KEYNOTE SPEECH: CHALLENGES AND SOLUTIONS IN THE SIMULATION PROCESS FOR ADVANCED ELECTRO – OPTICS TECHNOLOGY - IMPLEMENTING ANSA & META IN ELBIT SYSTEMS ELECTRO-OPTICS ELOP

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ABSTRACT –
The Opto-Mechanical field has unique demands besides the stress issue: minimum deflections and distortions due to vibrations, pressure and temperatures and minimum weight for airborne and hand-held applications:
Pressure differences distort the structure damaging image and optical performance.
Opto-mechanical structures subjected to Random Vibrations are also distorted due to natural frequencies and amplifications resulting in poor line of sight retention.
Thermal soaks and gradients on structures containing materials with different coefficients of thermal expansion cause deflection and optical elements distortion which reduce optical performance.

Those structures usually contain many parts with different materials connected by bolts and glue.
The strength, stiffness and weight are critical and structure optimization including parts replacements is often needed.
In order to reduce development time and TTM improving design quality and performance we started a benchmark for several pre/post processors including MSC/APEX, ALTAIR/HYPERMESH and BETA/ANSA & META to replace MSC/PATRAN.

The process was very intensive including courses, webex, hot line support and working with each software for actual projects.
Key issues, such as geometry clean-up, 2-D mesh, mid surface generation, volume meshing, connectors, NASTRAN interface, CFD mesh for FLUENT, thermo-elastic analysis, large models and post processing were examined.
We found ANSA & META as the best software and a very responsive developers team.
As we perform thermal analyses with MSC/NASTRAN solver we needed a thermal module for it in ANSA.

BETA was committed to develop this module according to our special needs and did it within few months with full collaboration with us.
This module works well and we are using it for our projects very successfully and we entered TEC (Thermo Electric Cooler) equations inside.
Some optimizations were done using TOSCA activated from ANSA menu.
Today, all the structural & thermal analysis engineers in ElOp are using ANSA & META as pre/post processor.
Our challenges for the future is to be familiar with the advanced features such as common model, configurations, post processing random results, scripting with python in order to reduce time in repeated processes, Kinetics and Additive Manufacturing optimization with TOSCA.