



6G: HYPE VERSUS REALITY

Webinar: Questions and answers

July 2022

6G: Hype versus reality

*This document outlines the questions and answers received from the STL Partners webinar, **6G: Hype versus reality**, which was hosted on Wednesday 31st August 2022.*

In this document, we seek to address the questions raised in the webinar that we were unable to address in the time available.

You can also watch the recording of the session, and also access the slides, using the link [here](#).

If you have any questions not addressed in the webinar or this Q&A document, or want to hear more about our research findings or from our speakers, please contact:

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Webinar questions and answers

The below questions were received from the webinar audience during the live session, this does not include the questions asked to our panellists.

1. **W4G/5G standards already enable many mission critical and industrial use cases, but chipset/device and RAN/network vendor mainly focus on operators and consumer eMBB markets. How can 6G enable special industry use cases to be more attractive to become reality?**

STL Partners: It's unlikely that 6G will fundamentally change the economics of semiconductors or devices, especially if another 8 years of 4G/5G doesn't manage it. Maybe RISC-V open-source chips might help? On the RAN side, standardised disaggregation (ORAN++ or equivalent) should make special uses more possible by enabling niche vendors.

2. **6G being an environment of integration and interworking of multiple services and technologies, will it mean the end of the traditional telecoms operator as we actually know it? Or do operators need to make a massive evolution or risk a possible demise or takeover by hyperscalers or other players like Starlink for example?**

STL Partners: Traditional telcos are already changing. People talk about 5G "transforming" industries, but the first industry being transformed is telecoms itself! We already see new classes of telco & CSP (see our recent "New Telcos" report) and 6G will be a continuation of this trend.

3. **What is your view about 6G spectrum? What would be priority 6**

STL Partners: It's more about the authorisation models than specific bands. It would be good to see more dynamic / shared spectrum, fluid secondary marketplaces, better databases and (where possible) "spectrum as a service". I think that there will also be important roles for the 7-20GHz range, such as 7-8GHz and 12GHz areas already considered for 5G in some places.

4. **Do you see it as desirable / inevitable that we go back to the 3GPP / 3GPP2 days, one global standard for a global network - is that not "a thing" in 2030?**

STL Partners: I think it is currently uncertain what 2030 will bring. We should probably be less dogmatic about "one standard to rule them all", because it will be hard to reconcile all the different conflicting priorities & political realities. There is also a chance of a "horizontal" split between standards suited to old-world MNOs vs all the categories of other SPs, enterprises etc. We should *certainly* decouple the RAN and Core for 6G as much as possible. 6G RAN shouldn't mandate use of a 6G core - do it all via APIs.

5. Do you think we will be here again in 2032 talking about the future of 7G or will industry change the approach to the generation game?

STL Partners: Changing the approach seems unlikely at this point in time, unless we manage to get to a "continual release" DevOps approach. If I look at the Wi-Fi industry as a comparison, the cadence is speeding up, not disappearing.

6. Do you see convergence of Wi-Fi and cellular (6G)?

STL Partners: Not really. There will continue to be complex Venn diagrams with smallish overlaps. There will be converged and diverged applications - and convergence in both directions. One thing here is that 99% of Wi-Fi doesn't need a 3GPP-type core network. There's more chance of core-free 6G option, than core-anchored Wi-Fi 9/10.

7. What will 6G handsets look like, how will they differ from 5G devices and what will be the key new features to be incorporated into a 6G handset?

STL Partners: I think device format & functions correlate with G's rather than have a causal relationship. More aligned with trends in materials science (eg glass), semiconductors, antenna design, batteries etc. By 2030 we might have some new form factors like folding devices, but I don't see that as 6G specific. Sensing might use both 6G and WiFi radios (and UWB) though.

8. A couple of factors will determine the scope of 6G. Non-mobile requirements (see industrials getting involved in 3GPP) and non-telco players (cloud, compute, social media etc.). To what extent will ITU and 3GPP remain the forum to standardize 6G (beyond spectrum/network topics)?

STL Partners: At the most recent WWRF event I attended there was some early signs of ITU taking more note of non-MNO stakeholders. I think 3GPP has more problems, especially if it continues with terms like "NPN" which try to imply private networks ("non-public") are somehow secondary. It will get sidelined if that attitude continues. Telcos need to learn to be supporting cast members as well as leading actors.

9. **6G with ultra enhanced positioning/radar-like sensing and connectivity to satellites/drones/uavs - sounds like a perfect surveillance mix - are there any discussions on how to approach related threats (to privacy/to personal freedom in general)?**

STL Partners: There are certainly discussions, yes. How they get reflected in standards is something we all need to watch carefully. I'm not sure that 6G is the single largest risk here - there's loads of other ways that surveillance can infringe on privacy. I don't think sensing is such a massive deal, in this context.

10. **How would 6G work/compete/augment with CBRS and it's use cases?**

STL Partners: CBRS is mostly currently 4G-based, with very early 5G versions starting to emerge. It's a US-only specific band (3.5-3.7GHz) and system - other countries have different approaches to local / dynamic spectrum suitable for local cellular. By 2030 there will be private cellular spectrum options (& loads of solutions) in many places. I'd expect P5G to evolve to P6G - the Q is how much that it is reflected in the standards processes. I think enterprises should be taking central roles in defining priorities and standards - some may not realise the timelines start now!

11. **What market model would most probably support 6G? - Federated models, Eco-Systems with clear leaders (which needn't to be Telcos), clear separation of resource layer from service layer with Wholesale models?**

STL Partners: All of the above, and probably varying by national / regional market. Some will likely stay close to the current MNO-led model. Others will become more cloud/enterprise-driven. There will definitely be more wholesale layers - from RAN to spectrum to numerous "aaS" options,

12. **Won't users expect 6G on their handset in many places indoor and outdoor? Wide area coverage of 6G vs hotspot capability? Are we really going to get better macro cell speed than with 5G? If there's no central coordination how is the handset going to know 6G from non 6G?**

STL Partners: Sure, they'll expect it to work everywhere. The indoor / outdoor angle is more about industry structure and ensuring that small cells are "first class citizens" and a primary target rather than an afterthought.

13. **Possibly we should begin to become more focused on being use case driven. We have much technology in our tool kit.**

STL Partners: I think that's a false binary. Use-cases are important to help direct thought and priorities. But they need to be reasonable and not sci-fi fantasies. Tech capabilities plus ways to make them "democratised" are important - but at the moment the 3GPP 5G core and APIs are far too complex and protectionist (designed for the "classic MNO" not developers) model. Lets see if Open RAN type elements like the RIC and hyperscalers make it better & more programmable.

14. Dean - can you expand on your THz concerns

STL Partners: I'm just unconvinced they're likely to be mainstream. Where will they be used? What range? What power levels? How are they affected by obstacles? I can imagine them for back/fronthaul perhaps, but direct to user devices?

15. The current challenges for the adoption of private 5G networks is the lack of sufficient use-cases that provide value to potential users of those private 5G networks. On the other hands, development of use-cases will only make economic sense once there are sufficient potential users for them who already have private networks. How is this chicken-and-egg challenge expected to be overcome with 6G?

STL Partners: We've had private cellular networks for 20+ years. There are 1000s of them, perhaps 10000+ already. There are 100s of use-cases. We're still mostly at the stage of P4G exponential increase, with P5G just starting. Most of the useful 5G stuff needs R16 or R17 cores & support in devices - there's not much that R15 can do that 4G can't. 6G will continue the evolution eventually. The things to focus on are more/easier spectrum, and more people/skills in enterprises and integrators.

16. What is the 5G killer app and, if not here yet, what are the barriers?

STL Partners: 5G killer app = "more of the same, but a bit faster". There's basically no 5G-only or 5G-primary uses yet. Probably the closest is FWA, and we might get certain forms of industrial automation that *need* 5G.

17. How long before upcoming XR headsets are running on 5G data?

STL Partners: We'll see a few over the next year or two. Unclear whether they'll be massmarket. Most headsets will be WiFi-primary, perhaps using a smartphone as a 5G modem if needed.

18. Do you see any specific/interesting effects on charging/billing with a 6G ecosystem

STL Partners: Unclear if new stuff like sensing and position/location can be monetised directly, but it's possible. A key thing will be a continued move away from the "subscription" as the fundamental quantum of mobile business models. It will look anachronistic apart from classical MBB and FWA models.

19. **Charlotte mentioned sustainability benefits still being unclear. Enabling potential much be huge, the other side of the coin is the negative environmental footprint. Even if 6G becomes more energy efficient, what will it require in terms of hardware/additional natural resources? Will dematerialization bloom or will the footprint be as big as for 5G, and only a decade later?**

STL Partners: "Enabling" is a bit of a con, in most cases. Most "enabled" functions have multiple connectivity options - there's almost nothing that can be uniquely attributed to 5G, 6G etc - and usually the connectivity can only reasonably claim 5%, 10% etc of any overall gains. At the moment we don't know what 6G will need in terms of resources - part of the challenge at the moment is defining the priorities to minimise/rationalise this. Potentially more use of "cloud" should allow for greater efficiencies in some areas. We should probably be wary of ultra-massive MIMO and higher frequencies & what they mean for power.

20. **Will smart phone continue to play a central / hub role for other devices, or will devices have their own 6G connections?**

STL Partners: Unless 6G radios are designed to be much much cheaper than 5G or 4G, I don't expect most devices to have their own connections. That's due to both hardware costs & likely IPR loads.

21. **Any ideas about uRLLC in 6G?**

STL Partners: There's plenty of talk about microseconds, but that's probably only feasible on specific well-engineered networks like a small cell in a factory. I don't think a 2033 drone or robot in a public space will reliably get <1ms roundtrip.

22. **What is the role blockchain and AI play in making the network more secure and cognitive?**

STL Partners: Blockchains - very unclear. There might be some private DLT use-cases internal to the software functions (e.g. to ensure updates are certified, or that any billing to 3rd parties is reconciled). Unlikely to see public DLT / cryptocurrency baked into the RAN. A lot of current hype about "decentralised wireless" is nonsensical. AI will have many, many touchpoints for optimisation, security etc. The report discussed quite a lot of angles on this.

23. **What is the main driver for an Operator start having 6G discussions, when and why should they start thinking about it, in particular when at the moment, the trend is to offload infrastructure in an environment where they are still struggling to monetise 5G?**

STL Partners: Depends which part of an operator. The units involved in long-term standardisation and tech strategy need to be thinking about this now, if they want input into what 6G becomes & what aspects get prioritised. The commercial sides (eg investment decisions on deployments) are probably 4-5 years away.

24. **With all the remaining question marks for 6G open, and particularly in light of your comments that the "core" may not be "global", how do you expect that cybersecurity would best be approached by regulators (collectively, in particular)?**

STL Partners: Good question, but we'll have to duck that one. Cybersec is obviously hugely important, but an area where we don't have the specialised knowledge to give accurate answers. I think the key thing is not to consider 6G as a "special flower", but develop and apply broader rules & security models used for "advanced connectivity", whether that's FTTX, 5G, satellite, WiFi or two cans on a string.

25. **Will 6G be eco friendly?**

STL Partners: Unclear. Hopefully it will be designed "environment-first". Higher frequencies and orders of MIMO might be larger energy-hogs.

26. **Do you think 5G advanced or 6G will finally "cannibalize" WiFi service?**

STL Partners: No. The opposite is more likely, except in a handful of situations. Fibre+Wi-Fi is usually far more energy efficient than macro RAN, so offload may work the other direction. (Most Wi-Fi is not a "service" - and it's the non-service versions of 5G in private networks that are most useful here).

27. **As far as I know, the current deployed 5G phone is still using mostly below 6GHz frequency, because the signal is more susceptible to channel variation. I don't know how many customer is actually using 28GHz spectrum. How do you see this would be improved in 6G?**

STL Partners: 28GHz is being used in the US, Japan, S Korea and a few other places in quite large volumes. Probably 26GHz soon in Europe. Main uses are for FWA and extra capacity in

hotspots (e.g., airports, stadiums). I think better approaches to repeaters, small cells and perhaps smart-surfaces (RIS) could make mmWave more broadly usable.

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