

The MacNeal Group

NASTRAN-L Series V1.0.0

NASTRAN-L Series
Installation and Operations
Guide for Windows

Corporate

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The MacNeal Group Software Suite

The MacNeal Group, LLC, (tMG) offers a suite of advanced FE software tools that are intended to facilitate the design and analysis of structural systems and components within the context of the unique requirements of a broad range of industries, customers and processes. This suite of software applications and libraries provides the state of the art in finite element based simulation.

This manual documents the installation and configuration of the **NASTRAN-L Series**¹ finite element based analysis product of tMG. The **NASTRAN-L Series** products represent a subset of tMG's advanced NASTRAN[®]² implementation. tMG's NASTRAN implementation represents a significant step forward in the modern, modular integration of NASTRAN finite element analysis with in-house and third party tools to provide a significant increase in simulation productivity and process data integrity. Through its integration with other tools in tMG's software suite (such as the seamless integration with our **GATEWAY**[®]³ product), the user will find that **NASTRAN-L Series** provides many innovative features needed to help support the modern, distributed, engineering enterprise as well as providing a robust feature set for basic FE structural analysis.

¹ **NASTRAN-L Series** is a trademark of the MacNeal Group, llc

² NASTRAN is a registered trademark of NASA

³ **GATEWAY** is a trademark of the MacNeal Group, llc

Welcome to NASTRAN-L Series V1.0.0

The New Choice for Large, Complex Structures.

NASTRAN set the standard for aerospace and automotive simulation and analysis software more than 30 years ago.

Since then, companies in numerous industries have relied upon NASTRAN's superior elements and powerful solvers to prove concepts and prevent catastrophic failures in everything from chemical plants, oil refineries and rail vehicles to next-generation fighter aircraft, sports cars and skyscrapers. The convenience of DMAP has been critical to the use of NASTRAN in industry, in that it allows each company/user to "customize" NASTRAN to their specific needs. In the **NASTRAN-L Series** we have extended DMAP by adding a GATEWAY capability, which turns every **NASTRAN-L Series** program into a user-modifiable program.

The **NASTRAN-L Series** are enhanced versions of legacy NASTRAN, including many updates and modifications. The series currently contains three program, **NASTRAN-LS**, **NASTRAN-LM**, and **NASTRAN-LD**. In the list below, LS will be used to indicate features which are available in **NASTRAN-LS**, LM will indicate features which are available in **NASTRAN-LM**, and LD will indicate features which are available in **NASTRAN-LD**.

The programs now use sparse matrix technology in all major numerical modules, resulting in vastly improved performance.

Analysis Types in **NASTRAN-L Series**

1. Static Analysis – LS, LM, LD
 - a. Linear Statics
 - b. Statics using Inertia Relief
 - c. Statics with Differential Stiffness
 - d. Cyclic Symmetry
2. Buckling Analysis – LM, LD
3. Dynamic Analysis – LM, LD
 - a. Normal Modes (Including Lanczos Eigenvalue solver) – LM, LD
 - b. Frequency Response (both direct and modal) - LD
 - c. Transient Response (both direct and modal) - LD
 - d. Complex Eigenvalues (both direct and modal) - LD

- e. Normal Modes with Differential Stiffness (pre-stressed modes) – LM, LD
- f. Normal Modes using Cyclic Symmetry – LM, LD

Element Types

The programs have many of the familiar element types, including, but not limited to:

0-D

ELASi, DAMPi, MASSi (I=1,4)

1-D

ROD, BAR, BEAM, BEND, BUSH, CONROD, VISC

2-D

QUAD4, TRIA3, SHEAR

3-D

TETRA, HEXA, PENTA

SPECIAL

GENEL, DMIG, DMI

R-elements and Multi-Point Constraints -

MPC, RBAR, RBE1, RBE2, RBE3, RSPLINE, GAP

Automatic M-set selection – unless instructed otherwise, **NASTRAN-L Series** will automatically select the best M-set for your constraint equations. This includes handling redundant MPC-equations, and constraints applied on dependent dof. This relieves you of the extra effort required to determine the correct dependent dof when writing constraint equations (MPC's and R-elements)

Legacy NASTRAN Characteristics

Structured data formats

General-purpose equation solvers

DMAP – NASTRAN scripting language (found only in true legacy NASTRAN) that allows customization of existing solutions, and, creation of user-defined algorithms.

Prerequisites

Note: Minimum requirements to install **NASTRAN-L Series**

The minimum computer configuration should have 256mB or more of memory with at least 40mB available disk space. Solution speed will be best with 1gB or more of memory. The largest problem size that you can run will be determined by the amount of available disk space on your computer and a hard-coded limit of 100,000 GRID points. Installation requires administrator privileges on the computer.

Supported Hardware and O/S

NASTRAN-L Series V1.0.0 is intended to run on:

Windows 2000 - Pro, SP4 or higher with Internet Explorer V6.0 or Windows Script Host v5.6

Windows XP - Pro, SP1 or higher with Internet Explorer V6.0 or Windows Script Host v5.6⁵

Products on The Optional CD

The optional CD contains the **NASTRAN-L Series** product you have purchased and the associated documentation. The same information is contained in the download file.

⁵ Windows Script Host 5.6 is installed along with Internet Explorer 6.0 or can be downloaded separately from <http://msdn.microsoft.com/scripting/>

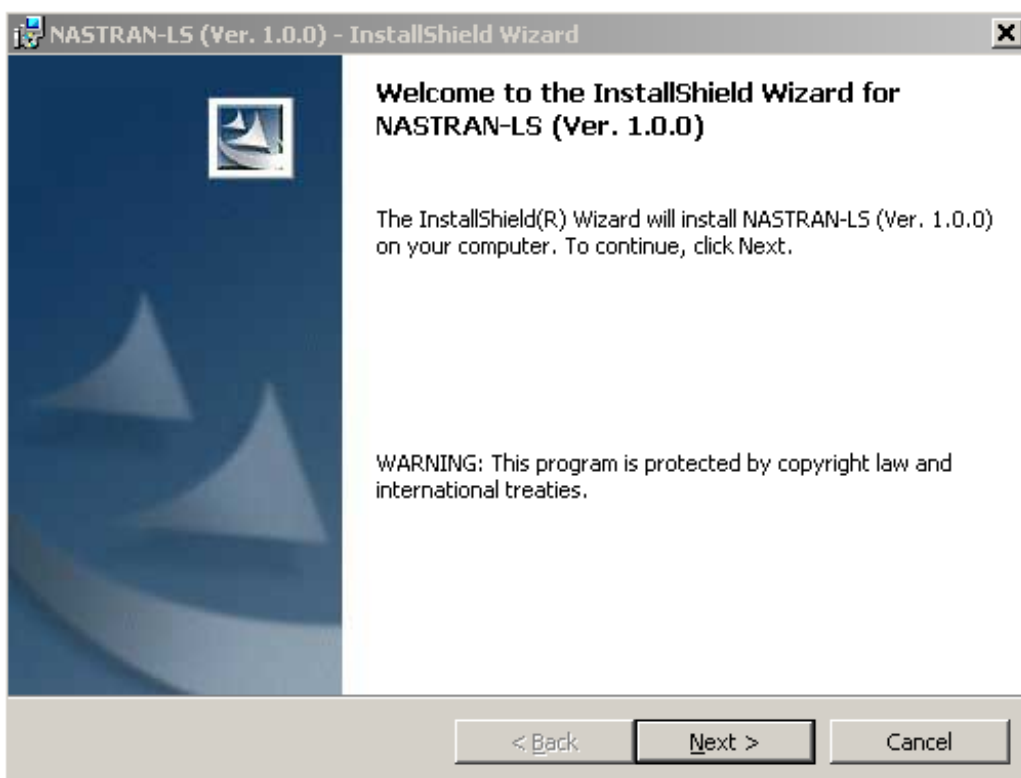
Installation

Step 1 – Double-click on the downloaded file or insert the NASTRAN-L Series CD

If you are using the cd, it contains an autorun.inf file, but if the installation script does not start, click START, select run, then type <CD-ROM>:\setup.exe in the window, and click on “OK”.

THE IMAGES SHOWN IN THIS SECTION ARE FROM NASTRAN-LS. IF YOU ARE INSTALLING NASTRAN-LM OR NASTRAN-LD, THE APPROPRIATE PROGRAM NAME WILL APPEAR.

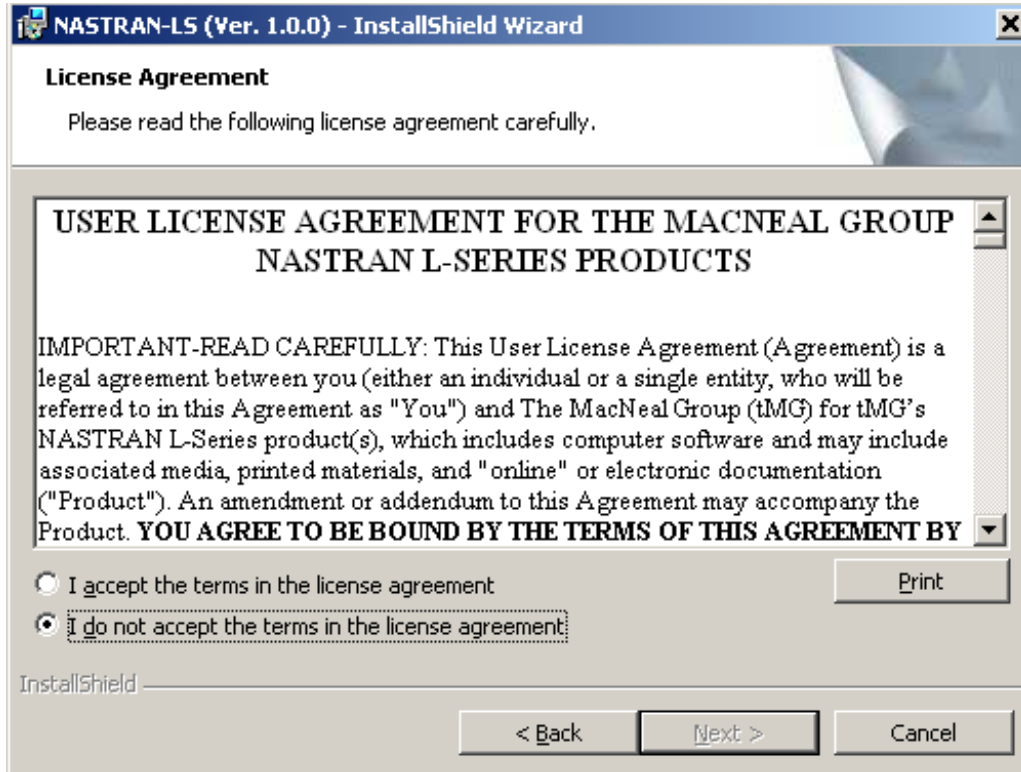
The first window will appear as:



Click on “Next” to continue, or “Cancel” to halt the installation process.

Step 2 – Licensing Agreement

The second window will appear as:

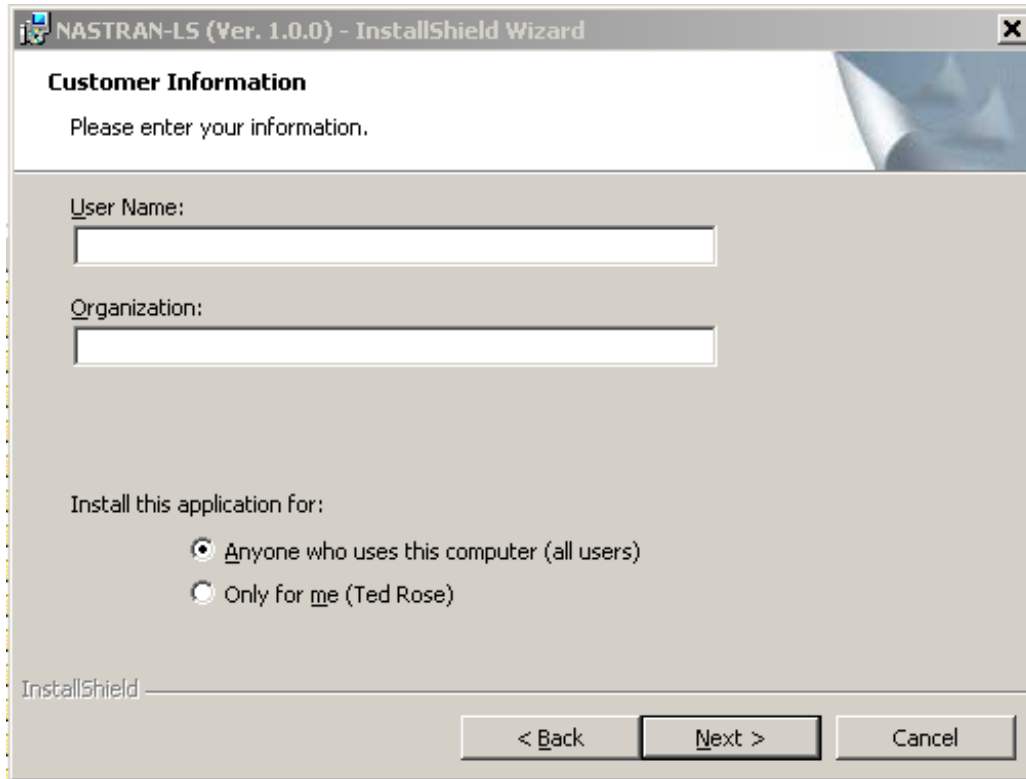


Please read the License Agreement carefully and select to accept or decline the terms of the agreement.

Click on either the "I accept" button, then "Next" to continue or "Cancel" to halt the installation process.

Step 3 – Entering Customer Information

The third window will appear similar to the following:



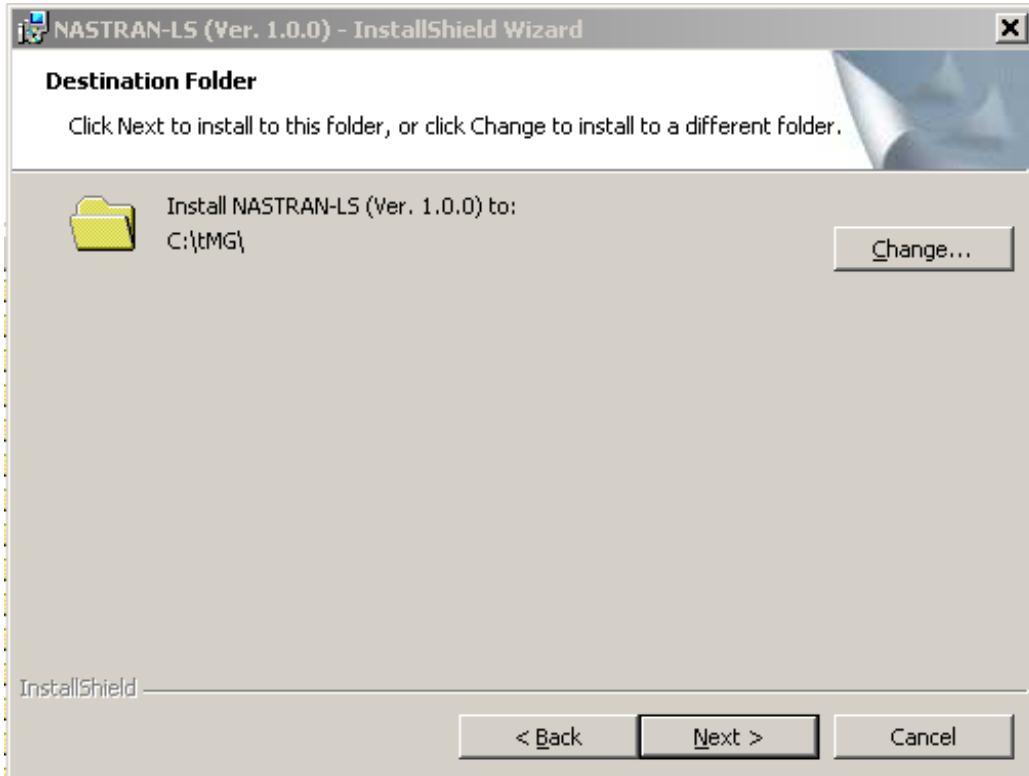
The screenshot shows a Windows-style dialog box titled "NASTRAN-LS (Ver. 1.0.0) - InstallShield Wizard". The main heading is "Customer Information" with the instruction "Please enter your information." Below this are two text input fields: "User Name:" and "Organization:". Underneath the fields is a section titled "Install this application for:" with two radio button options: "Anyone who uses this computer (all users)" (which is selected) and "Only for me (Ted Rose)". At the bottom of the dialog are three buttons: "< Back", "Next >", and "Cancel". The "InstallShield" logo is visible in the bottom left corner of the dialog area.

Please enter your user name, company name and indicate if the application is to be installed for a single user or all users on this computer.

Click on "Next" to continue, or "Cancel" to halt the installation process.

Step 4a – Selecting the Destination Folder

The fourth window will appear as:



Accept the default destination folder (C:\tmg) or click on the button titled Change... to change the destination folder.

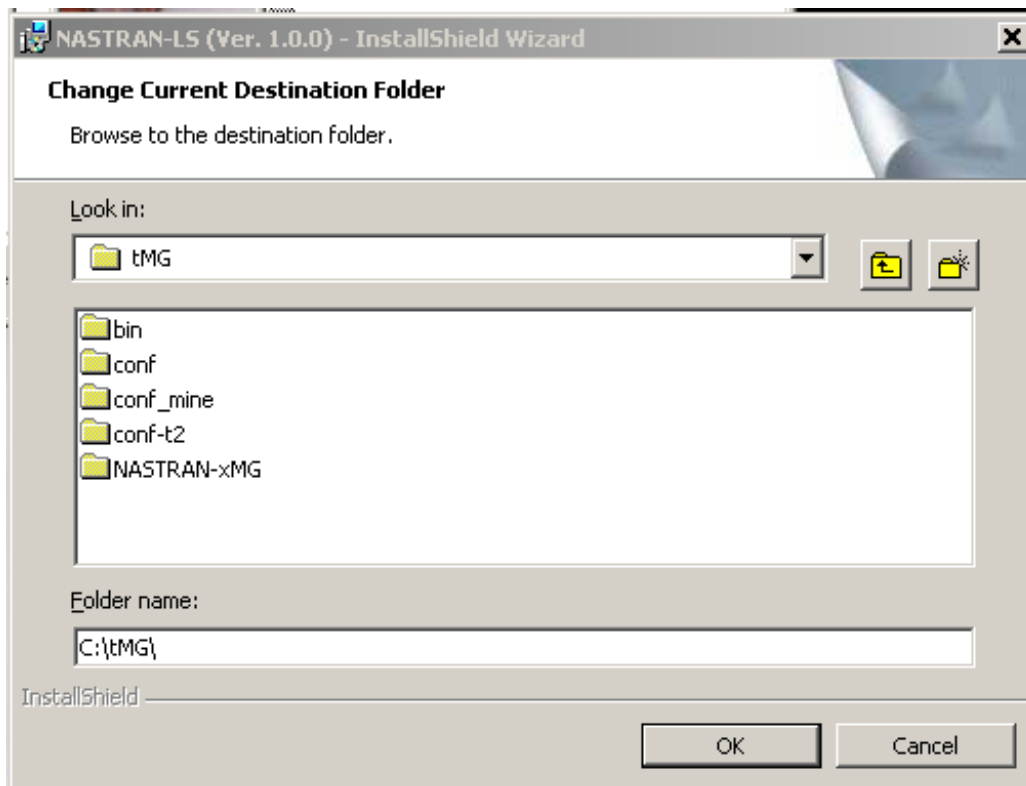
Click on “Next” to continue, or “Cancel” to halt the installation process.

Step 4b – Change Current Destination Folder

If you have accepted the default destination folder proceed to Step 4d.

The window will appear similar to the following:

NOTE: The path to an alternate destination folder and folder name itself must **NOT** contain any spaces



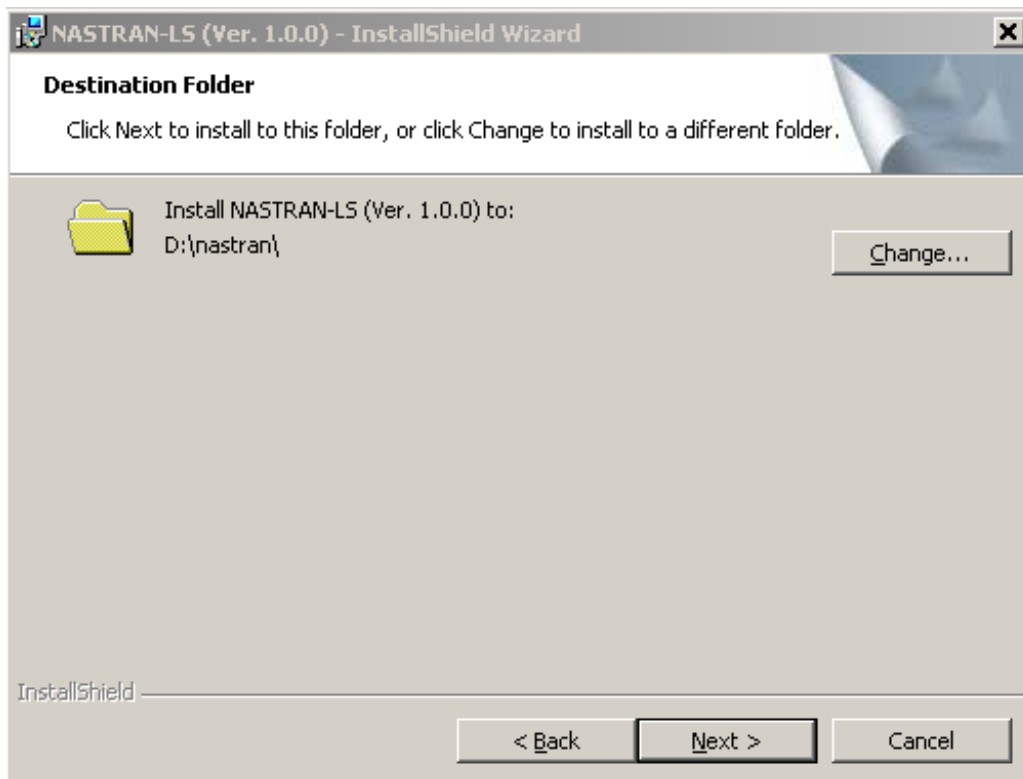
If you have chosen to change the destination folder, select or create an alternate “Destination” location of your choice.

Click on “OK” to continue, or “Cancel” to change the destination folder.

Step 4c – Accepting the New Destination Folder

The window will appear as:

NOTE: The path to an alternate destination folder and folder name itself must **NOT** contain any spaces

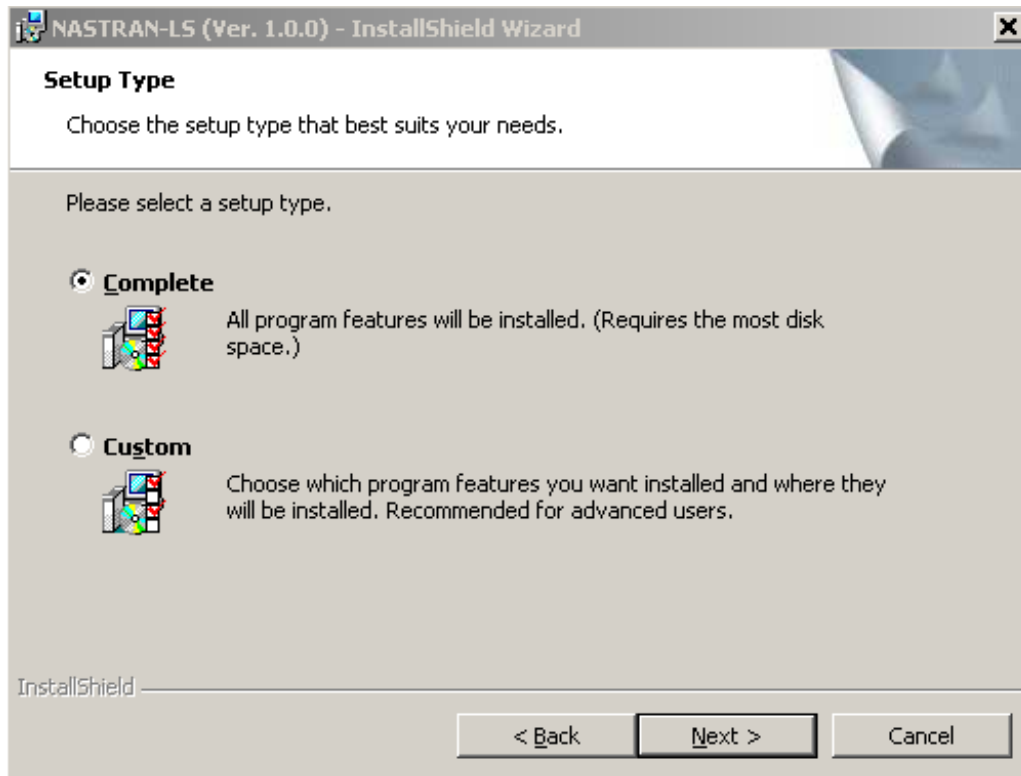


Accept the new destination or click on the button titled Change...

Click on “Next” to continue, or “Cancel” to halt the installation process.

Step 4d – Choosing Setup Type

The window will appear as:

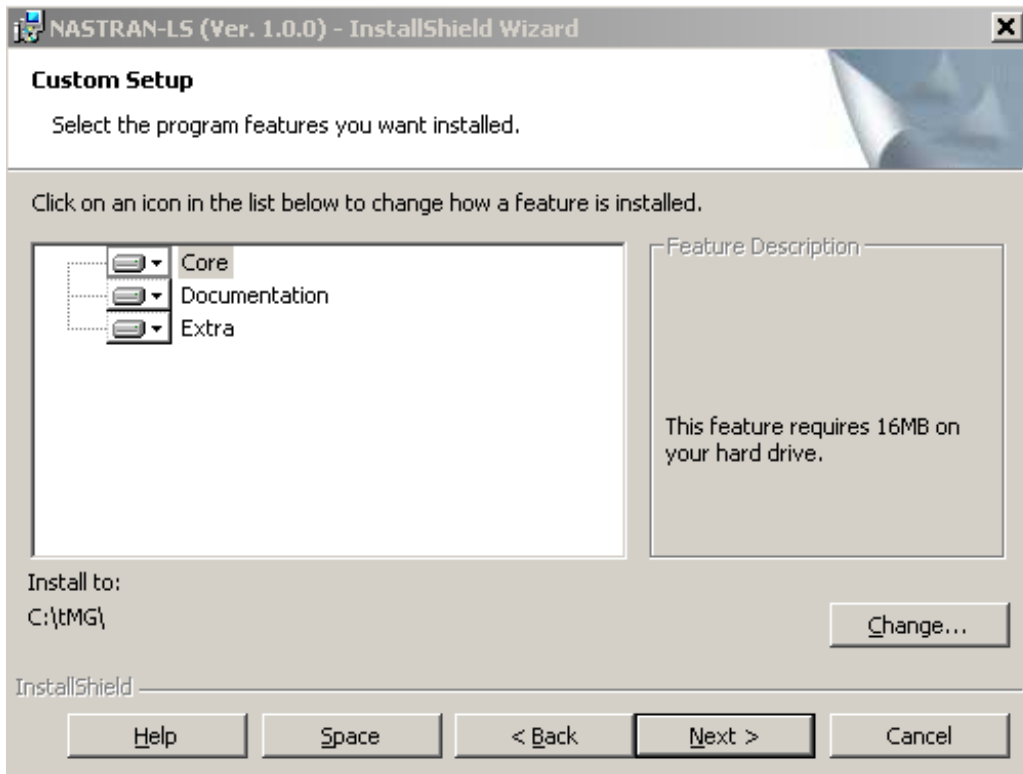


Select the Setup Type you would like to use. The "Complete" option installs all program features into the designated destination folder (Steps 4a-c). Select the "Custom" option to install a subset of the program features.

Click on "Next" to continue, or "Cancel" to halt the installation process.

Step 4e – Choosing Setup Type “Custom”

If you selected the “Custom” option to install a subset of the program features, the next window will appear as:

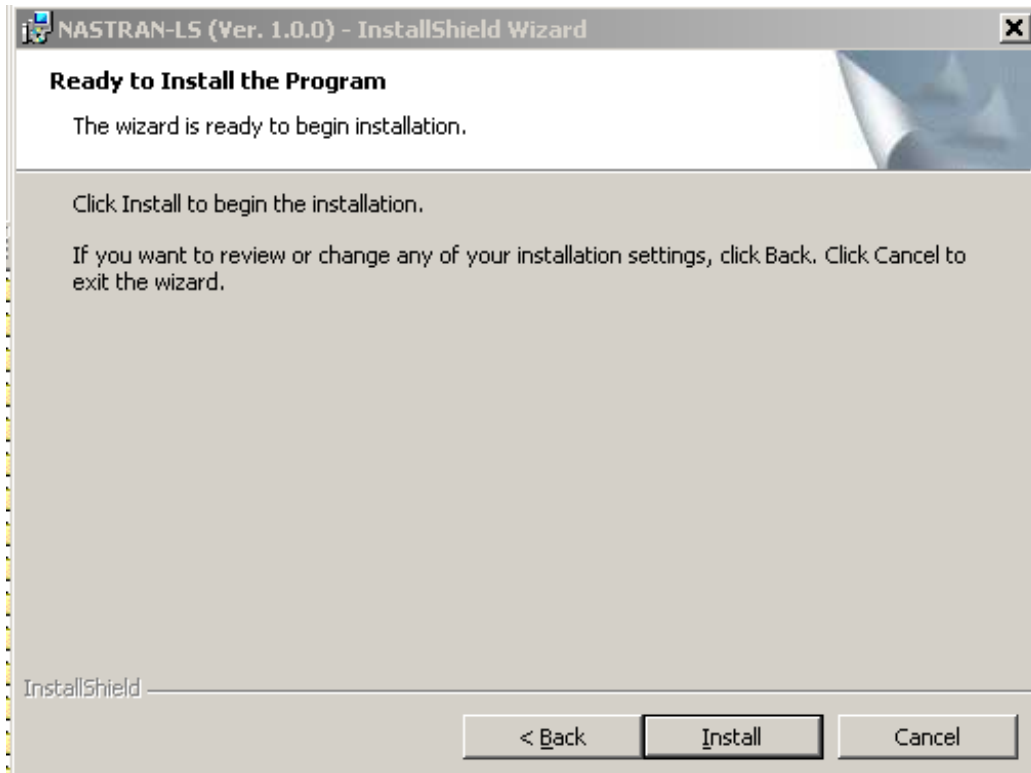


Click on “Change...” to specify an alternate “Install to: “ destination folder, “Space” to list the available disks and disk space on your computer, “Back” to review or change your setup choices, “Next” to accept the changes input here, or “Cancel” to cancel the installation process.

NOTE: The path to an alternate destination folder and folder name itself must NOT contain any spaces

Step 5 – Install

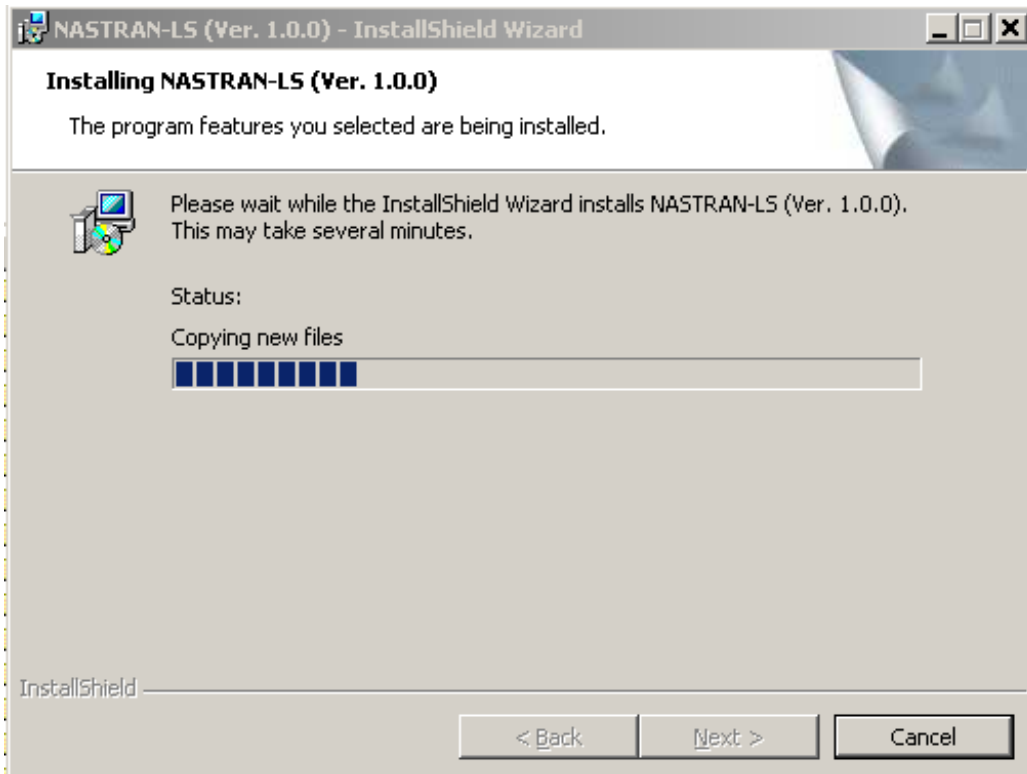
The window will appear as:



Click on “Back” to review or change your installation setup choices, “Install” to execute the final install procedures, or “Cancel” to cancel the installation process.

Step 6 – Installation Wizard Progress

The window will appear as:

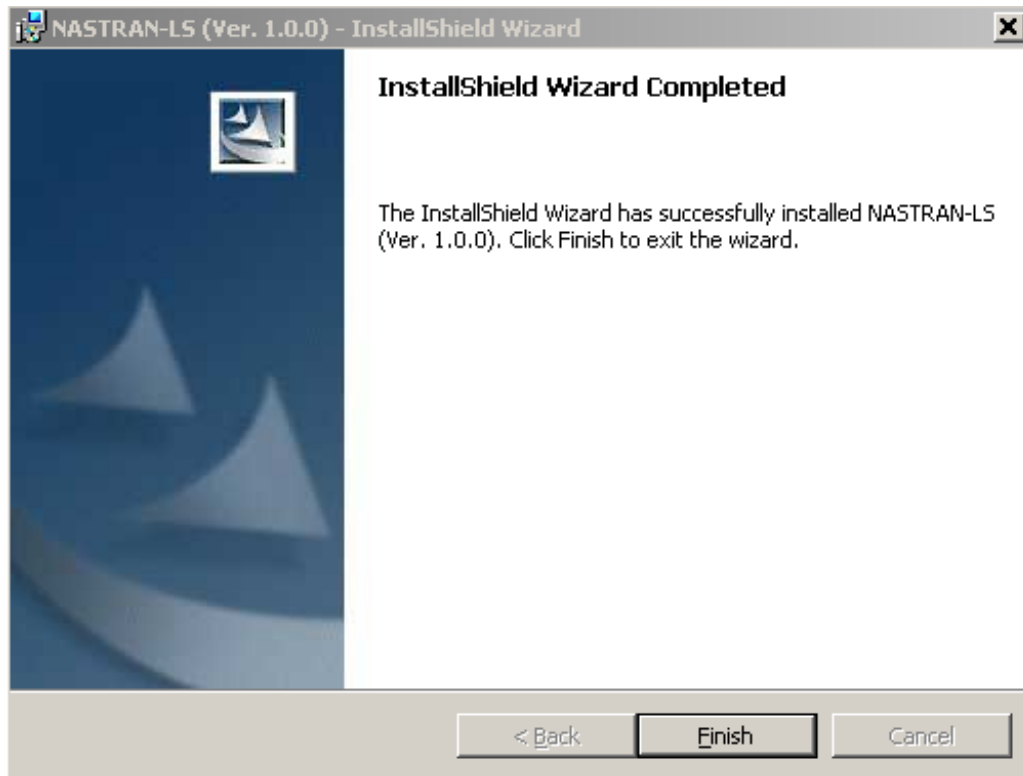


No interaction is required.

You may click on “Cancel” at any time during the installation process to halt the installation.

Step 7 – Installation Wizard Complete

The final window will appear as:



Which indicates that the installation was successful.

Click on “Finish”

Note: The installation of **NASTRAN-L Series** will not function properly until a valid license file is installed. For more information on how to install a valid license file, please refer to the licensing section of this manual.

Licensing

When you purchase a **NASTRAN-L Series** product, a license file will be sent to you by email shortly after your purchase. This initial license file will allow the software to be run during the length of the warranty period (90 days). If you retain the software without return for refund after the warranty period ends, you will be sent a permanent license file to replace the initial license file. If you have not received a license file within 12 hours of your purchase, contact us at ecom@macnealgroup.com with the information on your purchase.

You should keep a backup copy of the license file in a separate place from the installation.

Users have three methods at their disposal to use the license file.

- 1- Place a copy of the license file in the <tmg_install_dir>\conf\ directory (do not change the name of the file).
- 2- Include the keyword, “lic=<full path to license file>” on the nastran command line
- 3- Include the command “lic=<full path to license file>” in a global/local runtime configuration file (<>.rcf).

The first method is the preferred method, in that the program will automatically find the file when run.

Configuring NASTRAN-L Series

The behavior and computer resource utilization in **NASTRAN-L Series** is controlled by many parameters, most of which are available as command line options on the command interpreter (see Running **NASTRAN-L Series**). However, it is often desirable to configure collections of default settings and/or to set invariant parameters. For example, you can set the location of the scratch file directory or the license file or create settings appropriate for “large” and “small” jobs. Saved settings are supported by **NASTRAN-L Series** through the use of resource configuration files (RCF). These files are interpreted in a hierarchical manner with the application searching in various locations relative to the installation and relative to the user’s environment and the current working directory at the time of submittal for these files.

Installation Structure

To understand the configuration options, you need to understand a few assumptions that are made by the **NASTRAN-L Series** applications and their command line interface (“script”). These applications have been written to provide robust, but flexible configuration control over the **NASTRAN-L Series** applications. Certain locations and file names in the installation hierarchy are important because they are default locations and/or default names for various files (including the RCF) that may contribute to the baseline settings for the application parameters.

First, the installation (as you have seen in the preceding installation instructions), can be placed “anywhere” in the hierarchical file system of the host computer. The full path to the installation directory is named TMG_BASE. The command line interface, license files and installation configuration RCF (as well as the platform/version applications) are located relative to this location.

Note: The relative locations of the installation directories are critically important and must not be changed.

Schematically, the basic installation structure is:

install_dir	Product	Version	Version Specific Directories	Host
TMG_BASE (base installation directory)				
	\bin (contains the scripts)			
	\conf (contains the license and runtime configuration files)			
	\NASTRAN-LS \NASTRAN-LD or \NASTRAN-LM (program-specific files)			
		\v0100 (version)		
			\alterlib (DMAP alters)	
			\documentation (manuals)	
			\exe	
				\i386 (programs)
			\rf (contains SOLutions)	
			\testsuite (sample input files)	

Typically, the application launch scripts are located in `TMG_BASE\bin` and, if that location is in your `%PATH%` variable, no further configuration is needed. However, if you move the scripts from within the installation structure to some other location, then you must set the environment variable `%TMG_BASE%` to the full path to the installation directory.

Installation level RCF may be placed in `TMG_BASE\conf` or in `TMG_BASE`. By default, a minimal RCF is located in `\conf`. More information on the RCF file naming and contents is located in Resource Configuration Files (RCF).

By default, an invalid license file is also located in `TMG_BASE\conf`. After you have received your valid license, it can replace the invalid file in `TMG_BASE\conf` or any RCF may point to it via the `LIC=` option.

Launch scripts for the **NASTRAN-L Series** application may be copied into new names because the name of the launch script itself plays two important roles:

- It may define a default version number for installations containing multiple versions of the applications. For example a script named “`nastld.vbs`” will default to the most recent version of NASTRAN-LD in the installation structure. In general, launch scripts named `xnast<version number>` will default to launch version `<version number>`, if it exists. Of course, the `VER=` command line option may override this default. And, if the selected version does not exist, the most recent will be used.
- It defines a “base name” for the RCF files that will be used to establish configuration defaults. For example, if the **NASTRAN-L Series** launch script is named “`nastran.vbs`”, the RCF names that will be searched are “`nastran.rcf`”, “`nastran.rcs`” and “`nastran.rc`”. In general, if the script is named `<scriptname>.vbs`, the RCF named `<scriptname>.{rcf|rcs|rc}` will be searched.

Resource Configuration Files (RCF)

The resource configuration files (RCF) are searched by the **NASTRAN-L Series** application starting from the “closest” locations and working outward to the installation. The first appearance of a parameter setting defines its value for the run. (Parameters that are set are logged in the `.log` file generated during the application execution.) Most of the contents of the RCF are also command line arguments, so the command line is, essentially, another RCF. Finally, **NASTRAN-L Series** supports a NASTRAN statement in the input file and many of its options are also command line or RCF entries. The order of precedence, from highest to lowest is:

- NASTRAN statement in the input file
- Command line arguments on the invocation script

- The RCF file named in the RCF= command line option
- RCF file(s) in the current working directory
- RCF file(s) in the user's HOME directory (as denoted by the environment variable %HOME%)
- RCF file(s) in the installation directory as described previously in Installation Structure

The combination of these default locations and the derivation of the RCF names from the launch script name gives you have tremendous control over the default settings of **NASTRAN-L Series**.

Structure of RCF Entries

The RCF is essentially a stream of name value pair entries of the form

<name> = <value>

where the case of <name> is not important (all keywords will be compared in upper case, but the file can contain mixed case entries). The case of <value> is preserved. Spaces may precede <name> and surround the equal sign (“=”).

Commentary is allowed following pound signs (“#”), exclamation marks (“!”) or dollar signs (“\$”), so that either whole lines can be made comments, or comments can be supplied after an entry.

Running NASTRAN-L Series

NASTRAN-L Series are run in a command interpreter window/shell by entering the following command on the command line:

NASTRAN-LS:

nastls fid opt1=xxx opt2=yyy...

NASTRAN-LM:

nastlm fid opt1=xxx opt2=yyy...

NASTRAN-LD:

nastld fid opt1=xxx opt2=yyy...

where:

fid = input_file_name – if your input file has the .dat extension you do not have to type the extension, however, any other file extension must be typed. The program assumes that the input file is in the working directory for the command window. If the input file is not in this directory, the full path or relative path must be entered with the file name.

opti are keywords – for allowable keywords see the next section, Command Line and RCF Keywords

Sample:

```
nastls test1 mem=20mw
```

will submit a NASTRAN-LS run using test1.dat in the current working directory as the input file and will allocate a maximum memory of 20 megawords for the run.

This run may generate several output files, for example:

test1.f06	= output file
test1.f04	= summary of NASTRAN execution
test1.log	= log file containing information on file assignments and memory allocation
test1.plt1	= output file for plots (only exists if plot requests are in the input file)
test1.ps	= postscript file containing plots (only if plots are requested in the input file)
test1.dic	= file for checkpoint dictionary (only exists if CHKPNT YES is specified in the input file)
test1.nptp	= New Problem Tape – restart information file
test1.op2	= ouput2 file for post-processing – created if PARAM,POST,-1 is specified in the input file

Using command line keywords you can change the names of most of these files.

Command Line and RCF Keywords

NOTE: If any keywords or their values (for example the file name) contain blank spaces, those options must be enclosed in double quotation marks (“”) on the command line. For example, if your filename is *my test.dat* then you should type:

```
nastlx “my test.dat”  
(where x is s, m, or d depending on which product you are using)
```

Inside an RCF entry, this requirement is not imposed and names are bounded by white space or the equal sign “=” and values are bounded by the equal sign and comment characters.

The following is a short list of the most commonly used command line and RCF keywords. For a complete list please refer to Table 1: Command Line and RCF Keywords later in this section.

Memory (Mem):

Requests the amount of memory to be used by **NASTRAN-L Series** for the run. The default units are words. Default memory is set based on the available physical memory at the time of the run, for large models, allocating more memory will allow the program to run more efficiently. Allowable units are:

GB = gigabytes

MB = megabytes

KB = kilobytes

B = bytes

G or GW = gigawords

M or MW = megawords

K or KW = kilowords

SDIR:

Select directory to be used for scratch files (default is the temp directory for the operating system).

OUTPUT or OUT:

Selects directory for output (default is the directory containing the input file)

SYSTEM(n) or SYSn:

Sets values for SYSTEM cells (see the NASTRAN statement in the NASTRAN-L Series® User's Reference Manual for cell numbers and values)

SILENCE or SIL:

Silent mode - yes or no.

yes = enable pop-ups from the submittal script (default)

no = disable pop-ups

PS:

Convert plot file (plt1) into postscript file – yes or no

Yes = convert 'plt1' file into postscript file automatically (default)

No = don't convert file In this case, you need to set PLT1=YES)

File assignments: default file names are input_file_name."keyword" - note these files may also be assigned using the ASSIGN statement in the Executive Control Section of the input file.

NPTP = assign NPTP file

OPTP = assign OPTP file

OP2 = assign output2 file – used as unit 12 in DMAP

OP4 = assign output4 file – used as unit 14 in DMAP

Table 1: Command Line and RCF Keywords

Name	Abbreviations	Type	Range	Purpose
MEMORY	MEM	Integer	>0<units> {units =Gb Mb Kb Gw Mw Kw b w}	Total Memory allocations
SDIRECTORY	SDIR	string	Directory	Location used for scratch files
SYSnnn SYSTEM(nnn)	N/A	Integer	Value of system cell nnn	Various
REAL	N/A	float	>0.0	Fraction of the total memory allocation reserved for modules
LICENSE	LIC	string	full path	full path to the license file
RFDIR DIRECTORY	RF	string	Directory	Alternate location of the rigid format directory
NOTIFY	NOT	string	YES NO	YES causes a beep on completion of the execution
RCFILE	RCF RCS	string	partial path & basename	
Named SYSTEM Cells	Abbreviations	Type	Range	Purpose
BUFSIZE	N/A	Integer	$1024 \leq \text{BUFSIZE} \leq 65540$	Set Buffer size in words for file I/O operations
F06	N/A	Integer	$1 \leq \text{F06} \leq 89$	Fortran unit number to use for 'f06' output
F04	N/A	Integer	$1 \leq \text{F04} \leq 89$	Fortran unit number to use for 'f04' output
NLINES	N/A	Integer	> 0	Number of lines per page in output (f06)
MAXLINES	N/A	Integer	> 0	Maximum number of lines allowed in f06 file
PRINTSYS	N/A	Integer	$0 \leq \text{RINTSYS} \leq 1$	A non-zero value results in printout of description of modifiable system cells
HICORE	N/A	Integer	>0	Length of open core in words
STST	N/A	Integer	$-301 \leq \text{STST} \leq 0$	Exponent for singularity test in EMG
DIAGA	N/A	Integer	$0 \leq \text{DIAGA}$	Alternate way to set DIAG 1 through 32
DIAGB	N/A	Integer	$0 \leq \text{DIAGB}$	Alternate way to set DIAG 33 through 64
DIAGC	N/A	Integer	$0 \leq \text{DIAGC}$	Alternate way to set DIAG 65 through 96
K88	N/A	Integer		Unused - available for user-defined use
K89	N/A	Integer		Unused - available for user-defined use
K90	N/A	Integer		Unused - available for user-defined use
SPARSE	N/A	Integer		Enables/disables sparse matrix operations
WRT2SCRN	N/A	Integer		Causes some summary data (F04) to also go to the console

Table 1: Command Line and RCF Keywords continued...

Named SYSTEM Cells	Abbreviations	Type	Range	Purpose
MSGLVL	N/A	Integer	$0 \leq \text{MSGLVL}$	Controls diagnostic output in decomposition and eigenvalue solutions
MAXRAT	N/A	Integer	$0 \leq \text{MAXRAT} \leq 30$	Controls MAXRATIO calculation and reporting in decomposition
MORDER	N/A	Integer	$0 \leq \text{MORDER} \leq 2$	Reordering method selection
IREVERT	N/A	Integer		Revert to non-sparse method of sparse solver has insufficient memory
CHKBULK	N/A	Integer		Control Bulk Data checking
NRANK	N/A	Integer	$0 \leq \text{NRANK} \leq 64$	Rand order for sparse solver
PLOPT	N/A	Integer		nonzero value requests structural plots
NBLOCK	N/A	Integer	$0 \leq \text{NBLOCK} \leq 512$	Right hand block size for sparse solver
NRATIO	N/A	Integer	$0 \leq \text{NRATIO} \leq 512$	Row/column ration for math kernel blocking logic
NOSEID	N/A	Integer	0 or 1	Allows superelement-related bulk data entries
NODETJ	N/A	Integer	$0 \leq \text{NODETJ} \leq 1$	Controls action if negative Jacobian is found
ZEROTOL	N/A	Integer	$-32 \leq \text{ZEROTOL} \leq 32$	Filter used in generating output
COREDUMP	N/A	Integer	0 or 1	Controls core dump on some I/O error messages
ESEFILT	N/A	Integer	$-32 \leq \text{ESEFILT} \leq 32$	Filter used on element energy calculations
SOLVER	N/A	Integer	$0 \leq \text{SOLVER} \leq 2$	Choose default solver for eigenvalue solutions
BADMATL	N/A	Integer	0 or 1	Force program to continue when materials used for shell elements have 0.0 for G11 or G22
Script Only Args	Abbreviations	Type	Range	Purpose
JID	JID= is optional	string	Name is optional, value is partial path & basename	Input file name
SILENCE	SIL	string	YES NO	Flag to avoid popup warnings (Windows Only)
WINDOW	WIN	string	MIN/MAX/NONE	State of the command window (Windows Only)
BATCH	BAT	string	YES NO	Background execution (Unix Only)
OPTP		string	partial path & basename	Override default file name
NPTP		string	partial path & basename	Override default file name
OP2		string	partial path & basename	Override default file name
OP4		string	partial path & basename	Override default file name
OLD		string	YES NO	YES causes existing outputs to be retained with a version ID
SCRATCH	SCR	string	YES NO	YES causes restart files to be deleted
OUTPUT	OUT	string	partial path & basename	Override default location for the output files
EXECUTABLE	EXE	string	executable full path name	Alternate version of the executable
VERSION	VER	string	{v}MMmn where MM=major, m=minor and n=micro version	Choose a particular version from the installation
PS		string	YES NO	Convert any PLT1 files to postscript on completion
FTNnn		string	partial path & basename for unit nn, nn=13,14...23	Fortran file names for units
SOFn	N/A	string	partial path & basename; ;n=1,2,...10	SOF file names
PAUSE	N/A	string	YES NO	Causes the command window to pause on completion

Generating Plots using NASTRAN-L Series

NASTRAN-L Series has the ability to generate plot files during execution. In some cases, such as XY plots in dynamic analysis, this may be preferable to using a post-processor to create plots. If you wish to use this capability simply include the appropriate commands in your input file. The resulting file (by default) will be a PLT1 (ASCII) file, which (unless you instruct the program otherwise) will be converted into a postscript file.

If you do chose to create a PLT2 format (Binary) file by using the NASTRAN statement, **NASTRAN-L Series** will write it in the PLT1 file. If this is done, the conversion program (plt2ps.exe) will fail, therefore you must select PS=NO.

The “plt1” file is a file formatted for plotters, which most organizations do not have. Therefore, a utility program (plt2ps) is included with **NASTRAN-L Series**, which automatically converts the file into postscript format. This program is automatically executed unless you select “PS=NO” on the command line. If you wish to convert your “plt1” files manually, you may run the command:

```
<tmg_install_dir>\NASTRAN-L *\v0100\i386\exe\plt2ps <plt1_file>
```

where * should be replaced by the correct letter for the product you are using.

and the output will be placed in the current working directory in a file with the same base name and the “.ps” extension.

Documentation for NASTRAN-L Series

If you look in the directory created when you installed **NASTRAN-L Series**, you will see several Adobe Acrobat® pdf files and also a Documentation directory – this directory contains the documentation for **NASTRAN-L Series** in pdf format. All the manuals included on the delivery cd are in this format as well.

NASTRAN-L Series_Users Reference Manual.pdf = Reference Manual, describing the format of input for **NASTRAN-L Series**. This is the recommended reference for use when preparing input for the program.

NASTRAN L-Series DMAP Manual.pdf = contains a description of the DMAP programming language and descriptions of the most commonly used DMAP instructions.

Static and Normal Modes Analysis Using Nastran L-Series.pdf – a guide to using the **NASTRAN-L Series** for statics and normal modes analysis written by Harry Schaeffer. Included with all **NASTRAN-L Series** products.

⁶ Adobe Acrobat is a trademark of Adobe Systems Inc

Dynamic Analysis Using NASTRAN-LD.pdf – a guide to performing dynamic analysis using **NASTRAN-LD** written by Harry Schaeffer. Included only with **NASTRAN-LD**.

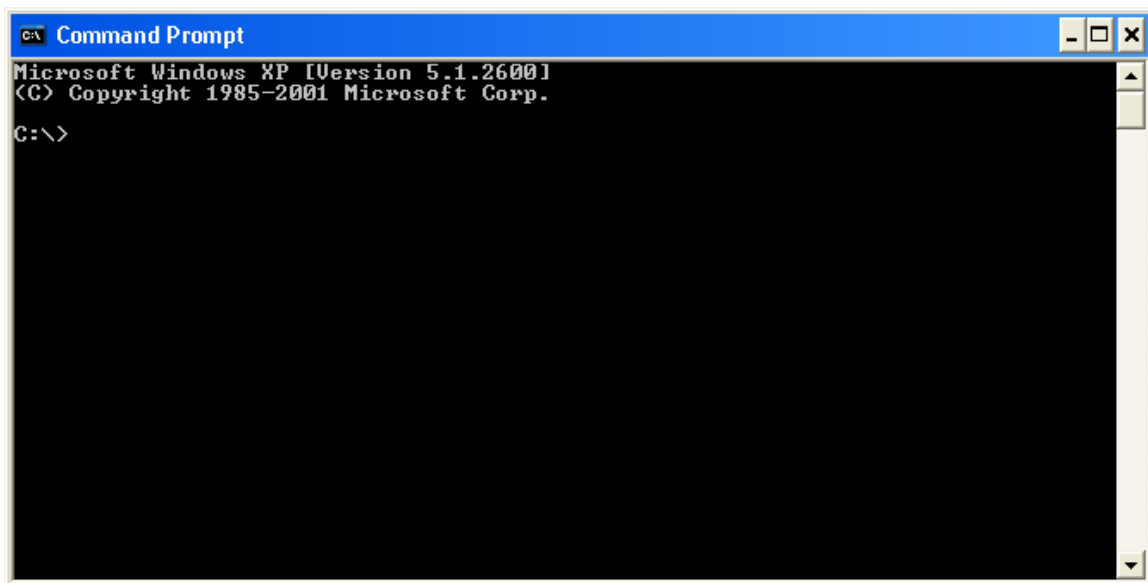
Known Error List.pdf = **NASTRAN-L Series** list of known errors in this release of the software. If an avoidance is known for an error, it will be listed in this file. If you find any additional errors, please bring them to our attention and we will strive to fix them as quickly as possible.

Sample Files

If you look in the directory where you have installed **NASTRAN-L Series**, you will find a subdirectory named “testsuite”. This directory contains a small subset of the input files used in testing and verifying the program. Included in the “testsuite” subdirectory is a readme.txt file containing a short description of the files in the test suite. To run the entire test suite, copy the “testsuite” subdirectory to a new location, and execute the included batch file, “winrun.bat”.

Running a Sample Problem

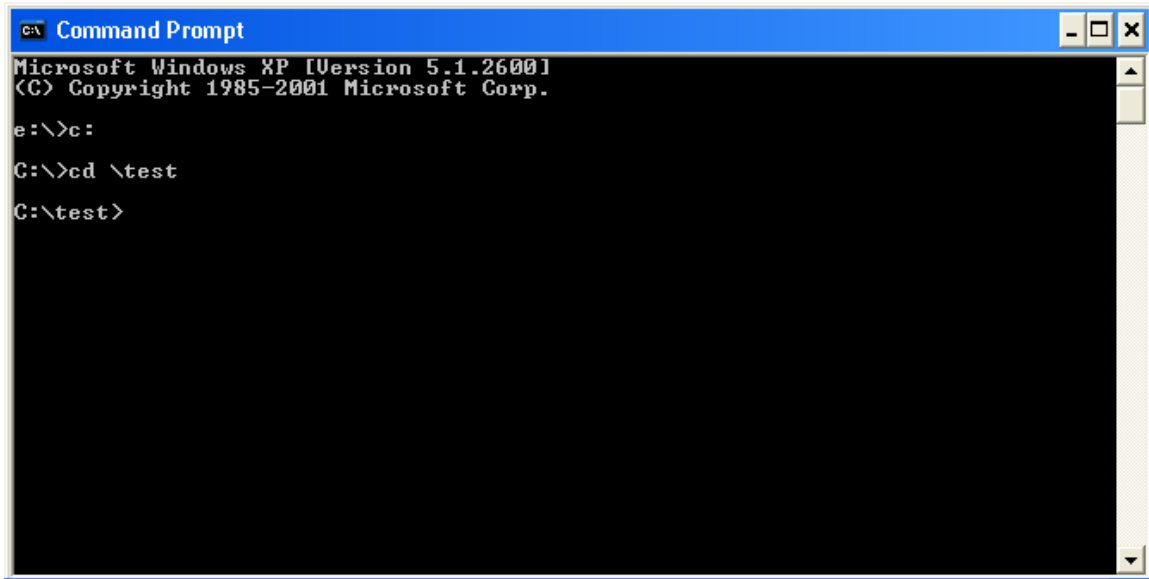
As a demonstration, you may try running one of these problems. The first step is to copy it into another directory (recommended, but not required). Now that you have the file in a working directory, open a command window. If you are not familiar with this procedure, simply select “Start” in the lower left corner and select “run” in the popup window. In the blank field, which occurs in the resulting pop-up, type “cmd” (without the quotation marks), and click “OK”. A command window will now open on your desktop as follows:



The next step is to change to your working directory. In the command window, type the command to change to the directory where you have copied the input file (unless your file is in the current directory). This is done by first typing the appropriate drive letter, followed by “enter”, then typing the command to change directories. For example, assume that the file C:\tmg\NASTRAN-LS\v0100\testsuite\ref_beam_static.dat was copied into the directory c:\test.

The commands we would use are:

```
C:  
cd \test
```

A screenshot of a Windows Command Prompt window. The title bar reads 'c:\ Command Prompt'. The window content shows the following text: 'Microsoft Windows XP [Version 5.1.2600] (C) Copyright 1985-2001 Microsoft Corp.', 'e:\>c:', 'C:\>cd \test', and 'C:\test>'. The window has standard Windows XP window controls (minimize, maximize, close) in the top right corner.

At this point, you are ready to run **NASTRAN-L Series**. Assuming that you are using **NASTRAN-LS**, you simply type the following command, followed by “enter”.

```
<install location>\bin\nastls ref_beam_static.dat
```

Entering this command will result in a new command window (minimized by default) opening, where **NASTRAN-L Series** will run. You cannot type commands in this window.

NOTE: For your convenience you may add <install location>\bin to the environment variable, Path. (Select Control Panel\System\Advanced\Environment Variables). The command to run **NASTRAN-LS** the command would then be:

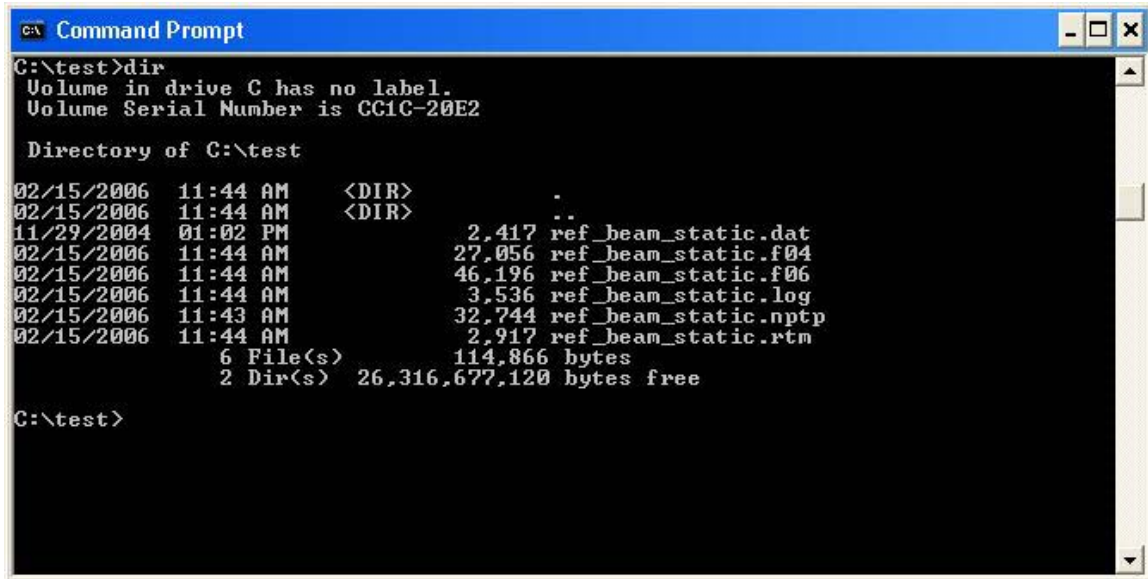
```
nastls ref_beam_static.dat
```

NOTE: When you type in the nastls command (or nastlm or nastld) for the first time, if you have antivirus software active, it might refuse to allow the script to run until you enable it, which you must do to proceed.

NOTE: If you have copied or renamed the command script, you should use that name in place of “nastls” in the above sample. Throughout this manual, we “nastls” is used.

Once this new window closes, the **NASTRAN-L Series** run is complete.

At this point, requesting a directory listing using the “DIR” command results in:



```
Command Prompt
C:\test>dir
Volume in drive C has no label.
Volume Serial Number is CC1C-20E2

Directory of C:\test

02/15/2006  11:44 AM    <DIR>          .
02/15/2006  11:44 AM    <DIR>          ..
11/29/2004  01:02 PM             2,417 ref_beam_static.dat
02/15/2006  11:44 AM          27,056 ref_beam_static.f04
02/15/2006  11:44 AM          46,196 ref_beam_static.f06
02/15/2006  11:44 AM           3,536 ref_beam_static.log
02/15/2006  11:43 AM          32,744 ref_beam_static.nptp
02/15/2006  11:44 AM           2,917 ref_beam_static.rtn
              6 File(s)          114,866 bytes
              2 Dir(s)  26,316,677,120 bytes free

C:\test>
```

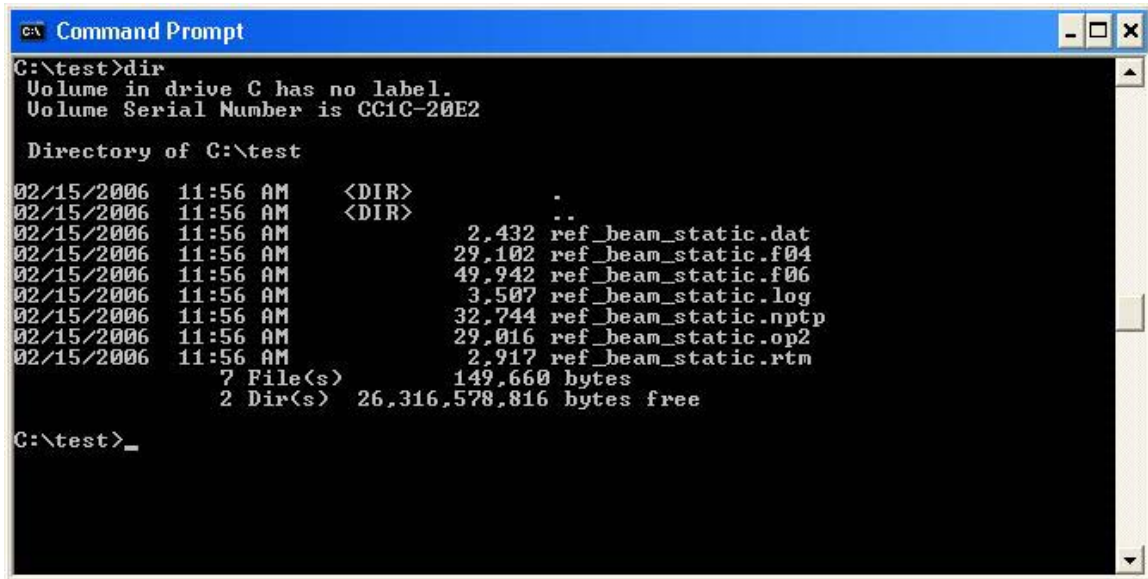
The f04 file is a roadmap of the **NASTRAN-L Series** execution and is invaluable if the run fails for any reason. The f06 file is the printed output. The log file is a listing of the procedural information used during the analysis. Note that there is no “op2” file (for use in post-processors), as the input file used in this example does not have PARAM,POST,-1 set.

If this parameter is added to the file (in the Bulk Data section and you re-run the analysis with the command

```
<install location>\bin\nastls ref_beam_static.dat old=no
```

the directory will look like:

NOTE: The files in the testsuite directory are write-protected, you must change the permissions for the copy you have made of this file before editing it



```
Command Prompt
C:\test>dir
Volume in drive C has no label.
Volume Serial Number is CC1C-20E2

Directory of C:\test

02/15/2006  11:56 AM    <DIR>          .
02/15/2006  11:56 AM    <DIR>          ..
02/15/2006  11:56 AM                2,432 ref_beam_static.dat
02/15/2006  11:56 AM            29,102 ref_beam_static.f04
02/15/2006  11:56 AM            49,942 ref_beam_static.f06
02/15/2006  11:56 AM             3,507 ref_beam_static.log
02/15/2006  11:56 AM            32,744 ref_beam_static.nptp
02/15/2006  11:56 AM            29,016 ref_beam_static.op2
02/15/2006  11:56 AM             2,917 ref_beam_static.rtn
              7 File(s)          149,660 bytes
              2 Dir(s)    26,316,578,816 bytes free

C:\test>_
```

Now we have the “op2” file, which contains information for use by post-processing programs. At this point, you have verified that your installation of **NASTRAN-L Series** is functionally complete.

Contacting tMG Technical Support

Support for **NASTRAN-L Series** is provided by email. In order to get support, you must have an E-support certificate. You receive 3 with the purchase of an L-Series product and additional E-support certificates may be purchased on the web site at

www.macnealgroup.com/support/support_lseries.htm

When requesting technical support, you must include the E-support certificate number that you are using. Also please include a detailed description of the problem/question and any associated files. Each E-support certificate is valid for a single problem/question. Multiple problems/questions will require one E-support certificate per problem/question.

Technical Support E-mail: esupport@macnealgroup.com