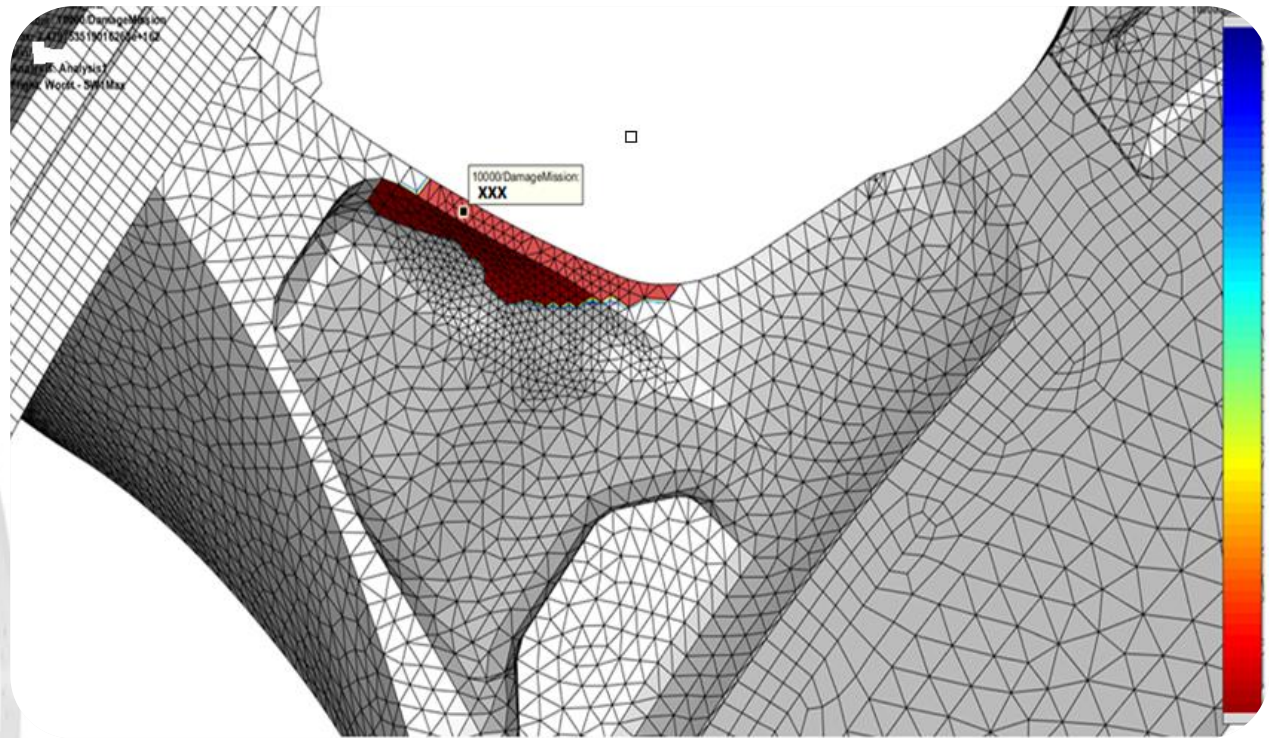




the power of talent



MegaLife, a cheap fast and suitable product history

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Simulation Technology Department, ITP
2017-May-04

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Key Takeways

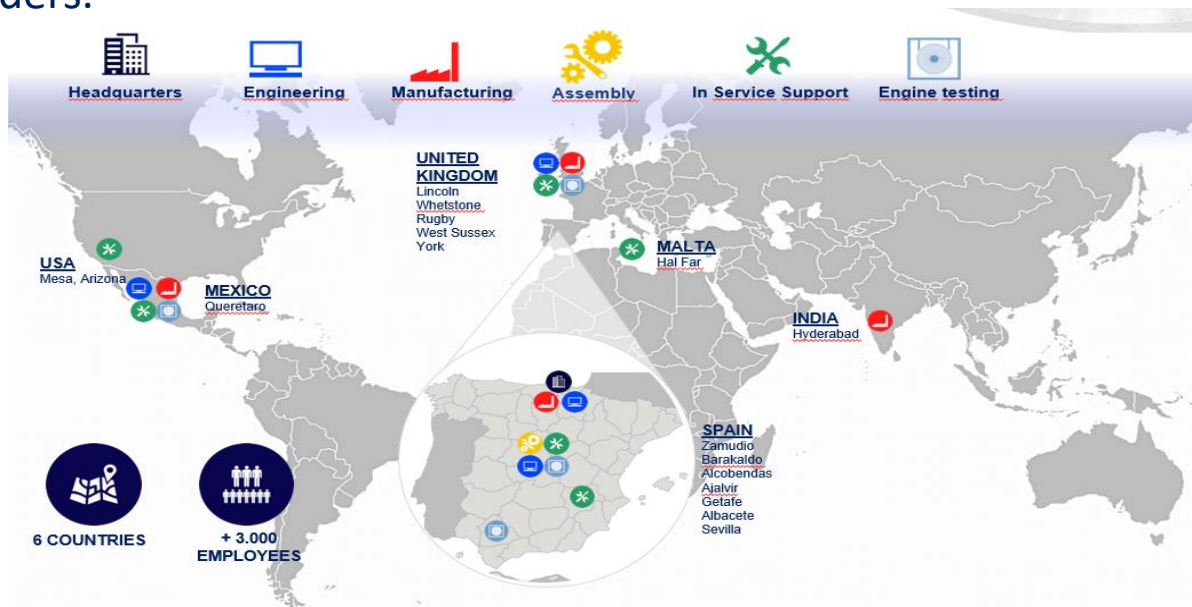
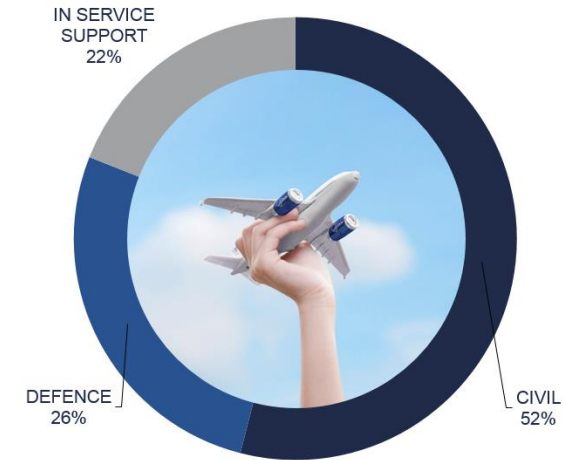
- MATLAB© based development workflow allow us:
 - To create ad-hoc Finite Element Analysis post processor tool.
 - Having a fast development and easy debugging enviroment.
 - With suitable run time speed.

ITP: Industria de Turbopropulsores

- **Our vision**

A global enterprise and a leader in aeronautical and industrial engines market over the entire product life cycle through its technology, recognizing the importance of the environment in all our activities.

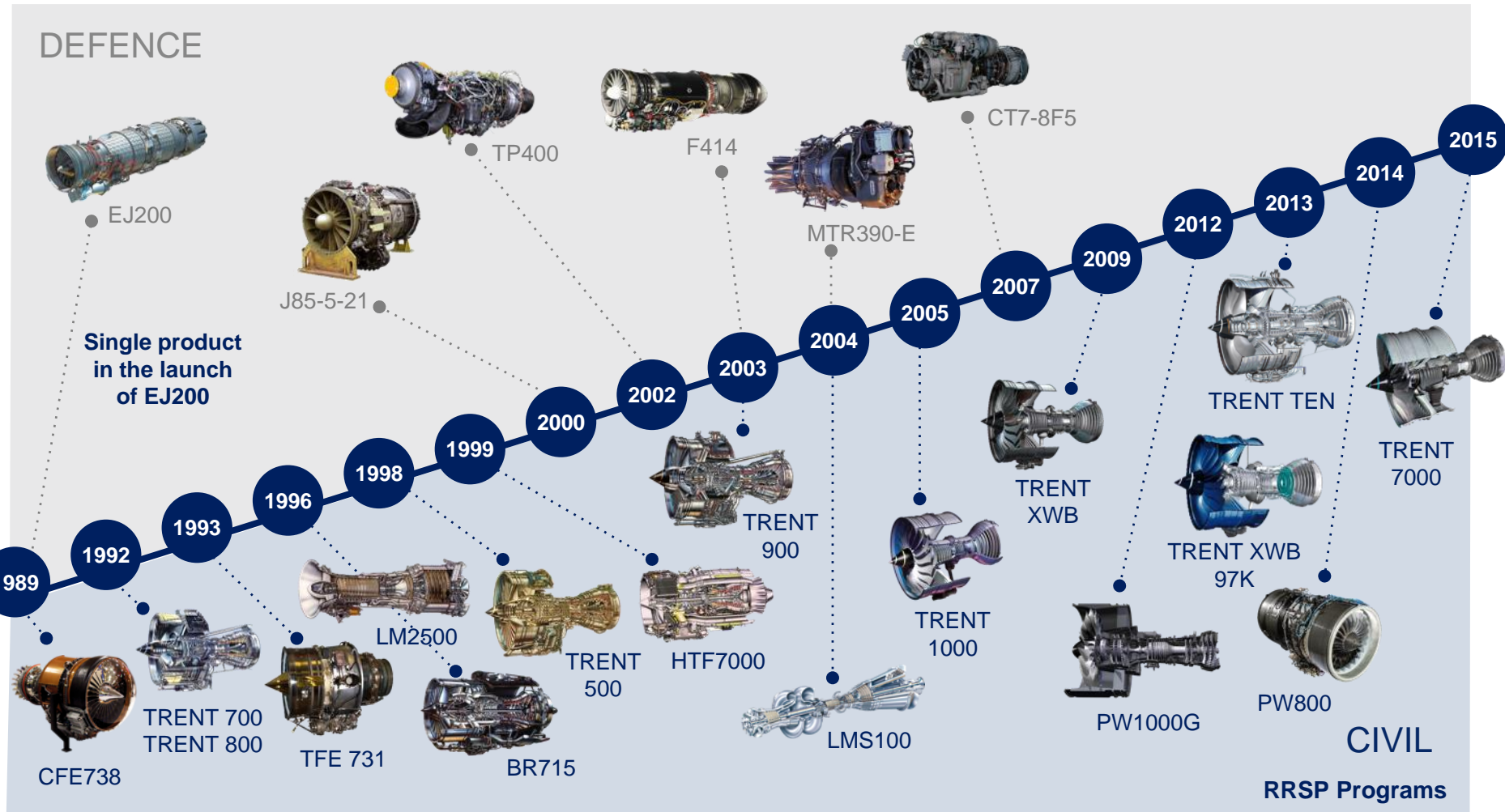
Committed to excellence, we develop strong partnerships with our customers, adding value to the company and all its stakeholders.



ITP: Industria de Turbopropulsores



- Over 25 years involvement in programs



Innovation Challenges and Solution

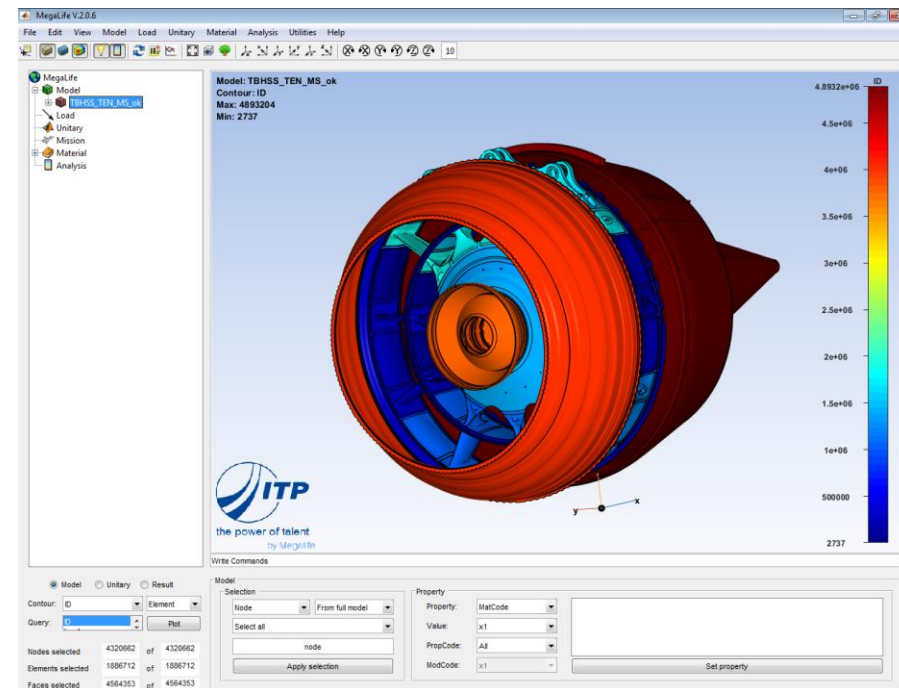
- Finite Element Method Post Processor.
- Large data handle and visualization, 1 to 10 millions of faces.
- Modular Software Design and modular Information Data Base.
- User friendly interface, 75% usability of commercial software.
- Flexible development due to production use.
- Development of several thermo-mechanic post process methods.
 - Fatigue of components.
 - Damage tolerance.



MATLAB©

MegaLife V.2.0 - Definition

- **MegaLife V.2.0** is a post processor software for strength and fatigue analysis.
 - Imports data from different commercial solvers.
 - Calculates temperature, stress, strains and displacement histories.
 - Plot map and history data.
 - Calculates strength RF.
 - Calculates fatigue damages.
 - Calculate endurance ratio ER.



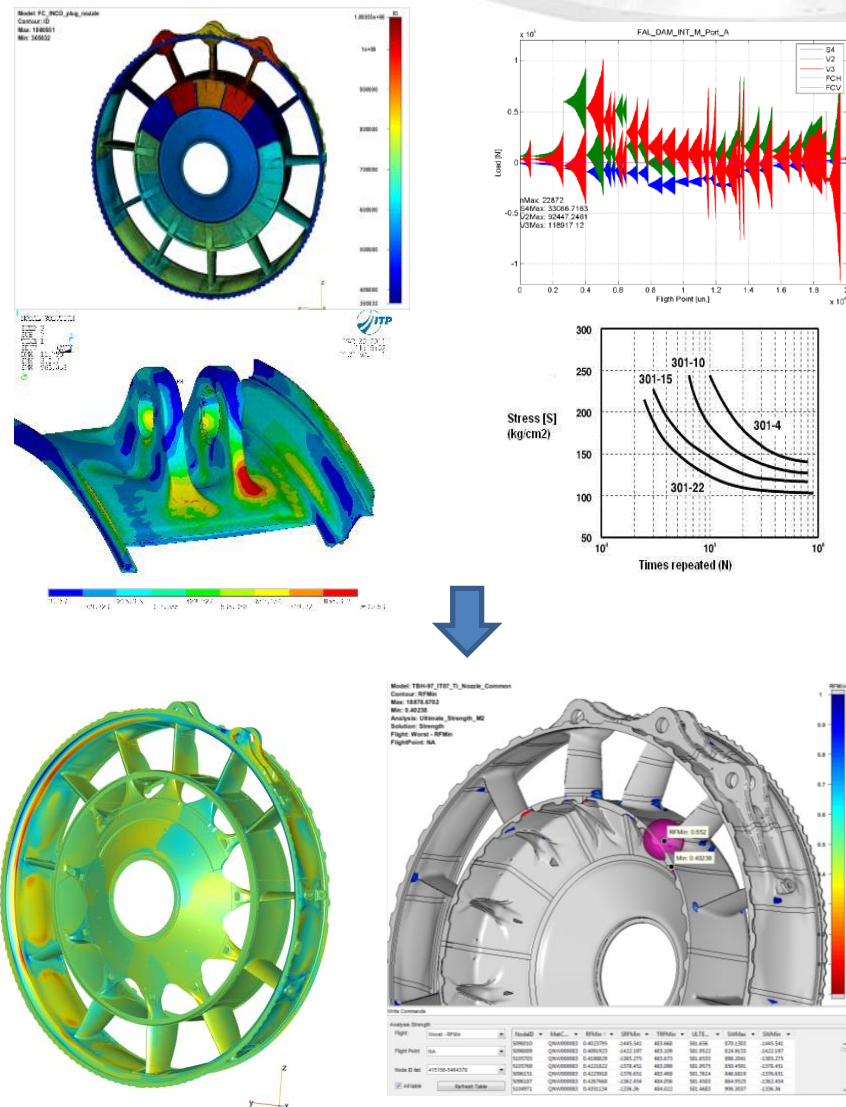
MegaLife V.2.0 – Workflow

Inputs

- FEM Model
- Mechanical and thermal Load matrix
- Mission with the signals combination
- Materials
- Analysis Options

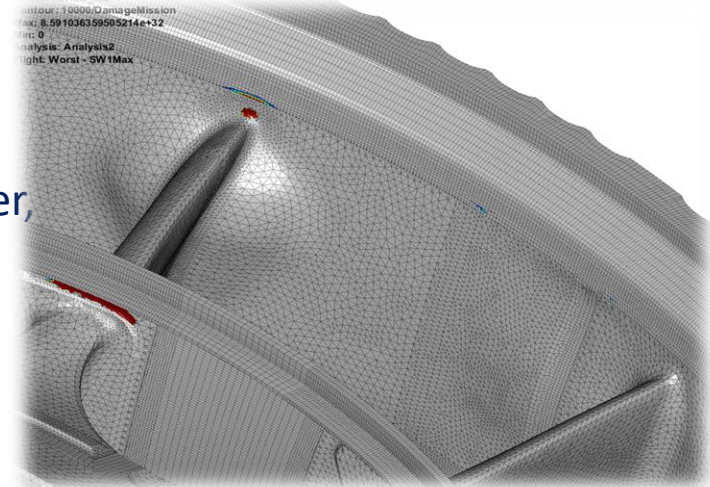
Outputs

- Strength Reserve Factor
- Damage/Life
- Temperature, Stress, strains and disp. hist
- Endurance Ratio



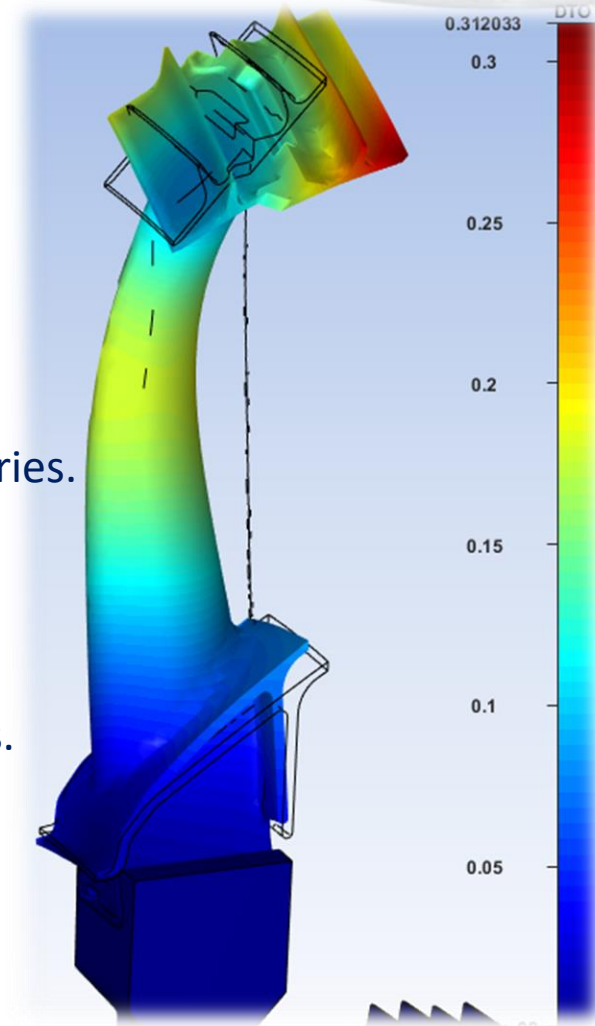
MegaLife V.2.0 and MATLAB - Benefits

- **Reduce time of Post Process for strength and fatigue analysis.**
 - Fatigue analysis : T1000-TEN TBH from 2 weeks to 1 hour.
 - Strength analysis: TXWB-97K TBH from 1 day to 3 minutes.
- **Detailed strength and fatigue analysis.**
- **Reduced cost and weight** designs of Low Pressure Turbines.
- **Improve consistency and quality** with standardized analysis processes.
- **MATLAB© benefits:**
 - Matrix computation with built-in libraries: ismember,
 - Real time development-debugging. Run JIT.
 - Be able to integrate C++ libraries to speed up.



Concluding Remarks and future work

- **MATLAB®** allow you develop suitable products with:
 - Smart software specification and design.
 - High problem understanding.
 - Modular software implementation using objects and libraries.
- **FUTURE:**
 - Improve software capabilities: Damage tolerance and cuts.
 - Extend user community.



MegaLife V.2.0 and MATLAB – Questions?



Questions?