ANSA / metaPOST deployment in Groupe PSA

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Kick-off

Genesis

- VLAB platform widely used for numerical simulations in Groupe PSA since 2008
- VLAB developed by LMS on CATIA V5 platform (DASSAULT SYSTEMES)
- End of 2012 : SIEMENS acquires LMS International

Consequences for Groupe PSA :

→ No VLAB in CATIA V6 environment

→ Absolute need to replace the current solutions by the end of 2018 (contractual deadline)

VLAB

2012	2013	2014	2015	2016	2017	2018	2019

5C

RESEARCH & DEVELOPMENT

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5C Project building

- 5C Project = new pre and post processing tools deployment project
- Impact analysis based on detailed functional cartography (As Is, To Be) :
  - What has to be changed ? VLAB software and all dependencies (plugins CV5, CV5/VLAB)
  - What has to be kept ? Solvers
  - Which areas to cover ?
  - What are the functional links between them ?
  - …
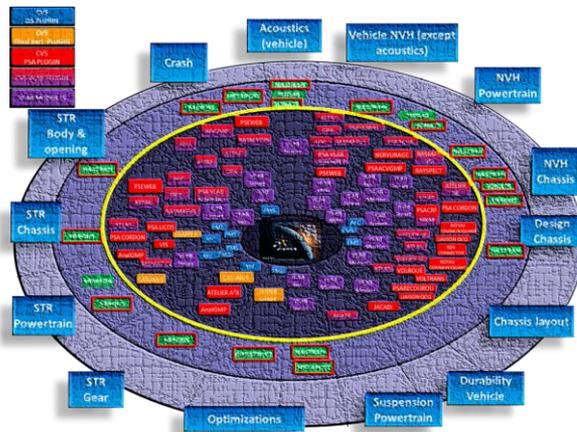
Impacted areas and tools
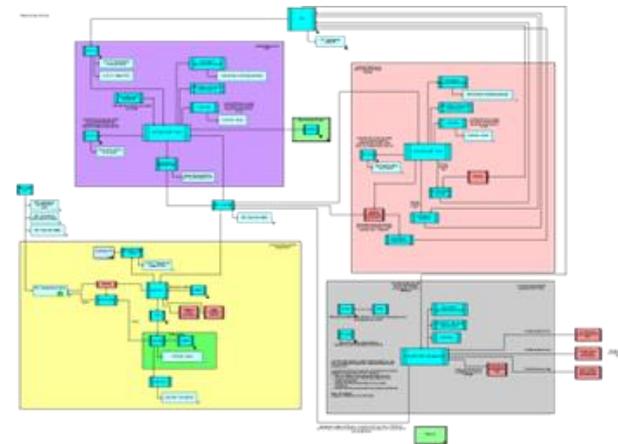
Software Architecture

5C Project targets

- **5C Project = great opportunity to improve our processes**
  - To achieve a real break :
    - Leadtime : drastic reduction of time for assembly and iterations during digital simulations
    - Adaptability : contribute to the optimization of development expenses by quickly integrating new methodologies
    - Deployability: short ramp up among CAE worldwide teams
  - Expected KPI for all departments were gathered, converted into detailed requirement

- **Key figures :**
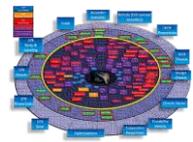 - ~60 softwares, modules, solvers or tools involved
  - ~100 scenarios – use cases
  - ~700 requirements

- **Several software providers were contacted during RFI and RFQ**

PSA
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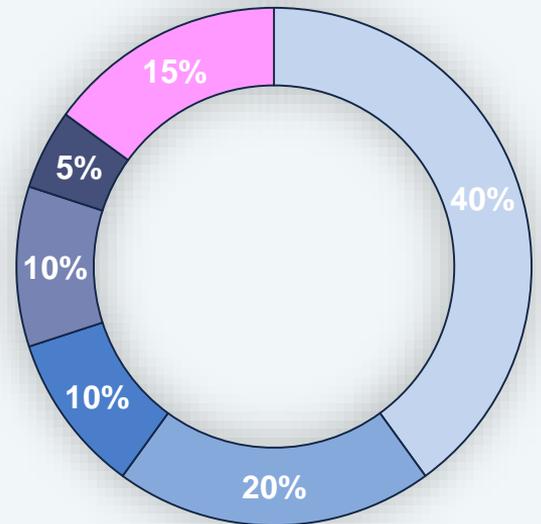RESEARCH & DEVELOPMENT

The choice of ANSA/metaPOST

5C

- BETA tools previously used
  - ANSA for meshing including morphing
  - metaPOST for post Crash

- Keep the concept of multi software platform

Disciplines

- Assembly
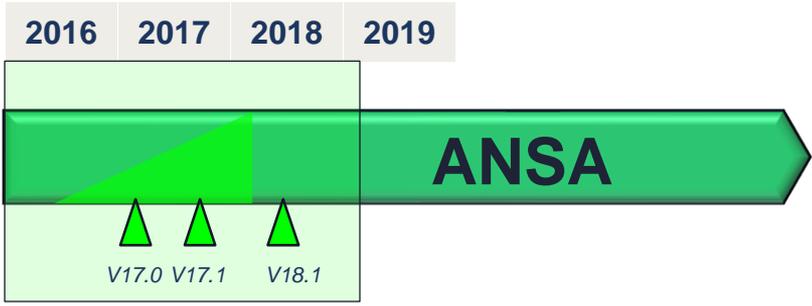- Crash
- Structures
- NVH
- Optimization

covered by BETA

- Multibody

covered with another soft
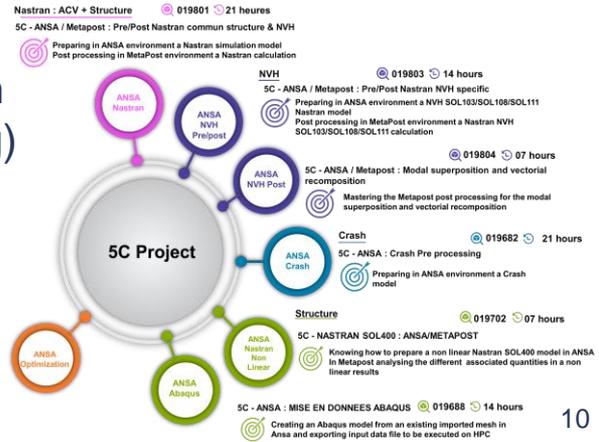

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20%
10%
10%
5%
15%

5C

- 3 main deliverables from BETA corresponding to requirement work package : ANSA version 17.0, 17.1 and 18.1 including new development, new functionalities,…
    - Nastran SOL200 model setup (*)
    - Abaqus model setup

2016	2017	2018	2019

ANSA

V17.0 V17.1 V18.1

- 7 new training modules created from scratch in partnership with BETA and business agent (Safran Engineering Services, Turing)

Nastran : ACV + Structure 019801 21 heures
5C - ANSA / Metapost : Pre/Post Nastran commun structure & NVH
Preparing in ANSA environment a Nastran simulation model
Post processing in MetaPost environment a Nastran calculation

ANSA Nastran

ANSA NVH Pre/post

NVH 019803 14 hours
5C - ANSA / Metapost : Pre/Post Nastran NVH specific
Preparing in ANSA environment a NVH SOL103/SOL108/SOL111 Nastran model
Post processing in MetaPost environment a Nastran NVH SOL103/SOL108/SOL111 calculation

ANSA NVH Post

019804 07 hours
5C - ANSA / Metapost : Modal superposition and vectorial recomposition
Mastering the Metapost post processing for the modal superposition and vectorial recomposition

5C Project

ANSA Crash

Crash 019682 21 hours
5C - ANSA : Crash Pre processing
Preparing in ANSA environment a Crash model

Optimization 019684 07 hours
5C - Multi Cases NASTRAN SOL200 Optimization Pre & Post-Processing in ANSA & METAPOST
Defining preprocessing for multi cases NASTRAN SOL200 Optimization Pre & Post-Processing in ANSA
Realizing post processing of the NASTRAN SOL200 results in Metapost
Updating the database built in ANSA with Nastran format

ANSA Optimization

ANSA Nastran Non Linear

Structure 019702 07 hours
5C - NASTRAN SOL400 : ANSA/METAPOST
Knowing how to prepare a non linear Nastran SOL400 model in ANSA In Metapost analysing the different associated quantities in a non linear results

ANSA Abaqus

5C - ANSA : MISE EN DONNEES ABAQUS 019688 14 hours
Creating an Abaqus model from an existing imported mesh in Ansa and exporting input data file to be executed on HPC

(*) A. Bonet - Nastran SOL200 Design Optimization Pre&Post-Processing in ANSA and META - 2018 BETA CAE Systems Open Meeting
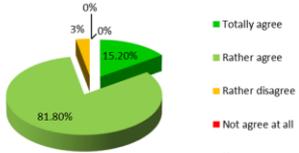
Conditions of deployment

- **Prerequisites**
  - Software:
    - Make sure to have all needed requirements with no critical issue and a minimum of major

  - Skill :
    - Make sure end-users :
      - To be previously trained
      - To have sufficient time to practice before using in Project

- **Planning = all projects to be switched before end of VLAB licensing**
  - For all new projects → ANSA/metaPOST usage
  - For ongoing Project using VLAB → study case by case the opportunity to switch for VLAB to ANSA/meta
  - One imperative → no impact (delay) for vehicle project

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Summary of 5C Project

Goals	Results
Leadtime : drastic reduction of time for assembly and iterations during digital simulations	ANSA/ META suite is clearly offering leverage to reach our internal lead-time target (5 weeks max by workstreams) Some new opportunities are identified to speed up the lead-time
Adaptability : as a PrePost, software contributes to the optimization of development expenses by quickly integrating new methodologies	ANSA is more flexible to follow the rhythm of R&D improvement thanks to scripting customization ability
Deployability: ability for the software to be quickly deployed among Groupe PSA CAE worldwide teams	ANSA / metaPOST software is extensively used among our suppliers and partners For new users, ease-of-use is not direct → skill ramp-up (training and practicing) is really mandatory
End user global satisfaction	Globally first use is very good ~1000 end users among the world

Overall are you satisfied with this application ?

- Totally agree
- Rather agree
- Rather disagree
- Not agree at all
- No response

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Conclusion

- BETA has demonstrated a high level of reactivity in case of issues or new features during the 5C project
- Mission accomplished and benefits are visible for Project

- Thank you to the BETA development team and technical pilots
- A special thanks to the 2 BETA project managers :
  - Emmanouil KRASTRINAKIS
  - Stefanos CHATZIANGELIDIS

- 5C project is terminated but our partnership with BETA still alive !
- New challenges already engaged to improve again : modular approach
- Presentation of Groupe PSA during this conference :
  - Automated checklist for intermediate deliveries
  - Lead time reduction - Fast and easy setup of structure load cases using ANSA
  - NVH post-processing automation
  - Evaluation of occupant injury results using META focus on THOR
  - Efficient watertight preparation tools and methods for CFD meshing at Groupe PSA