

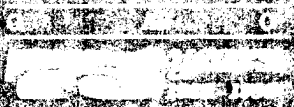
# MAINTENANCE

## Two Level Maintenance Program Assessment



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National Security and  
International Affairs Division

B-270867

March 27, 1996

The Honorable William J. Perry  
The Secretary of Defense

Dear Mr. Secretary:

We reviewed the Air Force's implementation of the Two Level Maintenance (TLM) program. Our objectives were to determine whether the program (1) was achieving the anticipated benefits, (2) has resulted in reduced repair turn around time,<sup>1</sup> and (3) will be an effective maintenance program for supporting deployed forces.

## Background

The TLM program objectives were to save money by reducing maintenance staffing, equipment, and base level support without sacrificing force readiness. Under TLM, the number of maintenance levels was reduced from three (organizational, intermediate, and depot) to two (organizational and depot).<sup>2</sup> Maintenance previously performed at the intermediate level would be performed at the depot level which, in turn, would allow the Air Force to significantly reduce the number of maintenance personnel and equipment at the base level. However, it also required that items sent to the depots be repaired and ready for issue in a timely manner to compensate for the longer repair pipeline between the customer and the depot.

In implementing TLM, the Air Force decided that it would not increase inventories. Inherent in this decision was the realization that it would have to

- develop a responsive transportation system to quickly move items to and from the point of repair,
- make necessary changes at the depots to absorb intermediate maintenance work that was previously performed at the base level,
- achieve a balance between spare parts and mission capability rates (i.e., determine the acceptable level of risk), and

<sup>1</sup>Repair turn around time is measured from the time an item is removed from the aircraft until it is repaired and ready for reissue.

<sup>2</sup>Organizational and intermediate level maintenance is performed at the base level. Organizational maintenance is generally preventive maintenance with some capability to remove and replace defective items. Intermediate maintenance, also done at the base level, involves fault isolation, repair and replacement of defective items, and repair of electronic circuits. Depot maintenance involves more extensive repairs and overhaul of major components and end items.

*Air Force  
Maintenance  
Two Level  
Maintenance  
Program Assessment*

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- expand maintenance capabilities at the unit level to perform fault diagnostics to avoid sending items to the depot repair facility for relatively minor repairs.

The Air Force tested the program from July 1991 through September 30, 1993. The tests—Coronet Deuce, Coral Star, and Coral Thrust—involved F-16 avionics items as well as several engines such as the F100-220, TF33-103, and TF33-7A.<sup>3</sup> Based on the test results, the Air Force decided to implement TLM Air Force-wide for selected avionics and engines. Implementation began in fiscal year 1994 and is expected to be fully implemented by fiscal year 1997.

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## Results in Brief

The TLM program is not achieving the full extent of the intended benefits. Between the time of the Air Force's first cost and savings analysis in 1992 and the second analysis in 1993, the estimated costs to implement TLM had increased and the expected net savings had decreased—from \$385 million to \$258 million. In addition, all program costs have not been included in the cost/savings analyses.

For avionics items, the repair turn around time under TLM generally met the Air Force's established repair turn around standard. For engines, however, the repair turn around times are exceeding the standard by as many as 87 days. For example, the repair turn around time standard for the TF30-111 engine, used on the F-111 aircraft, is 41 days, but as of August 1995, its average repair turn around time was 128 days.

The use of TLM to support deployed forces in times of conflict will add to the airlift burden. Because the deployed forces will not have in-country intermediate maintenance capability, the forces will be dependent on airlift for their spare and repair parts. However, airlift priorities are controlled by the theater commander not the Air Force. As a result, a theater commander could decide that the need for combat power in the early stages of the conflict has a higher priority than return of unserviceable items to depot repair facilities and movement of items from the depots to the theater of operation. The need for early sustainment airlift to support TLM is an issue that has not been fully resolved and is one that could affect sustainment of the deployed forces.

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<sup>3</sup>These engines are used on the F-15, F-16, B-52, and C-141 aircraft, respectively.

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## Status of the Program

The Air Force believed that between fiscal years 1994 and 1999, TLM would result in reducing the number of authorized maintenance personnel positions in the force structure by 5,888 (5,770 military and 118 civilians) and saving about \$385 million. The personnel reductions and savings were predicated on the assumption that 2,023 TLM-designated avionics items and 13 aircraft engines would be TLM-designated and sent to the depots for repair. These initial estimates proved to be overly optimistic. According to Air Force documents, as of September 1995, the number of TLM avionics items had been reduced to 1,171. Additionally, of all the TLM avionics items removed from aircraft for repair, only 47 percent of them were sent to the depots for repair. The remaining 53 percent are still being repaired on base. It was expected that 80 percent of the items would be repaired at the depots and 20 percent would be repaired at the base.

The Air Force also removed three engines from the program because the engines were not as reliable as initially thought. Keeping the engines in the program would have resulted in additional transportation costs to move the engines to the depots for frequent repairs.

According to information provided by the Air Force, it plans to increase the number of TLM-designated avionics items from 1,171 to 1,282 and is considering adding 2 aircraft engines to the program during fiscal year 1996. At the time we completed our review, no decisions had been made about increasing the number of avionics items and engines in the program further. As of September 1995, the personnel authorizations had been reduced by 1,852 to reflect anticipated TLM program savings.<sup>4</sup> However, according to Air Force officials, this does not mean that 1,852 individuals have left the Air Force or that these individuals have been removed from base level maintenance positions. They said that some of the people may still be at their same locations. The officials could not provide us the number of personnel reductions actually achieved as a result of TLM.

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## Increased Costs and Reduced Savings

The Air Force's initial TLM cost and savings analysis in November 1992 showed that from fiscal years 1994 through 1999, program implementation would cost about \$1.043 billion and savings would be about \$1.428 billion—a net savings of \$385 million. The major element of cost was due to the increased workload at the depots (i.e., performing intermediate maintenance at the depots versus the base level), and the major element of cost savings was due to maintenance personnel reductions at the base level.

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<sup>4</sup>Through fiscal year 1999, the total reduction in planned personnel authorizations is 5,012.

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The Air Force later revised its initial analysis in December 1993. The analysis showed that implementation costs had increased from \$1.043 billion to \$1.468 billion and that total savings had increased from \$1.428 billion to \$1.726 billion. The program costs increased more than savings. As a result, the net savings decreased from \$385 million to \$258 million.

As shown in table 1, depot repair was the principal factor that accounted for the major cost increase. This increase occurred because the scope of depot intermediate maintenance work had increased. When an engine is inducted into the depot intermediate maintenance facility, it is inspected and all necessary repairs are performed. In addition, other maintenance is performed to extend the operating life of the engine if the engine components are within a certain threshold for overhaul. This increased maintenance is referred to as jet engine intermediate maintenance plus (JEIM +).

The increased savings was in the area of on-condition maintenance. According to Air Force officials, as a result of JEIM +, the time interval between engine overhauls will be extended. Thus, the savings increased from \$451 million to \$821.8 million.

**Table 1: Projected Implementation Costs and Savings From Fiscal Years 1994 Through 1999**

Dollars in millions

Category	1992 analysis	1993 analysis	Increase (decrease)	Reason for increase (decrease)
<b>Cost</b>				
Depot repair	\$826.05	\$1,233.41	\$407.36	Increased scope of depot maintenance work. Additional depot maintenance personnel and increased avionics transportation costs as a result of using commercial sources.
Transportation	13.65	31.39	17.74	To correct previous transportation cost estimate for TF-39 engine.
Defense Logistics Agency	73.42	73.42	0	No change.
DMRD 904	129.76	129.76	0	No change.
<b>Total cost</b>	<b>\$1,042.88</b>	<b>\$1,467.98</b>	<b>\$425.10</b>	
<b>Savings</b>				
Military personnel	\$292.80	\$237.10	\$(55.70)	Additional personnel to perform base level repair on the three engines removed from the program.
Equipment maintenance	20.40	15.00	(5.40)	Need to retain test equipment for three engines removed from the program.
Equipment purchase	201.20	201.20	0	No change.
On-condition maintenance	451.00	821.80	370.80	Reduced engine overhauls resulting from increased scope of maintenance work at the depots.
Base operating support	144.20	144.20	0	No change.
Training	157.20	157.20	0	No change.
Civilian personnel	160.80	149.78	(11.02)	Additional personnel to perform base level repair on the three engines removed from the program.
<b>Total savings</b>	<b>\$1,427.60</b>	<b>\$1,726.28</b>	<b>\$298.68</b>	
<b>Net savings</b>	<b>\$384.72</b>	<b>\$258.30</b>	<b>\$(126.42)</b>	

Even though the 1993 analysis continued to show a net savings by implementing the program, it did not include all program costs. For example, a 1993 Air Force analysis showed that the value of the mobility readiness spares packages (MRSP) kits<sup>5</sup> would increase about \$543 million to reconfigure the kits from a three level maintenance configuration to a TLM configuration for five aircraft types. Table 2 shows the value of the reconfigured kits by aircraft type.

<sup>5</sup>MRSP kits are supply kits that are intended to sustain a deployed unit for a certain numbers of days until the resupply pipeline can be established into the theater of operation.

**Table 2: Value of Reconfigured MRSP Kits for Five TLM Aircraft**

Dollars in millions

Aircraft	MRSP value under three level maintenance	MRSP value under TLM	Difference
B-52	\$246.1	\$691.0	\$444.9
C-5	195.4	213.8	18.4
C-141	180.7	219.8	39.1
F-15C	401.3	423.7	22.4
F-111F	255.2	273.4	18.2
<b>Total</b>	<b>\$1,278.7</b>	<b>\$1,821.7</b>	<b>\$543.0</b>

Prior to TLM, the kits were configured with shop replaceable items that would be used by intermediate maintenance units to repair the line replaceable components. However, with TLM, there will not be any intermediate maintenance capability in the theater of operation. Consequently, there is no need for the shop replaceable items in the MRSP kits. To make the kits compatible to TLM, the kits had to be reconfigured with higher cost line replaceable components rather than the lower cost shop replaceable items.

Air Force officials emphasized that the Air Force did not have to spend any additional funds to achieve the kit reconfiguration. They pointed out that the largest increase in MRSP kit value was for the B-52 aircraft, which did not have MRSP kits prior to TLM. Air Force officials told us that when the mission of the aircraft was changed from a nuclear to a conventional mission, this necessitated a MRSP kit, even if the avionics items were not designated as TLM items. The officials said that they were able to establish these kits by redistributing excess inventory that was in the supply system as a result of retiring the B-52G aircraft. Therefore, they did not consider this to be a TLM program cost since they did not have to buy the inventory needed for kit reconfiguration. In our opinion, although no additional funds were spent to achieve the kit reconfiguration, the \$449 million of added value of the MRSP kits should be considered a TLM program related cost because the added value was necessitated by the kit reconfiguration to a TLM orientation.

A second example of excluded costs involved the assumption about how many avionics items would be sent to depots for repair. The 1992 analysis assumed that all TLM avionics items would be returned to depots for repair. The 1993 analysis, however, reflected that about 67 percent of the items would be repaired at the depot. Our review showed, however, that the

revised assumption was not occurring. As of September 1995, only 47 percent of the TLM avionics items removed from the aircraft for repair were being sent to the depots. Because the avionics repair workload at depots has not materialized to the extent it was anticipated, the amount of depot repair costs shown in the second analysis category is overstated.

Air Force officials said that having less items being sent to the depots for repair than expected did not mean that more items were being repaired at the base level. They said that better screening processes at the base level to identify those items that do not need to be sent to the depot for repair and better fault diagnostic capability could account for the reduced workload at the depots.

A third example was the cost for facilities' renovations and minor construction (\$8 million) at the San Antonio and Oklahoma City depots. Renovations and construction were required so that the depots could handle the anticipated increased TLM workload.

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## Repair Turn Around Times for Engine and Avionics Items

The decision as to whether a TLM-designated item is repaired on base or sent to a depot depends on the extent of maintenance required. The Air Force criterion is that if avionics items and engines cannot be repaired at the base level, they must be sent to a depot within 48 and 72 hours, respectively. This criterion reflects the recognition that, under TLM, there is a need to reduce the amount of time from when an item is removed from the aircraft until it is repaired and ready for reissue. In this regard, the Air Force has emphasized the use of express transportation to move items from a base to a depot repair facility and to expedite the depot repair process. The Air Force was concerned that without expedited transportation and repair, operating bases might have to increase their inventory levels.

The Air Force has established repair turn around time standards<sup>6</sup> for TLM items. Our analysis showed that, for the month of October 1995, the reported repair turn around times for avionics items averaged about 10.9 days as compared to the Air Force standard of 8 days. Officials said that a large percentage of the avionics items are being repaired at bases rather than at depots as evidenced by the fact that, as of September 1995, only 47 percent of the items are being sent to depots for repair.

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<sup>6</sup>The standards include the time for on-base processing, transportation to the depot, depot processing, repair, and return to stock.

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At one depot, an official told us that this low workload has resulted in about 40 people being transferred from the avionics repair shop to other depot repair activities. The official said that in a contingency situation, the higher generation of unserviceable items due to high operating tempo coupled with reduced ability of field units to repair the items could cause the depot workload to double or triple. In turn, this level of increase could overwhelm the depots' repair capabilities and result in increased repair turn around times for avionics items.

With regard to engines, the reported repair turn around times show that the standards generally are not being met. However, some officials said that a better measurement of the depots' response to TLM would be to compare the actual repair turn around times to the average of the depot and base level repair time prior to TLM implementation.

Other Air Force officials said that the pre-TLM averages are not realistic because they were derived from a 1992 baseline<sup>7</sup> when the Air Force was experiencing long maintenance delays due to a shortage of repair parts. The officials said that it should be noted that after the Gulf War, the returning aircraft underwent extensive maintenance and that it was this period that was used to compute the averages. Consequently, they said the averages are inflated. The results of our comparison of actual repair turn around times to the Air Force standard and pre-TLM average are shown in table 3.

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<sup>7</sup>The baseline included data for the fourth quarter of fiscal year 1991 and the four quarters in fiscal year 1992.

**Table 3: Actual Repair Turn Around Times Compared to Standard Repair Time and Pre-TLM Averages for TLM Engines (as of August 1995)**

Engines (aircraft)	Repair turn around times (days)					
	Pre-TLM average	Standard	Actual as of August 1995	Difference between actual and		
				Pre-TLM average	Standard	
F100-220 (F-15, F-16)	26.2	19.5	51.0	24.8	31.5	
T56 (C-130)	57.4	19.5	74.5	17.1	55.0	
TF39 (C-5)	77.2	71.5	129.5	52.3	58.0	
TF33-7A (C-141)	89.2	51.0	66.3	(22.9)	15.3	
TF33-103 (B-52)	94.0	46.0	54.0	(40.0)	8.0	
TF33-100 (E-3)	100.0	51.0	38.5	(61.5)	(12.5)	
TF33-102 (KC-135)	159.0	56.0	74.5	(84.5)	18.5	
F108-100 (KC-135R)	158.0	41.0	44.0	(114.0)	3.0	
TF30-109 (F-111)	115.0	41.0	93.6	(21.4)	52.6	
TF30-111 (F-111)	115.0	41.0	128.0	13.0	87.0	

Air Force officials told us that the primary reason that the repair turn around time for engines exceeds the Air Force standard is that there is a ready supply of engines. When there is a ready supply of serviceable engines available for issue, there is no real requirement to rapidly turn around the unserviceable engines. Therefore, when an unserviceable engine or engine component is shipped to the repair facility, it could be stored until there is a need to repair the item.

Our analysis of Air Force-wide engine requirements and available inventory as of October 1995 confirms that, in most cases, there are sufficient TLM engines available for issue to meet requirements. Our analysis showed that for 8 of the 10 TLM engines there were enough ready-for-issue engines to meet at least 90 percent of the requirements and for 7 of the 10 engines, the number of ready-for-issue engines met or exceeded the requirements (see table 4).

**Table 4: Comparison of TLM Engine Requirements and Ready-for-Issue Inventory (as of October 1995)**

Engines	Requirements	Ready-for-issue inventory	Inventory as a percentage of requirements
F100-220	64	42	65.6
T56	100	92	92.0
TF39	33	35	106.1
TF33-7A	103	105	101.9
TF33-103	32	18	56.3
TF33-100	19	19	100.0
TF33-102	25	27	108.0
F108-100	55	63	114.5
TF30-109	21	26	123.8
TF30-111	19	20	105.2

Another indication that the Air Force has a sufficient supply of TLM engines is the fact that it has retired 114 of the TLM engines valued at \$41.1 million during fiscal years 1993 through 1995, as shown in table 5.

**Table 5: Number of TLM Engines Retired From Fiscal Years 1993 Through 1995**

Dollars in millions		
Engines	Number of engines retired	Value of engines retired
TF33-7A	49	\$15.4
TF33-103	21	5.5
TF33-100	11	3.4
TF33-102	14	5.4
TF30-109	11	5.1
TF30-111	8	6.3
<b>Total</b>	<b>114</b>	<b>\$41.1</b>

Although not meeting repair turn around times and relying on the current supply of engines to meet customer needs may not cause a problem in the short term, it could become a problem over the long term as more items are designated as TLM items and as the ready available supply of engines is decreased.

Air Force officials said that when the program is fully implemented in fiscal year 1997, the Air Force will analyze the engine supply situation, and some engines may be eliminated from the inventory. If this occurs, the number of engines to be repaired will be reduced and the maintenance

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focus will shift to meeting the repair turn around time or the Air Force will have to buy additional stocks for the base level. In the interim, the program has not been fully tested in the type of restrictive environment that it may be required to operate.

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## Use of TLM to Support Deployed Forces

When Air Force units deploy overseas, they will not take intermediate maintenance capability with them for the TLM avionics items and engines. Instead, the units will have to rely on airlift to transport their unserviceable TLM assets to the depot for repair. Likewise, they will have to rely on airlift for replenishment stocks.

According to Air Force officials, not deploying the intermediate maintenance capability will reduce airlift requirements by the equivalent of 175 C-141 aircraft during the first 30 days of a two major regional contingency scenario. Before TLM, the plan was to airlift the intermediate maintenance capability to the theater sometime after the initiation of mobilization. TLM, however, will require airlift much earlier in the contingency for returning and replenishing spare parts inventories. Because airlift is not dedicated for these purposes, retrograde and resupply will have to compete with other airlift users.

Airlift priorities and assignments are controlled by the theater commander. In the early stages of a conflict, the commander could decide that airlift priorities should be devoted to moving more combat power into the theater rather than spare parts. If this occurs at the same time that the Air Force units are seeking replenishment avionics and engines, sustainability problems could arise.

U.S. Central Command officials told us that airlift has not been specifically dedicated for returning unserviceable items from the theater of operation to the United States and for resupplying units in the theater with needed spare parts. Command officials, however, believed that there should be sufficient airlift available for these purposes. Other Air Force officials told us that they are not convinced that there will be sufficient airlift available to meet TLM needs early in a contingency.

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## Recommendations

In view of the unresolved TLM issues and the fact that the program has not fully achieved its intended objectives and has not been fully implemented, we recommend that the Secretary of Defense direct the Secretary of the Air Force to continue to periodically reassess the cost efficiency and

effectiveness of items already in the program as well as those planned for the program to determine whether the avionics items and engines are the most appropriate TLM candidates. To facilitate the reassessment, the Secretary of the Air Force should develop

- a revised cost and savings analysis that reflects (1) the facilities and minor construction costs incurred to ready depots for TLM and (2) the fact that the anticipated workload at the depots has not materialized;
- an assessment of the depots' ability to meet the repair turn around times prescribed by the Air Force standard when the current inventory of engines is reduced and TLM is fully implemented; and
- an action plan, in concert with wartime theater commanders, that assesses the availability of airlift in the early stages of a conflict to fully support the added airlift requirements of TLM.

## Agency Comments

The Department of Defense concurred with our findings and recommendations. Officials agreed that there should be a continuing reassessment of TLM candidates to ensure that the right ones are in the program and that further assessments of capability and inventory should be conducted. These assessments have been programmed through the TLM end-to-end analysis and engine supply reassessment. The officials further stated that the Air Force will continue to work with the Joint Staff and Supported Commanders-in-Chief to determine effective use of airlift allocation to meet service requirements. The full text of the Department's comments are included as appendix I.

## Scope and Methodology

To determine how the TLM program costs and anticipated savings were computed, we reviewed Air Force studies and budget documents and held discussions with Air Force headquarters officials responsible for program development and implementation. Also, we compared the costs and savings identified in the original cost/savings analysis to the revised cost and savings analysis developed for the fiscal year 1995 budget. We then held discussions with officials to ascertain the reasons for cost increases and net savings decreases.

To determine whether the program has reduced repair turn around time, we reviewed Air Force reports summarizing repair turn around time and held discussions with depot officials who monitor and analyze the data. For engines, we compared post-TLM repair time data to pre-TLM repair time data and to repair standards developed by the Air Force. For avionics

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items, we compared actual TLM repair turn around times to Air Force repair standards.

To assess the use of TLM to support deployed forces, we reviewed deployment plans, airlift requirements and held discussions with officials who plan and implement deployment plans during military operations. In addition, we obtained and analyzed cost data showing the effect of TLM on the configuration of the war reserve kits.

Our review was performed at the

- U.S. Central Command, MacDill Air Force Base, Florida;
- U.S. Air Force Headquarters, Washington, D.C.;
- Air Force Logistics Management Agency, Maxwell Air Force Base, Alabama;
- Air Force Materiel Command, Wright-Patterson Air Force Base, Ohio;
- Air Mobility Command, Scott Air Force Base, Illinois;
- Air Combat Command, Langley Air Force Base, Virginia;
- Oklahoma City Air Logistics Center, Tinker Air Force Base, Oklahoma;
- San Antonio Air Logistics Center, Kelly Air Force Base, Texas; and
- 1st Fighter Wing, Langley Air Force Base, Virginia.

We performed our review from June 1995 to December 1995 in accordance with generally accepted government auditing standards.

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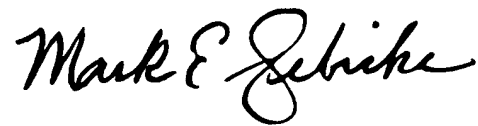
As you know, the head of a federal agency is required by 31 U.S.C. 720 to submit a written statement on actions taken on our recommendations to the House Committee on Government Reform and Oversight and the Senate Committee on Governmental Affairs not later than 60 days after the date of this report. A written statement must also be submitted to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are also sending copies of this report to the Chairmen and Ranking Minority Members, House and Senate Committees on Appropriations, House Committee on National Security, Senate Committee on Armed Services, Senate Committee on Governmental Affairs, House Committee on Government Reform and Oversight; and the Director of the Office of Management and Budget. If you or members of your staff have any questions or would like to discuss the matters in this report in further

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detail, please call me at (202) 512-5140. The major contributors to this report are shown in appendix II.

Sincerely yours,

A handwritten signature in black ink that reads "Mark E. Gebicke". The signature is written in a cursive style with a large, looping "G" at the end.

Mark E. Gebicke  
Director, Military Operations  
and Capabilities Issues



# Comments From the Department of Defense



ACQUISITION AND  
TECHNOLOGY

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON  
WASHINGTON DC 20301-3000



25 MAR 1996

Mr. Mark E. Gebicke  
Director, Military Operations  
and Capabilities Issues  
National Security and International  
Affairs Division  
US General Accounting Office  
Washington, DC 20548

Dear Mr. Gebicke:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report "AIR FORCE MAINTENANCE: Two Level Maintenance Program Assessment," dated February 6, 1996, (GAO Code 703102), OSD Case 1090. The DoD concurs with the draft report findings and recommendation.

The Air Force significantly restructured aircraft maintenance through their Two Level Maintenance (2LM) Program to meet future force support requirements and significantly reduce costs. The 2LM program provides better service to the warfighter, reduced personnel risk by moving repair out of the combat zone, lowered movement requirements for deploying combat units, and a savings of one quarter of a billion dollars. While our recent history has lowered saving assumptions, it has also proven that 2LM can successfully support units engaged in combat.

Detailed DoD comments are provided at Attachment 1, and technical comments were provided directly to the GAO staff. The Department appreciates the opportunity to comment on the draft.

Sincerely,

John F. Phillips  
Deputy Under Secretary of  
Defense (Logistics)

Attachment:  
As stated



DRAFT REPORT, February 6, 1996  
(GAO CODE 703102), OSD CASE 1090

"AIR FORCE MAINTENANCE: TWO LEVEL MAINTENANCE  
PROGRAM ASSESSMENT"

DEPARTMENT OF DEFENSE COMMENTS

FINDINGS

**FINDING A: Status of the Program.** The GAO reported that the Two Level Maintenance (2LM) Program is not achieving the full extent of intended benefits because the initial estimate for 2LM-designated items was overly optimistic. The GAO pointed out that as of September 1995, the number of 2LM avionics items was reduced to 1,171 and only 47 percent of the 2LM-designated items were being sent to the depots for repair. The GAO noted that the Air Force plans to increase the number of 2LM-designated items during FY 1996. (pp. 3-4/GAO Draft Report)

**DoD RESPONSE: Concur.** In 1992, the Air Force projected savings estimates based on early 2LM tests. During program implementation, accumulation of additional information required the Air Force to adjust expected savings downward based upon actual data. However, the Air Force's adjusted savings of \$258 million dollars is significant and should be noted as such.

**FINDING B: Increased Costs and Reduced Savings.** The GAO reported that between the time of the Air Force's first cost/savings analysis in 1992 and the second analysis in 1993, estimated costs to fully implement 2LM had increased and expected net savings had decreased from \$385 million to \$258 million. The GAO noted that the major element of cost was due to increased workload at depots (i.e., performing intermediate maintenance at depots versus base level), and the major element of cost savings was due to maintenance personnel reductions at base level.

The GAO found that not all program costs were included in implementing the program. For example, The GAO stated that a 1993 Air Force analysis showed the value of Mobility Readiness Spares (MRSP) kits would increase about \$543 million to reconfigure the kits from a three level maintenance configuration to a two level maintenance configuration for five aircraft types. The GAO reported the Air Force did not consider the kits a 2LM program cost since they did not have to spend any additional funds to achieve the kit reconfiguration. The GAO concluded that even though no additional funds were required to achieve the kit reconfiguration, the \$449

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million of added value of MRSP kits should be considered a 2LM program-related cost because added value was necessitated by kit reconfiguration to a 2LM orientation. (pp. 5-8/GAO Draft Report)

**DoD RESPONSE:** Concur: The Air Force removed base-level positions during the FY94 POM process through DMRD 983, thereby generating cost savings for personnel reductions. While the estimated cost was not as high as expected, the bottom line is total Air Force funding was reduced by \$258 million due to 2LM implementation.

The Air Force's B-52 MRSP kits were established as an operational requirement in support of a mission change for the B-52, i.e., from nuclear to conventional. The decision to establish an MRSP kit was made independent of the 2LM decision. Establishing B-52 kits was satisfied through reallocation of available on-hand spares.

**FINDING C: Repair Turn Around Times for Engine and Avionics Items.** The GAO found that repair turn-around time for avionics under 2LM generally meet the established standard, however, engines exceed the standard by as many as 58 days. The GAO stated that pre-2LM averages are inflated because they were derived from a 1992 baseline when the Air Force was experiencing long maintenance delays due to a shortage of repair parts.

The GAO reported that Air Force officials indicated the primary reason repair turn-around time for engines exceeds the Air Force standard is that engines are in a "supply rich" environment. The GAO analysis confirmed there is a ready supply of serviceable 2LM engines. The GAO concluded that while not meeting repair turn-around times and relying on the "supply rich" environment to meet customer needs may not cause a problem over the short term, it could become a problem over the long term as more items are designated as 2LM items and the ready supply of engines is decreased. The GAO noted the program may change when the Air Force analyzes the engine supply situation in FY 1997. (pp. 9-13/GAO Draft Report)

Now on pp. 7-11.

**DoD RESPONSE:** Concur: Preponderance of Air Force engines in the 2LM program are meeting their turn-around time "goals." As the shortage of repair parts problem is resolved, engine turn-around times should decrease. Following the decrease in engine turn-around times, the Air Force will simultaneously reduce the numbers of engines in the inventory. Fixing engines faster will decrease the amount of engines needed in the inventory, and by reducing the inventory savings can be achieved. However, the "supply rich" environment for certain engines may well remain due to the wartime surge requirement. Exercising depots at wartime surge levels to determine depot throughput would be needless and prohibitively expensive. Instead, as part of the Air Force's Lean Logistics end to end analysis, depot surge and pipeline responsiveness will

be key areas of interest. As noted by the GAO report, the program may change when the Air Force analyzes the engine supply situation in FY 1997.

**FINDING D: Use of 2LM to Support Deployed Forces.** The GAO stated that the use of 2LM to support deployed forces in times of conflict will impact airlift allocation. The GAO reported that since deployed forces will not have in-country intermediate maintenance capability, forces will be dependent on airlift for their spare and repair parts. The GAO pointed out, however, that airlift priorities are not controlled by the Air Force, but by the Theater Commander. (pp. 13-14/GAO Draft Report)

**DoD RESPONSE: Concur.** Air Force analysis indicated that 2LM saves airlift. Conversion to 2LM generated airlift savings of 175 C-141 equivalent aircraft in two major regional contingency scenario due to the reduction of maintenance, equipment, and personnel. An Air Force initiative, Air Mobility Express (AMX), will provide early, regular resupply to all Services. The Air Force portion of that lift is less than the 175 C-141s saved by 2LM. The Services' exact requirements are being developed in an AMX sizing study. While the decision to initiate AMX is the Supported Commander's, logistics planners in Central and Pacific Commands have indicated their support for AMX as necessary to support logistics requirements. We agree that theater plans for AMX should be clearly expressed in theater regulations and operations plans.

#### RECOMMENDATIONS

**RECOMMENDATION 1:** The GAO recommended that the Secretary of Defense direct the Secretary of the Air Force to periodically reassess the cost efficiency and effectiveness of items already in the program, as well as those planned for the program, to determine whether avionics items and engines are the most appropriate 2LM candidates. To facilitate the reassessment, the Secretary of the Air Force should develop:

- a revised cost and savings analysis that reflects (1) facilities and major construction costs incurred to ready depots for 2LM, and (2) the fact that anticipated workload at depots has not materialized;
- an assessment of the depots' ability to meet repair turn-around times prescribed by Air Force standards when the current supply rich environment is over and 2LM is fully implemented; and
- an action, in concert with wartime theater commanders, that assesses availability of airlift in the early stages of a conflict to fully support the added airlift requirements of 2LM. (pp. 14-15/GAO Draft Report)

Now on p. 11.

Now on pp. 11-12.

**Appendix I**  
**Comments From the Department of Defense**

**DoD RESPONSE:** Concur. The Air Force's 2LM program has proven it is an effective program having saved \$258 million, and is a key component of the Air Force's "Lean Logistics" initiative. Program implementation is monitored closely at highest levels by the Air Force Deputy Chief of Staff for Logistics and Commander, Air Force Material Command (AFMC). HQ AFMC's major reengineering effort will improve depot processes, efficiency, and customer support. Through the Air Force's Two-Level Capability (TCAP) process, program managers, item managers, and Major Command customers agree on when, and which items, will convert to 2LM. The Air Force uses stringent metrics to assess an item's effectiveness under 2LM, and to make necessary adjustments. Facility and construction costs specifically attributable to 2LM are already counted, and depot personnel are continually adjusted to meet workloads. The DoD agrees further assessments of capability and inventory should be conducted, and the Air Force has these assessments programmed through the 2LM end to end analysis and engine supply reassessment. In addition, the "Mobility Requirement Study-Bottom Up Review Update" (MRS-BURU) Inter-Theater Airlift Analysis Study, determined the requirement for inter-theater airlift. The Air Force will continue to work with the Joint Staff and supported Commanders-in-Chief to determine effective use of airlift allocation to meet Service requirements.

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