R&M 2000
The Tactical Air Command Approach

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Reader Aids —
Purpose: Communicate the Tactical Air Command approach to achieve the R&M 2000 goals for current and future systems
Special math needed for explanations: None
Special math needed to use results: None
Results useful to: Managers, planners, design engineers, logisticians, manufacturers

Abstract — This paper describes the Tactical Air Command (TAC) methodology for stating R&M requirements for new systems and improving the combat capabilities of existing systems. It focuses on why TAC chose to state R&M in broad, output terms and illustrates three ways the R&M 2000 program has increased the emphasis on supporting fielded systems. Specifically, attention is given to two new technologies which should profoundly affect the maintainability of tactical systems.

1. INTRODUCTION

Reliability and maintainability (R&M) have long been recognized as valid program considerations impacting both combat capability and logistics supportability. However, in the past, R&M were often sacrificed for better cost, schedule, and performance goals. To correct this, in 1984 the Air Force established the R&M 2000 program. The objectives of this program were to improve the Air Force combat capability by institutionalizing sound R&M practices. In response to the USAF R&M 2000 program, TAC established a Special Management Organization for R&M (SMO-R&M) under the Deputy Chief of Staff for Requirements. This paper reviews the TAC approach to defining R&M for future systems and its initiatives to apply technology to improve fielded systems.

2. IDENTIFYING REQUIREMENTS FOR FUTURE SYSTEMS

Historically, requirements for R&M were usually stated in contractual terms such as mean time between failures (MTBF) and mean time to repair (MTTR). Development of the Advanced Tactical Fighter (ATF) statement of operational need (SON) revealed the inadequacy of this approach for complex systems. These contractual measures did not provide an adequate picture of the operational performance of the system, nor were they available from existing data collection systems. It became clear it would be more meaningful to express R&M requirements in terms like break rate, fix rate, and combat turn time to measure operational R&M performance output. Break rate measures the reliability of the system in terms of required maintenance due to system failure, while the fix rate measures the maintainability impact as a percentage of aircraft repaired to mission capable status in a given period of time. Additionally, combat turn time reflects the ability to refuel and reload a mission capable aircraft for the next sortie. These operational measures, therefore, equate to sortie punch, the ability to generate sortie after sortie to meet the wartime mission. To influence design further, TAC has restricted the number of people allowed to support the system and the number of C-141Bs required for airlift support. These restrictions add teeth to the other requirements by showing the visible payoffs of R&M. Systems that are more reliable and maintainable require fewer people, fewer spares, and fewer pieces of support equipment. These reductions add up to large savings, an improved force structure, and a more efficient support posture.

Specifying requirements in this type of operational language more clearly constrains the overall system design, system performance, and system support requirements. Moreover, these operational terms provide a positive way of measuring and tracking R&M requirements in an operational environment with existing data-collection systems. In essence, TAC tells the implementing command and contractors what we want, not how we want it. In this way, the contractor is allowed to make intelligent trade-offs to achieve the R&M and operational performance requirements.

3. APPLYING NEW TECHNOLOGY

The R&M effort would be insufficient if it addressed only new system acquisitions. A look at the Air Force aircraft that will be flying in the year 2000 shows only one totally new fighter being added to the inventory — the ATF. The rest of the fleet flying today (from the F-4 to the F-16) will still be in the inventory. This presents a tremendous challenge for those responsible for operating and supporting these systems. Not only must they sustain current systems, they must also incorporate new technologies in these systems — and do it smartly.

To address this challenge, the R&M people joined forces with the logistics staff and the Logistics Command to increase the influence of R&M on fielded systems. Three avenues were specifically chosen to spearhead this effort.

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1. There are a variety of base-level programs designed to generate grass roots involvement in identifying problems with fielded systems and to offer solutions. This multitude of programs led to two problems: different managers for each program caused duplication of effort, and, more importantly, resulted in a lack of concerted emphasis for a good idea. With the advent of R&M 2000, a product improvement manager has been established at each local unit. This person is now the central point of contact for all the programs that are involved with improving the design and support of existing systems. This tangible change at the local level has impressed the young troops that their ideas will receive greater emphasis under the R&M 2000 program.

2. The Air Force Logistics Command (AFLC) has established a Product Improvement Working Group (PIWG) for each weapon system it supports. The working group consists of weapon system managers from AFLC and TAC along with component item managers from the depot. The PIWG charter is to identify components with design deficiencies, low reliability, and/or poor maintainability. Once a problem is identified, possible solutions are presented along with a funding profile. TAC views the PIWG as potentially the best vehicle for improving R&M in fielded aircraft systems. TAC is working hard with AFLC to improve the methodology used in identifying deficiencies for PIWG discussion to make it more responsive to the using command’s field experience. Additionally, planning is underway to bring the identified components to industry’s attention so they can be more responsive to our needs.

3. The Productivity, Reliability, Availability, Maintainability (PRAM) office at Wright-Patterson AFB is fast becoming an active partner with TAC in incorporating new technology into fielded systems. PRAM was established to provide funds to research potential candidate off-the-shelf and near-term technologies for weapon system insertion. Two projects recently submitted by TAC illustrate the flexibility and broad application of the PRAM program. The number one target for improved R&M has been the batteries used on F-16, F-4, A-10, A-7, C-130, and other aircraft. Each of these aircraft currently uses a nickel-cadmium battery which has experienced poor reliability and has required extensive support over the years. Working with PRAM, we are testing a maintenance free lead-acid battery on an A-10 aircraft. To date, the battery has exceeded all expectations and plans are being made to start testing the battery for the F-4 fleet.

A new PRAM project has far-reaching implications in weapon system repair. A small company has a simple system using a small power source and electromagnetic radiation to induce bonding between materials. This system has repaired hydraulic lines, composite structures, a windscreen, and a canopy — all on the aircraft. This device could well be used for aircraft battle damage repair as well as everyday field repair, and offers significant potential to reduce manpower and repair and cure time requirements.

CONCLUSION

TAC/SMO-R&M has the throttle on R&M at max power. Proper emphasis is being placed on smart, up front, early definition of R&M requirements as well as sharpening the R&M performance of fielded systems with the insertion of new technology. TAC looks at the whole R&M picture in terms of output — what does it mean in broad terms to combat capability and logistics supportability. In TAC, R&M is coequal with cost, schedule, and performance and is synonymous with the ability to fly, fight, and win.

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