00:00:05:19 - 00:00:24:01
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Polaris is actually an acronym. A lot of people might not realize that, but it stands for Performance Oil Analysis Laboratories. And the important part of that is reliable information services. So back in 1999, they recognized very early on that our real you know, we producing data.

00:00:24:05 - 00:00:53:08
Unknown
But our real product is information right. It's not just numbers on a page. It's the actionable commentary at the bottom of that report that tells you what we think you should do with that information, how you how should it be applied? Like I said, we started back in 1999. We are ISO 1702 five certified. Like most fluids analysis labs, we're up to about 1.7 million samples a year.

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Unknown
And we do that all over the world. And, you know, seven different laboratories from here to Guatemala to Colombia, Poland and everywhere in between. So we do lubricant testing. We do fuel testing, grease and coolant as well.

00:01:10:15 - 00:01:32:07
Unknown
And these days, it's more than that, right? Because now we have all these other places we can get information from. Yeah, I come from a heavy equipment background, worked at a cat dealership for ten years, ran their laboratory, was involved in their condition monitoring and telematics. And our equipment is telling us all kinds of stuff all day, every day, almost to the point of annoyance.

00:01:32:07 - 00:01:56:02
Unknown
Right. And you've probably got, different guy handling all these different, you know, different inputs. But you can see we're looking at how how much are we idling, how much fuel are we consuming? The what's our condition of our coolant look like? How the transmission over speeds. Are we getting fault codes in our equipment? Thank you.

00:01:56:04 - 00:02:21:21
Unknown
And how can we take that and take it from a reactionary standpoint of. Oh, we saw a fart code. Let's go check it out into, you know, something that's predictive. And then like, like you said, let's just sleep at night. Right? So we've got all these things telematics, sensors, vibration, thermography. And then at the very end they're probably the oldest and most venerable fluid analysis.

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So what does fluid analysis tell us? You know, amongst all those things? Mostly it tells us three things. The condition of the lubricant itself is the lubricant degraded. Is our base number too low? Do we need to change the oil? You know, are the additives performing like they're supposed contamination control? Do we have silicone in the oil?

00:02:40:06 - 00:02:55:22
Unknown
Do we have fuel in the oil? Is there something that needs to be addressed? Right. Or in a lot of cases, even brand new product? You know, we we had a very long, presentation at our summit last week where they talked about how contaminated oil often is right out of a tote, right out of a drum. Right.

00:02:55:22 - 00:03:30:18
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So you can do baseline sampling as well. And then of course, the wear debris. What's left over in the oil can tell us a lot about the condition of the equipment. Is it failing prematurely? Are we experiencing a wear mode that's unusual for the piece of equipment that we're investigating? And, you know, we we take all that and we look at a trend over time and we determine not just based on that current, you know, sample that we've got, but the historical data from, you know, months or years of previous samples to tell us, is this an unusual pattern or not?

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So how did we get here? We started way back when, a few folks decided they were going to take their military training and, and apply that to railroad. And they, they brought some equipment back. A lot of them started with just surplus equipment that was left over from things like, Vietnam brought it back to the states, started testing oil for big EMD engines and things like that, and use that as a as a way to determine what was going wrong inside of their engines.

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Unknown
Then in the, you know, mid 90s, some of you are old enough to remember when the internet was brand new thing. And thankfully people like me at the time got to quit folding paper reports. Tens of thousands of paper reports. We were, you know, had huge machines and giant printers, and we were shipping thousands of reports a month by mail, and we were able to put all of that onto, eventually a smartphone, a tablet.

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You know, Polaris was one of the first ones that said, hey, this is an opportunity here. We can have all this information, you know, on the internet as opposed to somebody waiting three, four days for the US Postal Service to get a report to take that even further. You know, thank

goodness for Apple. And they came up with a way that we could mount a camera on a smartphone and be able to scan an asset tag.

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So now we have a QR code. We put it on an asset. We scan that immediately. It recognizes the component, and then we scan the barcode of the sample that we're going to send. Then no paperwork required. In fact, I got chided last week because one of accounts that I handle did not know that we could get away from paper, and he's got some guys that does.

00:05:05:12 - 00:05:25:07
Unknown
He desperately wants them to stop, making us read their handwriting. And he said, you mean I can get a kit and it doesn't have a paper form in it at all? And then he spent the rest of the week giving me the side eye every time he saw me, because he didn't know that about. So now he's going to go to this asset tagging, make everybody do everything digitally.

00:05:25:08 - 00:05:47:14
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No paper involved at all. No need for us to try to read your handwriting. And we took that a step further and said, now that we've got all that information, we can actually provide commentary that tells you should the oil be changed or not? So I've got a client that last year saved about $1.4 million in oil, and all he did was go to condition based oil changes.

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He started looking at the report, and the reports clearly say, run the oil for another 125 hours, 250 hours. Whatever the analyst thinks is a good timeline. Then take another sample and we'll let you know if the oil needs to be changed or not. 100,000 gallons of oil in just one of the regions that he manages per year, from using condition based oil changes.

00:06:10:02 - 00:06:21:15
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So now we're going a step further, right? We're going to take all of that information and try to make something that's even more effective in helping you sleep at night.

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So trade publication in our industry sent out a survey back in 2022 and ask a couple of questions. One of them was, what direction do you see oil analysis and condition monitoring headed over the next 10 to 20 years. And you see that by and large, most people thought sensors were going to play a huge part in that.

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And also on site laboratories were going to play a huge part in that. And we have seen some people go to doing on site laboratories and then to decide that that wasn't for them. And they've gone back to having third parties now run a lot of those labs. Right. So, but you see another huge one there is computer data analysis.

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Somebody other than a, you know, a laboratory data analyst sitting in the RNA telling you what to do with your equipment. And there's some validity to that, because one of the things that we've always said about fluid analysis is that it's about 75% science, and about 25% are when your data analyst sits down and looks at your stuff, it's highly dependent on, you know, the level of expertise that that particular analyst has and the familiarity he has with that specific piece of equipment.

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We all know that one guy that you can go ask about Cummins engines, and he knows more than everybody else does. Right. And he can tell you sometimes you can just hold the phone up while the engines run. And he can say, oh, I can tell you right now that's a lifter or whatever it is. You know, we've all known those guys.

00:07:43:01 - 00:08:01:17
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The other big challenge, as they said, is education and cost, right? And the cost of training and the challenge of training. And you see the quote there. We're failing to train the next generation. So how do we avoid running into a wall with this?

00:08:01:19 - 00:08:24:04
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You've already seen this curve. Is it going to look a little bit different than other people present? But you can see, you know, we put it into service ultimately towards the end, the failures cost us more. You see, down at the bottom there increased cost with time. So if we let the smoke out, as I call it, where I come from, we're a little bit too late, right?

00:08:24:06 - 00:08:47:11
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We're at the reactive side of doing things. This is where we do not want to find ourselves. If we use infrared, we can catch things a little bit quicker and use vibration, maybe a little, little sooner than that. Fluid analysis, probably the earliest. Now, if you're a vibe person in this room, you would probably say that fluid analysis and vibes should be switched on that chart.

00:08:47:11 - 00:09:13:19
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Right. And that's true in some cases. Right. There's cases where oil analysis is going to find it first, and there's cases where vibration is going to find it first. But that's where we want to be, right? We want to be in that predictive maintenance arena. And like I said, we've got the sensors telematics, vibration, thermography, ultrasound, fluid analysis possibly run by six different guys in six different departments with six different logins.

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Right. So it becomes critical to have something like Red list where all of that information gets put into one place. And we're going to see how fluid analysis you can impact that here in just a second. Why is that so important to do. And you know here's a good example. We have a huge construction company, hundreds of pieces of equipment per month.

00:09:34:11 - 00:09:57:15
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They're generating 20,000 telematic fault codes. If you've ever tried to handle these codes, it's much like having a partner like myself. If you were to ask my wife, who gives you way too much information and expects you to remember five critical things about their week, but that's out of 10,000 conversations. And I've told you what what I'm putting in my coffee now and all kinds of other stuff.

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Your equipment's doing the exact same thing. It's telling you all the time, I'm using this much fuel. I've got this many hours, you know, I'm in such and such place, which is great if maybe your equipment's getting stolen or something. But what if you really need to know which of those things are not noise? Well, one of the things you could do is validate that information with an oil analysis report.

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And we're going to get an example here. So you see up the top we're monitoring engine oil temperature. And down at the bottom left you can see in May we started to experience something kind of unusual where we were running anywhere from 200 degrees down to 180 or so. And then we started to really climb. Do we have a problem?

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Well, let's look at the oil analysis and see if we do. And if you look at the bottom left there, you can see from from March to May. Our base number is kind of staying steady ish. But our oxidation, our nervous capacity are increasing. So that's what happens to oil as we overheat it. It starts to essentially cook and we're oxidizing the oil.

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And that's going to increase our viscosity. So there's our our corroboration. Right. Or if we're doing an investigation, we're not just looking at one clue. We're going to find other clues that we can add to our investigation to determine what is really going on. And here's an example of where those two really did corroborate each other. And we were able to tell, absolutely, there's a problem.

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We do need to investigate what's going on with this piece of equipment.

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So what are the next steps for condition monitoring? We just talked about optimizing drain intervals but not based on time. You know, in the past what we would do is we would say, all right, we're going to change oil to the synthetic product. And our supplier tells us we can get 500 hours instead of 250 or whatever the number is, you know, or even a thousand now or more.

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We want to do that based on condition. We had an example recently where we had a client that saved $190,000 engine on a ferry in, in New York, and they found it using oil analysis. But the sample that they took a few months ago was at a level one. Absolutely nothing wrong. The sample that they took most recently at the next oil change, was critical level four.

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And they pull, you know, pull the engine found out that they were having problems internally and we're able to save it. What they weren't doing was taking a sample in between those two. They were only taking samples at the oil changes. They weren't taking an intermediate sample between. So we kind of got lucky, right? Because had we had we had that midpoint sample, we would have known that the condition of that oil was deteriorating into something was going on, and we might have called it a level two or a level three instead of it advancing all the way to a level four.

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Right. So we want to optimize our drain intervals, but not based on time. We want to do it based on the sampling.

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So that will allow us to execute what we call a data backed, risk based decision. All the way up to that same company is now repowering some of their vessels, because they've determined

that using oil analysis, that those engines just simply don't hold up in the application. Right. And that there's better options out there. And they use the oil analysis as part of the way they to make that determination that, hey, we're seeing just too many failures, too many cooling system problems.

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These engines are obviously just can't handle the loads that we're putting on them. So we're going to switch to a different model. And of course we want to move to from away from reactive maintenance, which is everybody. This today is going to tell you that same thing, right? We want to go to condition based monitoring. And we're also going to hammer on this.

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Unknown
We've got laboratory test results. We've got the equipment type. We've got your fluid manufacturer. And you know the the grade and everything associated with the fluid. The component manufacturer and what application you're in. A big part of what we do with Polaris is we you know, when I consult with people, I look at their industry and we provide them based on the millions of samples we have in our database, a benchmark for their industry.

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Unknown
How many severity threes and fours are other people in your industry you're experiencing? So if you're in mining, we use a mining data. If you're in construction, we use a construction data and we give you a benchmark in your industry, the average for severity three and four is about 15%, 16%. Whatever the number is. And then I go over the data with them and I tell them you're at 25%.

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Your competition is beating you in this regard. Right. And so that gives you something to benchmark yourself against and determine if you're, you know, are we on par with the competition in terms of our maintenance practices. But we can only do that if the AI model that we're developing has been trained, with all of this information being as accurate as we possibly can, and I'm sure everybody in this room is familiar with the challenges of just getting stuff that's as simple as just getting the hours on the component.

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How many hours are on the oil? What type of oil is it? We have to have all that information, and the easiest way to do that is communication between a computer based maintenance software and something like horizon. Again, it's garbage in, garbage out. You give us terrible data going in, you're going to get very ineffective recommendations coming back out the other side.

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Unknown
You're going to get flagged for viscosity because you told us that the wrong type of oil, you're going to get, an evaluation that's kind of generic because we just know it's a transmission. But we don't know what type of transmission. Right. So we're not able to tell you like that guy that can listen to the engine. We don't know what engine we're listening to.

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Right. So we don't have any way to determine what's going.

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All right. So we're in our case at Polaris. Like I said, we've been doing this for over 25 years. We're talking about analyzing 21 million plus samples in our database. So what we used to do the benchmark and we just talked about what a lot of people don't realize. I get the question all the time. People call me and say, can you tell me what the flagging limits are for sample 12345?

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And I say, no, I can't because our system might have run your sample through as many as 20 different flagging templates. We might have one for oil condition. We might have a separate one for that specific product. If you provided us a baseline reference sample, we'll use that. We might have one for that specific manufacturer on and on and on.

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So one sample could hit 20 different flagging templates in our system.

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So we're using all that to like I said, make condition based monitoring, oil change recommendations and maintenance recommendations. And we do that from a zero to a four, you know, so if you hear me talking about a level 3 or 4, those are the ones that are actionable, that need to be addressed. And the system that we're going to start doing it with is called Aurora.

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Right. So you've probably if you've familiar with Polaris at all, you've probably heard Aurora talked about for a long time. It is now live I think we're somewhere about 80% of our clients are on Aurora currently, and by the end of the year, 100% of them will all be using this new AI interpretation model. The effect of that is that all of the art that I just talked about, all of the

different evaluators over the years that have a little bit of a way of the way I do things, the way Billy does things might be a little bit different than the way Jacob does things.

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It's going to learn from all of that. And it already is, right. We've already trained it, you know? And then as time goes by and we start getting better, you know, more consistent information from our customers, that data will become more and more accurate and more and more product and model specific.

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All right. So like I said, we're doing this as a as a learning tool. But there's a key component to this that makes the whole thing work. And that is feedback. When we make a recommendation from the user that tells us how accurate we were, was our assessment correct? Could we have been better at determining what the what the actual cause of the problem was?

00:18:19:22 - 00:18:42:04
Unknown
And of course, so like I said, we're doing that with large sets of data. So sometimes the answers to us aren't obvious, you know, and we need machine learning in order to be able to derive anything valuable out of it. So we're we're going to have it be a virtual analyst. And we're analysts aren't going away. Right. We're not going to suddenly not have a team in Indiana.

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Unknown
Everything's not going to be spit out by a computer. But what it is we're going to do is make their jobs a lot easier, make the pattern recognition a lot better. You know, one of the challenges as an evaluator is oftentimes we will get data and we look at one sample, we look at the next sample, we look at the fourth, fifth, sixth sample.

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And then it dawns on this is something's not right with that fleet. We don't we don't catch it on the first few samples. We don't notice the pattern until we've we've had our eyes on it for several samples in a row. And then we stop and we call the customer and we say something like, hey, did you just change from dollar $400 600 because something doesn't look right?

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And they say, yeah, we did. We forgot to tell you. All right. We go back and change all the information on those samples, reevaluate those samples. And in that case, it's a very dramatic difference, right? Those two products, one of them have potassium in it. That would make you think that every sample that you sent in has coolant in the oil, which it doesn't.

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It's a it's just the formulation that chevron cooked up has something different in it. And what we're used to. So yeah, we'll catch that a lot faster than a human. I would, especially when you got eight guys sitting in a room all evaluating samples right on a first come, first served basis. And we're not necessarily looking at, 20 samples in a row all from the same client anymore because we want them first and first out.

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Unknown
You know, as fast as we can possibly get your sample done. But again, the main thing is we need the information back to the laboratory to tell us where we how accurate we were. The more feedback we get. If, you know, if you say, hey, you said I had HiSilicon and I checked it out and I didn't find one thing wrong, you know, something's going on, you know?

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Unknown
And in that case, I would tell you it's probably sampling, you know, technique. But we need that feedback. And the best way to do that is connectivity, right? You don't want your guy's not going to spend all of his time putting in information on a work order and then turn around and input all that same information into a platform like horizon.

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He needs to be able to do it in one place. So that's the idea, right? Break down the silo, not have multiple logins, have a way for that feedback loop to happen. Pretty much automatically without the guy that's inputting the information into the work order system really having anything to do with it other than doing his job.

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So you see here some of the things that you're going to happen, right. We're going to have more better utilization of the data standardization. You're going to hear that over and over and over from from these guys and everyone else you talk to, because that's critical. And in order to make this function, we're going to see a bigger picture.

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And we're going to be able to protect issues sooner. Right.

00:21:24:14 - 00:21:45:09
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Again, all of these things, you know, you heard tales, I just know about digital twins and being able to model and predict what's going to happen in the future, anticipating potential issues before they occur and being able to plan ahead. Right. And not have those nights where you got to get halfway home and turn around and go back to the shop because somebody calls you?

00:21:45:09 - 00:22:23:08
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That machine broke down before you could even make it to the house. My job is mostly this saving money. You know, you saw that slide several slides ago where they talked about the cost, the cost associated with training, you know, and how it's becoming ever more expensive. All these sensors aren't free. So the main thing we're trying to do is make you more profitable, make it easier to be predictive and then, you know, we give extreme examples, sometimes $1.4 million just on oil, but there's plenty of other opportunity there.

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And quite often there's a lot of very low hanging fruit. And it's very easy. Those initial wins are very easy to get in a lot of cases. But not everything is going to change, right? I talked about new oil and how it's contaminated right out of the gate. That's not going to change. I talked about fluid cleanliness and, you know, and the fundamentals of oil analysis.

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Taking a good clean oil sample that's not going to change.

00:22:53:13 - 00:23:09:14
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What is going to change is the data is going to become more accurate. We're going to be better at making decisions. Our consistency is going to improve because we don't. We're taking some of the art of oil analysis out of it, and things are going to obviously become more automated.

00:23:09:16 - 00:23:15:00
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All right. With that, Kyle is going to do a demo for you and that is my time. Thank you