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Into the New Space Internet Era:

An African Golden Opportunity

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Tasilii smiled as she walked her holographic avatar away from the 100 youngsters she'd just mentored from her suite on Unity III orbiting Earth. Each of these young digitally savvy entrepreneurs from across Africa had sat next to her, or more accurately, a 3D holographic representation of her, and each received their own personal masterclass on how advances in radiative cooling could help power their small businesses at night.

The year is 2069 and it was a precious hour well spent for the 100 year old Tasilii on her birthday, one she shared with the Internet and the first message sent over the ARPANET network. Being a child of Africa herself, a modern elder from a very different era, her satisfaction was profound as she looked out at the thriving culturally diverse continent she had helped grow into the most socially and economically vibrant region on Earth.

Fantasy? Not really. We can already see the beginnings of this happening in the rapid advancement of the Internet and communication sectors today and with the increasing awareness of the modern elder's role in reciprocal mentoring. The live interaction between youth and experience will be critical if we are to keep today's rapidly aging population engaged and billions of young Africans productive in 2069.

Our world is descending into an age crisis with developed nations suffering a birth deficit, last year (2018) heralding the first time in history that 65 year olds outnumbered five year olds, while less developed nations, concentrated in Africa, enjoy an abundance of youth but without the benefit of a demographic dividend.

These two problems present an opportunity, one that is rooted in the essence of the Internet - connectivity.

Focused investment into personalized education platforms tailored to youngsters with little or no access to proper formal education is the technological first step to realizing the demographic dividend Africa needs to capitalize on. The all-important human ingredient required for a good education, a good teacher/mentor, is the second step and there will be many modern elders in 2069 who will relish the rewarding and productive opportunity to mentor and inspire 1000's of children in their golden years.

Connecting the two presents an opportunity that is already underway and it is happening in the final frontier, space.

As we enter the 2020s, space and Internet technologies are converging. Global technology leaders that consider the Internet evolution, in terms of adoption, affordability, performance and reach, fundamental to their continuous growth, are pouring tens of billions into space Internet technologies at the moment. This makes for exciting, albeit risky, times ahead!

Few more interesting paradigms have emerged recently with the potential to impact the Internet infrastructure and the design and deployment of Internet-based services than the developments in space technology. Traditional GEO/MEO (Geostationary and Medium Earth Orbit) satellite networks are refreshing their assets and developing innovative new business models while a new generation of Low Earth Orbit (LEO) satellite constellation networks ready themselves for a paradigm shift in global connectivity that heralds a new era of space-based Internet technologies.

Imagine connection speeds anywhere on Earth that can seamlessly deliver three dimensional one-on-one conferencing and education platforms with AI enabling multiple representations of oneself in real time…

It's happening - the major internet/cloud providers are already working on various aspects of such deployments - Amazon, Google, Facebook, Microsoft – along with the space innovators such as Virgin and SpaceX investing billions alongside technology mega-investors like Softbank.

The existing GEO and MEO satellite communication providers are ratcheting up their networks and exploring ground access distribution models to face up to the LEO challengers. Combine this with multiple venture capital-backed startups and government funded consortiums in China, Japan, Korea, Europe, North America and the Middle East and the 2020 – 2025 timeframe, when most LEO constellation launches are planned, promises to be an era of communication transformation.

The new LEO constellations are being designed to take advantage of low latency, broad reach and high capacity. The scale of these private sector investments, despite the risks, add significant advantage to their potential. These new space networks have no legacy constraints and are being designed specifically to leverage the mechanisms in place for terrestrial networks - routing, switching, Quality of Service (QoS), resources management, software-defined network (SDN) control, virtual network functions (VNF) orchestration, and cyber-security.

The next five years offers an unprecedented opportunity to leverage both the new LEO and the refreshed GEO/MEO networks for multiple Internet service offerings:

- Services that leverage new cost structures against coverage, bandwidth and latency while exploiting new global routing topologies with reduced autonomous systems and new peering/transit models.
- Piggybacking on the deployment of distributed mobile edge computing solutions with highly distributed data centers and clouds, on the ever expanding content delivery networks, and on legislated public safety networks.
- Revisiting the technology and deployment models of peer-to-peer (P2P) based networks - to leverage the characteristics of these new networks and develop new models in the design and hosting of peer hierarchies and topologies.
- The renewed potential to deploy global Mobile Virtual Network Operations (MVNOs) utilizing the large-scale geographical coverage of new and refreshed satellite networks and their reconfigured underlying economics.
- Leveraging the global coverage of satellite networks and the new interconnection models driven by the LEO constellations to connect with terrestrial wireline, wireless, submarine and cloud networks to significantly change the dynamics of rolling out high-speed broadband in rural regions worldwide.

With these opportunities of course come risks and challenges:

- Harmonizing Internet Routing and Signaling Protocol Design to fit the requirements of the new LEO networks, such as the adaption of intra and inter domain routing protocols to fit the specific requirements of LEO networks
- Evolving Quality of Service mechanisms for data path resources management and the design and dimensioning of oversubscription models over LEO space segments
- Adopting software defined networking approaches in LEO space operations systems
- Tailoring state-of-the-art cyber-security mechanisms, where security for data and control paths require rethinking to accommodate the characteristics of space segments and the constrained functionality on satellites
- How to grow next-generation IoT Networks to leverage LEO connectivity so that today's Internet of Things gateways and backend architecture can benefit from an interface with the control and management plane of LEO networks
- Crafting new Technology Standards and Regulations that stimulate innovation while taking into account current regulations required for the deployment of large-scale LEO networks.

The major technology and financial investments that are going into the deployment of new LEO networks and the redeployment and reinvention of GEO/MEO networks are addressing these risks and challenges in different ways. This offers new and exciting opportunities for the TMT sector to leverage spacetech innovation and ground infrastructure partnerships and take their products to new markets. The intersection of space and Internet technologies, particularly in reaching the end user, is still in its infancy and the next few years will witness a rapid evolution in Internet service delivery.

Consider that only 10 years ago the iPad did not exist. The next 30 years promises unprecedented opportunities for a truly connected world, one that emerging markets stand to gain the most from. The half billion connected, informed and enterprising young African's in 2050 will be a global asset – an asset that will begin to reveal itself over the next five years as the last frontier is harnessed for the greater good.

Let the Xona Connect Earth Partnership, with over two decades experience in connecting the unconnected, show you how to design, build and implement the technology and business solutions you'll need to be part of the next Internet revolution.

As Tasilii's avatars will be saying to her young African audience, "the future of our beautiful planet is now in your hands".

Join us on our "Space Intersects Internet" roadshow, a series of workshops around the world, starting in London in November 2019 and visiting Vancouver, Algiers, Cape Town, Dubai, San Francisco, Paris, Tokyo and many more into 2020.

Come meet us at the following events in 2019, where we will be discussing our Space Internet for Africa initiatives:

TowerXchange Meetup Africa 2019

8/9 OCTOBER, 2019
SANDTON CONVENTION CENTRE
JOHANNESBURG, SOUTH AFRICA

TowerXchange is an open community for thought leaders in the emerging market towers industry. We bring together MNOs, towercos, investors, equipment and service providers to share best practices in passive and active infrastructure management, opex reduction, and to accelerate infrastructure sharing.

https://www.towerxchange.com/meetup/meetup-africa-3/early-confirmed-panellists-roundtable-hosts-and-working-group-members/

SES Industry Days 2019 Africa (iDAfrica)

Pioneering Technology Together

11 NOVEMBER, 2019
THE LOOKOUT, V&A WATERFRONT
CAPE TOWN, SOUTH AFRICA

iDAfrica is a platform to network with thought leaders, industry professionals and colleagues, who share a passion for Africa and impact that satellite technology can have on the continent.

https://www.ses.com/event/ses-industry-days-2019-africa

AfricaCom 2019

12 – 14 NOVEMBER, 2019
CTICC
CAPE TOWN, SOUTH AFRICA

Accelerating business transformation to strengthen African economies
Bringing together the connectivity champions critical to enabling digital transformation in Africa.
15 000 Attendees / 500 Exhibitors / 450 Speakers

https://tmt.knect365.com/africacom/

TMT Finance World Congress/Africa

28 NOVEMBER, 2019
LONDON, UK

Who is leading investment and M&A in telecoms, tech and media in Africa? Now part of the 3-day TMT world congress 2019 – the biggest global gathering of TMT, finance and investment leaders.

https://www.tmtfinance.com/world-congress/africa/speakers

Xona Partners (Xona) is a boutique advisory services firm specialized in technology, media and telecommunications. Xona was founded in 2012 by a team of seasoned technologists and startup founders, managing directors in global ventures, and investment advisors. Drawing on its founders' cross-functional expertise, Xona offers a unique multidisciplinary integrative technology and investment advisory service to private equity and venture funds, technology corporations, as well as regulators and public sector organizations. We help our clients in pre-investment due diligence, post investment lifecycle management, and strategic technology management to develop new sources of revenue. The firm operates out of various regional hubs which include San Francisco, Tokyo, Vancouver, Dubai and Singapore.

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CONNECT EARTH is a professional services and project development firm specialising in sustainable connectivity in emerging markets. With the founder's on-the-ground experience across Africa and business experience in the US and European digital technology sectors, Connect Earth has a unique skillset in developing viable connectivity driven business models for clients looking to engage in the Telecom, Media and Technology (TMT) sector in emerging markets. We have a particular focus on Africa and work with our clients on how to thrive in the fickle African TMT markets through our Professional Services arm. We assist public, private and development sector clients in designing, building, implementing and financing their connectivity solutions through our Project Development arm. We also have our own Special Projects division for projects where we design, build and own projects in partnership with our clients.

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