

# Single Source Solution for Sustaining Test Capability



Advanced Testing Technologies, Inc.

# Roadmap for ATE Obsolescence Mitigation

## 1.0 Introduction

For years Automatic Test Equipment (ATE) was designed with closed or proprietary hardware and software architectures. This was partially due to the technology available to ATE developers at the time. However, it was also favored by some suppliers who utilized these closed architectures to their advantage by forcing their customers to come back to them for costly hardware and software upgrades time and again. With the long life cycle of many systems these costs were quite substantial. ATE obsolescence was a continual problem for users of these systems.

Many ATE manufacturers now claim open architecture. However, there is a simple test to ascertain if this claim is actually valid. If such a manufacturer has gone back to the government one or more times to update one or more of their hardware or software capabilities, the claim of open architecture is truly hollow. An ATE with a true open architecture can assimilate state-of-the-art test hardware and software advances with ease. BRAT has accomplished this on numerous occasions over the years without any government funding.

## 2.0 General Obsolescence Problem

Many of today's weapons systems are legacies of the Cold War in terms of their design and technical sophistication. The cost of maintaining and updating these systems has increased dramatically over the past two decades. The escalating costs associated with the maintenance and upgrading of system electronic architectures as they reach obsolescence are driving this cost growth.

Legacy electronic systems are often built around closed architectures using proprietary software and hardware. The preferred current solution to problems with these systems, the insertion of commercial-off-the-shelf (COTS) components, often involves one-time engineering costs. However, both re-engineered and new systems require frequent technology upgrades due to the short lifecycle of some commercial components (6 to 18 months). Thus, legacy systems as well as new systems, with life expectancies of 20 to 40 years respectively, must be able to incorporate new components and subsystems seamlessly as commercial sources of supply dry up and new capabilities are required.

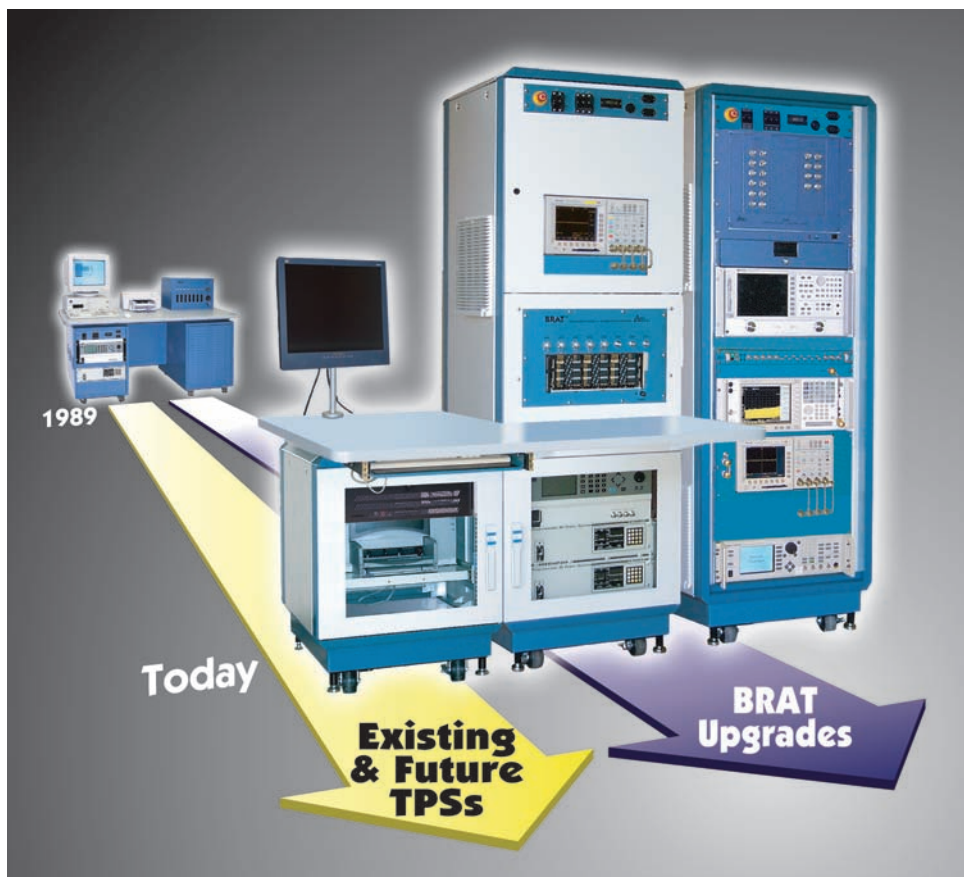
## 3.0 ATE Obsolescence

Automatic test equipment (ATE) used to support weapon system electronics maintenance and readiness must also be able to successfully and seamlessly accommodate electronic subsystem upgrades and modifications. Furthermore, modern ATE themselves, like the weapon systems they test, require some electronic subsystem refreshing. In many respects, the bulk of the ATE currently in service which was designed, developed and produced during the Cold War era are facing the same electronic obsolescence issues as the weapons systems they test.

Obsolescence is particularly acute in the area of closed architecture ATE. This is due in part because automatic test equipment used to support weapon system electronics maintenance and readiness has been historically developed to address the individual testing requirements for each specific system requiring test support. Thus, a wide array of ATE systems have been developed and acquired to support each major system.

A single aircraft type for example, may require numerous ATE testers, each dedicated to testing a different subsystem. Furthermore, for every ATE system there are unique counterpart systems designed for various levels of maintenance, (i.e., they are different at the operational, intermediate, and depot levels as well as at the manufacturing site). This has led to a proliferation of types of test equipment which have evolved over the years.

Many of the current systems are old or obsolete and are subject to frequent breakdowns. The ATE hardware investment is very large itself but is dwarfed by the investment in TPS development. Because of their age and condition, most components needed to repair 20-30 year old ATE systems are not readily available. Furthermore, these test systems are severely limited in their design since both their hardware and software architectures are fixed and therefore cannot readily be modified. These systems cannot be upgraded easily since they





**BRAT 407B Transportable tester**

are neither compatible nor competitive with current, more powerful, cheaper, commercially available hardware and software. In an era characterized by forward deployment and mobility, these systems are neither ruggedized nor transportable.

ATE obsolescence is obviously a huge problem. The enormous investment in TPS development is at stake. But now ATTI has a patent pending on a solution to this crucial problem.

#### **4.0 ATTI Solution to ATE Obsolescence**

ATTI was founded with a specific focus and vision. The firm's focus centered on the design, development and manufacture of state-of-the-art ATE and related equipment that could overcome obsolescence. The vision was to develop commercial off-the-shelf (COTS) automatic test equipment that could readily accommodate changes in technology and system requirements. This equipment could be used for all levels of maintenance. It could also be configured to provide only the level of capability required at the time of acquisition. Through its modular design, more capability could be easily added when needed. Therefore, the customer would not need to purchase excess capacity as insurance against some undefined future need. Furthermore, the ATE could be transportable and ruggedized. Not only would ATTI's COTS tester be less expensive to acquire than a specialized ATE, but due to its open architecture, new electronic components could be readily acquired and installed. Thus, the total ownership cost of the ATTI tester would be significantly less expensive.

ATTI has always utilized an open hardware and software architecture on its BRAT Family of Test Systems. This is partially due to the modern hardware and software technology available to BRAT's designers at the time of its development. However, it is also due to ATTI's corporate business philosophy which has defined BRAT as a true commercial-off-the-shelf (COTS) tester! BRAT was developed solely by ATTI's funds; no government funding was ever utilized.

The open architecture of the BRAT allows the user to procure only those test assets (e.g. stimulus and measurement instruments, switching subsystems, etc.) required to accommodate the UUT suite as initially identified. This keeps the initial tester cost as low as possible. If test re-

quirements change with time (e.g. a UUT is modified or a new type of UUT is added to the test suite), the requisite assets may be added. The same is true if an instrument supplier suddenly discontinues production. This has happened more than once and ATTI has used its own funding to integrate replacement instruments. In addition, as test assets are improved by various suppliers over time, this new technology may be added if desired. This should be especially comforting to the test industry which is now struggling to cope with increasing numbers of obsolescent, unsupported test systems. In addition, it should be emphasized that as instruments are added or replaced, existing TPSs always remain valid. And now ATTI has a patent pending for the BRAT Family of Test Systems on the method and system for obsolescence mitigation.

Commercial ATE systems are sold to many customers. By definition COTS testers must be broadly accepted since this is the way the commercial market works. If a COTS tester does not achieve this broad acceptance, the product simply doesn't survive. Today COTS ATE machines have gained wide acceptance in the military sector. Their technology edge and cost advantages are overwhelming. COTS testers have not only gained wide acceptance in the commercial field but have also been chosen for many different military programs. For example, BRAT has been chosen by programs including AWACS, C-5, C-141, F-16, JTIDS and JSTARS. The point is that such broad acceptance does indeed tell a story. BRAT was not chosen by a single group for a single application at a single point in time. Wide acceptance across both the military and commercial sectors leads to the reasonable conclusion that the machine is broadly acceptable to a wide range of customers and their broad spectrum of requirements. If BRAT's non-obsolescence was not a proven fact, it would not have been chosen time and time again.

#### **5.0 Summary**

A reasonable conclusion is that an open architecture COTS machine is the key to low initial cost, high performance due to the ability to seamlessly absorb advances in the commercial state-of-the-art of hardware and software, non-obsolescence due to this same open architecture, and overall superiority in life cycle cost minimization. If we judge by history, a unique tester development program funded by the government might well lead to a costly closed-architecture machine which will at some point result again in obsolescence. By the time the development is complete the tester will likely be late, well above anticipated budget, proprietary in some sense and already behind the state-of-the-art.

State-of-the-art test hardware and software trends provide strong evidence as to the optimal path for future ATE systems. The enormous success of the personal computer tells us the COTS route is the way to go. An open architecture BRAT COTS ATE guarantees state-of-the-art hardware and software and prevents obsolescence. The entire hardware and software industry participates in keeping the system state-of-the-art. No costly government NRE need be expended. Using an existing BRAT COTS ATE which has already gained wide acceptance across a broad spectrum of both military and commercial customers is an optimal and prudent path to pursue. The patent pending for the BRAT solution to ATE obsolescence should effect a significant contribution to the test industry and result in the ability to ensure the protection of the enormous investment in TPS development.

## ATTI Company Profile

### The corporation:

- has designed, developed and manufactured ATE since 1987
- has delivered and supported many test systems in both the commercial and military sectors
- is an innovator in developing and implementing VXI technology solutions
- has developed over one thousand test program sets, covering the test spectrum from simple to extremely complex
- has numerous satisfied customers, including:
  - Agusta, Italy
  - Boeing
  - Esdas, Turkey
  - Havelsan, Turkey
  - Hellenic Air Force
  - Japanese Air Force
  - KLM Royal Dutch Airlines
  - M&T Corporation
  - Modern Technologies Corporation
  - NASA
  - NATO
  - Palomar Products, Inc.
  - Royal Saudi Air Force
  - US Air Force
  - US Navy

## ATTI Worldwide Support

### The corporation:

- has delivered numerous test systems worldwide
- offers one of the most experienced service, training and support teams in the world
- has worked with our customers solving diverse test challenges in digital, analog, and RF applications
- is committed to total hardware and software support including service, spares, upgrades, documentation, training, and configuration control
- offers modem links to experienced professionals in our home office in Hauppauge, NY
- is committed to future updating of both hardware and software to enhance our customers' products while protecting their investment in test programs
- has the financial efficacy to guarantee long-term commitments



## ATTI Offices

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