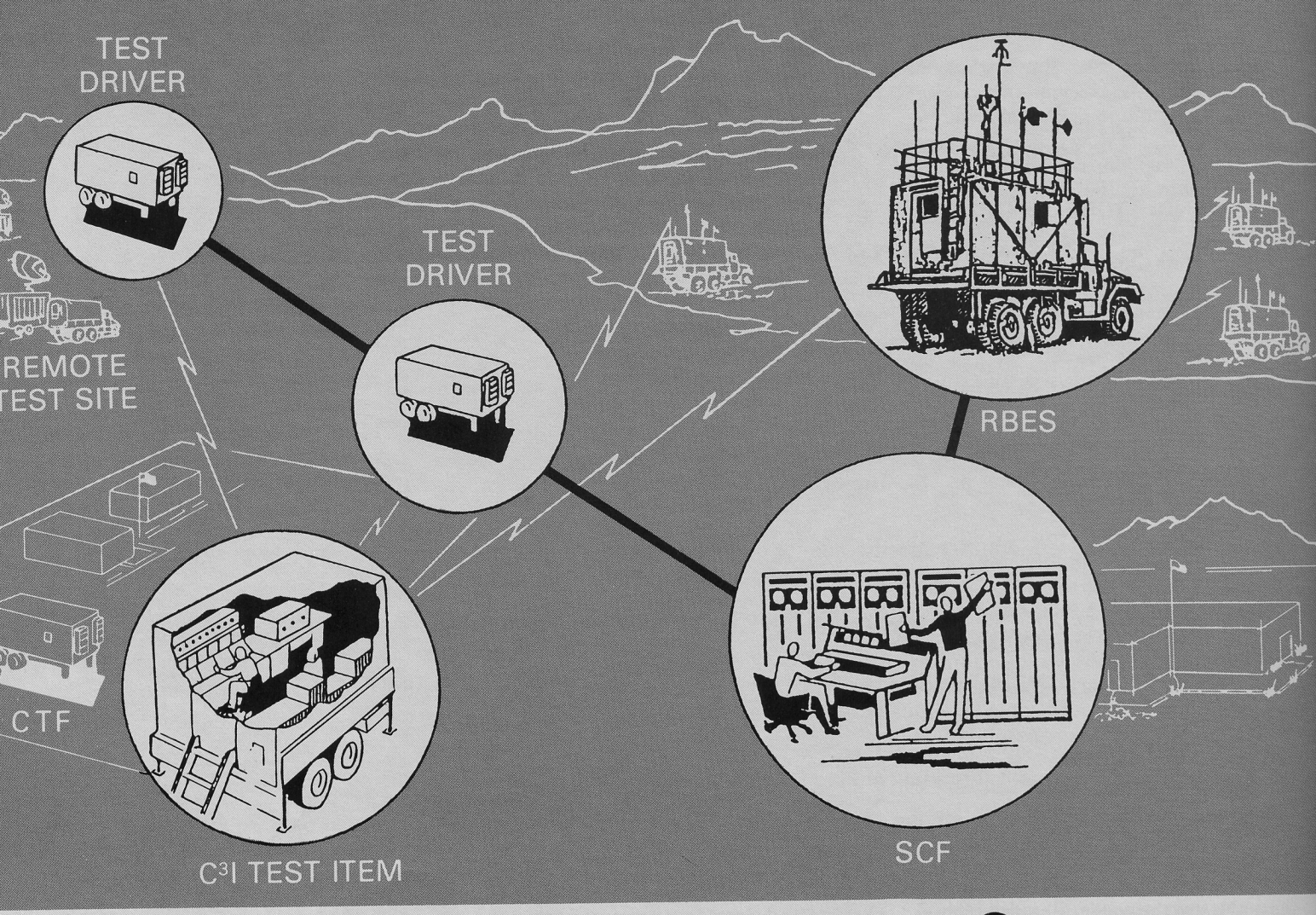


Mainsite

by Dee Williams

The home of the future...probably it will be completely mechanized, computerized and able to run by itself.

The weather modification unit will sense any slight change in outside temperature and close windows or open them, turn on the heater or the air conditioner.

A master cleaning unit will sniff the air for dust and quietly and efficiently dispatch miniature vacuums to rid the entire house of dirt.

The washing machine will go into action when clothing, whisked from bathroom to laundry room by air chutes, signals the machine is filled. And so it goes. Meals could be started by a phone call, lights might go on or off when a person enters or leaves a room.

It all sounds marvelous and, of course, it will be if everything works right, that is if each computer is able to "talk" correctly to other computers. But what if the washing machine fails to receive the signal to stop filling? What if the air conditioner is activated when the temperature reads 32 instead of 82? Hopefully, however, none of these "what ifs" will occur because all the equipment, all the computers will be completely checked before installation. Each piece will have to be tested independently and then all of it will have to be tested as a complete unit. Not an easy task for the tester.

Although homes of the future are still dreams to talk and read about, battlefield computerized communications systems are here today. The same types of testing problems are faced daily by the engineers of the US Army Electronic Proving Ground. Single pieces of communications equipment are tested which must eventually become part of a large network. Some pieces of the network may still be on the drawing board.

Accrding to EPG's Technical Director, Grady Banister, "We are tasked with conducting adequate performance tests on the next

generation of automated command, control, communications and intelligence (C^3I) systems. Problems do arise when these systems are being independently developed. How can we, for example, determine the nature of each system's requirements, the interdependence between systems, the dynamics of the entire network?"

Ideally, systems should also be tested in a realistic battlefield environment. Portions of a network might be damaged, destroyed or captured by an enemy. Certain weather conditions might affect data flow, making it necessary to reroute messages or reallocate circuits. And the effects of radio electronic combat might result in a reduction of the quality of all existing circuits.

To better cope with these situations, EPG has been developing a concept which has the potential to solve many of these problems. It's entitled MAINSITE, and the concept is about to become a reality.

MAINSITE is an acronym standing for Modular Automated Integrated Systems/Interoperability Test and Evaluation.

The importance of *MAINSITE* is tied to the Army's program to develop and field a collection of C^3I systems which will provide effective battlefield management. The many systems and subsystems of this network must be able to interconnect and interoperate with systems of other services as well as those belonging to our allies.

Testing a network of such magnitude and complexity is what led to MAINSITE. This has not been an overnight project, however. The current chief of EPG's MAINSITE Project Office, Bob Reiner, was in on the preliminary design as far back as 1970 when he was with the Army Security Agency Test and Evaluation Center. Banister, too, was involved in the concepts when he was at Fort Monmouth in the early 70's prior to becoming EPG's Technical Director.

What will MAINSITE look like? There will NOT be a large building with that title across the entrance. Rather, there will be additions to existing EPG facilities as well as visible van-mounted systems. There will also be an increase in less noticeable communications equipment such as radio links and fiber optic cable.

As Banister points out, "There are several essential parts to MAINSITE, such as the System Control Facility (SCF), the Realistic Battlefield Environment-Electronic (REBEEL) and the Test Item Stimulator (TIS).

The SCF could be referred to as the brains of the entire system. It will consist of a large central computations center and will provide real time test control and data management. In addition, it will be capable of simulating responses of systems not actually present for a test.

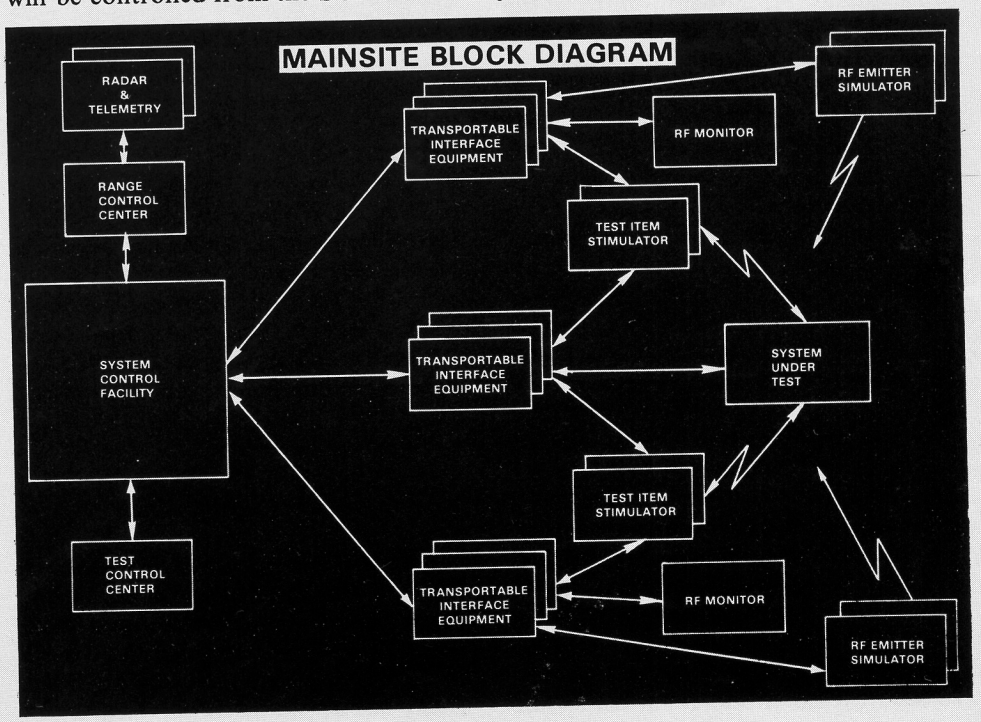
REBEEL is a collection of mobile threat simulators, replicas and actual emitters. These will create an electronic environment and will be capable, as in the case of simulators, of representing either friendly or enemy radios, radars, jammers and the like. Some of the emitters, which will be integrated with MAINSITE, are currently on hand. They will be of various sizes and complexity but will all be transportable to permit placement at realistic locations during a test.

While concepts and facilities such as REBEEL and the SCF are not new to the testing world, TIS, the Test Item Stimulator, is unique and is being developed by EPG. In essence, it will create the working or data environment by feeding messages to the system under test and will represent all the other computers that will eventually connect to the system.

A single TIS may have to represent a number of missing systems. Therefore, it will be capable of handling multiple communications channels and data. It will be controlled from the SCF or will operate independently. In that respect, simulators and monitors, as well as TIS, will be independently operable using their own individual computers and timing systems. Also, they will be mounted in shelters or on trailers or trucks so that they can be easily transported to locations away from Fort Huachuca.

As to the advantages of MAINSITE, according to Reiner, there are many. First and foremost, there's repeatability. Programmed tests presented repeatedly to a system will test not only the overall system but each of its sub-functions. It will quickly be determined whether a system is functioning as specified or whether any problems are occurring. Also, being able to simulate systems will shorten testing time.

The bottom line, of course, is that MAINSITE will mean substantial savings to the government. The cost of transporting systems and people will be reduced; the cost of testing will be reduced.

As Technical Director Banister points out, "There are many problems yet to be understood and solved for complete performance testing of a very large, dynamically changing network of systems. MAINSITE, a soon-to-be reality, is the first major effort to provide solutions."

And what about that home of the future? Who knows, the lessons learned and skills acquired from MAINSITE just might bring it closer to reality. **AC**