

DOT/FAA/AM-96/20

Office of Aviation Medicine
Washington, D.C. 20591

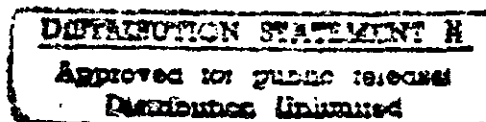
Aviation Topics Speech Acts Taxonomy (ATSAT) pc User's Guide Version 2.0

O. Veronika Prinzo
Civil Aeromedical Institute
Federal Aviation Administration
Oklahoma City, Oklahoma 73125

Otto Maclin
University of Nevada at Reno
Reno, Nevada 89507

August 1996

Final Report



This document is available to the public
through the National Technical Information
Service, Springfield, Virginia 22161.

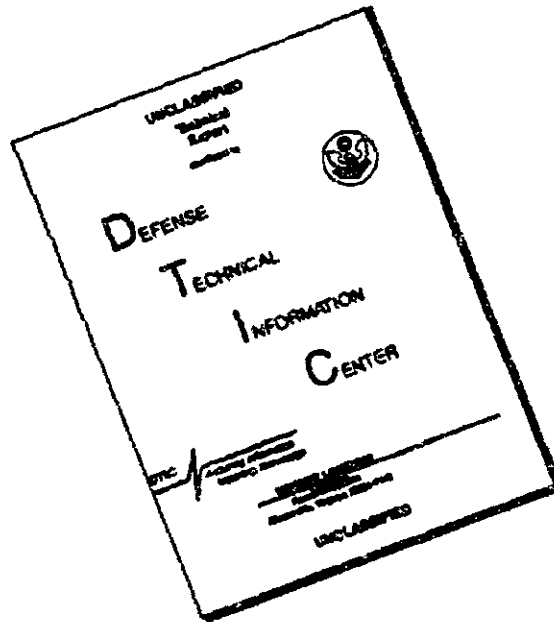


U.S. Department
of Transportation
Federal Aviation
Administration

DOT/FAA/AM-96/20

19960913 181

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

NOTICE

This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for the contents or use thereof.

Technical Report Documentation Page

1. Report No. DOT/FAA/AM-96/20		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Aviation Topics Speech Acts Taxonomy (ATSAT) pc User's Guide Version 2.0				5. Report Date August 1996	
				6. Performing Organization Code	
7. Author(s) O. Veronika Prinzo, Ph.D. Otto Maclin, M.A.				8. Performing Organization Report No.	
9. Performing Organization Name and Address FAA Civil Aeromedical Institute P.O. Box 25082 Oklahoma City, OK 73125				10. Work Unit No. (TRIAS)	
				11. Contract or Grant No. DTFA-02-91-C-91089	
12. Sponsoring Agency name and Address Office of Aviation Medicine Federal Aviation Administration 800 Independence Ave., S.W. Washington, D.C. 20591				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplemental Notes					
16. Abstract <p>ATSATpc is a Windows™-based software program designed to facilitate posting of <i>transcribed</i> voice communications data into a pre-defined electronic spreadsheet. The steps involved in processing air traffic control communications using ATSATpc coincide with the steps that must be followed when manually encoding communications according to the procedures outlined in <i>Development of a Coding Form for Approach Control/Pilot Voice Communications</i> (Prinzo, Britton, & Hendrix, 1995).</p>					
17. Key Words ATC-Pilot communications Communication taxonomy Operational communications Coding ATC phraseology			18. Distribution Statement Document is available to the public through the National Technical Information Service Springfield, Virginia 22161		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 22	22. Price

TABLE OF CONTENTS

SECTION	PAGE
1.0 INTRODUCTION	1
2.0 PROGRAM INSTALLATION	2
2.1 Program Installation from File Manager	2
2.2 Program Installation from DOS	3
3.0 OPEN FILES	3
3.1 Selection: New Data Sheet	4
3.2 Selection: Resume Entry	5
4.0 DATA ENTRY	6
4.1 Overview	6
4.2 On-line Help Feature	7
4.3 Transmission Identification Menu	7
4.4 Parsing transmissions into communication elements	8
4.5 Speech Act Category Menu	8
4.6 Aviation Topic Menu	9
4.7 Communication Error Menu	10
5.0 DATA AND TEXT OUTPUT FILES	11
5.1 .DAT Output Files	11
5.2 .TXT Output Files	12
6.0 TROUBLESHOOTING	12
6.1 ATSATpc DATA Entry	12
6.2 Windows Applications	12
7.0 REFERENCES	3
8.0 APPENDIX A	A-1

AVIATION TOPICS SPEECH ACTS TAXONOMY (ATSAT) CODING SOFTWARE

1.0 INTRODUCTION

The Aviation Topics Speech Acts Taxonomy (ATSAT) is a tool for categorizing pilot/controller communications according to their purpose and for classifying communication errors. ATSAT differs from other taxonomies in that FAA Order 7110.65 Air Traffic Control served to guide its development. The ATSAT and its coding form can be found in *Development of a coding form for approach controller/pilot voice communications* (Prinzo, Britton, & Hendrix, 1995) and in Appendix A in this manual. An indepth discussion of the taxonomy is presented in *An analysis of approach controller/pilot voice communications* (Prinzo, in press). We recommend encoders become familiar with that coding form and taxonomy before using ATSATpc.

ATSATpc is a software program designed to facilitate posting of voice communications data into a pre-defined electronic spreadsheet. The steps involved in processing air traffic control communications using ATSATpc coincide with the steps that must be followed when manually encoding communications according to the procedures outlined by Prinzo and co-authors (1995).

ATSATpc is a mouse-operated, Windows™-based computer program that consists of 5 main menus:

- File Information
- Transmission Identification
- Speech Act Category
- Aviation Topic
- Communication Error

File Information Menu - The File Information menu is used to select the transcription text file for data coding. The encoder enters a 3-digit facility and sector code and a 2-digit controller code into the appropriate box. ATSATpc creates a text file that contains any key entries and general comments made by the coder, and a tab-delineated spreadsheet of the data set for statistical analysis. The original transcription text file is left unchanged by the program.

Transmission Identification Menu - Within the Transmission Identification menu, each transmission is tagged with the time, speaker, and receiver. Each transmission is made up of at least 1 communication element. A communication element is a meaningful utterance that conveys a purpose, operation, or action. Communication elements combine to form messages that are transmitted over radio frequencies. Within the ATSAT, each communication element is described in terms of speech act and aviation topic. The encoder highlights the communication element in the transmission displayed in the dialogue box that corresponds with the word "TIME," "SPEAKER," or "RECEIVER" respectively, and then places the cursor on that word, and double clicks the mouse button. The highlighted information is copied directly into the box beneath the word and entered directly into the appropriate columns on the spreadsheet.

Speech Act Category Menu - The Speech Act Category menu allows the coder to select and label a communication element by its purpose, operation, or action (what). A speech act is a single utterance that suggests an action. The Speech Act categories are: "ADDRESS," "COURTESY," "INSTRUCTION," "ADVISORY," "REQUEST," and "NON-CODABLE." The ADDRESS is the "who" of the transmission. It references either an aircraft or the air traffic control facility position/sector. In addition to showing a level of respect, a COURTESY often signals the end of a dialogue between the air traffic controller and the pilot, in much the same way that a "good-bye" signals the end of a telephone conversation. The INSTRUCTION, ADVISORY, and REQUEST speech act categories represent what the communication element in the message is about - the action to be undertaken. They represent the "do something," "tell something," and "ask something" of an utterance. A [COMMENTS] button is included so that personal notes can be recorded during the encoding process. These comments may serve to explain why a particular encoding sequence was associated with a transmission or serve as future memory joggers.

Aviation Topic Menu - The Aviation Topic menu lists the aviation topics that are members of the selected speech act category. The aviation topic places a constraint on the communication element by imposing a restriction on its identified speech act category (who, what). For example, there are only 2 types of aviation topics listed under the ADDRESS speech act category. There only can be 1 speaker and 1 receiver of a transmission¹. There are 3 types of aviation topics listed in the COURTESY speech act category: "THANKS," "GREETINGS," and "APOLOGY." The types of aviation topics listed in the INSTRUCTION, ADVISORY, and REQUEST speech act categories are not exhaustive, but represent common messages that we heard from field tapes.

Communication Error Menu - The Communication Error menu is used by the encoder to identify and label non-standard communications according to the type of error present in the communication element. There are 2 categories of communication error: message content and delivery technique. Message content errors pertain to non-standard phraseology usage; delivery technique errors refer to stammers, stutters, or misspoken words. ATSATpc assigns a numerical code to each identified communication error and places that code into the encoder determined speech act and aviation topic columns in the electronic spreadsheet. The types of message content errors and their corresponding numerical codes are "GROUPED" (1), "SEQUENTIAL" (6), "OMISSION" (2), "SUBSTITUTION" (7), "TRANSPOSITION" (3), "EXCESSIVE VERBIAGE" (8), and "PARTIAL READBACK" (5). "DYSFLUENCY" (4) and "MISARTICULATION" (9) are delivery technique errors.

2.0 PROGRAM INSTALLATION

ATSATpc is a mouse-operated, Windows™-based software program written in Visual Basic™ 3.0. Transcripts created from Microsoft Word™ 2.0 or Write™ are easily processed by ATSATpc. ATSATpc only

recognizes and processes transcripts that contain a .CMM extension. Data entries are entered into the tab-delineated spreadsheet that can be accessed by EXCEL™ or SPSS™ for subsequent analysis. It is assumed that the user has a minimal familiarity with personal computers and Microsoft Windows™ software applications. Although the ATSATpc program can operate from drive a, the use of a hard drive improves the performance of the program and ensures that sufficient memory and disk space are available to process, create, and store files. We strongly recommend that you install ATSATpc onto the c drive of your computer.

The ATSATpc diskette contains 3 files: ATSAT.EXE, VBRUN300.DLL², and PRACTICE.CMM. These files can be copied from the ATSATpc diskette either through File Manager or from DOS to the c drive.

2.1 Program Installation from File Manager. Once your pc is on³, the DOS prompt, "c:\>," should be displayed on the video monitor. At the DOS prompt, type "WIN" and press the [Return] button.

c:\> WIN [Return]

This will activate the Windows™ program. If the Windows™ program fails to open, consult your technician or user's manual. From File Manager, place the mouse pointer on the word File and press the mouse button once. At the next menu, place the mouse pointer on the phrase "Create Directory..." and press the mouse button once. In the rectangle, type "ATSAT" as the name for the directory into which the 3 files will be placed, position the mouse pointer on the [OK] button and press the mouse button once.

Insert the 3½" ATSATpc diskette into drive a. Place the mouse pointer on the drawing corresponding to drive a. A list of files will appear. Place the mouse pointer on ATSAT.EXE and press the mouse button once. The name of the file should be highlighted. Then, under File Manager place the mouse

¹In most instances air traffic control (ATC) communications take place between 1 controller and 1 aircraft. An exception would be when ATC is broadcasting general information such as an Automatic Terminal Information Service (ATIS) update (e.g., "Attention all aircraft, Charlie now current").

²The VBRUN300.DLL is a Visual Basic file™ required for ATSAT.EXE to run.

³It is assumed that the a drive is used to copy diskettes and the c drive is the hard drive.

pointer on **File** and press the mouse button once, select **Copy**, and press the mouse button once. In the [copy from] rectangle you should see the name of the file that you highlighted. Directly beneath it is another rectangle [copy to]. In that rectangle type:

```
c:\ATSAT\ATSAT.EXE
```

Place the mouse pointer on the [OK] button and press the mouse button once. Repeat these steps to copy the next file from drive **a** to drive **c**.

2.2 Program Installation from DOS. Once your pc is on⁴, the DOS prompt, "c:\>," should be displayed on the video monitor. First create a working directory entitled "ATSAT" and then copy the 3 files into it. At the DOS prompt type:

```
c:\> MKDIR ATSAT [Return]
```

At c:\ you are going to change directories and then copy the 3 files into the new ATSAT directory by typing:

```
c:\> CD ATSAT [Return]
```

```
c:\> COPY A:\ *.* C:\*.* [Return]
```

To determine if the files were copied, type the word "DIR" at the c:\ATSAT prompt.

```
c:\ATSAT> DIR [Return]
```

The files in the ATSAT directory are listed:

ATSAT.EXE

PRACTICE.CMM

VBRUN300.DLL

Once the files are placed into the ATSAT directory go through the normal procedures to start windows. ATSAT does not start windows when activated from DOS.

3.0. OPEN FILES

This program must be operated within the Windows™ environment. Through File Manager, change to the ATSAT directory by placing the mouse pointer on the file folder named ATSAT, and then very quickly press the mouse button twice. This will open the file folder to reveal the 3 files that you copied from the ATSATpc diskette. To execute the ATSATpc program, simply place the mouse pointer over the ATSAT.EXE file name and then quickly press the mouse button twice.

As a safeguard, transcript files are opened in ATSATpc as *read only* files. You will never be able to *directly* modify these .CMM files through ATSATpc. However; comments, segmentation marks, error codes, and/or any other entries made in the dialog box will be written to .TXT files. DAT files will store the field and numerical codes associated with each button entry and commented transmissions will be referenced by their corresponding line number.

When ATSATpc first opens, you can chose to begin a new coding form, resume entering data into an existing data sheet, or quit. Simply place the mouse pointer on the button that corresponds to your decision.

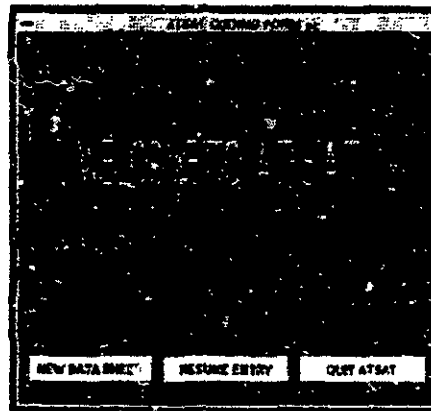


Figure 1. Welcome Screen.

[NEW DATA SHEET]: This selection will create a .TXT and .DAT file for a new transcription file that has the required .CMM extension. Keep in mind that facility, traffic, or controller codes are up to you to define. Frustration can be reduced by using the same name for all related files.

[RESUME ENTRY]: This selection will retrieve a previously encoded file. The [RESUME ENTRY] button is used to access existing .TXT and .DAT files. If a transcript was partially encoded and you now wish to complete that file, press the [RESUME ENTRY] button.

[QUIT ATSAT]: This selection is essentially a **Close** file command. It will cease ATSAT operation, close the program, and exit to the previous Windows™ application.

⁴It is assumed that the **a** drive is used to copy diskettes and the **c** drive is the hard drive.

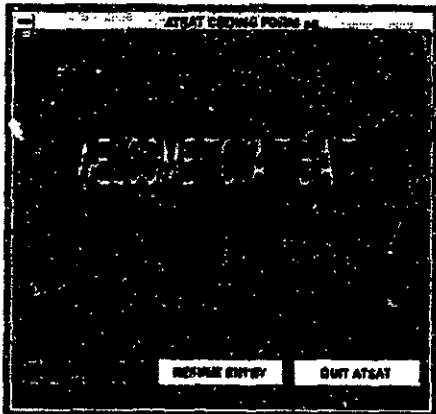


Figure 2. Creating a new data file.

3.1 SELECTION: [NEW DATA SHEET]. ATSA TPC will present a series of decision screens from which the program will retrieve the transcript .CMM file to encode and create output files with .DAT and .TXT extensions (see Figure 2). The hard drive file names with .CMM extensions are displayed in the CMM file directory (see Figure 3). If .CMM files were stored on any of the other drives available on the pc, you could retrieve those files by placing the mouse pointer on the letter corresponding to that drive and pressing the mouse button. Throughout the program, you will make what are commonly referred to as "point and click" decisions.

To retrieve PRACTICE.CMM, place the mouse pointer on the file name in the 'Files:' display and then press the mouse button. The name of the file will appear in the 'Filename' display. Place the mouse pointer on the [Ok] and depress the mouse button. Since the [Ok] rectangle is presented with a thicker border, the file will be opened and the next screen

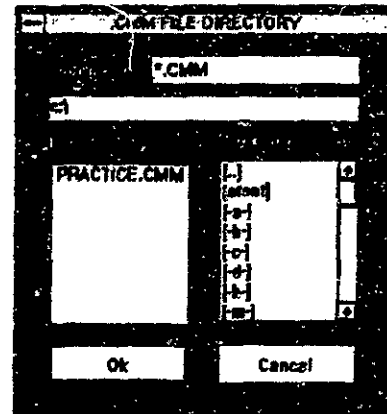


Figure 3. .CMM file directory.

displayed as the default. If you want to cancel your decision, simply place the mouse pointer on the [CANCEL] button and click.

File Information Menu. Once the [NEW DATA SHEET] button is pressed, ATSA TPC will prompt you for information to create the .DAT and .TXT output files (see Figure 4). You must determine the name of the communication file to open and specify the facility, sector, and controller codes.

3-DIGIT FACILITY CODE: Enter the name of the facility (e.g., terminal radar approach control facility names may be OKC, LAX, ORD, etc., and en route facility names may be ZTL, ZKC, etc.) or the 3-letter identifier for that airport, as specified in the most recent publication of the *FAA 73506, Location Identifiers*.

3-DIGIT SECTOR CODE: This is the air traffic sector code. For example, heavy traffic communications from a high west sector might be coded as HHW.

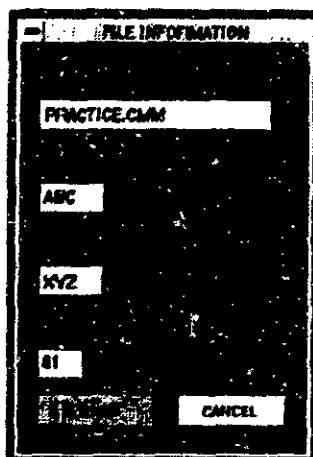


Figure 4. Naming your files.

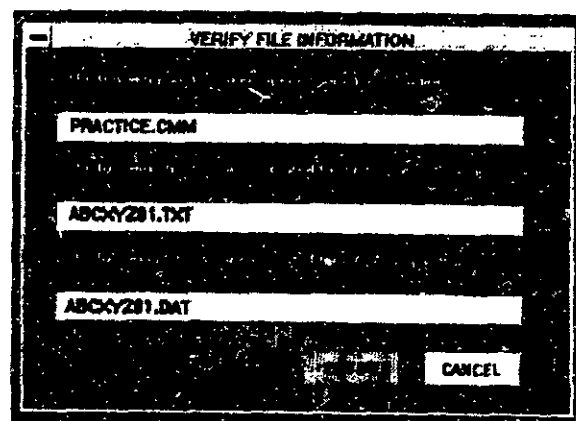


Figure 5. Verifying file names.

2-DIGIT CONTROLLER CODE: Enter the number assigned to the person or file you wish to process. For example, a series of field tapes may be identified as 01 for tape 1, 02 for tape 2, and so on.

After the [ENTER] button is pressed, a file verify screen appears (see Figure 5).

If the entries are correct, place the mouse pointer on the [ENTER] button and click; otherwise, select the [CANCEL] button and start over. As the encoder, you segment and label communications according to speech act and aviation topic decisions. For more information on how to encode speech acts, go to Chapter 4, Data Entry.

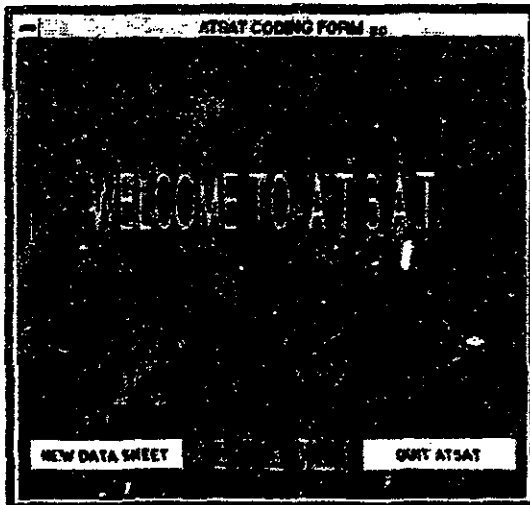


Figure 6. Entering data to an existing file.

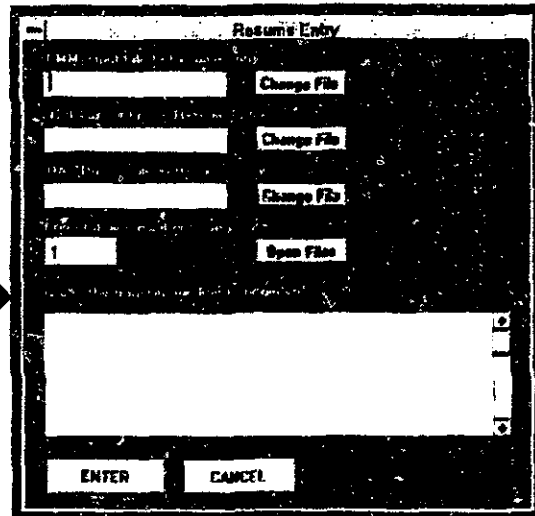


Figure 7. Selecting existing files to open.

3.2 SELECTION: [RESUME ENTRY]. To reduce frustration, it is advised that you write down the number of the last line previously encoded into AT3ATpc and have that line number available when being a new session. To add more lines of data for analysis, select the [RESUME ENTRY] button and click (see Figure 6). At the next screen, you must enter your choices for which .CMM, .TXT, and .DAT files to open (see Figure 7).

To open an existing .CMM transcript file, place the mouse pointer on the top [Change File] button and click. The .CMM file directory will appear (see Figure 8). Move the mouse pointer to the .CMM file you want to open and click. The name of the file will become highlighted. To open that file, place the mouse pointer on the [OK] button and click again (see Figure 9).

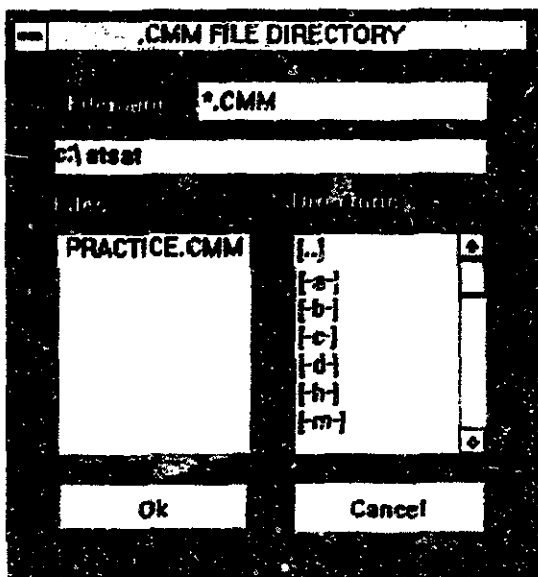


Figure 8. List of existing .CMM files.

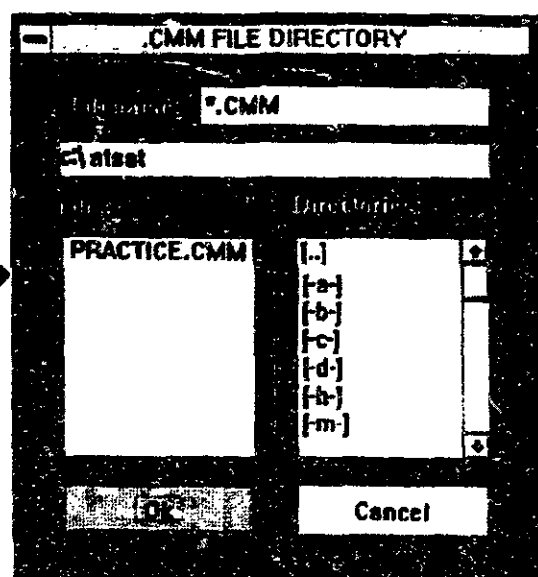


Figure 9. Selecting a .CMM file to open.

Use the same procedure to open the .TXT and .DAT files that you want data entries written to (see Figure 10). To open an existing .TXT file, place the pointer on the middle [Change File] button and click. The name of the file should appear in the ".TXT Output File to Resume Entry:" display. Select [Ok] and click. Select the .DAT file to open by placing the pointer on the bottom [Change File] button and click. The name of the file should appear in the ".DAT Output File to Resume Entry:" display. Select [Ok] and click.

To resume entry, type in the line number that you want to begin encoding, then select the [Open Files] button, and click (see Figures 11 & 12). The transmission corresponding to that line number should appear in the dialogue box beneath the query, "Is this the transmission line to begin on?" If you are not satisfied with the entry, simply type in a different line number and click on the [Open Files] button. When satisfied, press the [ENTER] button. At this point, you will begin segmenting and labeling communications according to speech act and aviation topic.

4.0 DATA ENTRY

4.1 Overview. To classify and encode communication elements that comprise a transmission into speech acts and aviation topics, ATSAtpc will present a series of menus from which you will make selections and answer questions. Once a communication element is associated with a speech act and aviation topic, you must determine whether a communication error is present within that element or not. If no errors are present, you can elect to move to the next speech act, next transmission, or quit. If you determine that an error is present, then a menu of communication errors is presented.

Before quitting ATSAtpc, it is strongly recommended that you write down the ending line number for future reference. This information is required to resume data encoding into existing .DAT and .TXT files.

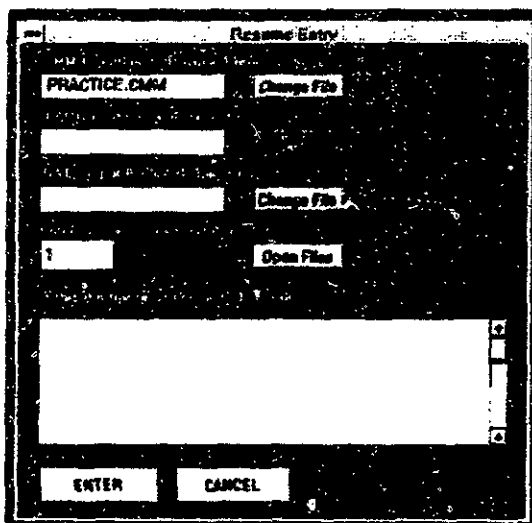


Figure 10. Selecting a .TXT file to open.

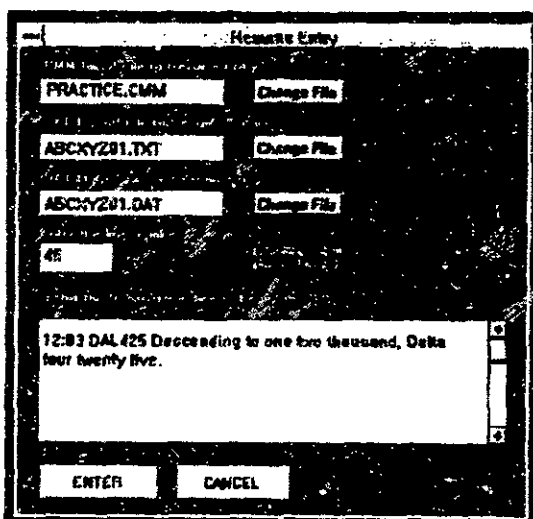


Figure 11. Selecting the transmission to encode.

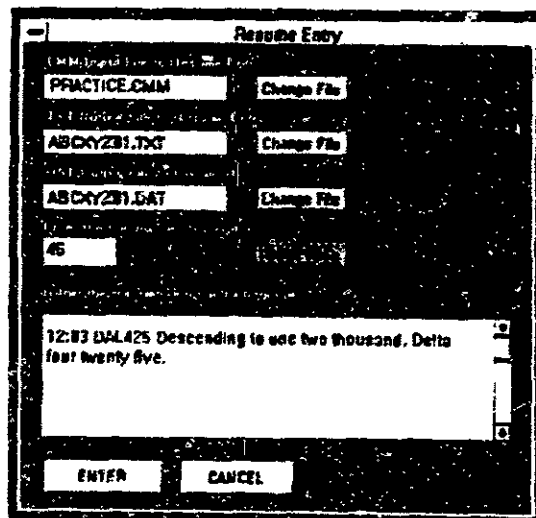


Figure 12. Begin encoding.

4.2 On-line Help Feature. Definitions from Appendices B and C of the ATSAT coding form have been integrated into ATSATpc (Prinzo et al., 1995). To access a definition, place the mouse pointer on the

name of the speech act, aviation topic, or communication error; keep the mouse button depressed to display the definition while reading, or it will disappear from the screen (see Figure 13).

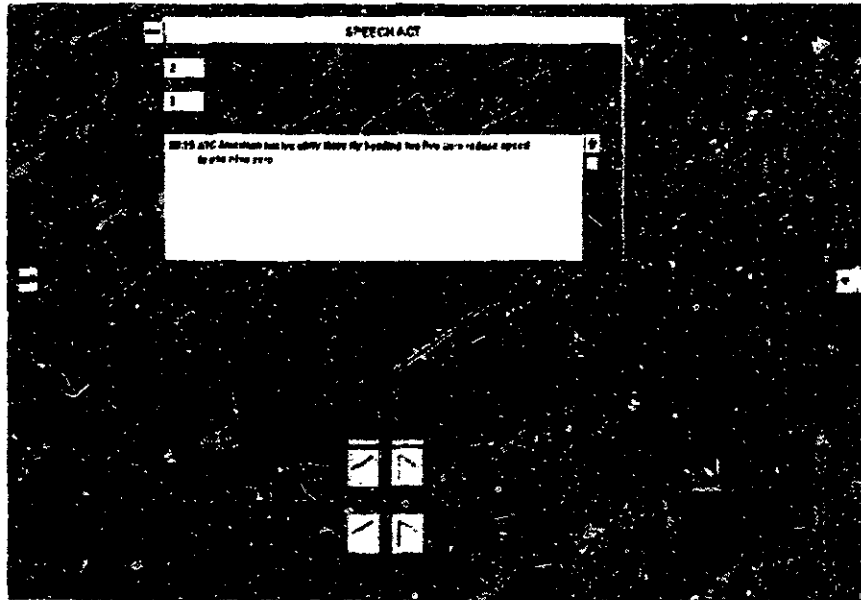


Figure 13. On-line help feature.

4.3 Transmission Identification Menu. Once the .CMM file is open, ATSATpc will display the number "1" in the line number box. Line number 1 is the first line on the page not the first transmission. Keep selecting the [NEXT TRANS.] button until the first transmission appears in the dialogue box. Presented beneath the dialogue box are 3 empty data entry boxes. You can enter the time, speaker, and receiver of the transmission manually or use the automatic data entry feature of ATSATpc. To manually enter the time, speaker, and receiver, place the mouse pointer on the appropriate box, click, and at the cursor prompt, keyboard in the desired information.

To automatically enter the time, speaker, or receiver information, simply highlight only 1 piece of information, place the mouse pointer on the word label above its data entry box, and click (see Figure 14). For example, place the mouse pointer over the receiver name displayed in the dialogue box, press and hold the mouse button down while moving the mouse pointer from left to right until the entire name is "highlighted," and then release the button. Move the mouse pointer to the word label "RECEIVER" and click

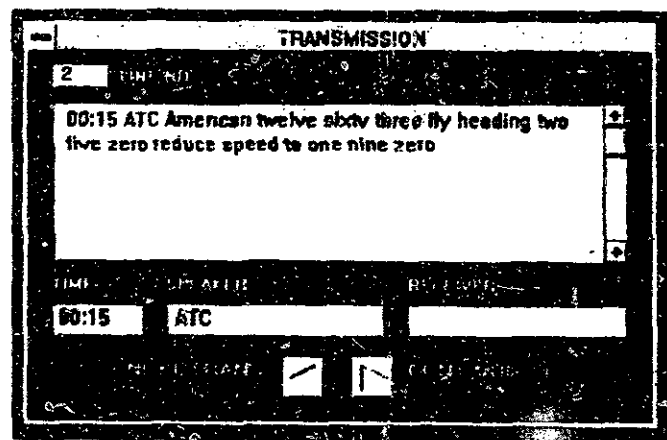


Figure 14. Entering time, speaker, and receiver information.

the mouse button. The receiver name should appear in the receiver data entry box. Once the time, speaker, and receiver of the transmission are identified, select the [CONTINUE] button to parse transmissions into communication elements.

4.4 Parsing transmissions into communication elements. Within the dialogue box (see Figure 15), insert slashes ("/") in the transmission to separate communication elements. For example, the transmission "American twelve sixty three fly heading two five zero reduce speed to one nine zero," has been parsed into 3 communication elements. Once parsed, each communication element is associated with a speech act category.

4.5 Speech Act Category Menu. Once parsed, ATSATpc will enable you to assign each communication element to 1 of the 7 speech act categories, move to the next transmission, redo the encoding process for the current transmission, or quit (see Figure 16).

SELECTION: [ASSIGN SPEECH ACT CATEGORY]. At this stage of the encoding process, you select the speech act category that best represents the purpose of the communication element from the following choices: "ADDRESS," "COURTESY," "INSTRUCTION," "COMMENTS," "ADVISORY," "REQUEST," and "NON-CODABLE." For example, the first communication element in the transmission "American twelve sixty three fly heading two five zero reduce speed to one nine zero." is American twelve sixty three. You point to and click on the [ADDRESS] button and the entry is encoded into the "Address/Addressee" column in the ATSAT coding form. ATSATpc immediately presents the aviation topics associated with the selected speech act.

SELECTION: [NEXT TRANS.]. Selecting [NEXT TRANS.] results in ATSATpc advancing to the next transmission. The value in the LINE NO. box increases by 1 and the next transmission in the .CMM file appears in the dialogue box.

SELECTION: [QUIT]. Selecting [QUIT] results in ATSATpc returning to the Welcome to A.T.S.A.T. menu.

SELECTION: [COMMENTS]. From the COMMENTS menu, you can elect to make comments, clear comments, move to the next speech act, re-do the entry, or re-do the transmission. Any comments or personal notes are appended to and stored with the transmission in the .TXT file. This information may be useful to other encoders, serve as a memory jog about why a communication element was encoded in a particular fashion, and so on (see Figure 17).

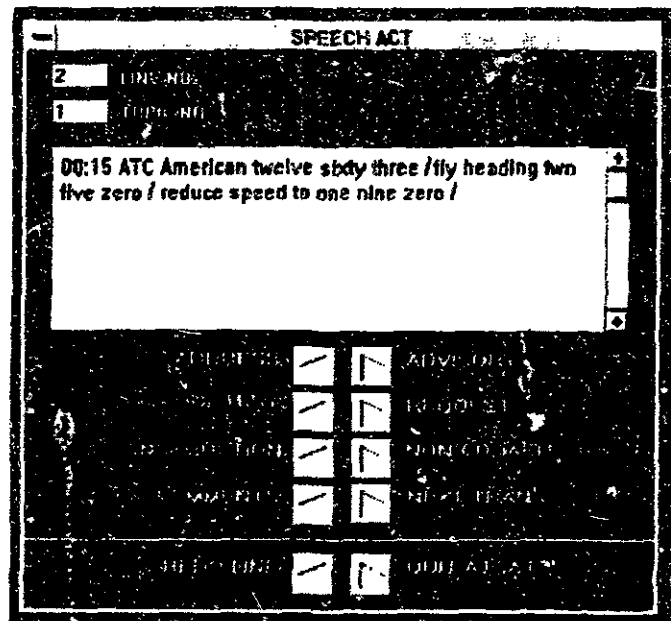


Figure 15. Transmission parsed into communication elements.

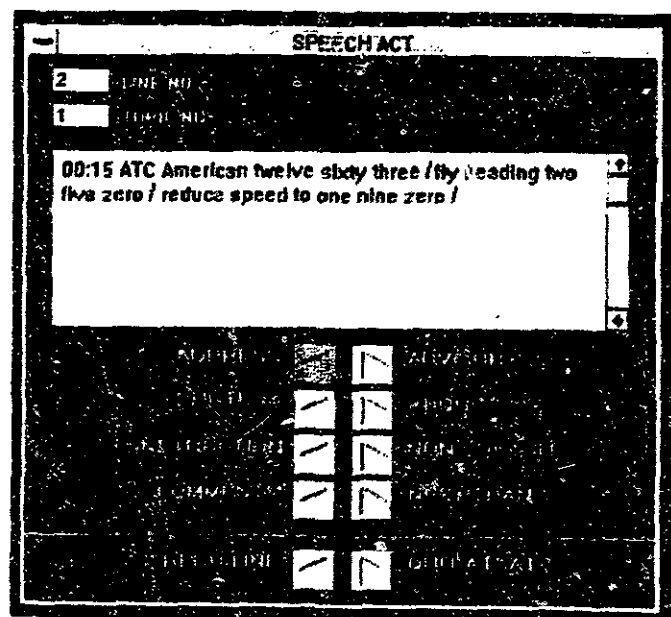


Figure 16. Speech Act Category menu.

SELECTION: [CLEAR COMMENTS]. You must first point to and click on the [CLEAR COMMENTS] button to remove any text in the comments display box before making any new keyboard entries. Comments are associated with the entire transmission and not with a specific speech act, aviation topic, or communication error. You are not limited in the amount of information that can be typed in the comments display box. When finished, point to and click on the [NEXT SPEECH ACT] button to resume encoding the transmission displayed in the dialogue box. The comments will be appended to that transmission in the .TXT output file and a numerical code will be entered into the "Comments" column in the .DAT output file.

SELECTION: [NEXT SPEECH ACT]. Pointing to and clicking on the [NEXT SPEECH ACT] button will return you to the Speech Act menu without changing the counter in the "TOPIC NO." display box.

SELECTION: [RE-DO ENTRY]. To correct a mistake, pointing to and clicking on the [RE-DO ENTRY] button will remove the entered values for the *current* aviation topic only. Previously encoded speech acts in the presented transmission will not be affected by this action.

SELECTION: [RE-DO LINE]. If you wish to recode the current transmission from the beginning, pointing to and clicking on the [RE-DO LINE] button will remove the entered values for all of the communication elements in that transmission. This action will take you back to the Transmission Identification menu, at which time you must re-enter the time, speaker, and receiver information, re-parse the transmission, and so on.

4.6 Aviation Topic Menu. From the Aviation Topic menu, you can select to encode the aviation topic, re-do the entry, or re-do the line. After the aviation topic is assigned to a communication element, you must determine the accuracy of the communication element. If no communication error is present, ATSATpc returns to the Speech Act Category menu; otherwise the Communication Error menu appears.

SELECTION: [ASSIGN AVIATION TOPIC]. In the example, "American twelve sixty three fly heading two five zero reduce speed to one nine zero," American twelve sixty three was associated with the ADDRESS speech act (see Figure 16). The ADDRESS aviation topic

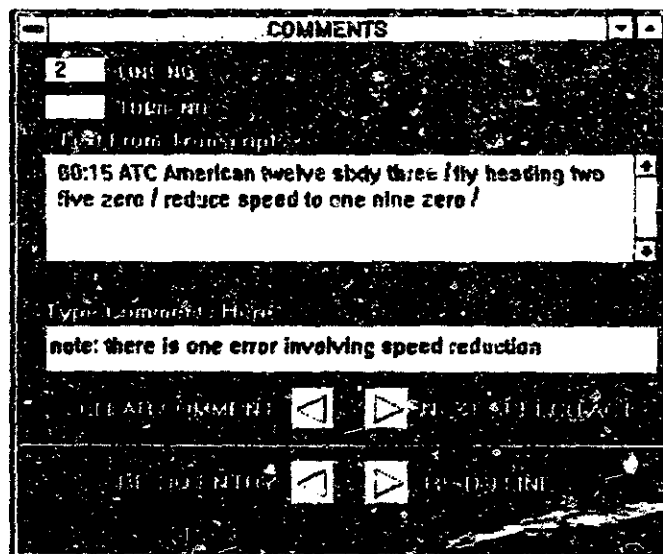


Figure 17. Typing in comments.

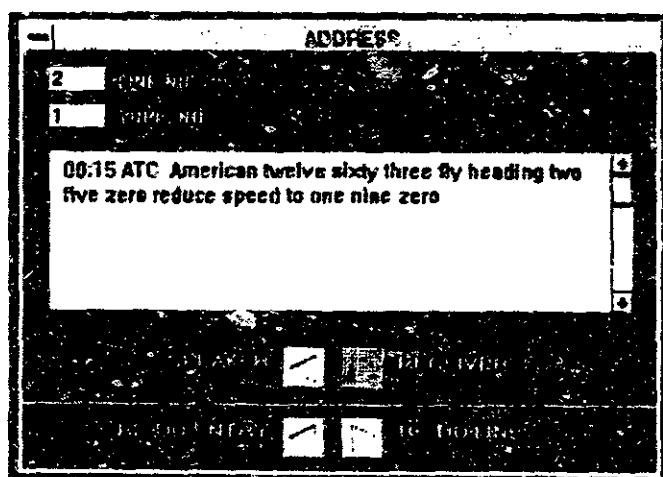


Figure 18. Selecting aviation topic.

menu will appear automatically and you must select either "SPEAKER" or "RECEIVER" as the corresponding aviation topic (see Figure 18).

In the current example, you would point to and click on the [RECEIVER] button. Once a selection is made, ATSATpc presents the message "Are There Any Errors?" (see Figure 19). You would point to and click on either the [YES] or [NO] button. If the communication element is in accordance with the FAA Order 7110.65, point to and click on the [NO] button and ATSATpc will return you to the Speech Act Category menu. Otherwise, you should select the [YES] button to activate the Communication Error menu.

SELECTION: [RE-DO ENTRY]. To correct a mistake, pointing to and clicking on the [RE-DO ENTRY] button will remove the entered values for the current aviation topic. Previously encoded speech acts in the presented transmission will not be affected by this action.

SELECTION: [RE-DO LINE]. If you wish to recode the current transmission from the beginning, pointing to and clicking on the [RE-DO LINE] button will remove the entered values for *all* of the communication elements in that transmission. This action will take you back to the Transmission Identification menu, at which time you must re-enter the time, speaker, and receiver information, re-parse the transmission, and so on.

4.7 Communication Error Menu. From the Communication Error menu (see Figure 20), you can enter up to 3 communication errors per aviation topic, move to the next speech act, re-do the current entry, or re-do the entire transmission. ATSATpc provides definitions for each type of message content and delivery technique error. This on-line help feature is accessed by placing the mouse pointer on the name of the communication error and depressing the mouse button. Once the mouse button is released, the definition disappears from the computer screen.

SELECTION: [ASSIGN A COMMUNICATION ERROR CODE]. There are 9 communication errors listed in the Communication Error menu. Each communication error has a numerical value associated with it, which will be displayed in the ERROR # data entry box if the button next to the name of the communication error type is depressed. The numerical codes are: "GROUPED" (1), "OMISSION" (2), "TRANSPOSITION" (3), "DYSFLUENCY" (4), "PARTIAL READBACK" (5), "SEQUENTIAL" (6), "SUBSTITUTION" (7), "EXCESSIVE VERBIAGE" (8), and "MISARTICULATION" (9). These numerical codes will be placed into their corresponding column fields in the electronic spreadsheet.

To enter communication error codes, place the mouse pointer on the button adjacent to the name of the communication error and depress the mouse button. The communication error code first entered will be displayed in the ERROR #1 data entry box, the

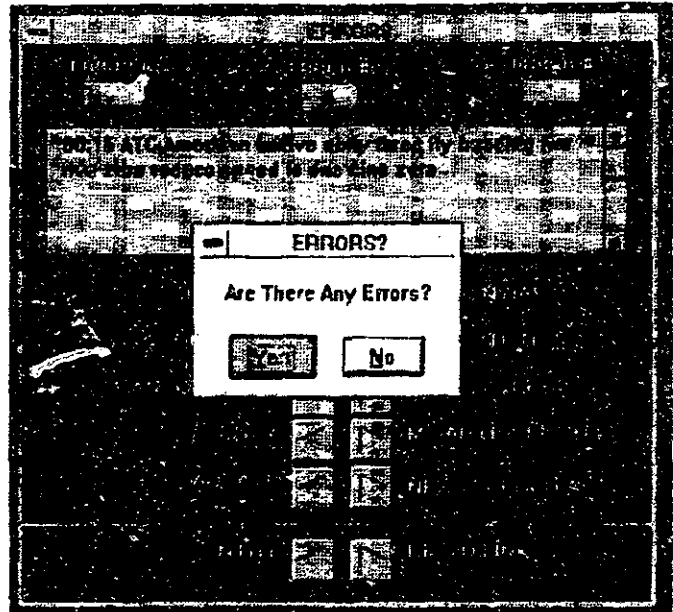


Figure 19. Coding errors.

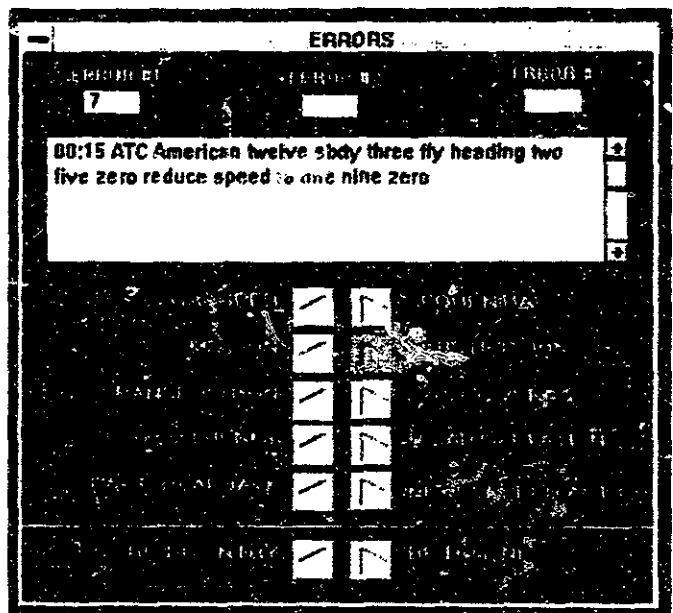


Figure 20. Communication Error Category menu.

communication error code entered next will be displayed in the ERROR #2, data entry box, etc. The order in which communication errors are entered is arbitrarily determined.

There is 1 communication error present in the third communication element in the transmission, "American twelve sixty three fly heading two five zero

reduce speed to one nine zero." The INSTRUCTION speech act involved a SPEED aviation topic that was evaluated to contain a SUBSTITUTION (7) error⁵.

SELECTION: [NEXT SPEECH ACT]. Once the first communication element has speech act, aviation topic, and communication error codes assigned to it, pointing to and clicking on the [NEXT SPEECH ACT] button opens the Speech Act menu and advances the counter in the TOPIC NO. display box by 1.

SELECTION: [RE-DO ENTRY]. To correct a mistake, pointing to and clicking on the [RE-DO ENTRY] button will remove all communication error codes assigned to the current aviation topic. Previously encoded speech acts, aviation topics, and communication error codes will not be affected by this action.

SELECTION: [RE-DO LINE]. If you wish to recode the current transmission from the beginning, pointing to and clicking on the [RE-DO LINE] button will remove the entered values for all of the communication elements in that transmission. This action will take you back to the Transmission Identification menu at which time you will re-enter the time, speaker, and receiver information, re-parse the transmission, and so on.

5.0 DATA AND TEXT OUTPUT FILES

5.1 .DAT Output Files. ATSATpc writes to a preformatted spreadsheet that exemplifies the ATSAT coding form (Prinzo et al., 1995). Each speech act and aviation topic button entry is associated to a specific column field in that electronic spreadsheet (see Figures 21-23).

For example, information provided by the encoder in the Transmission Information menu for the transmission, "American twelve sixty three fly heading two five zero reduce speed to one nine zero," will be displayed in the columns labeled "time," "speaker," "receiver," and "line_no." of the spreadsheet (see Figure 21).

When the [INSTRUCTION] and [SPEED] buttons were clicked on, ATSATpc moved to the "i_speed" column. In the present example, the communication element, "...reduce speed to one nine zero" was the third element in the transmission and a "3" was posted in the "i_speed" column. That number represents the

time	line_no	speaker	receiver	sp_id	sp_id1	sp_id2
00:15	3.00	2.00	ATC	AAL1263	.00	.00
00:17	3.00	3.00	AAL1263	ATC	1.00	.00
00:19	2.00	4.00	ATC	AAL1263	.00	.00

Figure 21. .DAT file.

i_line_r2	i_line_r3	i_speed	i_speakr1	i_speakr2	i_speakr3	i_speakr	i_speakr
.00	.00	3.00	7.00	.00	.00	.00	.00
.00	.00	3.00	2.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00

Figure 22. .DAT file.

other2	other3	other	other1	other2	other3	commactr
.00	.00	.00	.00	.00	.00	2.00
.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00

Figure 23. .DAT file.

order in which that communication element was delivered. Since the [YES] button was selected in response to the question "Are There Any Errors?," the ATSATpc software advanced to the column labeled

⁵The speaker substituted the word "nine" for "niner" as part of the instruction.

2	00:15	ATC	AMERICAN TWELVE SIXTY THREE/ FLY HEADING TWO FIVE ZERO / REDUCE SPEED TO ONE NINE ZERO	1 COMMUNICATION ERROR ON THE SPEED REDUCTION
3	00:17	AAL1263	AMERICAN TWELVE SIXTY THREE /{AHHH} HEADING TWO NINER ZERO/ REDUCING TO ONE NINER ZERO	
4	00:19	ATC	AMERICAN TWELVE SIXTY {STAMMERS} SIXTY THREE/ EVERYTHING RIGHT EXCEPT THE HEADING FLY HEADING ZERO NINER ZERO	

Figure 24. Text output file produced by the ATSATpc software.

"i_speed1". When the encoder classified "... reduce speed to one nine zero" as a substitution error, the numerical code "7" was posted in that field (see Figure 22).

Since the [COMMENTS] button was selected, the number "2" appears in the "Comments" column as an indicator to the analyst, to read the comments from the .TXT file (see Figure 23).

5.2 .TXT Output Files. The ATSATpc software produces a .TXT output file that contains all keyboard entries made in the transmission and/or comments dialogue box (see Figure 24). The original transmission input file will not be altered in any way. ATSATpc will include the transmission number to the front end of each encoded transmission and will append any comments to the end of the original transmission. Only those which have been encoded will be included in a .TXT output file.

6.0 TROUBLESHOOTING

6.1 ATSATpc Data Entry

Problem: Text is omitted from the .DAT spreadsheet. When entering information into the Transmission Identification menu, each transmission is tagged with the time, speaker, and receiver. If a tab or space character is highlighted along with the time, speaker, or receiver name and placed into the data entry box, then some of the columns in the .DAT spreadsheet may contain only a "." or "|" in them.

If the name of the speaker or receiver is entered manually and either name exceeds 9 characters, the *spreadsheet* program may display an error code and, in many cases, may omit or delete the name of the speaker or receiver from the spreadsheet.

Solution: Make sure that addresses *do not* exceed 9 characters. The 9 character limitation *does* include any hidden characters, such as tabs or spaces.

The spreadsheet data has shifted and/or some information is lost: If you use the highlight and click method when entering information into the Transmission Identification menu, and either tabs and \ or spaces were inadvertently included on either side of the time, speaker, or receiver then *either* an error is displayed, that data block is omitted, or some data will shift.

Solution: Only enter applicable text and data. Do not enter any spaces or tabs. If spreadsheet data have shifted, that information must be re-entered into the ATSAT program.

6.2 Windows™ Applications

The transcript is complete, but ATSAT alerts you that the end of the .CMM file has been reached. Although no encoding has been performed on a .CMM file, ATSATpc notifies the encoder that the end of the document has been reached. This is a good indicator that the proper Association and/or Conversion necessary for ATSATpc to "recognize" the information in the .CMM file has not yet been made.

Solution: Enter the File Manager and associate your .CMM files with your current version of Microsoft Word for Windows™ text editor. If a file conversion needs to be performed, Windows™ will display a "Convert From" dialogue box. Consult your Windows™ users guide for more information. Once files have been associated/converted, restart the ATSATpc program.

The "OOPS RESTART ATSAT" has appeared during data encoding. This error appears when you click the mouse outside of the menus and buttons provided. In preliminary tests, no data were lost when this occurred; however, it is recommended that mouse actions be limited to those required for encoding data.

The computer has locked up while searching for files. It is possible to have your computer enter into a continuous loop while it is searching for files through ATSATpc. When searching for a specific .CMM file you may use the [...] to back up through directories.

For example, if you are going to encode a new .CMM file, ATSATpc will list the directory it has currently accessed, e.g., c:\atsat\subinfo\subs. If you double click [...] this action will back up the current directory to c:\atsat\subinfo. Another double click [...] will produce c:\atsat, and so on until only c:\ is displayed. If the current directory is c:\ and yet

another double click is made [...], the program produces an argument within itself that *will not* let the user escape. Through testing, the only solution to this problem is to reboot your computer system. *Any application* that has been running in the background, that has not been saved, will be lost.

7.0 REFERENCES

- Airman's Information Manual, Official Guide to Basic Flight Information and ATC Procedures.* (1994). Washington, DC: U.S. Government Printing Office.
- FAA Order 7110.65G Air Traffic Control.* (March, 1992). Washington, DC: Air Traffic Rules and Procedures Service.
- Prinzo, O.V., Britton, T.W., & Hendrix, A. (1995). *Development of a coding form for approach control/pilot voice communications.* Washington, DC: FAA Office of Aviation Medicine Report, DOT/FAA/AM-95/15.
- Prinzo, O.V. (in press). *An analysis of approach control/pilot voice communications.* Washington, DC: FAA Office of Aviation Medicine Report, DOT/FAA/AM.

8.0 APPENDIX A

