Global Internet for Everyone on the Planet using LEO Routers

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Editor's Note
Following the "Conference Book 12th Reinventing Space" book review in the "Journal" [1] and inspired by the book's paper "Sprite: A very low-cost launch vehicle for small satellites, Nicola Sarzi-Amade (Microcosm)", Lutz Kayser , former OTRAG CEO offered the following op-ed article as contribution to the discussion on how to lower the cost for launch vehicles and possible enter mass production for the growing near-earth markets.

Worldwide internet access for all mankind will only become possible with an Internet in the Sky, as originally proposed by Bill Gates.
Today only about 1 Billion users have the advantage of access through terrestrial hot spots, which is quite often unaffordable.
Geostationary orbits (GSO) are unpractical since the latency is a few seconds and terrestrial senders and receivers need high transmission power in the range of watts and the GSO is already overcrowded.

The solution of the problem is a large system of many thousands of internet routers in Low Earth Orbit (LEO).
Router satellites in LEOs between 150 km and 700 km altitude and 0 to 360 degree azimuth will serve as an Internet in the Sky. They receive data from the user and route them around the earth via many other routers to the desired destination. Latency is in the order of 100 ms and transmission power in the range of milliwatts (mW); only slightly more than ordinary Wi-Fi hot spots.
In order to cover every location on earth a system requires between 5.000 and 10.000 router units at approximately 200 kg each; essentially moving Wi-Fi hot spots in the sky. With a lifetime of 5 years another 10.000 router satellites will have to be launched every following decade.

Before commencing this project two severe problems have to be solved. First, there is not enough launch capacity. Second, the available launchers are too expensive. The latter was the reason Bill Gates dropped the idea in the nineties.
Let us assume a mass produced router satellite costs of 500.000 US$ per unit. With presently available launchers it is assessed to cost at least 5 Million US$ for transport into LEO. This is an unreasonable ratio of launch cost to manufacturing cost. Therefore, the search for lower cost space transportation is mandatory.
Advanced technology for such drastically reduced launch cost into LEO has been successfully flight qualified by OTRAG using the modular approach by bundling many identical Common Propulsion Modules (CPM) in parallel. All 3 stages are assembled using identical mass produced CPMs.
Pressure fed storable propellants, ablative chamber cooling, and the elimination of all moving parts lead to high reliability and lower launch cost by a factor of ten. All 25 unpublished inventions for this disruptive rocket technology are owned by Lutz Kayser, who developed the CPM principle. [2]

Launched daily from a dedicated site with 360 degree azimuth freedom, this space transport system can do business of 50 Billion US$ in the coming 10 years with a profit margin of 30%.
After 40 years and investment of 150 Million US$ for rocket engine testing and CPM flight qualification , another 500 Million US$ will be sufficient for mass production and range establishment. No other private or sovereign entity worldwide is known to possess a comparable low cost "shovel launcher' ready launcher technology.

It is sure that the investors recognizing this chance and having the ambition to establish a worldwide Internet in the Sky will see a fabulous ROI. And for the internet users it will be a new freedom without the interference of regional monopolies, restrictions, blackouts, and excessive fees. Unrestricted access

to space is guaranteed by the UN Space Treaty and satellite routers are not subject to limitations as terrestrial microwave links or FO cables.

Conclusion:
"Internet in the Sky" would be possible, following a low cost launch vehicle and satellite mass production approach, however operational (transparency, compatibility and funding), privacy and security questions have to be solved in an international context and probably will pose more hampering hurdles than producing the "hardware".

References
[1] http://opsjournal.org/DocumentLibrary/Uploads/Reinventing%20Space%202014_final.pdf
[2] http://opsjournal.org/DocumentLibrary/Uploads/OTRAG_u2_final_LK%20.pdf