Loads

- **LE9 - AAL587 Loads assessment**

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Loads

- **LE9 - AAL587 Loads assessment**
  - Analysis performed using:

    – the "simulation method":

      . two analysis performed:
        - Simulation 1: handling quality Flight Mechanic Simulation Module (airplane handling quality model for aerodynamic, mass, engines and 6 degree of freedom simulation software).

        - Simulation 2: loads Flight Mechanic Simulation Module (airplane loads model for aerodynamic, mass,engine and simulation software working as a pseudo 6 degree of freedom simulation where the 3 degree of freedom of the airplane longitudinal movement are those of simulation 1, lateral movement being fully simulated)

   – the "kinetic/Ny integration" method.

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Loads

- **LE9 - AAL587 Loads assessment – Summary**

Simulation

Simulation 1

| D F D R | Speed
Controls
Rudder
….. .
……... | **FMSM -**HQ 6dof | Sideslip
Simulated | **LM** | Loads (S-B-T) |

Simulation 2

| D F D R | Speed
Controls
Rudder
….. .
……... | **FMSM -**L"3dof" | Sideslip
Simulated | **LM** | Loads (S-B-T) |

Kinetic/Ny Integration

| D F D R | Speed
Ny
Heading angle
Roll angle
……
Controls
Rudder
…... | **Kinetic/Ny Int.** | Sideslip
Derived | **LM** | Loads (S-B-T) |
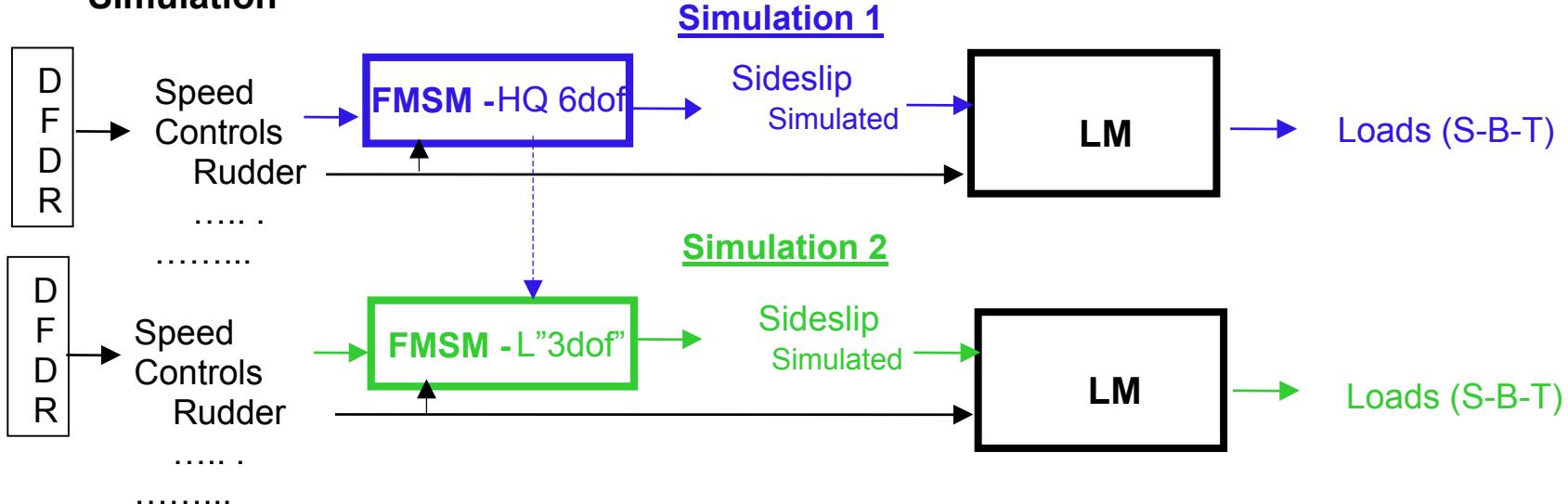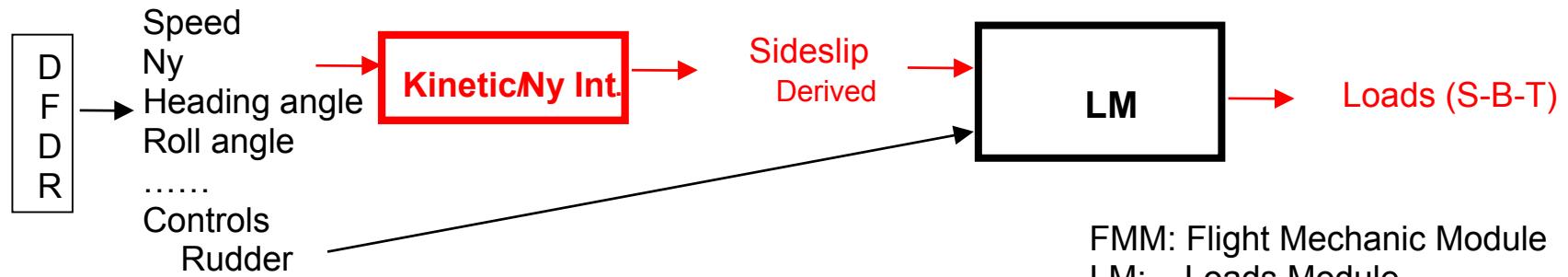
FMM: Flight Mechanic Module
LM: Loads Module
S: Shear, B:Bending, T: Torsion

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Loads

- **LE9 - AAL587 Loads assessment**

Sideslip

— Kinetic/Ny Integration
— Simulation 1 -"By-pass"
— Simulation 2 - "Simu L"

Rudder deflection (°)
sideslip (°)

Time (s)

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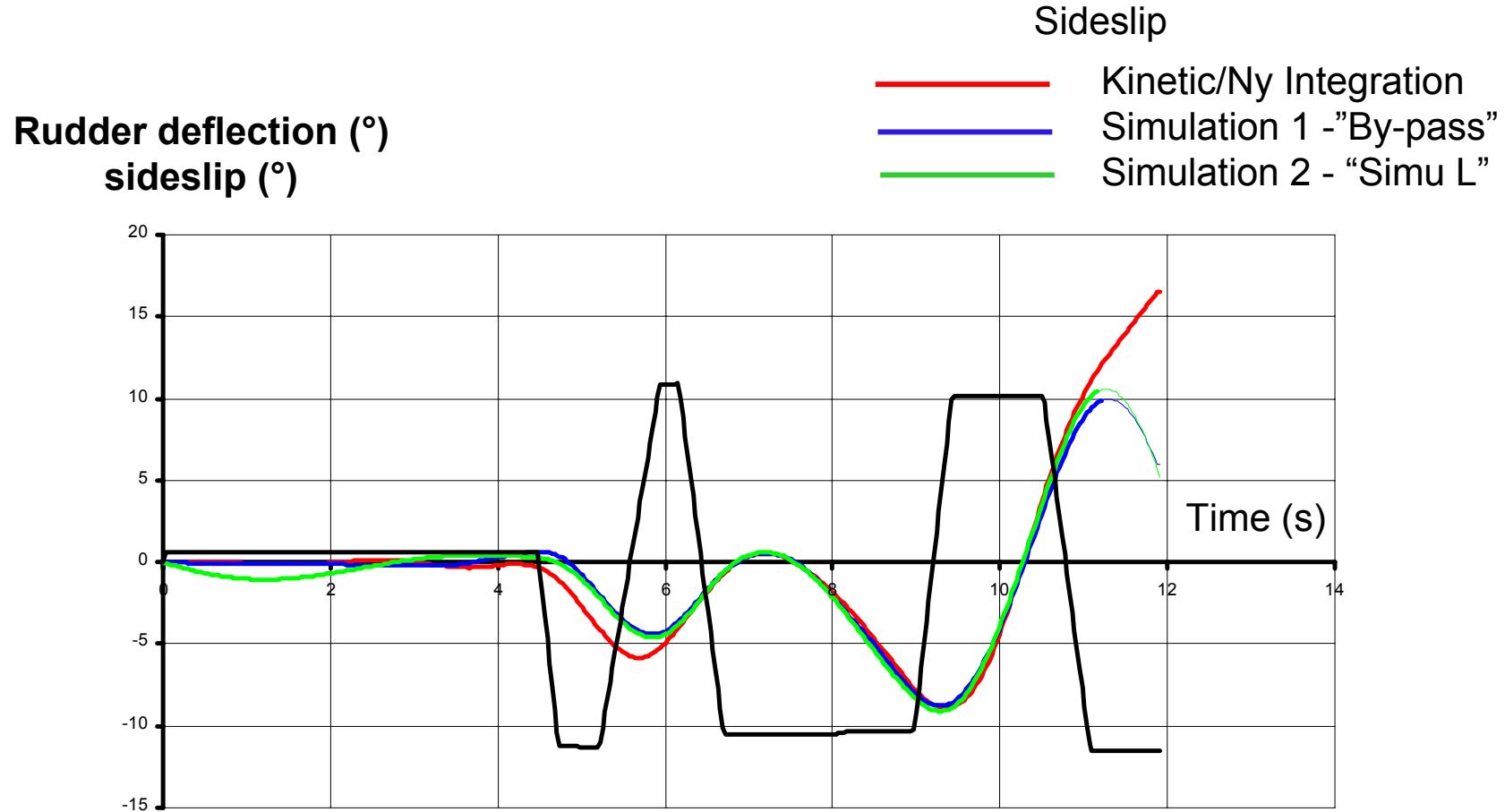
Loads

- **LE9 - AAL587 Loads assessment**

Kinetic/Ny Integration
Simulation 1 -"By-pass"
Simulation 2 - "Simu L"

Bending at root

Torsion at root

AIRBUS
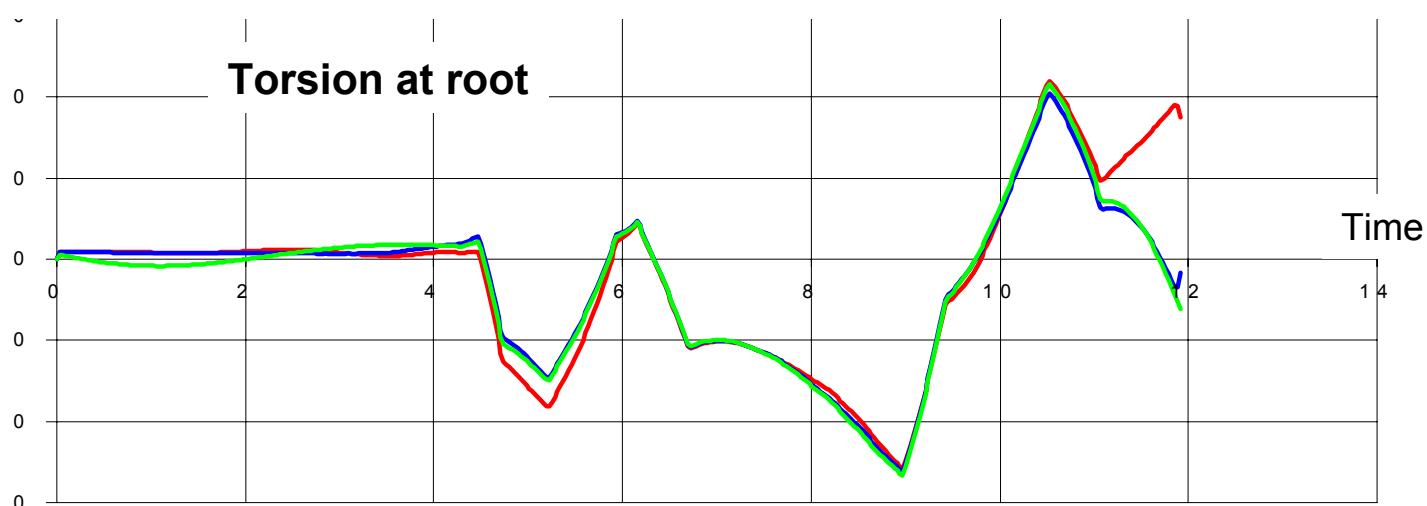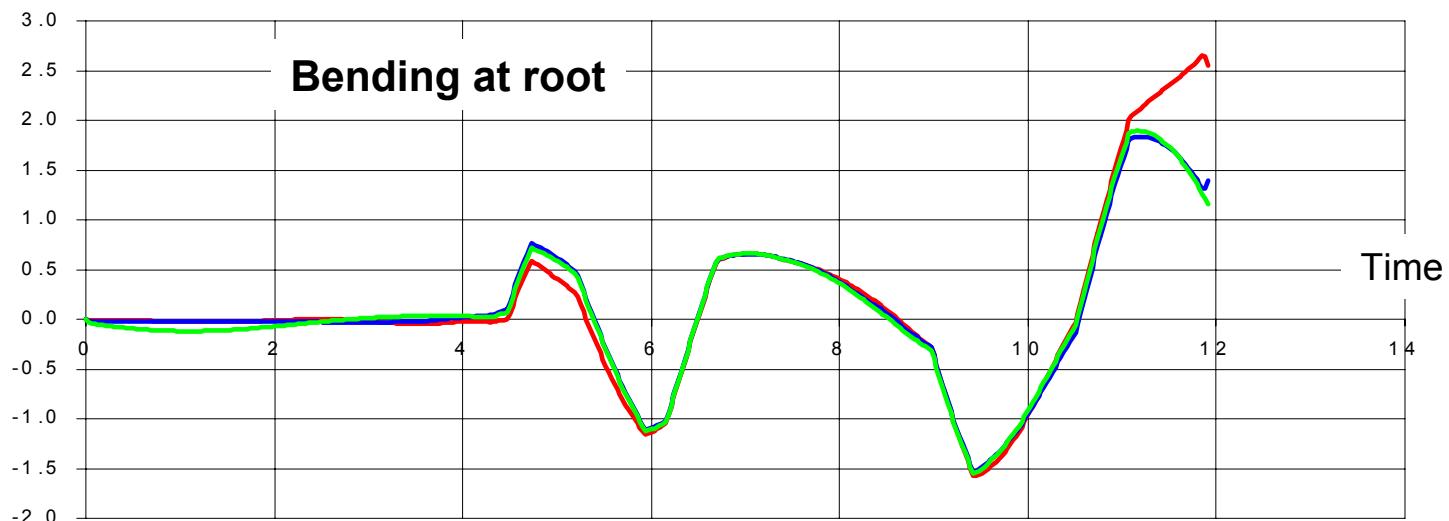
Loads

- **LE9 - AAL587 Loads assessment**

Rudder deflection & Sideslip
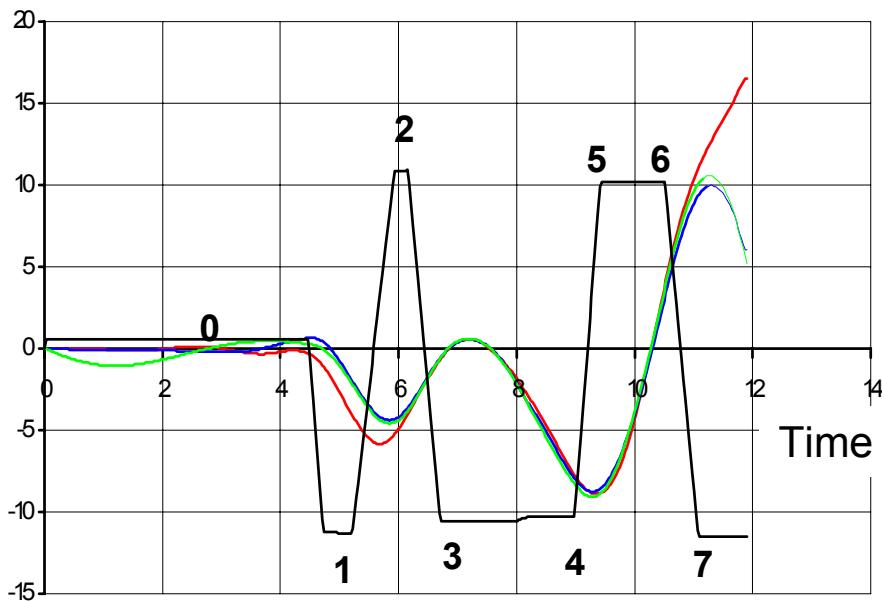
Correlated vertical tail
Bending-Torsion at root

Kinetic/Ny Integration
Simulation 1 -"By-pass"
Simulation 2 - "Simu L"

EGLC - 2002

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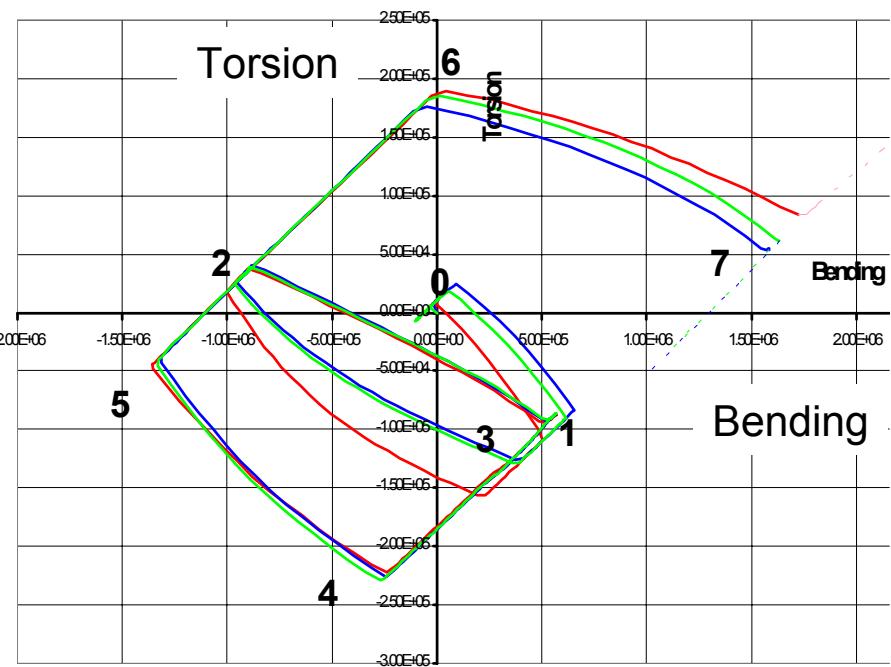
Loads

- **LE9 - AAL587 Loads assessment**
  - Criterias for loads case selection
    - Kinetic/Ny integration method:
      - Criteria 1: Ny maximum acceleration (jump)

t=11.19s

Lateral
acceleration
Ny

Time
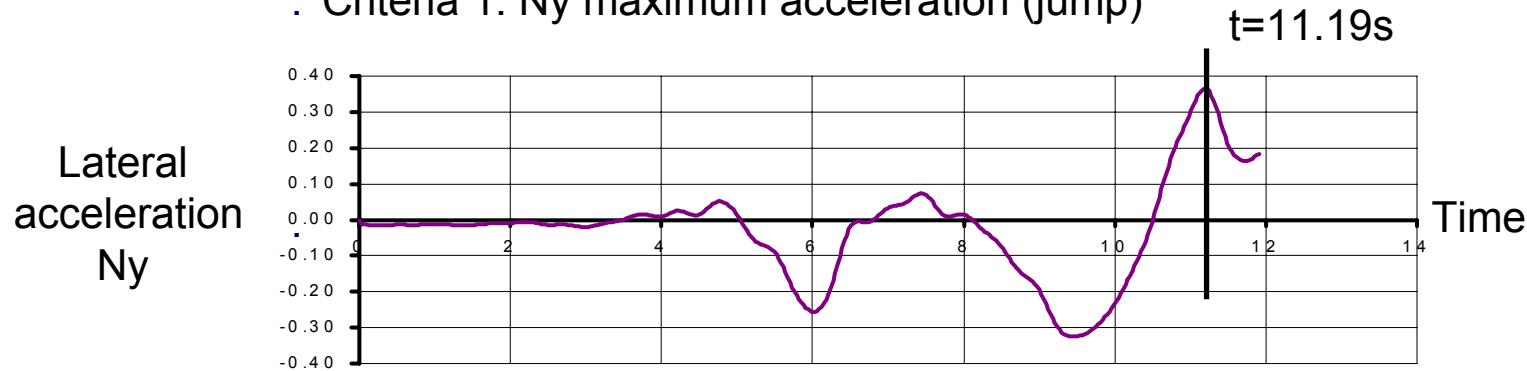
        . Criteria 2: Bending-torsion "correlated corner"

Torsion

t=11.07s

Bending

1

AIRBUS
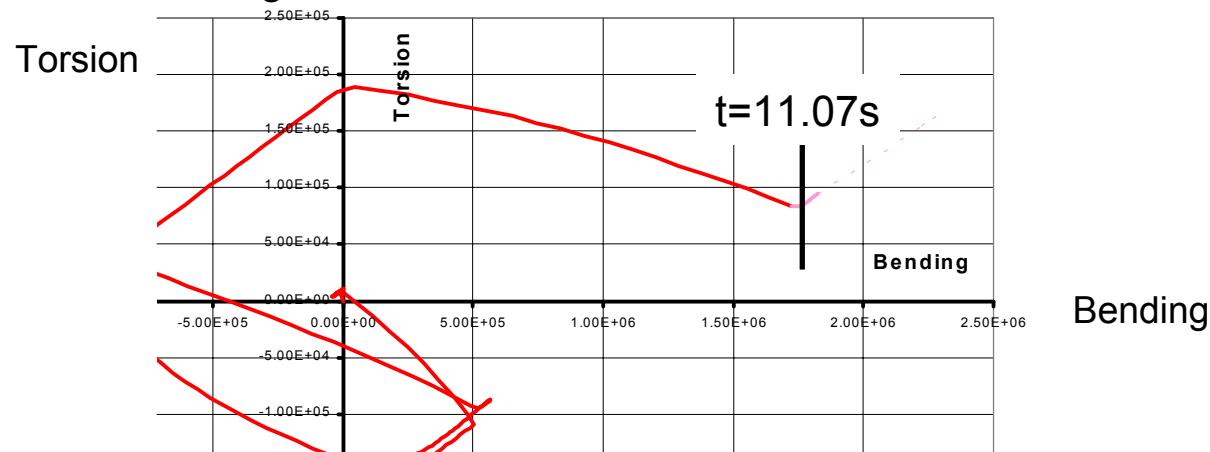
Loads

- **LE9 - AAL587 Loads assessment**
  - Criterias for loads case selection
   - Simulation method
      - . Criteria: maximum vertical tail bending moment at root

t=11.16s   t=11.22s
Simulation2 "SimuL"   Simulation1 "by-pass"

Vertical tail
bending moment
at root

time

AIRBUS
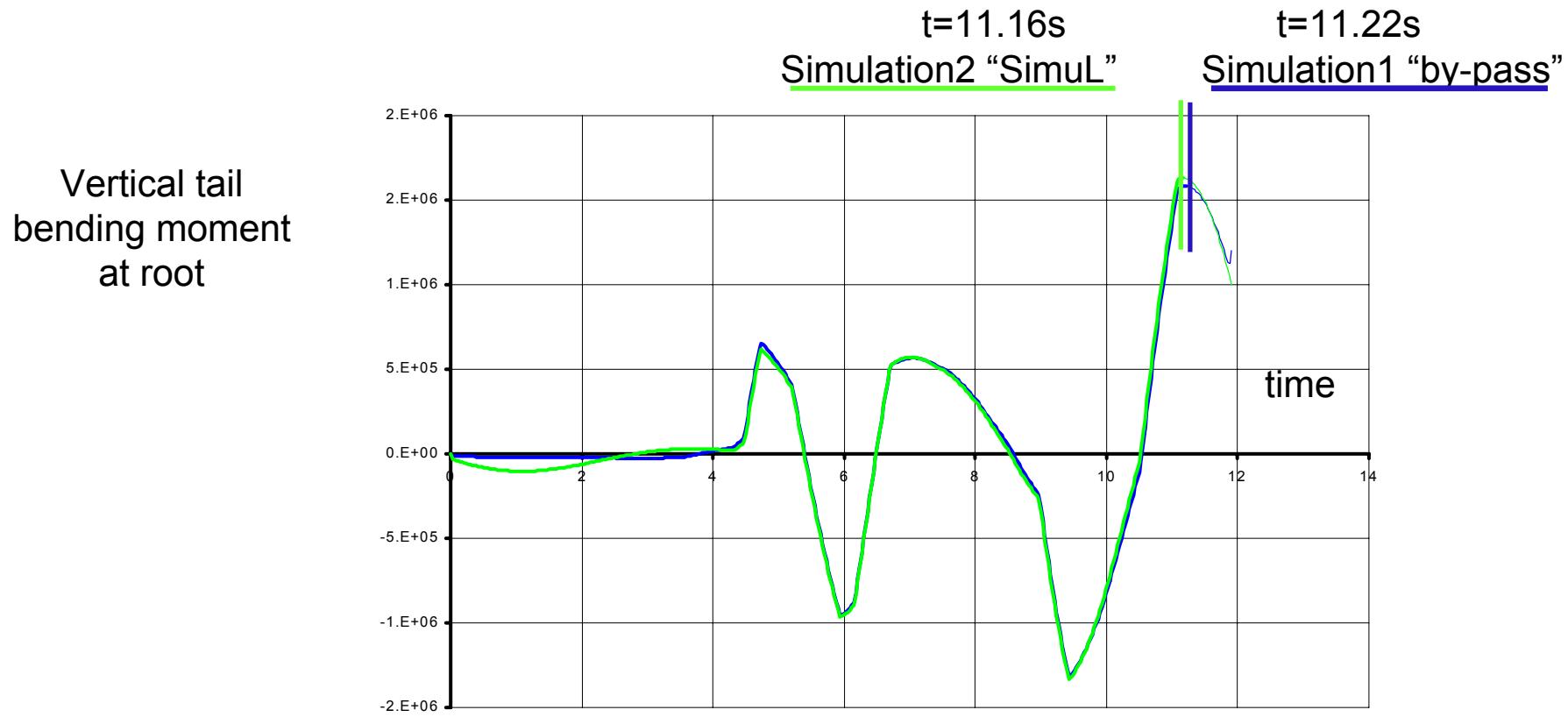
Loads

- **LE9 - AAL587 Loads assessment**
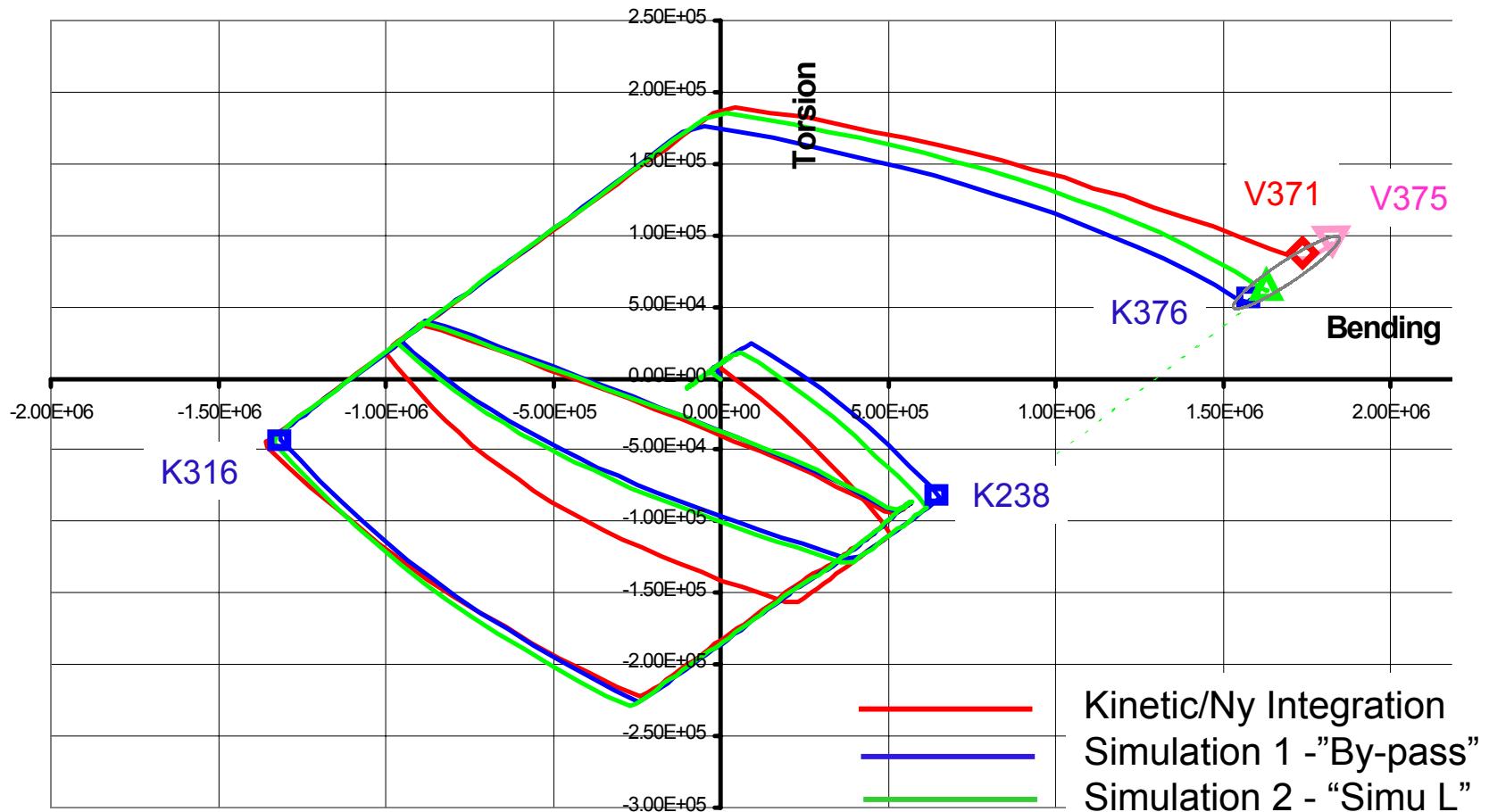
Loads

- **LE9 - AAL587 Loads assessment**
  - Loads cases selection

|				Shear (daN)	Bending (mdaN)	Torsion (mdaN)
Kinetic/Ny Integration						
	Criteria: Ny max			-41 069	182 451	9 430
	Criteria: Correlated "Corner" Bending-Torsion			-38 704	172 337	8 365
Simulation: criteria Bending max at root						
	Simulation 1 - "By-pass"			-35 155	158 290	5 396
	Simulation 2 - "Simu LM"			-36 365	163 220	6 178

— Kinetic/Ny Integration
— Simulation 1 -"By-pass"
— Simulation 2 - "Simu L"

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Loads

- **LE9 - AAL587 Loads assessment**
  - Loads cases selection

	Kinetic/Ny Integration
	Simulation 1 -"By-pass"
	Simulation 2 - "Simu L"

	Shear (daN)	Bending (mdaN)	Torsion (mdaN)
Kinetic/Ny Integration			
Criteria: Ny max	-41 069	182 451	9 430
Criteria: Correlated "Corner" Bending-Torsion	-38 704	172 337	8 365
Simulation: criteria Bending max at root			
Simulation 1 - "By-pass"	-35 155	158 290	5 396
Simulation 2 - "Simu LM"	-36 365	163 220	6 178

"Y376"

Torsion

Bending

00   5.00E+05   1.00E+06   1.50E+06   2.00E+06
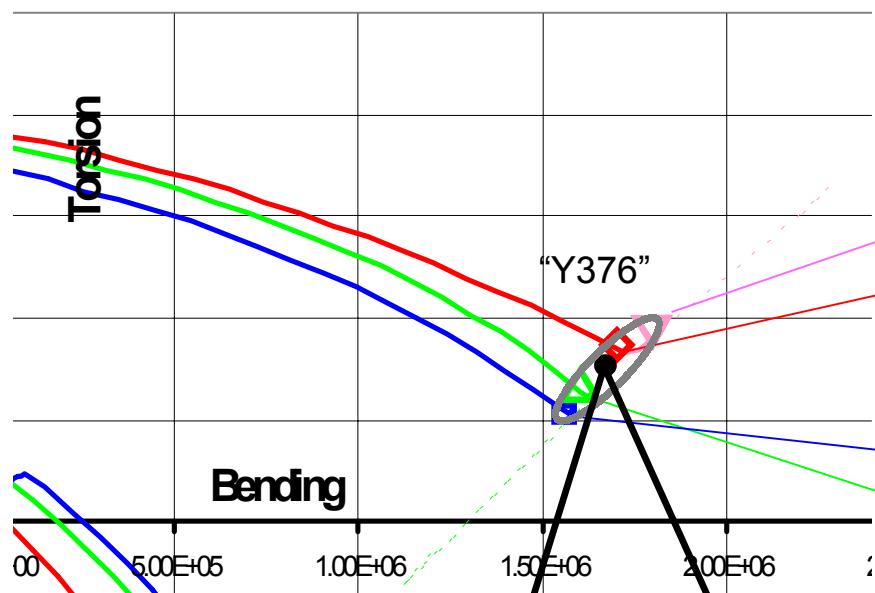
Mean quadratic value: Bending: 169 325 mdaN
(represented by Y376)   Torsion: 7 520 mdan

1

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