

# OBO's "Reverse" Industry Day: Pernix Federal and Cowen Design Group

## Meeting Transcript

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BUREAU OF OVERSEAS BUILDINGS OPERATIONS



**MR. JAMES RODRIGUEZ:** Good afternoon, everyone. I want to thank you for being here with us today. This is a great event, and I'm looking forward to being able to participate. So welcome to the Department of State's Bureau of Overseas Buildings Operations Monthly Industry Day, hosted by External Affairs.

I'm James Rodriguez. I'm the new director of External Affairs. And today is our third "Reverse" Industry Day, where we take the opportunity to listen and gain insights from our industry partners, many of whom we've had the privilege of working with for many years. These Industry Days are a critical part of OBO's ongoing commitment to maintaining transparent communication and building strong partnerships with our contractors and collaborators.

For today's event, you'll first hear welcome remarks from our Principal Deputy Director, Douglas Dykhouse, followed by introduction from Mitch Miles, OBO's new Managing Director of Construction Management and Security Management. We are also fortunate to have our trusted partners, Pernix Federal and Cowen Design Group leading today's discussion.

In attendance from OBO, we have representatives from the Office of Construction Management, the Security Management Office, along with colleagues from the State Department's Office of Procurement and the Office of Small and Disadvantaged Business Utilization. Throughout the event, Lauren Lockett, our Industry Engagement Advisor in External Affairs, will be sharing useful resources in the chat. And at the end of the presentation, we will facilitate a Q&A session.

Next week, we will send out a copy of today's presentation along with the survey to collect some feedback. Without further delay, it's my honor to introduce OBO's Principal Deputy Director Douglas Dykhouse. Over to you.

**MR. J. DOUGLAS DYKHOUSE:** Thanks, James. And good afternoon, everyone. Thanks for joining today for OBO's "Reverse" Industry Day, hosted by External Affairs. I'm particularly excited about today's event, as it gives us-- it gives us an opportunity to hear from our partners to lead the conversation about a critical topic, the use of technology on our projects.

These Industry Days provide a valuable insight from our partners, and I extend my appreciation to the Pernix-- to Pernix Federal and the Cowen Design Group for leading today's discussions. This is a unique opportunity to explore how emerging technologies are transforming the way we design, construct, and maintain the facilities that support OBO's mission to provide the most effective facilities for United States diplomacy abroad.

As technology continues to evolve, so, too, must our approach to managing projects and overcoming the unique challenges we face. At-- whether it's leveraging data-driven insights for project management, employing cutting-edge construction technologies, or utilizing advanced systems to enhance security, technology is becoming an integral part of, of how we succeed.

Today's session will allow us to hear directly from our partners about how technology is reshaping the industry. I'm eager to hear from Pernix Federal and the Cowen Design Group regarding their insights on how technology is enhancing their ability to deliver innovative and secure construction solutions for OBO. But before we move forward, I'd like to introduce OBO's new Managing Director for Construction & Security Management, Mitch Miles.

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Mitch joined the Foreign Service in 2006 and currently holds the rank of counselor in the Senior Foreign Service. He has managed multiple projects, including the \$600 million new embassy compound in Brasilia, as well as projects in Vilnius, Minsk, Geneva, and Addis Ababa. He has held senior leadership positions, supporting projects in London, the Hague, Hyderabad, Jerusalem, and New Delhi. And Mitch, I turn it over to you.

**MR. MITCH MILES:** Thank you, Douglas. As James mentioned, today's event underscores OBO's ongoing commitment to fostering open communication and collaboration within our industry partners. We are excited to welcome Pernix Federal and Cowen Design Group, two key partners who have been instrumental in integrating innovative technology into our projects and helping OBO achieve its mission.

Pernix Federal is a leading construction management and general contracting firm, who has been supporting on complex, high-profile projects around the world since 2006 and currently working on our new embassy in Lagos. Known for their expertise in delivering large-scale infrastructure and diplomatic facilities, Pernix has been a trusted partner in advancing U.S. diplomatic efforts globally.

Cowen Design Group is a multidisciplinary architecture and engineering firm with a strong focus on civil engineering and site development. With 18 years of collaboration with, with OBO, Cowen Design Group has been integral to the construction of numerous posts, bringing innovative solutions to meet the unique demands of overseas projects.

Today, they will provide us with a seven-part presentation, focused on the transformative role of technology in OBO projects, exploring the tangible benefits technology brings to contractors, OBO, and ultimately, the end users of our facilities. The discussion will cover the use of cutting-edge software tools, collaborative platforms, how drone technology and advanced photo documentation have revolutionized our ability to manage projects, artificial intelligence, AI in project execution, and how it will shape the future of OBO work.

So I'm pleased to introduce three key representatives from these organizations. First, we have Ronnie Bussiere, Project Engineer at Pernix Federal. Ronnie is currently overseeing the Lagos NCC project. With over 10 years of, of experience working with OBO on various projects, Ronnie is responsible for the technological-- sorry, technical coordination of construction, designs documents, and serves as the direct liaison between the contractor design team and OBO, while supervising the site engineering staff.

Next, we have Enrique Villa, Vice President of Operations at Pernix Federal. Enrique brings over two decades of experience, leading teams in the architecture, engineering, and construction industry. He has guided national and international projects, focusing on operations across sectors like diplomatic health care-- I'm sorry, like diplomatic, health care, and military support facilities. Enrique currently manages a \$600-million international construction portfolio.

Finally, we are joined by Navid Roshan, Senior Project Manager and Civil-- Senior Civil Engineer at Cowen Design Group. Navid has over 19 years of experience in site development for commercial, residential, and federal facilities. He has led the civil engineering design and construction of more than 26 MC projects worldwide, and brings senior management expertise to tackle the unique challenges of overseas construction.

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So today's event is more than just a sharing of experiences. It's about exploring how we can collaborate and use technology to enhance our projects and meet the evolving needs of U.S. diplomacy. Thank you again for being here and for your commitment to our shared mission. With that, I will now hand it over to Ronnie.

**MR. RONNIE BUSSIERE:** Hello. Thank you for the introduction. Next slide, please. So just to kind of give a brief overview of our project, so the Lagos NCC. It's on a 14-acre plot located within Eko Atlantic, which is a reclaimed development. Similar to the Islands in Dubai, right, they, they brought in a bunch of dredged sand and built up where we're currently constructing the NCC. Next slide, please.

All right, so here at Pernix, we utilize BIM, you know, not only as we're required to. But we kind of took our use of BIM to the next level. You can kind of see on the, the right of this slide here, we have this crisscross pattern for a facade. We call it the diagrid. And within that very compact space, we have multiple systems that, that all need to work together, right?

We have a concrete structure. We have a steel structure embedded in the concrete structure, FEBR window system, as well as a UHPC facade system. And all of that, all of those systems, you know, had to fit within a space of 60 cm by 1 meter, right? Also within that same node, you know, we have four columns intersecting. We have a beam running behind it. You know, some of these steel members have flanges up to 10 centimeters thick, as well as all the various embeds that hold the windows and facades, right?

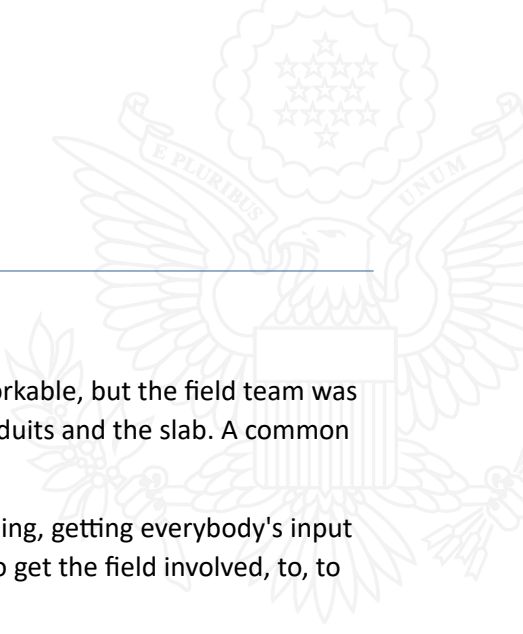
So we, we saw the challenges involved trying to complete this structure and the enormous amount of stuff that was, was packed into a very tight and confined space. And, and so we knew we had to leverage, you know, the benefits of BIM and technology to make a solution that's workable, right? So we started through the process. We modeled all the components, every piece of Rebar, every plate, every Nelson stud, everything that goes into that space.

And, you know, after our first iteration of that model, you know, it looked like a bunch of spaghetti. Everything was hitting everything, you know? And at that point, it was unconstructable, right? So we kind of took that. We, we cleaned up some of the clashes. We involved our field team, working with the designer and the various BIM teams to kind of go through this problem step by step, right?

This was an enormous effort that took a lot of people's time. And you know, basically, the output of that was, was a solution that was constructible, that worked for everybody, and that fit, honestly, within the space, right? Next slide, please.

We also adopted a similar approach to our interior space as well. So you can kind of see on the right there, this is one of our corridors coming out of our core of the building and the tower. We have a mechanical room, an electrical room, TSS telecom, and, you know, they're, they're all sitting right next to each other.

You know, of course, in typical fashion, you know, our original design, everything wants to run in the same space and didn't quite fit. So here, we kind of took our use of BIM to the next level as well, right? We put-- we modeled all the conduits, all the hangers, and, and kind of got our field team involved to, you know, find the most efficient way to kind of construct the space.



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We went through level by level and made sure, you know, not only was the design workable, but the field team was able to execute the work in an efficient manner. We also, you know, modeled the conduits and the slab. A common problem that happens is you put up a bunch of hangers and punch through conduits.

So, you know, the, the amount of time we spent kind of in the lab, so to speak, modeling, getting everybody's input together will and is providing dividends in the future, right? It's an essential part to, to get the field involved, to, to make sure what you're producing is actually constructible. Next slide.

So in further development of BIM, we also did a 4D model. So essentially, what that is we took the schedule. We took the models, and we tied them together through SYNCHRO, right? So this-- what this software does is it allows the visualization of a schedule.

Oftentimes, a P6 schedule is very complex. And I'm sure a lot of us here have, you know, spent a lot of hours trying to chase ties, those little dotted lines, all across PDFs to be like, all right, what comes next? Where does this go? And so this, this program was instrumental in kind of making that very complex material easy to digest and easy to understand, as well as, you know, we're able to show this to the field, right?

And they're able to provide input a lot easier as well. It's an interactive process. It's live, and you're able to see problems kind of easier, right? You're able to see, you know, for instance, if you have a bunch of utilities popping up and being shown in a corner of a building. Well, you know, you have, you know, a sequencing issue, and you're overloaded on one side of the building, right? So the trades need to spread out.

On the other side of that, if you start seeing walls magically appear in the air, right, you know you, once again, you have a sequence issue that you need to resolve. You know, similarly, if you have a building and now a foundation appears underneath the building, you know, you, once again, you have to go back and kind of work through that process, right?

You know, as the, the info becomes greater and greater as far as the amounts of information it takes to build these buildings, leveraging them, Lean or SYNCHRO helps, helps us to condense this information to make it easy to digest. Next slide.

So another use of technology and program we use here on the Lagos project is Hoylu. So what this does is this is basically our lean program, right? We're able to take those items in the schedule and break them down to an even finer level. We utilize Takt planning. We kind of work backwards through the program or through the problem.

You know, we break down the items in the schedule, and we're able to focus on any issues or bottlenecks we may encounter. For instance, visualizing this, you know, if a submittal is missing, you'll be able to see it. If material is late or hasn't showed up, you'll be able to immediately see the impact of this.

You know, we have these daily huddles with the key players, right? And, you know, with the use of this, we're able to discuss transitions of trades and, you know, what the various teams need. For instance, you know, if electrical needs to

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finish a certain area before the other trade can come in, This, the use of this program will highlight that and kind of allow you to focus on that. Next slide.

So one of the outputs of that program is-- you can kind of see it on the right. It allows you to focus your energy and resources in time to kind of see, where do you need to focus that? So on the upper side, you can kind of see percent complete. These are our various teams, and, you know, the amount of work that they said they were going to get done was actually completed.

But in addition to that, what we track is, why was the work not completed? What was the issue? And you can kind of see that below. So, you know, we have these categories of variance. And you know, if you see, for instance, on, on this slide here, prerequisite work, we had six of those issues during that week.

You know, if we start to see those problems over and over and over, we know, all right, well, we need to spend more time and resources to ensure prerequisite work is completed, to ensure that the plan is being executed smoothly and without delays. Next slide.

So another technology we utilize is a drone, right? And here you can kind of see some footage we take. So this, this is kind of a picture of the consular, looking at the tower. It's a little bit choppy. But so here's one of our slabs being poured on the tower.

This is a really useful tool to share with your upper management on, you know, the progress of the site. Here we're looking at one of the elevations of the facade. You can see all that Rebar and steel I was mentioning earlier in the presentation. Here we're looking at the ASMs, right?

So, oh, here we're looking at the MSGQ, VHM and UTL kind of wrapping around the corner of our site. In the background there, you can kind of see the warehouse, our fuel tank, our welding shop, the start of the SCAC. Here we're panning over to our parking garage. And working on down the line, south of the NOB. On the right, you can kind of see the canal there.

But really, this is a great and effective tool to communicate with senior management, kind of, where is the site? What's progressing? And you know, kind of give everybody an easy way to track progress. With that, next slide. I'll hand it over to Navid with Cowen.

**MR. NAVID ROSHAN-AFSHAR:** Thank you, Ronnie. I really appreciate the opportunity to present the design standpoint in some of this industry discussion. So it's a really great opportunity. There have been a lot of changes over the years I've worked with OBO in terms of how the civil design and the items that are needed, not just during the design process, but through CA and post-construction.

And I think it's really become a unified process. Before, there was a lot of different treatment between compound side, campus side, utilities side improvements and the building systems and how well they were being tracked and as-builts. So one of the main advancements, I think, since COVID has been BIM for all systems, really, we saw that advance much

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more just before COVID and through COVID, partially out of the need to address remote work and the ability to do the same kinds of interdisciplinary coordination, but not in person.

And while BIM can often be viewed only as the end product, I think, really, from the design standpoint, it's applicability is at all stages, including the design process itself, where it's, from our standpoint, a critical for avoiding issues in the field. Next slide.

So by utilizing direct coordination with Revit, Civil 3D, and Navisworks, we're able to provide clash detection at the peripheral tie-out points at the same points that oftentimes become these kinds of conflict points, So between MEP systems, underslab foundation, and the utility systems of the site. This is reinforced by doing ongoing weekly BIM coordination calls that we have initially during the design process, but then also adapted during the CA process.

During this design process, every discipline is really involved. We pinpoint errors that we are finding and have action items as to whose resolution and how the resolution is going to be made. That allows for the visual representation of those misalignments, where, before, it took a lot of time to just figure out what the misalignment was. Now these new tools are really shortening the period that's necessary to create a more agile and responsive design. Next slide.

So as I mentioned, this is really only the first step in the process. And we're seeing this adapt and change with every new project that comes out. I mean, there's new requirements even on the most recent projects on the compound side. After the IFC, you really see a kind of handover to the construction team, the coordination model, and the continued development of it beyond the 300, 400 series to the shop drawing level documentation that Ronnie was pointing to, as well as attributing that to all of the necessary scheduling assets.

We will continue at this stage to have those BIM calls with the coordination team to iron out any of those gaps that occur once shop drawings are starting to be implemented, which, with every project, will happen. This is further then developed by the construction team into the survey conformation as-built set.

And eventually, the final phase obviously is to have a high quality ad-built model that can be used both by OBO for future projects, but also the post to know where those assets are. When it comes to the compound side, it's much more difficult to get access to determine the location after the fact. So it's very critical to the campus side. Next slide, please.

By having the BIM model as a starting point, you then get to implement more advancements that OBO has really been stewarding, including the COBie and asset-tracking systems for benefits for facilities management and various other benefits as well for life cycle planning. This allows us to tie those same campus mechanical systems, pumps, valves to the BIM model directly.

In many ways, it's more critical on the compound side for this to occur because access issues on the compound side are so much more restrictive. Whether it's confined space access or simply not being able to access an item without excavating for it. So we find this to be a critical tool for establishing campuses that are able to develop and grow for the next 50 years. Next slide, please.



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There are other elements, too, that I think is beginning to implement that are great for facility management and post. I think that is the primary focus that we've seen over the last, I'd say, decade, is really creating systems that are maintainable and, and the information technology to have on hand really at a click of a button. So with that in mind, you know, products such as tracer wire in lieu of detectable warning tape, you know, allows us to track those kinds of plastic utilities that otherwise can become real conflicts.

As OBO continues to adapt and change to new program mission needs, we're seeing a lot more expansion projects and redevelopment projects. This becomes critical because on an expansion project, even though the cost of moving utilities is not a substantial cost, the schedule impact of lost days because of a found unknown is really a critical setback for projects. So this is one example of how a little bit of capital upfront investment can reduce those future impacts. Next slide.

And with that in mind, with the idea of more rehabilitation and expansion projects as being a driver, and even on new projects like Lagos, the footprints of the campuses versus the amount of program that needs to go into these projects is continuously in conflict. So on Lagos, we have created additional campus, actually, by stacking portions of campus on top of buildings and really integrating that.

So with that in mind, really utilizing things such as stormwater management in a more compact footprint, utilizing free treatment as part of the structure, and using those assets for multiple purposes, not just flood abatement and the federal stormwater requirements, but also for reuse of water, which has been continuously advanced in, in our projects is absolutely critical.

You have to use the footprint carefully so that you have more buildable space for the inevitable expansions and modifications that have to come after the project is completed. And I think, with that next slide, and I'm going to hand it off to Enrique Villa.

**MR. ENRIQUE VILLA:** Thank you, Navid. So now let's talk about the challenge. The challenge is how to educate your teams and help them to leverage new technologies. I think the question we all ask ourselves regularly is, how do we work more efficiently and help our teams?

So some interesting statistics here-- according to research recently conducted by the Project Management Institute, or PMI, the construction industry has had the lowest technological improvement by sector in the last 50 years. Now, one factor for this finding is people. As it turns out, companies in the construction industry proportionally invest the least amount of capital to educating their staff.

Now, the same research shows 7 of 10 projects are over budget. They're delayed with significant scope creep. For every billion dollars spent in construction, \$127 million is wasted. Now, what's interesting about this research is that the biggest pain point comes down to one thing-- ineffective communication. Now, this is the result of the largest conducted research on 14,000 of the project management professionals. Next slide.

You can think of this as three parts. It's people, it's process, and it's technology. AI can analyze vast amounts of data from past projects. It can process lots of regulations for you and help you to optimize your designs while proposing

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efficient plans and construction methodologies. What you'll want to consider is how to use that data to inform what you're going to do. Next slide.

One way to leverage this information is in project planning and design. Now, you saw from Ronnie earlier today in the presentation the 4D simulation, augmented reality, which is the ability to overlay digital content into the real world, to identify what's behind the data, and to see what's ahead in your schedule.

Now, let's talk about time travel. AI can digitally help you to go back and visit where you work in a particular place and time, along with relevant information participants you had at the time of the event. What was the work that was promised based on P6 schedule? What was supposed to be, be on site and installed at that time? I mean, think about how impactful that work is going to be to your jobs.

Another item to consider is information in bit-sized chunks. For companies like Phoenix that have two decades worth of diplomatic construction data, the challenge that we have is, how do you transfer that information to your teams in a relevant and useful manner. I mean, we call them lessons learned or some variation thereof, which often becomes useless to new teams and new projects. I mean, we all know it is very, very difficult to roll out these programs effectively.

Now, one exciting feature that we're seeing and we're testing is how to give our site leaders information in time. Based on the task that they're about to undertake, that is grounded primarily on three methodologies. Number one, what did we learn from conducting this task in the past? That's all your historic data.

Number two, what has the industry learned from conducting this particular task in a similar set of constraints. And number 3, what's really interesting here is, what is AI predicting are the top key items we should keep in mind when conducting this particular task?

Now, the result may be a simple recipe of-- call it 10 items, specifically tailored checklist for your PM or CM as she or he is about to embark on a particular task in your upcoming, let's say, two-week look-ahead. In other words, it becomes specific. It becomes timely. It's relevant. It's educational. And therefore, it's useful.

Now, lastly, let's talk about supply chain management. AI can streamline the logistics of getting materials to a job site on time. Predictive analytics can anticipate demand, avoid stock-outs, and even suggest alternative suppliers if needed, reducing delays, and keeping the project on track.

Now, one thing to keep in mind, and this was mentioned earlier by Ronnie, is the level of effort that you're investing in your product and your documentation. When we talk about LOD, or Level of Design, most platforms we're looking at here will require a minimum of LOD 400 to even begin to give you effective information that you can process and leverage in your analysis. Next slide.

Second, let's talk about Schedule Optimization. I was lucky enough last week to-- had the opportunity to visit the Oracle Innovation Lab in Deerfield, Illinois. One software tool that's interesting is called Alice. Alice is a platform that



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helps you to optimize your schedule. It runs on the Oracle platform, and its goal is to quickly and efficiently run multiple P6 scenarios.

We, those of us who've been involved in scheduling, we know how difficult that can be, how time-consuming that can be. But think about these scenarios as what-ifs. The first thing you'll want to do is to clearly identify your project constraints. Second, you want to resimulate and analyze data. Third, you'll want to resequence activities without violating construction logic and existing constraints.

Now, the output that comes from that is you'll receive a series of P6 schedules identified on x-axis as time and y-axis as cost. You then get to decide what is the best decision investment your team would like to make, and you can begin to iterate along the way as, as needed to optimize your project. That optimization, that level of optimization that's offered by AI helps you predict delays, such as whether, supply chain logistics, issues, labor shortages. I mean, those are all huge advantages that we're seeing as advantages to working with these platforms. Next slide.

The use of robotics. Perhaps, for us, the most useful tool that we see for us is digital imagery documentation, which gives us on-site monitoring and data collection. Drones, as you saw from the earlier video, can perform high-risk aerial inspections and nondestructive examinations so data-driven decisions can be made.

The use of robotic crawlers, for example, they're capable of performing both internal and external nondestructive inspections with remote visual inspections and ultrasonic thickness capabilities. AI-powered drones and sensors can continuously monitor construction progress and provide to your teams real-time data on quality control, research usage, which in OBO Diplomatic facilities can be pretty high, as well as to give you real lifetime information in terms of site conditions.

You can then use this data to analyze and to make quick adjustments to the project, which will help you to detect issues before they become costly problems. What's really interesting, for example, is kind of seeing the advantages of using autonomous drones and robots to perform perhaps dangerous tasks, like inspections, or even hazardous material handling, keeping your workers safe. And on safety, let's go to the next slide.

Improved safety. AI systems can predict potential safety hazards by analyzing data from sensors, cameras, and historical safety records. Our job site in Lagos, for example, can have north of a thousand employees on site at any one given time. That's a lot of people. That's a lot of resources. That's a lot of movement.

Platforms like Ideagen Damstra, which are primarily focused on safety and help you to improve this very important part of your work, can help you with incident and risk management, with fatigue tracking, as well as with compliance of HR and ERP. Next slide.

Now what's the future? The future is automating construction tasks, and power robotics are being developed currently to automate tasks like bricklaying, concrete pouring, and welding. This increases productivity and reduces human error, which, over time, more complex tasks may be automated, allowing for faster project completion. Next slide.

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The offer-- well, the offer is to produce smart building and infrastructure. AI can enhance the functionality of buildings by integrating smart systems that can optimize energy usage, monitor structural health of buildings, and enable predictive maintenance. For example, AI can analyze data from sensors embedded in infrastructure to detect issues like stress, cracks, or other signs of deterioration, allowing for timely repairs.

Lastly, I would say we remain agnostic to software platforms, but we're certainly excited about the news of Kahua. Though it's clearly not AI, it is certainly a step forward in the right direction. So we're clearly excited to see where that's going to go, and it's great to see platforms like Aconex become FedRAMP compliant and to see advances in OPC, or Oracle Primavera Cloud Platform, and seeing where that's going to go. So with that, I'll turn it over for Q&A. Thank you.

**MS. LAUREN LUCKETT:** Thanks, Enrique. We're going to-- I'm going to give a moment for our OBO subject matter experts to hop on screen and just give some insight from OBO's position on the use of technology on our projects. So Lisa, Courtney, Frank, if you could-- [INAUDIBLE], if you could hop on that would be great, and provide some initial take.

**MS. LISA KYRIIENKO:** Yeah. Hi, everyone. Just want to say thank you to the product team for sharing some of the great work that they're doing. And some of the things they are working through in general and, I guess, on the Lagos project in particular. Yeah, I think it is really exciting. I think we are trying to obviously work with our construction partners to make sure that we can implement the technologies that they want to.

Yeah, and in general, I think we're all seeing a lot of really positive things as well, especially, you know, I personally liked the story of working through some of the detail-- working through the details of the construction with the coordination phase. So I think that's my takeaway, is that the use of the new technologies, it's not just about the flashy drone videos.

It is also about, you know, how do we actually fit all of these things together. So, so that we can build it and make a design idea into an actual constructable structure? So thank you, and I think we are-- we're working right with you guys to, to try and engage this stuff.

**MR. FRANK CHI:** Yeah, Thanks for the presentation. I think that's very interesting. And I think there a lot of things to-- for OBO as an organization to think, to think about going forward in into the near future. Myself, you know, I, you know, I deal with physical security, and also in construction as well.

So I think my, my most interest or most concern is always about people on the ground, people who are actually responsible for carrying out, you know, the task and, and get the work done, and also making sure-- making sure the, you know, the people on site will be getting the materials, you know, in a timely manner so that they can continue to push forward, and also to be able to stay on schedule.

You know, Lagos, well, actually, in general, OBO project, most of the projects are being done in the challenging, you know, environment. Lagos is no different. I think Lagos is Nigeria. And being in Africa is-- it's one of those places, you know, it's always challenging to, to perform a construction project.

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And in this particular case, you know, the site, as you mentioned, it is actually done on a reclaimed land. So I think that in itself also presents some challenges that I wonder if our plannings that's considered-- you know, I understand the building is not necessarily considered a high-rise building.

But, but still, it's being-- since the site is a reclaimed site, couple of things come to mind. One is whether, whether settlement is a concern, and also whether this is a-- with-- have you considered this site in Lagos being a corrosive environment or not? That's, that's one thing I've been wondering about as during the presentation, is, is it, is, is corrosion a concern, you know, in terms of a design, and also in terms of actual execution, selection of material, and things like that, right, Pernix?

**MS. LUCKETT:** Thanks, Frank. Courtney, I don't know if you wanted to add anything before we jump into the Q&A.

**MS. COURTNEY BUSTIN:** Yeah, I think I'll just add-- thanks again to Pernix and Cowen Design Group. I think you guys did a really great job highlighting the benefits of technology on our projects. I know from a security perspective, the pace at which technology has evolved over the past 10 years or so definitely presents a challenge for us and what we can bring on site and allow in some of our spaces.

Oftentimes, it seems like we're playing catch-up to industry, but we are fully supportive of the advancements and increasing use of technology for all the reasons we just heard. I think we have a pretty solid framework in our contracts that cover IT and information security requirements. They lean on industry standards, like NIST and FedRAMP, that, that give us a level of assurance that our sensitive information is being protected.

So I would just reinforce, you know, we're here to support our contractors. Industry tends to outpace us. And so if there's an ask for us to evaluate proposals or look at new or emerging tech, just ask. Send it across so we can take a look and, and coordinate with the other subject matter experts and hopefully see some advancements on our projects. That's it for me. Thank you.

**MS. LUCKETT:** Thank you. Next slide. We are going to jump directly into our Q&A. Right now, I'm going to invite all of our subject matter experts and presenters to come back on screen. So this way, we have the full-- full fields here and answering questions for us.

And Courtney actually just went ahead and basically answered the first question we had queued up. So we're going to jump to our next one. The construction industry is facing a worker shortage, certainly in the U.S. And it's different extents globally. How do you see the increase in the use of technology impacting contractor's ability to better recruit workers?

**MR. VILLA:** It-- let me jump in here. I actually just had a conversation with a team member who's working on a test to leverage AI to help us find resources and to help us find talent. And we know that that's going to continue to fluctuate over time, so we are seeing a lot of advances in terms of recruiting. And we, we hope that that's going to be able to inform, as we start to prepare for new projects, new pursuits, to find talent and to find those resources, but also to understand how those resources may fluctuate over time.



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**MS. LUCKETT:** Thanks, Enrique. The next question that we have here--

**MR. CHI:** Can I just-- can I just have a follow-up question?

**MS. LUCKETT:** Of course.

**MR. CHI:** So in, in the case of Lagos, you know, specifically, you know, do you need to bring in skilled workers to perform the work in Lagos from another place, from U.S. or maybe in other countries?

**MR. VILLA:** We do. We complement the local labor force. Part of it is-- think of it as training. We do go through an intensive amount of training of the local resources to make sure that they're up to speed, they're up to par, that they understand the project requirements. It is a significant effort that we undertake.

And it's, frankly, part of the value and one of the most wonderful things that OBO as a State Department does is that we end up giving back an immense amount of talent back to the local communities after these projects are done, just even as a result of that training that they undergo. The, the technical requirements of doing diplomatic facilities is very high. The quality control, the expectations is, is at the top notch. So as a result, there is a lot of getting those resources up to speed.

**MR. CHI:** Thank you.

**MS. LUCKETT:** The next question that we have here-- looking ahead, how do you envision AI transforming the landscape of projects in the next few years?

**MR. VILLA:** I don't want to be the only one talking here, so maybe somebody else could take that on.

**MS. LUCKETT:** Do we have anyone from OBO who wants to jump in?

**MS. KYRIENKO:** I mean, one of the things I'm excited about-- and you guys were talking about it a little bit in terms of BIM and the design coordination, again, is, you know, what's, what's so painful in our construction projects is when we find out about something too late, right? So I really am optimistic about our industry and that some of these AI tools can-- again, when we're doing those design reviews, maybe when we're doing procurement, maybe when we're doing submittal reviews, just the earlier we can find out that something isn't working, the more time we have to do something about it.

I just, I think that might be like a really critical game-changer for our industry as a whole because, I mean, we have some projects where-- you know, we're getting to the point where we're almost done with a project, and we find out something that should have been caught in the design.

And it becomes a really costly and timely delay that nobody enjoys, right? Our construction contractors don't like it. We don't like it. So yeah, I'm really excited about some of those BIM uses that were discussed as well in terms of, again, the construction industry that struggles with. We're always building a prototype, right?

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So I'm really optimistic that this technology and AI can, can take all of those previous lessons learned, like we're also discussed, and apply it to this current, new, unique project but say, these are all the things that were challenging before. Are they taking care of on this project? Can we solve these problems during the early phases, not when we're all standing there looking at it and being like, this doesn't work? So that's something I'm excited about to help our industry a lot.

**MR. CHI:** Yeah, this is, this is something I wonder AI can help now. You know, Lagos is-- it happens on other projects, and I'm sure it happens to Lagos there. You know, the one thing that I found contractors-- oftentimes, they have-- they, they have problems to track outstanding submittals, for instance, because sometimes submittals is not-- may not be approved in the first round of submission. Sometimes, they have to be returned and revise and resubmit again, and then also provide additional data or information for real review.

So as a result, as the construction is going on, you know, on site, but, but the submittal is kind of lagging behind. And sometimes, the contractor, I found, at least on some of my project-- I have to remind them, hey-- say, hey, look, you know, you still haven't, you know, [INAUDIBLE] submittal. And you are already almost ready to, to jump into your next sequence of construction.

So as a result, you know, things has to slow down on site because the submittal is still outstanding. It's not-- you know, it's finalized. So it's-- so I'm just wondering if this is something AI can help, you know, track, and also to find out, what is the outstanding-- and making sure, you know, all the requests metals are in place and, and reviewed, and also accepted by, you know, all concerned parties.

**MR. VILLA:** Let me take a stab at it since I kind of discussed it a little bit in my presentation. So one of the things that we think that is going to be very helpful in terms of AI is being able to iterate quickly, doing multiple iterations to try to understand different results, right?

So as you bring in additional inputs-- let's say you add X number of resources, or you have this particular constraint from a supply chain because you cannot get X material to your job site. Or the manufacturing a particular part of equipment is going to be delayed by another two to three weeks. What can you do in terms of recovery, right? What can you do in terms of doing a different type of iteration to come up with a different type of result?

Right, so the idea is that AI, given a large volume of, of data and inputs, can create different scenarios for you that can give you different options, right? So OK, so I've got A, B C. If I work an extra four hours, you know, for the next however many weeks, I'm going to be able to catch the schedule by doing X, Y, Z, right?

And Then you can have an intelligent conversation, not just internally at a leadership level, but also with OBO as a client and the end user to say, would you allow this or that to take place in order to be able to accomplish this with a high level of certainty? Right, so the idea to quickly iterate with multitude of inputs, it's something that we think is going to be very helpful through AI.

**MS. LUCKETT:** Thanks. Frank--

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**MR. CHI:** Can I just ask one more question, related?

**MS. LUCKETT:** Absolutely.

**MR. CHI:** It's fascinating, actually, you know, nowadays, you know. So what about material selection? Do you think AI might be able to help in that regard in terms of, you know, selecting materials that is appropriate, you know, for this particular site, for instance? Again, using Lagos, as I mentioned, I'm, I'm concerned that because I've been to Lagos.

So, I, so I'm, so I know what kind of environment which is-- which can be corrosive, you know? Especially this project is being done, you know, near the water. So it is definitely a corrosive environment. So I wonder if this is something that AI can also be helpful, you know, in advising and selecting, you know, materials for the project?

**MR. VILLA:** No, for sure. When we started doing bridging this process, this particular project was moderate and it evolved into a highly corrosive environment. And so therefore, that had an impact in terms of material and equipment selection, right? So the idea is that AI should be able to help us, right, work through that selection process and optimize solutions, think about where the materials are going to be coming from, for example, and see the impact that, that could potentially have on your schedule, right?

So what does that-- what does that do for procurement? What does that do for your schedule? What does that do for delivery, right, in terms of being able to make sure that you have the equipment and what you need on site. So yes, it should help you with material selection, but also in terms of the optimization and coming up with solutions.

**MS. KYRIENKO:** I saw in another presentation, AI is going to be designing materials for [AUDIO OUT]

**MS. LUCKETT:** Hopefully, Frank, did you-- did you get all the answers you were looking for? Hopefully, Enrique was able to provide those.

**MR. CHI:** I do. I appreciate it. And, and I think this, this is something I think is-- yeah. I think it's very helpful when it comes to AI. This is something definitely we can rely on, I think, more and more in the future. So thank you.

**MS. LUCKETT:** Absolutely.

**MR. CHI:** Yeah.

**MS. LUCKETT:** We have a question now regarding BIM. How effective is BIM on OBO design BID build projects where the initial design from the engineer of record is incomplete, and the contractor ends up with over 4,000 RFIs?

**MR. BUSSIERE:** Oh, so I can take this because this was my last project. So my previous project was Beirut design BID build, where we had a model from the designers. And they actually used two incompatible programs to create their design. And so it created immense challenges for us, right? And we actually undertook a massive effort on that project to not only rebuild the models, but then to coordinate the models, right?

And so, you know, regards to BIM, the earlier you start, the earlier you have a contractor involved, the better the output is going to be. You know, designers are great. But they just don't have the field experience to understand what



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it takes to complete what they're drawing. And so the earlier you can get the contractor on board with that, the better your end product will be, and, and the less RFI you'll receive as well.

**MR. ROSHAN-AFSHAR:** Yeah, and I think just to add to that, too, I think a lot of what we're seeing is also a bit of a lag effect. A lot of the projects that have been DVB came out before full implementation of, I think, BIM and the newest orders and what the level of development is needed at construction level. So I think it's a little bit of a growth pains also of adapting to, I think, the, the forefront of, of what the construction industry is doing and trying to get to the more advanced level of detailing.

I think the other part that brings up is that BIM can't be done in a vacuum. I think the critical part of BIM is that you can't just model your ODR standards and call it a day. BIM is just the step one for advancing the design coordination in an interdisciplinary project, like all of our projects are.

So, you know, it has to go beyond just the development level. It has to also then go on to those detections, making sure that we advance it to the point where shop drawings can really be created from. And I think that's really where we're at with BIM now. And the unified conditions between all systems is really the critical end goal for all BIM systems.

**MS. LUCKETT:** Thanks. Switching kind of the focus, how is leveraging advanced technologies to optimize sustainability efforts? I see Lisa thinking, maybe this is one that we circle back and get everyone the answers to later on. We don't necessarily have our CS&R team or, on here. But if-- I'll give a moment to see if anybody within OBO wants to jump in on it first.

**MR. VILLA:** One thing, I guess, using Lagos kind of as a case study, early on in the design, working with the team, both at the bridging level-- because I know [INAUDIBLE] had went through this exercise, as well as us, is we went through significant testing in terms of energy optimization and PV panels, locations, shadow analysis, and trying to understand what, what that was going to do to the overall design.

So being able to justify that is, one, a fiscal responsibility for the U.S. government and taxpayers. And second, it was for us to understand, really, the impact and the, the solution. And that was all done through a multitude of iterations and analysis that went through the life of the project, both at bridging, as well as all the way through the IFC.

**MS. KYRIIENKO:** Yeah, and I think, too, I think what technology is going to allow us to do better on the operations phase of a building is to actually show maybe a little bit better the payoffs and the optimization of those design choices. So, you know, again, the, the industry in general, not quite OBO yet, but is looking at continuous monitoring-based commissioning, and just different tools that will-- you know, there's lots of articles about, you can design a building as a net zero building.

But then someone runs the ice cream freezer or something, and it throws it all off. So I think all of this is going to help us build the buildings-- you know, make the right choices up front, build the buildings and have them perform the way they were supposed to be, and then keep them performing that way during operations.

**MS. LUCKETT:** Thank you.

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**MR. CHI:** Yeah, this is-- yeah, this is an interesting question about, you know, sustainability because it involves, inevitably, costs because you want something to last, to be able to be that you can rely on, you know, reliably over, you know, extended period of time, something that will not disintegrate or degrade over time.

All that eventually is going to come down-- not come down to, but, but result-- there is a cost aspect of it. And that's something-- you know, I-- you know, it's just a question in my mind that, you know, how OBO was State Department. We, we should look at it because typically, when we win OBO a world contract, we will look at-- we look at the cost proposal. And then most of the time, that is a critical deciding factor.

However, you know, sometimes, you know, I think we should-- actually, I guess this is a question that we have to ask ourselves internally. We should also look at, you know, the selections, the, you know, choice of material, the, the way, how the system that we want to be-- to be constructed, you know, how that's going to help us in the long run. And then take that into consideration, and not just the immediate cost, you know, for the project.

So this is something I guess is a question that OBO, especially the senior management, you know,

**MS. KYRIENKO:** Yeah, when I--

**MR. CHI:** --if you think about it, right?

**MS. KYRIENKO:** Yeah, I mean, we definitely do make those decisions while we're developing and designing the projects and how we build them. And, and yeah, I think maybe just the next phase of that for the industry is that we're not just talking about lifecycle cost projections. We're actually able to collect the data to show that those, those choices, those systems are really paying off the way we thought they would. And then that will really sort of, you know, secure the future of those kinds of life cycle cost analysis-based decisions, which, which OBO does do. But yeah.

**MR. CHI:** Actually, maybe there's something. I wonder if the contract-- we can also ask the contractor to help us out. You know, as part of the proposal, they can also demonstrate the cost saving or the efficiency of, of the facility is, is going to provide, you know, over a long-term basis and then show that, you know, their proposal is better in, in the sense of, you know, of efficiencies and cost saving, you know, and, and as part of the proposal.

I think that that would be helpful, you know, I think, to OBO. And I, and I, and I just wonder, you know, if this is something that, you know, OBO will consider, you know, in, in the future when they send out a request for proposal to ask the contractor to-- that they include that as part of their consideration.

**MR. VILLA:** Well, one thing to consider, which I think is really interesting, it was part of-- it was discussed in the presentation earlier. Going back to the question here, which was energy optimization and panels and things of that nature, when you think about the Department of State as owning the asset from the beginning all the way to disposition, right, one of the things that AI is proposing to do, which I think is fascinating, is to be able to give you the predictability of potentially the failure, the maintenance associated with some of his equipment.

So you begin to see when you begin to degrade to a certain level by receiving data, by receiving information to say, by X year, I'm going to need to be preparing my budgetary, you know, my teams to be able to replace, replace X, Y, Z,

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right? I was predicting that it was going to last 20, 30 years. But in fact, it's going to be, the way that I'm using it, maybe 20, 25, right?

Because you're using-- you know, Lisa was talking about additional ice cream machines or something. I don't know. So depending on those kinds of things, being able to get that information so you don't get to failure. You get to help prepare for those adjustments over time. And that's interesting information that I think is certainly coming up.

**MR. CHI:** That's great.

**MS. LUCKETT:** Thank you.

**MR. CHI:** That's great.

**MS. LUCKETT:** OK, next question we have-- has OBO engaged in automated construction, either 3D-printed concrete or robotic bricklaying, in a specific project yet?

**MS. KYRIIENKO:** Luckily, my computer-- I don't know why my computer is glitching. But I know we're studying it. Don't know that we've done it in a project yet, but we're studying it along with like different parts of the government. Obviously, for us, the added challenge is having it comply with our blast and our [INAUDIBLE] requirements.

But definitely something we are looking into and, yeah, especially maybe for-- I was thinking like maybe we can have a 3D-printed construction office one day that can work out of. So we'll see. Still, still in development.

**MR. CHI:** I don't know. When I went down to Florida in March, I actually saw a building done by 3D, you know, a 3D printing method, you know. But it's just a very simple building. It's not, you know, a complicated structure.

So, so what I'm trying to say is, you know, I think, based on what you know and I know about OBO's project, you know, the complexity of the project, the building, and the security requirement that we had to meet, I think we still have a way to go in terms of using or utilizing, you know, 3D or, you know, some kind of events, construction technique.

Most of our project will have to, you know, meet both physical security, and also blast requirement. So we will, we will definitely have to get our DS colleagues involved. You know, if we are-- you know, if this is something that we want to look into it in the future. So at this moment, I would say, we still have a way to go in that regard.

**MS. LUCKETT:** All right, thank you for that. Next one is about our occupied posts. How can AI help phasing development on renovation projects at occupied posts? So, I mean, this could just be an occupied building in general. So this doesn't have to necessarily be specific to OBO, so I want to open the floor to everybody. Not all at once.

**MR. VILLA:** All right, let me take a first pass at it. So one of the things that we're seeing in terms of the platforms that, that we're evaluating is, is being able to provide inputs on construction logic, right? So, so in order for you to be able to get the best output on all these platforms is it's all related to the constraints that you put on the software, right, what you're asking to do for you.

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So if you have an occupied post, you're going to have an additional set of considerations that you have to put into place in order to be able to create logic that is going to help you with the right level of results. In an occupied post, that's a lot more complex. And what's interesting in the question is that modernization is a big component of clearly what we're thinking is going to occur, right?

So you've got a lot of existing facilities that are going to require significant adjustments along the way. How does AI begin to inform all of that? And I think, in order for it to be effective, you have to have a more dedicated effort in terms of providing the right level of constraints.

**MS. KYRIIENKO:** Yeah, and I know we've been exploring the technologies associated with capturing. I don't know what it's called, LiDAR or whatever it is. Those little-- the ones that capture the existing conditions as well. And you can imagine a future where, you know, maybe 20 years from now, when we're going back and we do still have BIM models and we do have all this active data, I think it's a capability we're probably unlocking by establishing some of the models and the data that we're doing right now.

**MS. LUCKETT:** Great. The next one came in specifically for Pernix. Can you speak to how much time on-site is reduced by using modeling and AI off-site?

**MR. VILLA:** I apologize. I didn't hear the question. What was-- can you repeat?

**MS. LUCKETT:** Oh, no problem. Can you speak to how much time on-site is reduced by using modeling and AI off-site?

**MR. VILLA:** We're very limited in full disclosure in terms of the AI that we've been able to implement, just due to the security constraints. For us to use drone footage has been fantastic, has been phenomenal. And I think what we're trying to do is we're trying to push the envelope by not just documenting the process, but also creating data sets that we can then look back to and make it useful, even for future projects.

So Lagos, like we said earlier in the presentation, is very much a case study for us. Hoylu is a case study for us. A lot of these platforms we're testing in Lagos is a perfect project just due to the nature and the size. And it was something that-- you know, it's a-- it was truly a greenfield, brought in from the ocean into Eko Atlantic. So it created the right set of conditions for us.

In terms of time and in terms of time savings, what would tell you is that there are some elements that we would have been very hard pressed to resolve without the technology that we've used. And Ronnie talked about one in particular, which is near and dear to my heart, which was Navisworks.

For us to be able to resolve the core coming up on the tower, multiple levels, with the level of adjacency that we had without getting to that high level of precision, it would have been almost impossible for us to get all the SMEs, all the parties in play to come to an agreement in terms of what would be acceptable, because we were basically pushing the envelope in terms of what was accepted from an OBO perspective, from a building perspective, from a technology perspective.

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So in terms of time, I don't know if I have the right answer for that. But, but in this particular case or case study, it's helped us to be able to move the project forward.

**MR. CHI:** Yeah, I think I can certainly appreciate-- and I think this is where Courtney comes in, you know, in the play. You know, we-- for OBO project, you know, security is always a concern during construction, so-called construction security. And this is, is always a challenge, you know? And I, and I think Courtney probably have more experience than me on all this project in the past.

And we have to do multiple times, you know, during the phase, during the course of the project, you know, that you had to comply with construction security. And we had to coordinate with a lot of people, contractors, site security managers, and even sometimes, even Diplomatic Security people. It's a challenge.

And I-- and this is where-- yeah, you know, maybe AI-- maybe AI can also give us a hint on that. But ultimately, I think that's something really has to be dealt with, you know, on-site by, by, bringing-- by, by bringing everybody to the table and try to work it out.

**MR. ROSHAN-AFSHAR:** I will say, from the design perspective, I think viewing this against 10 years ago and how construction went through from a CA standpoint, I think the, the biggest advancement has been how quickly the inevitable conflicts that do arise in a complex construction project can be resolved. You know, before, the communication lag between on site to back to the design team and back. That was a real friction for the schedule.

I think now it's, it's a much quicker process from what we're observing in terms of getting the information about what's being seen in the field, relaying that to the models, to the coordination sets, and getting the correct answers back out. You know, how to quantify that, it's hard to say, because we don't have a base case of not using it, really. But I think it has significantly improved, especially because the projects continue to get more and more complex.

**MS. LUCKETT:** OK. Next question is regarding security. What technology solutions are implemented to enhance the security of OBO facilities, both physical and digital?

**MS. BUSTIN:** Since that's for security, I guess I'll take it.

[CHUCKLING]

I'm not sure if the question's for temporary or permanent. But I think in both instances, we have pretty robust programs for both physical and, and for technical. I mean, our, our technical security systems, Frank and I are not from that branch.

But our alarm systems, our camera systems, the systems themselves are managed by DS. So I couldn't really speak to the emerging technology stuff they're using. But we use technology on sites and use them to protect our existing missions. Frank, any comments? You're on mute. You're still--

**MS. LUCKETT:** Frank, you're, you're on mute, Frank.

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**MR. CHI:** Sorry. I was just saying that I wish my DS friends is on-- is on call so we can call him up and provide us his input. I think, I think the on-site security-- you know, we rely on our security people in on-site quite a bit, you know, to, to make sure that the project is done in a, in a secure manner and meet all the security requirements construction-wise. But I don't really know much about the actual technique or technology that they're using, actually, to be honest with you.

**MS. LUCKETT:** Not a problem. We can move on to the next one. How does OBO use data analytics in identifying potential project risks?

**MS. KYRIIENKO:** So, I mean, I think, in general, we try to do it the same way everyone else does. [CHUCKLES] But we are-- you know, that's an effort that OBO is undertaking right now as well. You know, I think everyone's riding this wave of-- you know, we had data analytics for a while, and we've had data visualization. But it kind of seems like we're at this perfect moment where the technology is coming together to just allow it to all be done so much easier.

I mean, I remember six years ago, we were talking about data cleaning and how all the data had to be just perfect. So that you could ever possibly learn a lesson from it. Now the technology is helping all industries and everyone. It doesn't have to be perfect anymore because the machines know how to read. They know how to read drawings. You know they know how to-- and I guess that's AI, right?

It knows how to just take a lot more-- like a big quantity of data and do some of that analysis and cleaning for you. So we're still-- we're still working that out. But yeah, I think that's definitely a goal is for us to be able to look across our program, across our projects and really see, you know, what, what is always causing a delay? Or what is always causing a risk?

We have some-- you know, we do it a little bit manually now, too. We know what the risks were on the last project, and so we apply them to the current project. And we use those to do the model risk simulations and things like that. But yeah, I think it's something else we're working to really unlock the full potential of right now.

**MR. VILLA:** The one thing that we see that is kind of interesting, and I kind of touched upon it when I was talking about some of these Oracle Base platforms, like Ideagen, you know, we've all gone through the ACFs. And we go through the iris scan, right? That's very much a straight-on security protocol.

But in the future, what we're seeing is that, that iris scan is going to give you all kinds of data and information about that particular resource, right? So it's going to be able to measure items like fatigue. It's going to be able to tell you what, what kinds of training they may or may not be missing, right, the type of security.

So it's going to inform all kinds of things that are not just necessarily connected with just raw security, but also in terms of safety and operations, right, so managing large, large numbers of people, a thousand-plus, again, being able to give you information that is live, but also predictive is, becomes incredibly useful.



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**MS. LUCKETT:** We've got a question that is calling on everyone to draw from their experience. Have you found that the technological tools discussed today have a greater or more critical role in an overseas context than they would a domestic context?

**MR. ROSHAN-AFSHAR:** I'll jump in from the design side. I mean, I think the, the nature of the remoteness, working on these projects, not on-site, it does assist in that way. There's a common sort of interface that we're able to now use where before, it required a lot more extensive communication to depict those, those issues. So definitely from a design side, it assists for these remote projects.

**MR. BUSSIERE:** And, so I'll step in a little bit from the spike site perspective. Absolutely, it does help when you're able to resolve an issue using technology beforehand, right? In domestic work, if you're missing material or a stud, it's a call away maybe a few hours or a day at the most. Where we're at, you know, that could be weeks to months. So you know, leveraging technology to make sure you have everything to go as planned is essential for our operations.

**MR. CHI:** Yeah, I think maybe there's something Pernix can give us more insight from their perspective. I know that, you know, certain materials have to be shipped secure, you know, because all our projects are overseas. So I think that also presents some challenges to, to you guys, I'm sure.

So is, is this something that you can comment on? And how do you deal with it? You know, or whether, whether you utilize any, any technology to help streamline the process or make-- or making sure the shipment meets the security requirements, all the way from, from the vendor, you know, from the shop, you know, to the site.

**MR. VILLA:** Well, one thing that I would say is it's, it's interesting to see the, the level of control that we're seeing from some of our vendors and the information that's then being provided to us, even in their manufacturing process. You know, we haven't touched upon it on this particular call.

But some of the vendors that we're working with, particularly UHPC as an example, I mean, the level of analysis that they go through in developing their panels and the careful orchestration that they then have to go to in terms of, you know, storing, preparing, shipping, all the logistics, all the way to getting to our job site to then installation, I mean that requires an immense amount of rigor and information.

And they've also seen-- I've seen a lot of progress in terms of how technology has helped vendors with the information and the coordination that then is provided to us, which feeds our schedule, which feeds, you know, the production, which feeds resource usage, all kinds of different things from an operational perspective.

**MS. LUCKETT:** All right--

**MS. KYRIIENKO:** Well, and I-- sorry. I was just going to magnify really quick that, yeah, that is the key difference about working overseas, working, working domestically, is what some of our team members said. So any technology that helps us be more proactive to discover problems before they're literally upon us-- like, when we can catch problems during the design, when we can catch problems six months ahead of time, not one week ahead of time, all of that, it's

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beneficial to domestic construction projects. It's game changing to our overseas projects. So I think the increased risks we have when we're trying to do these projects, this technology can really help make a difference.

**MS. LUCKETT:** This may be our last question. But this is-- came in for everybody. What emerging technologies does everyone anticipate will significantly impact OBO's projects in the next few years? So what are we seeing out there that we think are really going to make an impact for us? Anyone?

**MS. KYRIIENKO:** I'll start because then maybe this will be my last talking bit. And I'll be done. I really think that we have not fully unlocked the capabilities of BIM, right? I mean, again, for 10 years, we've been talking about the 25 use cases of BIM. And it's, it's good to see it being used more and more.

But like Enrique was saying, like, now that the, the fabricators are using it and the vendors are using it, it's really all starting to come together. And again, to what I was talking about before, I think maybe the ideal is you get to a place where you are virtually constructing a building before you try to do it in real life.

And if we get to the point where that is easy enough and effective enough to do, that could really, I think, make a difference in our ability to really execute our program. So, you know, not, not just the technology that's available for buildings and design and things like that, but just for our industry to really reinvent itself. I think about that, that quote or that statistic all the time, too.

Why is construction the, the industry that has been least adaptive of technology? It's kind of an interesting conundrum. You know, what, why haven't we embraced it? Why haven't we used it? But maybe the tools are finally getting to the level where, where we will and we can.

**MR. ROSHAN-AFSHAR:** Yeah, I'll second that, for sure. And I think, really, with the BIM component, that's now the starting point. That is the language that you can feed into systems that help you know everything from maintainable schedules, when something's going to need to be replaced, how to fix things.

Those assets can be populated, and, you know, it can also be spoken to because it's now an object that, you know, you can manipulate and call upon and query upon. So I think that's really going to be the main advancement. I think the BIM itself is just the initial point to allow for all those advancements that will help post facility management and OBO on future projects.

**MS. LUCKETT:** Great. That pretty much brings us to time. So, yes, Lisa, that was your last talking point. And I appreciate yourself and all of our other OBO subject matter experts and our industry partners for the great presentation they put on today. I'm going to hand it over to the Director of External Affairs, James, for some closing remarks. James, over to you.

OK. He may be wrapped up with something. I know that he was working on the back end helping me in Slido. So with that said, again, just another thank you for everybody. We had a great turnout.

**MR. RODRIGUEZ:** Hey, Lauren.

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**MS. LUCKETT:** And-- oh, fantastic. There he is.

**MR. RODRIGUEZ:** Sorry, my-- the-- I had a tech issue. The menu part was bouncing around the screen. So I finally got it. And I hope-- hopefully, you can see me. So, no, I just want to thank everybody for their participation today or Pernix, the Cowen Group. It was all just a lot of good information. I appreciate you sharing your knowledge.