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STUDENT REPORT

AN ANALYSIS OF THE
ATLAS ADVANCED MAPPING PACKAGE
FOR USE IN BATTLE STAFF BRIEFINGS

MAJOR LYNN D. SZYMKOWICZ 87-2430

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TITLE AN ANALYSIS OF THE ATLAS ADVANCED MAPPING PACKAGE
FOR USE IN BATTLE STAFF BRIEFINGS

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Submitted to the faculty in partial fulfillment of
requirements for graduation.

AIR COMMAND AND STAFF COLLEGE
AIR UNIVERSITY
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EXECUTIVE SUMMARY

REPORT NUMBER: 87-2430

AUTHOR: MAJOR LYNN D. SZYMKOWICZ

TITLE: AN ANALYSIS OF THE ATLAS ADVANCED MAPPING PACKAGE
FOR USE IN BATTLE STAFF BRIEFINGS

I. Purpose: To analyze a new off-the-shelf software package for its applicability to battle staff briefings.

II. Problem: Several commands have established an immediate need for an automated briefing system for their battle staffs. The off-the-shelf software they are currently using does not meet all their needs, and they have found custom software is expensive and not responsive to frequent changes. They would like to find an automated briefing program to work on their current IBM-compatible microcomputer networks which is flexible in supporting changes quickly.

III. Data: The Atlas Advanced Mapping Package (AMP) was selected for analysis because of its flexibility in creating maps and charts quickly and because of its purported capability to draw information from other data bases such as dBase and display the information on the maps and charts. By testing actual slide formats used by one of the commands, the analysis showed that Atlas AMP would support the creation and display of battle staff briefings. It also showed that Atlas AMP had some additional capabilities in the areas of pre-stored maps, zooming, and data base interface which did not exist in the current software being used by the commands. However, some limitations such as a multi-step process to create and update slides and the limitation of only being able to pull numeric data out of other data bases keep the program from being a panacea. An advanced version of Atlas AMP (called ExpressMap) which is supposed to eliminate some of the multi-step process was not tested.

IV. Conclusions: Atlas AMP has some distinct advantages and disadvantages over current programs. The advantages could outweigh the disadvantages if the advanced version of Atlas AMP was used because the multi-step process to create slides would be reduced. However, the inability to pull text data from data files remains a significant limitation.

V. Recommendation: Commands interested in a flexible briefing program based on maps and charts should test the advanced version of Atlas AMP to see if it is simple and timely enough for their battle staff use.

AN ANALYSIS OF THE ATLAS ADVANCED MAPPING PACKAGE
FOR USE IN BATTLE STAFF BRIEFINGS

OVERVIEW

A need has been established by several commands for an automated battle staff briefing system. At least three commands (NORAD, AAC, and ADTAC, prior to becoming 1AF) have acted on the immediacy of the need by procuring networks of microcomputers, some with closed circuit TV systems, outside of the normal procurement cycle. Software for these networks is either rudimentary off-the-shelf briefing software or software under development at great expense in manpower or contractor dollars. None of the software currently in place satisfies user requirements for a briefing program. The purpose of this research project is to analyze a new, more sophisticated off-the-shelf software program called Atlas Advanced Mapping Package (AMP), by Strategic Locations Planning, Inc., to see if it would better meet battle staff requirements of these three commands. The software analysis includes a brief description of the requirements the battle staffs have for briefing software and the limitations of the current software; it then describes the capabilities of the Atlas Advanced Mapping Package and how to go about setting up a battle staff briefing; it discusses some advantages and disadvantages of using Atlas AMP over current programs; and finally it offers some conclusions. Appendix 1 has sample NORAD briefing slides using Atlas AMP.

REQUIREMENTS

A need for a flexible automated briefing system using microcomputer networks has been established for several years at NORAD, ADTAC, and AAC. (7:-- , 8:-- , 10:--) While detailed requirements for the hardware of the various microcomputer networks exist, only ADTAC developed detailed written requirements for the briefing software needed by region battle staffs. In general the software had to have the capability to overlay color-coded text and numeric data from a data base on to maps displayed on the Air Force standard Tempest microcomputer (7:--). NORAD had not written down their briefing software requirements, but from interviews with the responsible action officers several requirements were apparent. The briefing had to be in a slide show where color slides could be added, deleted, or rearranged rapidly. They needed to be able to modify existing slides or create new slides quickly. Slides consisted mostly of maps and charts. Finally the slides had to be easy to read from a distance of about 20 feet using the 25 inch TV monitors installed in the NORAD Cheyenne Mountain Complex (NCOM). Experiments showed that 40-character mode medium resolution graphics met that requirement (10:--). AAC had developed data base software requirements but had not specified briefing software requirements other than the general requirement to have briefing software that drew information from the data base (8:--). A final requirement not formalized but verbalized in user meetings was for commonality of software since ADTAC and AAC support the NORAD mission. With common software it would be possible to exchange information digitally at some future point and training requirements would be simplified (12:--).

There are numerous problems with the current software in place for these three battle staffs. ADTAC's software requirements were to be developed by a contractor, however the development was placed on hold after the first region's maps and data base were delivered. The contract was modified to include an analysis of all battle staff software requirements (9:--). Consequently, the CONUS regions do not have a standard briefing software package. One of the weaknesses in the software requirements as originally written was the lack of a requirement for the capability to rapidly modify slide formats (7:--). Experience at NORAD has indicated this is an important capability. The rudimentary briefing software at NORAD (PenPad) basically meets senior battle staff requirements, however several members of the support staff have indicated the software does not support their requirements for timely updates and interface with the regions' data bases. Consequently a significant amount of time is spent manually receiving information, and short notice slide requirements are generally accomplished using

transparencies rather than the automated system (9:--; 10:--; 11:--). AAC did not have a graphics-capable briefing slideshow program in place.

• In summary, if commonality is a goal, then the NORAD and region battle staffs need a briefing slideshow program which is easy to modify and update, and which can pull information from data bases and overlay the information on maps and charts. This analysis looks at one off-the-shelf program which has the potential for satisfying many of the battle staff needs.

CAPABILITIES OF ATLAS AMP

The software package analyzed here which appears to have considerable potential for satisfying many of the battle staff needs is Atlas Advanced Mapping Package (AMP). Before going into detailed capabilities of the Atlas AMP software, a brief description of how the programs work is warranted.

There are actually three major programs and several utility programs that Strategic Locations Planning has developed. All of the programs are needed to create a battle staff briefing. The three major programs are Atlas AMP, DataEdit, and MapEdit. The most used utility is Slides (3:2-5,19-3). In addition, Atlas programs can import numeric data from other popular data base and spreadsheet programs such as dBase and Lotus 1-2-3 (3:17-48).

To create a slide, you must first select a map/chart while in Atlas AMP or create a new one using MapEdit (with or without a digitizer pad). If you have numeric data used to color code the map/chart, you must use DataEdit to create or update the numeric data. Atlas AMP is then used to combine the map with the color-coded numeric data, to add any labels or comments (which can be saved and overlaid when necessary), and to save the screen as a screen image (3:5-3 - 6-28). Finally, Slides is used to show a series of slides (3:19-3). While this is a multiple step process, it is fairly quick and gives the flexibility to modify briefings easily without software changes.

Atlas AMP and its associated programs have the following features which support battle staff briefings:

- It already has worldwide maps in either lat/long or projected. You can view any state, country, or combination (4:24-23 - 24-46). (See Appendix 1, figures 1-3.)

- New maps and charts can be created using a digitizer pad or keypad. Existing maps can be modified. The program will automatically size the map to the screen. (It does this by using data files rather than screen images to create the maps.) (4:24-2 - 24-89) (See Appendix 1, figure 3.)

- You can zoom in to isolate a specific area or zoom out to resize map to a portion of the screen (3:2-4). (See Appendix 1, figures 4 and 5.)

- You can type in text in three different sizes anywhere on the screen (3:2-4). (See Appendix 1, figure 6.)

- Features such as bases, region boundaries, etc. can be overlaid on the maps (3:2-4). (See region boundaries in Appendix 1, figure 3.)

- Circles with radii in miles can be drawn on lat/long maps. (Useful for radar coverages, aircraft ranges, etc.)(4:24-54) (see Appendix 2, figure 7.)

- Maps can be tilted or rotated for special effects (4:24-18 - 24-22). (See Appendix 1, figure 8.)

- Geographic features or chart features can be automatically labelled with their name or an associated numeric value (3:2-4). (See Appendix 1, figure 10.)

- Maps can be color-coded to reflect status or some other characteristic (3:2-4) (e.g., hostile vs friendly tracks). (See Appendix 1, figure 9.) Numeric data can be pulled from other programs such as dBase, Lotus 1-2-3, or VisiCalc (3:17-48) to color-code the maps. Atlas AMP also has a simple spreadsheet capability internal to the program. Numeric data from these spreadsheets can be used to color-code the maps and charts rather than importing the data from another program (3:6-3). (See Appendix 1, figures 9-11.)

- It only takes a single keystroke to move between program functions such as zoom and label (except loading files). There are also extensive help screens and prompts which make it easy to move through the programs (3:2-4).

- Slide presentations can be put together using any standard bit-saved screen images, not just screens created by Atlas (3:2-4).

- Sixteen colors are available with an Enhanced Graphics Adapter (3:3-10). (Four color mode is also available, but not recommended because it does not support standard reporting of operational status using red/yellow/green color-coding.)

- Lat/long maps can be converted to projected maps and vice versa (4:24-14). This is useful if the lat/long distortion is disconcerting to the user.

- Features (such as region boundaries) can be copied from one file to another. New features can be added, unnecessary ones deleted. The program automatically sizes the map to the screen. This allows rapid modification of maps and charts (4:24-25 - 24-64).

- Features on the maps/charts (circles, lines, sites, geographic areas) can be combined into new features or split into

separate features (4:24-25 - 24-46). This is good for depicting such things as areas of responsibility.

In short, many of the features of Atlas AMP and its associated programs directly support rapid creation and modification of briefing maps and charts. The next section describes how battle staff briefings might be set up using the features described above.

HOW TO SET UP BATTLE STAFF BRIEFINGS

Atlas AMP is a very flexible program. However, this flexibility forces the user to follow multiple steps in creating or modifying briefings. To initially create a briefing, the following steps must be followed:

1. Create your background maps and charts using MapEdit. (Background maps and charts are those which contain the outlines of countries or charts without any words or numeric data.) The MapEdit reference manual and tutorial give clear instructions on creating maps. The same principles apply to creating charts with some added tricks described later in this paper. Once those are created you can call them up as background for numerous slides.

2. If the map or chart will be color-coded to reflect certain conditions (e.g., outage reports), create the data bases for those conditions using DataEdit or other program such as dBase. Because color-coding is done by the program using numeric data, conditions must be entered numerically (i.e., 1/2/3 for red/green/yellow).

3. Assemble individual slides using Atlas AMP. Select a background map or chart and overlay whatever text information (titles, labels, keys, textual data) you need. (When the text information is placed appropriately, save the text information to a "comment file" for subsequent updates.) If color-coding is required, load the appropriate data base and data ranges and have Atlas AMP color the map according to the information in the data base. Save the screen image. (All of these actions are single keystroke actions except for the file names.)

4. Assemble the briefing using Slides.

5. View the briefing using Slides (3:--,4:--).

To update the information on briefing slides:

1. As changes occur update the data bases using DataEdit or other data base/spreadsheet program. (If using another program, you must use DataEdit to import the data and transform it into the format used by Atlas AMP.

2. As changes occur update the comment files which contain the text on the slides using Atlas AMP.

3. When preparing the briefing, assemble the background map/chart, color-coding data, and text for each slide and save the screen image (3:--,4:--).

Do's and don'ts in preparing briefings: (This information will seem rather abstract unless you have read through the reference manual.)

- If you prepare a chart, make sure you put a line around the edge as a border. Otherwise the program will resize your chart to fit the screen after you have finished drawing it, distorting the boxes and lines on the chart (3:9-7).

- If you only want certain features labelled, name those features you want labelled, and put a null character (/) in the name of the remaining features. Otherwise all features will be labelled including screen borders, boundaries, and other extraneous lines (4:25-109).

- To color-code outages, make all the outage features "polygons" rather than "lines", "sites", or "circles". Only polygons are affected by the color-code numeric data in the data files (4:25-97). The program color-codes polygons using "hatch patterns" which can be solid colors, various patterns of lines, or various densities of dots. Make sure that the hatch patterns used to color code the slide reflect what is appropriate (3:11-4) (e.g., hatch pattern for "non-operational" is red solid - see figure 4).

- All features of a certain type (i.e., lines, sites, polygon outlines) are colored the same color by the program. If you want to color certain outlines a specific color, convert the feature from a circle, line, or polygon to another feature which is the appropriate color (4:25-97).

- To locate an aircraft or satellite track on a map, use MapEdit. Use a lat/long map and input the track (single point or line) with the lat/long point, label the track with the track number, then project the map if the lat/long map is too distorted (4:25-119).

- On charts, draw all boxes and connections which must be color-coded as polygons. Only polygons can be color-coded using the numeric data in the data files (4:25-97).

- If using a data base or spreadsheet program to provide data for Atlas AMP, consider using an extension of the disk operating system (DOS) such as Windows to switch rapidly between programs.

As can be seen, Atlas AMP is a complex program. Creating battle staff briefings, especially with slides depicting charts rather than maps, requires some manipulation which is not obvious from the reference manuals. Atlas AMP has some definite advantages over currently used software because of its flexibility, but it has some definite disadvantages because of its complexity and other limitations. The next section discusses those advantages and disadvantages in detail.

ADVANTAGES AND DISADVANTAGES TO ATLAS AMP

Atlas AMP has some clear-cut advantages and disadvantages when considering its use for battle staff briefings. The two primary advantages to Atlas AMP are the ability to color-code maps based upon data in a data base and the flexibility it provides in creating and modifying maps. These were explained in some detail above. The capability to project and unproject maps from lat/long, the capability to zoom in and zoom out on maps, the capability to automatically label features on the maps are capabilities which do not exist in the current battle staff briefing programs in use, and are capabilities which satisfy needs not currently being met. (3:--; 4:--; 7:--; 8:--; 9:--; 10:--; 11:--)

Another advantage is the capability of the Slide utility to use any screen image from any other program which uses the standard IBM screen image format (described in the IBM BASIC manual under the BSAVE command). (2:4-33) This makes it possible to integrate slides which were created using a different program which satisfied other user needs.

The primary disadvantage of Atlas AMP is the inability to use text (except for feature names) in their spreadsheet and overlay that text on the maps or charts. For example, if you want a map with fighter status (12 F-15s) displayed under the airbase name you must type the fighter status in directly on the map using the text function. You cannot have it in the spreadsheet and overlaid automatically on the map under the base name (3:10-5 - 10-6). This slows the updating process because the user must update some data in the data file using DataEdit and other data on the screen using Atlas AMP. It also means the support staff can not have a truly integrated data base and briefing program. If the support staff has a microcomputer for tracking data base information they will have to enter some information twice -- once in their data base and again in the briefing program.

Other disadvantages to using Atlas AMP are its multiple step process for updating slides and the complexity of the programs which may mean the development of a training program for operators.

The multiple step process is not a hindrance when creating a one-time briefing because the various steps provide flexibility in designing the slides. However the multiple steps are a hindrance when updating a briefing over and over again in short periods of time. You can't just call up the last slide and update information directly. You must update the data file, the comment file, and sometimes the background map (for inserting tracks, etc.) and then

assemble all the files and save the screen image in order to update any slide (3:--). This may be too time consuming in a stressed environment. One possibility for overcoming this disadvantage is to test an enhanced version of Atlas AMP. According to a PC World review of Atlas AMP, ExpressMap is an enhanced version of Atlas AMP which has "built-in macros [which] let you tailor the program to your own applications and automatically generate maps with just a few keystrokes. Its capabilities are essentially the same as Atlas AMP's except that it runs much faster -- you can whiz through a session in no time." (6:268)

The complexity of the program is also a problem. In the same PC World review of Atlas AMP the reviewer's only negative comments about the program were with regard to the "struggle up a steeper learning curve" because of the program design, particularly in the use of function keys (6:265). "[The] non-intuitive function-key orientation will tend to discourage novice users." (6:271) The reviewer also criticized the organization of the reference manual, saying "the abundance of detail was welcome, [but] you could easily develop a finger blister flipping back and forth." (6:266) Not only are the programs themselves complex, but using them for battle staff applications requires special techniques which are not in the manual. Those uncovered during this analysis are listed in the section on how to set up battle staff briefings. Because of the program's complexity and the special techniques required, training and checklists would probably be required for those who have to create new slides. On the up side, those who are only updating data or assembling slides can probably get by with reading the Atlas Quick Guide, a small manual included in the package (5:--), and with receiving a training session at the beginning of an exercise.

The problems with using Atlas AMP are clear, but the advantages of using Atlas AMP are also persuasive. The next section offers some conclusions to assist those acquiring software for battle staff systems in determining whether Atlas AMP would be of use.

CONCLUSIONS

It is not possible to make an absolute recommendation to use Atlas AMP for current battle staff microcomputer networks at NORAD, IAF, and AAC. There is no doubt Atlas AMP can be used to create battle staff briefings. The program essentially has all the capabilities of the current program in use in Cheyenne Mountain and some additional capabilities. The advantages of flexibility and data base color-coding are extremely useful. The zoom, rotate, tilt, label, lat/long input and other functions allow for rapid, professional creation of maps. These capabilities are not present in current software. The possible additional speed advantages gained by using the enhanced version, ExpressMap, make it an attractive software package to test. The inability to use text in their spreadsheet and overlay that text on maps is the major disadvantage of the Atlas AMP program. That information has been provided to Strategic Locations Planning via their user suggestion program. Perhaps a subsequent version of the software will include that capability. In the meantime this software package and its enhanced version have some excellent capabilities which may be exploited by battle staffs and battle support staffs.

SELECTED BIBLIOGRAPHY

Books

1. Ashton-Tate. Learning and Using dBase III Plus. Ashton-Tate, 1985.
2. International Business Machines Corporation. BASIC by Microsoft. Boca Raton, Fl: IBM Corp., 1981.
3. Strategic Locations Planning. Atlas User's Manual. San Jose, Ca: Strategic Locations Planning, Inc., 1986.
4. Strategic Locations Planning. MapEdit User's Manual. San Jose, Ca: Strategic Locations Planning, Inc., 1986.
5. Strategic Locations Planning. Atlas Quick Guide. San Jose, Ca: Strategic Locations Planning, Inc., 1986.

Articles and Periodicals

6. Dykstra, Dennis. "Mapping Strategies," PC World, October 1986, pp. 260-271.

Official Documents

7. Air Defense Tactical Air Command (ADTAC). Request for Proposal for Air Defense Combat Information System. Langley AFB, Va, 1985.
8. Alaskan Air Command. Data Automation Requirement for Joint Task Force- Alaska Information Management System. Elmendorf AFB, Ak, 1983.

Other Sources

9. Anderson, Donald, Capt, USAF. NORAD/NCOO. Interview, June 1986.
10. Carver, William, Major, USAF. North American Aerospace Defense Command (NORAD)/NCCX. Interview, July 1986.
11. Myers, James, Lt Col, USAF. NORAD/NCOF. Interview, July 1986.
12. Szymkowicz, Lynn, Major, USAF. NORAD/NCOO. Meeting notes, ADCIS Requirements Meeting, November 1984.

APPENDIX 1

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FIGURE 2--Projected map..... 16

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FIGURE 7--Lat/long map with circle; radius drawn in miles..... 21

FIGURE 8--Map tilted for special effect..... 22

FIGURE 9--Color-coded maps..... 23

FIGURE 10--Color-coded chart with labels..... 24

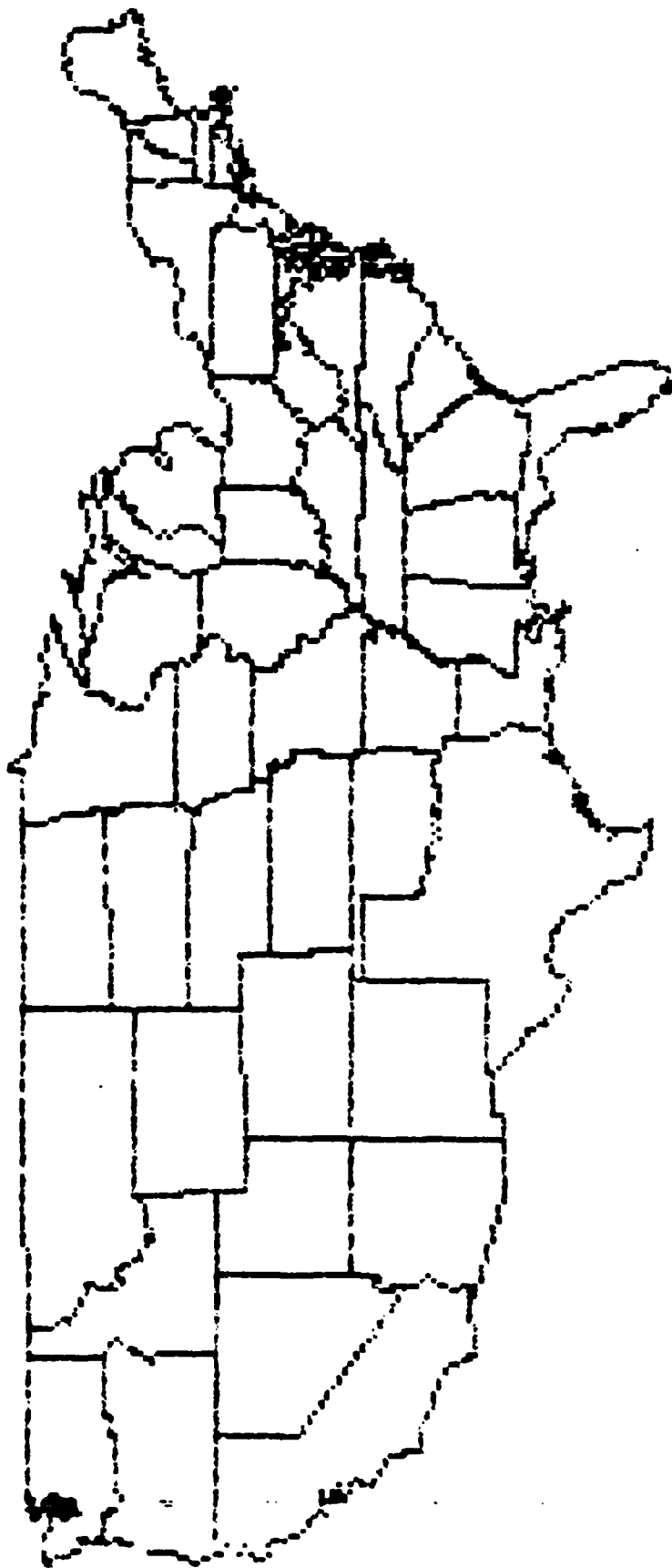


Figure 1. Lat/long map

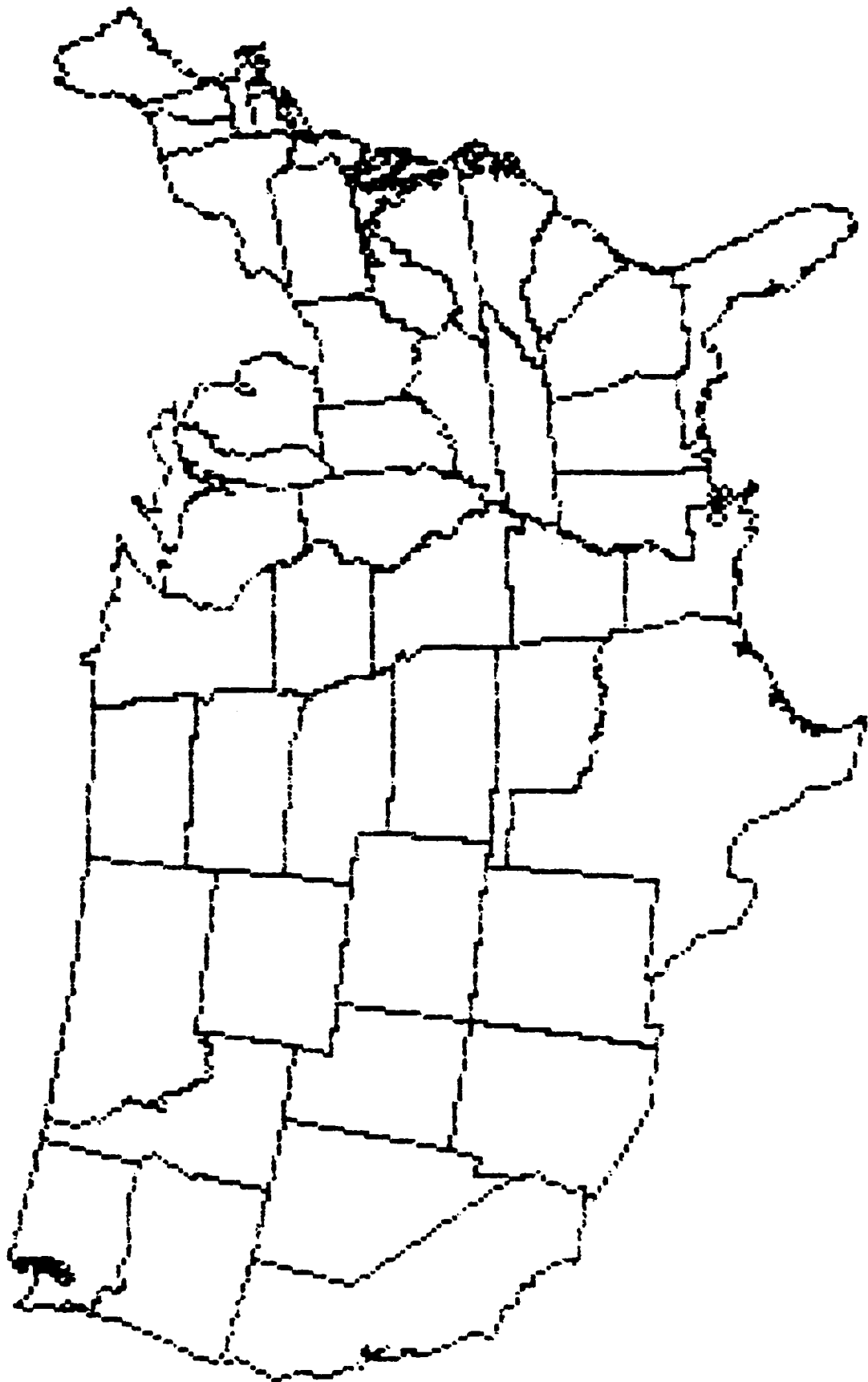


Figure 2. Projected map

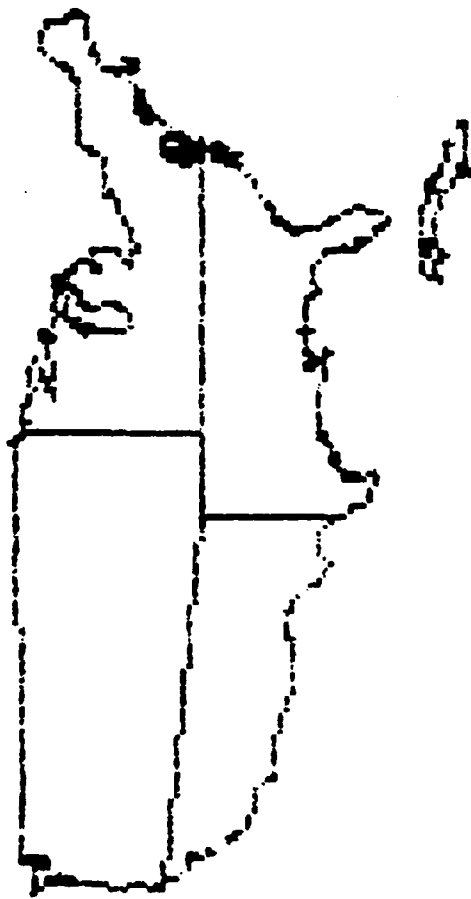


Figure 3. Selected countries

40

40

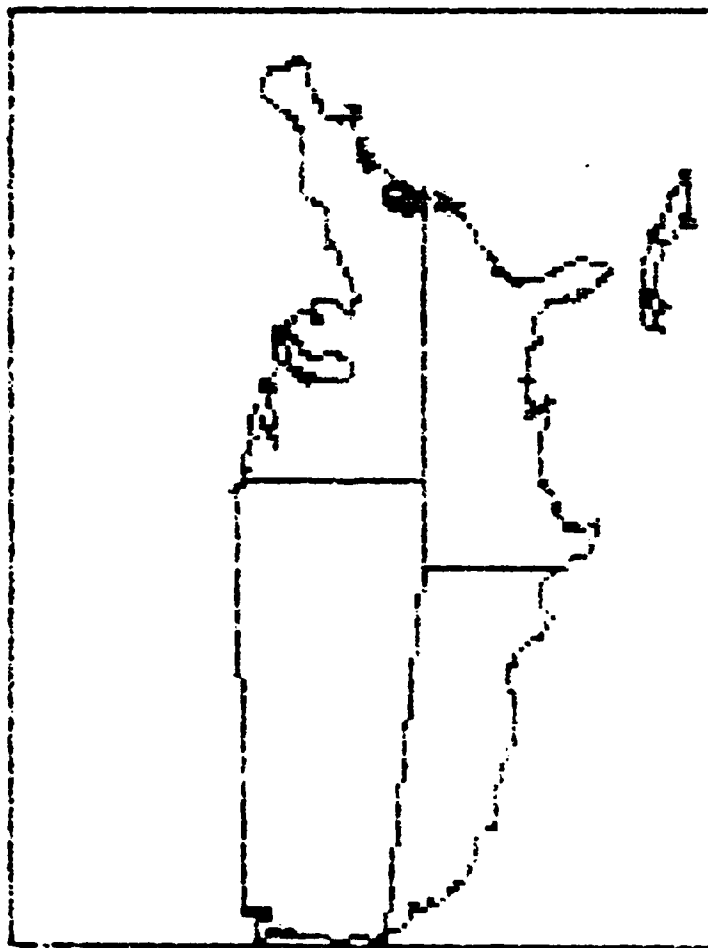


Figure 4. Selected area to zoom in

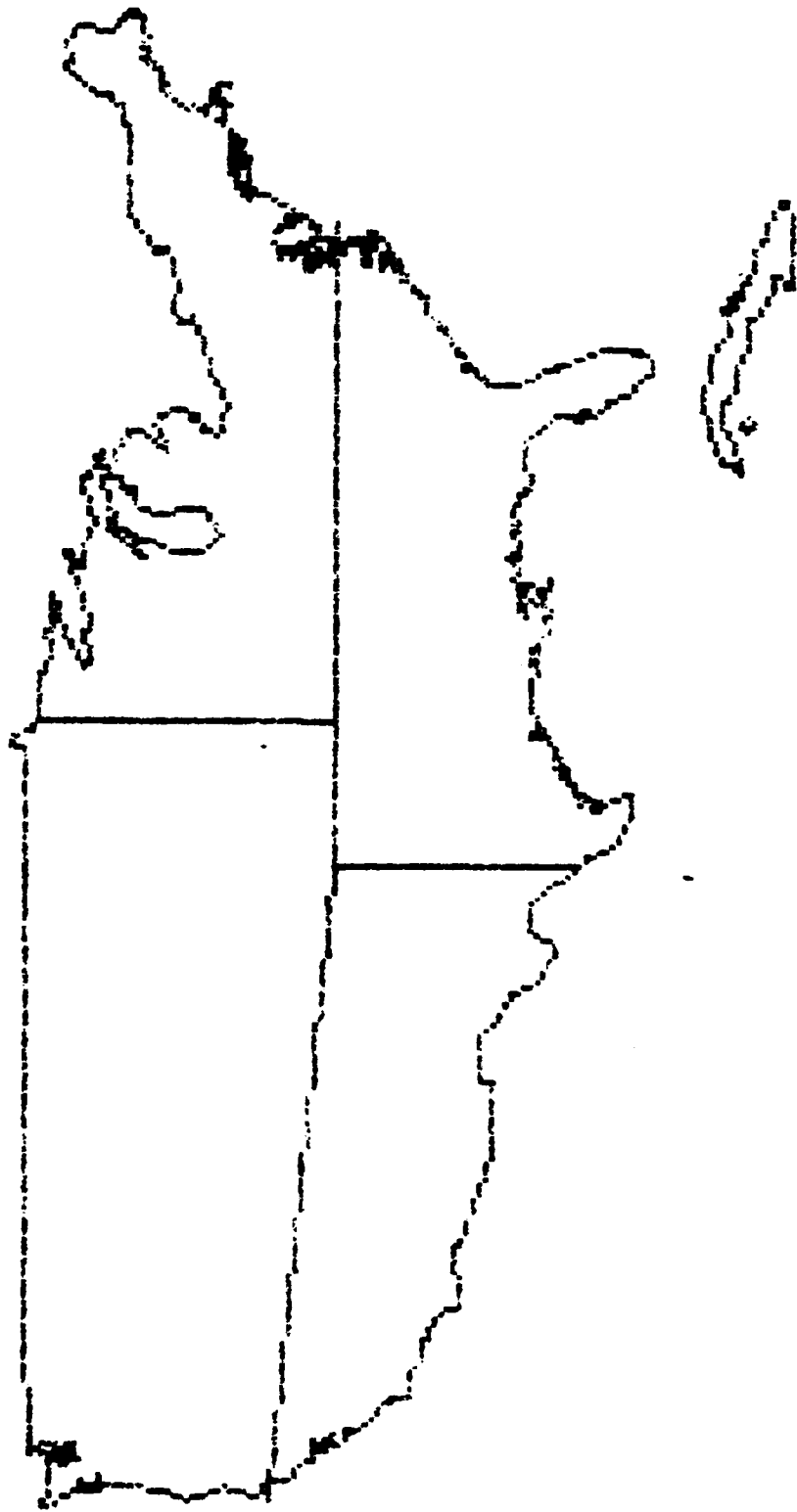


Figure 5. Zooming in

REGION COMMANDERS

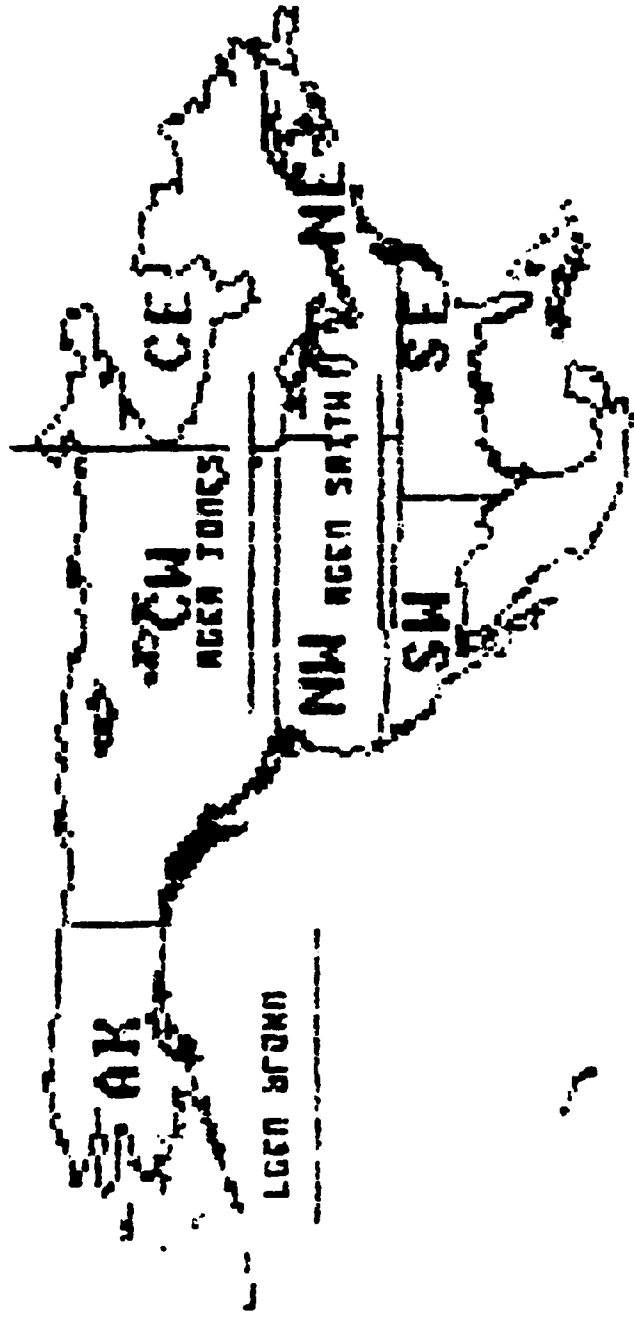


Figure 6. Three sizes text overlaid on maps

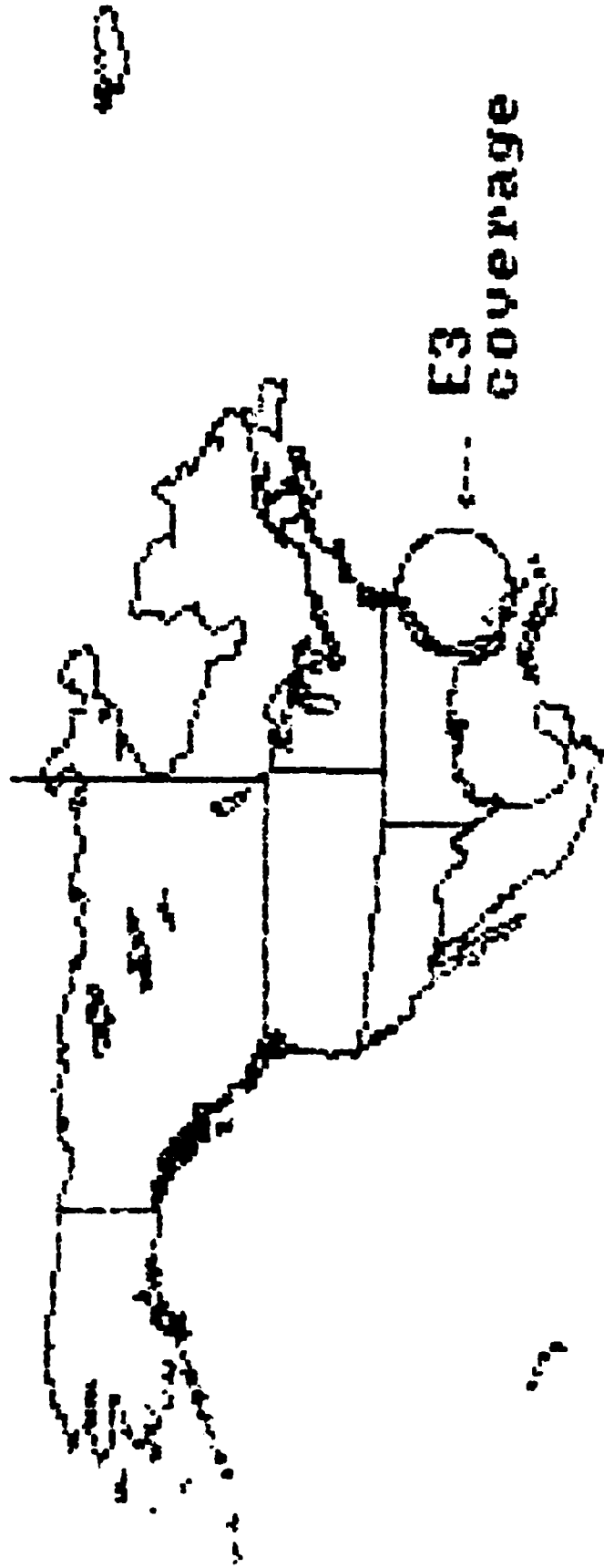
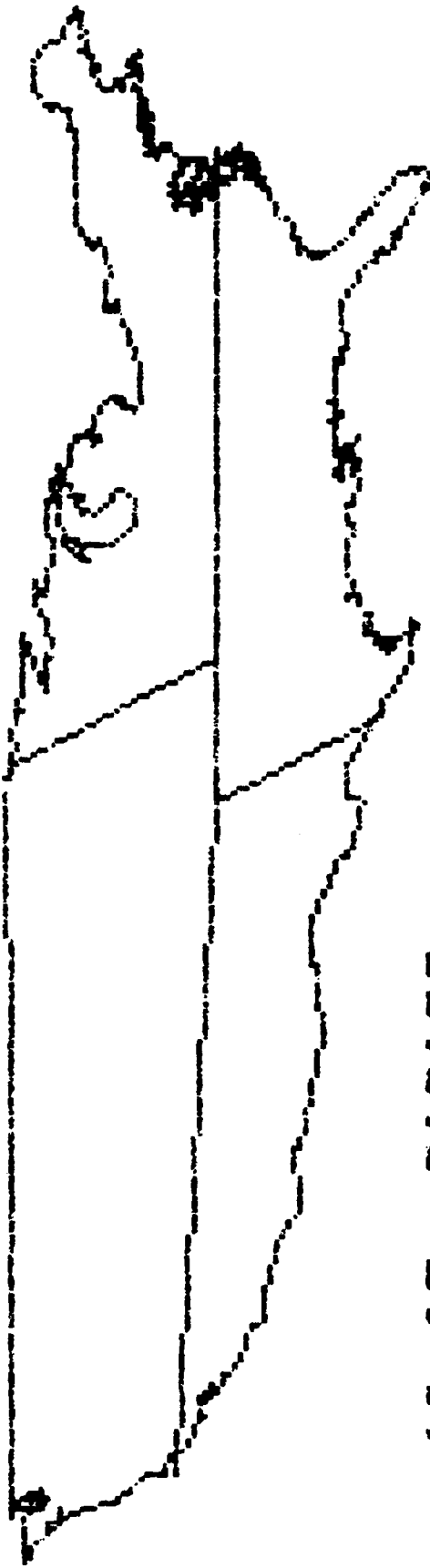


Figure 7. Lat/long map with circle
Radius drawn in miles

COMUS MORAD REGION

DAILY BRIEFING



AS OF: 010100Z

Figure 8: Map tilted for special effect

SPACE CONNECTIVITY

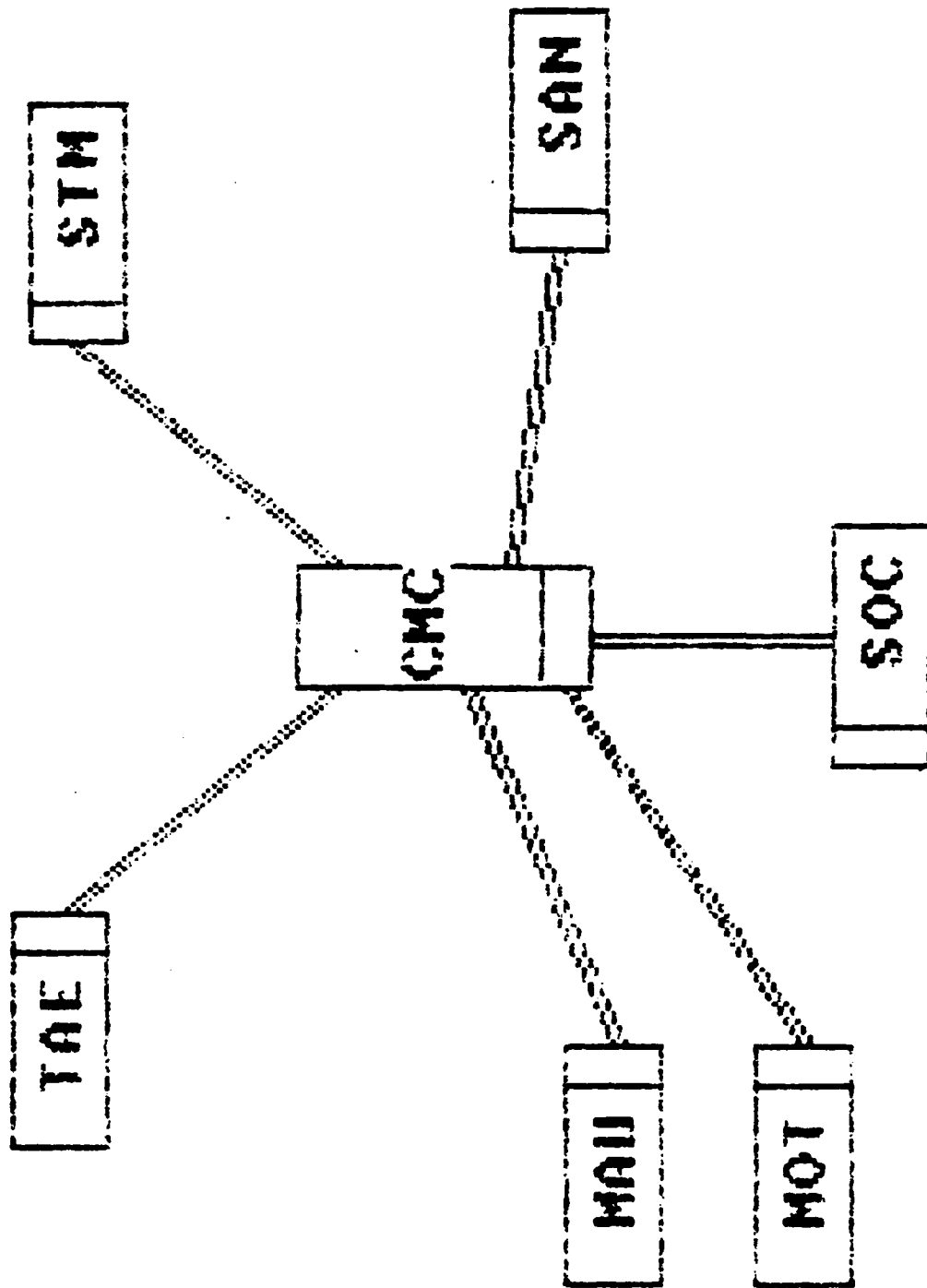


Figure 10: Color-coded chart w/labels

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