Space + Terrestrial:
New Ground for 5G Convergence

Semir Hassanaly, Head of Backhaul

Our Position

We are a **global leader** in IP-based satellite communications.

Perfecting ground infrastructure, **accelerating** business growth, and **developing** innovative solutions for the world's top satellite operators, service providers, telcos and equipment makers.

Owned by ST Engineering

Headquarters in Europe, USA and Singapore

35+ years of innovation

1,000 employees globally

57% VSAT hub market share

Product portfolio branded under iDirect and Newtec

Leader in Enterprise, Mobility, Broadcast and Government/Military Markets

iDirect Government, wholly owned subsidiary, leader in US DoD

3 Ecosystems are Converging Today

NEW SPACE

LEO
MEO
GEO

Probably the largest transformation in satellite history

- From GEO to VHTS GEO/MEO/LEO/HEO

- From 20 GBPS capacity to terabit level constellations

- From static beams to dynamic beams

- From bespoke payloads to standardized/programmable payloads?

GLOBAL
TELCO AND IT
5G

Major transformation in telco history

- To a master 5G platform
- Convergence of all access technologies
- Automation, virtualization, orchestration
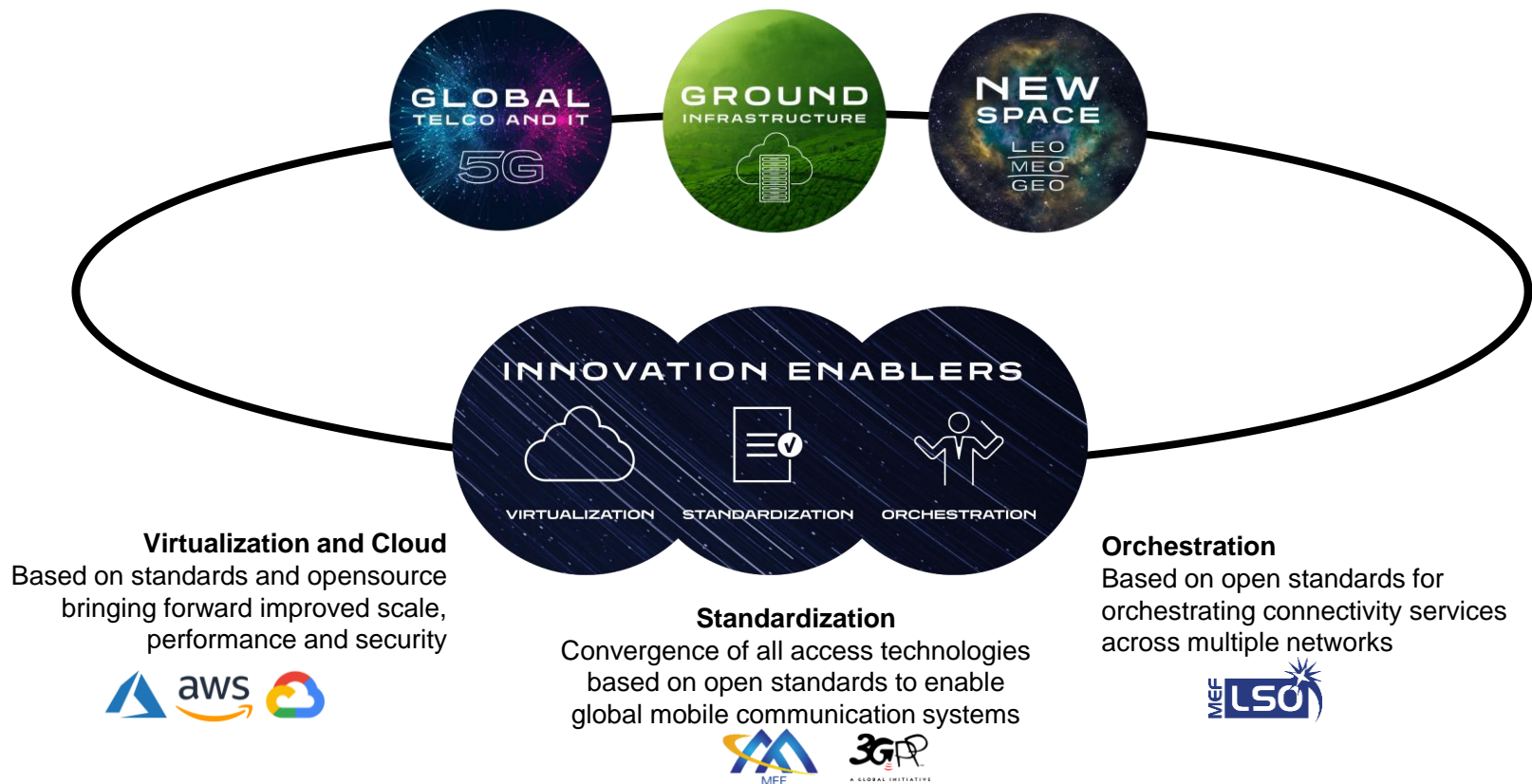- Scale, capacity and performance
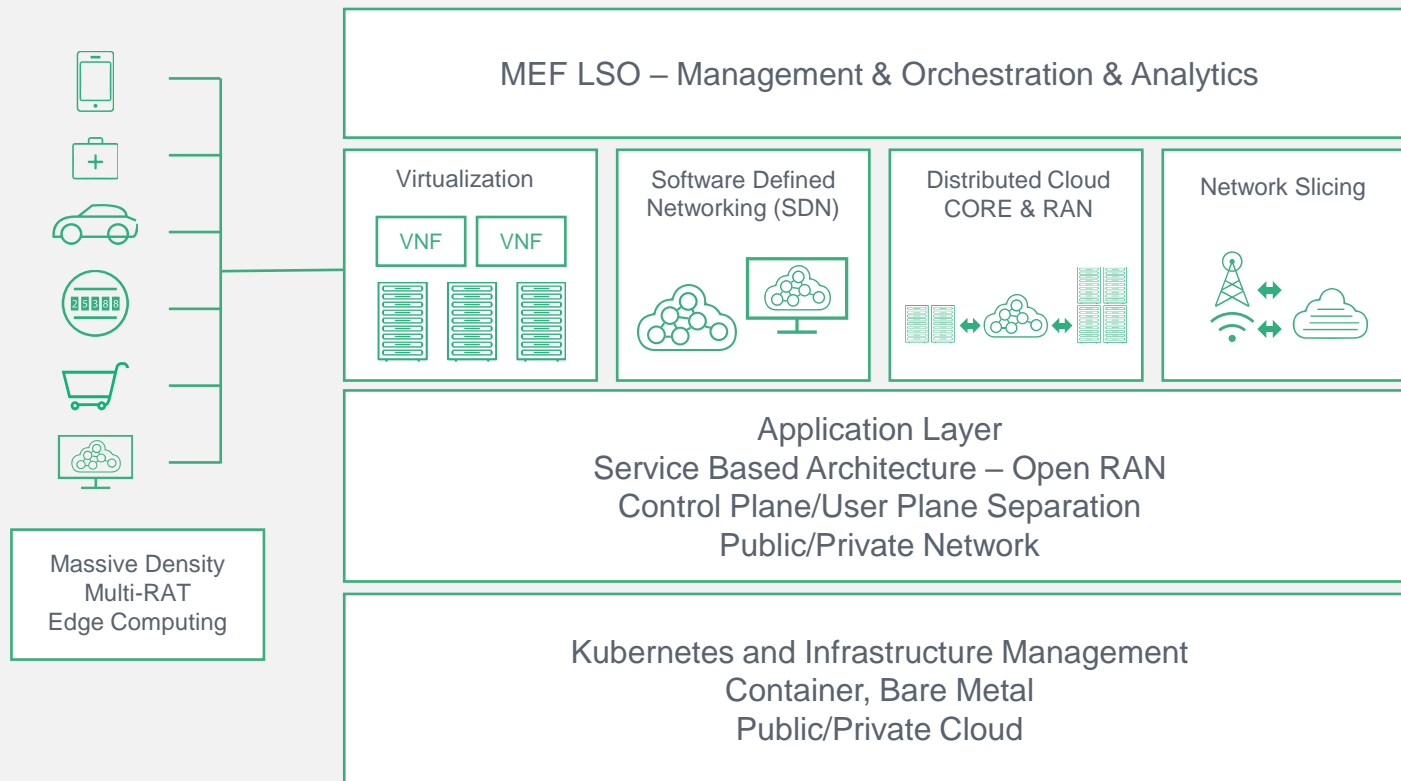
GROUND INFRASTRUCTURE

Ground infrastructure must play a unifying role

- From software-defined satellites to software-defined networks
- From stand-alone networks to **integrated** ecosystems
- From appliances to **virtual** infrastructure
- From configuration to **orchestrated** service delivery

Innovation Enablers

Virtualization and Cloud
Based on standards and opensource bringing forward improved scale, performance and security

Standardization
Convergence of all access technologies based on open standards to enable global mobile communication systems

Orchestration
Based on open standards for orchestrating connectivity services across multiple networks

Architecture Evolution

ST Engineering

MEF LSO – Management & Orchestration & Analytics

Virtualization

VNF   VNF

Software Defined
Networking (SDN)

Distributed Cloud
CORE & RAN

Network Slicing

Application Layer
Service Based Architecture – Open RAN
Control Plane/User Plane Separation
Public/Private Network

Kubernetes and Infrastructure Management
Container, Bare Metal
Public/Private Cloud

Massive Density
Multi-RAT
Edge Computing

Uniting 5G, New Space, New Ground

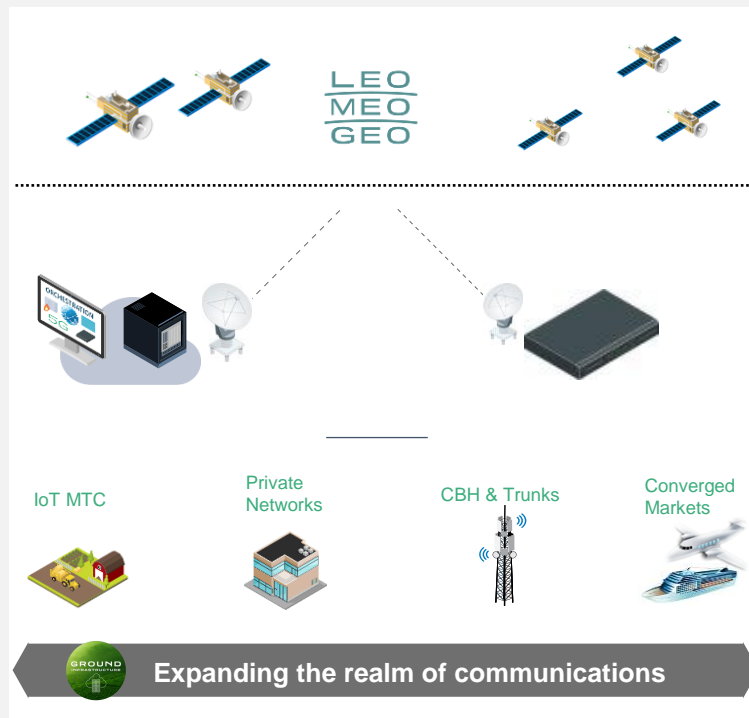ST Engineering

INTEROPERABLE
OPEN SOURCE
VIRTUALIZATION

MULTI-ACCESS
4G 5G Wifi IoT

ORBIT
INNOVATION

IP CONTENT
DISTRIBUTION

FLEXIBLE
RESOURCE
ALLOCATION

MEF - END-TO-END
SERVICE
OCHESTRATION &
AUTOMATION

TECHNOLOGY
CONVERGENCE

MXDMA
5G NR
Waveforms

CLOUD
EDGE COMPUTING,
M2M, IA, BIG DATA

IoT

LEO
MEO
GEO

IoT MTC

Private
Networks

CBH & Trunks

Converged
Markets

GROUND

Expanding the realm of communications

Broadband & Enterprise Use Cases

ST Engineering

Digital Divide ǀ Cloud Access | IoT

Scalable throughput and CIR to meet any demand and best user experience

Lowest TCO - Optimal bandwidth and operational efficiency, proven reliability

End to End **service orchestration and assurance** of carrier services

Seamless integration in Telco 5G infrastructure, expansion to edge computing

Mobility Market Use Cases

ST Engineering

- **Highest throughput** serving most demanding customers with a single modem

- **Best User Experience** with highest CIR at the right place and time

- **Security and Reliability critical** to address digital transformation

- **Service orchestration and service assurance across capacities**
  - LEO MEO GEO

- **Advanced mobility features for seamless connectivity switching**

CBH Market

Highest throughput serving most demanding customers with a single modem

Best User Experience - highest throughput, CIR and retaining connectivity in fading conditions

Cost-effective CAPEX - lower power consumption using smaller terminals

Lowtest TCO - Unique bandwidth and operational efficiency and **Bandwidth sharing/portability across sites** in real-time

In-Country hub, full capability for **any use case & expansion**

Seamless integration in **Telco 5G** and expansion to **edge computing and 5G edge**

Ground Infrastructure Must Unify Ecosystems

Full interoperability with Telco via 5G architecture

Continuous advances in waveform efficiency

Cloud-based architectures benefiting from virtualization

Orchestrate services so they are seamless, responsive, cost-effective and scalable to any site and application

Serve all satcom mobility and fixed markets with seamless user experience

Provide application specific solutions

WE MAKE IT POSSIBLE FOR OUR CUSTOMERS TO BUILD MULTI-ORBIT, MULTI-ACCESS TECHNOLOGY STRATEGIES ON THE WORLD'S FIRST CLOUD-BASED PLATFORM