

NOVA

INTEGRATION SOLUTIONS

**A NEW ELECTRONIC CHASSIS ANALYSIS SERVICE PROVIDED
BY NOVA INTEGRATION SOLUTIONS**

DOES YOUR ENCLOSURE HAVE PROBLEMS?

WE CAN HELP!

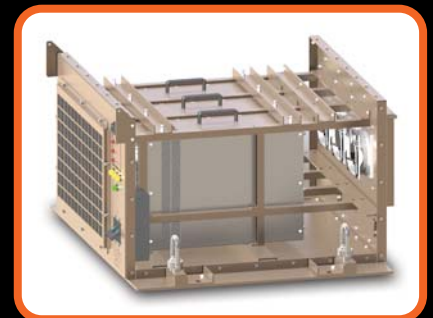
ENCLOSURE EVALUATION SERVICE



TECHNOLOGY REFRESH



PERFORMANCE IMPROVEMENTS



WEIGHT & THERMAL REDESIGN

DOES YOUR ENCLOSURE RUN HOT? DOES IT WEIGH TOO MUCH? SUFFER FROM MECHANICAL FAILURES, OR IS IN DIRE NEED OF AN UPDATED POWER SUPPLY? DOES IT RUN TOO SLOW AND NEED A TECHNOLOGY REFRESH?

NOVA Integration Solutions, Inc. (NIS) has developed a solution that is intended to detail your enclosure problems and to take the next steps in remedying these concerns with a new product offering known as our Enclosure Evaluation Service ("E-Squared"). If you send us your electronic enclosure or better yet send us your electronic files, NIS will perform a full analysis on your enclosure. The results will be summarized in a comprehensive report to include our recommendations in making any needed changes.

The service will include a full mechanical, electrical and thermal assessment of your enclosure to determine where it can benefit from any change in the form of remedies and improvements. The service is ideally suited when:

- Performance improvements and new features must be added.
- Changes to minimize size, reduce weight and improve thermal management are needed.
- An expanded power supply is needed to include the use of an EMI power filter.
- A technology refresh is required due to poor product performance or part obsolescence.
- A prototype was developed and the design must transition to production.
- Documentation does not exist and the enclosure may need to be reverse engineered.
- Your enclosure must be re-evaluated to meet military-grade testing and specifications.



DESIGN GOALS

Our design goal is to provide packaging improvements that minimize **Size**, reduce **Weight** and use less **Power** (AKA: **SWaP**). Our approach is to reduce costs by introducing modular designs and technologies that improve manufacturability and serviceability that mitigate field failures.

FINITE ELEMENT ANALYSIS (FEA)

NIS offers a broad range of FEA services and will team with your engineering resources to perform the evaluation in a timely manner. The evaluation will be completed using our SolidWorks Simulation 3D software analysis tool-set. This cost-effective analysis will determine structural integrity and thermal performance. The enclosure will be analyzed to predict performance under "load" conditions, and the results will be provided in a clear easy to interpret format.

- Geometric optimization and stress analysis to include temperature and altitude profiling.
- Frequency analysis in accordance to MIL-STD-810.
- Buckling and drop tests to include fatigue, load and impact analysis.
- Deformation and behavior with complex materials such as plastics & rubber.



ELECTRICAL EVALUATION

NIS will perform a functional analysis of the existing power supply based upon your product's specifications. Power draw requirements will be assessed for each internal subassembly to include an assessment of any needed power filtering, EMI concerns, cabling and connector selection.

ADVANCED PACKAGING CONSIDERATIONS

NIS has introduced a new advanced packaging concept known as **Flatware**, and uses **crystalline carbon fiber** and **carbon fiber-based composite** materials in their enclosure designs. These materials will be considered as part of the analysis in support of improving thermal management, increasing strength, reducing weight and minimizing size.

DELIVERABLES

The service will include a full list of reports in compliance to a mutually agreed to Statement of Work. In addition, a comprehensive proposal will be provided containing any considerations or remedies that may be needed.

CASE STUDY 1: "AMPLIFIER" HEAT SINK RECOMMENDATION

Problem: The customer's "Amplifier" enclosure was over heating and shutting down under normal operating conditions. An urgent evaluation of the enclosure was needed to confirm the problem to include a recommendation for an improved heat sink. The improvement required an inexpensive and quick solution that was easy to install.

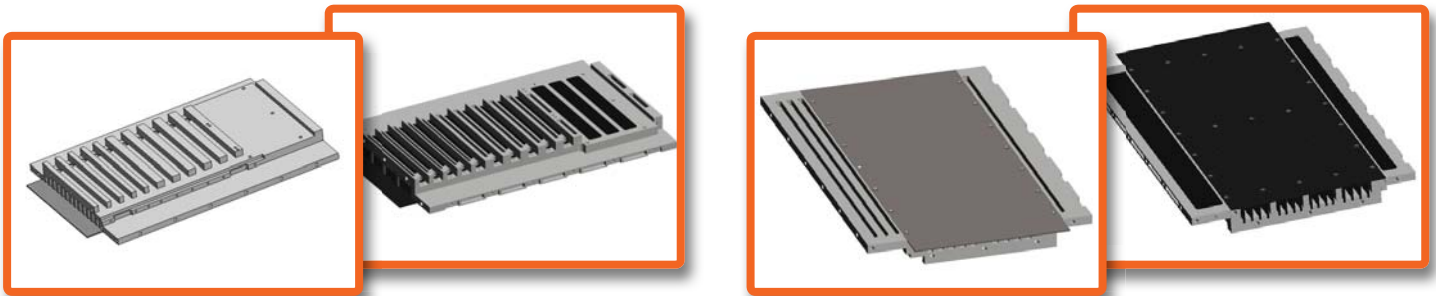
Conclusion: Solidworks was used to produce a thermal analysis utilizing a variety of heat sink designs which resulted in the recommendation of an alternative heat sink. The recommended heat sink was a stock part available from at a local extruder and the instructions to easily retrofit their enclosures was provided by NIS.

CASE STUDY 2: ATR CHASSIS WEIGHT REDUCTION

Problem: An innovative way was needed to reduce weight in a hybrid-cooled ATR chassis. In doing so any improvement needed to be in the form of a drop-in replacement, sustained thermal conductivity and without loss of structural integrity. Any changes had to be in the form of a retrofit and utilize in future designs to provide lighter weight chassis for manned and unmanned aircraft (UAVs).

Conclusion: Solidworks was used to model the chassis resulting in the recommendation to use a specially designed ATR chassis side plate consisting of a variety of thermally-conductive lighter-weight crystalline carbon fiber materials in combination with an aluminum shell. The improved side plate was designed to exceed all of the environmental requirements and was provided as a light-weight drop-in replacement.

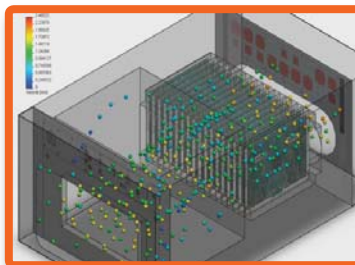
The improved side plate was reduced in weight from 6.7 pounds to less than 4.9 pounds. Two side plates are used in the chassis resulting in a total weight savings of 3.6 pounds. Future changes are being considered to reduce weight in a similar manner and the concept developed by NIS known as *Flatware* is expected to expand. The increased thermal management introduced by the new design may also result in the removal of fans that may no longer be needed.



CASE STUDY 3: TECHNOLOGY UPDATE - 7U VME64X CHASSIS

Problem: A technology update of a military-grade in-flight convection cooled enclosure was needed. The upgrade needed to incorporate a transition from VME to a VME64x backplane, utilizing higher-performing computer interfaces, an updated system monitor, the insertion of an EMI power filter and the replacement of the power supply in support of the aircraft's 400Hz power input system. The upgraded chassis needed to be a drop-in replacement when installed in the aircraft and be fully backward-compatible.

Conclusion: The Customer provided an existing chassis and the set of engineering drawings in support of the effort. The existing chassis was modeled using SolidWorks and redesigned to include the needed internal subassemblies. Airflow simulations were generated to validate the upgraded cooling system required by the additional boards and power usage.



WHY USE NIS?

NIS is an innovative engineering-based small-business and an expert in customizing electronic packaging to include the design, manufacture, integration and testing of "Mission Critical" rugged and military-grade chassis and enclosures.

These custom solutions often contain embedded computers to include other highly-sophisticated electronic devices. They must operate in harsh environments and typically require extreme power supply solutions with robust cooling systems when installed in portable shelters, ground mobile vehicles (Line Replacement Units - LRUs), aircraft (Air Transport Racks - ATRs) and ship-board workstations. Hardware platforms include VME/VME64, cPCI, VPX, PC104, PICMG passive backplane PCs, ATX mother-board and other small form factors.

The solutions produced by NIS are highly engineering oriented. It often requires NIS to work in a cooperative manner with our customers well beyond what is normally provided by most companies.

NIS is ISO 9001:2008 certified and is a registered ITAR supplier.



HOW DO I GET STARTED?

NIS can be contacted through anyone of our Representatives listed on our website or by contacting NIS regarding your interests in having your enclosure evaluated. In doing so, NIS will assist in developing a clear Statement of Work to include identifying the costs to perform the service. A purchase order is required to begin work. Any follow-up to implement the recommendations thereafter are considered outside of this initial evaluation and requires a separate agreement to proceed.

ORDERING TABLE

95-8100 Engineering Evaluation Service

Factory quote is required. Pricing will be quoted in the form of NRE charges based upon the customer's Statement of Work, level of involvement and delivery requirements.

FOR FURTHER INFORMATION, INQUIRIES SHOULD BE DIRECTED TO:

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**INTERNATIONAL MICROELECTRONICS
AND PACKAGING SOCIETY**