Scenarist Automated Scenario Generation System

Sample Demonstration Demo 1.

Contract No. DAAB07-89-C-P017

April 17, 1991

Sponsor: US Army Communications-Electronics Command
SIGINT/ESM Branch
Advanced Concepts Division
Center for Electronic Warfare / Reconnaissance,
Surveillance and Target Acquisition
ATTN: AMSEL-RD-EW-C (Dr. Frank Elmer)
Fort Monmouth, NJ 07703-5000
Tel: (201)544-3224

Contractor: Vista Research Corporation
ATTN: Dr. J. George Caldwell, Director
William N. Goodhue, Scenarist Program Manager
5055 E. Broadway Boulevard, Suite D205
Tucson, AZ 85711
Tel: (602)790-0500

Note (added 31 January 2017): This document was originally produced using WordPerfect 4.2, which did not have a capability for imbedding graphics. The graphics (photographs of computer screens) and are not included in this document.

1.0. Introduction

1.1. Purpose of Document

This document presents a description of a demonstration disk of the Scenarist Automated Scenario Generation System.

1.2. Overview

This demo provides an overview of the Scenarist functions. Part I of this demo (Steps a-l) guide the user through the log on procedures, Project File selection, digital terrain, elevation, and vector map displays, and the display of the TRAILBLAZER military organization. Shown are the key elements of the organization that will be referenced in the CLIPS expert system knowledge base and used in the automatic repositioning of units in conformance with the doctrine for their placement. Rules governing placement of TRAILBLAZER equipment are being developed and tested. Positions shown are the initial, canonical locations. An update to this demo will be prepared following the completion of the TRAILBLAZER knowledge base. That update will include repositioning of equipment based on assessments made by the CLIPS expert system.

Part II of this demo (Steps m-s) does employ the CLIPS expert system to automatically reposition Field Artillery radars on digital terrain. An initial set of rules has been developed for determining the suitability of a location. The following suitability criteria are used. For radars, a location is unsuitable if:

1. The terrain type is mountains, urban, or water.
2. The distance to the FEBA is less than 7 kilometers.
3. The horizon angle is less than 0.2 radians in absolute value.

A search algorithm is used to evaluate nearby terrain cells until a suitable location is found or the maximum search cell count is reached.

2.0. Minimum Hardware Requirements for Running Demo

The Scenarist runs on a PC/AT machine (286/386) and requires approximately 1.5 megabytes of disk space, an EGA or VGA monitor, and a mouse.

A batch command file, INSTALL.BAT, can be used to install the

Scenarist. INSTALL.BAT contains the following DOS commands:

```
c:
mkdir scendemo
cd\scendemo
copy b:*.*
copy b:\scendemo\*.*
```

If you do not want to use the c: drive or the c:\scendemo directory, appropriate changes will be necessary.

The Scenarist demo is started by typing SCENDEMO from the installation directory.

3.0. Step-by-Step Description of the Demo

3.1. Part I.

Step a. Setup procedure

Load the Scenarist demo disk onto your system either by running the b:\install.bat batch command file by copying all the files contained in the b:\scendemo*.* directory to the directory of your choice.

Step b. Log on procedure

To begin execution of the Scenarist demo, type:

SCENDEMO <Enter>

The following introductory screen will be shown:

```
*****************************************************************
*                                                               *
*                                                               *
*                        SCENARIST                              *
*                                                               *
*            Automated Scenario Generation System               *
*           Developed by: Vista Research Corporation            *
*               Dr. J. George Caldwell, Director                *
*         William N. Goodhue, SCENARIST Program Manager         *
*            5055 E. Broadway Boulevard, Suite D205             *
*                   Tucson, AZ 85711 USA                        *
*                    Tel: (602) 790-0500                        *
*                                                               *
*      Sponsor:  US Army Communications-Electronics Command     *
```

```
*          SIGINT/ESM Branch, Advanced Concepts Division          *
*          Center for Electronic Warfare/Reconnaissance,          *
*               Surveillance and Target Acquisition               *
*              ATTN: AMSEL-RD-EW-C  (Dr. Frank Elmer)             *
*                  Fort Monmouth, NJ  07703-5000                  *
*                       Tel: (908) 544-3224                       *
*                                                                 *
*******************************************************************
```

To continue, click left mouse button on:

CONTINUE.

The following introductory screen will be shown:

```
*******************************************************************
*                                                                 *
*                  Scenarist Fact Sheet                           *
*                                                                 *
*                                                                 *
*    1.  The Scenarist is an AI based system developed by         *
*    Vista Research Corporation for the US Army                   *
*    Communications-Electronics Command.                          *
*                                                                 *
*    2.  The Scenarist utilizes digital terrain and features      *
*    data derived from Defense Mapping Agency data bases.         *
*                                                                 *
*    3.  The expert system shell is the NASA-developed C          *
*    Language Integrated Production system (CLIPS).               *
*                                                                 *
*    4.  The Scenarist knowledge base can account for:            *
*         a.  tactical doctrine for unit/equipment placement      *
*         b.  mission and objectives of the friendly forces       *
*         c.  nature and mission of the enemy threat              *
*         d.  geographic terrain features                         *
*         e.  Forward Edge of the Battle Area (FEBA)              *
*                                                                 *
*    5.  The Scenarist dynamically repositions subordinate        *
*    units once the parent units have been positioned.            *
*                                                                 *
*    6.  The Scenarist is written in the C programming            *
```

```
*    langauge, with planned emphasis on portability to          *
*    diverse hardware platforms.                                *
*                                                               *
*    7.  The Scenarist database is a normalized structure       *
*    and can accommodate inputs from a variety of user sources. *
*                                                               *
*****************************************************************
```

To continue, click left mouse button on:

CONTINUE.

Step c. Project File Selection.

1. Select project file by moving mouse cursor to file name PROJ0101.FIL and clicking left mouse button.

2. Confirm PROJ0101.FIL project file selection by clicking left mouse button on ACCEPT.

3. The Terrain-type Data File Summary will appear.

To continue, click left mouse button on:

CONTINUE.

4. The Elevation Data File Summary will appear.

To continue, click left mouse button on:

CONTINUE.

5. The Set Map Location Point screen will appear.

To continue, click left mouse button on:

CONTINUE.

6. A brief description of Part I of the demo will appear.

To continue, click left mouse button on:

CONTINUE.

7. A brief description of Part II of the demo will appear.

To continue, click left mouse button on:

CONTINUE.

Step d. Display Digital Terrain Map

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This screen shows the different terrain types in the map area of interest.

To continue, click left mouse button on:

CONTINUE.

Step e. Display Elevation Map

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This shows the terrain elevation which will be used by CLIPS and/or the user in determining the correct positioning of units and equipment.

To continue, click left mouse button on:

CONTINUE.

Step f. Display Vector Map

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This screen shows major cultural map features such as towns (scaled to size) and roads. Bodies of water are also shown.

To continue, click left mouse button on:

CONTINUE.

Step g. Display Blue Division Unit on Map

Identified in Division2 are DivHQCo, MIBn, and two MechBde. Also shown are the FEBA, Objective, and Avenue of Approach.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This screen shows elements of a deployed division and the zoom capability of the SCENARIST.

To continue, click left mouse button on:

CONTINUE.

Step h. Display MI Battalion on Map

Identified are MIBnHQCo and EWCo.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This screen shows subunits of the previously displayed Blue Division.

To continue, click left mouse button on:

CONTINUE.

Step i. Zoom Map to Battalion Boundary. Display EW Company on Map.

Identified are EWHQPlt and SIGINT Processing Plattoon.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This represents a zoom-in from the previous screen to focus on elements shown in that screen.

To continue, click left mouse button on:

CONTINUE.

Step j. Display SIGINT Processing Platoon (SPP) on Map.

Identified are TEAMPACK Team and TRAILBLAZER master control sets (MCS).

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This screen shows the sub-elements of the SIGINT Processing Platoon displayed on the previous screen.

To continue, click left mouse button on:

CONTINUE.

Step k. Display TRAILBLAZER Section, TBSec1, and TEAMPACK Section, TPSec1, on Map.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. The TRAILBLAZER elements are deployed in the standard "W" shape.

To continue, click left mouse button on:

CONTINUE.

Step 1. Zoom Map to Display TBSec1 on Map.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This screen isolates the TRAILBLAZER section and shows canonical locations and orientation toward the FEBA and target area.

The TRAILBLAZER knowledge base, as represented in CLIPS, will determine final locations based on such rule elements as: distance from the FLOT, minimum platform separation distance, a maximum 30 degree gradient for access to the deployment site, LOS condition between stations, etc.

To continue, click left mouse button on:

CONTINUE.

3.2. Part II.

Step m. Display Blue and Opposing Red Division on map.

Identified are Division1, Red Division, FEBA, the Objective, and the Avenue of Approach.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen.

To continue, click left mouse button on:

CONTINUE.

Step n. Display MechBde1 and MechBde2 on map.

Identified are ADABatt and FABatt in each brigade.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This screen shows the brigade sub-elements of Division1 from the previous screen.

To continue, click left mouse button on:

CONTINUE.

Step o. Zoom Map to MechBde1 Boundary and Display MechBde1 on Map.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This zoomed display shows the ADA and FA batteries.

To continue, click left mouse button on:

CONTINUE.

Step p. Display FA_Batt1 and ADA_Batt1 on Map.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This depicts the brigade's Air Defense Artillery battery, consisting of a battery headquarters and three Forward Area Alerting Radar (FAAR) units and the brigade's Field Artillery battery, consisting of three DIVARTY target acquisition assets -- two TPQ-36's and a TPQ-37.

To continue, click left mouse button on:

CONTINUE.

Step q. Display Canonical positions of FA_Batt1 on Map.

To proceed, click left mouse button on:

CONTINUE.

Shown below is printed output of what will be on the screen. This depicts the elements of the Field Artillery battery.

Note that the canonical laydown has one TPQ-36 positioned in a lake. The next sequence of screens shows how this will be resolved by the SCENARIST.

To continue, click left mouse button on:

CONTINUE.

Step r. Reposition the Subunits Using the CLIPS Expert System

The CLIPS expert system will indicate to the user which rule has failed. In this case, the FAILED CLIPS rule is:

"Initial Location of Subunit is Suitable"

The reason for failure is that the cell containing the initial location is of Terrain Type 6, Water. This condition initiates a search algorithm for a suitable location.

To proceed, hit <Enter>.

At this step the FAILED CLIPS rule is:

"Flood search location is suitable"

The reason for failure is that the selected cell is of Terrain Type 6, Water.

To proceed, hit <Enter>.

At this step, CLIPS has successfully relocated the radar and the map is redrawn with symbols indicating the final repositioning.

Shown below is printed output of repositioned subunits as determined by the CLIPS expert system. This screen also shows the unsuitable locations which were tested (marked by dots) before the suitable location was found. The TPQ-36's final position is outside the cell identified as containing water.

This completes the SCENARIST Demo. Some general information on the SCENARIST follows.

To proceed, click left mouse button on:

CONTINUE.

Step s. Summary Screens.

```
************************************************************
*                                                          *
*    The complete Scenarist Automated Scenario Generation  *
*    System provides the user with a broad range of:       *
*                                                          *
*         Unit Definition and Display functions            *
*                                                          *
*         Define generic and specific units in the data    *
*         base.                                            *
*                                                          *
*         Enhanced inter-file unit copying to expedite the *
*         unit definition phase.                           *
*                                                          *
*         Delete units, generic and/or specific from       *
*         the data base.                                   *
*                                                          *
*         Reposition units. The Scenarist allows for       *
*         the following types of placement of units:       *
*                                                          *
*              0: Canonical placement - initial value;     *
*              1: User-reviewed, unchanged;                *
*              2: User-suggested placement;                *
*              3: User-mandated placement;                 *
*              4: Position reviewed by rules               *
*                 unchanged;                               *
*              5: Position reviewed by rules, moved.       *
*                                                          *
*         Display unit on digital terrain map.             *
*                                                          *
*         Output specific unit file and/or generic unit    *
*         file to a HP Laserjet Series II (or              *
*         compatible) printer.                             *
*                                                          *
************************************************************
```

To proceed, click left mouse button on:

CONTINUE.

```
************************************************************
*                                                          *
*         Terrain, Elevation, and Vector Map Processing    *
*         and Display functions.                           *
*                                                          *
*        The Scenarist can handle, at the same time,       *
*        terrain and elevation maps having different       *
*        resolutions.  The Project File identifies which   *
*        map files will be active when the Scenarist       *
*        begins processing.                                *
*                                                          *
*        The user can display each of the three map        *
*        types: Terrain, elevation, and vector.            *
*                                                          *
*        The user can change the Map Location Point.       *
*        This allows the user to move throughout the       *
*        viewing area and the Scenarist automatically      *
*        orients the maps to the common intersection       *
*        point.                                            *
*                                                          *
*        The user can change map files.  This allows the   *
*        user the flexibility to choose the map            *
*        resolution that best fits the application         *
*        requirements at that moment.                      *
*                                                          *
*        A hard copy printout of any map display can be    *
*        obtained.                                         *
*                                                          *
************************************************************
```

To proceed, click left mouse button on:

CONTINUE.

```
************************************************************
*                                                          *
*    APPLICATIONS:                                         *
```

```
*                                                              *
*    The SCENARIST  can support a number of user               *
*    applications.  Some primary uses are:                     *
*                                                              *
*    1.  To support the assessment of military equipments      *
*        in their intended operational environments.           *
*                                                              *
*    2.  To support the analysis of doctrinal deployment       *
*        issues.                                               *
*                                                              *
*    3.  To support the evaluation of sensor system            *
*        deployments, effectiveness, and tradeoffs.            *
*                                                              *
*    4.  To support the analysis of force sizing               *
*        requirements for various military systems.            *
*                                                              *
*    5.  The SCENARIST is a training tool for military         *
*        scientists.                                           *
*                                                              *
*    6.  Other applications that require use of realistic,     *
*        detailed, large-scale, military deployments.          *
*                                                              *
****************************************************************

     To proceed, click left mouse button on:

                CONTINUE.

****************************************************************
*                                                              *
*    7.  For further information:                              *
*                                                              *
*                    SCENARIST                                 *
*                                                              *
*       Automated Scenario Generation System                   *
*      Developed by: Vista Research Corporation                *
*          Dr. J. George Caldwell, Director                    *
*    William N. Goodhue, SCENARIST Program Manager             *
*       5055 E. Broadway Boulevard, Suite D205                 *
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*         Surveillance and Target Acquisition                  *
*        ATTN: AMSEL-RD-EW-C  (Dr. Frank Elmer)                *
```

*   Fort Monmouth, NJ 07703-5000   *
*   Tel: (908) 544-3224   *
*   *
****

To proceed, click left mouse button on:

CONTINUE.

To Quit from the Scenarist demo, click left mouse button on:

CONTINUE.