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# Transferable Output ASCII Data (TOAD) Gateway Version 1.0 User's Guide

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## ***Preface***

This document describes the Transferable Output ASCII Data (TOAD) Gateway, release 1.0. It is intended to serve as a "cookbook" reference for all users. New users are directed to read the introductory section, then study the sample sessions presented in appendix A. Readers not familiar with the TOAD format are referred to appendix B of this document, or to NASA Contractor Report 178361.

Because of the ongoing development of this package, the current software release may offer substantially more translator options than what is documented here. However, all data formats discussed within this document will continue to be available on all future releases of the Gateway.

This software was developed by Computer Sciences Corporation, Applied Technology Division, under contract to the National Aeronautics and Space Administration's Langley Research Center, during the Autumn of 1989 and early Winter of 1990. CSC supports this package only at Langley Research Center.



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# Introduction

## **General Description and Purpose**

The Transferable Output ASCII Data (TOAD) Gateway is a software tool for converting tabular data from one format into another via the TOAD format. For example, the Gateway can be used to convert a wind tunnel Standard Interface File (SIF) into input for a PC spreadsheet program. This initial release of the Gateway allows free data interchange among the following file formats: TOAD; Standard Interface File (SIF); Program to Optimize Simulated Trajectories (POST) input; Comma Separated Value (CSV) and Tab Separated Value (TSV), used extensively as input to PC and Macintosh spreadsheet and database packages; and a general free-form file format. As required, additional formats can be accommodated quickly and easily.

## **Features**

The major features offered by the Gateway are:

**Dialogue Driven** - Because the Gateway asks all the necessary questions, and accepts a variety of plain English answers, even new or occasional users can effectively transform their data files.

**Automatic Formatting** - When it opens an incoming data file, the Gateway automatically determines its format. This feature is particularly handy when receiving unfamiliar data files from unknown or foreign sources.

**Consolidation** - An attempt has been made to include most data formats used at Langley into this software package. This allows Langley's researchers to use this "data gateway" for their data transformations.

**Error Messages** - All error messages are written in plain English and every effort has been made to describe the problem as clearly as possible. A complete list of all error messages, including a further explanation and suggested remedies, is presented in appendix C.

**Portability** - Perhaps the Gateway's most enduring feature is its ability to execute on a variety of operating systems. Developed under UNIX, it also executes under VMS and NOS.

## **Limits**

The Gateway reads and writes entire data files, not file fragments. Consequently, there is an upper limit on the total number of raw data cells it can accommodate. The capacity of the Gateway is 1000 columns of data and 10,000 raw data cells. However, these capacities may change as the Gateway is installed on various hosts. Both limits are set once in a central part of the Gateway and are easily modified. If and when a data file exceeds either limit, a clear error message is written.

## ***Associated Products***

A companion package, the TOAD Editor, allows the user to selectively review, extract, and manipulate the contents of TOAD files. Both the TOAD Gateway and the TOAD Editor are available and supported at NASA Langley Research Center.



# Interactive Use

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## Files

The user is responsible for ensuring that all incoming data files are available to the Gateway. This normally requires that "read" permission be granted to the user, the default on most systems. The exception is NOS, where the file can only be made available ("local") by using the command

**get,filename**

where *filename* is the name of the permanent file to be made local. In addition, the files created can only be retained ("saved") by using the command

**save,filename**

or

**replace,filename**

where *filename* is the name of the local file to be made permanent. (Remember the NOS command *save* makes a local file permanent only when a permanent file by that name doesn't already exist; the *replace* command always makes the local file permanent, whether a permanent file by that name already exists or not.)

## Execution

How the Gateway is executed depends upon the host computer system. Most installations require only that

**toadgw**

be entered to begin execution. Again the exception is NOS, where the commands

**get,toadgw/un=ntfilb**  
**toadgw**

are required. The following welcome banner then appears:

```
-----  
      T O A D   G a t e w a y  
Release 1.0      December 1990  
-----
```

The release number and date will change as new versions of the Gateway are installed.

## ***Incoming Data File***

The first question is:

What is the name of the incoming data file ?

A file name must be provided - the Gateway cannot assume a file name. The file name must be valid for the host operating system. Also, the file must exist, and it must not be in use (or "locked") by another user or another process. Finally, the file cannot be empty. If any of these conditions are not met, the Gateway writes an error message and repeats the question. (For more information regarding a specific error message, please refer to Appendix C - Warnings and Error Messages.)

The Gateway may be stopped here by entering "quit", "qui", or "q".

After the file is opened, the Gateway attempts to match its contents to a recognized data file format. This process is invisible to the user. Once a match is made, the Gateway writes the message

"filename" is in TOAD format.

in the case of a TOAD file. Other formats generate a similar message.

## ***Outgoing Data File***

The next question is:

What name should be given to the new file being created ?

A file name must be provided - the Gateway cannot assume a file name. The file name must be valid for the host operating system. If the file does not already exist, it is created in the active directory. Otherwise the message

This file already exists. Do you want it overwritten ?

appears. Answering "yes" tells the Gateway to go ahead and overwrite the file. Entering "no" instructs it to ignore that file name and ask for another.

The Gateway may be stopped here by entering "quit", "qui", or "q".

## ***Outgoing Data File Format***

The next question is:

Which data format should be used for the new file ?

The Gateway attempts to match the format name provided with an internal list of formats supported. For example, either "toad" or "toa" is accepted as a request for a TOAD file. The other formats have comparable abbreviations and aliases. For a complete list of the available formats, and their abbreviations/aliases, answer this question with "help" or "?".

The Gateway may be stopped here by entering "quit", "qui", or "q".

## ***Recycle Dialogue***

The final question is:

Do you wish to convert another file ?

If another file is to be translated, enter "yes" or "y". This starts the dialogue cycle again, beginning with the incoming data file question. Even if the cycle is restarted by mistake, the Gateway stops when any questions are answered with a "quit", "qui", or "q".

If no other file is to be translated, enter "no", "n", "quit", "qui", or "q".



# In Case of Problems...

## **General**

No software is above design and development errors. If you uncover an error, or notice some strange behavior, please follow the steps described below. One minute of your time may save hours or even days of effort.

## **Langley Users - All Systems**

If possible, assemble the following information:

1. Your host computer's manufacturer, model, operating system, and location.
2. The incoming data file name.
3. The desired outgoing data format.

Then call Bradford Bingel ("Bing") at Computer Sciences Corporation, (804) 865-1725. Every attempt will be made to correct the problem, when possible, within a few minutes.

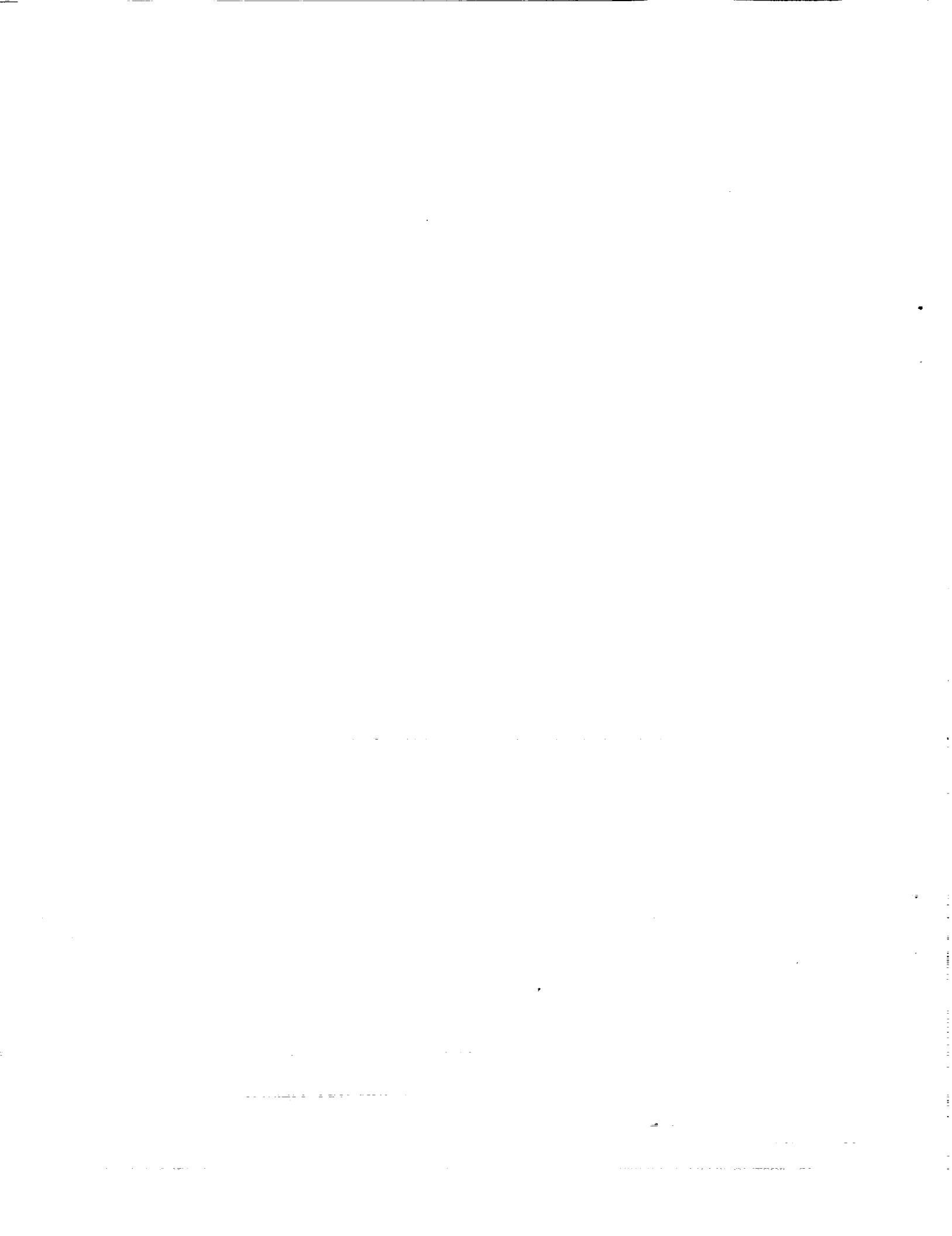
## **Non-Langley Users - All Systems**

Computer Sciences Corporation does not support the TOAD Gateway outside of NASA Langley. All questions and problems concerning this software should be directed to Dr. John E. Lamar, mail stop 361, (804) 864-2851.

**All comments are appreciated and welcomed !!!**

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# Appendix A

## Sample Sessions

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### Sample Session #1

*This first example illustrates how the Gateway's "auto-format" feature may be used to determine the format of an individual data file.*

```
% toadgw
```

```
-----  
      T O A D   G a t e w a y  
Release 1.0      December 1990  
-----
```

What is the name of the incoming data file ?

```
> test12
```

"test12" is in TOAD format.

What name should be given to the new file being created ?

```
> q
```

```
%
```

## Sample Session #2

*This second example illustrates a complete Gateway dialogue, including an assortment of error conditions and their corresponding messages.*

% toadgw

```
-----  
      T O A D   G a t e w a y  
      Release 1.0   December 1990  
-----
```

What is the name of the incoming data file ?

> test12

"test12" is in TOAD format.

What name should be given to the new file being created ?

> testp12

Which data format should be used for the new file ?

> post

Do you wish to convert another file ?

> y

```
-----
```

What is the name of the incoming data file ?

> 14

"14" is an improper file name.

What is the name of the incoming data file ?

> test14

"test14" is in SuperCalc CSV format.

What name should be given to the new file being created ?

> scl14

This file already exists. Do you want it overwritten ?

> y



"sc14" will be rewritten.

Which data format should be used for the new file ?

> help

The following data formats are available:

TOAD	toad	toa
SIF	sif	
POST	post	pos
CSV	csv	cs (comma separated values)
TSV	tsv	ts (tab separated values)
FREE	free-field	free-form free fre

Which data format should be used for the new file ?

> toad

Do you wish to convert another file ?

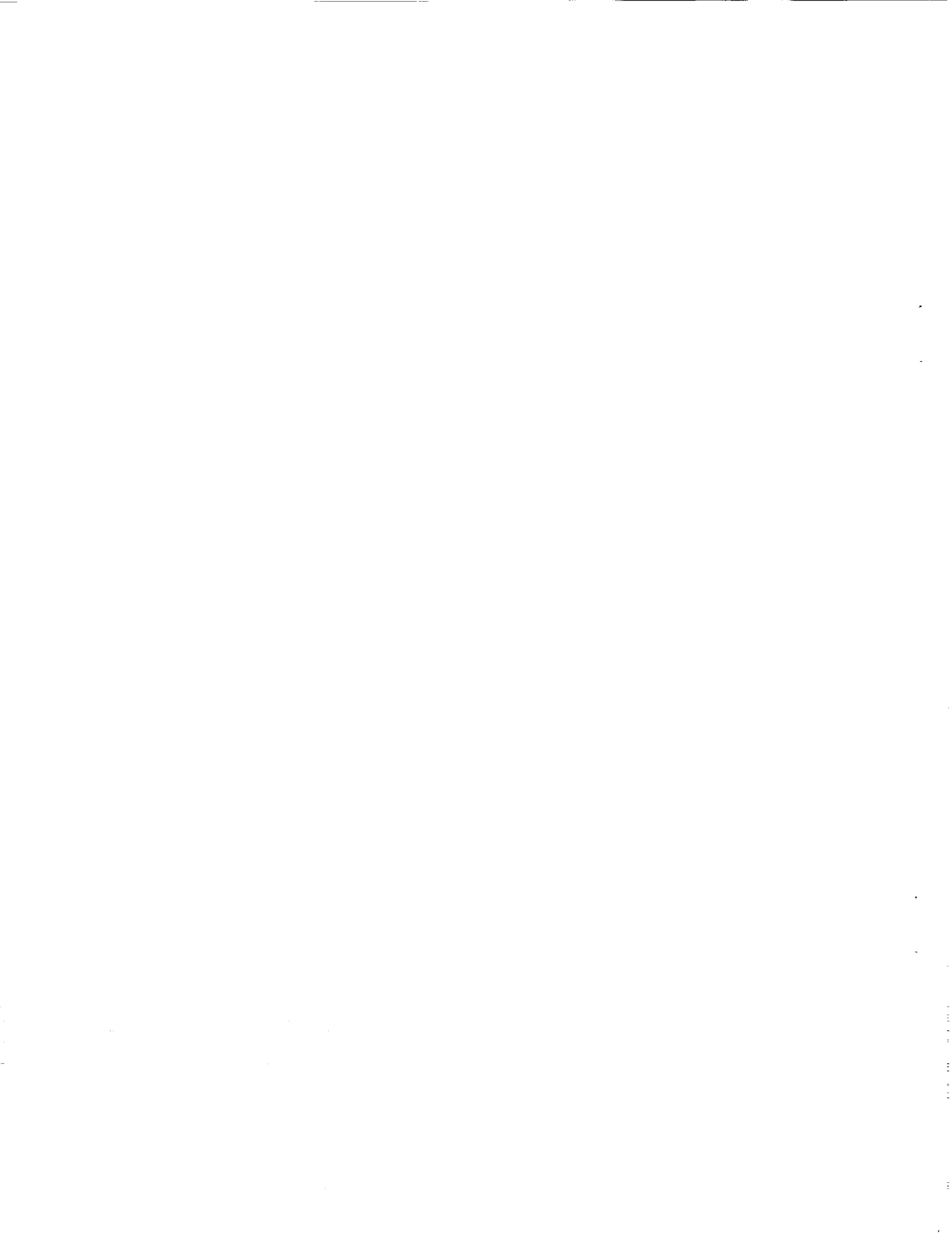
> x

Please answer with a YES or a NO.

> n

Normal session.

%



# Appendix B

## The TOAD Format (summarized)

The Transferable Output ASCII Data (TOAD) format was developed by Computer Sciences Corporation for NASA Langley Research Center as a uniform way to store and retrieve tabulated data. A full discussion of the TOAD format is presented in NASA Contractor Report 178361. However, most readers will find the following abbreviated description adequate for their purposes.

TOAD files are sequential-access, formatted, and use fixed-length records of 80 characters. This file type makes them simple to edit, write to or read from magnetic media, or send across communications networks. Unfortunately, these same characteristics make them large compared to their unformatted, variable record-length counterparts. Therefore, we recommend that TOAD files be used only when relatively small amounts of data are to be retained (less than 5000 pieces of data), or when any amount of data must be transferred from one computer to another (usually different) computer via magnetic media or a communications network.

Blocks of information within a TOAD file are called "warts." Each wart has its own purpose, and may use one or more records. For example, consider the abbreviated TOAD file below:

```

BEGIN
SKIP Predicted aerodynamic properties of a modified F-4D fighter
COUNT          9
LABELMACH      ALPHA          2Y/B          CL-V          CD-V
              CM-V          CL-Z          CD-Z          CM-Z
DATA  .85000000E+00 .10000000E+01 .70800000E+00 .97261000E+00 .15166000E+00
      -.24139000E+00 .88951000E+00 .11640000E+00 -.24754000E+00
DATA  .85000000E+00 .10000000E+01 .79200000E+00 .89415000E+00 .11423000E+00
      -.27911000E+00 .78920000E+00 .69700000E-01 -.27105000E+00
DATA  .85000000E+00 .10000000E+01 .87500000E+00 .78330000E+00 .72870000E-01
      -.29796000E+00 .65651000E+00 .19080000E-01 -.26920000E+00
END
  
```

Notice that the file begins with a BEGIN wart and ends with an END wart. The SKIP wart is used to insert comments inside the file. The COUNT wart indicates that there are 9 variables in this TOAD file. The LABEL wart assigns a 15-character name with each of these variables. Each DATA wart contains information gathered at some common event. For example, the second DATA wart indicates that at Mach .85, 10 degrees angle of attack, and at 79.2% semispan the full vortex flow coefficients of lift, drag and moment ( $C_l$ ,  $C_d$  and  $C_m$ ) are .89415, .11423 and -.27911, respectively, while the zero leading-edge suction coefficients of lift, drag and moment are .7892, .0697 and -.27105, respectively.

The FORTRAN 77 edit descriptors for each type of wart are:

<u>Wart Type</u>	<u>Write Format</u>	<u>Read Format</u>
SKIP	'SKIP ', A75	T6, A75
COUNT	'COUNT', I15	T6, I15
LABEL	'LABEL', (5A15)	(T6, 5A15)
DATA	'DATA ', (5E15.8)	(T6, 5E15.8)

The following rules must always be observed when creating and using TOAD files:

1. Exactly one BEGIN wart must appear in the TOAD file, and it must be the very first record.
2. Exactly one END wart must appear in the TOAD file, and it must be the very last record.
3. A COUNT wart must appear before any LABEL or DATA warts.
4. No wart may come between two records within another multi-record wart.
5. SKIP warts may appear anywhere in the TOAD file, subject to condition 4.
6. Multiple DATA warts are expected. All DATA warts must contain the same amount of data and use the same number of records.
7. There is no limit on the number of warts or records in a TOAD file.

# Appendix C

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## Warnings and Error Messages

The TOAD Gateway generates few error messages. Each was designed to be self-explanatory, but occasionally they may be misinterpreted. The purpose of this appendix is to clarify the situation creating the error and, where appropriate, suggest techniques which may help to avoid similar problems in the future.

All error messages are presented in alphabetical order.

**"filename" appears to be empty.**

The file exists, yet contains no information. On most operating systems this is possible when some previous I/O operation created a new file without transferring any data.

**"filename" does not exist.**

The requested file does not exist, or the file exists but "read" permission is denied. Note that file names are case sensitive on UNIX installations (i.e., file "DATA1" is unique from file "data1").

**"filename" doesn't look like a TOAD file.**

The incoming data file has all of the outward appearances of a valid TOAD file, yet something it contains has caused a fatal read error. Files using other formats may create similar messages.

**"filename" is already in use.**

The requested file exists, but another user (or another process) has it "locked," making it inaccessible to the Gateway.

**"filename" is an improper file name.**

The file name provided is not valid on the host operating system. The most common problems are having a number as the first character, or using some special character (!@#%) anywhere in the name.

**"filename" is a reserved file name.**

The file name provided is reserved for use only by the host operating system. For example, file *stdout* is reserved under UNIX, and *SYSS\$INPUT* is reserved under VMS.

**"filename" will be rewritten.**

The outgoing file specified already exists. Its original contents will be lost as the Gateway writes the new information in its place.

**Internal Fatal Error - Ghost File.  
Please contact the TOAD Gateway support team.**

Internal fatal errors appear when logic errors occur within the software. Please accept the developer's apologies for any consequential inconvenience, and follow the steps listed in the section "In Case of Problems . . ." to report this message.

**Internal Fatal Error - Improper I/O Unit Passed.  
Please contact the TOAD Gateway support team.**

Internal fatal errors appear when logic errors occur within the software. Please accept the developer's apologies for any consequential inconvenience, and follow the steps listed in the section "In Case of Problems . . ." to report this message.

**Internal Fatal Error - Unknown Error Code.  
Please contact the TOAD Gateway support team.**

Internal fatal errors appear when logic errors occur within the software. Please accept the developer's apologies for any consequential inconvenience, and follow the steps listed in the section "In Case of Problems . . ." to report this message.

**Please answer with a YES or a NO.**

The preceding question asked for a simple yes/no response. The Gateway accepts any of the following: **yes, y, no, or n**. In addition, the Gateway stops when any of the following responses are entered: **quit, qui, q**. Any other response appears as an unclear answer.

**Sorry, but couldn't understand your answer.  
Please try again.**

For some unknown reason, the Gateway did not receive the user's response. This usually occurs after an unsuccessful attempt to alter a response by using a series of control characters.

**This file doesn't appear to be sequential.**

All data file formats currently accepted by the Gateway are sequential-access, as opposed to direct-access or word-addressable. If the incoming file is direct-access or word-addressable, this message appears.

**Unable to open this file. Please try another.**

For any of a number of reasons, the requested file cannot be accessed. This situation should be somewhat rare, as most of the more common causes (e.g., the file doesn't exist, or it's locked by another user) are successfully diagnosed to create pinpoint explanations. The underlying cause is usually system-dependent, putting the Gateway in the unenviable position of writing this general error message. The only recommended remedy is to stop the Gateway, reestablish all file connections, and reexecute.

**Unable to open this TOAD file - Insufficient capacity.  
Only *number* words of central memory are available.**

The Gateway cannot dynamically allocate central memory. Consequently, there is a limit placed on the amount of central memory it may use to store the incoming raw data. If the file exceeds this limit, this message appears. When possible, a quick solution is to break up the file into two or more smaller files. However, if this message begins to appear regularly, please follow the steps listed in the section "In Case of Problems . . ." and ask for the Gateway's total capacity to be increased.

**Unable to open this TOAD file - Insufficient capacity.  
Only *number* columns are allowed.**

The Gateway cannot dynamically allocate central memory. Consequently, there is a limit placed on the amount of central memory it may use, and on the total number of "columns" it may handle. If the incoming data set uses more columns than the Gateway can handle, this message appears. When possible, a quick solution is to break up the file into two or more smaller files. However, if this message begins to appear regularly, please follow the steps listed in the section "In Case of Problems . . ." and ask for the Gateway's column capacity to be increased.

**Unclear or unavailable format.**

The incoming data file is not in a recognized format. Those formats which are recognized by the Gateway, along with their abbreviations/aliases, are then listed below the error message. If you would like to see a new data format added to the Gateway's vocabulary, or believe that additional aliases are needed for an existing format, please follow the steps listed in the section "In Case of Problems . . ." and ask for the enhancement.



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16. Abstract The Transferable Output ASCII Data (TOAD) Gateway is an interactive software tool which translates tabular data files from one format into another. This initial release of the TOAD Gateway accommodates six data formats: TOAD, Standard Interface File (SIF), Program to Optimize Simulated Trajectories (POST), Comma Separated Value (CSV), Tab Separated Value (TSV), and free-field. Future releases of the Gateway are planned and will be able to read and write many more data formats. Written in ANSI FORTRAN 77 and completely self-contained, the TOAD Gateway is very portable and has already been installed on CDC/NOS, SUN, SGI/IRIS, CONVEX, and CRAY hosts.			
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