WEBVTT

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00:00:25.980 --> 00:00:29.389
RS&H Zoom Host: Hello, everyone! Welcome. We're going to get started in 2 min.

2
00:01:22.820 --> 00:01:26.020
RS&H Zoom Host: Hi, everyone welcome. We're gonna get started in just a minute.

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00:02:17.730 --> 00:02:29.370
RS&H Zoom Host: Alright, let's get started. We're right at the top of the hour. Thank you. Everyone for joining us today on August 29th for our technically speaking, Webinar series.

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00:02:29.816 --> 00:02:40.209
RS&H Zoom Host: Our presentation today is state of the industry. 3D. The Ei and design. Before we get started. I wanted to outline a few technical instructions and some housekeeping details.

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00:02:40.780 --> 00:02:53.190
RS&H Zoom Host: We encourage your participation in the webinar and invite you to ask questions, using the Q&A function of zoom. And we've saved time at the end to get to as many questions as possible. Please feel free to add your question. At any time

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00:02:53.610 --> 00:02:57.810
RS&H Zoom Host: all attendees will receive one learning unit for participation.

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00:02:57.860 --> 00:03:11.979
RS&H Zoom Host: Your attendance certification will be emailed to you next week as long as you pre registered for this webinar. If you did not register with your certification information, please. Email events@rsnh.com. And I'll pop that in the chat for you.

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00:03:13.020 --> 00:03:20.430
RS&H Zoom Host: Today's webinar is being recorded and you will be invited to access the recording and additional content in a post webinar email next week.

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00:03:21.380 --> 00:03:29.539
RS&H Zoom Host: Zoom allows attendees to control the way they view their webinar. There are many different options. Please adjust the settings to your preference in the view options.

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00:03:29.900 --> 00:03:48.740
RS&H Zoom Host: We're happy. You're here, and we like to encourage you to respond to a brief survey after web, the webinar concludes your responses, help us to improve our webinar series, and then finally, just as a heads up if you do need to access closed captions or transcription at any time. Please note that Zoom has that option in the settings.

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00:03:50.580 --> 00:04:02.070
RS&H Zoom Host: I will now pass it over to our moderator, Justin Cole. Justin serves as the Northwest Florida area leader for Rsnh's infrastructure business unit covering the Florida Panhandle.

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00:04:02.270 --> 00:04:13.589
RS&H Zoom Host: He has 16 years of experience in engineering and program management for transportation and infrastructure projects primarily focused on intermodal rail port and transit.

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00:04:13.870 --> 00:04:23.499
RS&H Zoom Host: Justin has a bachelor of science in civil engineering and a master of business administration from the University of Florida, and he is a registered professional engineer in Florida.

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00:04:23.510 --> 00:04:25.590
RS&H Zoom Host: Justin, the floor is yours.

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00:04:26.470 --> 00:04:30.120
Justin Cole: All right. Thank you, Dana, for that introduction, and thank you everyone

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00:04:30.150 --> 00:04:35.599
Justin Cole: for joining us today for our topic of 3D. Cei. And design.

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00:04:35.650 --> 00:04:46.270
Justin Cole: As most of you know, technology in our field is improving quickly, and the way projects are designed and delivered is evolving an incredibly rapid pace.

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00:04:46.340 --> 00:05:03.619
Justin Cole: As our industry has begun shifting from 2D plan sets to 3D. Models, and really, as with any change, there can be growing pains. But at the end of the day, the advancement of project delivery, and really the potential time and cost savings associated with that is critical to our industry.

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00:05:03.620 --> 00:05:17.309
Justin Cole: So we think it's a good time to have the discussion on our topic today and work together as owners, designers, inspectors, and contractors to really help move our industry forward. So again, thanks for being here today.

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00:05:22.420 --> 00:05:32.380
Justin Cole: So a quick agenda for our meeting today. 1st of all, we're going to cover the 3D. Cei program with the Florida Department of transportation.

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00:05:32.440 --> 00:05:41.360
Justin Cole: Second, we're going to give you a field demonstration by video of some of the 3D cei Rover equipment being used in the field.

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00:05:41.990 --> 00:05:47.380
Justin Cole: 3, rd we're going to talk about preparing our industry for 3D deliverables.

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00:05:48.410 --> 00:05:53.789
Justin Cole: Next, we're going to look at contract models and their role in the construction phase of the projects.

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00:05:53.840 --> 00:06:02.499
Justin Cole: And we're going to close this out with a Q&A session at the end. So please ask any questions using the Q. And a option at the bottom.

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00:06:05.390 --> 00:06:17.480
Justin Cole: All right. So I'm joined by a very talented group of speakers today, including our friends from for department transportation and some subject matter experts within Rs. And H.

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00:06:17.510 --> 00:06:20.150
Justin Cole: 1st of all, we've got Olivia Townsend.

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00:06:20.280 --> 00:06:25.740
Justin Cole: Olivia is the construction final estimates engineer at the Florida Department of transportation.

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00:06:25.900 --> 00:06:39.459
Justin Cole: with 10 years of experience at the department she has previously worked in the State construction, roadway design and program management offices. Olivia holds a master's degree in civil engineering from Florida State University.

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00:06:39.960 --> 00:06:42.820
Justin Cole: Next we've got Taylor Carlquist.

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00:06:43.100 --> 00:06:52.010
Justin Cole: Taylor began his career in the private sector and joined the Florida Department of transportation in 2,015. As a quality assurance specialist.

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00:06:52.170 --> 00:06:59.399
Justin Cole: He holds A. BS. In civil engineering from Florida State University, and has over 12 years of construction experience

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00:06:59.650 --> 00:07:11.439
Justin Cole: currently as a final estimate, specialist, Taylor develops and updates, policies, procedures, specifications, forms and training materials for final estimates and quality control.

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00:07:12.340 --> 00:07:24.710
Justin Cole: Next, we have Andrew Positch with Rs. And H. Andrew has been at Rs. And H. Since 2,014, and he serves as the design integration lead for infrastructure. After spending many years in the highway design group

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00:07:24.780 --> 00:07:35.260
Justin Cole: he brings an in-depth understanding of transportation design and overall three-dimensional workflows related to core engineering principles and interdisciplinary collaboration.

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00:07:35.540 --> 00:07:39.459
Justin Cole: and last, but certainly not least, we have Marshall Bailey with Rs. And H.

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00:07:39.630 --> 00:07:45.999
Justin Cole: Marshall is a Cei Project manager that manages construction, inspection and quality assurance teams.

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00:07:46.080 --> 00:07:58.439
Justin Cole: Marshall has extensive knowledge and design build projects. And his expertise is in heavy concrete projects, tunnel construction, commissioning and operation. So welcome to all of our speakers today.

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00:08:01.980 --> 00:08:12.839

Justin Cole: So we're gonna start our webinar with the Florida Department of Transportation. And we're going to give you a an overview of their 3D Cei program.

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00:08:12.940 --> 00:08:18.710
Justin Cole: So to do that I'm going to turn it over to Taylor, Carlquist, and let him give you that overview. So take it away, Taylor.

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00:08:19.760 --> 00:08:21.520
Taylor Carlquist: All right. Thanks, Justin.

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00:08:21.750 --> 00:08:28.190
Taylor Carlquist: So, for those of you who don't know this all started for us. Back in April of 2022.

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00:08:28.280 --> 00:08:42.960
Taylor Carlquist: We were tasked by the director of construction at the our director at that time. He's now our chief engineer, to identify available inspection technology tools that could be used during construction to enhance our measurement and our verification processes.

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00:08:43.470 --> 00:08:52.681
Taylor Carlquist: We researched and looked at a lot of different tool options. We looked at rovers and base stations, drones, total stations. Lidar, 3D cameras. You name it

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00:08:53.460 --> 00:09:02.079
Taylor Carlquist: Also, along with that research and through discussions we had with our contractors some of our key consultants and some of our department staff.

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00:09:02.250 --> 00:09:06.359
Taylor Carlquist: we determined that Gnss. Rovers, used with either

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00:09:06.410 --> 00:09:13.990
Taylor Carlquist: an independent base station or the Florida permanent reference network, would provide the most benefits to us right now.

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00:09:14.240 --> 00:09:15.120
Taylor Carlquist: So

48
00:09:15.830 --> 00:09:21.079
Taylor Carlquist: we wanted to get Rovers out in the field on our projects to use for layout verification.

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00:09:21.130 --> 00:09:28.369
Taylor Carlquist: especially now that a lot of our contractors are using the automated machine guidance or Amg for their earthwork activities.

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00:09:28.811 --> 00:09:31.460
Taylor Carlquist: But we could also use the Rovers for

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00:09:31.500 --> 00:09:36.159
Taylor Carlquist: measurements, field record submission, and it would give us the ability to

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00:09:36.190 --> 00:09:40.600
Taylor Carlquist: accurately and efficiently collect as belt data which is becoming

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00:09:40.700 --> 00:09:47.700
Taylor Carlquist: more and more of a growing need in construction, and for the downstream users of users of our data.

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00:09:52.270 --> 00:09:57.162
Taylor Carlquist: So once that decision was made to move forward with utilizing Rovers.

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00:09:57.760 --> 00:10:13.839
Taylor Carlquist: the 1st thing we did was create an like an official 3D. Ci task team that was made up of a mix of some of our department staff. We made sure to have representation from our CAD office, our design office and our survey offices, as well as some of our key consultants and contractors.

56
00:10:14.414 --> 00:10:17.170
Taylor Carlquist: But we started meeting to discuss and determine

57
00:10:17.810 --> 00:10:21.490
Taylor Carlquist: the best course of action for implementing this technology to

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00:10:21.630 --> 00:10:27.069
Taylor Carlquist: establish some of our initial goals which were to identify pilot projects throughout the State

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00:10:27.580 --> 00:10:34.650

Taylor Carlquist: to develop some Cei scope language that we could incorporate into those pilot projects

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00:10:34.780 --> 00:10:37.839
Taylor Carlquist: and to establish an implementation timeline.

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00:10:38.360 --> 00:10:39.900
Taylor Carlquist: So aside from those

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00:10:41.013 --> 00:10:47.176
Taylor Carlquist: initial goals. Our main focus for this team will be to meet and discuss what we need needed to have in

63
00:10:47.900 --> 00:11:02.750
Taylor Carlquist: have in place to successfully implement using rovers and base stations for our verification and measurement purposes. And we also wanted to identify what updates were needed to our current processes and procedures to allow this technology to become

64
00:11:03.534 --> 00:11:06.020
Taylor Carlquist: part of our standards of operation.

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00:11:11.320 --> 00:11:19.688
Taylor Carlquist: So this is looking at our the workflow for our pilot projects. It's not a whole lot different than workflow for any of our projects.

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00:11:20.230 --> 00:11:26.250
Taylor Carlquist: the only differences would be so we it would start off. Still, we would get our design files.

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00:11:26.739 --> 00:11:35.569
Taylor Carlquist: They would be put in a collaboration site, our project solve sharepoint collaboration site. So that would be available to both our Cei and our contractor.

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00:11:36.081 --> 00:11:43.109
Taylor Carlquist: Most of our contractors are already using rovers, so they'll have, or they'll pick their type and vendor. And then

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00:11:43.590 --> 00:11:50.049
Taylor Carlquist: we want the Cei to also choose their type and their vendor. The main point there is, we want our

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00:11:50.160 --> 00:11:53.279
Taylor Carlquist: ceis to be conducting their inspection and measurements

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00:11:53.810 --> 00:11:57.819
Taylor Carlquist: completely independent from what the contractor is using to Qc. Their own work.

72
00:11:59.146 --> 00:12:10.850
Taylor Carlquist: From there. The next step, handling plan changes. If there are any changes considered, major plan change. Those can be. Those will be sent back to the Eor to incorporate those changes in a plan revision.

73
00:12:11.000 --> 00:12:23.299
Taylor Carlquist: If it's anything minor like field changes, those can just be documented by the Cei on their as built as they do now, just with red line revisions, and having the appropriate, appropriate backup documentation

74
00:12:24.720 --> 00:12:32.529
Taylor Carlquist: from there the contractor will use the files they need to build out the project. The Cei will use the files they need for their verification

75
00:12:33.000 --> 00:12:45.979
Taylor Carlquist: final measurement of items as built markups. And then, you know, down the road, we could eventually use some of that data that's collected during construction to build a more reliable and better asset inventory.

76
00:12:46.520 --> 00:12:54.920
Taylor Carlquist: obviously, that would require some changes to our current processes. If we added something like that in. But you know, that's that's what this is all for is trying new things.

77
00:12:56.207 --> 00:12:59.309
Taylor Carlquist: As far as our implementation. We decided to

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00:12:59.570 --> 00:13:03.559
Taylor Carlquist: lay it out in phases like, take a phased approach. Kind of taking baby steps.

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00:13:05.300 --> 00:13:06.560
Taylor Carlquist: phase one

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00:13:07.211 --> 00:13:11.290
Taylor Carlquist: we actually just completed phase one and kind of the 1st part of phase 2

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00:13:11.746 --> 00:13:17.250
Taylor Carlquist: phase. One was just getting Gnss. Rovers out on our pilot projects to verify layout

82
00:13:17.260 --> 00:13:18.400
Taylor Carlquist: earthwork.

83
00:13:18.570 --> 00:13:23.159
Taylor Carlquist: and really just utilize rovers anywhere you could provide feedback on

84
00:13:23.190 --> 00:13:27.750
Taylor Carlquist: how it compared to the traditional tools and methods that were already being used.

85
00:13:28.240 --> 00:13:33.409
Taylor Carlquist: We had well, we started out with like 20 pilot projects from around the State.

86
00:13:34.152 --> 00:13:38.260
Taylor Carlquist: That participated in phase one. All of them had different work mixes.

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00:13:38.310 --> 00:13:42.529
Taylor Carlquist: We brought Rs. And H. On board to be the experienced

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00:13:42.560 --> 00:13:46.230
Taylor Carlquist: support team that we were going to need for these pilot projects

89
00:13:46.615 --> 00:13:54.754
Taylor Carlquist: for the staff. They could rely on them to for help and for guidance. As they learn how to use this new technology and

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00:13:55.660 --> 00:13:59.320
Taylor Carlquist: Rs and H. Also collected feedback and prepared a report for us.

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00:13:59.930 --> 00:14:05.199
Taylor Carlquist: From all the feedback gathered by these from the pilot teams that we can use to

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00:14:05.410 --> 00:14:08.779
Taylor Carlquist: kind of prepare us and help us develop this next phase.

93
00:14:11.120 --> 00:14:14.523
Taylor Carlquist: the phase 2. A is looking at

94
00:14:15.690 --> 00:14:24.280
Taylor Carlquist: What changes need to be made in our processes and our final estimates documentation to allow for rover outputs and reports to be submitted

95
00:14:24.600 --> 00:14:26.720
Taylor Carlquist: also kind of a second part to that is

96
00:14:26.750 --> 00:14:32.449
Taylor Carlquist: to establish some priority construction items that we want to start collecting data on

97
00:14:32.850 --> 00:14:39.900
Taylor Carlquist: the second part of phase 2, which is 2. B is looking. Is actually piloting that data collection and determining

98
00:14:39.910 --> 00:14:44.389
Taylor Carlquist: what format we need this data in, or we want to store this data in

99
00:14:45.900 --> 00:14:47.620
Taylor Carlquist: and then going on.

100
00:14:47.830 --> 00:14:57.267
Taylor Carlquist: Phases 3. Really phases 3 through 5 are probably down the line, but it's you know, all in the direction that we're trying to go

101
00:14:57.880 --> 00:15:11.310
Taylor Carlquist: It would lead to a change. In our plan revision process for sure. Which is something we'll just kind of have to work out as we get there. But we would start with updating the CAD files with the digitalized built data that's been collected.

102
00:15:11.360 --> 00:15:18.770
Taylor Carlquist: Phase 4 could be updating the actual model, and then, lastly, 5 would be attempting to create a digital twin.

103
00:15:28.180 --> 00:15:36.360
Taylor Carlquist: This is a timeline going back to when we 1st started making some changes to our construction processes. By using surface files.

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00:15:36.650 --> 00:15:45.769
Taylor Carlquist: So it goes all the way back to 2,018. That's when we sunset. Our multi line software that was being used to calculate earth work using average end area.

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00:15:46.680 --> 00:16:04.270
Taylor Carlquist: We we've sunset that even though people still use it. But we recommend that surface to surface comparisons be used for calculating your Earth work now. So we support Trimble business center. We don't mandate its use. You can use other software that does has the capabilities to do surface to surface comparison. But

106
00:16:04.620 --> 00:16:07.039
Taylor Carlquist: that's when we started that in 2,018,

107
00:16:07.130 --> 00:16:19.669
Taylor Carlquist: in December 2021 we had a a quadri pilot project that went through our design and CAD offices. So they were looking at, you know, new ways to do things new, new ways to have their design review.

108
00:16:23.040 --> 00:16:28.650
Taylor Carlquist: then, in April 2022, that's when we started our 3D. Cei task team, we started doing all of our research.

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00:16:29.110 --> 00:16:31.400
Taylor Carlquist: Then there was another pilot project

110
00:16:32.167 --> 00:16:35.092
Taylor Carlquist: using Synchro that was looking at

111
00:16:35.660 --> 00:16:44.709
Taylor Carlquist: viewing 3D models and files in construction which the 3D model viewers. Still, something that we're looking into, and we hope to hope to get soon

112
00:16:45.710 --> 00:16:59.489
Taylor Carlquist: around that same time is when there was some changes to the CAD requirements requiring designers to submit earthwork models. So anything designed after July 2022

113
00:16:59.830 --> 00:17:06.049
Taylor Carlquist: sign and sealed earthwork models were then required to be submitted. So we're just starting to see those now

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00:17:06.802 --> 00:17:15.260
Taylor Carlquist: in construction. So you know, hopefully, Rovers will help with verifying those those models a little easier to work with.

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00:17:17.102 --> 00:17:26.789
Taylor Carlquist: Fall of 2023. That's when we had our kickoff meetings Rs and H. And us and all of our pilot projects. That's when that phase began. Phase one

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00:17:28.190 --> 00:17:37.349
Taylor Carlquist: At that same time. We also had another task work quarter with Kimley Horn to develop. An initial 3D Cei training course.

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00:17:38.100 --> 00:17:41.180
Taylor Carlquist: Which covers everything from basic survey knowledge.

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00:17:41.220 --> 00:17:51.970
Taylor Carlquist: Rover set up and capabilities data output updating models, cutting cross sections kind of like all across the board. Basic knowledge that someone would need to have.

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00:17:52.160 --> 00:18:10.424
Taylor Carlquist: It's going to be a part of our construction training and qualification program. So you'll be able to take this course and become qualified to submit rover data for you know, our final estimates purposes, or, you know, basis of payment.

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00:18:10.950 --> 00:18:13.210
Taylor Carlquist: so that was the idea. There, we are

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00:18:13.950 --> 00:18:24.140
Taylor Carlquist: working right now until we we have all the course material finalized. And we're trying to get that added to our Ctqp as quick as we can. Which is our training program.

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00:18:26.030 --> 00:18:27.719
Taylor Carlquist: so we're working on that

123
00:18:28.360 --> 00:18:29.870
Taylor Carlquist: as of right now

124
00:18:30.270 --> 00:18:36.820
Taylor Carlquist: the phase one feedback. We just received the final report, from Rsnh on the feedback from the pilot projects.

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00:18:36.950 --> 00:18:47.490
Taylor Carlquist: So we'll use that to develop our next steps, which will be identifying what elements of construction we want to prioritize for the Rover data collection for phase 2.

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00:18:51.950 --> 00:18:58.550
Taylor Carlquist: And then looking even more forward. The second part of phase 2 will be to actually start those pilot projects on data collection

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00:18:58.900 --> 00:19:03.659
Taylor Carlquist: phase 3 will be to determine what the digital as built may look like for fdot.

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00:19:05.290 --> 00:19:14.809
Taylor Carlquist: More discussions will need to take place between our construction office and our other downstream users of construction data to determine what features we want to focus on.

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00:19:16.330 --> 00:19:22.159
Taylor Carlquist: once we reviewed the outcomes of the data collection, pilot projects from the 2 B, we could then implement.

130
00:19:22.546 --> 00:19:27.809
Taylor Carlquist: the collection of data by the ceis for certain priority features that we identified.

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00:19:28.873 --> 00:19:30.806
Taylor Carlquist: After that we could

132
00:19:31.690 --> 00:19:38.440
Taylor Carlquist: look into the next phases which would be piloting changes to our as built requirements and then implementing that requirement

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00:19:38.804 --> 00:19:46.249
Taylor Carlquist: where the department would require the Cei to submit more than just a red line marked up Pdf, as Bill. And

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00:19:46.400 --> 00:19:56.639
Taylor Carlquist: you know, looking even more down the road in the future, that you know, there's sure to be more iterations and refinement. As we learn more about what exactly our needs are and where we want to go.

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00:20:03.380 --> 00:20:09.589
Justin Cole: Alright. Thank you, Taylor. So much for that background and information, and great to see

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00:20:09.990 --> 00:20:27.440
Justin Cole: fdot kind of at the forefront of this technology and kind of pushing this forward for the industry through our phase. One that that Taylor had mentioned. We've kind of developed some benefits of advancing this technology and the things that it could help.

137
00:20:28.780 --> 00:20:49.549
Justin Cole: down the line. So those are on your screen as you review those I'm just gonna ask. Ask a few questions here of Olivia, and kind of a little more information about where fdot is going with this program. So Olivia, with Fdot being on the forefront. Of 3. D. Cei. Why is this initiative so important to the department.

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00:20:50.120 --> 00:21:08.355
Olivia Townsend: So the department's always looking for new innovative technologies to streamline and develop our standards. And really, we want to reap the benefits of everything that you've listed there on the screen. We want to save lives. We want to save time. We want to be able to increase the data that we have.

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00:21:09.180 --> 00:21:24.419
Olivia Townsend: But this is all part of a larger effort to actually bring those technologies in and have procedures for digital data delivery, verification and collection throughout all of the different arms of the department. And throughout the project life cycle

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00:21:24.806 --> 00:21:35.729
Olivia Townsend: in addition to 3 3 Dci, we've got automated machine guidance, policy going on and we're also, as Taylor mentioned, the procurement of that 3 Dci viewer.

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00:21:37.280 --> 00:21:39.639
Justin Cole: Fantastic, great, great information there.

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00:21:39.770 --> 00:21:44.780
Justin Cole: How is the 3 Dci program currently being administered at fdot?

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00:21:45.220 --> 00:22:11.040
Olivia Townsend: So this is a phased implementation approach. So we can actually learn all the capabilities and use cases for this tool. Phase. One was administered through an experience C experience team. Rsnh, that oversaw the pilot projects as they were learning this technology. They were helping those pilot teams. With monthly meetings. Helping personnel. Get trained

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00:22:11.452 --> 00:22:20.238
Olivia Townsend: and learn how to operate the Rover and then also developing and submitting a Rover work. Plan for those pilot teams.

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00:22:21.540 --> 00:22:27.074
Olivia Townsend: And then, as we move forward, we're reviewing that phase. One report Taylor mentioned

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00:22:27.740 --> 00:22:35.970
Olivia Townsend: to find out all the successes and challenges of that phase, one pilot and then bring them forward into phase. 2.

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00:22:36.956 --> 00:22:43.530
Olivia Townsend: Really, we're looking at collecting data on elements of construction. Particularly final measure in phase 2,

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00:22:44.920 --> 00:22:48.867
Olivia Townsend: but we still have some decisions that need to be made as far as

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00:22:49.210 --> 00:22:51.949
Olivia Townsend: How other offices are going to be using this data.

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00:22:53.400 --> 00:22:55.666
Justin Cole: That's great. Yeah, we've had real good

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00:22:56.340 --> 00:23:02.810

Justin Cole: real good working relationship with our pilot teams out in the field and getting this phase one report.

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00:23:02.820 --> 00:23:08.060
Justin Cole: pull together and look forward to to to beginning phase 2 shortly

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00:23:08.481 --> 00:23:13.449
Justin Cole: so with that being said, what's the schedule for the 3D ce program? Rollout.

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00:23:13.970 --> 00:23:18.680
Olivia Townsend: Alright. So phase one was recently completed this just recently here in July.

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00:23:19.078 --> 00:23:42.989
Olivia Townsend: So we're working through reviewing the the summary report that our snah, submitted. With our upper management, and then developing what we want for phase 2. We don't have a hard deadline for phase 2. But it would be wonderful. Since most of the phase one projects are still in construction to go ahead and get that ball rolling so they can use their lessons learned. In phase 2. And we don't have quite as steep of a learning curve.

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00:23:44.680 --> 00:23:57.410
Justin Cole: Fantastic. Well, thank you, Olivia and Taylor, for that background on Fdot's 3 Dci program, and and where we've come from, where we're at and where we're going. Really appreciate that information.

157
00:24:00.280 --> 00:24:20.150
Justin Cole: So next, I want to move in and give everyone a 3D Cei field demonstration. So this is going to be through about a 5 min video narrated by Tony Manos, who's a Cei senior project engineer with Rs. And H. And Jahim Torre, who's a Cei roadway inspector with Rs and H.

158
00:24:20.210 --> 00:24:32.470
Justin Cole: This video is going to show you the use of some of the Rover equipment that you've heard mentioned out in the field and how our construction teams are. And Cei teams are using the equipment so that video should start here momentarily.

159
00:24:35.310 --> 00:24:46.720
Justin Cole: Alright. So this is our top Con GPS box. Our brand's top cons. There are many like it. But this is ours. So initially, whenever you get on site, you're gonna want to open this up.

160
00:24:46.780 --> 00:24:48.940
Justin Cole: and it comes with a few pieces.

161
00:24:49.500 --> 00:24:53.760
Justin Cole: You've got your tablet, which comes with a stylus. If you want to use that, it's also touch. Screen

162
00:24:54.270 --> 00:24:55.939
Justin Cole: 2 Rover heads.

163
00:24:57.200 --> 00:25:06.710
Justin Cole: and on the Rover ends they got a couple buttons. But mainly what you got to worry about is a big old power button. Once you hit the power button. These right here are just indicators. Just let you know that you have connectivity.

164
00:25:06.980 --> 00:25:14.979
Justin Cole: And yeah, let's get it connected. So I'll pick my Rover head of choice. Since we're working off the Dlt network. Pick my footer of choice. I'll go with the spike.

165
00:25:15.460 --> 00:25:18.519
Justin Cole: I'll initially start off by connecting my antenna.

166
00:25:19.230 --> 00:25:21.600
Justin Cole: Go ahead, and it just snaps on just like that.

167
00:25:21.680 --> 00:25:24.550
Justin Cole: Give it a good twist clockwise, and it's tightened.

168
00:25:24.680 --> 00:25:25.390
Justin Cole: So

169
00:25:26.680 --> 00:25:32.220
Justin Cole: go ahead, my tablets ready to connect. So it pops up a few options.

170
00:25:32.400 --> 00:25:38.700
Justin Cole: You got your rover head. So how do you know it's your Rover head? It's got a specific serial number. Where do you find your serial number

171

00:25:38.750 --> 00:25:41.130
Justin Cole: right here on the bottom of your rover head?

172
00:25:41.780 --> 00:25:47.010
Justin Cole: It's easy just to associate it with the last 3 digits. Once you do that you'll go ahead.

173
00:25:47.360 --> 00:25:52.279
Justin Cole: Click on your overhead serial number hit, select, hit, connect.

174
00:25:52.720 --> 00:25:55.989
Justin Cole: Let it do its loading sort of icon screen

175
00:25:56.380 --> 00:26:00.360
Justin Cole: at this point. I'll go ahead and connect my tablet to my GPS device

176
00:26:00.790 --> 00:26:07.429
Justin Cole: and let it load. This is a GPS Rover, which we, as a Ci firm, use to check the contractor and their work.

177
00:26:07.670 --> 00:26:14.280
Justin Cole: Currently, we're working off a department of transportation network which in tandem speaks to satellites to give us a specific geoposition.

178
00:26:14.650 --> 00:26:34.770
Justin Cole: Our contractor themselves are working off of localized base stations, and those base stations sort of give a bit of variance in regards to the checking process. You don't want to be based off the same system, because there's no way to check errors and accuracy. If you guys are both working off of the same system. So my next step, we just laid out a bunch of curb. I'd say maybe 700 linear feet.

179
00:26:35.620 --> 00:26:54.309
Justin Cole: When we're given these files from our design office, we upload them into our GPS or Rover. And that's how we go about staking lines or checking specific operations on site. So currently, as you can see in the GPS screen. It offers a positioning sort of icon, which is just the regular navigation arrow which indicates you, your rover, where it's sitting.

180
00:26:54.370 --> 00:27:07.380

Justin Cole: and as well as the plans, lines, and etc, that you can use to stake offsets, to lay out certain areas, etc. And as well. You can use this to create surface area. And that's for whatever sort of final estimate needs you need. So

181
00:27:07.410 --> 00:27:13.369
Justin Cole: I'm going to go ahead and stake a line which is currently the lip of lip, of curb or edge of pavement.

182
00:27:13.500 --> 00:27:14.809
Justin Cole: So I'll go ahead.

183
00:27:15.230 --> 00:27:16.350
Justin Cole: They restart.

184
00:27:16.530 --> 00:27:24.150
Justin Cole: click the line I want, and sometimes when you're in such a wide view. It'll give you an option between specific lines that you may have possibly clicked on. So currently.

185
00:27:24.240 --> 00:27:27.650
Justin Cole: I want to go to pavement asphalt or edge of pavement. Click, check.

186
00:27:28.220 --> 00:27:29.430
Justin Cole: hold down.

187
00:27:30.030 --> 00:27:38.090
Justin Cole: and I want to stake the line staking the line will give you the ability to check it in comparison to the plan. So currently the contractor is laying out the physical curb.

188
00:27:38.200 --> 00:27:39.930
Justin Cole: We have the planned position curb.

189
00:27:39.960 --> 00:27:41.140
Justin Cole: Once we stake it.

190
00:27:41.360 --> 00:27:47.840
Justin Cole: we can go to the curb and observe how accurate the contractor is with their layout. So using this.

191
00:27:48.130 --> 00:27:51.110

Justin Cole: I'm able to, of course, clean off your spike.

192
00:27:51.330 --> 00:27:52.860
Justin Cole: stake the lip of curb.

193
00:27:56.000 --> 00:27:59.569
Justin Cole: Using this, it'll be able to tell me a specific offset.

194
00:28:00.900 --> 00:28:03.120
Justin Cole: This is an example of

195
00:28:03.470 --> 00:28:05.840
Justin Cole: tying in the GPS

196
00:28:06.370 --> 00:28:10.650
Justin Cole: Amg. Which is automated machine guidance.

197
00:28:10.790 --> 00:28:13.779
Justin Cole: You can see the the 2 Rovers

198
00:28:13.980 --> 00:28:16.110
Justin Cole: and the midsection of the excavator.

199
00:28:16.260 --> 00:28:30.189
Justin Cole: And so the operator knows exactly where he's at with alignment and grade as he's digging the the ditch. Normally, I'm going to say this in the olden days you'd have to. You'd have stakes in here telling him how far he had to dig down

200
00:28:31.370 --> 00:28:37.700
Justin Cole: And right now you don't see any stakes around here, because it's all it's all done mechanically or all done automatically

201
00:28:37.860 --> 00:28:39.300
Justin Cole: with the Amd.

202
00:28:40.470 --> 00:28:41.290
Justin Cole: So

203
00:28:41.480 --> 00:28:44.270
Justin Cole: this machine is talking to a base station.

204
00:28:44.400 --> 00:28:47.320
Justin Cole: and the base station is talking to the satellites.

205
00:28:58.550 --> 00:29:25.099
Justin Cole: Alright. So hope you enjoyed the video. Wanted to kind of give you everyone a feel of of how the the models are being sent into the field, and then how that information is being captured and used to to actually build the the projects in the field. So I hope you enjoyed that. Next we're going to move into the next section of preparing industry for 3D deliverables and turn over to Andrew for the next section. Here, Andrew, take it away.

206
00:29:27.100 --> 00:29:28.520
Andrew Poszich | RS&H: Awesome. Thanks, Justin.

207
00:29:29.070 --> 00:29:51.830
Andrew Poszich | RS&H: So this whole entire initiative is part of a larger shift in industry. And that really all starts with the base data that we start off with in design process. So really, we're looking to shift the way we think about projects from a 2D first, st mentality to a 3D. 1st workflow. And this is consistent across all different disciplines, all different folks in industry, really, just in making sure that we're able to really elevate the way we do plan delivery.

208
00:29:51.850 --> 00:29:57.829
Andrew Poszich | RS&H: So in order to get good data in the field, it all starts with good data early on in the design process.

209
00:29:58.450 --> 00:30:23.409
Andrew Poszich | RS&H: So a little bit more about the evolution in this. We're all familiar with planned Pdf sheets. And how we navigate that traditionally, as part of the official plan. Delivery process. You've seen those plan and Pdfs be digitized not a lot of us are printing Pdfs anymore. For what signatures? But what we're looking for and really is this middle transition area where we're looking to extract data that we can use today with automated machine guidance and automated inspection workflows

210
00:30:23.690 --> 00:30:27.209
Andrew Poszich | RS&H: that can really see benefit down the workflow pipeline

211
00:30:27.220 --> 00:30:36.470
Andrew Poszich | RS&H: that involves surface models, 3 component models that can be used and really focusing on that here today, while still looking forward and realizing this isn't all we can do with data.

212
00:30:36.910 --> 00:31:03.130
Andrew Poszich | RS&H: As you saw in kind of the push for 3D. Cei, we're starting with real practical application of this data. While keeping in mind some of the more downstream workflow uses, such as models, legal document as well as 4 d. And 5 d. Deliverables, which is incorporating the cost and schedule into your model, which really is just again enhancing the data that we work with and making it more applicable to the design process.

213
00:31:04.200 --> 00:31:26.399
Andrew Poszich | RS&H: So a little bit of information on that of what that looks like, and shift the workflow whenever you traditionally start a project or start a job. You've got several things that happen. We have kickoff meetings. We send email correspondence. There's a lot of word of mouth communication that all happen behind the scenes. A lot of effort goes into getting a project started, and in a 2D workflow that's just as important as any other environment.

214
00:31:26.821 --> 00:31:42.488
Andrew Poszich | RS&H: However, something with the 2D workflow that's you know, we've all grown to rely on is relying on the latest Pdf set of plans. Now this is can be a slight delay in conversations. If you're waiting to get something printed to sheets waiting for someone to place a text label on the Pdf or in the plan set

215
00:31:42.979 --> 00:31:58.150
Andrew Poszich | RS&H: and ultimately it can get a little confusing. I know there's several on industry that are used to looking at these for years and years, and they may be second nature. But if you're coming in from a different state or working in a different region may take you a little bit of time to get acclimated to a potentially very confusing set of plans.

216
00:31:59.240 --> 00:32:23.099
Andrew Poszich | RS&H: Furthermore, you're relying on these file updates. So for no stranger to maybe a conflict file or clash detection in 2D. You're looking at this file. You have all your disciplines referenced in together, and you're able to build an overlay and really understand how different disciplines work together. So again, making use of technologies and tools within a 2D environment to give you that feedback. All kind of handled in this complex container file.

217
00:32:23.550 --> 00:32:42.610
Andrew Poszich | RS&H: Now that changes a little bit when you shift the 3D workflows. So you still have your kickoff meetings. You still have your email. You still have word of mouth. Basically, these traditional channels are never going to go away. They're always going to be critical

to the project development process. However, that latest Pdf print that maybe you were waiting for for your younger staff.

218
00:32:42.620 --> 00:32:59.280
Andrew Poszich | RS&H: That's not been replaced with the Bim data. So being able to access this information in real time, live whether you're pulling profile elevations component quantities. What have you really helps improve the way you can access the information that is underlying to the design.

219
00:33:00.320 --> 00:33:30.140
Andrew Poszich | RS&H: Your file updates that would traditionally take place in that 2D container file are now happening in a true 3D environment. So being able to see clashes as they occur, being able to work and collaborate with multiple disciplines in order to enhance the way we do project delivery. I'm no longer looking through a subfolder in a different discipline, looking for a spreadsheet that contains an elevation. I'm able to reference that directly from these 3D federated models which really is what we're trying to ship and push down into the construction workflow to save time and money on the

220
00:33:30.140 --> 00:33:31.160
Andrew Poszich | RS&H: field side.

221
00:33:32.943 --> 00:33:42.179
Andrew Poszich | RS&H: But why are we shifting to? 3 DI think we saw great of examples earlier of how it can improve the construction workflow process. But a little history of that of why we're at this stage.

222
00:33:42.453 --> 00:33:52.689
Andrew Poszich | RS&H: I know. When I 1st started off 3D modeling back in 2,014 is. There was a lot of just means to an end. We were just trying to get cross sections out the door as a different tool to get the job done.

223
00:33:53.264 --> 00:34:13.710
Andrew Poszich | RS&H: You see that evolution slowly evolve, though, and you start realizing there's more value more benefits between the cross sections. So rather than having a model analysis every 100 feet, what's your traditional? You're now looking at every 50 feet, 20 feet 5 feet in some cases. Really, your limited density is really just dependent upon the area or scope of the work you're doing.

224
00:34:14.590 --> 00:34:29.919
Andrew Poszich | RS&H: But now, all of a sudden, we're pulling things like quantities. There's a starting to come second nature to you. You're able to jump in and extract volumes very easily, as mentioned, earthwork,

or earlier, since summer, 2,022, we've been signing and sealing earthwork models for the State of Florida.

225
00:34:29.929 --> 00:34:35.509
Andrew Poszich | RS&H: A great way to get in there to validate what is oftentimes one of the biggest pay items on the project.

226
00:34:35.834 --> 00:34:44.639
Andrew Poszich | RS&H: Be able to say something that we can share and easily port over to either the contractors for estimating Cei for inspection or the owner for asset management.

227
00:34:45.880 --> 00:35:11.849
Andrew Poszich | RS&H: Those earthwork surface can then be merged in with some of the automated machine guidance. You just saw previously in the video, whether it's from the contractor side equipping and graders loaders, basically making sure that you're able to get your earthwork to grade where it needs to be, but also on the flip side, you're able to show areas to avoid. So if you're really trying to get the full advantage of your models, you're able to actually fence off certain areas whether it's subsurface utilities or other areas you'd like to stay out of.

228
00:35:12.167 --> 00:35:23.649
Andrew Poszich | RS&H: Ultimately the goal of being able to look at things from a high level efficiency and design, as well as construction, to reduce the errors and emissions not just in the plans, but also reduce risk overall in the project.

229
00:35:24.890 --> 00:35:41.150
Andrew Poszich | RS&H: With this we now have a Bim environment that you're able to extract this information you saw on the automated machine guidance and on the Rover itself. How that information that we're putting in from a design perspective can be loaded in the field and identified, based on its element classification.

230
00:35:41.150 --> 00:35:56.279
Andrew Poszich | RS&H: So being able to really, not just embrace the fact that we have a 3D. Surface now. But we also have all this additional data that can serve someone down the pipeline of a project all the way over, and no. Haven't talked about that today. But the goal is to be able to bring this forward to asset

231
00:35:56.310 --> 00:36:02.789
Andrew Poszich | RS&H: maintenance and operation, to make sure that these facilities we're constructing now can continue to thrive and benefit as years come.

232
00:36:06.430 --> 00:36:14.010
Andrew Poszich | RS&H: really cool to see this data come together. A quick example here of what kind of a design federated. 3D. Model looks like

233
00:36:14.337 --> 00:36:29.570
Andrew Poszich | RS&H: rendered up a bit. But all that core data is real information being able to access elevation, clash, detection, vertical clearance. And all this additional information you get on the front end is really a powerful tool to be able to help drive home some of those benefits.

234
00:36:29.960 --> 00:36:57.169
Andrew Poszich | RS&H: one of the greatest of which that I actually see, and this is involved as well when you start bringing the Cei involved towards the end of design. Is this idea of passive and active. Qc. A traditional Qc. On a project happens, you know, set intervals for planned delivery. Sure, there's some that happens along the way. But there's really no alternative, for when you're working in that live 3D model of having those conflicts really jump out at you, and being able to identify those sooner throughout the construction process.

235
00:36:57.190 --> 00:37:05.280
Andrew Poszich | RS&H: Basically, something looks right. It's way easier to tell in 3D. Than in a 2D. File. Regardless of what discipline you're working on

236
00:37:05.889 --> 00:37:30.140
Andrew Poszich | RS&H: we're ultimately using this to help broaden our cross practice knowledge. I know I've been on several projects where there might be a niche discipline involved. That person may not be familiar with transportation, infrastructure projects, or that familiar States plan, set, look, and feel. But when you introduce them to that 3D model. They're able to then have the same level of communication, understanding someone who's internalized the visualization of projects for many, many years in industry.

237
00:37:31.445 --> 00:37:44.290
Andrew Poszich | RS&H: Ultimately, this is just a something you can address prior to formal. Qc, not replacement of it, but definitely changes the way you look at the design when you start realizing that some of these files are going to be used down in construction.

238
00:37:44.660 --> 00:37:53.780
Andrew Poszich | RS&H: And one recommendation we've seen there's a few pilots in Florida, where we've done this, where we've actually brought

the Ce. On board final before final plans. And it's great to get that feedback.

239
00:37:53.830 --> 00:38:01.479
Andrew Poszich | RS&H: Get those groups in the models, they can often catch things that may or may not have been overlooked, as well as better prepare your data for use in the actual field.

240
00:38:03.620 --> 00:38:28.880
Andrew Poszich | RS&H: Really, all this just helps build up the team communication. Remember, the model is not a replacement. It's a enhancement of that communication. We got a lot of tools out there, so make sure you're using them. Make sure you're taking the time to educate your teams, whether it's the design teams, the asset owners, stakeholders in the process. There's a role that everyone has to play in this greater transition. So make sure that information that they're being shared is matching to their scope of the project.

241
00:38:29.315 --> 00:38:37.510
Andrew Poszich | RS&H: One of my favorite quotes is the model is only as powerful as its weakest component. So we want to bring everyone up to speed. Make sure everyone's speaking the same language and working in the same ecosystem.

242
00:38:38.890 --> 00:38:45.950
Andrew Poszich | RS&H: Now, I'm gonna switch gears a little bit here and talk about how we've been using some of that 3D design data that I just shared in construction

243
00:38:46.050 --> 00:38:50.670
Andrew Poszich | RS&H: before handing off to Marshall to talk a little bit more about another use case of that.

244
00:38:51.970 --> 00:38:57.959
Andrew Poszich | RS&H: So what we're able to do with these models you're able to communicate these complex designs a little more easy, more fluid.

245
00:38:58.247 --> 00:39:19.319
Andrew Poszich | RS&H: There's a lot of great tools and technologies that enhance the contextual experience you have out in the field. The demo you saw was a simple plan view of the project with elevations that's pulling along break lines or surfaces. That can really be enhanced. You have some augmented reality, solutions that are in the market that are very proficient. All with the goal to really help increase the way we're able to validate

246

00:39:19.510 --> 00:39:22.159
Andrew Poszich | RS&H: and confirm the way projects are built in the field.

247
00:39:24.060 --> 00:39:40.919
Andrew Poszich | RS&H: A few other examples that we've actually seen in recent years come up is using the 3D data as a way to enhance current processes request for information. Rfis, seeing official responses where we might have a somewhat complex situation going on, that we want to communicate

248
00:39:40.920 --> 00:39:55.509
Andrew Poszich | RS&H: being able to use the 3D model itself as part of that communication process. To enhance a traditional plan. Markup is a great way to really get in there and understand the value that the model can bring, and hopefully bring clarity to those out in the field, asking those original questions.

249
00:39:56.273 --> 00:40:05.900
Andrew Poszich | RS&H: Whether that's just from a 3D. Cap perspective that you can integrate into a 2D plan delivery, which is another great topic for another day. Or you're going with a full kind of rendered solution.

250
00:40:08.910 --> 00:40:33.409
Andrew Poszich | RS&H: One of the great other examples we've seen is to enhance the field review process so prior to a single shovel hitting the ground, we're able to take that 3D model and blend it with reality. Data of the surrounding environment to kind of walk through the project virtually, basically allowing everyone on the project team whether it's a stakeholder contractor, Cei, owner to understand the full scope of the project prior to setting foot in the environment.

251
00:40:33.420 --> 00:40:56.319
Andrew Poszich | RS&H: And this comes to light very, very clearly in virtual constructability reviews which we've gotten a lot of good feedback on, of actually implementing the model data. There's a few different ways. This looks like a quick example here that we're going to share is the use of a few different tools again, bringing some of the 3D design data forward into a solution. That's a little easier to digest for the average person.

252
00:40:56.763 --> 00:41:15.200
Andrew Poszich | RS&H: Taking a very complex. 3D model and navigating. That model is not always the easiest thing to do. So there's a lot of tools out there that are available for us to bring into a portable solution that can be shared with anyone. In this case we're doing before and after comparisons of a potential Mse wall that needs to be adjusted

253
00:41:15.200 --> 00:41:30.660
Andrew Poszich | RS&H: as well as giving the folks on the team access to be able to walk through and manipulate the environment themselves. I think, something akin to a high res kind of Google Earth experience being able to kind of get an idea of the project beforehand.

254
00:41:30.750 --> 00:41:50.070
Andrew Poszich | RS&H: Again, this look comes in many different fashions, especially with some of the tools in the market. There's a huge push for that augmented reality factor. But still think there's something pretty clear and clean about jumping in and actually walking you through the project to be able to understand some of the challenges associated with the potential constructability of the work.

255
00:41:54.190 --> 00:42:07.359
Andrew Poszich | RS&H: Another great example. A lot of tools mentioned Synchro earlier as part of the 4 D process. You're able to kind of review the model within the synchro ecosystem, basically to ensure that that construct ability is able to be pushed out there.

256
00:42:07.860 --> 00:42:27.929
Andrew Poszich | RS&H: Some great pilots going on in the State of Florida right now with that being able to go in there and start tying things like your schedule like your component cost quantities. Really 3D cei is just the baseline for this greater contextual conversation. Really looking just to make the most out of the data that we are able to provide throughout the construction pipeline.

257
00:42:29.380 --> 00:42:44.629
Andrew Poszich | RS&H: With that I do want to pass it off here to my colleague, Marshall, out West. He has a great example here of some of the work being done by our Ci folks out there that are on some very complex work, tying in the model to the actual field work and inspection

258
00:42:44.910 --> 00:42:46.350
Andrew Poszich | RS&H: that take it away, Marshall.

259
00:42:46.690 --> 00:42:47.400
Marshall Bailey: Great.

260
00:42:47.810 --> 00:43:01.329
Marshall Bailey: Thank you. I appreciate it. So today I'll be talking about the 1.2 billion dollar Central 70 project in Denver, Colorado we actually reached final acceptance in July of 2023.

261
00:43:01.350 --> 00:43:10.259
Marshall Bailey: And so this project took roughly 5 years to build. And now we're currently in the second year of the 30 year operations and maintenance period.

262
00:43:13.200 --> 00:43:19.830
Marshall Bailey: So for starters, this is how the project looked originally so. The goal was to eliminate a 57 year old Viaduct

263
00:43:20.304 --> 00:43:29.140
Marshall Bailey: That was built in the 19 fifties and lower a portion of the highway. So with lowering a portion of the highway, we also built a 4 acre park.

264
00:43:29.560 --> 00:43:45.199
Marshall Bailey: which was adjacent to an elementary school, and then, while the entire 12 Mile project was being constructed, we had to maintain traffic for the 200,000 vehicles per day, as well as maintain access for the 1,200 businesses that were along the corridor.

265
00:43:48.540 --> 00:43:59.526
Marshall Bailey: So, as we constructed the lowered section as well as the covertop. Our. We really had 4 major lessons learned the 1st one was as a 3D. Model would be non negotiable.

266
00:44:00.180 --> 00:44:19.239
Marshall Bailey: and we'll get into complexities a little bit later, and then, completing compiled specifications is extremely important. That need to be compiled by the designers. So with the cover, we really had 4 major stakeholders as well as 80 companies that were correlated to this work. So making sure that everyone is.

267
00:44:19.250 --> 00:44:31.719
Marshall Bailey: and Lockstep was extremely important, and then also going from the 3D model, but also the mock ups and proof of concept in the field. To make sure all those pieces do indeed tie together and do work together.

268
00:44:31.730 --> 00:44:33.800
Marshall Bailey: and then last, but not least, is

269
00:44:34.386 --> 00:44:43.099
Marshall Bailey: making sure that all the operations and maintenance needs are going to be highlighted and obviously correlated to a 3D. Model. So everyone kind of knows what lane they need to stay in.

270
00:44:46.680 --> 00:44:57.219
Marshall Bailey: So first, st here's a cross section of the cover. We did have 3D models that were utilized throughout the construction project, but they're more or less utilized to visualize the phasing of the work.

271
00:44:57.615 --> 00:45:16.059
Marshall Bailey: So just an example, especially in this lowered segment, was, first, st initially, where the viaduct was originally located. Including building the westbound section. So then we took all the traffic from the viaduct, and we dropped it essentially in the westbound bore, where we had a bi-directional traffic phase for roughly 2 years.

272
00:45:16.150 --> 00:45:23.459
Marshall Bailey: So then, during the bidirectional traffic phase, the viaduct was demoed, and then it allowed us to build the eastbound bore.

273
00:45:23.740 --> 00:45:26.879
Marshall Bailey: So then, right here, this is the final configuration

274
00:45:26.890 --> 00:45:28.959
Marshall Bailey: of the lowered segment.

275
00:45:33.670 --> 00:45:43.439
Marshall Bailey: So then, here, this is just a cross section of the cover. And one of the pieces I did want to emphasize is the the jet fan and the clearance envelope of 16 6.

276
00:45:43.590 --> 00:45:44.580
Marshall Bailey: So

277
00:45:44.970 --> 00:46:08.079
Marshall Bailey: here I just want to reemphasize is how how tight our tolerances truly were for all the surface street tie ins, including all the covertop elements, and then maintaining that 16 6 envelope, where all of those systems would reside, as well as where the final roadway profile would be constructed, because we had groundwater roughly, like a foot underneath the pavement section.

278
00:46:11.420 --> 00:46:20.758
Marshall Bailey: So here, this was just a a snapshot of the 3D modeling that we did use for the cover specifically. Here is a picture on the left

279
00:46:21.540 --> 00:46:24.900

Marshall Bailey: of the footprint of essentially just the cover top

280
00:46:25.337 --> 00:46:30.950
Marshall Bailey: and as you can tell from the picture, and the image that was provided is that we really didn't have any

281
00:46:31.462 --> 00:46:35.090
Marshall Bailey: additional data outside the actual footprint of the cover.

282
00:46:35.110 --> 00:46:38.860
Marshall Bailey: And then the picture on the right is the actual constructed image.

283
00:46:39.691 --> 00:46:41.400
Marshall Bailey: That we took with drones.

284
00:46:41.740 --> 00:46:52.029
Marshall Bailey: But what we really could have utilized just due to the complexity of the covertop is having a 3D. Model that would have extended roughly 50 feet off of the cover, approaches

285
00:46:52.515 --> 00:46:56.749
Marshall Bailey: to make sure everything as far as utilities were correlated with the covertop.

286
00:46:56.860 --> 00:47:03.489
Marshall Bailey: and a lot of drainage features that would be from the on structure cover, as well as some that went through the surface streets.

287
00:47:03.600 --> 00:47:08.579
Marshall Bailey: And then we did have a couple of covertop elements that would have been on and off structure as well.

288
00:47:08.923 --> 00:47:11.050
Marshall Bailey: So by just having a more complete

289
00:47:11.090 --> 00:47:16.930
Marshall Bailey: model, this would have helped us utilize, essentially eliminate a lot of construction issues that we did come across.

290
00:47:17.269 --> 00:47:25.610

Marshall Bailey: So we would been able to highlight these a little bit earlier, and making sure that we're working with the appropriate designers, and not necessarily working in a silo. As much

291
00:47:28.970 --> 00:47:30.780
Marshall Bailey: so here is the covertop.

292
00:47:32.990 --> 00:47:34.140
Marshall Bailey: and

293
00:47:35.070 --> 00:47:41.779
Marshall Bailey: not just having a 3D. Model, but also focusing on how important the mock ups and proof of concept do become.

294
00:47:42.085 --> 00:48:05.470
Marshall Bailey: And just reiterating just how how tight. These tolerances were for some of our drainage elements, and the complex shapes that were on the covertop, and making sure that all these parts and pieces actually work together in the field is extremely important, but being able to ensure that the actual model does work and being able to show that 1st hand to our construction folks in the field before any of these elements are actually constructed, and start tying together.

295
00:48:07.690 --> 00:48:14.210
Marshall Bailey: and by just having a good 3D. Model I mean, we would have. We would have eliminated a lot of rework and a lot of Ncrs in this process.

296
00:48:17.100 --> 00:48:24.659
Marshall Bailey: So here, this is a portion of the tunnel systems. So this would actually be an operator screen on our left. But

297
00:48:24.960 --> 00:48:42.089
Marshall Bailey: what I wanted to iterate today is that we do have a presentation online with our nature's website about the central 70 lessons learned which will go more into depth about these tunnel systems and how they were construction constructed as well as being operated but for today's case, I really want to focus on

298
00:48:42.160 --> 00:48:53.940
Marshall Bailey: tying 3 assets to a 3D. Model, so as you can tell from the image on the left hand side. This is what the operator is going to see. So it's very user, friendly, and very, very intuitive to show

299
00:48:54.280 --> 00:49:00.699

Marshall Bailey: firsthand exactly what's happening within a tunnel at any given point while traffic is traveling through it. But.

300
00:49:00.720 --> 00:49:05.359
Marshall Bailey: as you can tell on the picture from the right. There's just a lot more going on within the cover

301
00:49:05.620 --> 00:49:14.539
Marshall Bailey: than merely just what's on that screen. So just to get an idea, as we have roughly 1,200 lights within the tunnel, as well as 60,000 lineal feet of conduit.

302
00:49:14.760 --> 00:49:22.829
Marshall Bailey: and we have 20 fire suppression zones as well as 18 jet fans. So I mean, that's just a very high level overview of some of the assets that we do have within the cover.

303
00:49:23.820 --> 00:49:30.029
Marshall Bailey: But from those assets that would ideally be within a model. There's also the routine maintenance, aspect.

304
00:49:30.438 --> 00:49:52.459
Marshall Bailey: of these feature of of this type of infrastructure, and we have to complete roughly 2,900 routine maintenance inspections every single year, so by Number one having an asset within the model, but also being able to correlate all the construction information that was compiled, as well as all those routine maintenance inspections to an asset for future history. Tracking is extremely important for cost.

305
00:49:52.864 --> 00:49:58.459
Marshall Bailey: But also, if or when there is a essentially like a non routine maintenance issue that does pop up

306
00:49:58.630 --> 00:50:00.880
Marshall Bailey: the team in the field has the best

307
00:50:01.490 --> 00:50:04.839
Marshall Bailey: best information. And obviously, it's really, really accessible.

308
00:50:07.950 --> 00:50:19.740
Marshall Bailey: So now, kind of just getting into those cost savings. The the upfront cost of developing these models is obviously extremely large and making sure that all that data and information is making it into these models.

309
00:50:20.218 --> 00:50:28.731
Marshall Bailey: But we're we're essentially living at 1st hand with the Central 70 project on how valuable this information becomes.

310
00:50:29.490 --> 00:50:30.660
Marshall Bailey: and that

311
00:50:31.010 --> 00:50:31.690
Marshall Bailey: yeah.

312
00:50:32.130 --> 00:50:34.609
Marshall Bailey: one of the major takeaways that we

313
00:50:35.070 --> 00:50:47.199
Marshall Bailey: that we had was that number one. All the information needs to be compiled at the appropriate time within the project life cycle, and also the information needs to be populated within the model by the appropriate person at that time.

314
00:50:47.210 --> 00:50:53.289
Marshall Bailey: So once all that information is populated, and if or when issues do pop up.

315
00:50:53.900 --> 00:50:57.080
Marshall Bailey: all the information is there, and it's accessible.

316
00:50:57.270 --> 00:50:58.320
Marshall Bailey: and then.

317
00:50:58.410 --> 00:51:00.799
Marshall Bailey: if or when issues do pop up.

318
00:51:01.950 --> 00:51:17.820
Marshall Bailey: you're not necessarily having to reinvent the wheel every single time. So you're just saving a bunch of money just by just finding the appropriate resolution, but also the man hours. It's gonna take to deliver a lot of this work. So as far as

319
00:51:18.520 --> 00:51:20.230
Marshall Bailey: the manpower that's

320

00:51:20.530 --> 00:51:29.619
Marshall Bailey: going to be saved just in construction, but also over the life of the R. And M. Period. So those the cost savings would just be endless. So.

321
00:51:35.280 --> 00:51:37.645
Justin Cole: Alright, Marshall, thank you for that.

322
00:51:38.460 --> 00:51:42.099
Justin Cole: information there, and and how this information is used

323
00:51:42.240 --> 00:51:46.429
Justin Cole: out in the field. And on our projects. So

324
00:51:47.146 --> 00:51:58.223
Justin Cole: thanks, everybody. Thank you for the speakers for your time here. We do have a few questions that have come in that I will ask to our speakers before we wrap this up.

325
00:51:59.180 --> 00:52:05.110
Justin Cole: 1st one. I'm gonna direct this to Olivia Olivia. What are the goals and objectives?

326
00:52:05.589 --> 00:52:10.419
Justin Cole: For fdot in their implementation of this 3D. Cei program.

327
00:52:10.940 --> 00:52:13.230
Olivia Townsend: Sure. So really

328
00:52:13.260 --> 00:52:22.110
Olivia Townsend: right now, as far as implementation, our goals are really just to encourage the use of the Gnss. Rovers as a verification and measurement tool.

329
00:52:22.660 --> 00:52:27.709
Olivia Townsend: We would like to get pre-construction of verification of existing surfaces

330
00:52:28.258 --> 00:52:32.569
Olivia Townsend: as well as verification of finished grade, and

331
00:52:32.660 --> 00:52:40.299

Olivia Townsend: hopefully as built services, and then hopefully be able to actually produce final estimates documentation using the Rovers.

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00:52:42.570 --> 00:52:45.189
Justin Cole: Awesome. Thank you very much for that, Olivia.

333
00:52:45.734 --> 00:53:02.529
Justin Cole: Next question. I'm gonna kick this to Andrew, and anybody else who wants to chime in is welcome to the question is, what are the benefits of the technology? So we we've covered a little bit of that in our presentation. But, Andrew, if there's anything, maybe that that hasn't been covered, you want to tack on.

334
00:53:04.010 --> 00:53:06.410
Andrew Poszich | RS&H: Yeah, I always tell people, I think the

335
00:53:06.790 --> 00:53:32.870
Andrew Poszich | RS&H: biggest value is the improving, the way we communicate. And that means different things to different people. So what I encourage you to do. As you know, we have probably several different people in attendance here, whether you're, you know, from a Cei perspective. You're from the design side. You. Maybe you are the owner in this project. Start asking yourself, how can I leverage tools that give me better access to information I need. And the more we have those conversations sometimes that information is just a few clicks away.

336
00:53:32.870 --> 00:53:43.069
Andrew Poszich | RS&H: It's just not being provided or submitted as part of the official delivery. So have open dialogue. Have the conversation. And yeah, let's make our jobs easier. Ultimately, at the end of the day.

337
00:53:44.630 --> 00:53:46.310
Justin Cole: That's great. Great answer.

338
00:53:46.400 --> 00:53:48.920
Justin Cole: Anybody else have anything to add on that one.

339
00:53:51.430 --> 00:53:56.599
Justin Cole: Okay, we've got another one here. I'm gonna direct this over to Taylor.

340
00:53:57.165 --> 00:54:06.179
Justin Cole: Taylor, what are you finding is working with F. Dot's implementation of the program and what has not been working as well so far.

341
00:54:08.510 --> 00:54:09.879
Taylor Carlquist: Okay? Well, I think

342
00:54:10.320 --> 00:54:15.520
Taylor Carlquist: I mean, as far in terms of like, what's not working. I don't think we've encountered really anything that

343
00:54:15.640 --> 00:54:19.640
Taylor Carlquist: is gonna kind of stop the show or stop us from moving

344
00:54:20.010 --> 00:54:35.610
Taylor Carlquist: down this down this path that we've started to go on. I think one of the biggest challenges is trying to get the majority of our industry, our consultants, our resident offices to see these benefits, I mean, because not everybody's like, y'all.

345
00:54:35.610 --> 00:55:03.145
Taylor Carlquist: you know, like I've you know, I've heard Tony say. You know you all have been using Rovers for the past 1520 years on projects. You know we never required that or you know, asked for any data to be produced. That's just a tool that you all decided to use because of all the benefits that you've seen in it. Not everyone's like that. A lot of folks still rely on printed out plan sets that they're taking into the field, and, you know, flipping it over and writing notes on the back of it and using highlighters and as that may work.

346
00:55:03.980 --> 00:55:08.529
Taylor Carlquist: you know, like everybody's been saying. Andrew's been saying. I mean, this is kind of an industry move

347
00:55:08.680 --> 00:55:16.479
Taylor Carlquist: into more of a digital world. Everybody's moving to more model centric plan, design and capturing digital data is becoming more important. So

348
00:55:16.799 --> 00:55:20.510
Taylor Carlquist: that's kind of our challenge is getting everybody to see those benefits.

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00:55:21.990 --> 00:55:27.010
Taylor Carlquist: what's working for us. And I think what will work moving forward is just taking small steps.

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00:55:28.580 --> 00:55:34.369
Taylor Carlquist: you know, these pilot projects. The 1st phase is done. They're, you know, we're considering it to be a success.

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00:55:34.743 --> 00:55:42.019
Taylor Carlquist: Sure, there were some challenges for some. But overall, I think. I think it's gonna benefit a lot of folks once they

352
00:55:42.740 --> 00:55:45.000
Taylor Carlquist: once they can see what you know are the

353
00:55:45.030 --> 00:55:46.340
Taylor Carlquist: the capabilities.

354
00:55:47.320 --> 00:55:53.699
Justin Cole: Yeah, absolutely. We've had great, great participation amongst the pilot teams, and everybody's been very helpful and and

355
00:55:54.010 --> 00:56:01.449
Justin Cole: and using the equipment and giving us feedback. So it's been a real real great process through phase one look forward to continuing on.

356
00:56:02.630 --> 00:56:04.145
Justin Cole: Okay, thanks, Taylor.

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00:56:04.790 --> 00:56:19.610
Justin Cole: one last question here. Andrew, direct this to you. What Cde platform is or are utilized to coordinate design and construction communication.

358
00:56:21.570 --> 00:56:27.459
Justin Cole: Cde, I'm thinking, is maybe common data environment. So any cloud based

359
00:56:28.770 --> 00:56:31.799
Justin Cole: information being used to communicate between design and construction.

360
00:56:31.800 --> 00:56:58.370
Andrew Poszich | RS&H: Yeah, I I can make a comment of what we've seen kind of working with different agencies out there. And then I'll let Olivia and Taylor kind of chime in from an fdot perspective. From one of the previous slides. I know that there were a few pilots going on,

involving Trimble, Trimble, Synchro, as well as some other platforms. But what we're really finding is we have a massive shift in industry now, where there's a lot of different software vendors, you know, kind of levying for their space and industry.

361
00:56:58.390 --> 00:57:07.750
Andrew Poszich | RS&H: I'm not sure if you're aware of the Ifc or Industry Foundation class that's been kind of approved by Ashto as the go to kind of Pdf of 3D. Modeling.

362
00:57:07.750 --> 00:57:36.019
Andrew Poszich | RS&H: You're seeing varying levels of support across industry. I think everyone's kind of begrudgingly going along with it. Kind of say, in jest each of the software vendors wants you to kind of stay within their ecosystem the vendors like Quadri. I know there's the I twin on the Bentley side. They're really having these one stop shops if you're in their ecosystem, but they're starting to talk to each other a little bit easier than they have in past years. But yeah, quite a different options out there. But I'll leave it to kind of Taylor Olivia to talk through

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00:57:36.100 --> 00:57:38.330
Andrew Poszich | RS&H: what fdot is using in this case.

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00:57:42.690 --> 00:58:04.967
Taylor Carlquist: Sure I can. I can speak a little bit on it. I mean, we're that's part of this part of this push. I mean, our our CAD offices make changes, our design offices make changes, we make changes. We're trying to like bridge the gaps between especially design and construction. Right? Now we have our, we're using a project solve sharepoint as our collaboration site. So

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00:58:05.672 --> 00:58:16.940
Taylor Carlquist: everything, all the design files. Which there was a kind of a a brief list of things that were deliverables. That come from design into construction. That's all housed in

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00:58:17.686 --> 00:58:27.209
Taylor Carlquist: project. Solve. So each each project has its own site. So you're able to see the project plans. All the project documents are uploaded there.

367
00:58:27.719 --> 00:58:36.279
Taylor Carlquist: So that's what we're using. Currently, I know there's some we're looking into replacements for that that allow for more of a

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00:58:37.460 --> 00:58:42.439
Taylor Carlquist: like a workflow from design going into construction, and a a way to.

369
00:58:42.850 --> 00:58:45.279
Taylor Carlquist: you know. Keep a lot of the data not

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00:58:45.820 --> 00:58:53.581
Taylor Carlquist: necessarily just end in construction, you know. And then we just turn in a Pdf plan set, you know, and that you know all the data is done, you know. After that, you know.

371
00:58:54.080 --> 00:58:56.940
Taylor Carlquist: So we're looking into ways to try and have a more

372
00:58:58.400 --> 00:59:00.650
Taylor Carlquist: collaborative workspace, for sure.

373
00:59:02.820 --> 00:59:03.990
Justin Cole: Fantastic.

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00:59:04.680 --> 00:59:20.760
Justin Cole: Okay, that's the questions we've got. So we're right near the top of the hour. So we're gonna go ahead and wrap this up. I wanna again. Thanks all thanks to all of our speakers for joining us today. We hope you got something out of this webinar, and I hope everybody has a great day. Thanks for joining us.