Terms of Reference
for the Design and Supervision Consultancy Service
in Support of
the Federal Transport Authority for the
Transport and Traffic Management Systems Implementation Project

Glossary of terms

Term	Meaning
AM	Accident Management
ARB	Architectural Review Board
BI	Business Intelligence
DL	Driver's License
DWH	Data Warehouse
EA	Enterprise Architecture
ELPA	Ethiopian electric and Power Authority
EUC	End User Computing
FTA	Federal Transport Authority
GoE	Government of Ethiopia
HD	Help Desk
IAM	Identity Access Management
ICT	Information and Communications Technology
INSA	Information Network Security Agency
MCIT	Ministry of Communications and Information Technology
MoFEC	Ministry of Finance and Economic Cooperation
MoT	Ministry of Transport
MSAG	Multiple Service Access Gateway
OR	Operator Registration
PDSF	Program Design and Supervision Firm
PIU	Program/Project Implementation Unit
PM	Penalty Management
SI	Systems Integrator
SLHPL	Security, Language, Help Desk, Party & Location
TCO	Total Cost of Ownership
TOR	Terms of Reference
TRIPS	Tripartite Transport Registers & Information Platform System
TRANSIP	Transport System Improvement Project
TTTFP	Tripartite Transport and Transit Facilitation Program
TTMS	Transport and Traffic Management System
UX	User Experience
VR	Vehicle Registration
WBG	World Bank Group

1. Background

Transportation sector is the backbone of any economy. Several service oriented businesses such as logistics, public transportation, delivery and postal services, rental and raw material/goods supply services all depend on the existence and well-functioning transport infrastructure and transparent usage and management rules. Similar to any asset, the proper management and utilization of resources does not only cut cost and improve efficiency, but also encourages and acts as a catalyst in creating the ideal platform for businesses to flourish. On the other hand, lack of well-managed transparent system can act as a deterrent factor for economic development.

Ethiopia is faced with huge economic, social and human problems related to extremely high road traffic accidents and highway crimes. With the aggressively growing number of vehicle and opening of number of new high speed roads, the number of fatalities is expected to increase at an alarming rate. At the moment around 64 deaths per 10,000 vehicles, is occurring in the country. Currently thousands of people are put in imprison due to traffic offences leading to huge social problems both for the offender and victim families as most of the involved are supporters of several family members. Moreover, due to high rate of traffic crimes, huge public and private property is wasted every year. The World Health Organization estimates that an equivalent of about 1% GDP (about USD 500 Million) public and private property is lost every year due to road traffic accidents and high way crimes. This does not only result in loss of resources, but also hugely deters the economic growth, and therefore the livelihood of hundreds of thousands of citizens.

The root cause of these socio economic and human problems is the lack of an appropriate information technology infrastructure for enforcing the various measures the government has been implementing in the past years. Therefore, to mitigate these problems, it is vital to build a comprehensive IT infrastructure platform. The IT infrastructure should comprise, among other things, unified vehicle and drivers registry and monitoring system, automated traffic management and regulation system, implementation of social awareness and driver training quality control centers, installation of monitoring equipment along key economic routes and junctions.

The other factor that is important in a project of such magnitude is the need to thoroughly investigate the approach and the strategy that does not only guarantee that the project is successful but also minimizes cost and risks. Moreover, any path towards addressing urgent issues needs to be well aligned with the long-term vision of the system upgrade. To this end, for any efficient traffic and driver management system, a modern and clean database is vital. The database system, in fact, acts as a foundation for the implementation and appropriate reinforcement of any services.

Since Ethiopia is a Federal State, there are federal, regional as well as city administration states. Accordingly, road transport administration is organized into one Federal, nine regional and two city administration transport offices. The federal transport authority is a regulatory organ responsible to assure the implementation of rules and regulations related to road transport services throughout the country. It is under the Ministry of Transport. While the drivers' licensing and vehicles registration services are managed and issued by the nine regions and the two chartered cities, through 74 to 80 Zonal offices . And an act related to road safety enforcement is being done by Police. Although there are common procedures, standards and criteria for the issuance of licenses and permits no means to effectively enforce them within regions, and particularly across regional boundaries.

Moreover, to facilitate the development of a more competitive, integrated and liberalized regional road transport market, regulate cross-border road transport and allow member States of the Tripartite Region to undertake cross-border road transport in the territories of the other Member States, a harmonized and integrated Operator Registration System should be established in each member states. The Tripartite is an umbrella organization consisting of 3 of Africa's Regional Economic Communities, namely: the Common Market for Eastern and Southern Africa; the East Africa Community and the Southern African Development Community. The Tripartite consists of 26 member countries who are acceded to the Tripartite Multilateral Cross-Border Road Transport Agreement in which Ethiopia is a member

Bearing this in mind, the Ethiopian government initiates this project to implement a National Driver Licensing, Vehicle Registration, Penalty Management ,Accident data management, and Operator Registration System .

1.1 Current situation / Rational for the project.

The followings are several factors driving improvement in Road Safety in Ethiopia:

- Too many fatal and other road accidents in Ethiopia. Approximately 64 deaths per 10,000 vehicles.
- Primarily down to Driver error (85%), then vehicle defect (6%), then pedestrian error (5%).
- Inefficient and inconsistent transport services offered across the regions and city administrations.
- A lack of transparent law enforcement on the roads because of no integrated data and information systems, which makes it difficult to spot repeat offenders, etc.
- Due to poor driver's license management and insecure driver's license cards, this has opened the door to fraud and many people are driving with an illegal license.

- Comparable situation with Vehicle registration management. Fraud in inspection centers means unroad worthy vehicles are using the road.
- Multiple different systems are used throughout the country, as well as in some cases manual systems, which makes it difficult to obtain good quality information.
- Documents and permits between sub-Saharan countries cannot be validated electronically and can therefore easily be forged
- Limit quality control on vehicles, drivers and operators
- Administrative burden to apply, pay for and issue permit
- All this contributes to pushing the cost of transported goods up, directly affecting the economy.

It is hoped that by building a set of integrated systems, that span the entire country that there will be a reduction in fraud and illegal drivers on the roads, making the roads safer for all. The traffic police will be able to verify information remotely and formally identify poor drivers and repeat offenders. Vehicle registration will be improved minimizing fraud and make for safer vehicles on the roads. In addition, information will be exchanged between member states in 23 countries(including Ethiopia) in the sub-Saharan Africa for validation of operator, vehicle and driver documentation that cross paths through their boarders bringing a Significant increase in quality control of cross-border transport and improvement of road safety. All this will lead to an improved economy that can support the growth the country is going through currently

1.2 Program to rectify the situation

Modernization of Nationwide Vehicle Registration, Driver's Licenses, Penalty Management and Road Accident Information systems, which will enhance the function and data exchange of the sector as well as enhancing law enforcement capacity. Building these systems will support the Ethiopian Government overall national growth approach plan and modernize transport information systems to better serve its citizens and improve efficiency of the government agencies.

This Program is called **Transport & Traffic Management System(TTMS) and is** a sub-set of the larger **Transport System Improvement Project(TRANSIP)**.The project consists of the following activities:

- Establish a **Driver's Licensing, Training & Examination System**– this covers the full driver's lifecycle to be managed by both the Transport office staff and Driving schools' staff, of a new student Driver, through training, examinations and into the system as a daily road user. It also

covers upgrades to license types, revocation of license, printing of secure Driver's License Cards, accepting payments, with electronic notifications to the drivers of any changes, etc.

- Establish a **Vehicle Registration and Inspection System** – this covers the full vehicle lifecycle of a Vehicle from import through customs, buying and selling, registration, full inspection, 3rd party and other insurances, into daily use. Thereafter the annual re-registration discs and retiring from use eventually, including modifications and changes to the vehicle. Also includes Printing of secure Vehicle Registration documents and accepting payments, with electronic notifications to owners of any changes.
- Establish a **Penalty Management System**–this covers the full Penalty tracking lifecycle of fines issued to either drivers or owners of Vehicles by the police. We require a Web based and a Mobile Application to allow for remote operation by the police. It interfaces to both above systems to extract information on the Driver and the Vehicle. Also includes electronic notifications to owners, drivers of any fine issuance, payments, late notice warnings and cancellations, etc.
- Establish a **Road Accident Management System** – this covers the full Accident lifecycle of a Vehicle from any accident first happening, to follow-up of investigations on all involved, pulling information from all of the above three systems, to finalization with insurers, victims, etc. We require a Web based and a Mobile Application to allow for remote operation by the police. Also includes electronic notifications to owners, drivers, victims, etc.
- Establish an **Operator Registration system** that exchange information about Operators, Drivers & , Vehicles validity, all transgression and related data through TRIPS between member states (23 countries in the sub-Saharan region) who are acceded to the Tripartite Multilateral Cross-Border Road Transport Agreement and between Regions inside Ethiopia
- Establish a **Central Help Desk Ticket System** – To cover the full lifecycle of a Staff assistance ticket to assisting in running the systems. This is NOT a Customer relationship management system, it is just for use for in-house Staff and Police in obtaining assistance and removing blockages using the systems daily.
- Establishing **ICT Infrastructure** - To install the relevant infrastructure to support the above five systems. This to include everything from a Federal Data Centre, to Regional Data Centers right out to Zonal Transport Offices, including WAN, LAN and infrastructure hardware and software.

- Establishing **Sustainable Power Solution**–To install at all Federal, Regional and Zonal offices that require the Drivers and Vehicle systems above (not Police systems) a suitable for that office, Sustainable Power system to assist in mitigating the regular grid power interruptions.

1.3 Name of the Engaging Organisation

The organization for this program of work is the **Federal Transport Authority (FTA)**of Ethiopia, which is a government organization and is overseen by the Ministry of Transport (MoT). The FTA is a regulatory body for the road transport and road traffics systems within Ethiopia.

There are however many stakeholders connected to this program which is worth understanding to appreciate the scope of work. The categories of stakeholder are:

- **Regional and City Administration Transport Offices** Since the FTA only does regulatory work, all the executive work is all done by the Transport Offices (Bureaus) which form part of the Municipalities throughout the Country at various levels, Federal, Regional/City Administrative and Zonal/Sub-city. These are the main stakeholders for the Driver's License and Vehicle Registration systems.
- **Traffic Police:** Another major set of stakeholders are the various Traffic Police officers throughout the country also at three levels, Federal, Regional/City Administrative and Zonal/Sub-city. These are the main stakeholders for the Penalty Management and Accident Management systems.
- **System 3rd Party Stakeholders**: Since there is a lot of integration work both intra-systems as well as externally to 3rd party organizations in both directions, there are a set of stakeholders with whom the systems will integrate. Examples of these stakeholders are Ministry of Construction, Ministry of Transport, Ministry of Education, Insurance Agency, (MoTr) Ministry of Trade, private Vehicle Inspection Centre's, private Drivers Training schools, Payment organizations, 3rd party Research institutions, Freight and Public transport services, Road Fund, Customs Authorities, TTTFP
- **Ministry of Communications and Information Technology (MCIT)**: Since MCIT own the Government Virtual Private Network and data centers.
- **ICT Stakeholders**: The Information Network Security Agency (INSA) and Ethio-Telecom are the major ICT Stakeholders in the Program.

1.4 Program location

The systems will be rolled out across 9 regions and 2 city administrations and approximately 74 to 80 zones or sub-cities across the whole country of Ethiopia with a sizable percentage of the work will be centralized in the city of Addis Ababa.

1.5 Program history

Transport System Improvement Project (TRANSIP) was initiated by the Government and financed by the World Bank (IDA) in mid-2016. The effort was started in 2012 and become effective in 2016. The project life time is seven years starting from 2016 to 2023.

To get started on this TTMS program, it was decided to build an Enterprise Architecture, which would inform the future requirements at a suitably high-level, for the subsequent firms tendering on the program design and supervision work. Therefore, a high-level enterprise Architecture was developed. On the other hand a tripartite transport and transit facilitation program is being undergo which interconnects 23 Eastern and southern African countries for the sake of trade facilitation. This program, in order to be effective, transport rules and regulations of these 23 member countries must be harmonized, Drivers and Vehicles quality must be in similar position, and there must be seamless data exchange between the member countries. Therefore, a model laws, regulations and system specifications are developed and shared between member countries.

1.6 List of relevant studies and basic data

So far, a high-level Enterprise Architecture and model laws, regulations and system specifications has been designed. The following documents are the most important deliverables of the studies:

- The **AS-IS Enterprise Architecture Report.**
- The **TO-BE Enterprise Architecture Report (Version 1.0).**
- The **Enterprise Architecture Model set**, modeled in Archimate in an open source tool called Archi
- TTTFP model laws, Regulations and system Specifications

1.7 Motivation for consultancy

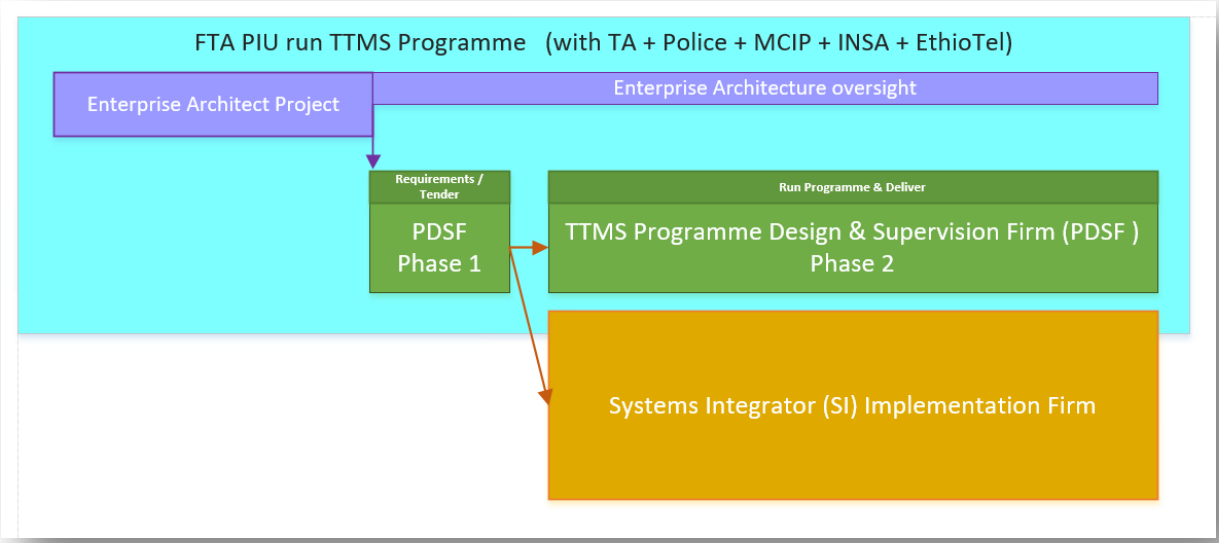
Due to the size of the Federal Transport Authority (FTA) and the existing nature of work done on a day to day basis, there is a need for a Firm (or Firms in a joint venture), to come in and work closely with the FTA PIU to design, supervise and deliver the TTMS Program to completion on behalf of the FTA.

1.8 Program Phasing

The Program Design and Supervision Firm will design and supervise to deliver the Transport and Traffic Management Systems (TTMS) through two Phases defined as:

Phase 1 = include specifying all requirements, discover and offer **solution options**, and specifications, detailed **solution designs,** preparation of implementation approach plan, refine the **Enterprise Architecture** and, bidding documents to tender for and on-board the SI implementation Firm. (11 months time proposed).

Phase 2 = This phase is planned for the PDSF and SI to work together Agilely. The PDSF firm is responsible for final detailed solution Design (all parties to sign off),Supervision of the implementation while the SI firm responsibility is Developing/installation/configuring and Implementation of the TTMS program(develop, supply and installation of the software, Hardware and ICT Infrastructure).



2. Objective of the assignment

The key objective of the assignment is to design and supervise the Transport and Traffic Management Systems (TTMS) implementation which comprises Driver Licensing, Vehicle Registration, Penalty Management, Road Traffic Accident Management system, Operator Registration System ,Staff help desk system and ICT Infrastructure.

3. Scope of Services, Tasks (Work Packages) and Expected Deliverables

The Consultant must complete the Tasks & Sub-Tasks shown under the following work packages and any others that may be related and required, but are not necessarily listed in the details, which the consultant may demonstrate adds value to the project and are applicable and indispensable. The Consultant may use its best judgment, based on its international experiences, expertise, best practices and standards to recommend and accomplish any related sub-tasks that may help to successfully complete the Tasks. In addition to the existing transport rules, regulations and procedures, the consultant shall review and use as

input, documents related to COMESA-EAC-SADC Tripartite Agreement on Cross-Border Road Transport and the work done by Tripartite Transport and Transit Facilitation Program (TTTFP), like model lows and regulations, standards, system specifications, etc to be provided in soft copy.
The TTMS project will be implemented in 9 regions and two chartered cities and 74 to 80 zonal offices which are found across the country.

3.1 Phase 1: –Detailed-Design, Bid document preparation and technical Procurement Support –- Lump-sum Assignment (Duration 11 months)

Under this Phase the consultant is expected to complete tasks and sub-Tasks of Work package 1 to Work Package 19 (the sequence may be ordered differently to achieve proper scoping and sizing of the requirements and detailed system design)

Work Package [01] Establish Program Plan for Phase 2
In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Define how the Inter-continental locations & collaboration will work in conjunction with the overall Program Team structures. E.g. Who resides where, who travels, who stays home, who stays in Ethiopia, etc. To maximize effectiveness and efficiency while minimizing cost to client.
    - Define a Program Methodology as a Business Processes to be followed per Team per Role
    - Define the input and output Deliverables per Business Process.
    - Refine the existing Business Functions each capability is responsible for delivering.
    - Define the Logical Tooling required per capability, as this will be requested of the SI firm later.
    - Define Change Control for P2 for multiple firms.
- Establish a Plan and estimation for the duration, effort, resources and costs to deliver this Program during Phase 2.
    - Define the plan for people resources and roles to fill for phase 2.
    - Collaborate with each Team to understand their estimation of duration and effort, order of functional delivery as input to overall duration and costing.
    - Define the Deliverables.
    - Define the proposed coordinated release schedules for all of Business Functionality, DC, WAN, LAN and Power Release Schedules.
    - Define the coordinated Business readiness with the above Release schedules.
    - Understand the usage of the SI firm roles required.
- Develop a roadmap for the entire project realization (to be continuously update)

Expectation: To have a functioning Program organizational structure and method defined, with resources on the ground ready to go once we reach Phase 2, who can do the work with the SI Firm once they are brought in and start operating.

Work Package [02] Establish and estimate the WAN and LAN Network requirement
In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Visiting both the Ministry of Communication and IT (MCIT) and the National Data Centre (NDC) to understand the work done to date and understand the existing future-plans.
- Understand the total existing “last mile connectivity” network extensions, bandwidth capacity. (Ultimately this work will be dependent on Ethio-Telecom for information).
- Understand the total non-existing “last mile connectivity” network extensions, bandwidth capacity. (Ultimately this work will be dependent on Ethio-Telecom for information).
- Plot on a map (can use Google Map), the exact location (GPS point) of the Transport Offices and the Connection points.

- Understand the total LANs requirements. (Potentially requires a visit to each site.)
- Define details on equipment required to action the connectivity, specifications and costs for this WAN/LAN equipment.
- Define a per Region, the installation workload, estimated time and cost to deliver the network connections to each Transport office (incl Fed, Region & Zone).
- Detailed Solution Architecture & Design of the Wide and Local Network Architecture.

Expectation: To scope out the likely cost, workload and duration that will be required to implement the network extensions. Detailed gap analysis has to be prepared, all technical and functional specifications.

Work Package [03] Establish a Data Centre usage approach plan

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Research into the existing data centers both National Data Centre (NDC) centrally as well as the Regional/City Government Municipal Data Centre's. Examining their existing capacity and understand the existing future-plans.
- Visit government institutions that have experiences in using existing data centers and find their benefits and challenges and use this as input to the overall approach.
- Inspect and appraise all Data centers for adequacy to support the requirements that the TTMS will demand. Check the basics of current capacity for ICT (Network, Servers, Storage, etc.), Physical (Building, Air-condition, Security, Power (UPS, Battery),redundancy etc...).
- Come up with a cost of implementing a central only hosting option approach plan.
- Come up with a cost of implementing a regionally distributed with central hosting option approach plan.
- Understand the impact of creating New TTMS specific Data Centre's.
- Define a recommended approach plan. Taking all the inputs into consideration and consideration to how the systems will integrate and share data when both on-line and off-line, seamlessly with integrity and with sufficient performance in distributed mode vs centralized mode.

Expectation: To propose and define a Data Centre usage approach plan which considers all the inputs and defines different options with pros and cons.

Work Package [04]Establish and estimate the Power extensibility approach plan

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Research, gather and understand existing Power situation per transport office (not data centers), to understand the expected minimum power requirements, to understand where the most outages occur, to understand the buildings architecture for panels, etc.
- Prepare a sustainable power requirement for each Transport Offices.
- Recommend with costing all possible sustainable power solutions which will work if a grid power failure happens and for any average scenario considering trade-off between cost and availability. Also specify the maintained options of such equipment.

Expectation: To have a detailed power solution options and approach plan which enables to have sufficient decision making

Work Package [05]: Specify and Cost all End User Computing Equipment requirements

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Gather a procurement list of all new End User Computing equipment that will be required to be bought for the Program with their prioritized order.
- Specify the minimum specification of all devices as well as quantity and estimated cost of acceptable set of devices.
- Specify the location of each device and where it will be installed in order cross check we have catered for all locations.

Expectation: To have specifications for all End User Computing equipment required for the whole Program, such that reliable quantities for each of the locations and costs are determined for all future purchases.

Work Package [06]: Establish an approach plan for which system modules will be reused, purchased off the shelf or built from scratch

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Define evaluation criteria and selection factors and priorities, including degree to which package must satisfy requirements and the relative importance of function vs. budget vs. schedule. Criteria can be application-specific, or they can be generic.
- Create a matrix to determine which products meet which requirements. Include functional requirements and performance requirements.
- Defined Sources of information for making the determination.
- Research into the market for available off the shelf COTS packages that meet the Business Requirements already defined. If any that meets the functional, system and budgetary requirement and constraints (Ideal first investigation selection would be looking for a full system of systems that fulfils all of the TTMS main systems required (DL,VR,AM,PM,OR, HD) with integration and customization).
- Analysis of the extent of Software modification, customization, and integration required. and Interface capabilities of the software to other components and subsystems.
- Establish a recommended approach proposal with pros and cons for Business management to consider. (Recommendation include but not limited, whether the software fits budgetary constraints, including time frame, costs of initial purchase, modification and integration, continuing license and maintenance, sustainability and platforms that will support the overall Architecture).

Expectation: To have a strategic way forward on the types and approach of application packages that will be implemented.

Work Package [07]: Establish a Solution Architecture for each Software Component and ICT

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Based on the solution option agreed, develop a Detailed Solution Architecture per Component (DL, VR, PM, AM,OR, HD, Party, Location, Language, etc.) defined in suitable Archimate, UML and BPMN Models.
- Develop ICT Solution Architecture.
- Develop and include a Business Continuity and Disaster Recovery plan.
- Define Detailed To-Be Business Processes that are optimized for reducing waste and optimizing efficiency and effectiveness, with the Transport Subject Matter Experts.
- Detailed design to include all ICT (Network, Servers, Storage, etc.), Physical (Building, Aircon, Security, Power (UPS, Battery)) including Manpower requirement
- Detailed Solution Architecture & Design of the TTMS Data Centers according to the Software requirements
- Detailed Solution Architecture & Design of each offices Power solution

Expectation: To have a sufficiently Detailed Solution Architecture (Solution Architecture Document).

Work Package [08]: Refine and agree all the business and technical requirements

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Refine existing requirements, documented inside the EA model under the requirements section, to full coverage and agree the minimum mandatory set of Requirements for the TTMS Program with the stakeholders. Put requirements in order of priority, such as Must have, should have, Could Have and Won't have (Moscow).
- Specifically look at the end to end (mobile vehicle inspection facility) comprising of a Vehicle Roadside Inspection requirements in terms of types of vehicles to procure, what inspection systems will be required to be installed in the vehicles, requirements for how and when they integrate to the TTMS, etc.
- Specifically define all the end to end Driver's Licensing system requirements including training, testing and all specialized Secure Card Printing requirements. Agree on the approach on Centralized vs. Distributed printing. Once approach Agreed refine requirements for all Printing.
- Specifically define all the Vehicle registration Specialized Secure Paper Printing requirements. Distributed printing. Refine requirements for all Printing.
- Define the system requirements for licensing process of different transport entities: ie Driving schools, vehicle inspection center, Garages, Vehicles importers, trainers, examiners, testers etc...
- Define the systems requirements for Driving Schools, where we define their system for them.
- Define the external systems requirements of Vehicle Inspections centers, where we integrate to the one or many different available systems they already use.
- Define the external systems requirements of Ministry of Urban Development and construction (the former Ministry of Construction) to understand their specific construction machine registration requirements are well defined.
- Specifically define all the end to end Operator Registration System requirements.
- Define the external systems requirements by working with the Customs, Insurance Fund Admin Agency and all other external stakeholders to make sure both the system-to-system interfaces, as well as the End User access via Web Portal requirements are well defined.
- Obtain knowledge and have the Traffic & Transport Specialists agree all requirements are sound before concluding Requirement gathering.

Expectation: To have a holistic set of requirements, agreed by the business, which can be used to size and design the required systems. Should enable near accurate specifications for tendering for the SI Implementation Firm.

Work Package [09]: Establish a Driving School System Approach plan

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Visit an appropriate sample number of independent Driving Schools/Drivers Training Schools in various regions and Find out how Driving Schools will best connect to TTMS.
- Understand what processes would be required in detail from both the Transport office and the Driving schools' point of view.
- Cost out the likely scenario in detail such as Cost of Internet connectivity per site per annum, Cost of hardware PC, Router, Printer, etc.
- Derive and Present the best way forward in an approach plan, given all the facts gathered during the exercise for Business to make an informed decision on the way forward.

Expectation: A defined approved and agreed Approach plan on how the Driving Schools will be integrated securely into the TTMS.

Work Package [10]: Vehicle Inspection systems integration approach plan
In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Research, gather, and discover all the Vehicle Inspection center systems already in use in Ethiopia.
- Define a logical business information integration and business functionality for TTMS that would accept Vehicle Inspection data as well as send them certain information they require from TTMS for each brand, type & version of Inspection system.
- Look at each vehicle inspection system, understand the degree of difficulty to access the relevant base data.
- Investigate from the manufacturers if they could/would service a defined (where we define) API from their equipment.
- Define a Vehicle Inspection Integration Approach Plan as to how best and most cost effectively, to automatically integrate data from Vehicle Inspection Centre tests, into the central TTMS via an API.
- Make sure all this information is factored into tendering for the SI Implementation firm, because this will have to be developed by them as part of the requirements.

Expectation: A defined approach plan on how to integrate the Vehicle Inspections centers into TTMS.

Work Package [11]: Create a Security Architecture approach plan
In this Work Package the consultant is expected but not limited to the following activities:

- Review the national Information Security requirement consulting with INSA and MINT (former MCIT) to understand the security requirements and policies.
- Produce the Security Policy Document for the scope that TTMS covers.
- Produce the Security Guideline Document for the scope that TTMS covers.
- Define the best security for the TTMS Program
- Align the Security Architecture with the Access to Information guideline
- Produce and present the final security set of standards to be followed for the TTMS Program, ensuring it aligns with the INSA and MCIT standards and policies. This to include all Software, Hardware, Network and physical security aspects.

Expectation: To have a reliable Security Architecture for the TTMS.

Work Package [12] Prepare the release approach plan for the Program Delivery
In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Develop Detailed agile Release approach plan which includes Task Planning, Agile Estimating, User Stories development, Backlog Management (Product & Iteration) Agile Scheduling.

Expectation: Detailed Release strategy.

Work Package [13]: Establish the Quality and Testing approach plan
In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Define which roles, responsibilities and quality of people that would populate the virtual test team (primarily from the Control point of view, but later also specify the SI tester minimum requirements).
- Define how the test people will work across all Firms (PDSF and SI Firm).
- Define Test tools to be used on the DevOps and DevSecOps pipelines.
- Define who is responsible for implementing Test tools (PDSF or SI or both). Make recommendations on the best way of working that minimized time wastage on the Program.
- Describe all the different types of testing, but specifically also consider the User Acceptance Testing in the approach plan.

Expectation: To have QA and Test Strategy Document.

Work Package [14] Develop Data management approach
In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Develop Access to Information Guideline
- Develop data definition and naming conventions
- Develop Data Quality plans
- Develop the Data Modeling guidelines
- Develop Data migration plan

Expectation: To ensure that the Data Management guidelines approach is clearly defined.

Work package [15]: Establish a Business Readiness approach plan
In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Understand the work defined by the Content release Approach Work Package [12].
- Understand the work done by Program Management and release management on timing of rollout.
- Understand the work the FTA Capability building & Change Management team on this approach plan.
- Develop Train the trainers Plans (PDSF) and End User training plans (PDSF), which contains plans on building End User Manuals, training materials and Guidelines on how to use the systems with the aim of minimizing the use of international resources for this work. State what materials and manuals will be developed.
- Define the approach plan ensuring Capability building in the Business is described.
- Propose how local people will be utilized to roll out the broader training in the Approach plan.

Expectation: To ensure that a well-defined approach plan is put forward on how to establish, implement, and rollout capability building including training and end user material to support the new systems across the country.

Work Package [16]: Establish a Change Management Approach plan
In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Work very closely and collaborate with the FTA Change Management team on a Change Management Approach plan.
- Specify the optimal number of change agents in and around the country for the Change Management Approach plan
- Define stakeholder involvement matrix by Understanding who and where all the many stakeholders are and who they need to communicate with during the Program.
- Work very closely and collaborate with the Program Management and release management team on timing of rollout.
- Work very closely with the Business readiness team on change issues.
- Develop a change management plan that contains all Change Management approach plans.

Expectation: To ensure that a well-defined approach plan is put forward on how to establish, implement, and rollout change management and communication to support the TTMS Program.

Work Package [17]: Establish a Business Systems Support approach and a Systems Sustainability approach plan
In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Determine the Business Systems Support Plan with SLAs required of the SI firm.
- Develop a Business Sustainability Plan for the TTMS after the support plan finishes. Understand the future after the Program ends. Costs, Funding, Human Resources for technical support & Communication, etc.

- Study the impact after going live with the TTMS systems of costs of opening a new office that has this IT system, in terms of HR, SW and HW licensing, and equipment EUC & DC, etc. Given the inputs that we now have from the HL Solution architecture.
- NOTE: Consider the Federated/Regional political nature in terms of the budgeting for Transport in this sustainability study. How does the federal government best fund and sustain a TTMS into the future? Offer recommendations to make this most sustainable, both from an international best practice point of view as well as a local Ethiopian perspective.

Expectation: To have an SLA plan and a Business Sustainability strategy from the end of the Program, years of maintenance and support, as well as options for sustainability thereafter, such that management can take the best most informed decisions before proceeding with P2.

Work Package [18]: Update and refine all Enterprise Architecture Models

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Understand the existing set of EA Repository Models.
- Migrate all Models from ArchiToolset into new EA Toolset.
- Capture all other Work Packages Architectures into the Enterprise Architecture Models (e.g. requirements, Capabilities, processes, WAN/LAN, Data Centres, Power, Applications, all Approaches, Roadmaps, Business, Releases, all Security, etc.)
- Model a Road map of the Release Approach plan chosen in the work package.
- Ensure that any new discoveries at all Architectural levels are modified and updated in the EA Repository.
- Ensure integration between the Enterprise Architecture Models and the Solution Architecture models for each Component are well defined and traceability exists between them.

Expectation: To ensure that the Enterprise Architecture v2.0 is stable enough to reflect the FTA inventory and Need of technology, data, applications, and business artefacts and to show the relationships between these components

Work Package [19]: Provide technical Support during Procurement processes for selection of a Systems Integrator (SI) Implementation Firm

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Prepare the bidding document to on board the SI
- Participate in the pre-bid conferences.
- Answer all Clarification questions from respondents.
- Support the tender by giving technical assistance during evaluation and negotiation during contract award
- Support Client in Identifying potential risks and challenges in relation to procurement & recommend mitigation measures.

Expectation: To ensure that qualified firm which will supply services in Top quality, Good price and minimum risk will be hired.

3.2. Phase 2: Final Detailed Design and Implementation Supervision - Lump-Sum Assignment

Up on successful implementation of phase I, Phase II assignment will be commenced. This phase is planned for the PDSF and SI to work together Agilely. The PDSF firm is responsible for final detailed Design and Supervision of the implementation.

Work Package [20]: Design and Supervise the Implementation of the Rn Production Hardware and Network

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Refining and agreeing with SI and Client the detailed architecture designs for WAN, LAN, DC, Power covering all aspects of the ICT and i.e. the data center(server room, air -conditioning, UPS, fire suppression systems, under floor cabling, racks, patch panels, etc), servers/virtualizations, network equipment (switches, routers, hubs), security (firewall, etc) desktops/virtual desktops, printers/scanners/copiers, PABX and voice mail system, etc.
- Supervises the sizing and implementation of ICT infrastructure.
- Oversee hardware, acquisition and installation for Servers, Storage, networking equipment, EUC, etc.
- Oversee hardening and security testing ready for live implementation.
- This Production go-live date would coincide with or be completed earlier than the Software Component Run Application go-live date.

Expectation: Ideal Outcome (Plan A) would be that by the time the Software Component Rn is ready to go into production, that all the necessary Production Hardware for that subset of the Rollout would be ready, so that it could be used actively and securely by the end users in a live situation. Should this not be possible in the given timeframes, the Plan B, would be to still release the Software Component Rn, but in a trial manner (not used Live or with for real data) to that subset of the End Users, so that they could learn and play with the real system and get experience with it, until the production Environment becomes ready at some later date.

Work Package [21]: Refine the Requirement of each applications systems where necessary.

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- In this Work Package, bringing together output from all the Data Centre, Power Rollout and Network Extensibility strategies, the Software Location Rollout, the Software Functional Release; This will be done Iteratively
- Change Management ensures communication throughout the Work Package to all involved in the Program.
- Project Manage / Scrum and Control the team direction, priorities and remove blockers.
- Product Owners define Requirements: Build User Stories for the set of requirements / functionality to be delivered in DEV.
- SI team develops/implements/customizes/configures the systems as applicable
- The release is promoted into UAT (by SI DevOps team) based on the set of requirements / functionality to be delivered. (Front End and backend)
- PDSF Testers with Product Owners do UA Testing to prove the quality of the release. Once all 100% complited.
- All Release Managed by the PDSF Release Manager
- The release is promoted into STAGE (by SI DevOps team)
- The release is promoted into PROD (by SI DevOps team)
- Business Readiness Team do Capability building and Training as per their plan.

Expectation: Refined Requirement specification.

Work Package [22]: Define Final Detailed Solution Architectures per Application System from Enterprise Architecture

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Define the Detailed Solution Architecture per Software Component and all micro services.
- Align this with the Hardware needed to support this in collaboration with the SI team.

Expectation: Solution Architecture Documents, produced (as living and continuously evolving documents) describing the overall Solution Architecture of each Application Component.

Work Package [23]: Supervise and Monitor the development

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Prepare a detail release plan with SI firm.
- Prepare detail test plan.
- Supervise all development or configuration (if COTS)

Work Package [24]: Full QA vetting per release.

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Software Release Component Static Reporting (Design review, documents, Code Inspection, Data Verification)
- Software Release Component Full Functional Testing (GUI, API, Core functional)
- Software Release Component Full Performance QA per release (Load, Stress, Volume, Capacity)
- Software Release Component Security QA per release (Env-Physical/Access, Sec Code Check, Authentication, , Penetration Testing)
- Supervise the planning, Preparing & execution of the User Acceptance Testing, tracing the functional requirements before the rollout.
- Perform integration testing.

Expectation: Complete QA done and approved.

Work Package [25]: Ensure the EUC is installed and operational per release

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Rollout Software Release Component Regionally
- At the same time install all the EUC and ensure it functions correctly with the Software

Expectation: Ensure all End User Computing equipment is installed and operates correctly with the new systems.

Work Package [26]: Implement the necessary Business readiness and training

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Report on Admin & End User Training
- Ensure the Data digitization and migration is done appropriately.
- Business Readiness Team do Capability building and Training as per their plan
- All Release Managed by the PCF Release Manager
- Business Readiness Team shall identify training needs of both business and technical personnel and provide training as per their plan

Expectation: Ensure all resources are in place and know how to operate the new systems.

Work Package [27]: Release the Functionality as per Rollout approach plan into PRO

In this Work Package the consultant is expected to cover (but not limited to) the following activities:

- Change Management ensures communication throughout the Work Package to all involved in the Program.
- Team Leader to Control the team direction, priorities and remove blockers.
- Infrastructure Architects oversee detailed designs
- SI team do the rest
- PCF Testers with Product Owners do Technical Testing to prove the quality of the network and hardware release. Once all 100%...
- All Release Managed by the PCF Release Manager
- Business Readiness Team do hardware engineers and operations people Capability building and Training as per their plan;

Expectation: An implemented, working rollout of hardware and networks ahead of the Software Rollout per Region.

4. Reporting Requirements and Time Schedule for Deliverables and Payment

4.1. Phase 1

4.1.1.Deliverables & Schedule (Proposed)

This includes all deliverables that will be presented for approval and payment during Phase 1.

#	Task	Deliverable	Time (T)(starting from project start date)
1 .	Preparation	• Inception Report	T+ 21 days (draft) T+31days (approved)
2.	Requirements Definition, guidelines and policy development (WP 02, 03,04, 08,11,18)	• DL, VR, PM, AM ,OR & HD Business Functional & Business Non-Functional requirements	T+ 30 days (draft) T+45days (approved)
		• Access to Information Manual	
		• Security Policy and Guideline	
		• Data Centre Requirements	
		• WAN / LAN Requirements	
		• Security requirement	
		• Power Requirements	
3.	Discover & Propose Solutions Options (WP 02,03,04,05,06,09,10)	• Power usage options	T+ 60 days (draft) T+90days (approved)
		• Data Centre usage options	
		• End User Computing Equipment options	
		• WAN/LAN options	
		• Application & DC Solution Distribution options	
		• Application buy vs Build options (Split between DL, VR, AM, PM,OR & HD)	
		• VR Inspection Integration discovery & solution options	
		• DL School system discovery & solution options	
4.	Solution Architecture (Detail Design) (WP 05,07,09,10,11)	• WAN / LAN Design	T+ 120 days (draft) T+150days (approved)
		• DC Architecture (Design)	
		• IT Infrastructure (Compute, Storage, , network design, etc)	
		• Power Solution Design	
		• DL and DL School System Design	
		• VR and Inspection System Design	
		• PM System Design including Mobile and Web portals	
		• AM System Design including Mobile and Web portals	

#	Task	Deliverable	Time (T)(starting from project start date)
		• OR System design	
		• Security Architecture design across all architecture domains (Business, Application, Data, ICT, Physical), including software IAM, Single Sign-on, etc.	
		• Language design	
		• Help desk design	
		• Party Design	
		• Location Design	
		• Data Integration including API Design	
		• Portal Front End and UX Design	
		• EUC Hardware specification (Web cam, Mobile, Ins. Van, Etc.)	
		• Business continuity and disaster recovery plan	
5.	Define Implementation Approach (P2) (WP 01,12,13,14,15,16 ,17)	• Business Readiness Approach	T+ 120 days (draft) T+150 days (approved)
		• Change Management Approach	
		• Quality and Testing Approach	
		• Business Sustainability Model	
		• Data management approach	
		• Proposed Program Plan for P2	
		• Release Rollout Approach	
6.	Refine Enterprise Architecture (WP 18)	• EA Repository Model • To-Be Enterprise Architecture	T+135 days (draft) T+150 days (approved)
7.	Bidding document (WP 19)	• Bidding Documents consisting: Final Bidding Documents including complete functional and technical specifications	T+180 days (draft) T+210 days (approved)
8.	Provide Technical Procurement Support (WP 19)	• Providing technical support during selection Process	T+330 days(Four months is taken for SI selection process)

4.1.2. Reporting requirements and Deliverable Formats

This table lists all the reporting requirements and deliverables with the requirement that there will always be a soft copy delivered for each report or deliverable at both the Draft Final stage as well as the Approved copy stage. In the table below, specific hard copies numbers are shown. These are to be printed and bound for submission.

Reporting requirements and Deliverables			Hard Copies	
#	Type of Deliverable	Description	Draft Final Copies	Approved Copies
1	Inception report	The inception report containing Approach. Methodology including Change Control Mechanism, work plan, Schedule for the project activity and Schedule of deliverables, team structure and staffing arrangement.	• 15 hard copies • 1 CD copy	• 15 hard copies • 1 CD copy
2.	Progress Reports	The report shall indicate the status of the projects, the challenges which needs the clients attention, problems which needs to be solved etc	• 3 hard copies	0
3	1st Interim reports			
3.1	Requirement Analysis Report	The report shall contain expected outputs of all detailed requirements refined from the existing EA. Consider the 5 perspectives, Business, Application, Data, ICT and physical as below: DL, VR, PM, AM ,OR & HD Business Functional & Business Non-Functional requirements ICT infrastructure requirement (Data Centre, WAN, LAN and Power)	• 15 hard copies • 1 CD copy	15 hard copies 1 CD copy
3.2	Policy & Guideline documents	Security Policy and Guidelines Access to Information Manual	• 15 hard copies • 1 CD copy	• 15 hard copies 1 CD copy
4.	2nd Interim reports			
4.1	Detailed Solution Options analyses report	The report shall contain expected outputs of (All ICT, Application, and others • Power usage options • Data Centre usage options • End User Computing Equipment options	• 15 hard copies • 1 CD copy	15 hard copies 1 CD copies

Reporting requirements and Deliverables			Hard Copies	
			Draft Final	Approved Copies
		• WAN/LAN options • Application & DC Solution Distribution options • Application buy vs Build options (Split between DL, VR, AM, PM,OR & HD) • VR Inspection Integration discovery & solution options • DL School system discovery & solution options		
5	3rd interim report			
5.1	Solution Architecture (Detailed System Design) document	The report shall contain expected outputs of • WAN Design • LAN Design • DC Architecture (Design) • IT Infrastructure (Compute, Storage, , network design, etc) • Power Solution Design • DL and DL School System Design • VR and Inspection System Design • PM System Design including Mobile and Web portals • OR System design • AM System Design including Mobile and Web portals • Transport entities licensing system design • Security Architecture detailed design across all architecture domains (Business, Application, Data, ICT, Physical), including software IAM, Single Sign-on, etc. • Language design, Help desk design, Party Design, Location Design • Data Integration including API Design • Portal Front End and UX Design • EUC Hardware specification (Web cam, Mobile, Ins. Van, Etc.)	• 15 hard copies • 1 CD copy	• 15 hard copies • 1 CD copy
5.2	Implementation approach for P2 documents	These documents are to propose the Phase 2 implementation approach Business Readiness Approach Change Management Approach Quality and Testing Approach Business Sustainability Model	• 15 hard copies 1 CD copy	• 15 hard copies 1 CD copy

Reporting requirements and Deliverables			Hard Copies	
			Draft Final	Approved Copies
		Release Rollout Approach Data management approach Proposed Program Plan for P2		
5.3	Enterprise Architecture	These deliverables are to formalize the To-Be Enterprise Architecture for Phase 2. EA Repository Models To-Be EA Document	 0 3	 0 15
6	4th interim report			
6.1	Approved Biding Documents	Bid document	For each 1 hard copy 1 CD copy	6 hard copy 1 CD copy
7.	Final reports	These are the formal deliverables to close out the engagement for Phase 1.		
	Procurement process support reports:			
		Bid evaluation report Consultant completion report	3 hard and 1 CD copy	3 hard and 1 CD copy

4.1.3 Payment schedule

PDSF - Phase 1 Milestones& Payment			
Task	**Milestones for deliverable**	**Date**	**Payment %**
Inception	Approved Inception Report	31	5%
1st Interim reports	Approved Requirement, Guidelines and Policy	45	10 %
2nd Interim report	Approved Solution Option	90	10%
3rd Interim report	Approved Solution Architecture Approved implementation Approach Approved EA Repository and Report	150	35 %
4th Interim report	Approved Biding Document	210	25%
Final Report	Bid Support (Question, Conf, Eval, Other) Completion Report	330	15 %

4.2. Phase II

4.2.1.Deliverables & Schedule

This includes all deliverables that will be presented for approval and payment during Phase II.

NO	Task	Deliverable and description	Time (T) (starting from Project start date)
1.	Rollout planning	• Refined Rollout plan (a rollout plan which is refined and agreed with the implementer)	TBD
2.	Equipment supply (WP 20)	• QA Correct Equipment Report (a report which assures the delivery of equipment as per the bill of quantity and specifications)	TBD
3.1	Power Implementation (WP 20)	• Power Final Detailed Design Document • Installation report: (a report which assures the proper implementation of the Power Solution after the installation is completed)	TBD
3.2	WAN and LAN Implementation (WP 20)	• WAN and LAN Final Detailed Design Document • Installation report: (a report which assures the proper implementation of WAN and LAN after the installation is completed)	TBD
4	Data Centre implementation (WP 20)	• Data Centre Final Detailed Design Document • Installation report: (a report which assures the proper implementation of Data Center and ICT Infrastructure after the implementation is completed)	TBD
5.1	Software (per Release Component) into TEST Env (WPs 21,22,23,24)	• S/W Release Component Configuration & Admin Manuals • S/W Release Component Final Detailed Design Document • S/W Release Component QA/Test TEST Env Report: (a report which assures proper implementation of the QA/Test)	TBD
5.2	EUC (WPs 20, 25)	• End User Computing QA Report: (a report which assures the proper installation of EUC)	TBD
5.3	Software (per release Component) into PROD Env . (WPs 21,24,26,27)	• S/W Release Component QA/Test PROD Env Report • Business readiness report for the operation of the new systems. • S/W Release Component Installation report • S/W Release Component PROD report	TBD
6.	**Project Implementation and Supervision**	• **Monthly Contract Performance and Management Reports** using PMIS/ Project Management IT tools for each contract during entire program period. • **Contract Completion Reports** for each project package. • **Quarterly and Yearly Progress Reports**	From the date of the commencement of the implementer to 2.5 Years

KEY EXPERTS	
#	**Position**
K1	Program Manager
K2	Enterprise Architect
K3	Security Architect
K4	Infrastructure Architect (ICT)
K5	Infrastructure Architect (DC)
K6	Team Leader (ICT)
K7	Team Leader (Accident Management &Penalty Management)
K8	Team Leader (DL&VR)
K9	Team Leader (Security, Language, Helpdesk, Party, Location)
K10	Business Readiness Manager
K11	Release Manager
K12	Quality /Test Manager
K13	Solution Architect (SLHPL)
K14	Solution Architect (DL&VR)
K15	Solution Architect (AM&PM)
K16	Change Manager

NON KEY EXPERTS	
S. No.	**Role**
NK1	Business Operations Consultant
NK2	Information Expert
NK3	Business Analyst (Driver Licensing & Vehicle Registration)
NK4	Business Analyst (AM&PM)
NK5	Business Analyst (SLHPL)
NK6	Driver Testing and Licensing Specialist
NK7	Vehicle Registration Specialist
NK8	Road traffic safety specialist
NK9	Electrical Engineer (Power)
NK10	Tester (DL/VR)
NK11	Tester (AM/PM)
NK12	Tester (SHLPL)
NK13	Tester (ICT)