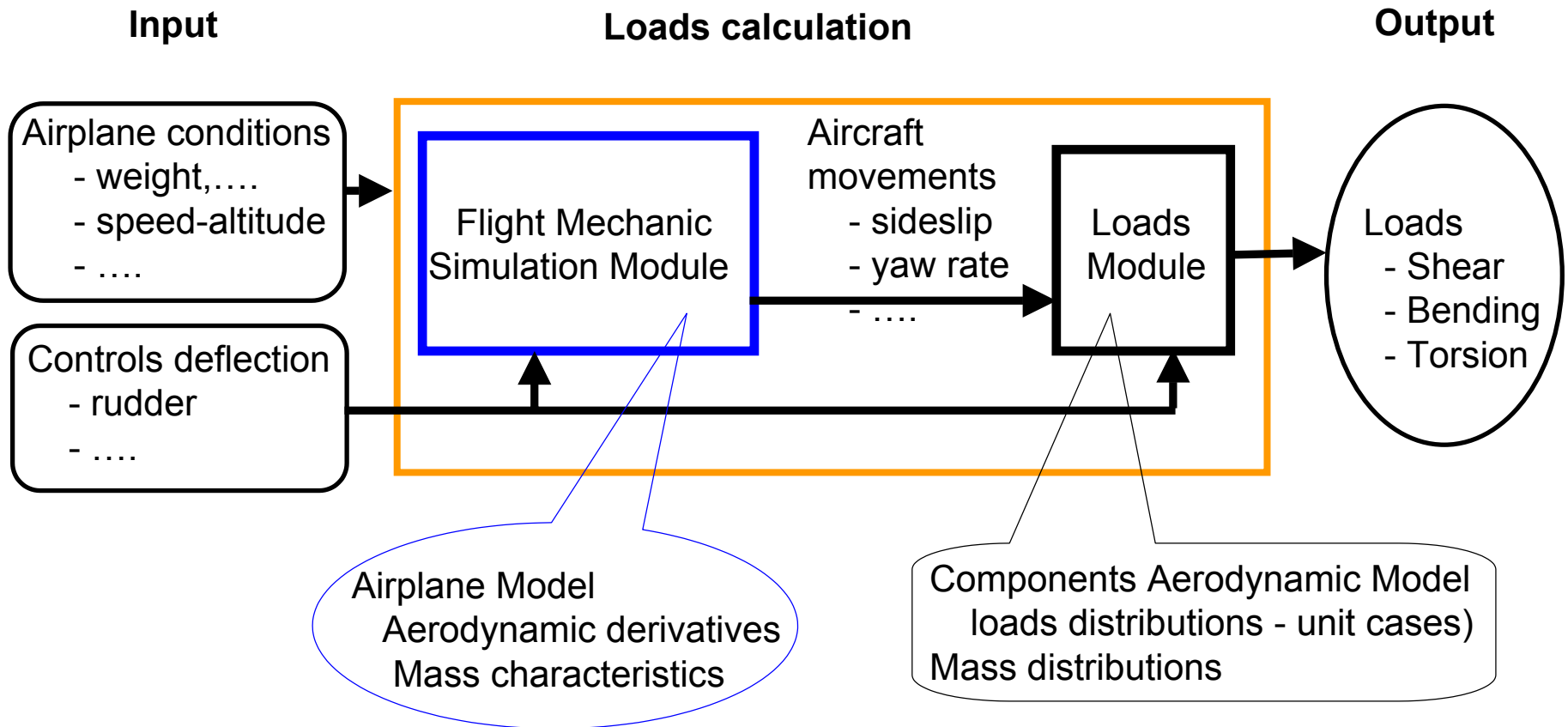# *Loads*

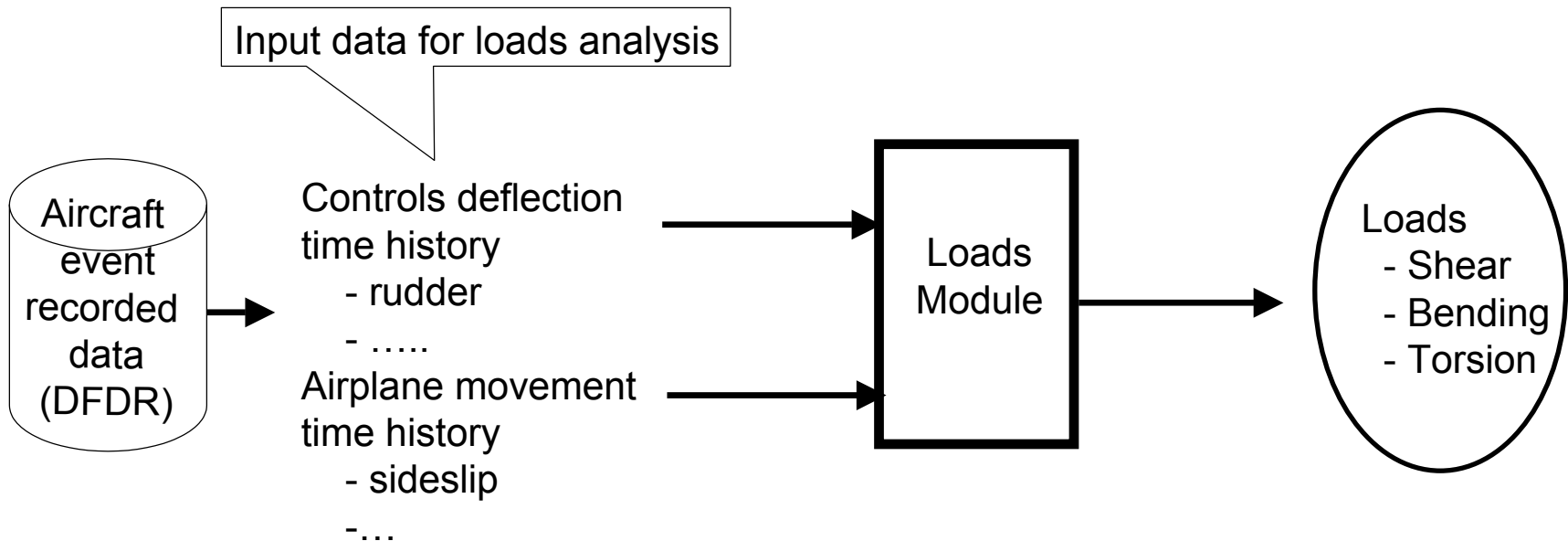- **LE8 - Loads Process & Methods developed to investigate in service events:**

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Loads

- **LE8 - Loads Process & Methods developed to investigate in service events - Vertical tail loads:**
  - Loads calculation process general principle:

Input	Loads calculation	Output

Airplane conditions
- weight,….
- speed-altitude
- ….

Controls deflection
- rudder
- ….

Flight Mechanic Simulation Module

Aircraft movements
- sideslip
- yaw rate
- ….

Loads Module

Loads
- Shear
- Bending
- Torsion

Airplane Model
Aerodynamic derivatives
Mass characteristics

Components Aerodynamic Model
loads distributions - unit cases)
Mass distributions

1

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Loads

- **LE8 - Loads Process & Methods developed to investigate in service events - Vertical tail loads:**

  - To assess the loads developed during an in service event the following principle applied:

  Input data for loads analysis

  | Aircraft event recorded data (DFDR) | → | Controls deflection time history
   - rudder
   - …..
Airplane movement time history
   - sideslip
   -… | → | Loads Module | → | Loads
 - Shear
 - Bending
 - Torsion |

  - The necessary input data for loads calculation are obtained by:
    – Using available DFDR data
    – Reconstruction of non recorded data :

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Loads

- **LE8 - Loads Process & Methods developed to investigate in service events - Vertical tail loads:**

  - Reconstruction of non recorded data (ex: sideslip)
    - Two methods applied:

      . "Simulation method":
      - Missing information are calculated through a simulation of the aircraft movement knowing the control surfaces deflection time histories by using the Flight Mechanic Simulation Module developed for handling quality analysis and training simulator support.

      . "kinetic/Ny integration method":
      - Missing information are derived from available DFDR airplane attitude recorded data by using the kinetic relationship between the different airplane movement/flight parameters and the 3 axis airplane accelerations through the flight mechanics equations.

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