

Comments on the TRAI Consultation Paper No. 1/2021 by

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Licensing Framework for Satellite-based connectivity for low bit rate applications

1. Low bit rate communication, mediated by satellites, could undoubtedly benefit India. The essence of my comments is that we should look at technological options and policies from a balanced point of view. We need to address the needs of human users as well as of devices. Whether it is bandwidth, or investment in infrastructure, policy making must consider equity. 300 bits per second of communication could be of great value to millions of humans. There are sparsely populated areas, hilly areas, as well as the fishing belt along the seacoast, about 50 to 100 miles wide, where cellular communication is poor. Of course, one could use specialized wireless equipment to address some of the needs in these areas. Innovation offers a better solution and could make it possible for a device like a smart phone to be the handset involved. What would such a device offer? The ability to send text messages in any of the official scripts of India, at a cost ideally less than three or four times that of an SMS. The key things this would give are a reliable two-way communication. Can it carry a voice message? That may require more than 300 bps, but in principle even 300 bps will do. The great advantage of voice messaging is that literacy is not a requirement to use it.
2. There is an interesting discussion of CubeSats and other small satellites in the consultation paper. However, we should not forget the advantages of complexity inversion: having particularly good receivers and relatively higher power transmitters on the satellite. This may necessitate a bigger satellite, but will it make it easier to work with affordable and lighter handsets. The ideal for low-rate text communication is to design the system to work with smart phones. One option is a separate portable antenna cum satellite transceiver that will communicate with a smartphone through Bluetooth signals. Such a design might support multiple smart phones with one antenna cum transceiver. The only change in the smart phone should be an app that is added.

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- Railways need to get involved in this technology. Level crossings, manned or unmanned, can use better technology. Satellite monitored trains and locomotives and cell phone notifications could benefit millions, informing them when a nearby level crossing would not be available for crossing over. There are a total of 31846 level crossings spanning over 64460 route kilometers i.e. average of 49 level crossings per 100 kilometers in Indian Railways [1].
3. An FAO document says "Fishing at sea is probably the most dangerous occupation in the world. Over 32,000 fishermen die every year. More than 50% of the world's population lives within 60km of the coastline. Billions of people are depending on scarce marine resources, they are depending on the fishermen and the fish that they bring home. A lost vessel and a lost fisherman have a vital impact on the coastal community [2]".
 4. Monitoring boat traffic at sea has always been a major problem in India. The security threat was highlighted by the terrorist attack on Mumbai on Nov. 26, 2008 and its tragic consequences. A low-bitrate, satellite mediated system should help us create a modern vessel monitoring system for boat traffic along the Indian coastline.
 5. Swarajya Magazine dated Dec 30, 2020 reports [3] that "Of the 16,833 police stations in India, 143 do not have wireless or mobiles while 257 are without vehicles, reveals BPR&D's latest data published on Tuesday". If the police station is itself without a mobile or landline telephone, you can imagine police parties and individual policemen on patrol. Any satellite-based communication system for rural areas must address the requirements of police.
 6. The absence of Indian start-ups and of disaster-management teams in this discussion is a big loss for Indian interests. It would be valuable if TRAI actively encourages faculty and students at universities to get involved in these discussions too.
 7. Para 2.18 of the Consultation Paper says "They orbit the Earth multiple times a day (orbital time period — 10 to 40 minutes)". The table in Para 2.19 also lists orbital period of LEOs as 10-40 minutes. These need correction. No LEO can have such a low orbit time.

References:

1. [Unmanned level crossing accidents result in 59% deaths as per Railways' High Level Committee Report | The News Minute](#), February 25, 2015 report by Vinita Desai
2. [Safety for fishermen \(fao.org\)](#) ©FAO, 2021

3. [143 Indian Police Stations Don't Have Wireless Or Mobile Phones, 257 Without Vehicles: BPR&D Report](#)