CENSIS Conversations
Transport and logistics
Conversation transcript

GEMMA MILNE
Welcome to sensors conversations CENSIS is Scotland's innovation sensor for sensing, imaging and Internet of Things technologies.

CENSIS normal holds lots of events throughout the year gathering people from across industries to network, debate and share ideas, however, of course the challenges we've all faced around COVID-19 has meant we've had to hit pause on their regular event schedule and find new ways to engage with their communities.

So, while you may be unable to attend a CENSIS event right now, they found a way to bring it to you in a new online discussion panel format.

Our conversations will touch on engineering, technology and innovation from the viewpoint of technology developers, service providers and of course the end users.   We're going to be looking at examples of what's happening in the sector right now, challenges businesses are facing and how sensing imaging and IoT are being used to help overcome technology barriers and of course transform organisations.

So, for this conversation, we're going to be talking about some of the cross cutting challenges around transport and logistics, exploring how technology can be used to create smart, connected, integrated and of course sustainable transport networks that benefit both operators and service users

Hello everyone, welcome to CENSIS conversations. My name is Gemma Milne, I'm a science and technology writer and today we're going to be jumping into this brilliant topic of planes, trains and automobiles getting mileage from sensing imaging and IoT to deliver a smart, sustainable, Scottish transport system and I'm really excited to be joined by 4 wonderful guests.

Before we get in deep to the topic, I wonder if each of you - we could go round and do really brief introductions. Cade, let's start with you:

CADE WELLS
Hi, my name's Cade Wells and I'm one of the Business Development Managers at CENSIS.

GEMMA
Thank you, Steve?

STEVE CASSIDY
Hi, I'm Steve Cassidy, I'm a Director of Fuse Mobility and Co-founder, it's a startup in technology.

GEMMA
Brilliant and Tom?

TOM RAFFERTY
Hi there, Tom Rafferty, I'm Head of Innovation for Cofficient IoT, looking at innovation, digital transformation and leading edge IoT technologies.

GEMMA
Thank you, Tom, and finally Aimye?

AMYE FERGUSON
Hi, I'm Amye Ferguson I'm a Senior Project Officer at Aberdeen City Council working in the Smart Cities team and I'm also the project manager for an EU-funded projects CIVITAS PORTIS.

GEMMA
Thank you, thank you guys for all introducing yourself.

So, as I mentioned, we're going to be talking about planes, trains and automobiles and talking about transport and logistics and specifically how we get mileage from sensing imaging and IoT.

So, Cade, I'd love to start with you.   I wonder if you could just give us a bit of a 'view from the bridge' - give us a little bit of scene setting around this sensing, IoT and imaging space, specifically within transport and logistics?

CADE
CENSIS is the innovation centre for sensing, imaging and IoT based in Scotland. We help both private and public organisations overcome challenges using technology to help develop new products services and processes and often these processes are bringing about transformational changes within the organisations.

We've delivered over 200 projects to date and increasingly, we are seeing interest in projects in the transport and logistics space.

GEMMA
Thank you for that Cade.   So, let's kind of go round the room.
Steve I'd love to go around the room - around the room! - around the 'virtual' room shall we say!

Steve I'd love to start with you, so I wonder if you could tell us a little bit more about what you guys are doing and how that feeds into this, this new thinking around how we do transport logistics?

STEVE
Sure, yes, so we work in an area called 'Mobility as a Service', which is all very exciting. Most people have heard of 'Software as a Service', so mobility service is something that's 'newish', I suppose, and that is the idea of moving away from owning something like a car which sits on your driveway quite a lot - to being able to have a service subscription to all your mobility - and so we at Fuse, we basically -within one app- can allow you to plan, book and pay for all of your travel - multi modal travel - around the cities and different areas and it's really getting away from that 'ownership' which is quite a quite an archaic model you know. So why should you always have a certain type of car on your driveway which you never use where as you can get a whole blend of things that really work for you and your family, and this real complexity of people's lives. It's really about making people's life simple with technology and transport's very messy and dirty

GEMMA
Amazing - it also sounds like personalisation comes into that too, about being able to kind of utilise the resources in the world for each individual, for each individual's specific circumstances if that's possible.

STEVE
Yes, exactly, you know let's get something that works for you and your family, in that moment, and so you can travel easier, better – because really using a blend of modes - the car is very easy, you know you've got your car keys (it's not easy for everybody), but you know it's generally an easy mode - but if you're going to try and you do multi modal travel, you know, it takes a lot of cognitive awareness – it takes awareness. You've got to know what's out there. If you haven't used a bus for years, how do you actually know what's running, how it runs, how it works, what the etiquette is, what the tickets are? You know there in Scotland; I think there are 300 - if I look at my piece of paper - 393 bus companies in Scotland.

GEMMA
Wow

STEVE
55 million different types of tickets on UK rail – it takes a lot of cognitive, physical, economic, acuity, I think, to be able to use it. It's just to make it simple, make people aware of what options work for them – exactly right, personalisation, 100%.

GEMMA
Amazing. Lots in there about information handling as well which I would love to dive into in this conversation but for now let's move over to Tom. Could you tell us a little bit more about what you guys are focusing on and how you kind of think about this new world that we're in right now when it comes to transport and logistics.

TOM
Surely, yes, because in terms of some of the IoT technologies that we're working with just now and again integrating that with telematics, so it's an area that we are focusing on just

now, particularly with a couple of companies in Scotland, in waste management, and with a lot of fleet management companies.

So through transportation and logistics, we're covering things like fleet and vehicle tracking up-to-the-second GPS tracking on HGV, you know vehicles from driver safety, compliance, including things like predictive maintenance, operational efficiency and even through to things like route optimisation.

So, this is a system where we are integrating back end into ERP solutions for all the job management in the financial side of it but we also have live telematics including things like geofencing where we can calculate very accurately things like 'time on site' for a particular vehicle.

The vehicle draws up to a particular location on site, he's on there for a duration, a period. And the minute or the second that he leaves that geofence, there's an automated bill that's sent back to the client.

Now that's in terms of building in the efficiencies into the process. Now the other things in there is looking at some of the job management, where we can feed a range of say for instance 200 jobs per day and the route optimisation software will then coordinate that to in-cab, you know, it will you triangulate to the particular driver - he will get his plan on a mobile device in-cab and that will give him proper route optimisation and obviously looking at the directional details you know to the, to the end customer.

So, it's a whole integrated solution, you know, including the things like telematics, route optimisation and back end ERP solution. So that's where we are looking at building these three platforms, you know together, to have one – it's like almost one application where we have one sign-on, and the managed, you know, fleet managers have, you know, everything at their fingertips. Because the key thing, we're working with some of the main dealers – say like Volvo for example - you know on things like diagnostics, so we've got their diagnostic information that's going real time to particular, you know, the maintenance teams, so we can categorise the type of defects that potentially are coming up and this is where we look at AI and machine learning for predictive, you know, predictive maintenance for vehicles and that has a big impact , you know, looking at making sure that the fleets are in best health possible

So, there's a whole range of things and we are moving into areas like using/adopting IoT sensors within the you know within the vehicles themselves so that we know the capacity real time of particular tankers so that we can route them accordingly. So, there's a lot of technologies that were, you know, put into one system that gives the entire gamut of fleet telematics as it were, you know, for any transport logistic business.

GEMMA
Yes, there's definitely lots of lots of themes around there, again around information management, putting information, putting data to use but also about optimisation so we'll definitely come into some of those themes

Amye, I want to come to you for a final sort of deep dive into, into what you're doing and what the kind of current state of things looks like for what's happening in Aberdeen transport logistics.

AMYE
Yes sure, so in the introduction, I mentioned our project CIVITAS PORTIS, which is the EU funded project which looks at sustainable mobility solutions in port cities - and Aberdeen, of course, having a harbour situated in the heart of our city centre. As part of that, there are several measures that we're doing which involves technology and data and the use of that, but one of the main measures that we're looking at, which is really exciting for the city I believe, is the development of a smart journey app.

It's not quite a Mobility as a Service solution quite as yet, but it definitely is a longer term ambition to become that. But in the first kind of early development of that, what we are looking at is the integration of data, and various different sources, and how we can use that to potentially be behavioural nudges to encourage individuals out of their private vehicle and on to multi, more multi modal journeys.

But as part of that, you've got to have a whole range of active travel infrastructure improvements at the same time as that.

Just when I'm hearing the conversation, I just want to touch on another bit of really innovative work that we're doing as part of the city, not as part of PORTIS, but as part of ERDF, the Smart Cities, Scotland's eight city work.

Aberdeen City Council, we looked at intelligent street lighting, so, and as part of our procurement we had a focus more on the communications network, so we deployed LORAWAN gateways and through those gateways, we can actually control nodes on each of the street lighting columns. So, it is an intelligent street lighting project, but actually it's a much wider project than that, because we've got sensors. So from the smart belly bins that we have, we've got waste as well, air quality and flooding are all connected onto that central management system so that's another really exciting project and this goes to show that innovation happening in the city right now.

GEMMA
Amye, I'm going to stick with you actually for the next question and we'll get back to get views from the others as well, but I think something that's been mentioned in all of these kind of intros and views from the bridge, is this idea of trying to integrate many different physical systems, informational systems, different kinds of people in different kinds of jobs and with your role obviously working you know representing a city and representing the people in that city as well, what do you sort of see as the difference between the opportunity that all these different technologies are bringing versus the reality of perhaps the challenges of starting to implement. What are you up against right now that you see as something you still have to work on?

AMYE

Yes, so what's been challenging is smart technologies being quite new to me and the development of a smart journey app, like having developers behind us who are given that support is being really helpful, but what I find challenging as an officer is getting around the privacy notices, the governance around it, the data, the GDPR, and for me that's been quite challenging. You want to supply a product that's going to be helpful for your citizens, but you've got some, maybe some institutional organisation buyers that you've got to come across first, especially for something as new to it as it is for me.

So that's been quite an interesting one to come across and I hope going forward, especially when we come to AI, that transparency, that ethics in the data is going to be - if we got a checklist or toolbox for example – we're some of the first officers may be in the council to be developing this sort of thing so having our best practice now that we can now share with colleagues or other cities and organisations is really helpful.

GEMMA
I want to come to both Steve and Tom for this one, because if there's a lot of discussion about, you know, with new exciting technologies, innovation and whatnot, we often look to start-up sort of, agile companies - companies that are able to dive into these new technologies or create these new technologies and then sell them onto the market and of course with some kinds of technologies, you don't necessarily have to integrate with these huge sort of social systems again both physical and informational.   So I wonder, if you could both talk a little bit - maybe Steve we'll start with you as I know you've already worked with Amye up in Aberdeen, about what it's like from a company , how to innovate quickly you know, do all the sort of feel fast and all these ideas that we have around innovation, but the same time actually implement at scale somewhere like an entire country like Scotland

STEVE

Yes, that's a good question. I think that innovation and that agility is – yes, we came out of Fuse Mobility, came out of being the R&D division of a larger organisation, a transport services company, and it's been great. We're a little bit like pit ponies released, at being able to really look at where -really try and discover where that user value is and being able to understand what problems in everyday life, problems we can solve.

And going back to Aberdeen, Aberdeen's a great example. So, the contract there is very much built around user engagement and design sprints and co-creation and okay we've got a platform and invested a lot in the platform. That brings together all this messy data that we're talking about.   We can, through a front end, can make it all very legible, but you know, the great transport system of the future isn't going to be designed by a lot of transport people sitting in a transport room talking about transport. It's about talking to people about their real life. So we've gone through, working with Amye, we've gone through two or three or four really - depends how you define different co-design sprints - talking to people from a range of backgrounds and talked to them about the travel and then trying to say what are the real features that will make a difference to your lives?

So, that that's been good and then the scaling bit, so that's the agility bit getting close to users, that's been really exciting. The other thing about the scaling question is a good one.

So, we ourselves have a platform which can bring in data. That data is a – if there's data available and it goes back to right the earlier questions about, from everything, from remote sensing to urban traffic control data -which is something that we're getting from Aberdeen - if we can get that data into the platform, we can then, in other cities that have similar approaches, or there is open data that's available which we can maybe talk about it later (the Transport Bill in Scotland is making that more available), yes we can then implement in other places and we've learned from it from one place to another.

So, there's lots of things for example that we do with National Rail which will apply to whichever city or region we work in the UK. There's other things that are a little bit more localised and I think the last thing on that I think I would say is - it's always about - one thing that we found very early in Aberdeen was that we can be better than Google Maps if we are personalised and if we are localised. And yes, you can get the economies of scale with a big platform but you've got to make it relevant to people and their city, and their region, and their lives and so it's that simultaneous level I think in terms of upscaling that you need.

GEMMA
Yes, interesting, that kind of having to think about scale when you're talking about an entire city, entire country but the same time about that localised knowledge. I guess it's trying to get the balance between the two.
Tom I'd love to come to you to kind of talk a little bit about that from a logistics perspective because you know for this sort of everyday people that are going about thinking about travelling around the city or commuting or whatever it is - sort of supply chains and getting things from a to b is not always necessarily what first comes to mind, but it's obviously a deeply, you know, huge system, complex system, with lots going on.

So, I wonder if you could talk a little bit again about this idea of this sort of opportunity versus the implementation and what have been some of the challenges up against you guys.

TOM
Sure thing Gemma, yes, because I think one of the kind of key things we always kind of use the mantra of you know, 'Think big, start small, and scale fast'.   You know one of the key things that we're always looking at is to get quick wins very early in terms of the project, so that gives us the confidence you know in terms of the teams that we are working with. So, say for instance, when we're looking, if we're looking at transport and logistics, when we're looking at you know HGV drivers for example - how do we on board them in terms of the technologies that are available now? You know, they're going from pen and paper to, you know, even going into mobility, you know, use mobile devices as part of their everyday kind of day to day working.

So, one of the things we try to make sure that they're on board, and they understand everything that we're doing you know, in terms of the technology. We bring them in and as we said, we start it small, you know, we give them confidence that we can, you know, we're listening to, you know, what their issues are and how we address those.

So the key thing that we found as part of the driver's -and this is one of the areas that we touched on - is in terms of driver safety and compliance in the whole range of, you know,

some of the new, shall we say some of the new reports that are coming in that's available from real time telematics and all the different systems, you know, is to bring them, you know, through a driver training programme. We call this ADAS which is Assisted Driver training programme and what that's got is, we have things like in-cab video technology that's monitoring the performance of the driver. And one of the things they've got a lot of fears about you know, 'spy in the cab, and all this, kind of, you know, some of these new technologies, but the first thing we found is that you the first issue there was, I think there was an accident, you know.

It happened with one of the vehicles, but the driver was immediately exonerated because there was a real-time video that was sent to the insurance company to say that driver was not at fault.

So, the drivers were then saying, 'wow I had so much paperwork to fill in you know in the past'. It would have been you know the blame is normally given to the HGV driver but in this case, it was very clearly that the driver was not at fault.

So that was an early stage you know, example we had with putting cameras you know and these cameras have got 120 point facial recognition you know built in, so that we can tell where the driver is you know, whether he's not attentive.

So, all these technologies are supporting the on-boarding with some of the implementation programmes that we're looking at and adopting the you know telematics technologies in place.

GEMMA
I suppose then it, so sorry, on you go

TOM
The only thing I was going to touch on was the next stage of that was looking at driver gamification, you know, where we have driver scores on their performance, like harsh breaking, harsh events, even down to like speeding and fuel efficiencies and even things like crashes so each, there was a driver scoreboard and this is all available in the driver app so one of the things that we found over the course of the last three months is you know, the performance in driving has got a lot better shall we say. There's been fewer incidents, fewer accidents and again the insurance premiums have got a knock on effect as well, so that way they are saving up to 10 to 15% on insurance you know because of the systems that's in place. That's an operational efficiency and its cost saving for the business.

GEMMA
Amazing. I think there, you're touching on some really interesting points around, we touched already on privacy and on information and kind of what we're all happy to allow into our, into our systems so that I want to touch on that a little bit next.

Before we do that Cade, I want to come to you because obviously your role is in some sense a bit of a 'connector' role and an 'enabler' role connecting together the government, local governments, the companies, the innovators, the universities, and again when it comes to

this coming up with new ideas around technology, we can, we can talk about the opportunities tons and say look we could put this in here we could do this da de da de da, and of course that is part of the 'kicking off' - we have to 'ideate', but when it comes again to implementation, I wonder if you could talk a little bit about perhaps 1 or 2 of the projects that you've worked on and again what this, what this looks like in terms of marrying these innovations with realistic kind of problem solving in, in the real world and cities.

CADE
Certainly. So, part of the challenge for organisations who are looking to develop new products and services to address challenges is actually that link to end users, so in part of what we do at CENSIS, we bring together collaborations between technology solution providers as well as end users but we also work directly with the technology developer to develop these solutions.

So, two examples of projects that we've worked on are around the optimisation for fleet management and logistics hubs. We worked with one company called FuelLink, who were looking at optimising the refuelling of vehicles, whether that be vans, buses, lorries, or indeed cars, and they worked with us to develop a solution which they brought to market called VINIE, and this solution enables a vehicle to approach a petrol pump, for the petrol pump to recognise that vehicle, to recognise the driver. It downloads information from the on board computer within the vehicle about how many miles the vehicle has done, the level of fuel within the fuel tank, and dispenses the right fuel, the right quantity of fuel to that vehicle.

Now where that, that is an advantage is that's its automated, so there isn't the manual input, there isn't the requirement for filling in paperwork and that human interaction. But I suppose the other really useful benefit is that you are understanding how your vehicle's using that fuel, so it might indicate there's a problem with the vehicle that might need some maintenance, or whether maybe fuel's being syphoned when it's on the road so that there are these other benefits as well as actually speeding up the process of fuelling the vehicle

And the, the other area which we've looked at recently is around 24/7 at logistics hubs where there's this real interest of getting lorries into a bay, filled with with pallets with products on and then out again, as effectively and as safely as possible and this is where we where we were aware of solutions which would be used for smart parking solutions within cities and we were aware of a supplier of this technology.

We worked with the supplier, an end user, a logistics company within Scotland, to trial the smart parking sensors within the parking bays. They were designed predominantly for sensing cars, so the first question was 'Can you detect a 22 tonne lorry with within the bay?' and did it have the right resolution, so you could actually measure the amount of time it spent within the bay.   And, how could you relay that to the driver as well as the fleet management organisation to improve the operation to get that smoother interaction from when the vehicle entered the Depot to when it left.

So that's just two examples, but where I think it's very exciting for CENSIS is where we bring in other partners, other organisations, where we have both public sector, commercial and

also academic partners coming together to solve challenges and this is where CENSIS was looking at some of the more fundamental challenges we have in being able to effectively identify people, the type of vehicle in changing conditions within urban and rural spaces and we funded projects within this space, but also in areas where we're trying to understand that flow of people through such a diverse built environment that we have within Scotland, and this is understanding how somebody gets from A to B effectively, how you can understand the journey that they're going through but without infringing on the privacy of that individual and this is where cyber security and cyber resilience and the trust and privacy aspects that Amye touched upon come into play.

GEMMA
Yes, so let's, let's talk about about data because I think there's quite a lot to talk about data specifically, I guess it's at the root of everything we're talking about this is the fuel at the centre of all this. So you know, I think on one hand you've kind of got the questions around privacy and having to balance making things useful and being able to kind of supercharge and optimise and all these sorts of things, with possibly infringing on particular kind of rights or people not necessarily knowing what they're giving access to, but also on the other side we have a huge sort of technical challenge around making sure we've got good data, clean data, data that, that's actually relevant, and who owns it and all this sort of thing so Amye let's start with you because I can imagine in your role you must have to think about so many different elements of this shall we say 'data life cycle' and I wonder if you could just talk a little bit about, about how you've been working with it.

AMYE
So what we do at the council is that if every, anytime we were thinking about collecting data, we have to have a use case, so we've got to have a clear purpose as to why we're collecting data and how it's going to be used and the data ownership like you say.   We probably also do some sort of , paperwork, a governance around that as well, so like a data privacy impact assessment, so that kind of goes to our data protection officer for approval and we go back and advise her as and when we need to do, that but like you say there's a lot of data that goes around and we've got an open data platform that we developed as a council as part of the ERDF and Smart Cities programme as well. So that's to encourage innovation and out in the public and what, you know, there's other organisations out there, so as part of the city region deal work, we've got a digital working group and some of those partners or they do engagement sessions with the public. They can use that sorts of data sources to bring about those innovation and new products and services in the city.

GEMMA
Steve, I want to come to you because you obviously started off by talking about all these however many was 300,000, I don't even remember, you were throwing numbers at me like a lot and I think that's kind of you know part of it when we come to talking about a lot of these future technologies, it is wrestling with, with data from all different sources, trying to somehow match up data from one company with another council and so on and so forth, so I wonder, how, where are we in Scotland when it comes to our kind of cleanness of data, our 'usableness' of data as it were?

STEVE

I think, the new transport bill that was passed last year in October - it will improve things in terms of data provision from bus companies – the bus companies figure which I mentioned - 393 bus companies - so there will be new requirements on all the bus companies to provide different levels of data. So that, so that's good.

I mean, Scotland isn't too bad you know we can get data which exists and we integrate information from Google from Travelline, we just make it more more usable. But then there's other information sources, so the Aberdeen example is a good one, in that their urban traffic control data, we can bring that, so real time parking data for example or events on the network, we can bring that into the app. So, somebody has something that they can, they have trust and confidence in the information and the app and that is providing, that's a good service.

I think that's the key, I mean, words that we always come back to in most of our discussions is trust and confidence.

Trust and confidence with the input information, trust, and confidence with the output information, in the overall service, and you know if that doesn't exist, you know, we haven't got anything.

We implemented a service for young people a couple of years ago, something called Navigogo, which we co-designed with young people from Young Scot national charity in Scotland. And it was really to help people when they got to a certain age, not necessarily own a car, so that they could use, maybe get a driving licence, and use car clubs but basically not necessarily own the car. And one of the things that we spent a lot of time with Young Scot was their five rights, five rights about data for young people to know. What information to give out and what they should expect and making things very, very simple because we spend a lot of time on terms and conditions and privacy policies but we've got to make it really accessible to people and that that was a very good example of improving trust and confidence in the service.

And the other one was actually in Aberdeen; we were talking to the youth committee in Aberdeen City Council and one of the things that came out very strongly was for that personalised information. If, if people can within the apps that we develop in with our platform we have personalisation modules where you can enter a little bit of information itself then you can get a very personalised price. So if you've got a National Railcard or if you've got a concessionary pass or if you are a certain age, we can tell you what peak and off peak means to you, how much it will cost you for that trip.

And some people, the young people in the youth committee, said people can use it for without registering all that data. If they registered that data, they can get something fantastic, but they said please make sure that people understand the value of registering, please get them to know that, because it would be so valuable to us, particularly as everything's changed post COVID, and there's a lot of uncertainty on the network.

So again, its trust and confidence - put your data in - and trust and confidence - in getting that data out - and how you do it from privacy policies to making those things easy and also how you encourage people to actually use these services with confidence really.

GEMMA
So I was about to say we've gone almost, what, about half an hour without mentioning COVID, but you just did Steve, so that means we're going to have to talk about COVID as the next part of our discussion and Tom, I'm going to start with you but I want to hear from all of you guys. Obviously, working in the logistics space, we all know, it's like 'supply chain' has kind of had its moment in the news I think at the moment, obviously people really realising how interconnected our systems are and how dependent they are on - or interdependent they are rather - so I wonder if you could talk a little bit about possibly some of the impacts of COVID on the area that you work in but also how you've been able to utilise technology to A) kind of keep going during the pandemic but B) start to build new systems

TOM
Yes sure, because I, I think initially was bringing you know drivers back to work you know in a safe environment because that was one of the key issues - how do we onboard you know drivers back in, to be safe when they're actually on site as well. And to give that confidence back to the end customer that you know they're, you're basically being tested.

So one of the first things that we'd implemented as part of the on boarding process was temperature scanning and one of the things that tied in with the you know, it's all about integration So what we had was a temperature based scanning camera that was linked to - it was almost like a clock-in system, but not so much as you know monitoring for that purpose but it was more so and it was through retina scan where we're doing temperature monitoring. So, they can even use their masks for example but still have you know, temperature testing. That was all time stamped and it was all available on the driver app, so the driver can then, when he comes on site, he then has got a signed-off notification to say that 'This driver is safe', you know he has been tested. So that was the first kind of part of the process that you know we had implemented.

The next part was through the mobile app technology, where we had, we brought in sanitisation checks as part of vehicle inspections. So, through this thing called DVIR process, where we had built a mobile app for the drivers to do his daily checks. So one of the key things was about the sanitisation of the vehicles to ensure compliance on that so that the fleet manager has awareness that every vehicle in his fleet has been going through the proper cheques and regulation agreements to get people back into a safe environment

Because one of the things that you would have vehicles where they may have a change of driver and we want to make sure that you know we're compliant in terms of those change over processes. So, it was putting in an integrated temperature scanning process and also looking at how do we adopt the mobile technology to compensate for COVID, you know. And again, we put in some cleaning processes, you know through some of the new technologies for that as well in-cab sanitisation, as well as you know monitoring - and again it was all back to data, to so we had actionable insights as part of you know the reporting

applications and dashboards you know within the platform. So that come back and the fleet managers can you know can check 'one of the drivers missed an inspection this morning'- you know we would actually not allow that vehicle out of the yard. And again, we can all do that through geofencing and so, through the technology, if a vehicle had not had its sanitisation cheques and left the yard it would be - there would be an alert, an SMS message that would be sent directly to the fleet manager. And, one of the technologies that we've got in the cabs is live text to speech within the vehicle, so the camera has a speech module so that we can communicate directly with the drivers. And that was one of the key successes because in fact the company that we were working with in terms of wastewater well one of the first companies to get back, you know, to become profitable again. You know, what you actually get is full fleet, up and running within a week and he was back into profitability.

GEMMA
I think one of the big things you're talking here about is, you know, reacting to what's happened and making sure that people can get back, that companies can survive. But I also want to talk about you know, obviously putting aside a lot of the horrendous stuff that is happening as a result of the pandemic, but thinking about, particularly with public transport the opportunity perhaps that this 'pause; of sorts is giving us, to maybe rethink how we how we design, how we do things. Amye I want to come to you, to hear your views obviously from that city perspective.

AMYE
Yes, well I just wanted to kind of touch on quickly is that in Aberdeen we have the 'Spaces for People' project. Like many others Scottish cities, we've got funding from SUSTRANS to implement various different measures to help the social distancing. So, as part of the smart journey planning tool, we're looking at a 'how to' etiquette. So we already had one to make people feel more a bit more comfortable about, confident about taking public transport but now in light of COVID-19, it's more about the etiquette, so wearing your face mask, like reduce maybe timetables - the capacity on buses as well. It's like you're saying about the public transport so, so we're doing that, incorporating that hopefully into this smart journey planning app, and we're hoping to launch it soon as well. It's not fully undergone all the tests that we maybe wanted to because of COVID, but we've been thankfully doing a lot virtually for the co-design sessions to make sure there's, there's progress in it. But because of the tie in and because it could be a really useful tool for individuals in light of COVID, we're hopefully bringing that forward.

We've also maybe got some advertising space within the app as well, so what we are investigating at the moment is the potential to offer advertising space for businesses, so not only is it a journey tool but it could lend itself to help support maybe the business recovery side as well, and local economy. And the culture team at the council's been in touch with us as well, if we could maybe potentially offer virtual walking tours. Again, trying to attract people back into the city. But going back to your question, how this can maybe - the way I see is maybe be more demand responsive and going back to that whole connected vehicle side of things. And as a city as well, we're laying the digital foundations. There's a lot of connectivity. We're investing a lot in the city region deal into that, so it all brings together maybe that connected side and people could maybe have a bit more of a demand/response

if they needed a public service, but it needs to be probably more of a bus occupancy and again that's a call we've had with Transport Scotland - we understand what they're doing. And we're following up with Aberdeenshire Council who actually hold that bus data but is looking at the data format that they hold that, then how that can be integrated into the journey planning app because that's what we potentially want to do in the longer term as well

So, there's quite a lot of things in there to think of and we have a NE Bus Alliance Partnership as well, that keeps dialogue going between the local authorities, with the bus operators, and our regional transport partners too. So, it's a lot of exciting things that could happen. But as an individual myself, probably what I don't want to do is be touching, you know, machines, so contactless payment - we've already got that in Aberdeen. But again, that comes back to that MaaS solution, reduction of touching machines and so on, that sanitisation, that hygiene, or more 'hygienic' because I think it's going to be a changed world going forward.

GEMMA
I think you're spot on its bringing in mass as possibly being connectivity as you say, in managing demand as being something that I think at the moment where we're more doing out of 'need' and we just have to use these technologies in order to get that going, but actually it might, possibly I hope, accelerate some of the interesting innovations and opportunities that we've been talking about.

Steve, is this is this what you're seeing on the ground obviously working with mass every day?

STEVE
Amye's spot on with her comments and, you know, what we've been finding. I do think that there's, there's now an increased focus on, you know, I spent most of my life trying to get people to use buses and suddenly people were told not to use buses.   I just started A journey planning company, which wasn't probably the best time to start a journey planning company, so I was a little bit nervous about a few things. But one thing that has come back very strongly is that in these times, we just have to encourage people to think and to plan and again to give trust and confidence. And so, if the service is like in Aberdeen as some of the other services that we're putting out, if people can, can use those services to think about what options are available and to know where there may be some problems in the etiquette is spot on as Amye said.

I think that's just a basic fundamental need. We are doing three services on our platform there, one is for the NHS and obviously that's important, about making sure that people understand what services and what etiquette exists and how to get to, how to get to hospital. The other one is Loch Lomond & The Trossachs National Park and some of the issues that we're looking at there is in terms of car parking, particularly would be interested in real time parking, car parking and understanding where the hotspots are because obviously we've all read about various problems that we've had in, in open spaces. And then the other one is a college, Dundee and Angus College and that is to help people to, get to college better and easier, particularly if they don't have a car. And with that there's

obviously a lot of change in terms of going online, in terms of whether or not you need to come into the college, when term starts and people will be travelling much more flexibly and so then, so stop, think, plan, understand, particularly if you're going to some of these big site attract. And then think about how you're going to pay. We think the overall transactions now on transit, well in the UK, 10% - there's only 10% of transactions in the UK that are actually using money. There's a push in bus, well in general, in smart ticketing now, to go to - usually you have a monthly pass or a weekly pass. It's going to be much more 'pay as you go', there will be a push for that, and using contactless payments and so that is something that is important in terms of the offer from the public transport company, and indeed, the mass services as well.

So, a change in ticketing, change in people - how people are living their lives, but fundamentally it's the same thing – stop, think, and have the right kind of service and be prepared for what's out there with trust and confidence.

GEMMA
Awesome. Cade, is there anything you want to add on this COVID point that we're discussing?

CADE
I think for me personally, and if I, if I look to, to my family, it's, it's about thinking about journeys differently now, thinking about a wider range of options that we feel the most comfortable with. I have a personal preference not to use the car, to use public transport, but now it's also looking at actually cycling for example, and bringing that into my family's life more on a day to day basis of getting around rather than just purely for enjoyment. And I think that's a very positive change.

GEMMA
It will be interesting to see how culturally this, this changes our approach to, to how we think about transport. So, Cade. I want to stick with you because you mentioned in your introduction - how can we think about sensing, IoT, imaging, the impact it has on transport logistics through a sort of environmental green lens?

CADE
Well that's a great question and, and quite a lengthy one, I think to answer, but let's let's try. So I think in terms of IoT, one of the largest areas and one of the early adopters of the kind of principles of IoT is around environmental sensing, so for example, looking at the quality of the air that we breathe in our urban and rural spaces. And I think now, it's a great opportunity to actually look at the technologies that are actually out there, that can actually help to enhance the journeys that we do make. And just to think of an example, you could use things like air quality sensing to understand hotspots within maybe an urban area, where there's a high density traffic, a high density of pollution and maybe you're looking to reduce that level of pollution. And you may redirect bus services and you might do that in real time for example. Or you might redirect cars. But also, you may provide feedback to, to people who were walking for example through, through that area, that they might not want to walk through that particular area at that particular time.

So, there's, there's that real opportunity to actually feedback benefits, not just to people who may be using vehicles and other forms of transport but actually just people who are walking and actually occupying spaces. So that's I think a good example that something that I know that many cities and towns have looked, adopting technologies. But you know, it could be taken far more and again, I think for me it comes back to the integration with the other systems that already exist. A lot of the technologies we can use to improve services around transport within our, within our towns, cities and our villages actually already exist. It's about bringing these technologies together, ensuring that the data can flow from one place to another, that this data could be fused together to draw out new insights about the environment and transport and how the two interact. And that's where I think very much, we see a very positive action in Scotland around open data for example, and the initiative now of sharing this data, making this available, because it's engaging the public in this, this discussion. But also enabling people to experiment, to come up with new ways to understand the environment and bring about new services that can have a positive benefit both environmentally and also from a transport standpoint.

AMYE
I think Cade's absolutely on the mark, it is so much more important and in any project that we're planning now, it's really around maybe Powering Aberdeen, which is our sustainable energy action plan, as well as our local community plan of what we call a local outcome improvement plan. So environment's really top of the agenda and at full council a few weeks ago, the energy transition was recognised as part of that and as part of the diversification of Aberdeen as well away from, you know, traditionally the oil and gas, but to the low carbon kind of capital. So, the council has been investing quite a lot into environmental projects. I can say we've got the Powering Aberdeen which looks at our carbon management basically, and a lot of PORTIS has looked at the emissions of that, so a big part of that has been looking at the traffic management. So we did an upgrade or what could be called as an upgrade of our CCTV to maximise our efficiencies from the transport network, and is looking at that transport signalling maybe if things need to be re-routed around the city centre like Cade was kind of mentioning that stuff that we're looking at and doing at the moment.

Car parking, dynamic car parking is something else that we're really interested in. In Aberdeen, there seems to be, you know, people like to go to a certain car park, they don't, they don't mind if they have to wait in a key, but trying to get that dynamically so if we know that one particular area is really congested, can we move that to another area. But again, if we implement other solutions like the active travel hard kind of infrastructure we're looking at procuring a bike hire supplier as well, so there's a range of stuff that we're doing at the moment and including a low emission zone, we're looking into that. And how we can use automatic number plate recognition to kind of enforce that as well. But a big part of what we're doing in Aberdeen too, as part of the whole diversification is hydrogen. And I think Aberdeen's quite well recognised for the advancements that we have in hydrogen technology.

As part of PORTIS, we worked with private sector partners to, to get that kind of last mile delivery, so we initially had the idea for consolidation centre in the south of the city centre and unfortunately there wasn't much appetite to do that, but we could still take forward

that last mile initiative, so we've got some private sectors onboard – I can't name them yet but it's really exciting to get them on board and for their respective fleets, it's the first hydrogen diesel van that they'll have, so it's a real positive for the city and hopefully with time and more funding - because we've derisked the technology as a council so we can get more and private sectors on board with us. We've got two hydrogen refuelling stations as well so, so we're laying the foundation. We've got the EV charge points as well, because we see it as a real mixture of technologies to, well to get that kind of environmental benefits that we're really looking for as well as the economic side and sustainability.

GEMMA

Yes, so it is so important that local councils do invest. I want to go to Tom coz I think one of the interesting sort of shifts in conversation around environment or at least from my perspective when we're talking about businesses in particular is environmental concerns not feeling like this, you know, 'it's just something we do because we're a nice company' but actually because 'it's going to save us money', it's not just about sustainability of the environment, its sustainability of business so I wonder if you could talk a little bit about how you know when you're working with your various different partners and implementing these new technologies, how conversations around environment and whether or not the technologies really can provide business savings as well as the planet.

TOM

Yes, that's a really good point, because that's one of the you know, in terms of the adoption of the technologies, is looking at what the return on investment is. You know you've got the initial outlay for the installation of the telematics you know systems and software integration, so there's an initial outlay there.

But, what we're looking at, and this is one of those things where we're working out cost calculators to give you an indication of say over a six month period, you can get full return on investment back you know for the technology you put in place.

And that, that return is all about things like fuel efficiency because that's a key component of you know looking at the telematics system and this is where we've built things like fuel and energy efficiency reporting within the dashboard. You know, we're looking at you know things like the distance travelled you know and analyse the fuel efficiency against that. Looking at the fuel used you know in a specific time frame and obviously looking at those estimated costs, because the system can determine the cost of, you know, the transportation - because this is where it ties in nicely with route optimisation. Because I know that, particularly from an HGV standpoint, you've got restricted routes and, you know, low bridges and all this area. So, HGV's predominantly would take a, would be consuming more fuel because of the distances travelled.

One of the things I'd like to kind of touch on is, and Cade mentioned this, you know, in terms of looking at the environmental conditions where we can do proper route optimisation and route the vehicles away from, you know, heavy polluted areas. And that's a key component working with some partners that we have, that if we've got access to that open data, then we could feed that into the system, to then become you know, a cleaner environment.

But back on to the, some of the other cost savings - one of the areas that we've just installed recently is for example 'idle time' and this is a key component of the driver, you know, efficiency and the gamification thing that I spoke about earlier. Now what this, in

terms of true idling, gives us an indication of things called PTO (Power Take Off), so one of the things is in terms of the wastewater industry where there is, you know, they're using pumps and motors and the vehicle is idling all that time to supply power. Now one of the things we need to understand is when those motors and pumps are in operation, and we can connect directly to those to see whether – yes, the vehicle is idling and the pump is on, or is the driver just you know idling for idling stake. And that's been a key component in terms of, how do we reduce, you know, carbon emissions and obviously overall looking at costs within the business. So they are key components of some of the new reports you know that are now available, we've now got them within the platform and there now been actively using in terms of getting back to that return investment in cost saving from the initial outlay.

GEMMA
And Steve I want to come to you finally to kind of give us your thoughts on the, on the environment question too and particularly, you've mentioned quite a few times the discussion about the importance of users and I wondered if this sort of role of being personally more responsible when it comes to the environment in your choices around transport has kind of come into play when you've been doing these, these user groups and the sort of building this business that you have.

STEVE
You know, I think that people want to do the right thing. I don't ever doubt that, ever. But people need to know the options, and need to know what the difference will be that they will make by doing the right thing.
And fundamentally, in terms of transport, they have to be able to get to hospital, or get to college or – you have to let them live their lives, so if we can enable both, so allow people to make the/a better choice, that that's the way forward.
I think in terms of the environment, one of the things that we have found is, and it goes back to Cade and his family and cycling, and there's some real opportunities now, I think.

I know from some of the work that we did in Aberdeen actually, it's interesting how people - there's a high demand for understanding where good air quality was, so that you could walk or cycle through that area, and that, you know, that's feasible.

There's a whole range of different people who cycle and we talked to a lot of 'MAMIL's you know, the 'middle aged men in lycra'. And we spoke to a lot of people who you know were completely new to cycling, not confident – there will be a lot people like that at the moment. Generally, when we've been talking to people, it was the non-confident people who, who wanted, 'I want somewhere safe and quiet and I can take my time' whereas the 'MAMIL's were saying 'Well actually, I get to work in 35 minutes when sometimes I do it in 34', and so it was a different kind of offer. So, I think, presenting the information in the right form, to different people, in different ways, to allow them to do the right thing and recognising that everybody is different. And I think it comes back to where we were in terms of personalisation. If I could set my confidence level as a cyclist and be presented with a route to go for my confidence level, that would be absolutely spot on.

GEMMA

I think I mean this whole conversation comes back to, you know, sensors, imaging, IoT. It gives us lots and lots and lots of information - that's the crux of these technologies, right? And if we can find ways of connecting up that data, presenting in a way that's useful, utilising it in a way that is both optimising as well as good for the environment and whatnot, it's empowering everyone, whether its businesses or councils or individual people.
And with that, I want to ask one last question which is kind of looking, looking forward to the future a little bit.
When you think about the future of transport and logistics, looking into your crystal ball, I would love to see what each of you sees.

So, I'm going to start with Amye.

AMYE
I think there's going to be a massive change, especially after COVID, to, towards the cycling and walking and the real focus kind of on that.
And I think it's going to - this is a total change of pace maybe of life, as we start working from home a lot more. I think this whole COVID situation has just accelerated us, possibly like 10 years or something like that. And in my personal life, I always thought I would live in the city centre, but I just bought a house in the country, you know, because I know I'm going to be working from home.
It's a lifestyle change and I think that's, that's going to be part of it - - because of cycling, more introduction, more cycle lanes.
And I think at the same time, mobile is going to be king. I don't think - I think it's important to remember to be inclusive and that's something that I've really learned from the development of the smart journey planning app, but that's still really important.
But for future generations, it's the mobile, it's being connected to their mobile and being able to do things on the move, so that whole 'mobility as a service' I think is really exciting.
And I'm really hopeful for the smart journey planning too, I think, I think it's got a lot of potential for Aberdeen and the way it can go. So, for me, that's the future and I'm really excited to have played a part in it and I'm, yes, I think it's really exciting and positive for Aberdeen going forward

GEMMA
Amazing Amye. Tom, what are you seeing in your crystal ball?

TOM
In terms of technologies, is the adoption obviously, of IoT within/to drive efficiencies and cost saving. I think cost saving in terms of the current environment is probably the key thing for business and the looking at ways how can we save costs. And that's all driven through actionable insights.
It's all about getting real time information into the business, to make sure that they're making the appropriate decisions. Because just now what I see in the industry is back in the dark ages with pencil and paper and they don't have that information at hand, you know, to make informed decisions.
So, I see like, the adoption of things like, you know, sensors in the vehicles which were gaining a lot of momentum in that space just now. You know, so we've got real, real-time

diagnostic information coming in. We've got tachograph information coming in, compliance, safety, there's a whole range, you know, technologies that are available there. And again, one of the things that we're working on in the next phase is say for example, you know, load sensors within the tanks to give that and that's just a kind of small snapshot of the technology that - and what's available and where you can drive these operational efficiencies going forward.

I think ultimately one of the things that we're looking at is in terms of electrification - how do we get EV vehicles on the road, you know, in terms of, you know, the zero emission policies. How do we start driving that forward? And again, that's the kind of, the new area, new space that we're looking to drive forward.

CADE

I think I definitely agree with Amye and Tom, I think there's the changes that affect us personally. I think there's the empowerment that IoT and the greater adoption of IoT by businesses,, public sector and by people can bring where you have that choice of how you move from A to B. The positive effect on, actually health as well, taking options of cycling, walking, as an alternative to the car and the positive environmental impact.

I think the point that Tom made in terms of greater adoption of IoT, I think we'll naturally see that as companies look to be leaner, more optimised and actually be more competitive, not necessarily just purely in a local market but also in an international market.

And Tom briefly touched on electric vehicles. I think what we'll start to see as well, is greater interest in electric vehicles, particularly for last mile delivery applications. We'll see that - we've started to see that already within our urban spaces, but where I think it's quite exciting is when we start to see the technology continue to develop to the point at which we start to see deployment in the rural space and that the, the business models around EV actually adds up to, to achieve that.

And again, potential environmental impact from a very positive standpoint, at least locally for the adoption of EV for that kind of last mile delivery in those areas.

GEMMA

Yes, it definitely comes back to that sort of making sure we have the infrastructure there, to allow it to expand beyond just urban, urban spaces - you can get a little bit caught up talking about in these in these discussions. And Steve, finally let's come to you, what's in your crystal ball right now?

STEVE

National governments, local government and organisations have all been to agility and resilience boot camp. They've all had gear up and intervene and do something and it's been a really, really, really, tough journey and I think there's been lots of lessons learned.

But I think the one thing that is happened - because they've been to boot camp - they are going to be much fitter and more ready to actually intervene and do something when there's another, you know, crisis or a local COVID or issues around Brexit or other environmental issues that come up. And I think because of that, they, they want to connect more to organisations through platforms like Tom's through to the public, through platforms like our own, and enact policy and I think now particularly given that we've pretty much gone to a publicly owned transport network now, because of all of the subsidies that are going in, and there's going to be more need for bang for the buck so it's right - what can

we get out of the system? Here, what can we learn? How can we adapt? And keep that feedback loop of learning which I think all of us have been coming back to so I think that agility is something that a more empowered public sector and organisations to do something about problems that are out there and use information to achieve that and that's going to be the new, new reality.

GEMMA
Awesome, I think that's a brilliant, a brilliant point to finish on - it's not just about the shiny new technologies and all of the kind of questions around that, it really is about mindset shifts and moving forward with that open mindedness, as well as that, armed with the feeling that you actually can do things even though it might be new and difficult and all that sort of thing.
And so, thank you to Amye, to Tom, to Stephen, to Cade for joining us today to chat about planes, trains, automobiles and all the technologies that are enabling the future of transport and logistics.

Thank you very much for joining us in this conversation. I found it absolutely brilliant to hear that these things are actually happening in Scotland. We're not just talking about innovation in technology, we're living in really exciting times it seems.

So if you enjoyed what you heard, or if you have any further questions where you think CENSIS may be able to help - perhaps the project you're planning right now or challenge that you have in this space, or you just want to find out more about what they do, please feel free to reach out to the CENSIS team by visiting the website at censis.org.uk where you're going to find all the information you need about how to make contact.
Thank you for joining us