SAWE Conference – W&B Tool Overview

Nicolas Riou

PLMP – Design & Integration

Nicolas.riou@aero.bombardier.com

514-855-5001 x62005

BOMBARDIER

SUMMARY

- **W&B Tool Requirements** **5min**
- **W&B Tool Functionalities Overview** **15min**
- **W&B Tool on CSeries Program** **10min**
- **Discussion/Questions** **30min**

BOMBARDIER

W&B Tool Requirements

- **Why was the tool requested**
  - This tool has been developed based on:
    - The Mass Properties Technical Requirement Document (PLMP/Core Eng)
    - The CSeries Requirements (CSeries MASS/PLMP/IBM)
  - It basically answers to the need of having a solution to compute and track Weights and Inertias of an Aircraft based on the Engineering database.
    - It allows to control Supplier/Partner data
    - It allows to generate Mass and Inertia reports
    - It allows the Mass Properties group to get involved with design earlier in the development phase
- **Developed for the CSeries**
  - Selected by the CSeries Program out of 3 other similar tools, the W&B Tool has been developed by Dassault System and deployed on the CSeries by IT/IBM
    - Integrated in VPM Nav interface (CATIA V5 R19 required)
    - Based on the ENOVIA Database
- **What are the challenges for using it on Legacy Programs**
  - The Product Structure have to reside in ENOVIA
  - VPM Nav and CATIA V5 R19 installation
  - Mass can be tracked at the node level in ENOVIA but Mass computation and distribution requires to have 3D models in CATIA V5 format

SUMMARY

- W&B Tool Requirements 5min
- **W&B Tool Functionalities Overview 15min**
- W&B Tool on CSeries Program 10min
- Discussion/Questions 30min

BOMBARDIER

W&B Tool Functionalities Overview (1/5)

- Mass Accounting – Preliminary Analysis
  - **JCDP**
  - **JDP**
- Mass Computation
  - **DDP**
- Mass Distribution Analysis
  - **DDP**
- Mass and Inertia Reports
  - **All phases**

W&B Tool Functionalities Overview (2/5)

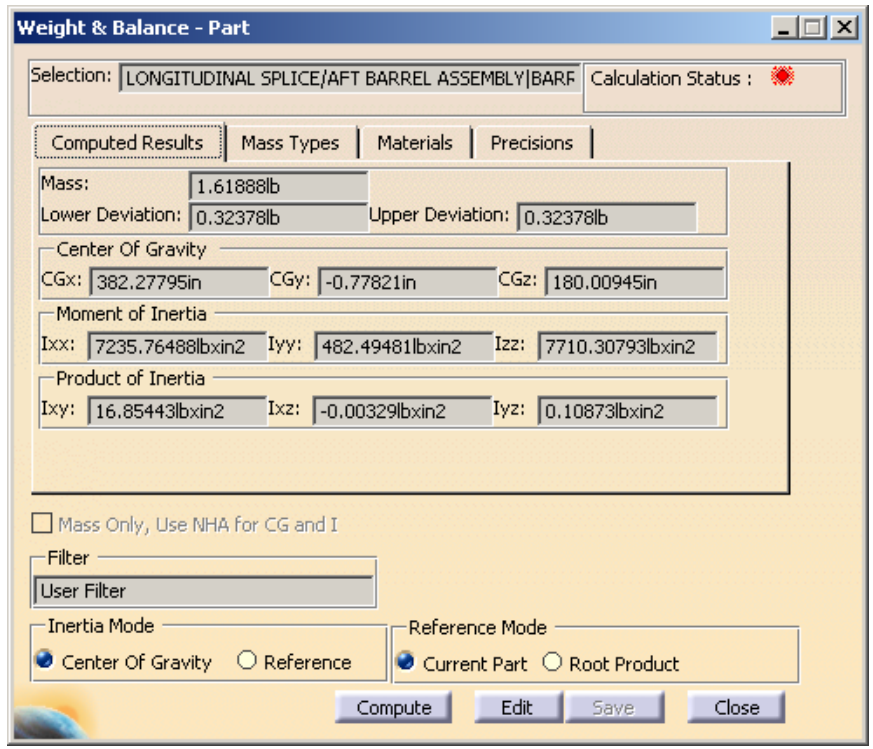
- **Weight & Balance Toolbar**
  - The commands used for W&B Analysis are available within the W&B Toolbar.
  - The usage and details of the commands are presented in the related BMs.
    1. **WB Part**
    2. **WB Product**
    3. **WB Report**
    4. **WB Group**
    5. **WB Filter**
    6. **WB Save**

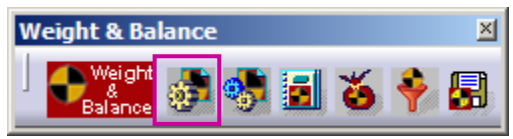
  - A correspondence between these commands and the W&B process can be found accordingly:

	Assign Density and Material	Specify Density Priority	Specify Active Mass Type and Mass Properties	Specify Deviations	Perform Detail Weight Analysis	Perform Assembly Weight Analysis	Material and Mass Type Statistics	Generate Report
WB Part	✓	✓	✓	✓	✓	✓		
WB Group					✓	✓		✓
WB Product					✓	✓	✓	
WB Report								✓

W&B Tool Functionalities Overview (3/5)

- **WB Part** is the command that allows Weights user to**:**
  - Browse the Mass Properties
  - Update the Mass Properties
  - Specify the Mass Type Active
  - Define Mass Type
  - Assign Mass Properties
  - Specify WB Density, Material and Priority
  - Define specific deviations
  - Perform Detail or Assembly Weight Analysis

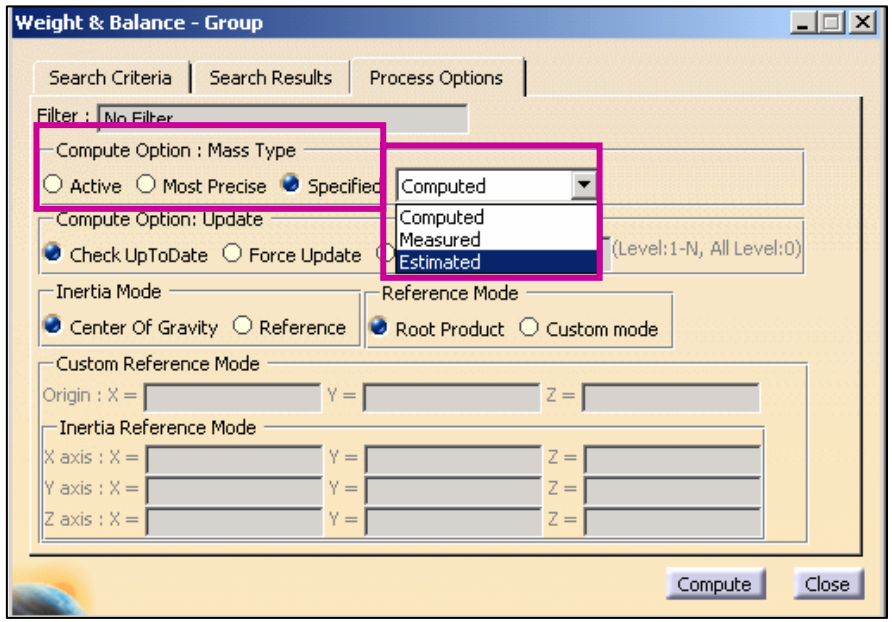




BOMBARDIER

W&B Tool Functionalities Overview (4/5)

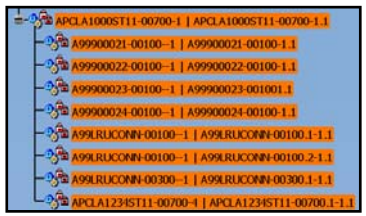
- **WB Group:** Mass Type Compute Option
  - Three mass types are available: **Active**, **Most Precise** and **Specified**.
  - **Specified** Mass Type: Can be chosen by the user from the pick list: **Computed**, **Measured** or **Estimated**.
- **WB Group:** Computation rules
  - If **Active** Mass Type is set, the corresponding Active Mass type for each part is used.
  - If **Most Precise** is selected, the non null Mass Type with the lowest deviation for each part is considered in computation.
  - If **Specified** is set to **Computed**, **Measured** or **Estimated**, all parts from the group are analyzed based on the specified Mass Type.

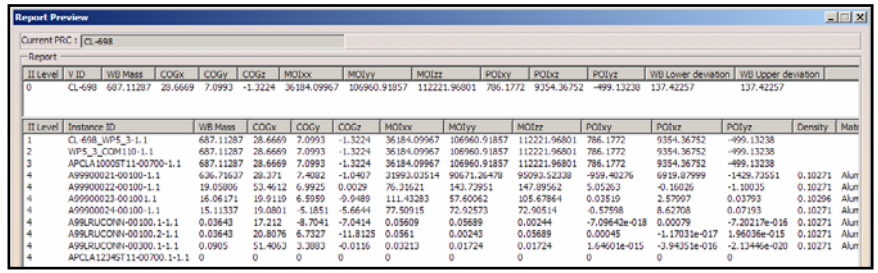


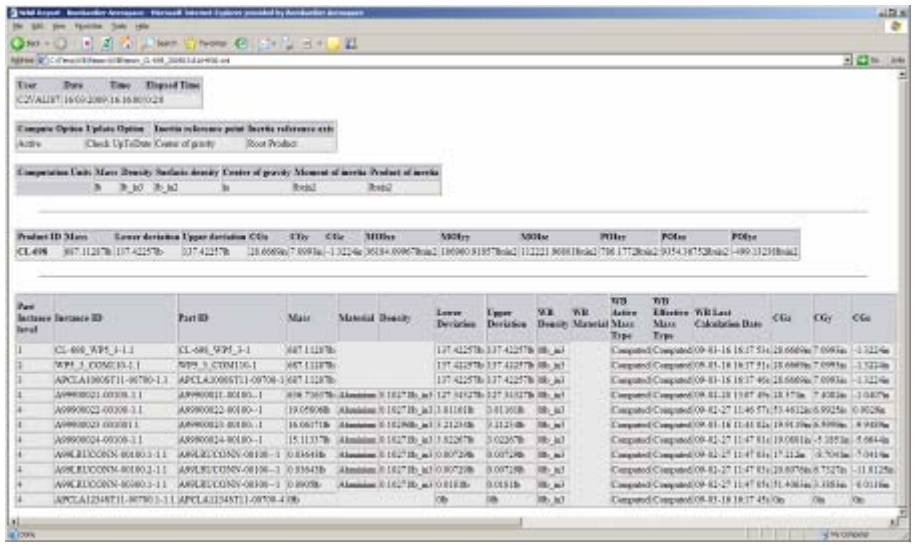
If a non computed Mass Type is selected and this is Null for a Part, the Active Mass Type will be used instead. If this is also Null, a warning message is displayed to the user (see Hints and Tips for more details).

W&B Tool Functionalities Overview (5/5)

- **Reporting principle**







Report in Excel based on a customizable Style Sheet

BOMBARDIER

SUMMARY

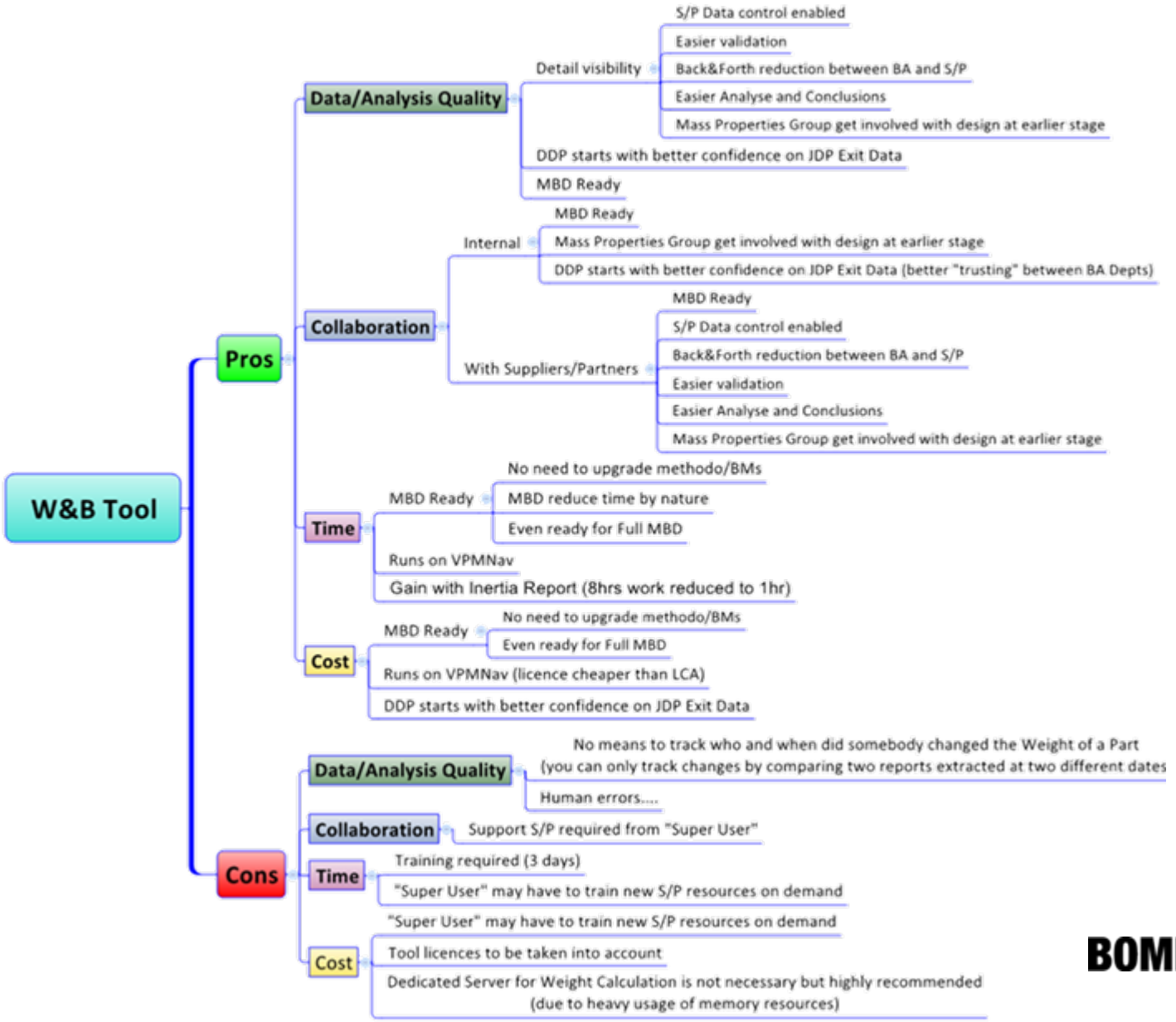
- W&B Tool Requirements 5min
- W&B Tool Functionalities Overview 15min
- **W&B Tool on CSeries Program 10min**
- Discussion/Questions 30min

BOMBARDIER

W&B Tool on CSeries Program

- **The W&B Tool has been selected by the CSeries Program out of 3 other similar tools**
- **The first drop of the deployment project was done in early JDP and allowed:**
  - Mass Accounting – Preliminary analysis
  - Mass Computation
  - Mass and Inertia Reports
  - Batch Computation
- **A second drop was delivered for beginning of DDP allowing:**
  - Mass Distribution Analysis
  - Mass Types and Material Statistics Reports
  - Data Import/Export with Partners and Suppliers
- **A major fix was released a few months ago allowing:**
  - Computation of Assemblies containing “Ghost Links”
  - Reports generation when errors occurs (list of errors displayed to the user)

W&B Tool on CSeries Program



BOMBARDIER

SUMMARY

- W&B Tool Requirements 5min
- W&B Tool Functionalities Overview 15min
- W&B Tool on CSeries Program 10min
- **Discussion/Questions 30min**

BOMBARDIER

Discussion/Questions

BOMBARDIER