SANTI SARICA: Hello everybody. I'm Santi Sarica. I am a technical specialist BIM for infrastructure at One Team. Thank you for coming to this session. Today I'm going to show you all how we have applied the BIM workflow to remake a project previously released with the traditional metal, for example, AutoCAD. OK, I would kindly ask you to hold the question until the end. Thank you very much.

So, this is the company I corporate in Italy and I have developed this project with. It is called One Team. ATIVA Engineering and its team of design is the company that I had the pleasure to follow from the training course of several software. The software are Civil 3D, InfraWorks, Navisworks, and Map3D, a little bit.

OK, today training on the job and, finally, the project coaching. OK, in this image, you can see how the flood wave has submerged and destroyed part of the Highway A5. These experimental design with BIM methodology has to target to make the Highway A5 safe from the risk of the flooding. With the functional geometrical adjustment of approximately 10 kilometers.

The class summary. OK, the first step of this experimental study was to develop a new stable and reliable workflow, to ensure the transmission of all relevant information. OK, restart. These are the main targets of this session. Create a hierarchical workflow to design an infrastructural project. Create dynamic link between software and different discipline. Define a BIM validation process for the infrastructural project design. And build a smart infrastructural models.

OK, to test the efficiency and gaps of BIM methodology, this project already realized with the classical workflow was remade with the new BIM workflow. The variety of professionals and disciplines involved in the implementation of the part of the same project, they are of different extents and timing, required adoption of the model and dynamic control system. Is it possible to create a 3D model with the-- only click with BIM methodology? No, not yet.

OK, the most critical part of infrastructure project is the complexity and multi-disciplinary nature of the indoor project areas. They need to be coordinated and harmonized. In order to better manage the construction works of the project, a division in the functional areas, according to the location. Topology and priority has been adopted. OK, the many areas of study themselves sub model. For example, the topographic, the roads, the structural and hydraulic

model has been identified. And altogether, they have created a reference final model.

OK, this is the hierarchical scheme developed for the transmission of the process and design information. As you can see, the key points of the project that we have identified, the milestone for each sector, and, finally, development of the project. These are the main issues related to the topographical model. In this case, the critical issues are point acquisition method, study of compatibility, georeferencing of topographical survey.

For the elaboration of topographical model, we have identified the most the suitable restitution scheme to create light and dynamic surfaces. OK, for this reason, a ground surface has been created by assembling elementary and light surfaces. Such surfaces can be separately modified, but since connected to all this one update dynamically. The final result is a surface off the ground similar to a puzzle.

OK, the concept of BIM should not be associated only with the software, as many still think. But it is still useful to remember that the implementation of these models inevitably passes through by technological development, and the new model design techniques and data processing.

OK, start the first video.

[MUSIC PLAYING]

OK, in this video, you can see how we created-- just a moment-- OK, start. In this video, you can see how we created the surfaces and as we link this through data shortcuts. OK, this is the main surfaces. Now, we create a link. We stay here [INAUDIBLE]. OK, I created a link through data shortcuts. This is the new file with the main surfaces. Now I'm working on the second surfaces and the third surfaces. It's all linked.

OK, the second video.

[MUSIC PLAYING]

OK, here you can see how after the previous processing, modification and integration between the surfaces is quick and easy. Here, we make a modify in the main surfaces. Now save. OK, switch in the new file. I update the link. OK, this is the modify in the main-- file in the main surface.

OK, these are the main issues, matters related to the road model. OK, the critical issues are many alignment interfering with each other. Level of the tile of the information to be shared. OK, after the topographical model, the roads and hydraulic wells were created. The two dynamic model were then linked to the terrain model.

OK, in this video, I'll start.

[MUSIC PLAYING]

OK, in this video you can see the profile and the section of the road project and also the dynamic interaction. This is the section. The new file. Again I linked the main alignment. I linked the surfaces. This is the road surfaces. And this, the main surfaces-- the terrain surfaces. Now I create in this file a new profile view and profile. Now, create the 3D model from the corridor. They're pretty solid from the corridor. And project into the profile view. OK, now switch back. In the previous file, I modified my profile. OK, rebuild the corridor. Save, and shift the previous new file. Now, I update the link. And this is the reason.

OK, the road model has been associated with all the necessary information about volume, counting item, and material. OK, in [INAUDIBLE] this case, we were able to create a dynamic structural model. What? OK, this structural project involves the construction of six box culvert. Six underpasses, two overpasses, and a viaduct. OK, about the culvert and underpasses. In order, this relies on the structural model. Rigid design rule were created. This is important. In down right, it's important. If you change data, the geometry changes, and back.

OK, next video.

[MUSIC PLAYING]

OK, in this video, we show you-- excuse me. In this video, we show you how the structure in the Revit changes by changing its parameters and value in the family of level. OK, now this is a particular of the fraction. A piece of it. Now we can change it. In this case, the material.

OK. But this type of file could be connected to previous model, but those were not dynamically managed. OK, now reinforcement management. Here you can see some simplified example of the structural model for the reinforcement. And again we video.

[MUSIC PLAYING]

OK, and in this video, also you can see how the structure realized from the severance substructure changed by changing the specific parameters of the single family or through the global parameters. OK, now select change family. All this is the reinforcement filter. OK. This is the [INAUDIBLE] of the reinforcement. All is linked. Now we change-- directly the parameter, and the chain.

OK, the overpasses. In this nice little animation, some simplified examples of the structural model for the overpasses. Now we have a [INAUDIBLE], in this case. OK. In the process of roles, which [INAUDIBLE] the collaboration among the sector, are useful also through the cloud platform. To capture the change and update in both direction, this has significantly improved the efficiency by reducing potential error, due to the missing, or incorrect, data transmission.

OK, noise barrier and safety barriers. The process of-- What is? OK, I get in this nice and-- Sorry? OK, it's going. In this nice animation, you can see some simplified examples of a structural model for the noise barriers and safety barriers. In this case, create again in red. The rigid rules adopted for the creation of the final model, have partly enabled to overcome the communication-- gap between the sub model.

OK, and after the surveying roads, and structure project, the hydraulic one has been realized. Collaboration with the specialized external collaborator-- consultant, sorry. External consultant. OK, here the project was creating two different systems. One, to remove the water from the road surface, and the second has water treatment. Also, in this case, the use of the cloud platform has allowed to optimize the efficiency and the quality of the transmitted information, reducing the amount and the gravity of potential errors.

OK, integration. OK. After that, we created and harmonized the four project model. This model has, then, been used as a model of reference for the study of interference. This was one of the most [INAUDIBLE] steps. Interferences are the main case of the project review during a both the design and the construction work. With a relative time burden and additional costs.

Start the video.

[MUSIC PLAYING]

In this video, we show you how it is easy shared the object between Civil 3D and Revit. OK, in this moment, we create georeferencing file in XML file extension. OK, save this file. Switch

from Civil to Revit, import the previous file-- XML file. Apply. Now, the model is georeferencing. Save and export the solid. Switch back in Civil 3D. Import the previous model. And the solid is correctly positioned. This is the result.

OK, the possibility to integrate different disciplines. I love to anticipate-- and the show in the design phase. Issue the potential delay, you had to incorrect forcing construction physics, allowing to make changes to the project when needed.

A control of the physical interference type was carried out. For example, the interference between the underpasses and the storm water network. Also, an interference type of-- at risk-- for example, the influence of the voltaic arc was analyzed.

OK, these are the main objects involved in the study of interference. Here, you can see a part of the interference verification process. Through the use of the [INAUDIBLE] detective in InfraWorks Manage. [INAUDIBLE] Just a moment. Sorry. [INAUDIBLE] Yes, OK. No charge. No, no charge.

[NON-ENGLISH SPEECH]

OK. This is the main object involved with the studio of interference. The upper structure road, back fill on the road, solid viaduct, box culvert, oil separator, and pipe network OK, all work. OK, next video. OK, in this video, we show you how was created the study of interferences. In this case, between the pipe network and the structures. This is the interference-- the first interference. This is the second.

OK, now we create a report-- interference report. Save the report. OK. OK, we save. This is the report. It's OK, thank you. OK, this is the interference report. OK, again. OK, now the report sorry, [INAUDIBLE] for a [INAUDIBLE] surveys have proved very useful to highlight anomalies, and to make improvements to the project.

OK, the next video. OK, with this video, we show you an example of fast mode part of 4D construction simulation, through the InfraWorks timeline.

[MUSIC PLAYING]

OK, this is a bridge. The box culvert. Stone water system and the treatment system. OK, the overpasses.

OK, next slide. Now, through simulation made in InfraWorks Manage, you can see the situation of infected area before the project. And after, you can see the situation of the infected area after the project. ATIVA Engineering is currently engaged in the testing of developing the work building site phases with Navisworks Manage.

OK, the video-- in this video, you can see the simulation of the situation during the flood. You can see the water that grows.

[MUSIC PLAYING]

OK. Now, Highway A5 is submerged.

OK, in the second video, but here, you can see the simulation of the situation after the realized the project in the same condition of the flood. Again, you can see the water that grows.

[MUSIC PLAYING]

OK, Infraworks 360. And finally, I showed the video showing the project included the territorial context. The experiment BIM of these projects-- as to understand the potential of these next kinds of design. The ability of optimize the efficiency and reduce error related to the lack or subnormal, suboptimal communication between the various project areas, is certainly an added value to our project. And, in addition, to the plain part, we must not forget the advantages, in terms of management and maintenance.

We'll start the last video. OK, this is the final present. OK, representation of the projecting environment context, planning and decisional tools, import of all useful data, simulation of several scenarios, and environmental impact assessment.

OK, next slide. OK, here there are some statistical data about the project realized. For the training, one day for InfraWorks, four days for AutoCAD Civil 3D, three days for Revit Structure, one day for Navisworks, six days for the analysis of the process and the standards. And two days for the BIM manager training. All process-- all this process, it was held in a year. We started with three months of intensive training activities, and the previously described. And after, with regular steps each month, of the project coaching. ATIVA Engineering realized that this part of the project, about in three months, included the creation of custom components.

OK, I know this. I know this person. OK, thank you for having stayed with me until the end of

my presentation, even more for having kindly stood my perfect English. OK, in this slide, you can find all references to contact us to ask for information on the testing of this project, or of other information. Below, you can see the names of the managers and designers who developed the project. They have had the main merit of this amazing project.

OK, we're finished. Thanks again. Thanks again, and have a nice time at AU 2016. Bye.