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## Attachment ASTAR Training Slides Final Report

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**ATTACHMENT**

**ASTAR TRAINING SLIDES**

**Final Report**  
**CDRL A003**

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# ASTAR

Ver 2.0

## Training Slide Series

# What is ASTAR?

The Automated Simulator Test and Assessment Routine (ASTAR) is an automated decision aid designed to assist an analyst in evaluating the effectiveness of a training device or method by asking questions regarding generally accepted learning principles for training systems.

# What is the History of ASTAR?

- ASTAR was developed by the American Institutes for Research
- Manual version of ASTAR developed during the 1970's
- Computer based version developed between 1979 and 1985
- Initial validation of ASTAR conducted between 1985 and 1988
- Operational evaluation performed by the Institute for Simulation and Training, 1990

# How ASTAR Works

- ASTAR asks questions in eight rating categories
- The analyst assigns a subjective rating between zero and one hundred.
- ASTAR internal formulas convert these ratings into a forecast of training device effectiveness.

# ASTAR

## 8 RATING CATEGORIES

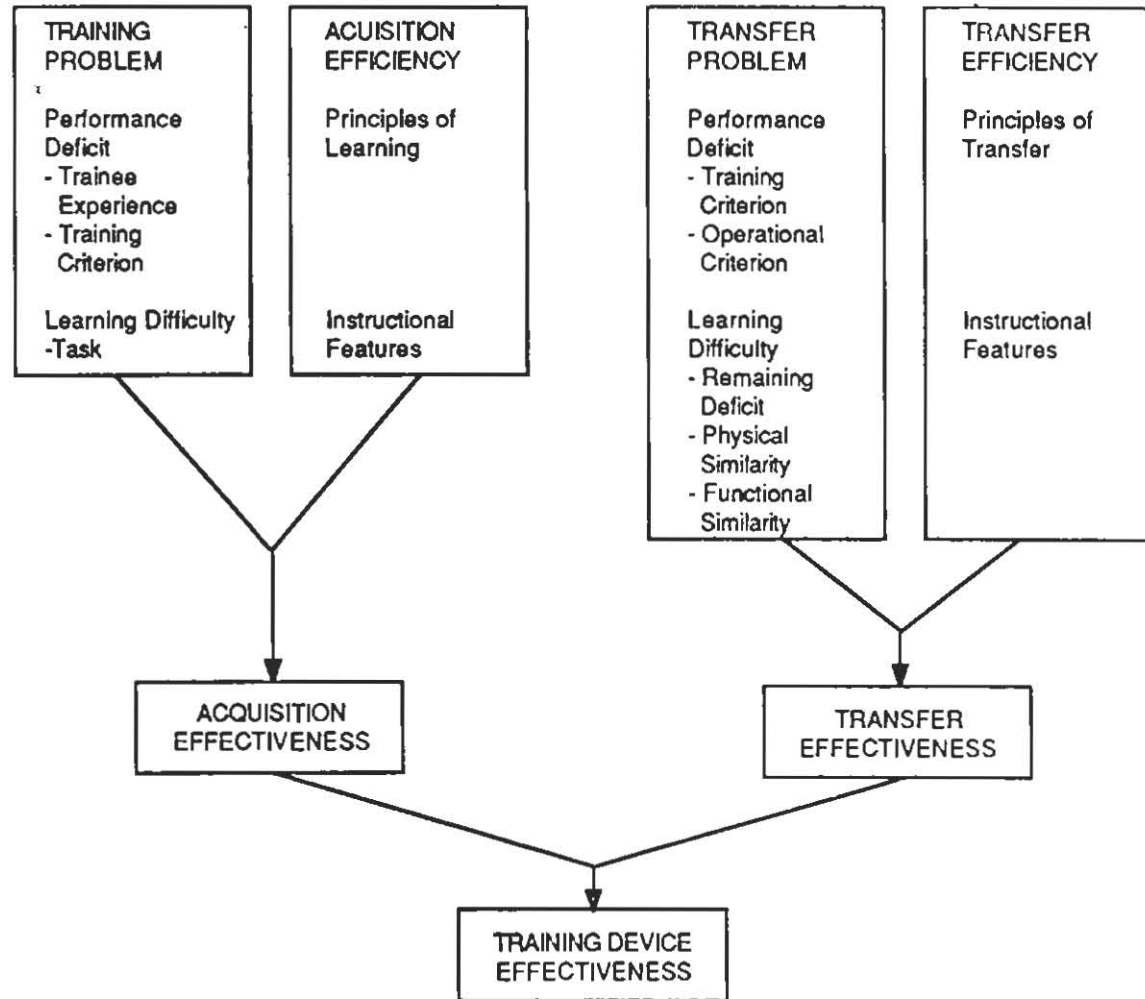
Within the three levels of ASTAR there are eight rating categories:

1. Performance Deficit
2. Learning Difficulty
3. Quality of Training - Acquisition
4. Residual Deficit
5. Residual Learning Difficulty
6. Physical Similarity
7. Functional Similarity
8. Quality of Training - Transfer



# ASTAR SUMMARY STATISTICS

## Flow Diagram



## BASIC ASTAR COMPUTATIONAL FORMULAS

Performance Deficit	: Performance Deficit Rating (R1)
Learning Difficulty	: Learning Difficulty Rating (R2)
Training Problem	: $(R1) \times (R2) / 100 = (S1)$
Quality of Training - Acquisition	: Training Acquisition Rating (R3)
Acquisition - Efficiency	: $\sqrt{(R3) / 100} = (S2)$
Acquisition	: $(S1) / (S2) = (T1)$
Residual Deficit	: Residual Deficit Rating (R4)
Residual Learning Difficulty	: Residual Learning Difficulty Rating (R5)
Physical Similarity	: Physical Similarity Rating (R6)
Functional Similarity	: Functional Similarity Rating (R7)
Transfer Problem	: $((R4) \times (R5)) / 100 + ((R6) - (R7)) = (S3)$
Quality of Training - Transfer	: Training Transfer Rating (R8)
Transfer Efficiency	: $\sqrt{(R8) / 100} = (S4)$
Transfer	: $(S3) / (S4) = (T2)$
Sum	: $(T1) + (T2)$

## ASTAR II COMPUTATIONAL FORMULAS

Performance Deficit	: Performance Deficit Rating ( $\bar{R1}$ ) = $\sum_{l=1}^{l:n} R1 / N$	
Learning Difficulty	: Learning Difficulty Rating ( $\bar{R2}$ ) = $\sum_{l=1}^{l:n} R2 / N$	
Training Problem	: ( $\bar{R1}$ ) x ( $\bar{R2}$ ) / 100 = ( $\bar{S1}$ )	
Quality of Training - Acquisition	: Training Acquisition Rating ( $\bar{R3}$ ) = $\sum_{q=1}^{q:4} R3 / 4$	
Acquisition - Efficiency	: $\sqrt{(\bar{R3}) / 100} \cdot (\bar{S2})$	
Acquisition	: ( $\bar{S1}$ ) / ( $\bar{S2}$ ) = ( $\bar{T1}$ )	
Residual Deficit	: Residual Deficit Rating ( $\bar{R4}$ ) = $\sum_{l=1}^{l:n} R4 / N$	
Residual Learning Difficulty	: Residual Learning Difficulty Rating ( $\bar{R5}$ ) = $\sum_{l=1}^{l:n} R5 / N$	
Physical Similarity	: Physical Similarity Rating ( $\bar{R6}$ ) = $\sum_{l=1}^{l:n} R6 / N$	
Functional Similarity	: Functional Similarity Rating ( $\bar{R7}$ ) = $\sum_{l=1}^{l:n} R7 / N$	
Transfer Problem	: (( $\bar{R4}$ ) x ( $\bar{R5}$ )) / 100 + (( $\bar{R6}$ ) - ( $\bar{R7}$ )) = ( $\bar{S3}$ )	
Quality of Training - Transfer	: Training Transfer Rating ( $\bar{R8}$ ) = $\sum_{q=1}^{q:3} R8 / 3$	
Transfer Efficiency	: $\sqrt{(\bar{R8}) / 100} \cdot (\bar{S4})$	
Transfer	: ( $\bar{S3}$ ) / ( $\bar{S4}$ ) = ( $\bar{T2}$ )	
Sum	: ( $\bar{T1}$ ) + ( $\bar{T2}$ )	

l = task or subtask number  
q = question number

## ASTAR III COMPUTATIONAL FORMULAS

NOTE: These equations are simplified. See Appendices for details.

Performance Deficit	: Performance Deficit Rating ( $R1_{ln}$ ) = R1 for $l = 1$ to $n$
Learning Difficulty	: Learning Difficulty Rating ( $R2_{ln}$ ) = $\sum_{q=1}^{q=6} R2$ for $l = 1$ to $n$
Training Problem	: $\sum_{l=1}^{l=n} (R1_{ln}) \times (R2_{ln}) / 100 = (\overline{S1})$
Quality of Training - Acquisition	: Training Acquisition Rating ( $R3_{ln}$ ) = $\sum_{q=1}^{q=11} R3/11$ for $l = 1$ to $n$
Acquisition - Efficiency	: $\sum_{l=1}^{l=n} \sqrt{(R3_{ln}) / 100} = (\overline{S2})$
Acquisition	: $(\overline{S1}) / (\overline{S2}) = (\overline{T1})$
Residual Deficit	: Residual Deficit Rating ( $R4_{ln}$ ) = R4 for $l = 1$ to $n$
Residual Learning Difficulty	: Residual Learning Difficulty Rating ( $R5_{ln}$ ) = $\sum_{q=1}^{q=6} R5$ for $l = 1$ to $n$
Physical Similarity	: Physical Similarity Rating ( $\overline{R6}$ ) = $\sum_{l=1}^{l=n} \sum_{c=1}^{c=n} \sum_{d=1}^{d=n} R6 / (Nl)(Nc)(Nd)$
Functional Similarity	: Functional Similarity Rating ( $\overline{R7}$ ) = $\sum_{l=1}^{l=n} \sum_{c=1}^{c=n} \sum_{d=1}^{d=n} R7 / (Nl)(Nc)(Nd)$
Transfer Problem	: $[\sum_{l=1}^{l=n} ((R4_{ln}) \times (R5_{ln})) / 100] + ((\overline{R6}) - (\overline{R7})) = (\overline{S3})$
Quality of Training - Transfer	: Training Transfer Rating ( $R8_{ln}$ ) = $\sum_{q=1}^{q=3} R8/3$ for $l = 1$ to $n$
Transfer Efficiency	: $\sqrt{(R8) / 100} = (\overline{S4})$
Transfer	: $(\overline{S3}) / (\overline{S4}) = (\overline{T2})$
Sum	: $(\overline{T1}) + (\overline{T2})$

$l$  = task or subtask number  
 $q$  = question number

# ASTAR

- ASTAR runs on an IBM Personal Computer with a floppy or hard drive system, and uses minimal computer storage space.
- ASTAR uses generally accepted training principles involving such issues as performance feedback and similarity of the trainer to operational equipment.
- ASTAR helps the analyst evaluate a training approach by asking questions about the training device features that affect learning difficulty or transfer of training to the job environment.

# Uses of ASTAR

- ASTAR investigates which of several utilization patterns is most effective for an existing device.
- ASTAR evaluates alternative design concepts in the early stages of training equipment acquisition.
- ASTAR compares the potential effectiveness of a new training system design, early in the acquisition cycle, with the effectiveness of an existing training system.

# Uses of ASTAR

- ASTAR compares the effectiveness of using a device-based training system as opposed to training on the operational equipment.
- ASTAR compares the effectiveness of two training devices used to train the same tasks.
- ASTAR investigates the effectiveness of differing device configurations and compares them to training on the operational equipment.

# Levels of ASTAR

The program has three Levels of evaluation, based on the level of detail available.

ASTAR Level 1 uses general ratings from the analyst without building a data base

ASTAR Level 2 and ASTAR Level 3 require a database to be built



# Levels of ASTAR

The decision about which level to use depends upon the amount of information available about:

- the training device or method
- the operational environment
- the tasks to be trained
- the trainees themselves.

# ASTAR Level 1 analysis

To conduct an ASTAR Level 1 analysis, you will need:

- \* General ratings from the analyst without the need to build a data base of tasks, subtasks, and displays or controls.

# ASTAR Level 2 analysis

To conduct an ASTAR Level 2 analysis, you will need:

- \* Detailed descriptions of the training and operational equipment.
- \* A list of training and operational tasks.
- \* A list of the skills and knowledge require perform each of the tasks.
- \* The characteristics of the trainees and the plan for device utilization.

# ASTAR Level 3 analysis

To conduct an ASTAR Level 3 analysis, you will need everything from Level 2, PLUS:

- \* Specific descriptions of the displays and controls in the training and parent equipment.
- \* Knowledge about the location of displays and controls, and what their functions are
- \* A list of operational and training subtasks.
- \* Specific operational performance criteria.

# PROGRAM OPERATION

## The BUILD command

The first step to begin all levels of ASTAR analysis is to use the BUILD command

The BUILD command creates a directory on your data disk containing six files

These six files will contain your list of tasks and subtasks, controls and displays, and ratings.

# PROGRAM OPERATION

## The BUILD command

The first step in constructing your ASTAR database is to execute the BUILD command. To execute the command at the system prompt (A> or C>), type BUILD followed by a character space and a device file name and press return.

Example:

```
A> BUILD DEVICE <return>
```

# PROGRAM OPERATION

## The BUILD command

Make sure that you have a formatted disk in the B> drive, and then hit any key. The screen below will appear:

Building Task, Subtask, Device & Control Database

Hit any key to continue

ESC to ABORT

This screen allows you to abort the BUILD process or to continue. ESCAPE will return you to the system prompt.

# PROGRAM OPERATION

## The BUILD command

When you execute the BUILD command, the following screen will appear:

```
*****  
*      Building new DEVICE files      *  
*                                     *  
*      Place ASTAR DATA Diskette in B: *  
*                                     *  
*****
```



# PROGRAM OPERATION

## The BUILD command

Once a set of device files is constructed, the program will not allow you to BUILD using the same file name again. This feature prevents you from accidentally writing over your data files.

# ASTAR Operation

## Start Up Process

Once the Build command has created a set of files for a training device the ASTAR analysis can begin

To access the main menu type ASTAR followed by a space and your file name

Example:

```
C>ASTAR device1 <return>
```

# ASTAR Operation

## Start Up Process

After accessing the main menu command the program will remind you to place your data disk in the B: drive

```
*****  
*                                     *  
*   Place ASTAR DATA Disk in B:   *  
*                                     *  
*****  
Strike key when ready...
```

Hit any key and the main menu will appear

# ASTAR Operation

## Main Menu

ASTAR MAIN MENU

ver 2.0

(1) ASTAR 1

(2) ASTAR 2

(3) ASTAR 3

(4) Display Ratings

(5) Database Maintenance

(6) EXIT PROGRAM

Enter Option ---

# PROGRAM OPERATION

## Data Base Maintenance

Once you have accessed the Main Menu you can select a menu option

Select number (5) Database Maintenance

The Database Maintenance menu will appear

# PROGRAM OPERATION

## Data Base Maintenance Menu

### Database Maintenance

- (1) Training Device - Task and Subtasks Maintenance
- (2) Training Device - Control and Display Maintenance
- (3) Operational Equip - Task & Subtask Maintenance
- (4) Operational Equip - Control & Display Maintenance
- (5) Commonality Analysis
- (6) Similarity Matching
- (7) EXIT PROGRAM

Enter Option \_\_\_

# PROGRAM OPERATION

## Data Base Maintenance

Options (1) and (2) are used to enter lists of training and operational tasks and subtasks into the database.

Option (3) and (4) allow you to enter lists of controls and displays in the training and operational equipment by task or subtask.

# PROGRAM OPERATION

## Data Base Maintenance

In option (5), you tell the program which of the operational tasks are represented in the training system.

In option (6), you indicate which of the operational controls and displays are represented in the training system.



# CONDUCTING ASTAR ANALYSES

## Raters and Rating Procedures

- Before beginning the rating process a group of raters should be selected.
- It is recommended to use three to five different analysts.
- Select raters with backgrounds in: Instructional Technology, Human Factor, Psychology, and Engineering.

# DATABASE MAINTENANCE

## Entering Task/Subtask

The process for entering information using options (1) Training device -Task and Subtask Maintenance and (3) Operational Equipment -Task and Subtask Maintenance is identical; the wording of the prompts differs according to which list you are working on.

# DATABASE MAINTENANCE

## Entering Task/Subtask

The first time you select option (1), the program will display the screen below.

```
(1) Training Device - Task and Subtask Definition
Enter Title of Training Device
      Title = ____
```

# DATABASE MAINTENANCE

## Entering Task/Subtask

Enter a title for your training device. The title need not be the same as the file name you created using BUILD command.

Also note that the program displays a list of four function keys at the bottom of the screen. Whenever this prompt is displayed, pressing these keys will allow you to review the information you have entered.

# DATABASE MAINTENANCE

## Entering Task/Subtask

- Type in a task number or subtask number.
- Enter a name for the task or subtask. Names are limited to 60 characters. When you press ENTER, the program will store the task name and prompt you to enter another number and name respectively.
- Enter the Operational Equipment task/subtask list in the same manner as the training device task/subtask list.
- When you are done the Database Maintenance will appear.

# PROGRAM OPERATION

## Data Base Maintenance Menu

### Database Maintenance

- (1) Training Device - Task and Subtasks Maintenance
- (2) Training Device - Control and Display Maintenance
- (3) Operational Equip - Task & Subtask Maintenance
- (4) Operational Equip - Control & Display Maintenance
- (5) Commonality Analysis
- (6) Similarity Matching
- (7) EXIT PROGRAM

Enter Option ---

# DATABASE MAINTENANCE

## Entering Display/Control Lists

The process for entering controls and displays into the database is similar to entering tasks and subtasks. You may use numbers or letters for controls and displays. We prefer to use a combination such as C1 for control number 1, D1 for display number 1, etc. The ASTAR program will order the list within subtasks (tasks) first alphabetically, then numerically.

# DATABASE MAINTENANCE

## Entering Display/Control Lists

The first time you select option (2) Training Device - Control and Display Maintenance following screen will appear:

(2) Training Device - Control and Display Maintenance

Enter Training Device Task.Subtask number 0000.0000



# DATABASE MAINTENANCE

## Entering Display/Control Lists

(2) Training Device - Control and Display Maintenance

Task.Subtask = 1.0000

Title = Track Target

Enter Control or Display number \_\_

**Enter a control or display number (such as C1)**

# DATABASE MAINTENANCE

## Entering Display/Control Lists

(2) Training Device - Control and Display Maintenance

Task.Subtask = 1.0000

Title = Track Target

Control/Display = 1.0000.C1

Title = \_\_

Enter the name of the controls/display (such as joystick). The name is limited to 57 characters (including spaces). When you press return, the program stores the name and prompts for another control/display number.

# DATABASE MAINTENANCE

## Entering Display/Control Lists

- Continue to enter the numbers and names of each control/display for the first task/ subtask in this manner.
- When finished, press Escape and the program will prompt for a new task/subtask number.
- When you have entered all the controls and displays in your task list, press Escape to return to the Database Maintenance menu.
- Follow the same procedure to enter your operational equipment controls/ displays using option (4) .

# PROGRAM OPERATION

## Data Base Maintenance Menu

### Database Maintenance

- (1) Training Device - Task and Subtasks Maintenance
- (2) Training Device - Control and Display Maintenance
- (3) Operational Equip - Task & Subtask Maintenance
- (4) Operational Equip - Control & Display Maintenance
- (5) Commonality Analysis
- (6) Similarity Matching
- (7) EXIT PROGRAM

Enter Option ---

# DATABASE MAINTENANCE

## Commonality Analysis

The Commonality Analysis tells the program which operational tasks are represented in the training task list. The program will search for task/subtask prompts in later analyses based on this information.

Select option (5) from the Database Maintenance menu. The program will display the following screen:

# DATABASE MAINTENANCE

## Commonality Analysis

(5) Commonality Analysis

Enter Starting Operational Task.Subtask number 0000.0000

Enter the first number in your operational task list. The program will display a set of instructions along with the number and name of the task you specified.

# DATABASE MAINTENANCE

## Commonality Analysis

### (5) Commonality Analysis

Consider descriptions of the subtasks (tasks) that comprise the training objective(s), the subtasks (tasks) that comprise the operational performance objective(s), as well as descriptions of the training device and operational equipment, including their displays and controls.

For each subtask (task) in the operational performance objective(s), enter a '1' if it is represented (simulated) in the training objective(s); enter a '0' if it is not represented (simulated) in the training objective(s).

Task.Subtask = 1.0000 Track Target  
Enter Rating = 999

# DATABASE MAINTENANCE

## Commonality Analysis

Following the directions on the screen, enter a 1 or a 0. After you enter the rating for the first task, the program will continue to list your tasks in numerical order.

When you enter the rating for the last task in the list, the program will return to the Database Maintenance menu.

If you have subtasks in your list, access option (5) and repeat this process for subtasks.



# PROGRAM OPERATION

## Data Base Maintenance Menu

### Database Maintenance

- (1) Training Device - Task and Subtasks Maintenance
- (2) Training Device - Control and Display Maintenance
- (3) Operational Equip - Task & Subtask Maintenance
- (4) Operational Equip - Control & Display Maintenance
- (5) Commonality Analysis
- (6) Similarity Matching
- (7) EXIT PROGRAM

Enter Option ---

# SIMILARITY MATCHING

The similarity matching function tells the program which tasks, subtasks, controls, and displays are common between the operational and training equipment. The program will search for prompts later analyses based on this information. Select option (6) from the Database Maintenance menu. The program will display the following screen:

# SIMILARITY MATCHING

(6) Similarity Matching

Enter Operational Task.Subtask number      0000.0000

Enter the number of the first task in your operational task list. The program will display the number and task name along with a prompt:

# SIMILARITY MATCHING

(6) Similarity Matching

Operational Equipment

Task.Subtask = 1.0000

Title = Track Target

Enter Control or Display number \_\_

Enter the number for the first control/display in the displayed task. The program will display the code number and name of the control-display along with a prompt.

# SIMILARITY MATCHING

## (6) Similarity Matching

Operational Equipment

Task.Subtask = 1.0000

Title = Track Target

Control/Display = 1.0000.C1

Title = Joystick

Enter Training Device Task.Subtask number 0000.0000

Enter the corresponding training device task number. The program will display the task number and name with a prompt to enter a control or display.

# SIMILARITY MATCHING

## (6) Similarity Matching

Operational Equipment

Task.Subtask = 1.0000

Title = Track Target

Control/Display = 1.0000.C1

Title = Joystick

Training Device

Task.Subtask = 1.0000

Title = Track Target

Enter Control or Display number \_ \_

# SIMILARITY MATCHING

Enter the number of the control/display in the training task that in your judgment corresponds to the operational control/display shown on the screen. The program will display the training device control/display number and name.

If in your judgment there is no comparable control/display in the training task, hit return and you will be prompt for the next operational control/display.

# SIMILARITY MATCHING

## (6) Similarity Matching

### Operational Equipment

Task.Subtask = 1.0000

Title = Track Target

Control/Display = 1.0000.C1

Title = Joystick

### Training Device

Task.Subtask = 1.0000

Title = Track Target

Control/Display = 1.0000.C1

Title = Joystick

Hit any key to continue



# SIMILARITY MATCHING

Press Escape. The program will then ask for another control/display in the first operational task displayed on the screen.

```
(6) Similarity Matching
Operational Equipment
  Task.Subtask = 1.0000
    Title = Track Target

Enter Control or Display number __
```

# SIMILARITY MATCHING

Press any key and the program will file this information. It will then display the following screen:

```
(6) Similarity Matching  
Operational Equipment  
  Task.Subtask = 1.0000  
    Title = Track Target  
  
  Control/Display = 1.0000.C1  
    Title = Joystick  
  
Enter Training Device Task.Subtask number 0000.0000
```

# SIMILARITY MATCHING

Continue entering the training controls and displays that correspond to the operational controls and displays for the first task.

When you are finished with the first task, press Escape twice; the program will request a new operational task number.

Continue with this process until you have finished all of the tasks/subtasks in the operational and training task lists.

This concludes the Similarity Matching, return to ASTAR Main Menu

# ASTAR Operation

## Main Menu

ASTAR MAIN MENU  
ver 2.0

- (1) ASTAR 1
- (2) ASTAR 2
- (3) ASTAR 3
- (4) Display Ratings
- (5) Database Maintenance
- (6) EXIT PROGRAM

Enter Option ---

# CONDUCTING ASTAR ANALYSES

## Display Ratings Screen

- The Display Ratings option presents four alternatives:
  - (1) List Training Device Ratings
  - (2) List Operational Equipment Ratings
  - (3) List Common Controls and Displays
  - (4) Exit

# CONDUCTING ASTAR ANALYSES

## Display Ratings

- The (1), List Training Device Ratings, option displays the ratings made while performing the three Acquisition analyses:
  - Performance Deficit,
  - Learning Difficulty,
  - and Quality of Training - Acquisition.
- These ratings can be displayed either by task or subtask.

# CONDUCTING ASTAR ANALYSES

## Display Ratings

- The (2) option List Operational Equipment Ratings, will display the ratings while conducting the three Transfer analyses:
  - Residual Deficit,
  - Residual Learning Difficulty,
  - and Quality of Training - Transfer.
- The (3) option List Common Controls and Displays will list each pair (training and operational equipment) of displays and controls and their Physical and Functional Similarity ratings.
- Option four returns the user to the Main Menu

# ASTAR Operation

## Main Menu

ASTAR MAIN MENU  
ver 2.0

- (1) ASTAR 1
- (2) ASTAR 2
- (3) ASTAR 3
- (4) Display Ratings
- (5) Database Maintenance
- (6) EXIT PROGRAM

Enter Option ---



# CONDUCTING ASTAR ANALYSES

## Raters and Rating Procedures

- Before beginning the rating process a group of raters should be selected.
- It is recommended to use three to five different analysts.
- Select raters with backgrounds in: Instructional Technology, Human Factor, Psychology, and Engineering.

# CONDUCTING ASTAR ANALYSES

## Rating Procedures

- ASTAR consists of rating scales from 0-100.
- It is important to use the full range of values.
- It is important to read the scales carefully while conducting the ratings, and rate each device independently.
- It is useful to take notes on how ratings are derived and list the assumptions that the ratings were based on, especially if the ratings to be reviewed with others.

# CONDUCTING RATINGS

## Select ASTAR Analysis Level

- From the ASTAR Main Menu Select options (1) , (2) or (3).
- The ASTAR Level XX menu will appear.
- The Level Menu is identical for all three Levels of analysis.
- The following Analysis Menu will appear.

# ASTAR

## 8 Rating Categories

- (1) Performance Deficit
  - (2) Learning Difficulty
  - (3) Quality of Training - Acquisition
  - (4) Residual Deficit
  - (5) Residual Learning Difficulty
  - (6) Physical Similariy
  - (7) Functional Similarity
  - (8) Quality of Training - Transfer
- Enter Option --

# ASTAR

## Conduct Rating

- Select one of the eight rating categories from the Ratings Menu.
- You will be asked to make rating judgements for a series of the question.
- Follow through the sequence until it returns you to the Ratings Menu.
- At any time press <ESC> to end the rating process and return to the Ratings Menu.
- Rating procedures are identical for all eight rating categories.

# CONDUCTING ASTAR ANALYSES

## Editing Ratings

To edit ratings:

- Select rating category to edit.
- Scan through all questions in that category until you reach the rating to be edited
- To scan you must press <enter> after each question. This reenters the value.
- Make the editing rating change by typing in the correct value.
- Press <enter> to change rating and <ESC> to return to the Ratings Menu

# CONDUCTING ASTAR ANALYSES

## Summary Statistics

- Once ratings are complete, option (9) Evaluation Summary will display the outcomes of the evaluation.
- For Astar Level 1 all raw score ratings for the categories are presented along with the Summary Statistics.
- For ASTAR Levels 2 and 3, only the Summary Statistics are presented.
- Summary statistics for Levels 2 and 3 can be listed by task or subtask.

# ASTAR SUMMARY STATISTICS

## Evaluation Summary Screen Level 1

Evaluation Summary			
Performance Deficit	XX		
Learning Difficulty	XX		
Training Problem		XX	
Quality of Training - Acquisition	XX		
Acquisition-Efficiency		XX	
Acquisition			XX
Residual Deficit	XX		
Residual Learning Difficulty	XX		
Physical Similarity	XX		
Functional Similarity	XX		
Transfer Problem		XX	
Quality of Training - Transfer	XX		
Transfer Efficiency		XX	
Transfer			XX
Summary			XX



# ASTAR SUMMARY STATISTICS

## Evaluation Summary Screen Level 2 or 3

Evaluation Summary		
Training Problem	XX	
Acquisition-Efficiency	XX	
Acquisition		XX
Transfer Problem	XX	
Transfer Efficiency	XX	
Transfer		XX
Summary		XX

# EVALUATION SUMMARY

## Training Problem

- The Training Problem Summary Score is a combination of the Performance Deficit and the Learning Difficulty ratings.
- It is a reflection of how much the trainees have to learn and how difficult the deficit will be to overcome.
- The larger the number the greater the training problem

# EVALUATION SUMMARY

## Acquisition-Efficiency Summary Score

- The Acquisition Efficiency Summary Score consists of ratings made for Quality of Training-Acquisition
- It is a reflection of how well the device is designed to overcome the training deficits specified.
- It reflects how long it will take the typical trainees to reach proficiency on the training device.
- It is good to have a low score

# EVALUATION SUMMARY

## Acquisition Summary Score

- The Acquisition Summary Score consists of: the Training Problem, and the Acquisition Efficiency.
- It is a reflection of the magnitude of how much trainees have to learn (Performance Deficit) , and how difficult this deficit is to overcome (Learning Difficulty).
- The higher the index, the larger the training problem.

# EVALUATION SUMMARY

## Transfer Problem

- The Transfer Problem Summary Statistic is calculated from ratings from four categories: Residual Deficit; Residual Learning Difficulty; Physical Similarity and Functional Similarity.
- It is a reflection of how much is left for the trainee to learn on the operational equipment.
- A high score does not necessarily mean a poor training device.

# EVALUATION SUMMARY

## Transfer Efficiency

- The Transfer Efficiency Summary Score consists of ratings made for the Quality of Training-Transfer.
- It indicates how well the device incorporates training principles that increase transfer efficiency.
- The Transfer Summary Score reflects how long typical trainees will need to reach proficiency on the operational equipment.
- A high number indicates a large remaining deficit and a poor first-trial transfer.

# EVALUATION SUMMARY

## Transfer Summary Score

- The Transfer Summary Score is a combination of the Transfer Problem and Transfer Efficiency Scores.
- The Transfer Problem Summary Score indicate how much learning must occur on the pare equipment. Consequently,
- A high score does not necessarily mean poor training.

# INTERPRETING ASTAR RESULTS

## Total Summary Score

- The Total Summary Score is a combination of the Acquisition and the Transfer Summary Score.
- It reflects the time necessary for trainees to go from the start of the training to proficiency on the operational equipment.
- When comparing two or more devices with the same training and operational objectives, the lower the total score, the faster the trainee should reach proficiency on the operational equipment.



