APPENDIX

Data Collection Survey on Intelligent Transport Systems (ITS) in African Region - Summary of the Final Report -

March 2021

JICA
PADECO and OCG JV

Background of the Survey

- ✓ Economic development has led to a rapid increase of motor vehicles in developing countries, and the infrastructure is suffering to keep up with the demands. As a result, traffic issues are raised in the urban area of major cities, such as traffic congestion, traffic accidents and air pollution.
- ✓ As one of the countermeasures, Intelligent Transport Systems (ITS) has been applied in many countries.
- ✓ However, the applied conditions of ITS are varied due to different traffic conditions and problems.
- ✓ Appropriate ITS technology should be introduced through the analysis process of suitability as needs of ITS for the cities in Africa seems very high.

Objectives of the Study

1. Survey on existing conditions on ITS: collect the data/information on the existing ITS related equipment and utilization conditions on it
2. Recommendations on Introducing Technology on ITS: prepare the recommendations on ITS technology to be introduced in the objective cities
3. Study on Japan's Cooperation Program/Project on ITS: study on the potential cooperation program/project on ITS from Japan through the suitable cooperation scheme

Target Cities of the Survay

1. Mombasa, Kenya
2. Accra and Kumasi, Ghana
3. Dar es Salaam and Dodoma, Tanzania

Study Period

1. Preparation in Japan: November – December 2019
2. Phase I (Jan – March, 2020) – Site Survey
   - Mombasa, Accra, Dar es Salaam and Dodoma
   - JICA Study Team (JST) submitted Draft Final Report in August
3. Phase II (Oct 2020 – March 2021)
   - JST add Kumasi study through the transport expert in Kumasi, Ghana
   - JST hold stakeholders' Meeting for Kenya, Tanzania and Ghana
   - Final Report submission (March 2021)

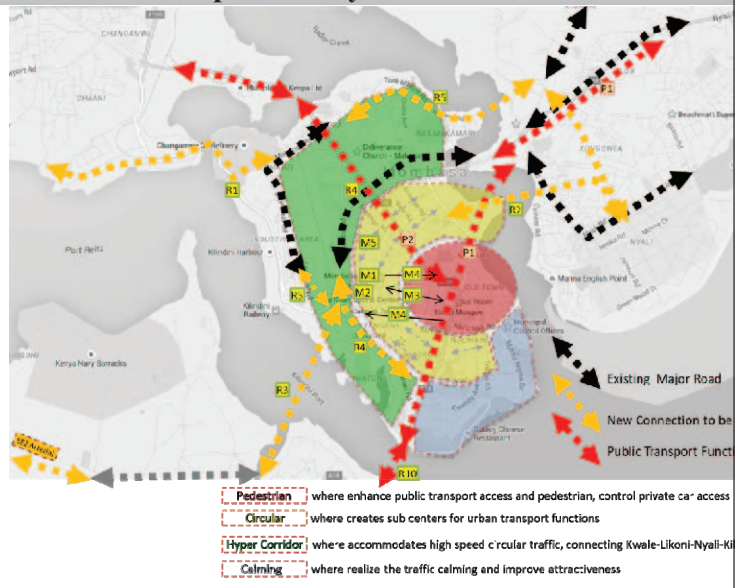
Existing Conditions in the Target Cities

1. Mombasa
2. Accra
3. Kumasi
4. Dar es Salaam
5. Dodoma

Existing Conditions in Mombasa

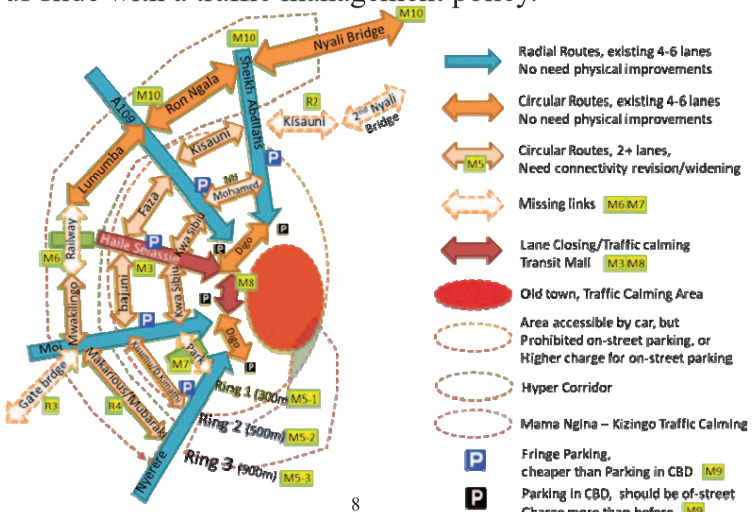
Transport Structure Plan Proposal for Island
Four Transport Policy Zones

(i) Pedestrian oriented
(ii) Circular
(iii) Hyper corridor
(iv) Traffic calming



Transport Structure Model Proposal

The concept of the three major circular corridor development in the island, in accordance with the transport structure plan shown in the previous slide with a traffic management policy.



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How Manage Chaos Mwembe Tayari

Number of 3W/Matatu

- 3W
  - Area management policy terminated?
- Matatu
  - Grafiti design has recovered?

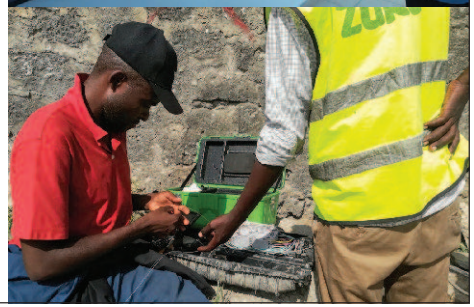
I think more control is needed.

E-Parking

- The *282# is impressive, technologically and in financial achievement.
- Expect how it can be expanded to matatu/3W monthly parking fee collection.
- But, Can we remove / shrink center divider parking, which may choke the CGM revenue?

CCTV and cable cut

- Traffic monitoring has started with 24-hours operation.
- No recovery of cable cut after more than 1-month.



Offset of Buxton/77

- Situation
  - 77 is under pavement maintenance. Traffic inspector control with walky-talky.
  - Buxton is under signal operation without police attendance
- Signal Cycle length on 21 Jan 10AM
  - 77: 6′ 30″, Buxton: 2′ 40″
  - There is a gap between the two junctions.

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Existing Conditions in Ghana
Accra and Kumasi

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Typical existing ITS Application in Ghana

1. Area-wide Traffic Signal Control was introduced to the QBS route to support bus priority operation in Accra.
2. There is no area-wide-control / corridor-based-control signals in Kumasi, however, unique initiatives were found.
3. Heavy truck management is made at each weighbridge station as Asset Management
4. The use and sharing of data to improve road safety is being undertaken by several government agencies.

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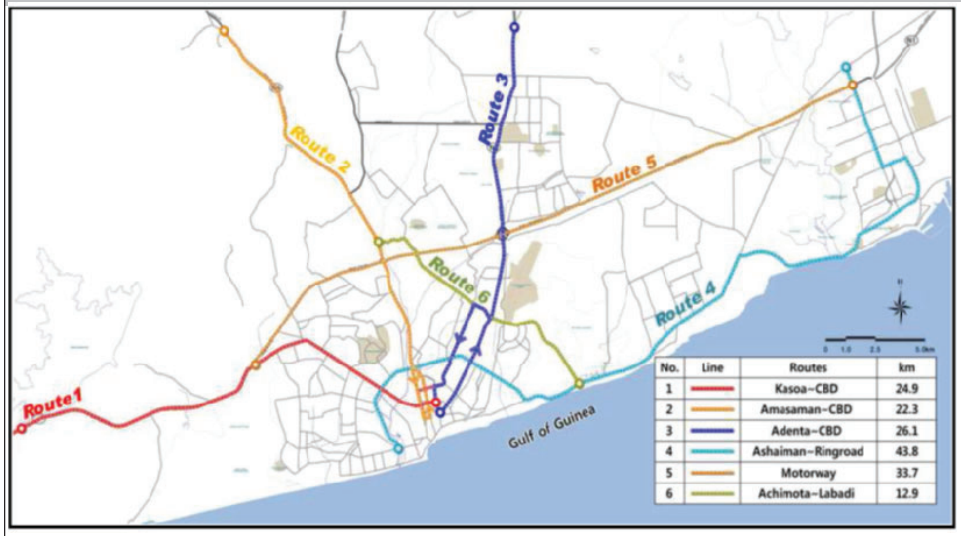
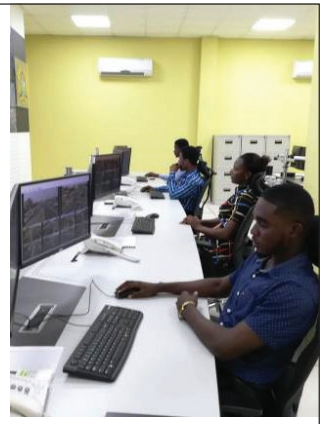
BRT Route Plan in Greater Accra Metropolitan Area



Source: KOICA Transport Master Plan

Target Corridors in ITS in Greater Accra Metropolitan Area

Source: KOICA Transport Master Plan



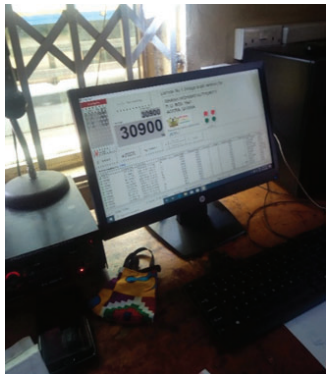
Traffic Signals in Accra

- Amasaman corridor realized Green-wave signal control and Aayalolo manual prioritization system

Measuring Condition of Axle load and total weight of Truck

Unloading Enforcement

Heavy Truck Management for Road Maintenance



Measured Result (sample)

Activities on Improvement of Road Safety

- NRSA introduced web-based Road Accident Data Management System (RADMS) as pilot basis supported by the WB/Transport Research Laboratory (UK)
- NRSA/MTTD plans to utilize nationwide video data for road safety and enforcement by using cameras managed by security police, MTTD, etc.
- MTTD is starting to procure an ITS solution project expecting integration of existing drivers license data under DVLA, insurance data under private companies, traffic control data under DUR, etc.

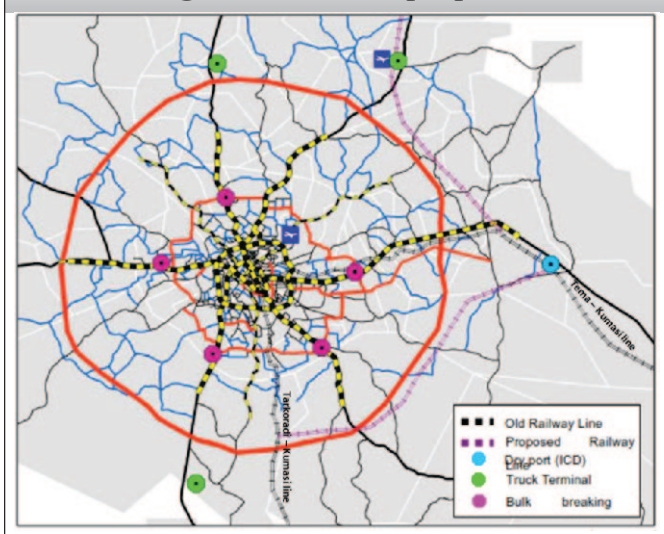
Traffic Assignment Result for existing case 2012(left), without case in 2033(mid.) and with case 2033 (right) in Greater Kumasi

Source: The Study on the Comprehensive Urban Development Plan for Greater Kumasi by JICA, 2013

With Case includes the following measures;

- Infrastructure-Based Approach: New Road Construction and Road widening including Outer Ring Road Construction
- TDM Based Approach: **Centralized Traffic Signal**, BRT, Type B Bus, Truck Access Control, **One-way/Traffic Control**, etc.

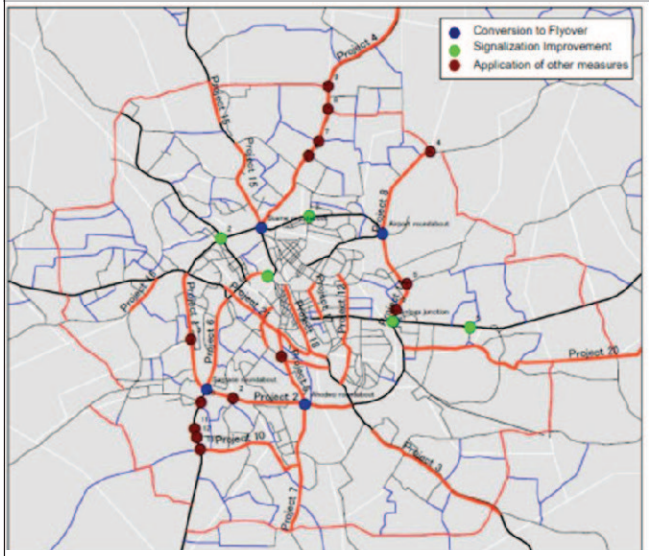
Proposed locations of the Dry Port, Truck Terminals and Bulk Breaking Points and the proposed new routes for the railway



Dry Port Construction was commenced in Novembers 2020. However the Proposed **Truck Terminals** and **Bulk Breaking points** are not developed yet.

Source: The Study on the Comprehensive Urban Development Plan for Greater Kumasi by JICA, 2013

Location map of projects under signalisation and intersection improvement proposed by JICA (2013)

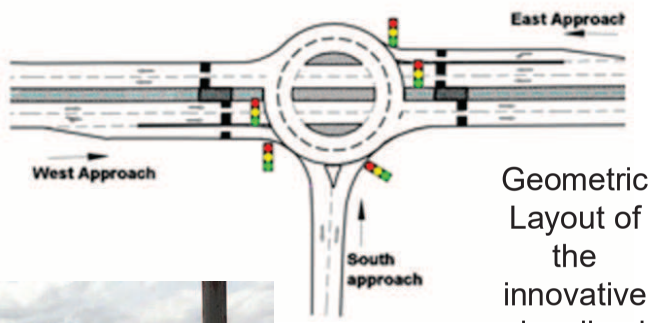


Flyover Construction is not implemented yet.

Under such condition, effectiveness of introduction of Corridor based signal control will be limited.

Source: The Study on the Comprehensive Urban Development Plan for Greater Kumasi by JICA, 2013

Traffic Signals in Kumasi - Innovative Signalised Roundabout

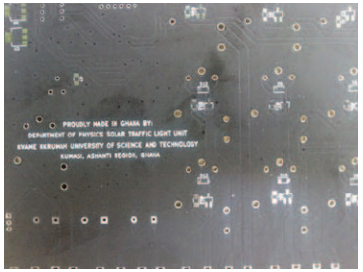


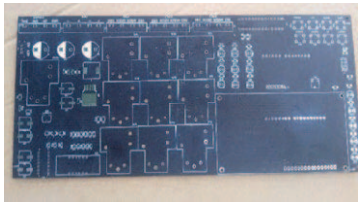
Geometric Layout of the innovative signalised roundabout

Current Construction Stage of the proposed Oduom innovative signalised roundabout

Traffic Signals to improve safety in KNUST

Traffic signal installed at shuttle intersection KNUST





Controller boards designed for the controller units by the physics department KNUST

Existing Conditions in Tanzania
Dar es Salaam and Dodoma

Tanzania

- ITS application in public sector seems advanced to Kenya and Ghana
  - LATRA's GPS tracking and speed enforcement for intercity bus
  - BRT operation (interim stage / DART)
  - Mwanza e-Parking enforcement (TARURA)
  - Tele-monitor of Weighbridges (TANROADS)
  - TRA's database open access
  - GePG and e-government servers

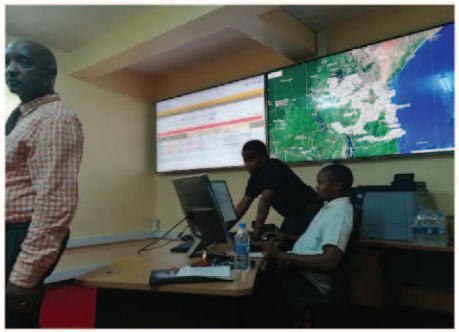
LATRA's GPS tracking

4.4.5 Public Transport Operation Management Systems

(1) LATRA's Vehicle Tracking System

LATRA, land transport regulatory agency, has recently developed the Intercity bus operation management system with its own budget, which has reduced the number of accidents and fatalities by more than 70% since installation, which is highly appreciated by private bus operators and the surrounding countries. It is called the Vehicle Tracking System (VTS) in LATRA. The detail of the background, achievement, system development, and expansion idea is summarized as follows.

Main Front Panels (4 screens)



Sub Panels (2 screens)

Mwanza e-Parking

4.4.6 Other ICT Interventions

The following interventions are not developed for the DSM and Dodoma, however, JST appreciates the advanced ICT practices in the transport and traffic management sector.

(1) On-Street Parking Management System in Mwanza by TARURA and NPK

TARURA, the on-street parking manager for all cities in Tanzania, has implemented a pilot on-street parking management system with number-plate scanning ICT technology integrated with e-payment collection arrangement since 2019, in Mwanza, not our target city, but the second largest city in Tanzania. The new ICT system has

Dashboard: showing 4,300 scans achievement on the day with a graph showing the number of scans per hour

Location of the parked vehicles on the map. Red squares are unpaid (most are red because they are paid

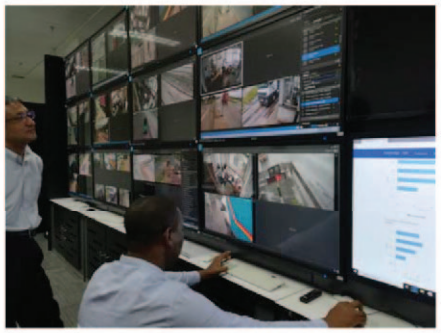
Tele-monitor of Weighbridge

4.4.2 Traffic Surveillance System (Communication Infrastructures)

Generally, the penetration of CCTV in Tanzania is much lower than Mombasa, Nairobi and Accra. Kenyan cities have CCTV at every corner due to national security requirement for Al-shahab concerns, but, Tanzania has less security requirements compared to Kenya[7].

The TANROADS, the national intercity road agency, has developed CCTV based weighbridge control center monitoring system since 2015 and started its operation in 2018.

CCTV monitoring panels



Monitoring panels and operation panel

Open Policy and GePG

(2) Open Policy of the Vehicle Registration Database

TRA, Tanzania Revenue Authority, manages the vehicle registration for vehicle tax levying purpose. TRA opens the database access for various public and private transport service operators to enhance the charging accuracy as well as TRA's enforcement of vehicle registration. Details of its development background with the open policy and its applications are reported as follows:

Toll Gate receipt shows Plate number (underlined in red)

BRT in Dar es Salaam

Physically separated, median-aligned BRT lanes

Platform - boarding at stations

Real-time system monitoring with FMS

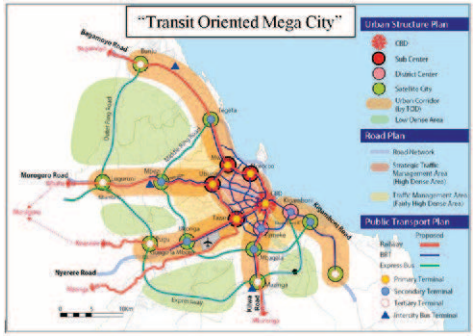
Off-board e-fare collection (non-working now)

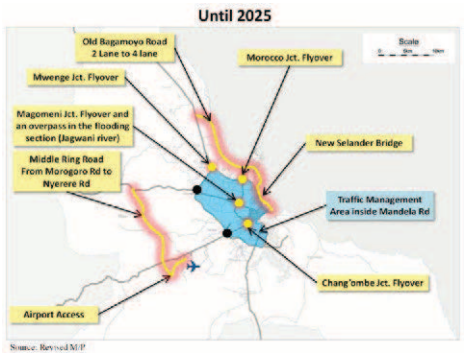
General review (chap10)

- GePG and open database is the best payment platform for vehicles in government service application
  - E-parking, e-tolling, future e-enforcement
  - Contribute personnel cost reduction
- Traffic signal controls are not yet coordinated even along the BRT corridors
- Delays in Passenger/user-oriented applications

ITS Background in DSM

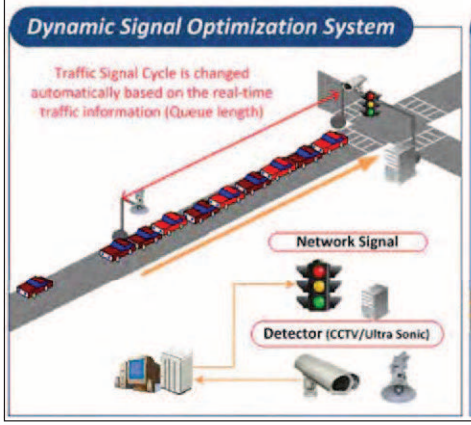
- Whole vision
  - The JICA revised M/P proposed traffic management area inside Mandela Rd. to be completed before 2025.

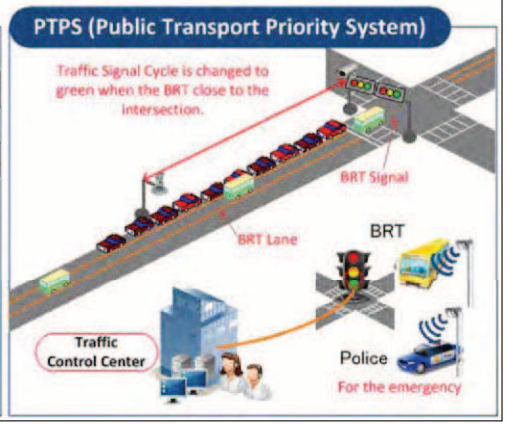




ITS Background in DSM

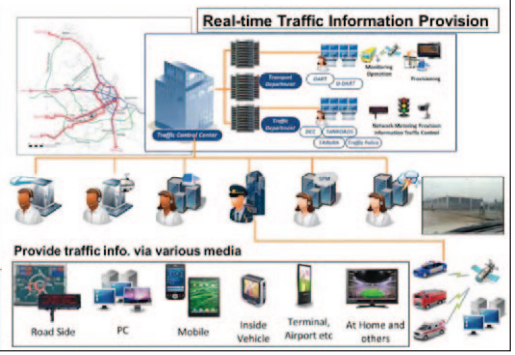
- Green-wave and PTPS are required qualification for development by the revised M/P





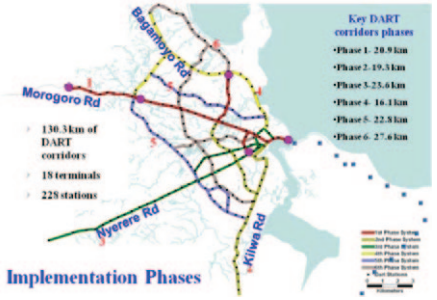
ITS Background in DSM

- VMS and multiple data access strategy are proposed for traffic data dissemination.



ITS Background in DSM

- BRT project implementation
  - Phase 1 is in Interim Stage,
    - i.e., ITS portion is to be added
  - The phase 2 is on-going, however, traffic signal and communication facility portion are not yet technically specified.



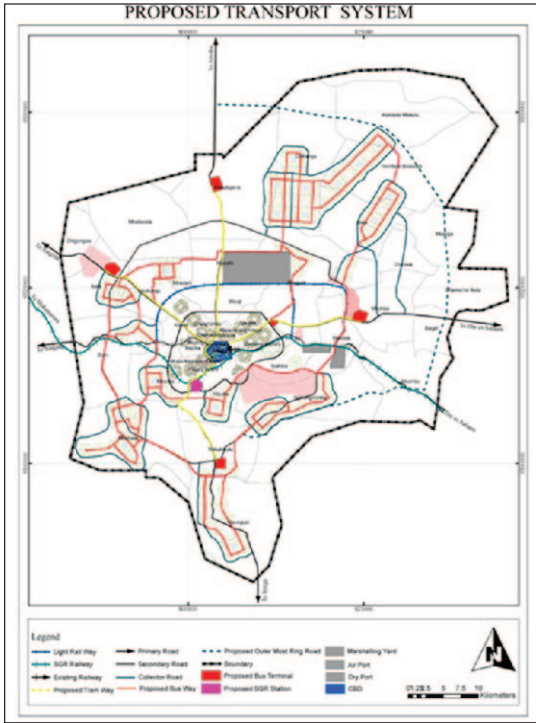
DCC ITS Strategic Plan

- The DCC study shows comprehensive concept in ITS scoping, with 9 strategic sectors.
- JICA team selected 3 prioritized sectors as they are essential for area traffic management.

TMDC: Data center development to collect real-time fleet flow, and signal operation and public transport priority system

AM: Arterial corridor management including real-timesignal control for green wave operation

CN: Communication Infrastructure for arterial corridor management



Dodoma National City Mater Plan 2019 - 2039

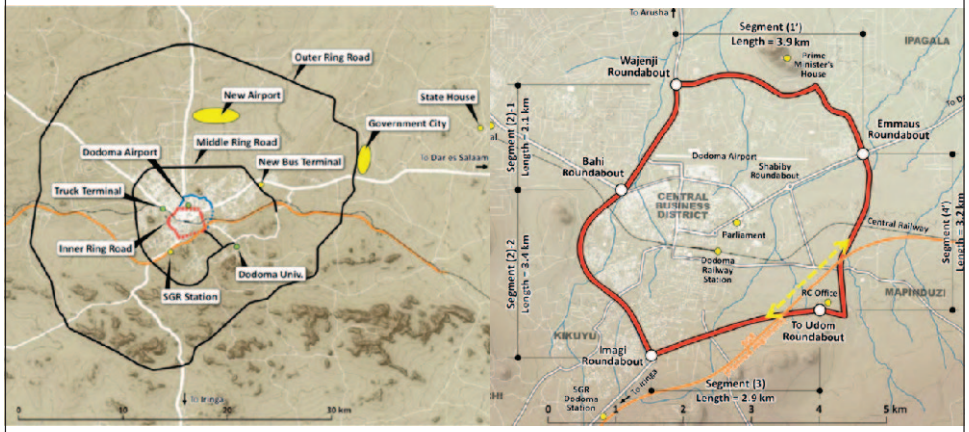
The masterplan consists of 10 sub categories of supplement studies including demographical and settlement analysis, infrastructures and public utilities, transport setting, etc.

The main report of the masterplan envisions the city development concept, including regional economic hub, academic hubs, including smart city concept and transit-oriented city concept.

Source: Dodoma National Capital City Master Plan 2019-2039

Road Development Plan in Dodoma

There are 3 ring roads development plan and inner ring road development plan.



Source: Data Collection Survey on Dodoma City Roads by JICA (2019)

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Emmaus

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Wajenzi / Area C

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A-11

POSTA RA, BAHI RA

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Maua RA, Imagi RA

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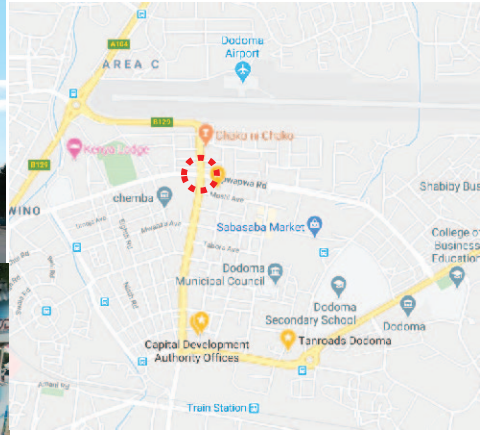
Junction at School Ave



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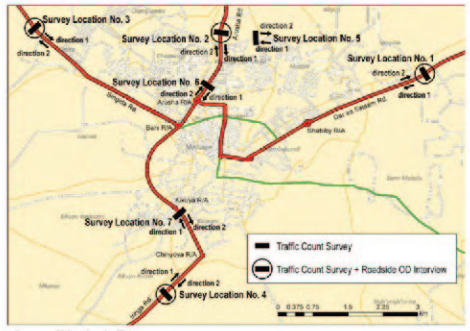
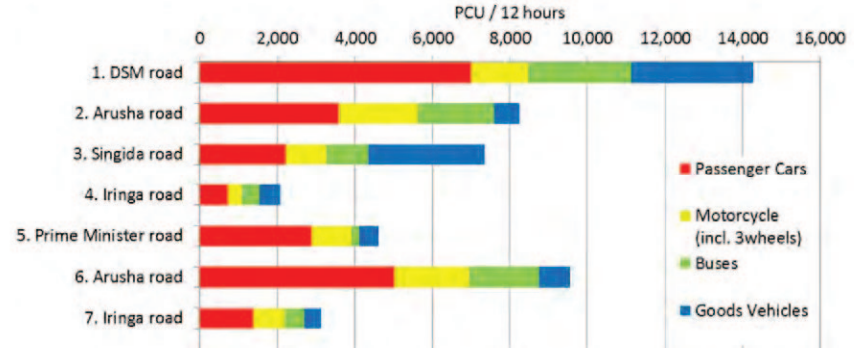
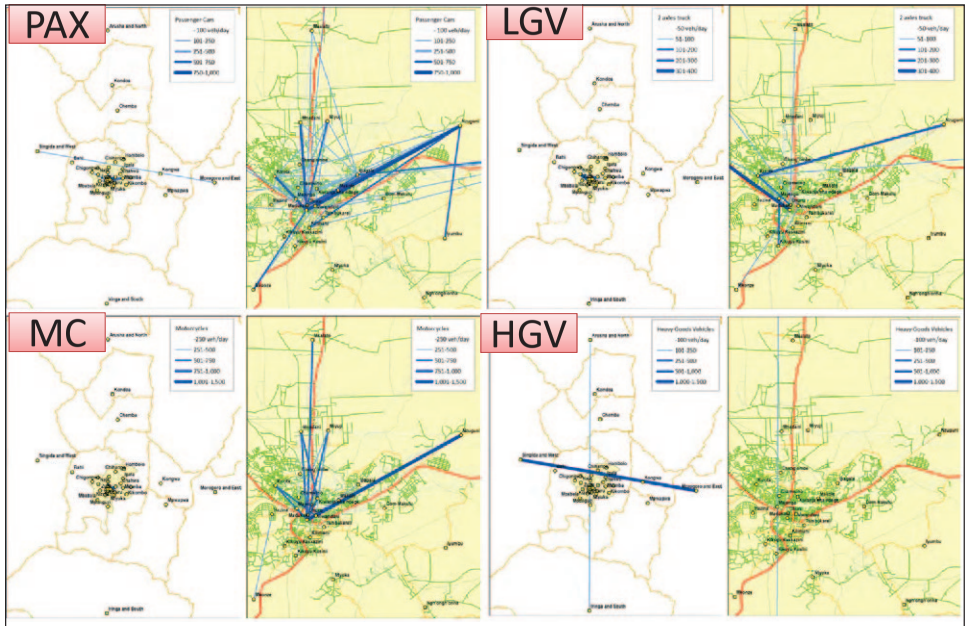
Traffic Counting in Jan 2019







ODs

Scenario

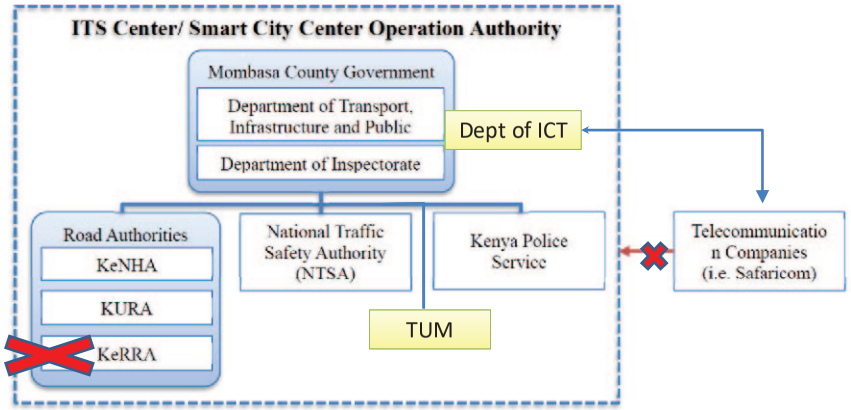
- Outer ring road can diverse the HGV between Morogoro-Shingida
- Pax cars will remain along CBD-Nzugumi.
- Inner ring road needs to harmonize the growing Pax cars and MCs demands harmonizing with Pedestrians/NMVs
- Flyover cannot develop for the junctions along the inner ring road, as the low demand, close to vicinity
- Traffic signal is the next option to achieve the harmonization
  - A symbol of smart traffic management

Project Proposal for Mombasa

Implementing Organization

- The CGM shall lead implementation, organize the Committee for Traffic Management and Safety, which shall be act as PIU in the project implementation phase.
  - CGM DTIPW: Overall management including traffic management and engineering aspect
  - CGM Inspectorate: actual operation
  - CGM ICT: O&M for ICT infrastructure and DATA
  - KURA/KeNHA: Technical support
  - NTSA: regulation support
  - Police: traffic enforcement by law
  - TUM: data analysis, HR contribution
- All stakeholders in Mombasa for traffic and transport above appreciate the proactive leadership of CGM
- Q: NTSA offers to share secretariat task

PIU Chart



Coordination Technology Standard

- JICA team recommends adopting MODERATO
  - Technical justification should be added.
  - Nairobi adopted SCOOT (British). KURA HQ technical deputy mentioned importance of interoperability in Kenya.
  - The traffic management is under responsibility of the county government; therefore, we understand CGM also leads the selection and decision.

Moderato Advantage

- Applicable from unsaturated to supersaturated:
  - In light traffic, it forms a safe traffic flow by not only reducing delays and stops, but also controlling speed.
  - When close to saturation, increase the green-signal time efficiency of the major junctions to maximize the processing of traffic volumes and thus reduce the occurrence of traffic congestion.
  - In super saturation, it directly determines the split and cycle length by taking into consideration of the traffic congestion length calculated from the detector information.
    - In addition, from the viewpoint of traffic management at major junctions, priority control is performed on conflicting traffic flow.
- The green-split-optimization in the cycle
  - To minimize the occurrence traffic congestion, appropriate green-signal time allocation is extended in coordination basis

Control Center/System Operator

- Location: Inspectorate Office
  - recommended as 24-hr operation can be secured already
  - Space can accommodate the more LCD panels
- The Engineering section of DTIPW will superintend the traffic control center

System Communication Method

- Several options
- Control Center – Intersection controller :
  - Fiber or Radio (4G)
  - Ownership & Operation Method
    - Owned and Operated by CGM
    - Owned by CGM and Operated by subcontractor
    - Lease and Operated by subcontractor
- Sensors – Intersection controller
  - Cable/Wireless
- Lights – Intersection controller
  - Cable recommended

Data Center Function

- The county's data center will be applied for center control server, data storage, backup.
- CGM ICT office will maintain for it.
- The server will not be in the traffic control room.
  - Control monitors, workstations, operator's PCs are delivered to the traffic control room.

Project Implementation Road Map

- Preparatory Study: 2021-22
  - Including F/S & B/D
- Grant Agreement in 2022
- Procurement/Const. in 2023 –
- TA for transport management should be added

	2021	2022	2023	2024
Preparatory Study (F/S & B/D)				
Grant Agreement		▲		
Procurement & Construction				
Technical Assistance		to be implemented		

Civil work components

- RAs at the target routes shall be removed and Geometric improvement for proper 4-legs intersection with lane marking and traffic islands should be applied.
  - The intersection size should be minimized to realize solid traffic flows and avoid unnecessary parking.
- The Right turning lanes should be added for two-way flow in a phase.
  - Lane width should be adjusted between 3.0m -3.5m, not fixed to 3.5m, minimize the shoulder, and secure the right turn lanes.
- In the pedestrian oriented area, optimize the cross-sectional profile to maximize the footpath capacity, instead, jaywalk-control facilities should be installed.

TA for Traffic Management

- TA for traffic management should be considered to enhance the project effectiveness
- 3Ws/Matatu enforcement seems same as before. Numerical limit regulation should be considered, particularly in town
  - Uber (human request) based -> AI based vehicle distribution (CCTV, density, daily travel pattern)
- Off-street bus sites should be developed otherwise we cannot build signals at Mwembe Tayari.
  - KRC station, CFS (Autoport) will be good?
  - RA removal may create space.
- TUM capacity expansion program for data processing and analysis

4. Selection of Intersections

- Previous study has proposed 7 locations.
- Basic policy in target intersections should be discussed first.

Basic policy -1

- Corridor-based or Area wide selection:
  - A group of intersections with 300 - 700m intervals should be selected to secure the coordinated signal outcome.
  - Not based on individual intersection improvement need.
  - Combination of corridors
- Respect superior Planning and traffic volume:
  - Proposals for Masterplan and Vision 2035
  - MGB and 2nd Nyali Bridge: correspond to New traffic generators

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Basic Policy -2

- Respect area/route characteristics
  - Pedestrian oriented area: Additional infrastructures for pedestrian safety and jay-walk control should be considered (widening and adequate barriers)
  - BRT routes: consider PTPS
- Procrastination and advise for Chaos section
  - Make chaotic route/intersections where the ITS cannot work properly lower prioritization and advise "What to do"
- RA removals and Phase operation
  - Roundabout should be removed, Two-phase operation with r-turn movement should be installed.

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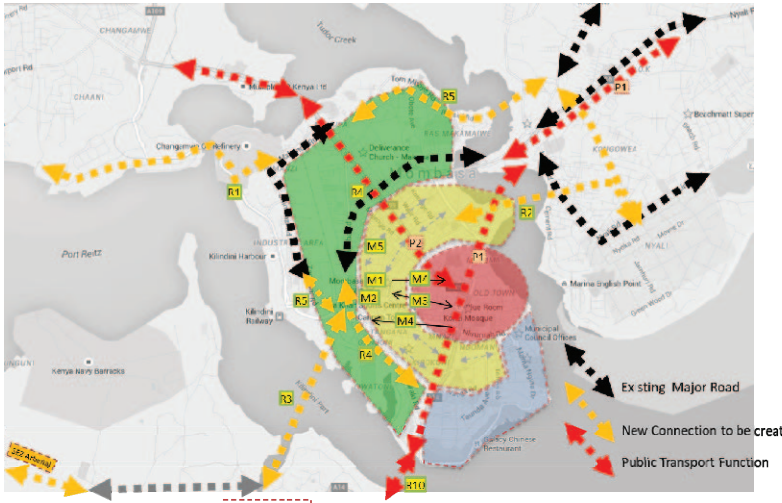
Respect area characteristics



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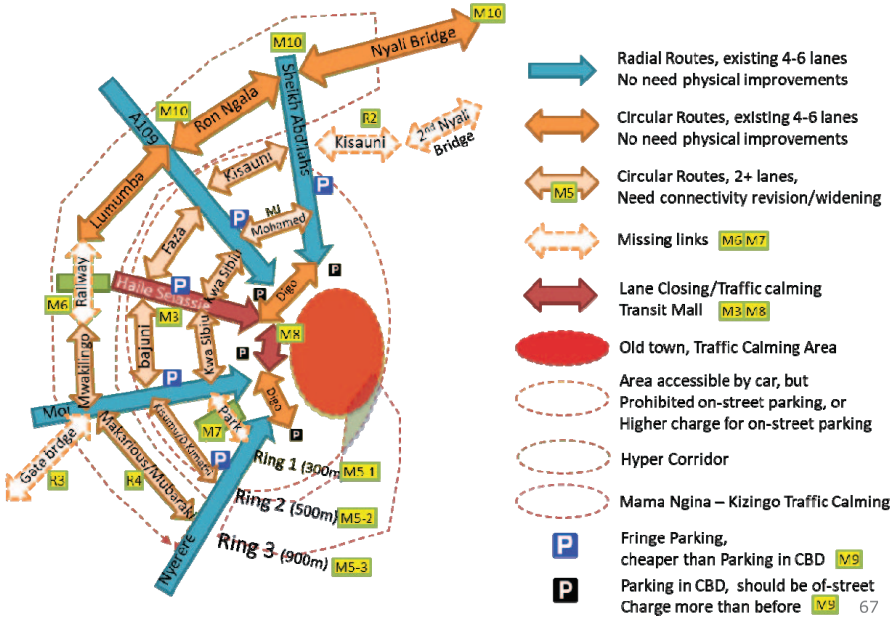
Respect area characteristics



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Route based selection

- Kengelani~Nyali~Buxton~77~Lumunba Route
- 2nd Nyali Bridge – ring road directional routes
- A8（Barkley~Mwembe Tayari～77～Makupa~）
- Nyerere~Digo, Moi（Nkuruma~Moi), Haile Selassie
- Nyali/Kisauni (Links Road/New Malindi)
- Chamgamwe / Likoni

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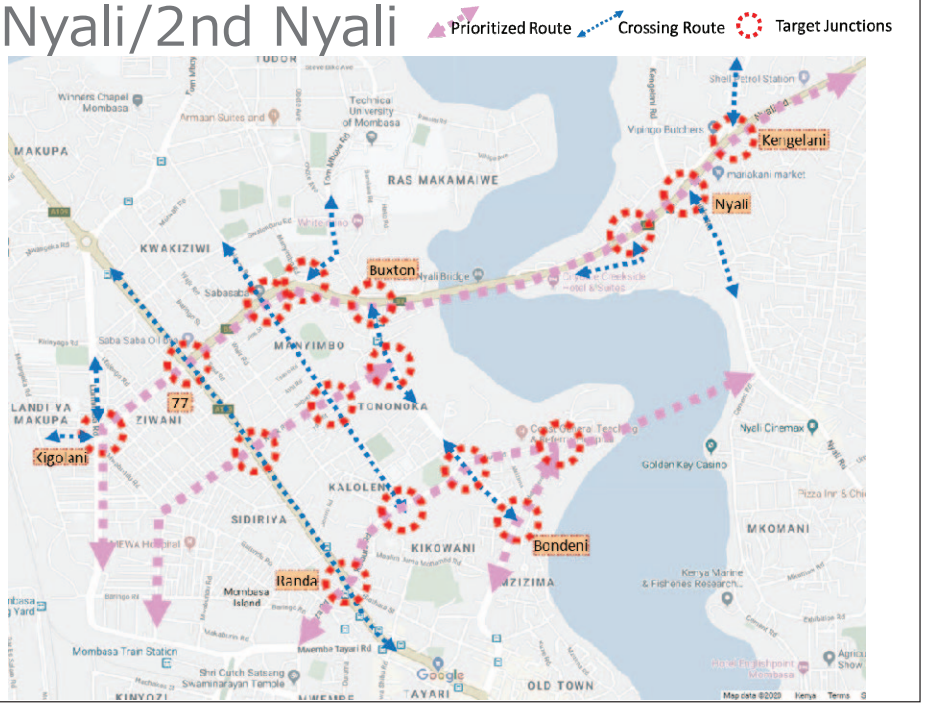
Nyali/2nd Nyali



Nyali route

- Advantage
  - **Little needs for large scale civil work** as most intersections are already square 3 or 4 legs junction. Only adjustment of lane width should be considered.
- Disadvantage:
  - Quite high traffic volume, mixture of undisciplined matatu traffic, high security concern for VIP **may damage proper control** of coordinated signals.
    - The 2nd Nyali bridge installation may alleviate the situation in near future.

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2nd Nyali Circular Directions

- Kisauni Road
  - Proper diversion for the 2nd Nyali Bridge should be prepared before the bridge installation.
  - The present Kisauni road applies Happy hour operation. (Evening/outbound)
- Narok Road
  - Tononoka internal circular connection should be designed to attract another diversion.
- Difficulties:
  - Nyali 2nd bridge plan are not yet finalized, and it will be designed as PFI basis, therefore, the connection would be denied by the private concessionaires.

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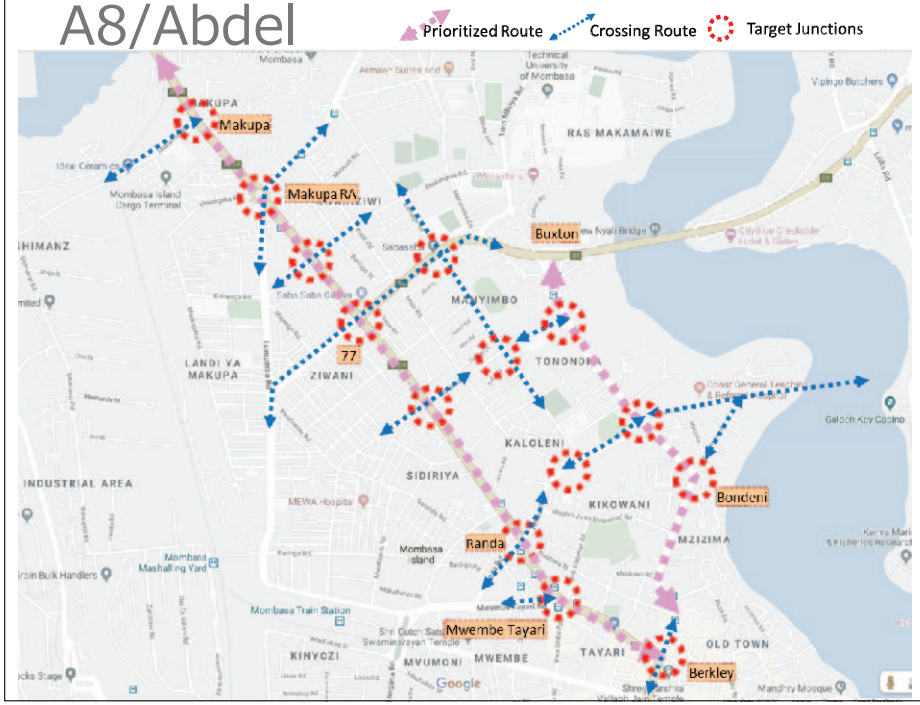
A8/Abdel



A8

- Requires RA removals.
- Disadvantage:
  - A8 (Changamwe-77) is on widening process, and 77-Barkley is pipelined for repaving, however, its work schedule are not yet fixed, so the signal installation timing cannot be fixed.
  - Mwembe Tayari and Lebanon intersections are full of longhaul bus services stopping on street. Removing of RA are also needed for those two, and Berkley.
  - Makupa RA is quite big, and KeNHA's work is on-going (no plan for removing the RA?)

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Sheik Ab/Koinage

- Sheik Abdulah
  - Proper lane width. Little civil work.
- Koinage Rd.
  - Divert the local traffic on A109 to Koinage.
  - Remove center divider on Ronald Ngara and realize crossing from Tononoka to Tudor along Koinage.

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Central

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Digo/Moi

- Need to remove center dividers and historical RAs.
  - Alternative off-street parking development required
- Need pedestrian barriers for jaywalking and exclusive pedestrian crossing signals with traffic stop.
  - Mackinnon Market, Nkuruma,Tayari
- Matatu/3W control

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Nyali/Kisauni

Prioritized Route Crossing Route Target Junctions

77

Nyali/Kisauni

- Priorities on
  - New Malindi, Links, and Old Malindi
  - Intervals comes longer
- 2nd Nyali access arrangement with singal installation
- Links reversible lane arrangement?

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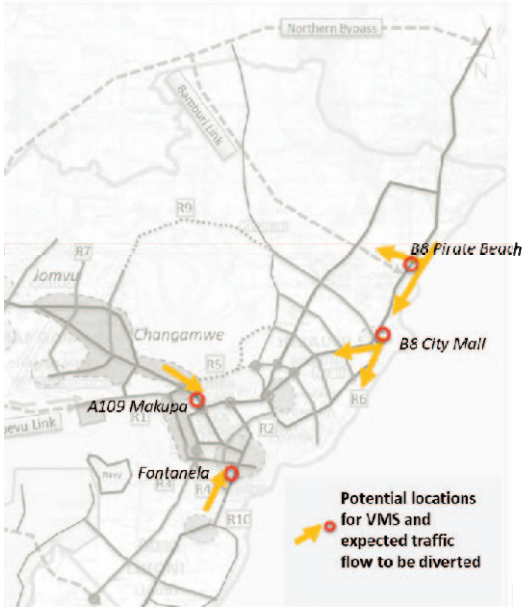
Reversible lane arrangement

VMS development



Together with the traffic signal development, Variable messaging system to inform the traffic information including congestion information, traffic management and diversion direction, disaster evacuation directions

"Happy-hour" Improvement

Image of the reversible lane operation and signal installation in Links Rd three-lanes section

Reversible lanes ITS control measures are to be included in the ITS traffic signal project. Covering the Links road and Moin road. Gantry type oneway VMS, cameras, marking improvement are to be included. Details would be designed in the following study.

Project Proposal for Accra

Proposed Project from JICA Study Team for Accra

1. Proposed short term project (approx. within 3 years)
   - The Project for development of Area wide Traffic Signal Control System by using existing Control System.
   - Technical Cooperation Project on Road Safety applying V2X and VMS
2. Proposed middle to long term project (approx. 3 – 10 years)
   - Vehicle Management by using FMS and related Technical Cooperation Project on Road Safety

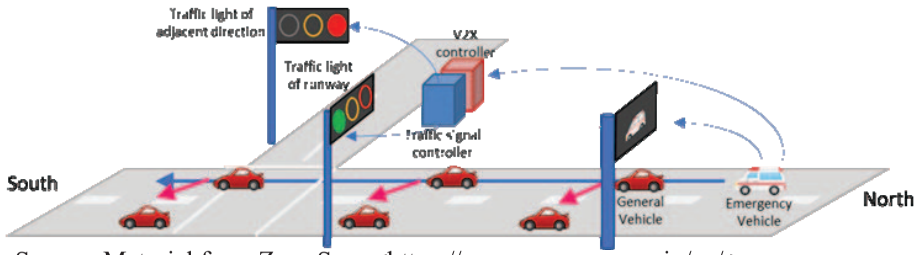
Outline of Technical Cooperation Project on Road Safety

Outline of the Project is;

- A pilot project for introducing V2X technology to the black spot of traffic accident is included to improve the road safety
- It is assumed the case between vehicle and motorcycle
- Collected data will be utilized for effectiveness evaluation and further expansion on road safety
- This idea can be applied for Kumasi and others also

Note: V2X: Vehicle-to-Everything, VMS: Variable Message Sign

Japan's V2X demonstration in India



Source: Material from Zero-Sum <https://www.zero-sum.co.jp/en/ >

- ✓ The above case can be applied for QBS operation in Accra.
- ✓ If so, we can expect;
  - ☐ The QBS user can expect the shorter travel time.
  - ☐ Increasing the user of QBS.

  ⇒V2X technology can also contribute to better operation of QBS.

Project Proposal for Kumasi

Proposed Project from JICA Study Team for Kumasi

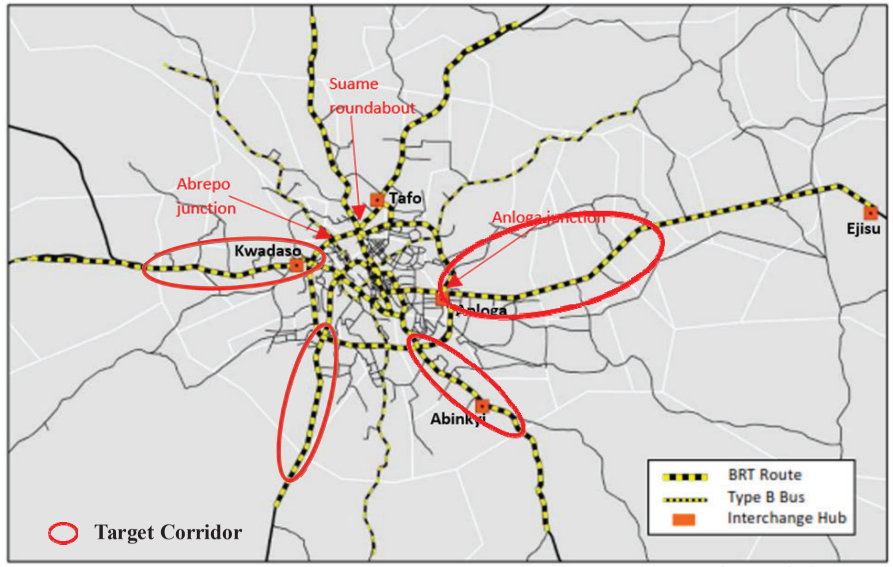
1. Proposed short term project (approx. within 3 years)
   - The Project for introduction of traffic signal using corridor based control system in Kumasi
   - Technical Cooperation Project for addressing transport issues in Kumasi including pilot project on improvement of parking information system
2. Proposed middle to long term project (approx. 3 – 10 years)
   - The Project for Development of Area Wide Traffic Control System in Kumasi Metropolitan Area

Outline of the Traffic Signal Project for Kumasi

The outline of the Project is;

- Introduction of corridor based control system to the several major corridor in greater Kumasi Metropolitan Area.
- Existing innovative signalized roundabout should be studied how to incorporate into the corridor control
- The institutional framework of operation of the signal should be established since there are different owner's signal along the corridor
- Such framework could be checked if we implement F/S + pilot project for around 3 intersections (Small Start like proof of concept)

Target corridors for the corridor based control signal (Tentative)



Proposed Project Implementation Structure

1. DUR: Executing Agency and responsible for operation
2. GHA: Coordinating with DUR for the Signals under GHA's Management
3. MRH: Supervisory Agency of DUR & GHA
4. MTTD/GPS: Traffic Enforcement by Law
5. NRSA: Regulation Support for the Project Plan and operation
6. KMA: Coordinating with others on Traffic Management
7. KNUST: Provision of recent Traffic Data including innovative signalized roundabout and traffic data analysis during the operation.

Project Proposal for Dar es Salaam

DCC ITS Strategic Plan

- The DCC study shows comprehensive concept in ITS scoping, with 9 strategic sectors.
- JICA team selected 3 prioritized sectors as they are essential for area traffic management.

ITS Priority Area	Goal
Transit Management	Continued investment in the citywide BRT system with emphasis on tools and systems that provide for connectivity and operations of this system. Emphasis is placed on improvement of the efficiency of the BRT operations, the ability to direct service changes in real-time to improve system performance, address safety of the system as well ensure performance-based management of these services.
Traveller Information	Providing a citywide traveller information service that will increase awareness and information on travel choices and reliability. This will assist in reducing congestion by being informed of network status and choices on how and when to travel.
Transport Data Centre/ Management	Development of a state-of-the-art data management centre to collect, manage and communicate extensive data generated by the transportation system and related areas. Utilise the centre for real-time operational management as well as on-going planning activities.
Arterial Management	Development of arterial management systems, improve signal timing and coordination as well as improving competitiveness of transit as well as reducing travel times on the roadway network.
Parking Management	Provide measures to improve information regarding available parking and have access to information to manage provision and pricing thereof.
Multimodal Integration	Achieve effective management of the transportation network and improve the efficiency of the transportation system through integrated operations and management. This will result in reduced congestion and travel time during the daily commute.
Electronic Payment Systems	Support initiatives to expand the use of automated payment systems for transit systems (such as BRT and ferries) and parking to provide for integrated multimodal fare systems.
Commercial Vehicle Operations	Provide electronic systems to commercial vehicles in moving freight to assist in regulating the operations and activities to improve knowledge regarding position of heavy vehicles, manage overload control and roadside operations in general.
Communicatio ns Network	Ensuring that a robust telecommunications network is in place that supports the transmission of field data to a central hub, as well as inter-agency data exchange.

TMDC: Data center development to collect real-time fleet flow, and signal operation and public transport priority system

AM: Arterial corridor management including real-timesignal control for green wave operation

CN: Communication Infrastructure for arterial corridor management

Priority Project

- JICA Study team suggested the DCC ITS strategy and its 3 prioritized sectors would be a suitable package for the further development assistance of JICA
  - Because it is planned by DCC and M/P but not yet implemented, fit to the M/P policy and items which will not be done by private sectors.
  - So far, no organization have negotiated with other countries or financial agencies for assistance.

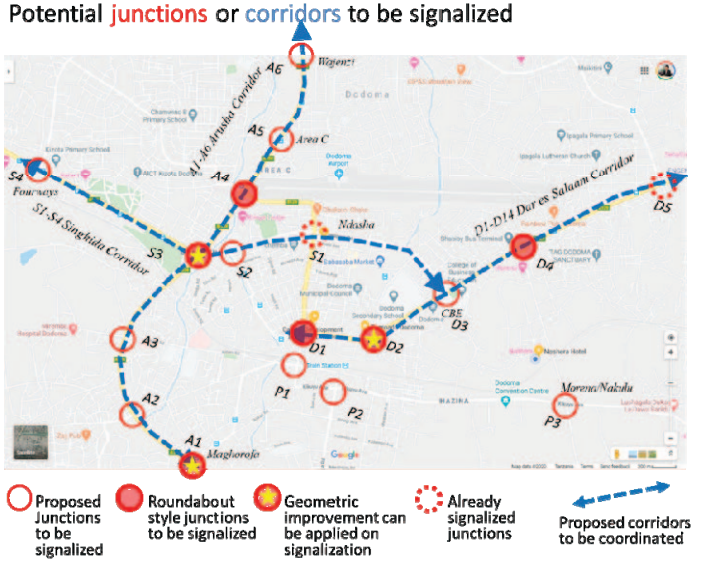
Implementation body

- JST suggests DART+TANROADS+Police will organize an implementation unit, with assistance of Ministries and LATRA.
  - Road traffic law: TANROADS Chief Eng. must design the road signs and Police will enforce.

Project Proposal for Dodoma

Proposed Signalization Project in Dodoma

Potential junctions or corridors to be signalized

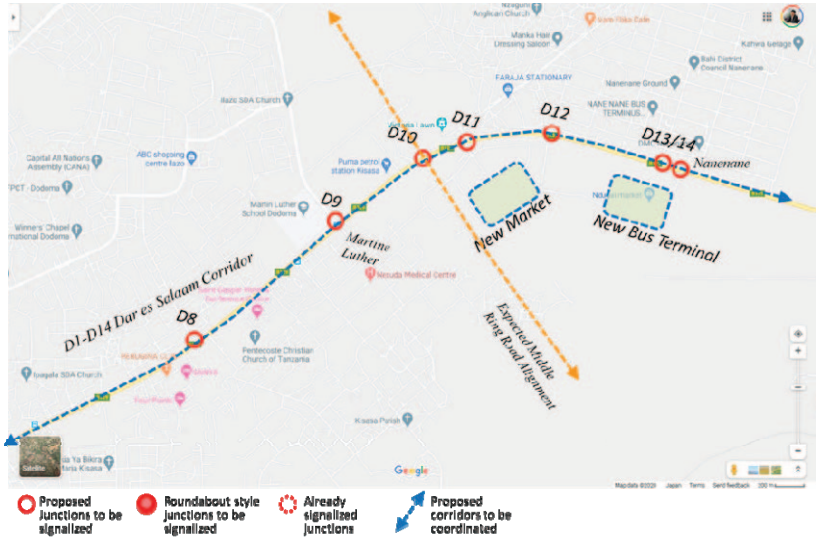


Signalization for Dar es Salaam Corridor and Inner/Middle Ring Road

Potential junctions or corridors to be signalized

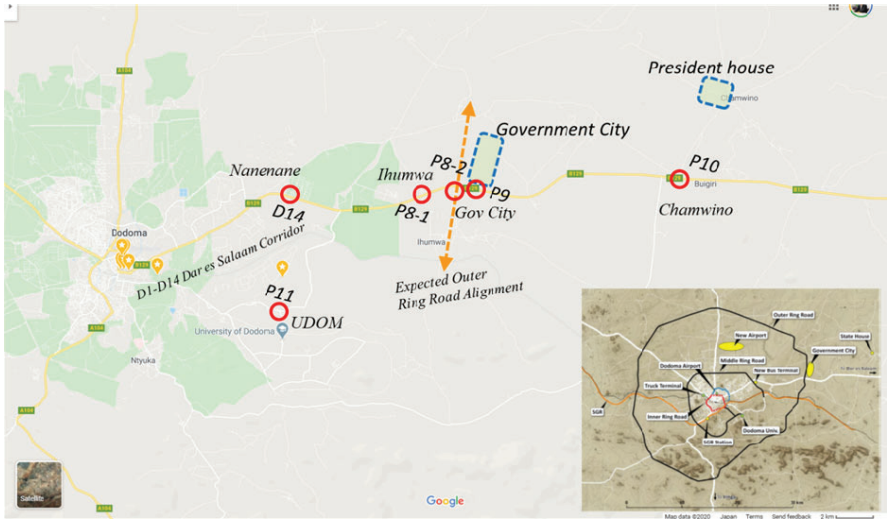
Signalization for Dar es Salaam Corridor and Inner/Middle Ring Road

Potential junctions or corridors to be signalized



Signalization for Dar es Salaam Corridor and Outer Ring Road

Potential junctions or corridors to be signalized



Proposed Junctions to be signalized

Roundabout style junctions to be signalized

Already signalized junctions

Proposed corridors to be coordinated

Thank you very much for your kind attention!