WE ARE CORTEX

Automation at scale

Roaming Automation:

New Revenue, improved margins, and happier customers.

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Introduction

how automation can help drive business

The imperative for automation is — generally — driven by three (related) factors:

1. Cost reduction
2. Increased efficiency
3. The need for enhanced consistency in execution

That's because, complex networks create problems (which incur costs), which we want to avoid, and we also want to reduce the need for manual interventions and operations and to improve accuracy in delivery (so enhancing efficiency and consistency). And, these manual interventions are, in any event, no longer tenable in today's 5G SA-based networks that demand dynamic, real-time performance adjustments.

So, both provide strong motivational factors for investing in automation. However, while frequently cited, these are not the only reasons to automate telco operations.

Opportunity cost and revenue growth are also factors – and, in particular, in one operational domain that is set for significant growth: Roaming.

In this paper, the third part of our series on roaming automation, we'll look at how automation presents an opportunity to drive business and grow revenue from your roaming processes, particularly those associated with changes to IR.21 and IR.85 agreements.

Why your

roaming universe is changing

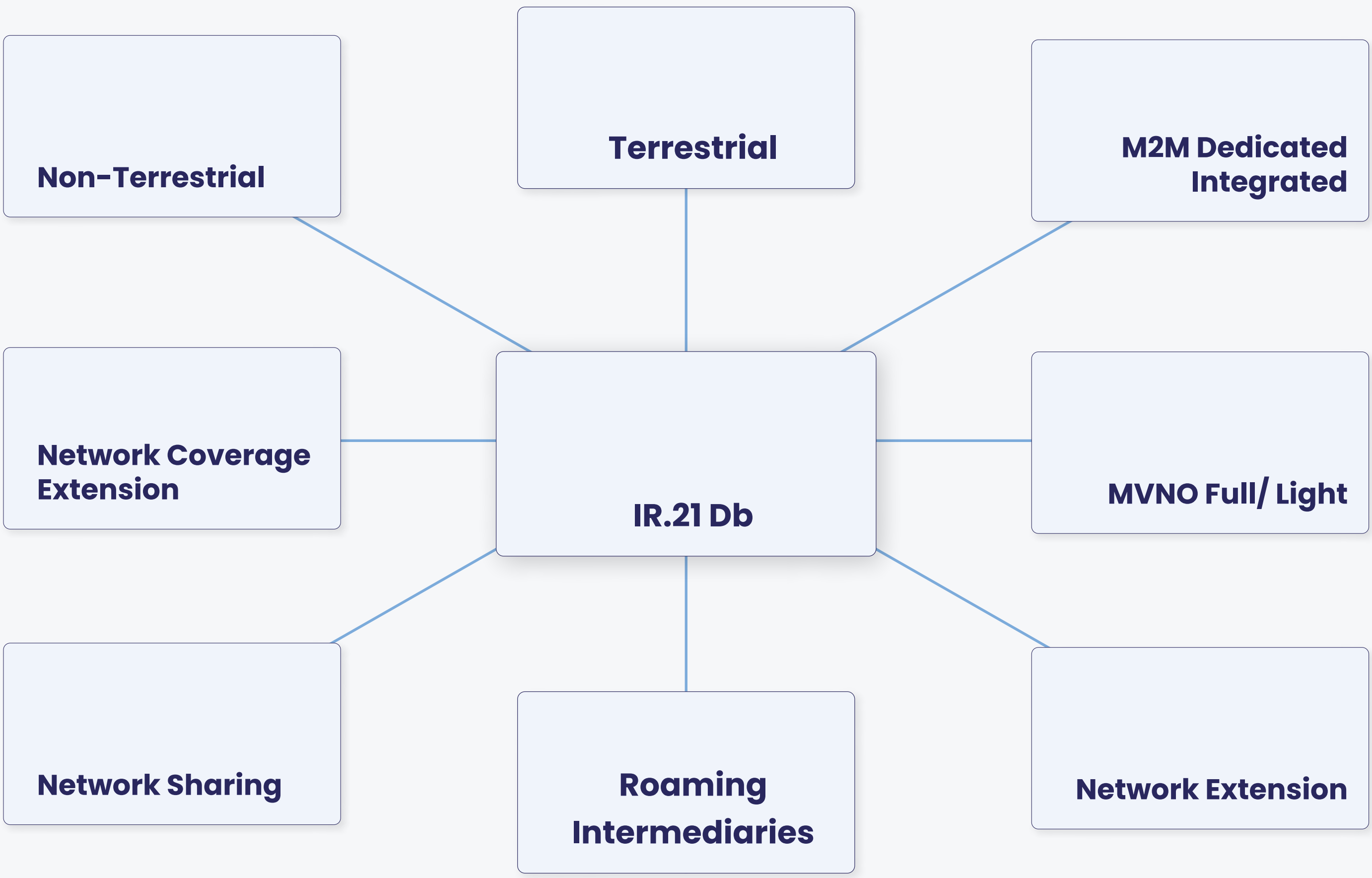
Until relatively recently, the roaming landscape for MNOs was essentially limited to direct interconnection between peer MNOs; indirect connectivity by proxy hubs to other peers; and with MVNOs that sought to create their own roaming relationships. Effectively, the key stakeholders were all providers of classical mobile services, either with their own PLMNs or with access to these through their MNO partners.

However, this landscape is changing: fast. That's partly because there are new kinds of networks, and partly because there are other kinds of services.

Among others, we now need to consider Private networks (NPNs), satellite-based networks, shared networks – and others have emerged and become part of the growing addressable roaming universe.

This expanded landscape can be seen in a handy summary from the GSMA that shows different networks to which IR.21 roaming agreements are applicable.

Network Types that IR.21 Database covers (Source: GSMA[1])



Mobility between these different networks will be essential for supporting the services they enable.

So, while you're busy focused on your classical business of MNO / MVNO roaming (and making sure that all changes to your current IR.21 and IR.85 agreements are implemented accurately), there are significant emerging opportunities.

Put simply, the time you need to spend detecting changes to your IR.21 and IR.85 agreements, assessing their impact and deploying the necessary changes – is going to expand to meet the needs of these new network partners and peers. As a result, you may not be able to capitalise on the new opportunities they present.

As noted, it's not just the new network partnerships that are emerging, it's also the new kinds of differentiated services – with new parameters and requirements to implement and assure.

So, not only will you have new potential partners, but you'll also have a much wider range of services to support (and to request) from your peers.

Essentially, you are caught in the classic Red Queen trap:

"Now, here, you see, it takes all the running you can do, to keep in the same place"[2]

The current mode of operations causes enough friction, so you can just about stay abreast of changes to your existing agreements – how can you target new opportunities if you are locked, trying to manage what you have – effectively running on the spot without moving forwards?

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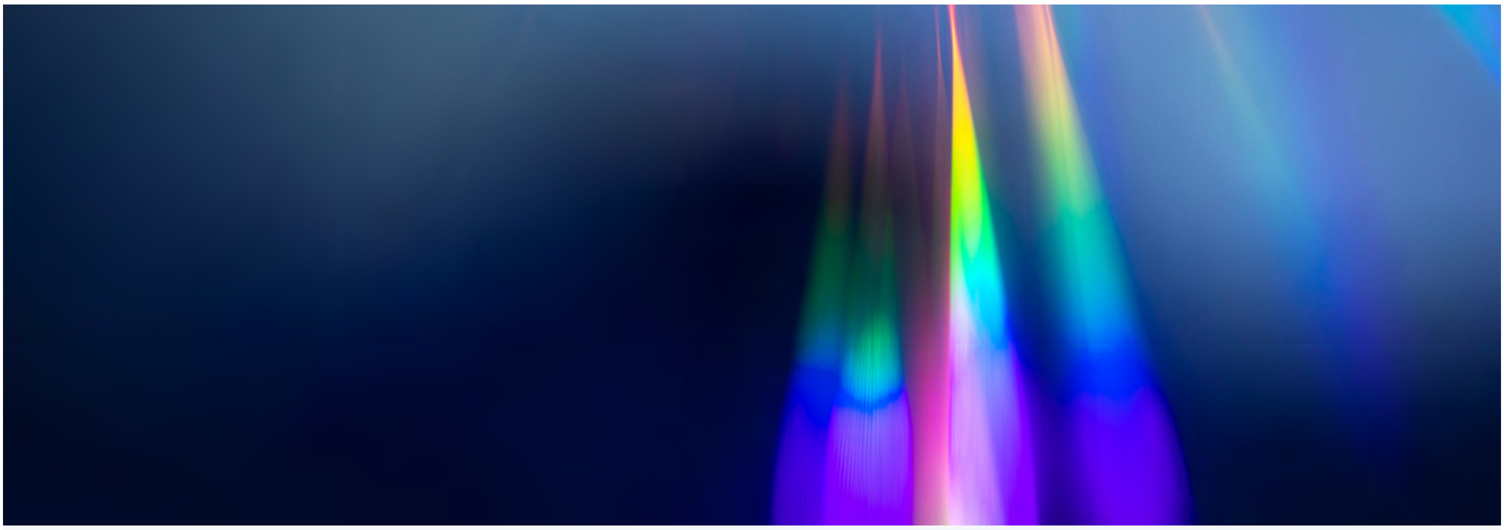

Plugging the leaks

what are you missing?

There's already friction in manual implementation of IR.21 changes, so the first win comes from targeting this – so you can free up your engineering talent to address other opportunities. By removing obstacles, you can then focus on building out new partnerships – there may be several hundred peers to which you cannot build roaming relationships – tapping this revenue stream should be an imperative.

This "revenue leakage" arises from a range of factors – and this is a growing problem, with Juniper Research reckoning that leakage will exceed $2 billion in 2026[3]. With around 1000 MNOs globally, that's several million dollars for each.

You may also be losing out on revenue because changes have not been made with the required accuracy – stemming roaming revenue leakage should be the primary target before exploring new opportunities, or because 5G roamers are misidentified as 4G subscribers, for example.

Similarly, roaming teams need to improve the efficiency of their operations for inbound roaming, where marginal improvements can result in single-digit gains, while more effective use of roaming steering can direct traffic to partners with better rates and better quality.

In this context, steering of roaming is particularly important, as it allows operators to select the most effective network, but this in turn depends on securing the right relationships.

If you do not have agreements with every MNO in key visited countries, and if you cannot perform steering, then you are stuck with what may be a sub-optimal partner.

With automation, however, you can tackle these issues, as you can more quickly close gaps in your roaming partner portfolio and also validate the configuration parameters required to correctly implement each IR and the changes that will inevitably result through time.

Taking these measures can result in the revenue growth (or reduced leakage) you need to fuel other activities. In short, your first benefits from automating IR change handling and implementation will be to generate revenue to finance new activities for your engineering team.

Scaling productivity – without incurring costs

If automation for accepting and implementing IR.21 and IR.85 changes can be achieved, then it will also drive productivity, because you can do more with less – and do so faster and more accurately.

This means that you can scale what your engineering resources do – but not by adding more team members or increasing costs, but because you can run more efficient operations, and thereby liberate time to focus on other activities.

In other words, automation enables you to refocus and target opportunities that you may not have had time to embrace or the resource capacity to consider. You can use the same engineering overhead more effectively and more efficiently – letting automation take care of the fundamental processes and removing friction.

So, in addition to reducing or eliminating roaming leakage, what else could you do with an effective automation solution in place?

The importance of

enhancing existing services and quality

For roamers, quality is an increasingly important differentiator. So much so, that the GSMA has introduced a new focus on Quality of Experience[4] (QoE), building on earlier efforts to capture Quality of Service[5] (QoS).

QoE...

"refers to a customer's overall satisfaction with a service and encompasses a variety of factors such as performance, functionality, and ease of use".[6]

QoE indices seek to measure customer satisfaction and depend on a range of measures that go beyond technical indicators. The bottom line is that customers complain if they can't quickly and easily get online, stream desired content or if they cannot complete calls when they need to do so.

As such, you need to be able to offer the best experiences to roamers, so that you can also become the preferred roaming option for your partners as they implement their own steering policies. So, since IR changes impact multiple parameters, the accuracy with which you implement these changes makes a huge different to the perception of quality, and the underlying QoS.

You may already have monitoring systems in place that track KPIs – but these are typically managed after a significant deviation is visible.

Typical KPIs include:

- Attach Success Rate
- Data Session Success Rate
- Call Setup Success Rate
- And many more

These values can depend on the parameters in your IR agreements – and so getting changes right is critical to managing roaming, because if you do get things right, you can spend less time fixing problems that are subsequently detected by your assurance systems or your customers and roaming visitors.

You can, of course, use feedback from your monitoring solutions to implement changes when issues are detected – but getting things right from the outset saves you the cost of subsequent investigations and remedial actions.

Similarly, you can more effectively manage services for your partners and support their own efforts to deliver compliance with the SLAs they offer to their direct customers – boosting your reputation as a partner and for the quality you deliver. But there are other ways to boost QoE still further – and to go beyond current service templates and definitions.

Differentiating service offers

and supporting slicing

Operators increasingly want to invest in differentiated services, which require specific performance goals. These may be for high-value customers, B2B / B2B2C partners, or for services like enhanced gaming or even for VoLTE roaming access (as opposed to classical default to CSFB). Some will be direct revenue generators, while others will reinforce competitive positions.

They will wish to offer such services to their customers while roaming – which means they will request these capabilities from roaming partners — or to deliver them to inbound roamers in their own networks.

At the same time, operators are also seeking to offer a growing range of IoT / M2M applications, many of which have requirements for roaming and differentiated performance goals.

In practical terms, this may require a user (or UE) to be attached to a particular slice (Network Accessibility in GSMA NG.147) or be permitted to use enhanced performance and for this to be actively managed.

If these expectations are to be met, the IR documents must specify the conditions demanded – which will place further requirements on your network and its service orchestration capabilities. You may be able to offer these capabilities from your IMS/VoLTE and 4G & 5G networks, but ensuring that you can do so when required by IR documents for given partners, or can meet requirements from them that depend on service optimisation means that you must be able to easily and accurately translate IR agreements into active services.

If you can do all of that, then you can attract premium roaming visitors and prices (with enhanced margin) from your partners, boosting your roaming revenue and profit – and support the expected range of IoT services. But what of brand-new opportunities?

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What to know about

embracing new market opportunities

Today, the expanded roaming universe will extend to partnerships with new kinds of networks (those we have already mentioned) that have previously been isolated from PLMNs – and new capabilities demanded through the emergence of full 5G SA roaming. These will lead to new demands.

Let's consider just a few of these.

Non-Terrestrial Networks or NTNs

MNOs are already building partnerships with operators of NTN networks. Roaming between these, while highly desirable for certain use cases, will bring a new set of requirements (and policies) for IR documents. The rules that govern how networks are accessed could be complex – a satellite-capable device could move from an NTN to a PLMN and also to Wi-Fi access, depending on location, use case and more.

And, this kind of service roaming will be applicable to different segments – it's not just P2P communication and connectivity, but also IoT connectivity. NTNs will offer both backup coverage for devices, as well as close gaps in national networks, so steering and ensuring that cost-effective coverage is matched with optimum QoS will be key considerations – and operators will need to have agreements with both peers and emerging satellite constellation partners to cover these options.

This will generate incremental revenue beyond current roaming and other sources. The GSMA reckons this could add up to $30 billion by 2035[7]. Opportunities will vary – some operators will partner with NTN providers to extend coverage options for their customers when roaming – while others will need NTNs to help extend coverage to the most remote parts of their own countries, or where building out 5G by deploying new or upgraded RAN assets is too expensive (for now).

Think Australia, Canada, the UK and other places with remote and sparsely populated areas, and islands.

Either way, strategic relationships will become increasingly important, particularly as more and more satellite-ready mobile devices enter the market.

Are you ready for this emerging market opportunity? Satellite connectivity providers need to urgently build out their terrestrial partnerships, and operators need to provide more connectivity options, so the clock is ticking — and this will mean yet more IR agreements — and introduce greater variability and new conditions.

Non-Public Networks or NPNs

In the same vein, while private networks were originally intended to be separate from public networks, they are converging towards full interoperability. Standardisation is proceeding through the 3GPP release process, but the GSMA is also alive to this, noting that:

"there are an increasing number of scenarios that are forcing enterprises to examine how their connected endpoints will stay on the network as they move from place to place."[8]

Emerging use cases cover not only endpoints that have mobility requirements, as noted above, but also employee devices that need to access NPNs securely and then move to public networks when outside the private coverage domain – or when people move from a public to private network.

Business models are evolving but such arrangements will need to be managed and there are implications for IR documents. While operators may be able to facilitate this for NPNs that they operate, they will also need to be able to negotiate with a new generation of stakeholders that operate their own NPNs, which means completing the appropriate agreements and managing all subsequent changes.

Of particular importance here, is the fact that special capabilities may be required when entering public domains, which will place further demands on MNO teams when they come to implement the required service parameters in IR documents to ensure that the required QoS / QoE is obtained.

Non-Public Networks or NPNs

The maritime sector has long operated its own networks, with some providers managing significant numbers of roaming agreements to ensure the widest range of coverage when at sea and when crew, passengers and devices are in reach of PLMNs when cruising in coastal waters, for example.

MNOs can build relationships with such providers to extend their own offers – but this also demands managing classical roaming agreements and ensuring effective change management.

Similarly, airlines are seeking to offer better connected experiences through partnerships with NTNs and MNOs.

While these may be niches, they can offer high yields and present opportunities for new offers, particularly when IoT applications are taken into the mix – think cross-border freight management across multi-modal logistics systems which transit your country via road or rail, move to sea transport and then on to road and rail again. Not only, then, are there consumer offers in these sectors, there are enterprise and IoT applications that can be targeted.

5G Standalone (SA)

5G roaming has been discussed as an opportunity for many years but full 5G SA roaming has been an almost equally long time coming. The thing about this, though, is that it is an inevitability – just as 2G, 3G and 4G roaming eventually emerged, so too will 5G SA roaming.

To that extent, enabling new 5G SA roaming agreements will be one of your highest priorities – but if you're still struggling with managing existing roaming agreements, you'll be unable to capitalise, leaving opportunities to rivals.

Of course, it's not easy. 5G SA brings new capabilities and a wide range of differentiated services, some of which will command a premium. As such, there's a host of new security considerations and possible models to support, again adding to the complexity of both establishing and then maintaining roaming agreements. For example, the GSMA sets out 4 main models:

The four GSMA models[9]

GSMA Model 1 – *Direct Bilateral* is a direct bilateral deployment model between a VPMN (visited public mobile network) and a HPMN (home public mobile network), whereby both the VPMN and HPMN have their own internal SEPP (security edge protection proxy) deployed within their networks.

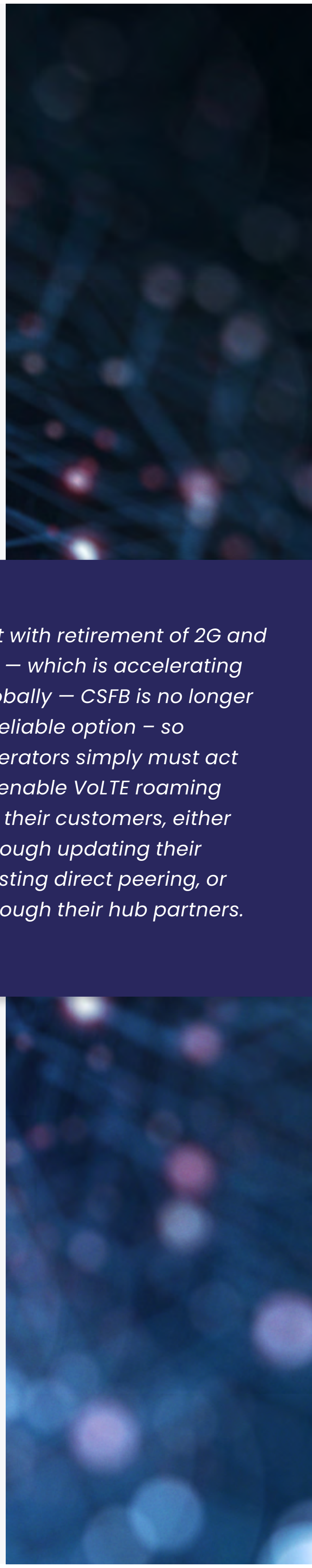
GSMA Model 2 – *SEPP Delegation* is where the mobile operators have delegated the SEPP management to a third-party service provider.

GSMA Model 3: *Service Hub* involves connecting the VPMN and HPMN via roaming intermediate signalling actors (service hub providers), based on a bilateral roaming agreement between the two networks.

GSMA Model 4: *Roaming Hub intermediaries* – global actors (roaming hub providers) – connect the VPMN and HPMN, based on a roaming hub contract.

These have requirements for new protocols, plus the interaction with and configuration of new network elements, as well as fallback criteria when 5G SA connectivity is unavailable. Despite this complexity, however, 5G SA roaming is coming – and it represents a significant opportunity. Not only for existing consumer services, but also for new enterprise offers, new premium packages, new IoT options, and much more.

As such, it's important to anticipate and prepare for this, which means sorting out your existing roaming change management processes now, so you can capitalise on 5G SA roaming at the earliest opportunity.



Voice over LTE or VoLTE

For many, this is a rather large pachyderm in the room. VoLTE roaming has been on the table for many years but, for various reasons, it's taken a long time to move to reality. The default position has been to drop to Circuit Switched Fallback (CSFB) for roamers – which delivers a sub-optimal experience.

One of the issues holding back adoption was debate in implementation model, but this has largely been resolved with the GSMA[10] providing robust guidelines for implementing VoLTE roaming, based on the S8HR methodology, as well as test procedures for ensuring accuracy when implementing both a new service and managing changes as they emerge.

But with retirement of 2G and 3G — which is accelerating globally — CSFB is no longer a reliable option – so operators simply must act to enable VoLTE roaming for their customers, either through updating their existing direct peering, or through their hub partners. So, VoLTE roaming has (or will soon) become table stakes – both to meet customer expectations and to support new services, such as in-car connectivity and mobility.

Put simply, while you may be waiting for 5G SA roaming, VoLTE roaming is unavoidable – and you need agile systems to manage your new roaming agreements – and early movers that have moved to VoLTE roaming are already grabbing preferred partner traffic.

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The business case

winning with roaming automation

First and foremost, the business case for automating implementation of RAEX changes rests on:

- Adding new inbound / outbound partners to your existing base
- Activating inbound and outbound partners faster

In both cases, automation removes friction from your existing way of working, leading to a 90% reduction in time to make the necessary changes – which means incremental revenue can be gained, faster.

But with this foundation in place, you can then target new opportunities – first focusing on VoLTE roaming and, soon, 5G SA – but also enabling you to address the expanded roaming universe and to consider new use cases, like NTNs and NPNs, as we have discussed.

Without making fundamental changes to the way in which you handle roaming and IR .21 and IR.85 change management, your teams will be unable to address these new opportunities – and cannot apply their skills to providing solutions for new services and use cases. So, while new opportunities are compelling and attractive, you need the right foundation to drive the evolution of your roaming stack. We Are CORTEX can help.

With the We Are CORTEX Evolved Roaming Solution, we will help you manage your existing roaming processes more effectively and efficiently – not simply reducing OPEX but avoiding it by growing roaming from the same asset base.

We focus on helping you to grow revenue and improve margins, so you can then invest in new services that can also be launched with enhanced profitability – driving class-leading performance.

Our references

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WE ARE CORTEX

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Kings Park House
22 Kings Park Road
Southampton
SO15 2AT

Phone: +44 23 8254 8990
Email: hello@wearecortex.com
Visit: wearecortex.com