Panel 1: The pan African Rail networks from vision to implementation

• Moderator: Ms. Heather Thompson, CEO, ITDP

• Mr. Mohamed Khlie, Director General, ONCF, Chairman of UIC Africa, UIC Vice Chairman

• Mr Younes Touitha, on Behalf of Dr. Towela Nyirenda-Jere, Head of Economic Integration Division, AUDA-NEPAD

• Mr. Wolfgang Küpper, Secretary General, OTIF

• Mr. Ayman Masoud Abdel Aziem, Director of the Risk Assessment Department, ENR
UIC Symposium

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Mr. Mohamed Khlie, Director General, ONCF, Chairman of UIC Africa, UIC Vice Chairman
Africa, dynamics and mobility factors

A remarkable evolution of mobility factors
- Population clock: record growth
- A growing middle class
- Accelerated urbanization
- An economic reversal from 1995

A socio-economic framework undergoing major changes for two decades
- Productive sectors in transformation
- Attractiveness hampered by external constraints
- Low weight in international trade
- ZLECA, a geostrategic project

- 16.6% Of global Population
- 25% Middle class / total population
- 43% Urbanization rate (2018)
- +40% GDP growth Per inhabitant
- 1.2 Exchanges / year Period 200-2019
- 47% Global mineral wealth reserves
Africa, a transport sector to develop

- **The road, a large predominance: 90% of the traffic**
  - Sectoral and unilateral policy
  - Budget constraints
  - Planning difficulties

- **Ports provide 95% of import-export goods flows**
  - Coordination and harmonization deficit
  - Lack of adequate legal instruments
  - Lack of experience and expertise...

- **Air transport, a strong weakness to external changes**

- **Railways, a known underinvestment**

- **−40%** Value of the annual loss of African GDP due to the transport deficit

- **2 à 4** GDP points / year the cost of the infrastructure deficit in Africa

- **6 à 6,8%** Annual increase in transport demand

- **30 à 40%** of the value of imported products corresponds to the cost of transport in Africa

- **+2 à 4** times, logistics costs in sub-Saharan Africa than in other emerging countries
Africa, the revitalization of the railways is imperative

- **Existing network**: 90,000 km
- **Normal spacing**: 14%
- **Network density**: 3.4 km
- **7%** of the world network
- **2%** world traffic
- **12,000 km** AHSR length
The ‘Africa Rail 2063’ strategy:
One vision, four axes and three pillars

1. Strength the DNA of sustainable passenger and freight mobility
2. Support social and territorial inclusion policy
3. Develop the internal performance of railway undertakings
4. Promote regional integration by combining economic logic and ecological transition

By 2063…
Africa has an interconnected rail transport system, forming the backbone of sustainable mobility and helping to promote regional integration, inclusive socio-economic development and a better positioning of the continent at world level.
The ‘Africa Rail 2063’ strategy

20 AMBITIOUS GOALS FOR A BRIGHT FUTURE ........

**TERRITORIAL NETWORK**
- Network doubling (km): 150,000
- Territorial coverage (km per km²): 10
- Population served (%): 80
- International airports served (%): 100
- Connected ports (%): 100
- Logistics sites and platforms (%): 100

**ECONOMIC DYNAMICS**
- Cumulative investment ($bn): 660
- Need in relation to GDP (per year): 0.6%
- Contribution to GDP: 14%
- Jobs created (million days): 760
- Gains for the community ($M/year): 34
- Creation of intangible capital ($M/year): 75

**SUSTAINABLE MOBILITY**
- Market share in passenger traffic: 25%
- Market share of freight traffic: 35%
- Freight transport cost savings: 30%
- Satisfaction rate: 86%
- Energy efficiency (2050): Neutralité
- GHG emissions (CO2 : Millions/year): -80
- Number of road fatalities avoided/year: -20%
- Number of cars avoided on the road: -30%
Thank you for your attention
UIC Symposium
30 November – 1 December 2021

Mr Younes Touitha, on behalf of Dr. Towela Nyirenda-Jere, Head of Economic Integration Division, AUEDA-NEPAD
UIC Symposium
The pan African Rail networks from vision to implementation

30 November – 1 December 2021
**Background - AIHSRN**

- **In context of Agenda 2063, objective is to facilitate economic and physical integration of Africa**
  - Connect landlocked countries to seaports
  - Provide interconnections between different regions/parts of African
  - Establish “Trans-Africa beltways”, similar to Trans African Highways (TAH)
  - Connect all political and economic capitals

- **Detailed Scoping Study (DSS) undertaken:**
  - traffic demand forecasts, costs and revenue estimates,
  - corridor/ routes,
  - rail technology options,
  - innovative financing models

=> to develop a 10-year and beyond implementation plan
DSS Results

- **Target Traffic & Speed options**
  - **Category A** – High speed, passenger trains only
    - Speeds up to 320 km/h (or 330 km/h)
  - **Category B** – Semi high speed, mix of passenger and freight trains
    - Speed up to 240 km/h for passenger trains and up to 120 km/h for freight
  - **Category C** – mainly or only freight trains
    - Speed up to 120 km/h

- **Interoperability**
  - SGR recommended

- **Electrification**

- **Operation**

- **Financing**

- **Implementation Framework**
# Masterplan 2033

## Accelerated Pilots

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Countries Involved</th>
<th>REC Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dar es Salaam-Kigali combined with Kampala-Bujumbura</td>
<td>Burundi, Rwanda, Tanzania, Uganda</td>
<td>COMESA, EAC, ECCAS, IGAD, SADC</td>
</tr>
<tr>
<td>2</td>
<td>Johannesburg-Gaborone-Windhoek-Walvis Bay</td>
<td>Botswana, Namibia, South Africa</td>
<td>SADC</td>
</tr>
</tbody>
</table>

## Additional Pilots

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Countries Involved</th>
<th>REC Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nairobi-Kampala</td>
<td>Kenya, Uganda</td>
<td>COMESA, EAC, IGAD</td>
</tr>
<tr>
<td>2</td>
<td>Abidjan-Ouagadougou</td>
<td>Burkina Faso, Ivory Coast</td>
<td>CEN-SAD, ECOWAS</td>
</tr>
<tr>
<td>3</td>
<td>Tunis-Alger-Sidi Bel Abbes-Casablanca</td>
<td>Algeria, Morocco, Tunisia</td>
<td>UMA, COMESA, CEN-SAD</td>
</tr>
<tr>
<td>4</td>
<td>Cotonou-Niamey</td>
<td>Benin, Niger</td>
<td>CEN-SAD, ECOWAS</td>
</tr>
<tr>
<td>5</td>
<td>Alexandria-Khartoum</td>
<td>Egypt, Sudan</td>
<td>COMESA, CEN-SAD, IGAD</td>
</tr>
<tr>
<td>6</td>
<td>Addis Ababa-Asmara</td>
<td>Eritrea, Ethiopia</td>
<td>COMESA, CEN-SAD, IGAD</td>
</tr>
<tr>
<td>7</td>
<td>Beira-Lusaka</td>
<td>Mozambique, Zambia, Zimbabwe</td>
<td>COMESA, SADC</td>
</tr>
<tr>
<td>8</td>
<td>Douala-Bangui</td>
<td>Cameroon, Central African Republic</td>
<td>CEN-SAD, ECCS</td>
</tr>
<tr>
<td>9</td>
<td>N’Djamena-Bangui</td>
<td>Chad, Central African Republic</td>
<td>CEN-SAD, ECCS</td>
</tr>
<tr>
<td>10</td>
<td>Dakar- Bamako</td>
<td>Mali, Senegal</td>
<td>CEN-SAD, ECOWAS</td>
</tr>
<tr>
<td>11</td>
<td>Lamu-Juba</td>
<td>Kenya, South Sudan</td>
<td>COMESA, EAC, IGAD</td>
</tr>
</tbody>
</table>
Conclusions

• Project Preparation is critical – need to ensure that adequate resources are provided for early-stage project preparation
• Innovative financing required to meet the infrastructure deficit
• Integrated Corridor Approach offers promise of multi-sectorial integrated infrastructure development
• Need to develop a Financing Strategy and Partnerships Strategy for HSR.
• AUDA-NEPAD has developed various tools and instruments that are readily available to support transport and other infrastructure projects
  • Advisory services based on our various tools, establishment of expert service pools and incorporation of sustainable business models and cost-recovery mechanisms are essential pivots
Thank you for your attention
UIC Symposium

30 November – 1 December 2021

Mr. Wolfgang Küpper, Secretary General, OTIF
The Organisation and the Convention
OTIF and COTIF: Key Facts

THE ORGANISATION

Intergovernmental Organisation for International Carriage by Rail

50 MEMBER STATES
+1 ASSOCIATE MEMBER

3 WORKING LANGUAGES: FR/DE/EN

HEADQUARTERS: Berne, Switzerland

COTIF THE CONVENTION

COTIF Convention concerning International Carriage by Rail
1999

1st INTERNATIONAL TRANSPORT CONVENTION

ENTRED INTO FORCE IN 1893

COTIF IS APPLIED ON 270,000 KM OF RAILWAY LINES

2011 ACCEDED TO COTIF
OTIF Membership
Situation on 1 May 2019
COTIF – What for?
https://vimeo.com/349648465
COTIF – developing uniform law for interoperable networks

- International binding law
- A bridging concept
- An approach based on partnership
- Railways as networks: connected, uniform and interoperable

- Freight / Passenger Contracts

- Dangerous Goods Regulation
  - Transport of dangerous goods by rail

- Technical Regulation
  - Safe exchange of Vehicle Towards full interoperability

Legal interoperability

Technical interoperability
The case for international rail freight

- **Time**:
  - 3x Faster than shipping

- **Costs**:
  - 70% Lower costs than aviation
  - Competitive area for rail
  - Fast but expensive
  - Cheap but slow
The “Luxembourg Rail Protocol”

OTIF will in future be the Secretariat of the Supervisory Authority of the “Luxembourg Rail Protocol”

What does this mean?

• The Luxembourg Rail Protocol offers an important means to finance railway rolling stock, by establishing a special register to safeguard the rights of different stakeholders.

• It is crucial that the Luxembourg Rail Protocol comes into effect asap by signing and ratifying it, because governments cannot afford not to use all potential sources to finance railway equipment.
African Rail Perspectives

According to the African Development Bank (Study 2015) there are two major reasons for the poor condition of African Railway systems:

1. A lack of investment in infrastructure
2. The absence of a supporting institutional framework

Both tasks are governmental tasks!

Solution for 2.: OTIF’s legal framework as “best practice” for international rail transport in Africa!
Thank you for your attention
UIC Symposium

30 November – 1 December 2021

Mr. Ayman Masoud Abdel Aziem, Director of the Risk Assessment Department, ENR
The development plan is based on five main axes:

1. Rolling stock
2. Infrastructure
3. Train control
4. Workshop
5. Human resources
# Rolling stock

## Locomotive
- Supply of (110) new locomotive for passenger trains with (GE).
- Supplying (50) new locomotive for passenger trains with (PRL)
- Rehabilitation of (81) locomotive for freight trains with (GE).
- Rehabilitation of (41) locomotive for passenger trains with (PRL).
- Upgrade efficiency of (50) Henschel locomotive with (PRL).
- Supply of spare parts required for maintenance and repairing with (GE) and (PRL)

## Passenger Coaches
- Supplying (300) 1st and 2nd air-conditioned coaches with (TMH).
- Supplying (500) 3rd air-conditioned coaches with (TMH).
- Supplying (500) 3rd dynamic ventilation coaches with (TMH).
- Supplying (100) sleeping coaches with Simaf.
- Supplying (100) Power coaches with Simaf.
- Supplying (6) complete trains (1st, 2nd air-conditioned coaches and service coaches) with Talgo.
- Rehabilitation of (6) complete trains with Talgo.
- Upgrade efficiency of (1223) regular coaches with ENR Workshops
- Upgrade efficiency of (90) Spanish air-conditioned coaches with ENR Workshops

## Wagon Freight
- Supplying (375) container deck wagons with SEMAF.
- Supplying (300) dump wagons with SEMAF.
- Supplying (75) grain transport wagons with SEMAF.
- Supplying (150) tank wagons with SEMAF.
- Supplying (125) box wagons with SEMAF.
- Supplying (50) Spence wagons with SEMAF.
Infrastructure

Track

• Three companies from the Egyptian private sector were entered this field, in addition to the two companies of ENR (Egyfrail - Ertrack),

Stations

• plan to improve (180) stations
• Improved and elongated platform of (119) stations

Line Duplication

• planned to start (7) duplication of single lines
Train control

Developing Signal System

• Implementation (5) projects including construction of (86) main towers and (61) secondary towers, with a total length (971) km

Developing Control system

• Implementation Electronic Train Control System (ETCSL1) from Alexandria / Cairo / Nagaa Hammadi, in addition to Banha / Port Said

Level Crossings

• Developing civil works for (1102) level Crossings.
• Developing control systems for (1120) Level Crossings.
Workshop

Main workshops

• The first phase of workshop development has been completed
• The second phase of the workshop development is underway
• The third phase of workshop development is planned

sub-workshops

• The first phase of the development of the sub-workshops, which includes (20) sub-workshops (completed)
• The second phase of the development of the sub-workshops, which includes (7) sub-workshops (planned)
Human resources

<table>
<thead>
<tr>
<th>ENR employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Evaluate the performance of all employees.</td>
</tr>
<tr>
<td>• Determine training courses for each job.</td>
</tr>
<tr>
<td>• Annual medical examination for employees.</td>
</tr>
<tr>
<td>• Updating work regulations to ensure safety.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>New staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Updated list of mental and physical tests</td>
</tr>
<tr>
<td>• Developing scientific curricula for all jobs</td>
</tr>
<tr>
<td>• Practical courses in sectors and workshops</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ENR structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Development of the administrative structure of ENR</td>
</tr>
</tbody>
</table>
Thank you for your attention
AFRICAN FOCUS
Panel 2: Digitalisation: the African solutions

• Moderator: Ms. Heather Thompson, CEO, ITDP

• Mr. Tilahun Sarka, Director General, EDR

• Ms. Samia Ben Hamida, Director of Planification and Controlling Department, SNCFT

• Ms. Mesela Nhlapo, CEO, African Railway Industry Association, ARIA

• Mr. Norman Frisch, Marketing Director of the Transport Sector, Enterprise Business Group, Huawei
UIC Symposium

30 November – 1 December 2021

Mr. Tilahun Sarka, Director General, EDR
Present Status of Digital Railway System in Ethio-Djibouti Railway line

• Ethio-Djibouti railway line is a fully electrified line that covers a length of 756km.
• It is a standard gauge(1.435m) electrified railway with a designed speed of 120km/hr for passengers and 80km/hr for freight transportation.
• Some of the areas of digitalization in Ethio-Djibouti Railway, EDR are as follows:
Railway Interlocking System

- Track circuit: Where is the train?
- Switch machine: Which route?

Control Equipments
Interlocking example

1. Operate: push down route buttons D11A and S5DA。
2. Route selection: determine the signal devices of the route, including D11, 11-13DG, 13(normal position), 11(normal position), 21DG, 21(reverse position), S5。
3. Change switch position: switch 21 to reverse position
4. Switch consistency check
5. Route lock (locked: display white color band)
6. Signal light( D11 light white color lamp)
7. Train enters the route → route release.
Level crossing

- To avoid human error and to enhance efficiency, railway crossing systems can be controlled in an automated manner.
- In an automated rail crossing system a train that approaches the gate is detected by a sensor and also the speed of the train is noted.
- The departure of the train is detected by another sensor and the gate is restored to its initial position.
- Sensors placed on the level crossing and send data that, once collected and processed, can open or close the level crossing.
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UIC Symposium

30 November – 1 December 2021

Ms. Samia Ben Hamida, Director of Planification and Controlling Department, SNCFT
Intermodality

Project Subject:
Review the integration of public transport networks in terms of prices through the harmonization of structures and ticketing systems of all public operators for the bus and rail modes, with the main networks concerned (STT and RFR lines A, D and E).
Intermodality: RAIL ROAD
Financially assisted by the CAMENA and the German agency for international cooperation GIZ, SNCFT had launched a call for tender for the elaboration of a roadmap and a decision support tool for:

- The deployment of an alternative diesel engine solution taking into account the environmental externalities
- The establishment of an infrastructure for recharging and refuelling railway rolling stock, potentially around stations, associated with the alternative solutions chosen.

A consortium (Studi International, EY and COWI Belgium) was selected to conduct the study that aims to:

- Assess the advantages/disadvantages of the latest technologies identifying the most relevant (natural gas/biogas, batteries, hydrogen, others) with the infrastructures associated to a possible decentralized production
- Assess and define the technologies and requirements for the production and storage of low-carbon gas and/or green electricity that will be used by the selected alternative powertrain solutions.

This is a pilot project that can easily be replicated in North Africa and many sub-Saharan African countries, thanks to the climatic conditions that are conducive to the development of clean energy, in particular green hydrogen.
Digitalization

An information system for mobile phones (train schedule, instant location, costs, dispatches short message in case of emergency...)

Digital library and internet on board

Real Time Train Schedual

The second African Digital Summit will be held in Tunisia 2022 on collaboration with the UIC
Thank you for your attention
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30 November – 1 December 2021
Ms. Mesela Nhlapo, CEO, African Railway Industry Association, ARIA
If Digitalisation is the solution what is the PROBLEM?

Overview

- Factors supporting digitalisation
- Relationship between literacy and digitalisation
- African Railways and digitalisation
Factors supporting digitalisation

- Basic needs
- Startup's
- Tech infrastructure
- Human capital
- Tech adoption
- Ease of doing business
- Business investment
## Digitalisation – Literacy - GDP

<table>
<thead>
<tr>
<th>Country Literacy and GDP</th>
<th>Country digital readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Literacy</strong></td>
<td><strong>Kenya</strong></td>
</tr>
<tr>
<td>• South Africa</td>
<td>• Nigeria</td>
</tr>
<tr>
<td>• Equatorial Guinea</td>
<td>• South Africa</td>
</tr>
<tr>
<td>• Seychelles</td>
<td>• Rwanda</td>
</tr>
<tr>
<td><strong>GDP</strong></td>
<td></td>
</tr>
<tr>
<td>• Nigeria</td>
<td></td>
</tr>
<tr>
<td>• Egypt</td>
<td></td>
</tr>
<tr>
<td>• South Africa</td>
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</table>
The value of a digitally literate nation is immediately reflected in the strong correlation that leading nations show against other indicators such as GDP.
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30 November – 1 December 2021

Mr. Norman Frisch, Marketing Director of the Transport Sector, Enterprise Business Group, Huawei
Dive into Digital: The New Paradigm in Rail

Transportation Industry Development in a Constantly Evolving World

Industrial Era
- Workers → Machines
- Transportation enables mobility in the physical world

Electrical Era
- Petroleum + Electric power

Information Era
- Computers: production tool
- Digitalization: mainstream
- Communication drives data interaction in the digital world
- Empowering all things with intelligence using AI and big data

Intelligence Era

HUAWEI
Unified Rail ICT Platform
The Foundation of Digital Transformation

- Converge IT Resource
- Accumulate industry application models
- Accumulate Data Assets
- Support Technical Architecture Evolution

Integrated Operation Control (IOC)

- Production
- Management
- Service

Digital Platform

AI

Data convergence Service enablement

ROMA

ABC

New ICT

IoT

Big data

Video

ICP

GIS

Cloud

Security

Connection

Terminal
In October 2018, the Wi-Fi Alliance specified a new name for different Wi-Fi standards, and 802.11ax was named Wi-Fi 6.
IOC: the “Brain” of Digital Twins for One Map Panoramic view

Comprehensive Situation
Deeper understanding the overall rail operating status, property, and group views

Decision Support
Scientific decision-making based on data analysis

Collaborative Command
Real-time monitoring and alert-warning, rapid emergency command

Digital Platform
Video IoT Big data GIS/BIM ...

Rail cloud platform

Enterprise operations data Security management platform ISCS IoT data Property management system Manual data entry

Finance
Investment
...

Human Resource
...

Safety
...

AI

Rail IOC
Thank you for your attention