Fresh Look goals: to assess the impact on combat capabilities in the European theater if the Donnersberg node (above) or the Feldberg node were lost and to develop near and far term alternatives to augment DCS...

Taking a FRESH LOOK at DCS survivability in Europe

by Capt. Robert J. Bonometti

The Defense Communications System (DCS) is a worldwide command and control system which supports US military forces and other key defense related subscribers. The system consists of assets under operational and maintenance (O&M) control of the various services, but its overall management, engineering and technical control is provided by the Defense Communications Agency (DCA). DCS is the communications network which links tactical and strategic forces to the National Command Authority (NCA) and the National Military Command Center (NMCC). DCS, therefore, provides the links between the various theater commanders-in-chief and the political and military leadership in CONUS. Additionally DCS provides links between major commands. The importance of DCS to our overall defense structure is readily apparent.

In CONUS, DCS relies heavily on leased circuits from civilian communications systems to meet its requirements. In overseas areas, however, a significant portion of system capacity is carried via the assets of the services under DCA management. Due to the limited assets available for this mission, a detrimental consequence exists in that system vulnerability is precariously high.

DCS survivability in the European theater has been a subject of great concern for some time now. Historically, DCS was created as an economic means of serving the general user with a peacetime network, but it has subsequently evolved into a critical command and control system. As the system developed during this evolutionary process, economic considerations led to greater reliance on the already existing system nodes. It is certainly more cost-effective, from both a hardware and manpower viewpoint, to increase system capacity by adding links structured around the existing nodes, as opposed to creating new nodes to meet the new requirements. Unfortunately, this strategy produces a nodal intensive system which is far less survivable than a richly gridded lattice network would be. The present DCS in Europe is beset with this survivability problem.

The role of our command and control communications (C3) systems in the overall defense picture was emphasized during the recent First Annual JCS C3 Conference. The theme of this conference was C3 Survivability, which reflects the high-level attention currently being given to this issue. During the conference, Lt. Gen. William J. Hilsman, Director, DCA, discussed some of the survivability initiatives presently being undertaken by DCA. One of the topics Hilsman addressed was the creation of a special staff study group to perform an extensive survivability analysis for certain nodes in the DCS-Europe system.

Although a number of survivability studies have been conducted in the past, Hilsman was interested in sponsoring a study which would be performed by personnel outside the realm of DCA. The basic concept was to form a special study group composed of junior officers who would take an objective fresh look at the survivability issue. Since DCS sites in central Europe are under the O&M control of both the Army and the Air Force, a joint service effort was appropriate. This proposal was endorsed by Maj. Gen. Clarence E. McKnight, Commanding General, United States Army Signal Center and Fort Gordon and by Maj. Gen. Don H. Payne, Commanding General, Keesler Technical Training Center at Keesler Air Force Base. Thus Project Fresh

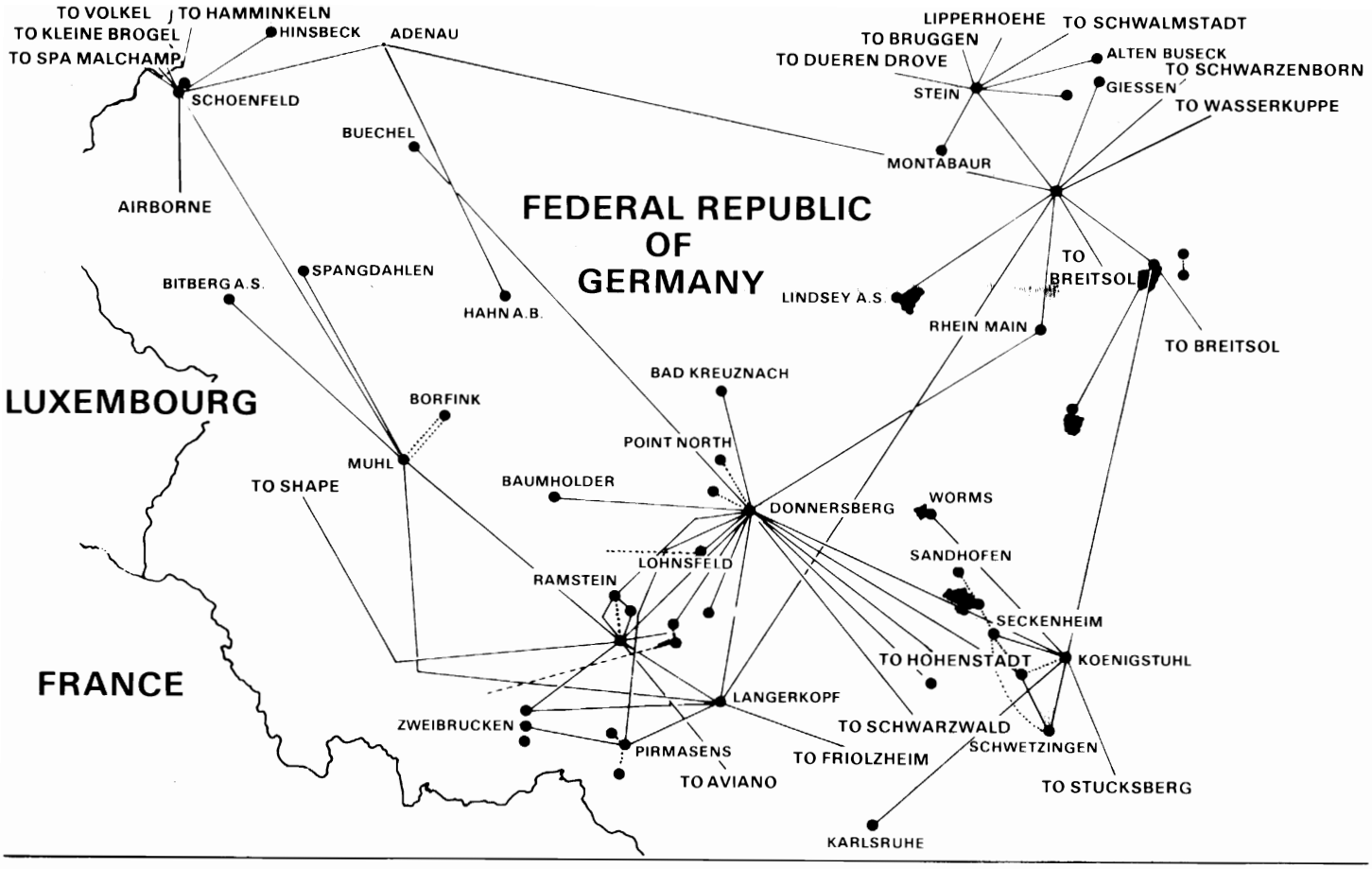

Figure 1

Look was created.

The special staff study group consists of student officers from the Signal Officers Advance Course (SOAC) at Fort Gordon and from the Telecommunications Systems Staff Officer Course (TSSOC) at Keesler AFB. Mr. J. R. Hill was designated faculty advisor for the Fort Gordon team and Maj. James L. Perrine was designated faculty advisor for the team at Keesler AFB.

Given the size and complexity of DCS in Europe, the mission statement in the project charter specified that the analysis was to focus on two critical nodes in the system. The chosen nodes were those at Donnersberg and Feldberg (Taunus) in the Federal Republic of Germany. Donnersberg is under Army O&M control and Feldberg is under Air Force O&M control. Although the scope of the project is delimited to these two specific nodes, the underlying philosophy is that the insight and information gleaned during this analysis will find broader applications on a system-wide scale.

There are two basic goals for Project Fresh Look. The first goal is to develop a graphic assessment of the impact of loss of Donnersberg and Feldberg on combat capabilities in the European theater. The results of this assessment will be prepared as a stand-alone document to facilitate its use as a caveat on strategic communications in Europe for the non-communicator. Therefore, it will be presented in graphic, layman terms and will include the following topics: impairment of combat capabilities due to loss of critical circuits which cannot be restored via DCS assets, estimates of the time required for restoral of critical communications and overview of those assets required to rapidly restore critical communications.

Additionally, this document will provide an indication of the impact on combat capabilities for the more realistic case of multiple critical node losses in a general war scenario (i.e., an impact overview not constrained to the Donnersberg/Feldberg scenario).

The second project goal is to develop near and far term alternatives to augment DCS and to rank-order these alternatives on a cost-effectiveness basis. Although this detailed analysis will focus entirely on augmenting DCS to counteract the loss of Donnersberg and Feldberg, the analysis methodology and proposed alternatives which are being developed will be applicable to the more complex multiple node loss problems. The results of this segment of the project will be prepared as a second final document to be submitted to DCA headquarters.

The project has been divided into three primary phases. Phase I was a background research phase in which over one hundred relevant documents were collected and studied. Phase II is presently underway and involves the analysis portion of the project. Phase III will entail the preparation of the two final documents as well as a briefing on the project results.

Figure 1 illustrates a simplified

POTENTIAL SYSTEMS FOR INTERCONNECTION WITH THE DCS

NATO Military Systems

- German Grundnetz System
- British Starrnet System
- German Autoko System
- Dutch Ascon System
- Belgium Bemilcon System
- NATO Integrated Communications System:
  - CIP-67
  - ACE-HI
- others

Host Nation Systems

- Deutsche Bundespost System
- others

Tactical Systems

- JMTSS Assets
- ETS Tactical Interconnections
- TRI-TAC Assets

Satellite Systems

TABLE 1

view of part of the DCS backbone in central Germany. Even this simplified diagram clearly reflects the nodal intensive structure which characterizes DCS in Europe. The critical nature of the node at Donnersberg is readily discernable.

Defense of a fixed strategic communications system is not an easily resolved issue. Commitment of tactical forces for site defense is antithetical to the "key force multiplier" concept, which aims at maximizing combat power. Judicious and cost-effective employment of physical security measures can enhance site survivability but cannot ensure it against a determined adversary.

The key point in the survivability issue is that it is system survivability, not site survivability, that is crucial. The driving concern in our study is that critical communications links survive despite destruction of DCS assets. This realization has led the study group to focus its attention on developing alternatives for DCS augmentation. Some of the more promising possibilities for interconnecting the DCS with other systems are succinctly listed in Table 1. For the far term, improved system architectures such as the Digital European Backbone (DEB) and the European Telephone System (ETS) offer promising possibilities for developing a more robust DCS network with increased interconnection potential and hence greater survivability.

In a word, the solution to the survivability issue is *redundancy*. We must develop pragmatic strategies to increase redundancy in the DCS network structure and to pre-plan redundant links for use in time of crisis (thereby avoiding high peacetime costs for on-line interconnections with other systems). Preplanned redundancy can circumvent the need for extensive reconstitution plans. Indeed, the diverse lattice network resulting from preplanned interconnects presents a more nebulous target for an adversary. In cases where redundant links cannot cost-effectively be implemented at the initiation of conflict, preplanned flexible reconstitution alternatives must be available to augment the system after it sustains damage. These fundamental concepts are simple to state, but development of detailed implementation plans for even the restricted Donnersberg/Feldberg scenario is a significant challenge which the project must satisfy to achieve one of its major goals.

Our second major goal is to develop a graphic impact of loss document for the non-communicator. In working towards this goal, we will be soliciting the support of the C3 community in Europe to provide feedback on impairment of their combat capabilities as a result of critical circuit losses. The consolidation of these responses will yield a potent impact statement which can serve to heighten awareness of this ominous problem and to emphasize the need for command support and resource allocation for DCS survivability initiatives.

The communications battle must be fought and won before the first round of a European war is fired. Without a survivable C3 system, overall combat effectiveness will be seriously impaired. It is incumbent upon the communicator to advocate the survivability issue and to work towards its resolution. Project Fresh Look is a positive step in this direction.

Capt. Bonometti is a graduate of the United States Military Academy at West Point and holds a Master's Degree in physics from Massachusetts Institute of Technology. He has served with the 123d Signal Battalion in Germany and is presently the Project Fresh Look Group Leader at Fort Gordon.