

# **CDH/AMLS Version 4.1.r24**

## Release Notes

October 10, 2010



AMLS is available for MSC and NX Nastran as well as Altair OptiStruct. For the current AMLS release, Delivery Data Bases will be provided for:

MSC V2005r3, V2008(mdr3), and V2010(mdr4)  
NX V7.0 and V7.1

Both short and long integer versions (i4, i8) are provided for each version of MSC and NX. If there is a need for another version of either MSC or NX, please contact: [support@cdh-ag.com](mailto:support@cdh-ag.com)

Starting with this version, AMLS will be supported for the following operating systems:

ibm\_aix  
linux\_x86\_64  
linux\_ia64  
sgi\_altix

hp\_parisc is no longer supported. For the next AMLS release, sgi\_altix will also not be supported, so please plan accordingly.

Users are reminded that each CDH/AMLS delivery package, amls\_pack\* also contains an executable program CDH/FastFRS (Fast Frequency Response Solver). It is a completely separate program that solves modal frequency response problems very efficiently. Even though it is separate from AMLS it is used in conjunction with AMLS. In other words, it cannot be executed by itself when the modes are calculated via other methods, e.g., Lanczos. To execute it with AMLS, the user must have a proper license feature that is the same license file as that used by AMLS. For further information about FastFRS, please contact: [support@cdh-ag.com](mailto:support@cdh-ag.com).

CDH/AMLS V4.1.r24 contains some minor error corrections that have been identified since the release of V4.1.r04 and occur in very unusual circumstances. In most cases, the users will never see these errors, because if they were encountered, AMLS would have failed. The corrections are for:



- 1) An error fix in memory allocation that decrease memory usage for some large models.
- 2) Fixed an error in the factorization of very small leaf substructure, which occurs in very unusual models. For very small leaf level substructures - a temp space was not being allocated, when, in fact it needed to be allocated with a length of 1.
- 3) Fixed an error with singularities when an attempted factorization produces an exact zero on the diagonal.

Several features have been added to 4.1.r24. Some were changes made to AMLS executable only, while others involved changes in the Delivery Data Base (DDB) as well:

- 1) Upgrade in compilers for Linux\_x86\_64 platforms. This will decrease the AMLS elapsed time between 10-20% compared to the previous versions. (AMLS only change)
- 2) Added error check for models with too many DOFs in the last (residual) substructure. (AMLS only change)
- 3) Changed AMLS to handle non-zero F1 and ND on the EIGRL definition exactly as Nastran does. However, in the case when there are residual vectors as well as an ND specification, then ND modes between F1 and F2 as well as the residual modes will be returned. (AMLS only change)
- 4) AMLS now supports OFREQ and OMODES requests in Case Control for SOL 103. (AMLS and DDB change)

AMLS returns to Nastran the complete eigenvalue summary, but only the eigenvectors corresponding to the modes selected by OMODES or OFREQ. This can result in a significant reduction in data transfer, because when OMODES or OFREQ are used, the typical Case Control request is: DISP(plot)=all.

- 5) Added capability to reuse the substructure tree map from a previous



run. (AMLS and DB change).

To insure that the tree map is exactly the same, guaranteeing exactly the same result, a new Bulk Data parameter, `p2map`, has been introduced to save the substructure tree information from one run to any subsequent run, i.e., 111 to 103. Note, that the reduced matrices, stiffness and mass, must be exactly the same in the two runs.

To save the substructure tree map, the user must specify:

`param, p2map, write`

This parameter saves the substructure tree map in a file named

`aml_s_p2_map`.

One can see a message in the \*.log file that says the following:

`writing out AMLS mappings for future reuse`

The `aml_s_pw_map` file must be made available to any subsequent run, i.e., it must be placed in the same directory where Nastran and AMLS are being executed.

To reuse the map, simply specify

`param, p2map, read`

in the Bulk Data file and the will find the message in the \*.log file that says the following:

`using AMLS Mappings from a previous AMLS run`

- 6) AMLS is now capable of also calculating modes the acoustic model in structure-acoustic coupled analysis. (DDB change only)

Some recent model have reached a 1M DOF level with hundreds of natural frequencies, thus is can be beneficial to use AMLS instead of Lanczos for eigenvalue extraction. To active this capability, the user need only to specify a parameter in the Bulk Data deck,

`param, amlsf, yes`

The default value for `amlsf` is 'no'.



The user is cautioned regarding the disjoint acoustic models. It is not unusual to have one acoustic model for the vehicle interior and another for the trunk. In some case, there are also separate models for the door cavities. In such cases AMLS will fail with a message that the “structure” is disjoint. There are ways of avoiding this problem, however, it requires explanation beyond the scope of this document. Please contact [support@cdh-ag.com](mailto:support@cdh-ag.com)

- 7) MSC/Nastran new capability, Equivalent Radiated Power, ERP, is fully supported by AMLS and V2010 (MDR4). (DDB change only)
- 8) Extensive changes were made in the support for generation of external superelements. (DDB change only).
- 9) Operational Shapes. (DDB change only) In a typical operational shape calculation where the user wishes to animate one or more mode shapes or frequency response shapes, the only required DOFs for output are the translational DOFs (T1, T2, and T3). Therefore, when the Case Control Deck specification is, DISP(plot)=all, an additional Bulk Data parameter, [alldisp](#), is now available:

[param, alldisp, 3](#)

informs AMLS that only the translational DOFs are to be returned to Nastran, thus reducing the required I/O.

- 10) SFE Participation Factors. (DDB change only) In the previous version if the user required Panel Participation factors in the coupled structure-acoustic analysis and was using SFE fort.70, the panel definitions had to be defined in Nastran. In the present version, the panel definition data is taken from the SFE fort.70.
- 11) SPCD support. (DDB change only). Owing to the changes made in MSC V2008 and NX7, SPCD is now fully supported by AMLS. Similar necessary changes were also made for MSC V2005r3 by CDH. Even though SPCD is now available, the Large Mass method is still the preferred method, simply because it is more efficient.

In the SPCD approach, a number of residual vectors will be generated. Potentially, three residual vectors will be generated for

each DOF that is enforced. Whether the particular vector is generated depends on the coupling (mass, damping and stiffness) between the enforced DOF and the rest of the structure. The stiffness coupling will always exist, whereas the mass and damping may or may not exist.

The user is reminded that the total number of loaded DOFs by all the residual vectors must not exceed 500. In almost all cases this limitation will not be exceeded for practical problems. However, in a case where an independent grid on the RBE2 is enforced, but that particular RBE has over 500 dependent grids, then the 500 limit will certainly be exceeded and the computation will terminate before AMLS is executed.