**[HVT][WS -extra] SystemSoftware Architects-20250507\_130136-Meeting Recording**

0:03  
We have with us Gabriel Chimuka, which is who is system architect.

0:15  
Our colleague software architect will join soon I think.

0:23  
But I, I propose to start with the system part.

0:36  
Uh, hello Gabriel.

0:40  
Hello, hello, uh, hi Gabriel.

0:45  
I'm, I'm Jerry Parking and I'm working with technologies and I'm responsible for handling this exercise of evaluating the ALM tools.

0:59  
So with me or my colleague Vijay is also here and rest of the team is there on the call.

1:05  
So the purpose of this today's meeting to understand predominantly from the system side, are you start with the system design or maybe the system requirements gathering and then from system requirements how which will be cascaded to the software level.

1:23  
So we'd like to understand your, you know, entire process of system architecture requirements defining how we are getting it, how you are managing it and how the software teams leverage those requirements for their architecture.

1:43  
So if we can process, we are for progress with that particular process explaining, I think that will definitely help us to understand.

1:53  
And in addition to that like management how we are managing the variant at system level and further software team is using those variants.

2:06  
OK, I need to check a little for some documents.

2:16  
Sure.

2:43  
Sorry, I was not prepared for that.

2:45  
I also I didn't ask a question and but I will find some documents and after that we'll discuss.

2:59  
Yeah, sure.

3:41  
Yes, we had a couple of workshops where we understood that from the system side your requirements get managed in the doors, doors too.

3:51  
And from there it get flow to the software team and they kind of develop their software requirement.

3:58  
Yeah.

3:58  
But from system side, basically how it starts, I mean from the system architecture point of view and how you define and manage the variance that further flow to the software part.

4:14  
So yeah, that part also would like to understand.

5:16  
OK, I'll share my screen in this presentation.

5:32  
There are a lot of slides but with these are the the milestone of the process and there are a lot of updates so I will take the last one.

6:12  
OK so this is the the last official and people on their side and they are working for a new version but I am not aware of what they do so so we have a project planning name V3 P and also it has some indexes.

6:50  
Now we are with V3, P4 and on this is it clear or I should going full screen?

7:04  
Yeah, yeah, if you yeah, yeah, this is better.

7:28  
OK.

7:28  
So, so the project planning start with the vehicle project, which is the most important.

7:42  
After that, we have another planning for powertrain and our system activities, sorry, are synchronized with the powertrain planning because we must respond to power trainings.

8:09  
OK.

8:09  
Yeah, there are other systems on vehicle side, but they are not in horse perimeter.

8:16  
So or system in horse are linked to the power train.

8:26  
After that, of course by the powertrain milestones, we are also linked to the vehicle milestones, but not directly.

8:36  
So on power train we can have a different top projects.

8:47  
So in the very early stage we can have advanced engineering projects which have milestones name, APR, advanced project here I don't know requirement or something like that or review, no, it's review.

9:12  
So advanced project appear 123.

9:16  
So this advanced engineering projects doesn't don't end with an industrial product, but they are we use that in order to develop new technologies and to prepare them to be integrated in an industrial project.

9:52  
Also we have advanced IVP, advanced project.

10:01  
It's like an advanced engineering, but for a small scale.

10:05  
So innovations or novelties less complex.

10:13  
They are also in the very early stage of the project because if we look to the power train schedule and the project starts with IU intention.

10:30  
So this is the first milestone on powertrain.

10:35  
And if you look to advanced engineering projects, they start before IO intention because they are not linked to a project.

10:46  
They are need to new technologies that must be developed.

10:51  
On the contrary, AVP projects are start after IO intention but they are developed during the upstream phase of the porting project.

11:06  
So there are like parallel projects to the industrial project in order to have additional budget and to develop some novelties or innovations which are needed for the industrial project and their complexity is low enough to to allow the development during the upstream phase of the industrial project.

11:42  
After that on system side we have SDR 's and we have here SDR O 53 of the 53 is the code for our perimeter system development and we say all 53 process for system.

12:09  
So on all 53 we have SDR milestones which start with SDR zero and goes until the SDR 5.

12:29  
In parallel with that, we have also Dr.

12:33  
So we have SDR and Dr.

12:36  
What's the difference?

12:38  
SDR means system design review because on a system we can have physical parts but we have also software parts, functional parts.

12:53  
So on system design review we treat the whole system.

12:59  
After that for physical parts development we have parallel design review which are dedicated to each component.

13:11  
So each component which is developed must pass through Dr review and Dr review has less milestones because it starts at SDR one.

13:29  
So at SDR zero system level we must collect all the needs the Cdcs.

13:43  
Cdcs means requirements, high level requirements from project vehicle, I don't know homologation and other stakeholders which are outside the system.

14:05  
OK.

14:05  
And we make first preparation and first quotation.

14:13  
And for SDL Zero we must perform also a quotation which is named S1 and S fun.

14:23  
This one is fun with little.

14:35  
This one is system operational architecture novelty S fun is system functional architecture novelty.

14:47  
And so this is the first quotation of the complexity of the novelty that we we must develop.

15:03  
But this is not linked directly to the system, it's mainly linked to feature.

15:17  
What's the difference between a system and a feature is that a feature is defined on vehicle level and it can impact one or more systems.

15:33  
For example, we can have a feature emission.

15:39  
Emission control is a feature on vehicle level because our vehicle must respected regulation.

15:50  
But to control the emission we have a lot of systems which are involved.

15:57  
Starting with my system, my air system which is responsible to for the to introduce the error into the cylinder that we have combustion system after treatment system, but also other systems which are additional like energy management or I don't know torque management.

16:18  
So a lot of system are contributor to this feature emission control and it is the zero.

16:32  
So the quotation is one is one is made on whole aspect like it's treated on features and it integrates all the involved systems.

16:53  
After that, because on the power train project, we have a milestone name IU preconcept on system side, we also must grant an SDR name preconcept.

17:16  
This is something new.

17:20  
This is why on the old framing that I provided to Adriana, this milestone was not on the slide.

17:32  
But so with V3, P4 they introduced this preconcept and on system side the the responsible experts said we must also prepare an SDR.

17:54  
So for this milestone we must present the list with novelties on function and also on component.

18:09  
NFL means a new function list and the L is new design list.

18:15  
It's for components and sizing.

18:18  
That means we should quote and to say if it is a complex or large or medium or small novelty complexity.

18:37  
After that we must prepare an SDR one.

18:46  
For this SDR one it is synchronized with a milestone on the purchasing.

19:01  
Because here we must grant milestone name erfq rang that means request for quotation for the a how to say that in English the most important suppliers or the most important components which need a long time for development and they are very complex.

19:29  
So for this RFQ rang R we must grant the SDR one.

19:37  
That means we must have the first version of STR and SDD One means STR is system technical requirements.

19:52  
These are the also named high level requirements which translate into system language the needs that we collect from outside of our system.

20:09  
SDD are low level requirements.

20:14  
That means we we have requirements on functional and also on physical components.

20:25  
More details for one str we can have several SDD.

20:33  
SDD means system design document.

20:37  
So, OK, so synthesis with the requirements low level requirements and also for this SDR one we must have what we call SDR comp come from component that means construction requirements or physical, physical requirements for for components which are quoted rank.

21:11  
So we have 2 in term of time.

21:17  
This is planned to considering the IU concept my son -14 weeks.

21:26  
But it is also linked as I said that where FQ rank after that.

21:36  
And as you can see, when we grant SDR one on component side, they can start with Dr zero because they cannot start Dr zero before having an SDR comp because SDR comp synthesizes the requirements for component.

21:59  
So we must provide that to component responsible in order to start their design process.

22:10  
So Kapil, I have one question here.

22:15  
Hello.

22:16  
Yes, yeah, yeah.

22:17  
So here when you are creating those, the system level requirement, at what level you are generating the variance?

22:25  
Because when you create a requirement, you must have defined the system variance already in this particular step, right?

22:36  
Yes, in this in this stage we also must think to to variance and like you manage those variance based on the vehicle variance or how that you the variance management is very different between systems because of system, sorry, system specificities.

23:07  
For example, on after treatment they organize their variance function of emission regulation €6, €7 and of course function of engine technical definition or functional event.

23:31  
We have HR 12 engine which is a 1.2 liter engine with turbo.

23:37  
We have also HR 18 which is a naturally spirited engine without turbo.

23:44  
So they organize like that by emission norm and engine and then on my yeah, Please wait.

23:56  
So they manage the variant like that on my side.

24:00  
For example on error system I must arrange my variance function of technical definition of the air system.

24:10  
Because for example I have the same air system for an engine and for €6 or €7 I have the same air system.

24:21  
But on air system I can have engine with turbo without turbo, I can have an engine with EGR without EGR and I must organize my variance like that.

24:37  
OK.

24:37  
And which system or tool you are using to manage the variants?

24:44  
We make that indoors, but it's not very simple to make that.

24:51  
Ohh, OK.

24:53  
And once you create a variance and like you have this system requirements are defined in to us.

25:00  
So how you pass these requirements to the software team because the software architecture then further get this system requirements and develop the software.

25:11  
Yes.

25:12  
So here on the slide on the below, on the bottom part you have this line mockup prototype.

25:21  
This is for software.

25:23  
And here you also can see software pre one, software pre 2 with different software loops.

25:31  
Yes, yeah, process where you pass the requirement.

25:36  
Yes, this is I want to say so before that it doesn't appear here.

25:44  
But in this part of the of the line before software pre one, we have SDR process where starting with SDR one SDR 2 we already have functional requirements from system.

26:10  
And based on functional requirements we prepare SCDR file in order to present the novelties to our software team.

26:23  
And here I have another slide.

26:27  
I put you an exact correlation between.

26:30  
This is OK, I tell it.

27:13  
OK.

27:14  
Do you see the screen?

27:16  
Yes.

27:19  
So when we have STR version one, we can already start to discuss with algo team about ACDR.

27:35  
But when we have SDR SDD version 2, this is for SDR SDR 2.

27:49  
Normally we can start to prepare the SCDR Zero where the PFS, the system pilot present the novelty to algo team in order to inform them about our requirements and what we want from ALGO.

28:15  
After that algo team works and they come back with a file name Sr One where they present how they understood and how they interpret the system requirement.

28:34  
OK actually and create the software requirements here in SDR one based on the system requirements presented in SDR Zero and also the software achitecture in SDR one, you define the software requirements related to the system requirements and the first software achitecture for this software requirements and how you get that system requirement.

28:57  
It is an extract from lower right in Excel format or you refer to the door direct Yeah, Excel format Excel from those plus PowerPoint PPT OK And when you create a software architecture and the software requirement that is also done in Excel and the the PowerPoint format, right.

29:16  
No tool is used for manage yes, in this moment, no.

29:19  
Yeah, OK, yeah.

29:21  
So ideally in this PowerPoint, we should integrate some system architecture made in Magic Draw.

29:34  
But current, so currently we don't use magic draw because system pilots don't know it and also it's very, very slow.

29:53  
So OK, So it's much, much easier to work in PowerPoint.

29:59  
OK, So for system architecture you are using magic drop, but for software, no, no, they're not using, not using.

30:06  
OK, sorry, they have magic drop, but they're not using it.

30:09  
So we should use magic drop, but we don't use it, right?

30:14  
Understood.

30:14  
So general one question process in the RFQ stage.

30:19  
OK.

30:21  
In the RFQ stage, are you managing the requirements in doors, doors itself or it is in the excel sheet you get from Reno?

30:33  
Sorry in the RFQ stage, I'm talking about a quotation.

30:37  
Quotation is still I think RFQ rang a right.

30:45  
What is that?

30:46  
Yes, but this are supplier for horse not for no.

30:52  
Ohh.

30:53  
OK, OK, OK.

30:54  
So so for example is the supplier for the ECM supplier for turbocharger or other other components which are very complex and also long to develop?

31:12  
OK.

31:13  
So in that process, I just want to understand how these requirements are generated.

31:18  
Are you getting from Reno or it is developed inside the horror Reno just give you a kind of this is the product you have to develop and you develop your system requirement on your own.

31:30  
Is that the thing?

31:32  
So STR, as I said that system technical requirements, it's their requirements, high level requirements, these are written by us on her side, but based on Reno or other OM requirements because we need to receive a document and entry document with the main requirements from the customer, OK.

32:04  
And we translate that in system technical requirements and that that based on system technical requirements, we detail the requirements at SDD level.

32:17  
Yeah, that that I that I got only the thing I wanted to understand how you get it from Reno.

32:23  
Is it a Excel or is it a PDF file?

32:29  
It depends.

32:29  
Excel, PDF, PowerPoint, anything, right.

32:33  
It's the process between Horse and Renault.

32:36  
It's still not frozen.

32:39  
OK.

32:40  
There are a lot of discussions how to to interchange with them.

32:46  
Yeah, not a problem.

32:48  
Yeah, I got that.

32:51  
Yeah.

32:51  
And the next question like once until you create a software, the architecture got created.

32:58  
So the variance that you are managing at system level, so same variant is cascaded to the software team and like they also follow the similar variants normally.

33:11  
Yes, because for example we implement the software Alex, Alex microphone, Yeah, it's open.

33:26  
I don't know.

33:26  
You cannot.

33:29  
OK.

33:29  
Yeah.

33:30  
So normally, normally we have A tag management system which is in mirror with the variant that Gabriel stated.

33:37  
So if there is something specific for a certain engine, we probably will create a simuling model based on our software requirements to be filtered only for for that variant.

33:50  
So it is possible to to do it also on our side.

33:52  
Yeah.

33:52  
And yeah, we do it often.

33:55  
OK, right.

33:55  
Yeah, thanks.

33:59  
And only system requirements are indoors, right?

34:02  
Software are in the Yeah, except, except yeah, only system requirements are indoors.

34:12  
Software requirements, I don't know they have another database.

34:18  
And regarding the validation of the system requirements, how do you manage the test cases It's indoors or it's other other document.

34:30  
Yes, this cases are indoors I can show the must I must open doors.

34:39  
So indoors to each functional requirements we have a valsis yes, system validation.

34:49  
So the the system pilot who writes indoors the system requirements, he also must write the valses or the valses because we can have a more valses for one requirement.

35:09  
So he's responsible to write also that indoors and we have separate databases which is which are linked versus and SDD.

35:32  
And we, I'm looking to open doors.

35:44  
OK, One more question before going to we'll do our stuff.

35:49  
You said you are exchanging your requirements with with the suppliers, right.

35:55  
Then in which format you give the requirements is required for it's Excel or PDF something you said the exchange requirements with the supplier.

36:06  
Yeah, yeah, correct.

36:09  
This is on on component level and this is not managed directly by us on system.

36:22  
I will show you.

36:44  
So as I said we have STR, SDD, str comp.

36:49  
So STR comp is the synthesis for the component requirements.

36:56  
But we on system side, we don't share that directly with the supplier because there are another department direction which is called horse RND design and they are responsible with development and validation of all the hardware components.

37:18  
And they have this Dr design review process and other process to develop and also to to relate with the suppliers because for example, they are also in charge to with with purchasing, they are in charge to choose the supplier because we have before Refq, we have an RFI which is sent to different suppliers.

37:53  
And after that there is a competition the winner.

38:01  
So our colleagues from design, they take the STR comp and they have their own templates and process to share the requirements with the supplier after the supplier is nominated.

38:21  
So with STR comp is also indoors, right?

38:23  
SDD and STR comps is also managing doors, Yes, so but design for example design is not able to go indoors.

38:33  
So we must we must extract STR comp in an excel format and after that they discuss with the supplier based on that.

38:46  
Sorry so I have.

38:57  
So here is the STD for boost, for turbo and for example to regulate post pressure, I have a requirement.

39:17  
And so here is the requirement the the functional requirement which is in SDD and here we have some link to versus versus OK versus.

39:34  
So as you can see this requirement has 2 versus.

39:39  
I can click on it and we have a separate database but also on doors which contains all the vices.

39:51  
And here we can see the validation plan which is detailed.

39:56  
Also we have view.

40:28  
It's better to show, sorry.

40:43  
So we have the item for each vertices, we have the validation plan and also we have the.

40:58  
In the comments we must inform about the NF new function which integrates this development.

41:08  
HCR is the name of the change request from for software.

41:15  
So in order to can filter and also to distribute the the viruses to the to the right team.

41:27  
After that we have the validation team.

41:30  
So air to M it's on tuning sign we have can have software design or other viruses are sent to HIL or so it depends on the specificity of the validation.

41:47  
We can have different teams also we must define which is the validation mean if it's on HIL or on vehicle or engine test bench etcetera.

42:01  
So, OK.

42:02  
And is your team using MATLAB or that is directly by software architectures?

42:13  
Normally each PFS system pilot should be able to perform simulation MATLAB Simulink, but in reality is not the case for all.

42:27  
OK, but also we have a dedicated team with simulation specialist which are expert in MATLAB, Simulink, AMSIM and other simulation tools and they can build and perform a complex simulation.

42:43  
But normally each PFS should be able to to simulate in MATLAB SIM link his new strategy in order to have A to prove or to verify if his strategy is working well or not.

43:02  
OK, so here maybe just want to update you my understanding.

43:06  
So when you create a system architecture or the system detailed designing system requirements.

43:13  
So at that moment the system architect architecture diagrams you create in PPT.

43:20  
But for like once this system design completes for validation point of view you need to build a system architecture model, right?

43:29  
But that is in MATLAB.

43:30  
So create validate the model at system level.

43:37  
So on my perimeter I didn't have this kind of new development so or that I have were already made in France.

43:51  
OK, so I don't have some new but we we should start very soon for €7.

44:01  
But until that I don't have something which is made by us.

44:08  
I have a lot of files from from France.

44:13  
OK And for software archive texture point of view, I think they build up their model in a matlab because further they need to extract the code and do the testing validation.

44:28  
So do you have any idea on that part?

44:32  
Sorry I didn't understood the question.

44:36  
So once you finish your system designing part, the software team start further decomposing the requirements at software level and they create a software architecture yes.

44:49  
And that they are doing in MATLAB right?

44:54  
Yes, the software specification are made in club SIM link and also based on that algo team build some mil modeling loop, Yes, correct.

45:09  
Where also in SIM link they can run and validate their strategies.

45:17  
But this is on algo side, it's OK, not on system.

45:23  
Yeah, because we talked with the software team and they mentioned that for validation mill part like they have this services the test cases from the system side and those they are having the traceability with the software mill testing, yes, so system side what I can show.

45:58  
I cannot show you like that very fast MATLAB model or something.

46:07  
But as I said, the PFS should be able, but it's not the case in Romania.

46:13  
So we we still need to work on that to scale up.

46:19  
Yeah.

46:19  
And another point from the system side, do you would like to highlight any challenges, pain areas from the tool point of view or the process point of view?

46:40  
I don't know if if we could have another tour more friendly than doors.

46:47  
It could be, it could be good and also what what it was what it was already presented to make a link.

47:01  
Because today we have an enough which is created in a database, but there is no direct link with the with doors.

47:16  
So indoors we must use for example this command column where we put the number of NF, we put the number of CR.

47:29  
But there is no link because NF is open in a separate database, CR is open in another database and there is no link between.

47:40  
So what does so presented with link between NFCR requirements and I think this is very good.

47:51  
So the only link we have here is between functional requirement and valsis.

47:58  
Yeah, because both are indoors.

48:00  
But yeah, no other dialling link.

48:08  
OK.

48:08  
Yeah, got it.

48:10  
Any other question?

48:15  
Yeah, I think yeah, we are good.

48:17  
So thanks for explaining this, the process and yeah, that was really helpful.

48:24  
So if you find any further information or would like to give some other information or find any pain areas that missed out so you can share that to the fund with the help of people.

48:37  
So anyway, So what they presented here is the system process that we inherit from Renault on pair, but we are not master or at least me, I'm not very used with that, I'm still learning.

49:01  
And so if you can propose something better process, I think we are open and we can we can adapt because our final scope is to have a process which is robust and also easy to use.

49:27  
So, Gabriel, that is what the agenda of this exercise is to understand your pain points or the challenges in your day to day jobs.

49:38  
And whatever the evaluation we are going to, uh, do going forward, we are going to take care of all these inputs which you are providing and we will evaluate based on these cases which are derived from your inputs only.

49:56  
So they that will address your problem and considering the process setup or maybe the robust process setup we are working with you know almost no all big OEMs across the globe or tier one supplies across the across the globe.

50:13  
I discussed with one as well as Stephen as well and we have many best practices available with us.

50:23  
So we will also do the comparison of your existing projects with the available best practices in the market record.

50:30  
We also we will, we will give some areas of for the improvement.

50:35  
Yeah.

50:35  
So this would be a very good because as I said we have a process, but it's not saying the horse process.

50:45  
We correct inherited like that from Renault, but the transfer was made very fast.

50:53  
So we are at the beginning.

50:55  
So if you have a better proposal, why not we the aim is to build a process for horse and the best possible.

51:07  
Yes, yeah, definitely in this part, Yeah, from software architecture.

51:16  
I have just one question, how this interfaces are managed, maybe Sushant if you want to fill it out.

51:26  
Wait, wait a little because Alex is in another discussion, OK, he is still OK, not a problem.

51:39  
We can write an email to Alex separately with the sorry with the question from the software architecture side, OK.

51:53  
And he wrote, he must go.

52:02  
Right.

52:02  
So any other thing Gabriel you would like to highlight like that note.

52:15  
So as I said, for me the most important and the the the very good improvement that we could have is this to have direct link with all the process stages and deliverables starting with system software validation.

52:38  
So if we can integrate that on one platform to have a link between all them, this would be a very great thing.

52:49  
And also if you have a better proposal for variant management, diversity management, because also for example, yes, variant or diversity for you is the same thing or not basically diversity is one of the reason for your variance, I would say, right.

53:16  
So diversity in the means you want to say the global, you know, because if you are a product is going across the globe at different different regions, so there is a different city, right.

53:28  
So according to the legislations and laws, yes norms.

53:34  
So those are different and based on that you need to know modify your product and that will lead to your different different variants in the product, right.

53:43  
So definitely that is that is a part of variant for which is coming at the top level basically because on our side the so we had a lot of work, but it's still not finished.

54:03  
Related to diversity management.

54:06  
We try to do that, but I'm not satisfied with that.

54:11  
For example, here on application scope, first our French colleagues put here only the norm and the engine, for example, €7 or €6 and HR 12 DDV.

54:30  
After that they put all HR 12.

54:33  
All this is, but this is not enough.

54:39  
And that's that we try to put based on the component.

54:44  
Because if I have a turbocharger, I know I need also boost pressure sensor, I need also an additional temperature sensor, etcetera.

54:59  
So we try to put into the application scope the codes for components, but it's very hard to filter.

55:09  
If I want to filter, it's not at all easy with doors, I don't know with other tool, but indoors is.

55:21  
And also to expect the reports and the dashboards, yes, So really difficult indoors.

55:28  
Yeah, understand.

55:30  
Yes, Today I'm still not sure I can have a filter which extract the whole list of requirements that I need for a specific project.

55:45  
I am not I am not 100% sure about that 15 is required for that purpose.

55:55  
So we have done it for other customers, but on development efforts are sorry many we should learn more about diversity and variant management, I don't know.

56:08  
But for instance, this is not it's a tough topic.

56:15  
Let me.

56:16  
Oh, no.

56:16  
Yes, yeah, sure.

56:21  
Thanks, Gabriel, thanks for your input.

56:24  
And definitely like if any further input are needed, we will get back to you or any revalidation is needed that data we collect presented.

56:32  
So we'll get back to you on that.

56:34  
OK.

56:34  
Thank you.

56:36  
OK, thank you.

56:37  
Thank you all.

56:38  
Thank you so much.

56:39  
Thank you.

56:40  
Thank you.