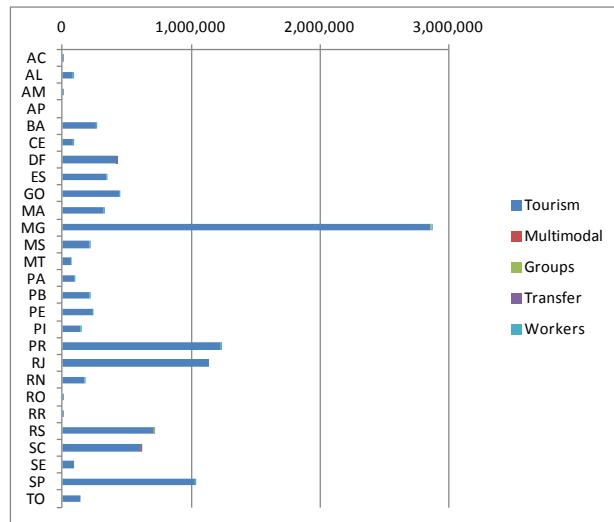
[Number of buses]



Source: ANTT Annual Report 2011

Figure 10-46 Number of Buses Authorized by ANTT

[Number of passengers]



Source: ANTT Annual Report 2011

Figure 10-47 Number of Passengers Transported by Interstate and International Buses

On the other hand, there is no terminal for interstate buses (ANTT) in the DF. Interstate buses are parked at the football stadium after the morning peak operation. They return to the surrounding areas only during the afternoon peak operation.



Source: JICA Study Team

Figure 10-48 Parking Situation at the Stadium

6) Local Bus Services in the Surrounding Municipalities

Local bus services in each city are mainly provided by private operators of vans and/or minibuses. Table 10-14 below shows the characteristics of these services in each municipality.

According to the PDTU-DF document, the municipal bodies have no reliable up to date information on local private bus operations.

Table 10-14 Characteristics of Local Bus Services in Surrounding Municipalities in 2009

Município	Frota	Operador	Valor da Tarifa (R\$)	Demanda Mensal (pass.)
Valparaíso de Goiás	62 vans	autônomos (autorização)	1,50	NI
Novo Gama	9 microônibus 22 vans	autônomos (permissão) autônomos (autorização)	1,10	NI
Cidade Ocidental	20 vans	Não informado (NI)	1,40	NI
Luziânia	42 micros e ônibus 11 vans	Viação Transcoluz (permissão) autônomos (autorização)	1,60	255 mil
Formosa	12 microônibus	Não informado (NI)	1,25	60 mil
Planaltina	9 microônibus	Viação Santana (permissão)	1,50	NI
Águas Lindas de Goiás	6 microônibus 50 vans	Viação Águas Lindas (liminar) autônomos	1,50	300 mil
Santo Antônio do Descoberto	50 vans	Autônomos	1,00	10 mil

Fonte: Prefeituras municipais

Source: PDTU DF

7) Taxis

Taxi operations are permitted and supervised by SETRANS- DF. Based on an interview with one of the taxi unions, the following basic information on taxi operations in the DF were collected:

- > There are no taxi companies;
- > Taxis in DF are operated by individual drivers;
- > Around 3,100 taxis are permitted;
- > Drivers are part of unions (Four unions are currently organized);
- > Unions own their dispatching system using GPS and mobile device (See photos below); and
- > Fare system: R\$3.30 (basic charge) and R\$1.80 per km (6:00 a.m. to 8:00 p.m.) or R\$2.20 per km (8:00 p.m. to 6:00 a.m.).

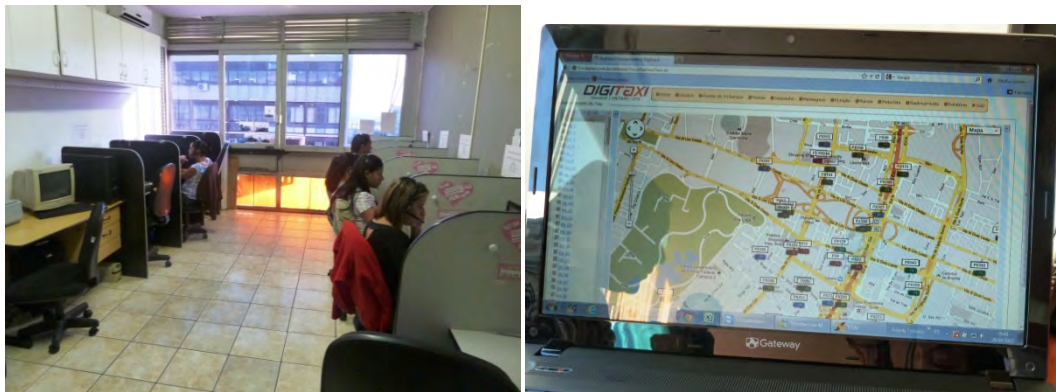
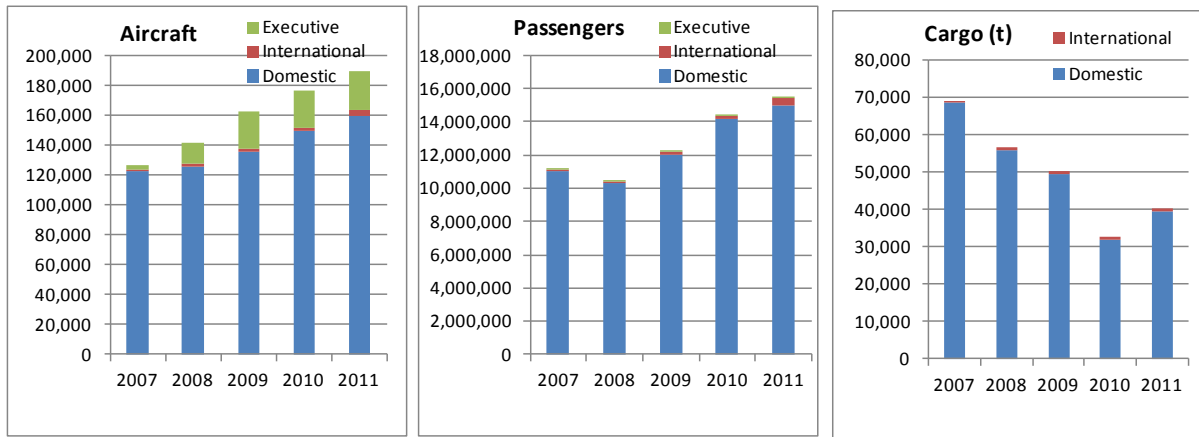


Figure 10-49 Photos of the Operation Center of a Taxi Union

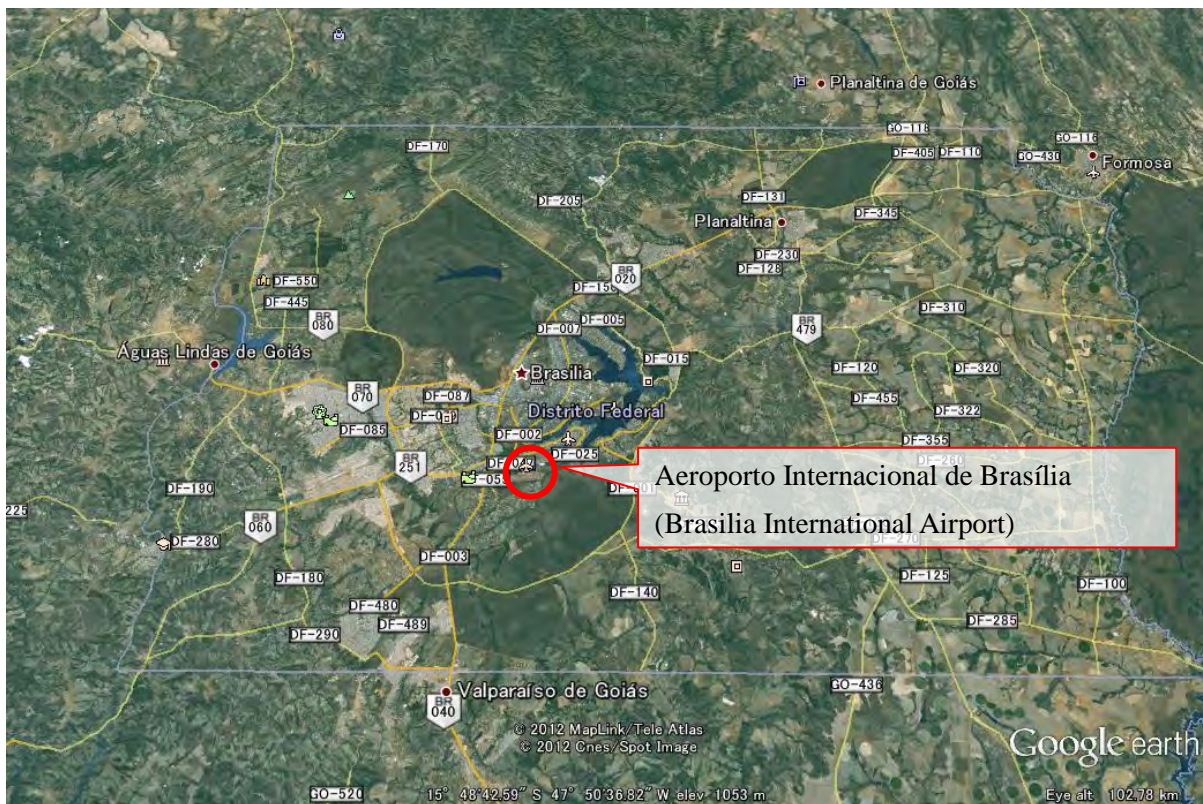
8) Airport

One international airport is located in the DF, which is called Brasilia International Airport Juscelino Kubitschek. Based on INFRAERO (the federal agency that manages airport and flight control) data, domestic flights are dominant and the number of aircraft and passengers have been increasing in recent years.



Source: INFRAERO

Figure 10-50 Demand Characteristics of Brasilia International Airport

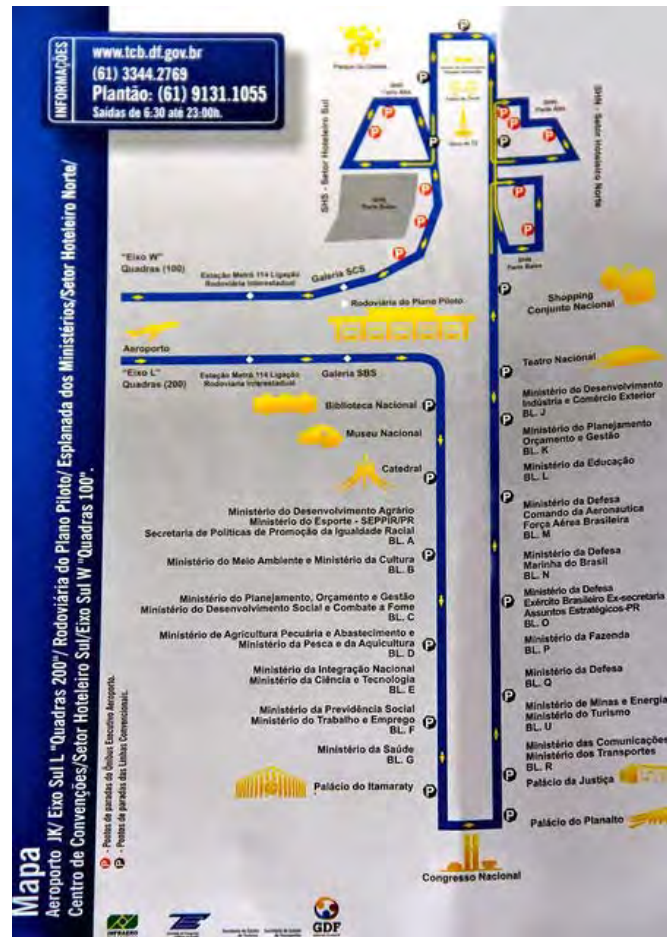


Source: JICA Study Team

Figure 10-51 Location of the Brasilia International Airport

The airport bus service is operated by TCB, a state government company, which provides executive buses to and from the airport. The bus frequency is set to every 30 minutes. Three different lines (113, 113.1, and 113.2) connect the airport, the convention center, and the south and north hotel zones.

Figure 10-52 shows the route map of this service.



Source: JICA Study Team

Figure 10-52 Route Map of the Airport Bus Service

(3) Stakeholders ITS Needs

Based on the interviews with additional stakeholders mentioned in this section, their ITS needs are discussed as follows:

Table 10-15 Stakeholders ITS Needs

Entity	Purpose	Needs Related to ITS
SETRANS-DF	<ul style="list-style-type: none"> > Policy making and permission for public transport services > Preparation of specifications for concession contract > Operation and maintenance of terminals 	<ul style="list-style-type: none"> > Plan to install GPS on each bus > Plan to develop new public transport system such as BRT, LRT, and MRT > Reduce traffic jam at peak time in the morning and evening > Upgrade signal control system > Provide users travel information > Improve metro operation
DFTRANS	<ul style="list-style-type: none"> > Monitoring performance of concessionaire companies > Planning and maintenance of bus stops > Operation of IC card charge 	<ul style="list-style-type: none"> > Plan to build efficient bus network > Plan to install GPS on each bus > Plan to build a data center like “clearinghouse” > Deploy CCTVs at each bus terminal > Integrate fare system among concessionaire companies > Monitor bus operation of concessionaire companies > Encourage public transport use > Provide users travel information > Improve safety and quality of bus services
Metro-DF	Government company Mass transit, Subway operator	<ul style="list-style-type: none"> > Improve services such as increase of train frequency > Improve equipment in the operation control center > Deploy more CCTVs
TCB	Government company Mass transit, Bus operator	<ul style="list-style-type: none"> > Install hybrid and electric vehicles > Plan to operate school buses and executive buses
SETRANSP	Union of bus companies	<ul style="list-style-type: none"> > Improve punctuality and reliability by solving traffic jams > Build an efficient bus network
Taxi Operator: UNITAX	Union of taxi drivers	<ul style="list-style-type: none"> > Mount on-board devices to record front and rear videos and utilize ad-board > Expect public sector to use taxi GPS data

Source: JICA Study Team

10.2.4 Accessibility Survey in the DF

The objective of this survey was to clarify the current conditions and identify accessibility/mobility problems for all modes of transport in the DF. All the pictures related to the survey contained in this section were taken by the JICA Study Team. The target places were stops, stations, and terminals, where the following aspects were verified:

- Overall station/stop conditions;
- Accessibility and mobility;
- Directional signs;
- Maps, route info, timetable, and travel time info availability;
- ITS services;
- Ticketing booth, automated service and fare information;
- Information in foreign languages; and
- Safety.

The survey was conducted during February and March 2013. Main metro stops and bus stations and terminals were visited. In addition, some of the cities that are part of the RIDE area and outside DF (such as Novo Gama, Valparaíso, Cidade Ocidental, and Luziânia) were also visited. The key points are discussed as follows:

(1) Metro System

Overall good accessibility for disabled users, with exclusive elevators, escalators, and designated seats at the platform and inside railcars, was observed. Some stations did not have guided pathway for blind users.



Figure 10-53 Metro System – Accessibility at the Stations

Directional signs, maps, and next train arrival information were available at the metro stations. However, there was no train arrival time information available at the platforms. In addition, very little information in English and foreign languages was available.

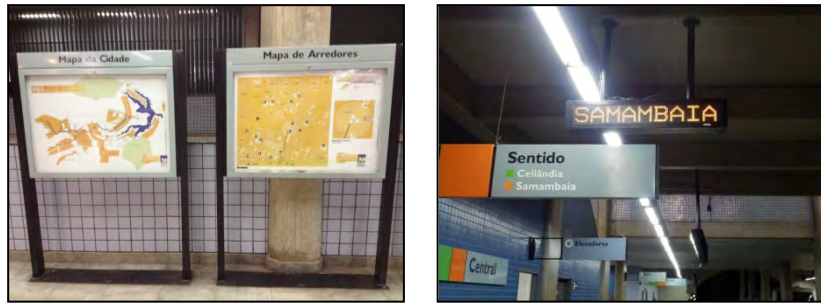


Figure 10-54 Metro System – Available User Information

With regard to ITS services, some stations have recharge units for metro card pass holders. Line formation was observed at the ticketing booths. No automated machines (totens) were found at the metro stations. In addition, there are two different card pass systems – one for metro and one for bus which provides integration with the metro. Users have to go to the designated entrance of each system.

At the stations and inside railcars, TV displays were available with institutional information and advertisement. Route information was not displayed.



Figure 10-55 Metro System – ITS Services

In terms of safety, not all stations have designated pathway for blind users. Also, there are no warning signs (such as audio system and vertical signs) for passengers to clear off from tracks at the platform. Only yellow markings at the platform delimits the clearance distance for users, which may not be sufficient warning for disabled and impaired users. In addition, the gap between the railcar and platform may be a safety hazard for wheelchairs and other disabled users.

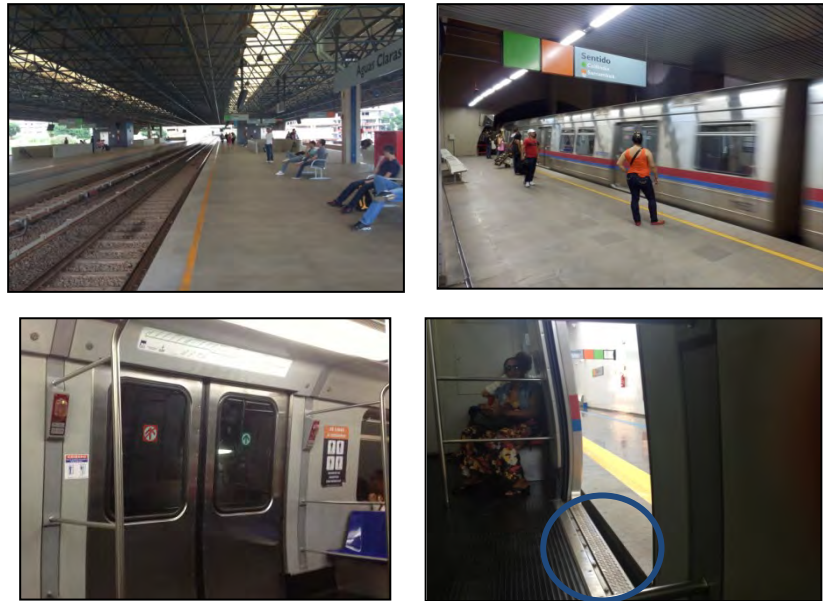


Figure 10-56 Metro System – Potential Safety Hazards

(2) Bus System

A portion of the DF bus system was also surveyed for clarification of existing conditions and ITS needs. Bus stops, bus interior and exterior design, the Brasília municipal and interstate bus terminals, and other adjacent bus terminals in DF were surveyed. The key points are presented as follows:

1) Bus Stops

Very little bus route, time table, and bus arrival information was found at the bus stops. Lack of bus stop design standard was also observed. Agglomeration of users often standing on the roadway waiting for the next bus due to the lack of information was noted. Integration system for some lines also confused users due to the lack of information at the stops and on the approaching buses.



Figure 10-57 Bus Stop Infrastructure

2) Bus Terminals

i) **Brasilia Municipal Bus Terminal**

The Brasilia Municipal Bus Terminal was surveyed and the following issues were noted: lack of information in foreign languages, no accessibility guidance for disabled users, no standard box office for ticketing purchase, and no information kiosk for users. There is no management and control center in the terminal. Each authority operates independently as pointed out during the stakeholder's interviews.

Some ITS services were noted such as: bus departure time at each bay and automated machines with route information. From the bus terminal main platform, there is integration with the Metro Central Station



Figure 10-58 Brasilia Municipal Terminal Infrastructure

ii) **Brasília Interstate Bus Terminal**

The recently constructed Brasília Interstate Bus Terminal has better signage and information services when compared to the municipal terminal. Information kiosk, directional signs, and clearer bus departure information are available. However, most signs are in Portuguese. There is no automated ticketing purchase, but the box offices from different operators follow specific standards. There is no audio system announcing arrival/departure.

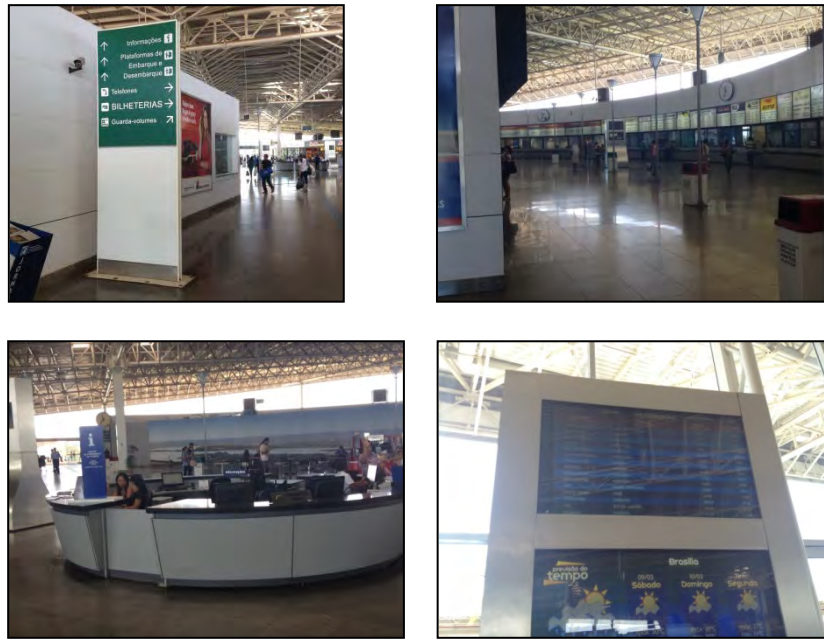


Figure 10-59 Brasilia Interstate Terminal Infrastructure

iii) Adjacent Bus Terminals

Adjacent bus terminals (such as the South Integration Terminal and Taguatinga Interstate Bus Terminal) were surveyed for additional clarification of current conditions. It was observed that almost no information is available in such terminals. No arrival/departure information is available. Bus bays are either handmade or not available. Lack of accessibility and safety standards were observed in such locations. Ticketing box offices design varied widely, which makes ticket purchase difficult for new users. No standard ITS services for bus terminals were observed in such locations.



Figure 10-60 Infrastructure of Other Bus Terminals

3) Bus Interior and Exterior

Inside regular urban buses, automated ticketing (SBA system) is available. In some buses, TV displays broadcasted local television content and advertisement. Buses are not tracked via GPS. Paper control is made to identify route and schedule. Route information and stops are not available. LED displays showing route number in front of the bus were observed.

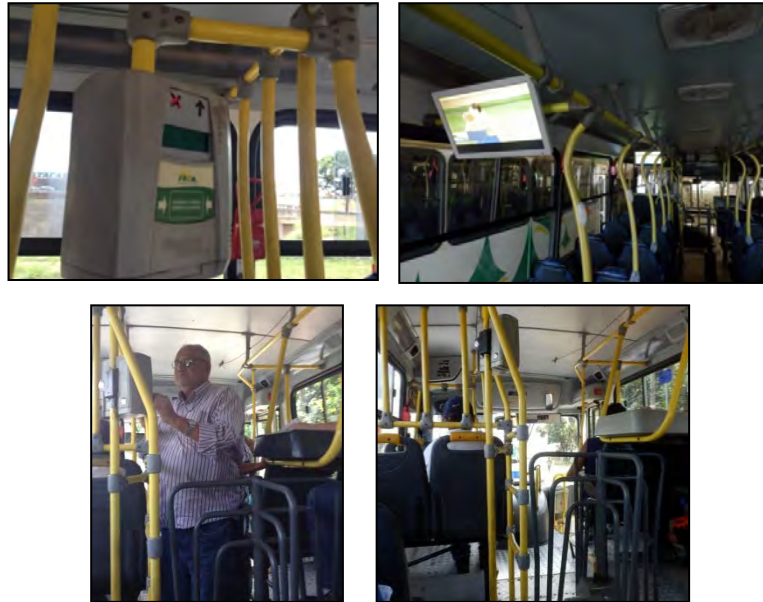


Figure 10-61 Bus Interior and Exterior

(3) Conclusion and ITS Needs

User information is the key for the success of an integrated transportation system. It was observed from the surveyed modes that overall user information such as arrival time, specific route information for bus systems, and automated user services are not available. In addition, lack of accessibility and safety standards were observed specially in the bus system. Therefore, the following measures are recommended:

- Improve accessibility for disabled users;
- Implement full user information in the bus system with route and arrival time provision;
- Provide information in foreign languages;
- Implement design standards to comply with safety and accessibility requirements at the bus stops;
- Increase the use of ITS to better inform and assist users (e.g., automated kiosk centers in different languages, monitors and panels with route, arrival/travel time, next stop/station, etc);
- Improve overall bus terminal infrastructure and management;
- Fully integrate metro and bus ticketing systems for seamless operation; and
- Integrate metro and bus timetable schedules for improved operations.

Lastly, the observed bus infrastructure conditions in the cities from the RIDE area are worse than those discussed in this section. Therefore, the same recommendations discussed here apply. In addition, the integration of urban and semi-urban bus systems (DFTRANS and ANTT) is a real need for daily commuters going to Brasília and other satellite cities.