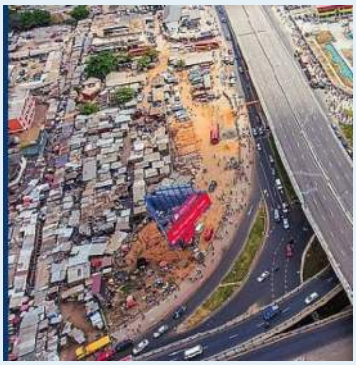
GTPF
Ghana Transportation Professionals Forum

50TH ANNIVERSARY

GHANA INSTITUTION OF ENGINEERING (GhIE)

Summary & Recommendations

GHANA INFRASTRUCTURE CONFERENCE 2018








"Enhancing Transportation Infrastructure for Accelerated Socio-Economic Development"

Holiday Inn, Accra, Ghana | 6th - 8th August, 2018

Regional Transport Research & Education Centre Kumasi -TRECK
KWAME NKRUMAH UNIVERSITY OF SCIENCE &TECHNOLOGY

THE REPULIC OF GHANA
MINISTRY OF ROAD AND HIGHWAYS

CONFERENCE COMMUNIQUE

GIC-2018

Conference on

"Enhancing Transportation Infrastructure for Accelerated Socio-Economic Development"

Organised by

GTPF

Ghana Transportation Professionals Forum

Regional Transport Research & Education Centre Kumasi -TRECK
KWAME NKRUMAH UNIVERSITY OF SCIENCE &TECHNOLOGY

GHANA INSTITUTION OF ENGINEERING

in Collaboration with the

THE REPUBLIC OF GHANA
MINISTRY OF ROADS AND HIGHWAYS

GUEST OF HONOUR: Hon. Yaw Osafo-Maafo
CHAIRMAN: Hon. Kwasi Amoako-Atta
KEYNOTE SPEAKER: Prof. Adjo A. Amekudzi-Kennedy, USA
OTHER SPECIAL GUESTS: Hon. Cecilia Dapaah,
Hon. Joe Ghartey,
Hon. Kweku Ofori Asiamah

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  - Godfrey Mills
  - Sabastian Salia Yiah
  - Samuel Labi
  - Stephanie Amoaning-Yankson
  - Sylvester Mensah

1ST GHANA INFRASTRUCTURE CONFERENCE-2018

SPEAKERS:

- **Special Guest:** Hon. Yaw Osafo-Maafo- *Senior Minister*
- **Keynote Speaker:** Prof. Adjo Amekudzi-Kennedy- *Professor, Georgia Institute of Technology, USA*
- **Chairman:** Hon. Kwasi Amoako-Atta- *Minister for Roads and Highways*

Other Speakers:

- Hon. Cecilia Dapaah- *Minister for Aviation*
- Hon. Joe Ghartey- *Minister for Railway Development*
- Hon. Kweku Ofori Asiamah- *Minister for Transportation*

THEMATIC AREAS INCLUDED:

- Infrastructure: planning, Design Construction, Maintenance & Asset Management, Materials
- Traffic Operations & Planning
- Innovation & Technology
- Governance Ethics and Finance

11 Presentation Sessions

35 Presentations

2 Workshops and Discussions

1 Networking Dinner

2 **Launches**:

- Infrastructure Report Card
- Regional Transport Research & Education Centre Kumasi (TRECK)

GTPF Ghana Transportation Professionals Forum

Regional Transport Research & Education Centre Kumasi -TRECK
KWAME NKRUMAH UNIVERSITY OF SCIENCE &TECHNOLOGY

Ghana Institution of Engineering

MINISTRY OF TRANSPORT Republic of Ghana

THE REPUBLIC OF GHANA MINISTRY OF ROADS AND HIGHWAYS

MINISTRY OF AVIATION Republic of Ghana

MINISTRY OF RAILWAY DEVELOPMENT REPUBLIC OF GHANA

2018 Ghana Infrastructure Conference: Summary of Key Issues and Recommendations

Executive Summary

The 2018 Ghana Infrastructure Conference (GIC), held in Accra on 6th -8th August 2018, was co-organized by the Ghana Transportation Professionals Forum (GTPF), the Regional Transport Research and Education Centre, Kumasi (TRECK) of Kwame Nkrumah University of Science and Technology, and the Ministry of Roads and Highways. GIC-2018 offered an opportunity for government officials, professional organizations, research agencies, and the public to engage in dialogue, deliberation, and learning on ways to address Ghana's infrastructure challenges with emphasis on the transportation sector. This is a summary of key issues identified and policy recommendations. The nine interrelated topical areas of summary and recommendations are herein grouped into two categories as follows:

I. Infrastructure Resource Development & Organization

1. There exists an urgent need for fundamental changes in attitude and behavior in terms of ethical conduct, to help address rampant corruption
2. Professional collaboration is key to identification of workable solutions to problems and challenges
3. Potential solutions need to be tested and refined before widescale adoption
4. New, tested solutions and practices should be encoded as standards in manuals and guides for consistency in implementation

II. Improving Quality of Life and the Economy

1. Recognizing the need for fundamental change in addressing problems, there ~~is the~~ exists a need to re-envision the physical character and priorities for urban transportation development in Ghana
2. Nevertheless, implementation of any envisioned changes will require augmentation of existing infrastructure-finance structures
3. A need exists to facilitate engagement between decision-makers and professionals, in order to prioritize solutions
4. There is urgent need to address short-term issues (such as traffic congestion and traffic safety) that threaten the country's economic progress
5. It is prudent to retain and train young professionals to carry forward the changes to be put in place.

Summary and Recommendations

Table 1 provides an abbreviated outline of topics; it serves as a quick index of contents. Table 2 presents additional details on the key issues and areas of recommendation.

Table 1: Quick Reference Table of Topics and Recommendations

Order	Topic	Issue/Problem	Recommendation
	I. Infrastructure Resource Development & Organization		
1	Ethical Conduct	Limited ethics and rampant corruption	1.There is a need for fundamental change in attitude and behavior in terms of ethical conduct, to help address rampant corruption
2	Research Collaboration	Insufficient collaboration among professional groups	2. Professional collaboration is key to identification of workable solutions to problems and challenges
3	Research Implementation	Limited use of research products	3. Potential solutions need to be tested and refined before recommendations for widescale adoption
4	Development of Design Guides	Inconsistency in designs	4. New, tested solutions and practices should be encoded as standards in manuals and guides for consistency in implementation.
	II. Improving Quality of Life and the Economy		
5	Envisioning Urban Areas	Transportation and land use challenges	1. Recognizing the need for fundamental change in addressing problems, there is the need to re-envision the physical character and priorities for urban transportation in Ghana
6	Finance	Ineffective financing of infrastructure	2. Implementation of any envisioned changes will require augmentation of existing infrastructure finance structures
7	Engagement	Limited engagement of professionals and politicians	3. Fluid engagement between decision-makers and professionals is necessary in prioritizing solutions
8	Mobility & Safety	Traffic congestion in capital cities	4. There is urgent need to address short-term issues (such as traffic congestion and traffic safety) that threaten the country's economic progress
9	Retention	Limited opportunities for young professionals	5. It is prudent to retain and train young professionals to carry forward the changes to be put in place.

Table 2: Descriptions of Key Issues and Recommendations

Problem & Issues and Impacts	Solution	GTPF Input	Input from Ghana
Corruption and ethical issues are a big challenge for practicing engineers. Corruption has pervaded all areas of national life, including ~~is~~ the engineering profession, as construction, supervision and inspection are carried out by engineers and contractors • **Shortcuts during infrastructure construction lead to shorter life span of facilities and increased safety risk of facility users** **Inaction by professionals on ethical issues for fear of retribution including abrogation of contracts, job loss or unwanted locational transfers**	GhIE needs to take the lead on this • Enforce the GhIE Code of Ethics • Code of Ethics developed 25 years ago, but still not on GhIE website • Most engineers are not aware they can report un-ethical incidents to GhIE When they report there is not clear written policy on what GhIE will do	GTPF will provide guidelines on incorporating ethics in the education and training of engineers.	GhIE should include Ethics in the Professional Engineering Exams and as part of exam for engineering license renewals GhIE should have clear policies on handling of reported ethical complaints and penalties for engineers found to engage in unethical conduct

Problem & Issues and Impacts	Solution	GTPF Input	Input from Ghana
Key institutions with common interests do not work closely together (GhIE, TRECK, KNUST, BRRI, GTPF)	Institutions need to work together more closely Use conferences such as GIC to provide awareness of initiatives and activities, and collaboration opportunities Include other relevant institutions such as BRRI in the next GIC conference	GTPF is building a database of Ghanaian transportation professionals in North America that GhIE, the Ministries and the Government can tap into for subject matter experts when needed GTPF is signing MoU to support TRECK and GhIE going forward GTPF members that own companies in the US have expressed willingness to work on projects in Ghana GTPF can facilitate collaborative research between professors overseas and those in Ghana GTPF organizes quarterly educational webinars and Ghanaian members can attend	GhIE should require members to maintain on-going Professional Development Hours as part of Engineering certification maintenance

Problem & Issues and Impacts	Solution	GTPF Input	Input from Ghana
Limited use of research reports amid tremendous transportation challenges	Research should target immediate and long-term solutions to challenges facing the country. Solutions should be tested with small scale demonstration projects and refined for adoption. Publicize proven solutions for wide deployment. Then integrate proven research solutions into Manuals, Codes and Standards so they can be implemented in practice. Similar to how the Highway Capacity Manual Committee was created to conduct research that continually updates the Highway Capacity Manual	GTPF to collaborate with GhIE, TRECK, BRRI to test, evaluate and vet research solutions	GhIE, TRECK, BRRI to collaborate with GTPF to test, evaluate and vet research solutions and the development of manuals Research agencies like TRECK and BRRI to build testing and demonstration into their funded research projects The transport sectors to budget dedicated resources for testing, demonstrations and development of guides and manuals.

Problem & Issues and Impacts	Solution	GTPF Input	Input from Ghana
Lack of readily available consistent design guides and manuals for practicing Engineers and Contractors. • **Leads to different facilities being designed to different standards** • **Current specifications either non-existent or outdated** • **No consistent guidelines for quality control and assurance needed; affects engineers' ability to supervise projects**	Develop a national design guide and standards for both transportation and other engineering disciplines that unifies appropriate standards to which all contractors, foreign and local must adhere	GTPF to collaborate with GhIE, TRECK, BRRI to develop manuals and standards for professional practice	Areas within the transport sector need to proactively support development of respective guides and manuals with dedication of resources, clear objectives and outcomes, and product expectations.

Problem & Issues and Impacts	Solution	GTPF Input	Input from Ghana
Rapid urbanization, uncontrolled development in the form of urban sprawl, and intensification of motorization pose challenges to urban transportation and quality of life • **Planning seems to lag behind the pace of development** **Public transport choices are no longer appropriate for the sizes of metropolitan areas**	To prevent metropolitan mobility from grinding to a very slow pace, a comprehensive vision for integrated physical development and transportation, is needed. Therefore, need to address: (a) the character of urban development with densification of urban areas to shorten or eliminate trips and support efficient delivery of urban public transportation; and (b) urban transportation options in the form of feasible, sustainable, and affordable mass urban transportation. Need to prioritize low-cost public transport options like bus rapid transit (BRT) and non-motorized modes like walking and biking as well as shared mobility like carpools, vanpool, taxi, care-share, and bike-share.	GTPF to collaborate with GhIE, TRECK, BRRI, Ghana Institute of Planners to lead the development of master visions to change character of development and to establish transportation priorities in metropolitan areas	Ministries in charge of transportation, agencies providing transport services, and metropolitan assemblies to seek public input in the development of long-term vision for future development and prioritization of transport options to support these visions. Visions to target: (a) re-zoning key corridors for densification; (b) establishing major activity centers along key corridors; (c) establishing high-capacity transit along key corridors with connections to surrounding areas.

Problem & Issues and Impacts	Solution	GTPF Input	Input from Ghana
Ineffectiveness of transport infrastructure finance. • **"Ghana collects revenue from similar sources as other countries and has institutions in place to direct these funds. So, why does Ghana's transport infrastructure seem to lag so far behind so many other countries?"** **Projects seem to be initiated political expediency instead of the prospective benefits in terms of mobility, safety, and economic development**	"Ghana beyond aid" means greater reliability on local revenue sources, but more importantly prudent and judicious management of revenue streams including prioritization of funds to serve the most critical needs of the country and those likely to yield high economic returns to the nation. Enhancement to transportation finance to include: 1. Expansion in collection and dedication of funds (fuel tax, tolls and parts of VAT and revenues from resource extraction) to specific infrastructure development needs 2. Legislation-backed fund allocation to set and alter priorities over time Fiscal responsibility through ownership, initiation and matching contributions from local governments at the regional or assembly level depending on the scope of the project	GTPF to collaborate with GhIE, TRECK, BRRI to deliberate and advise the national and local governments on assessing and prioritizing funding of needs to yield the most benefits over costs. Such collaboration can also help develop or refine guides and training sessions for local government personnel on project evaluation and prioritization.	Local and national government to proactively seek input and recommendations from professional groups to help in deliberations to develop new legislation and prioritize funding for infrastructure projects.

Problem & Issues and Impacts	Solution	GTPF Input	Input from Ghana
Limited engagement between engineers, who solve the technical issues, and the 2 branches of government (legislature and executive) who initiate and fund projects. • **The government allocates funding and resources to address national issues.** • **Due to lack of engagement from appropriate engineering institutions, some resources may be misallocated.** **An example is the Infrastructure Scorecard, which can foster awareness of infrastructure challenges among the legislative and the executive**	Need for a National Transportation Infrastructure Plan endorsed by GhIE so all political parties can use it as a guide for selecting and evaluating infrastructure investment • This will ensure that the projects embarked direct benefits for the entire transportation system Critical initiatives like the Scorecard needs to be used proactively by GhIE to educate government on the need to allocate resources to transportation and infrastructure development	GTPF can collaborate with BRRI, TRECK, GHA, GhIE to develop the plan • Initial list of transportation challenges identified by KNUST can be a starting point Start data collection for transportation studies	Encourage engineers (especially GhIE) to engage with politicians Encourage engineers to get involved in government and to run for public office.

Problem & Issues and Impacts	Solution	GTPF Input	Input from Ghana
Extreme traffic congestion in Accra • **There is no intervention on managing capacity through traffic operation activities** • **Trotro operating network structure is inefficient and contributes to traffic jams and delay**	Consider entire transportation network when solving traffic issues • Proper design of transit system considering trotro's; dedicated lanes may be introduced where necessary • Toll lanes should be made electronic to reduce queues		

Problem & Issues and Impacts	Solution	GTPF Input	Input from Ghana
Limited opportunity for young graduate engineers. **Many opt to leave the country soon as they graduate**	Develop student interest in the nation's problem-solving process by including them in research, webinars and conferences • Students can be encouraged with the opportunity to network and receive mentorship from professionals (technicians, engineers, researchers) in the field Develop more graduate programs Transportation Engineering Center Kumasi (TRECK) to develop and offer courses applicable to the country	Several GTPF members are leading academics in highly ranked universities in the US and can both assist in designing graduate programs and teach courses (both online and in-person)	Encourage students in the universities and polytechnics to join the GhIE. Start mentorship program. Encourage paid-internship programs as a way to offer field training and temporary jobs to new graduates and offer potential employers' opportunity to assess and groom new graduates for full time employment.

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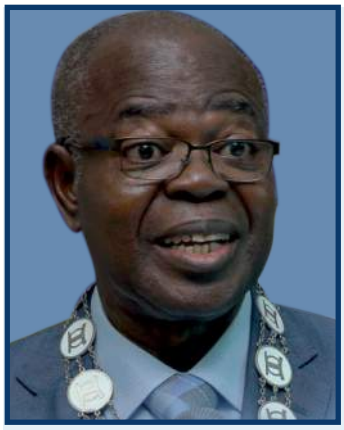


Ing. Steve A. Amoaning-Yankson, FGhIE
GhIE President

The Ghana Institution of Engineering was officially founded in 1968 to succeed the Ghana Group of Professional Engineers, as an autonomous professional body with no political affiliation. The late Ing. Dr. E. Sackey became the first President of the institution.

Mission statement

To develop, promote and sustain sound and competent engineering practice in Ghana comparable to global standards.

Vision

To build and develop a strong world class professional body by promoting integrity, accountability and excellence in the practice of engineering in ghana

The GhIE is the professional body which is responsible For certifying engineering practitioners (Professional Engineers, Professional Engineering Technologists, Engineering Technicians and Engineering Craftsmen) in Ghana.
The GhIE derives its authority from the Professional Bodies Decree NRCD 143, 1973 and the Engineering Council Act, 2011 (Act 819.)

Core objectives

- To establish and maintain a register of Engineering practitioners certified to Practice in Ghana
- To ensure that members of the Ghana Institution of Engineering maintain Professional standards, adhere to regulations, guidelines and codes of ethics of engineering practice.
- To ensure that engineering practice in the country conforms to established technical, environmental and safety Standards.

The head quarters of the GhIE was initially housed in the premises of Water Resources Research Institute. The vision to own a building befitting the status of the GhIE was realised in 1997, when the GhIE became one of the first Professional bodies in Ghana to move into its own building at No.13 Continental Road, Roman Ridge, Accra.

With its secretariat in place, the GhIE expanded its career development in all fields of Engineering, Management, and Education by organizing workshops, seminars, short courses and as a facilitator in research work for its members and the general public.

The GhIE Logo is formed by a perfect circle with a spur gear at the centre that is surrounded by a spider's web. The spur gear is considered a recognizable symbol of engineering whilst the spider's web, which is so slim and wonderfully woven to perform a function, expresses ingenuity and strength, both attributes required in engineering to solve problems of mankind. The GhIE logo also symbolises the unity of all the disciplines of engineering viz Civil, Mechanical, Electrical, Chemical, Agricultural, Marine, Mining, Computer, Biomedical etc The Logo remains relevant in this era of the world wide web which has transformed the practice of engineering.

The GhIE believes that engineering should be the backbone of economic development and progress of our country and that a nation cannot be transformed without a strong indigenous engineering sector.
GhIE is up to its responsibilities to Ghana, recognising that most development problems are essentially engineering related.

GhIE plays a major role to ensure that the standards regulations and guidelines governing engineering practice are strictly enforced and that the institution will not hesitate to investigate cases of unethical behavior and penalise members found to have gone contrary to the GhIE's code of ethics.
GhIE will collaborate with the government to address institutional weaknesses inherent in the engineering sector.

In 1999, Women in Engineering (WINE) were grouped into a unit and charged with the responsibility among other things, of spearheading the crusade to encourage young women to consider engineering as an option. To date, WINE has performed this job creditably.

Presently, members on the roll is about 11,000. This includes, 139 Fellows, Members, Associates, Graduate Members, Affiliates and Technicians.

Ing. Kwabena Agyei Agyepong, OV, FGhIE, M.ASCE
Ag. Executive Director, GhIE

The Ghana Transportation Professionals Forum (GTPF), founded January 2009 in Washington DC, multi-disciplinary professionals with a mission to promote innovation and sustainable developments in transportation infrastructure and related systems. The GTPF believes that its mission is critical to the long-term economic expansion of Ghana and is expressed through the following ideals:

a) Provide research and professional advice in the areas of transportation infrastructure and related systems planning, design, construction, operations, maintenance, security, ethics, environmental protection, and excellence in professional practice.

b) Provide a global platform for public expression and information exchange.

c) Foster creative collaborations with public and private agencies, communities, and academia regarding transportation- related issues.

The Transportation Research Centre, Kumasi (TReCK) is the expansion of the existing Road and Transportation Engineering Programme (RTEP) of the Highway and Transportation section of the Civil Engineering Department, College of Engineering of the Kwame Nkrumah University of Science and Technology. RTEP was established in 2004, with the support of the Ministry of Roads and Highways (MRH) and financed by World Bank. Since its establishment, over 200 professionals have either completed Masters level courses or attended short courses relevant to their practice with about 10% of the trained postgraduates being drawn from countries in the West African sub-region including Liberia, Niger and Burkina Faso.

With a track record of over a decade of capacity building and applied research for the roads and transportation sectors in Ghana, the RTEP is now restructured and reconstituted into a multi-disciplinary and interdisciplinary center of excellence for the Sub region (TReCK) with an expanded scope of applied research and capacity building and training activities and extension of knowledge to cover the broader field of transport systems land (i.e. road and railway), air, and water transport.

The Transportation Research Centre Kumasi is committed to improving the transportation system in Ghana and West Africa by:

a) Conducting interdisciplinary research to develop, support and complement the relevant national transportation plans and strategic directions

b) Collaborating with fellow national and international researchers for knowledge sharing and advancement

c) Acting as a transport and road safety resource and training center

d) Acting as a center for the promotion of coordination, integration and growth of all modes of transportation

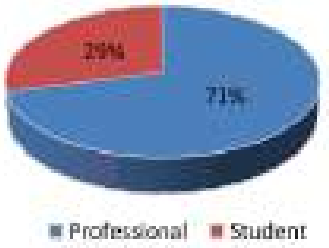
e) Establishing data repository and supporting national and regional policies with data led strategies

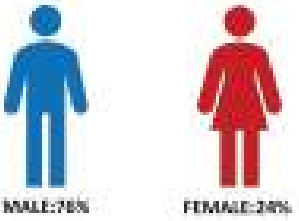
f) Training high caliber transportation professionals and academics with world class expertise to transform the systems in Ghana and Africa.

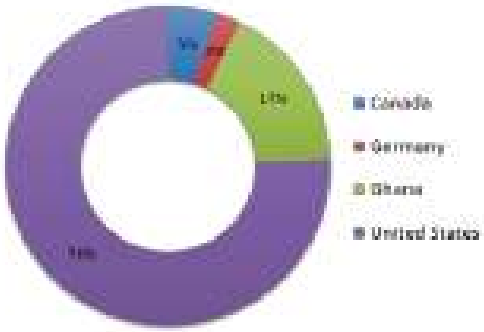
Ghana Transportation Professionals Forum of North America (GTPF) is a private, non-profit group of multi-disciplinary professionals with a mission to promote innovation and sustainable developments in transportation infrastructure and related systems through research, professional practice, and outreach. In these respects, the overall purpose of our organization is to promote research related to transportation planning, design, construction, operations, and maintenance of Ghana's transportation infrastructure.

GTPF members at the 2018 Annual meeting in Washington, D.C.

Our members fall into two groups: Ghanaian students engaged in transportation-related studies and Ghanaian transportation professionals including engineers, planners, professors and researchers. GTPF can boast of over 100 membership from across the world. As of June 2018, about 50 percent members had provided their detail information and biography. If you have interest in joining this organization, please visit our website at http://gtpf.org







H.P. Gauff Ingenieure GmbH & Co. KG – JBG – is the principal firm of the Gauff Consultants group of companies. Since it was founded, the company has consistently evolved within the infrastructure and structural engineering planning sector. Gauff Ingenieure – JBG – focuses on the supply of water and sewerage, road construction, building planning, and architecture. Within our business segments, we also provide services in the areas of construction engineering, line mechanics, hydraulics, hydrology, as well as surveying and geographic information systems (GIS).

In over 100 countries, the companies of Gauff Consultants stand for a high level of expertise, German efficiency and reliable partnership. Since the formation of the engineering office of Gauff in 1958 our international companies have successfully completed more than 40,000 extremely demanding consultancy and infrastructure projects. Today, JBG Gauff Ingenieure is considered as a Top 200 International Design Firm, according to the ENR- Engineering News-Record. Our umbrella brand, Gauff Consultants, comprises a multitude of domestic and foreign companies.

The expertise of our more than 600 employees – 260 of them located in Germany – helps to carry out projects in the disciplines of water and sewage, transport, roads and rail, mobility and IT solutions, environment and energy, urban planning and architecture. With our more than 25 representations worldwide, we are a reliable partner for local and international donor organisations as well as for the public sector and for private investors.

Since the the incorporation of “Ingenieurbüro Gauff” in 1958, the legal predecessor of “H.P. Gauff Ingenieure GmbH & Co. KG -JBG-” , to this day far more than 40,000 consulting and infrastructure projects have been completed successfully. We are valued as a reliable partner by Public authorities (federal, state, and local authorities), National and multinational donor organisations (KfW Development Bank, World Bank, African Development Bank, Asian Development Bank, European Investment Bank, etc.) and Private investors.

The knowledge, experience, and expertise of our more than 600 employees help the companies of Gauff Consultants to carry out projects in the most varied disciplines. Our range of services include Water and sewage, Transport, rail and road, Urban and structural engineering and infrastructure planning, Constructive civil engineering, Mobility consulting and IT solutions and Environmental protection and energy technology.

Thanks to our extensive, cross-segment range of services, we are able to offer and implement interdisciplinary solutions. Further advantages are, Almost 50 years of experience abroad – in Europe, Asia, Africa, North and South America and 25 permanent branches across the world with 100 project countries.

This unique selling point – our “German expertise” – makes the companies of Gauff Consultants the number one choice among project partners for the realisation of your infrastructure projects around the globe.

PTV GROUP
the mind of movement

PTV Planung Transport Verkehr AG is a German company specialising in software solutions and consulting services for traffic and transportation, mobility, and logistics. The company is divided into the following three business fields: Traffic Software (transportation planning, transport models, traffic simulation, public transport), Transport Consulting (transport planning and traffic engineering, traffic management, public transport, integrated transport concepts for sustainable mobility) and Logistics Software (planning and optimisation of transports and sales structures, software for route and trip planning, geomanagement, geomarketing, visualisation on digital maps). Over 2,000 customers in more than 90 countries use the Vision Traffic Suite in the fields of transport modelling and traffic flow calculation. PTV is ranked among the top 1,000 global market leaders in Germany The German company PTV Planung Transport Verkehr AG is a member of PTV Group.

Our Headquarters, located in the heart of the Karlsruhe technology region, house our centre of development and innovation. We have made ourselves a name as a successful B2B market vendor on growth track. Our expertise in every facet of mobility is unique worldwide. We ensure that people and goods arrive at their destinations on time and safe and sound, whilst conserving resources and decreasing environmental impact. We are trusted by customers from over 120 countries worldwide. More than 2,500 cities deploy our products. Tours for over one million vehicles are planned with our software. The European transport model, which encompasses all passenger transport and freight movements in Europe, is developed using PTV software. We currently have around 650 colleagues worldwide committed to driving the high performance of our products. Over the years, we have created a unique global network. Since its foundation as a spin-off of the KIT (Karlsruhe Institute of Technology), PTV has promoted exchange of knowledge, especially with the academic world.

Our software products:

- PTV Visum -Strategic traffic & transport lanning
- PTV Vissim -Multimodal traffic simulation & traffic engineering
- PTV Viswalk -Pedestrian simulation
- PTV Vistad/Euska -Road safety, accident analysis
- PTV Vistro -Traffic analysis & signal optimization
- PTV Optima-Real time traffic management, traffic forecasts
- PTV Balance-Traffic-adaptive control system
- PTV Epics-Traffic-adaptive signal
- PTV Map&Guide-Transport route optimization
- PTV Drive&Arrive-Real time information on time of arrival
- PTV Smartour -Trip planning & transport optimization
- PTV Map&Market -Field force optimization, territory & location planning
- PTV Navigator -Navigation and routing
- PTV xServer -Embeddable software componen