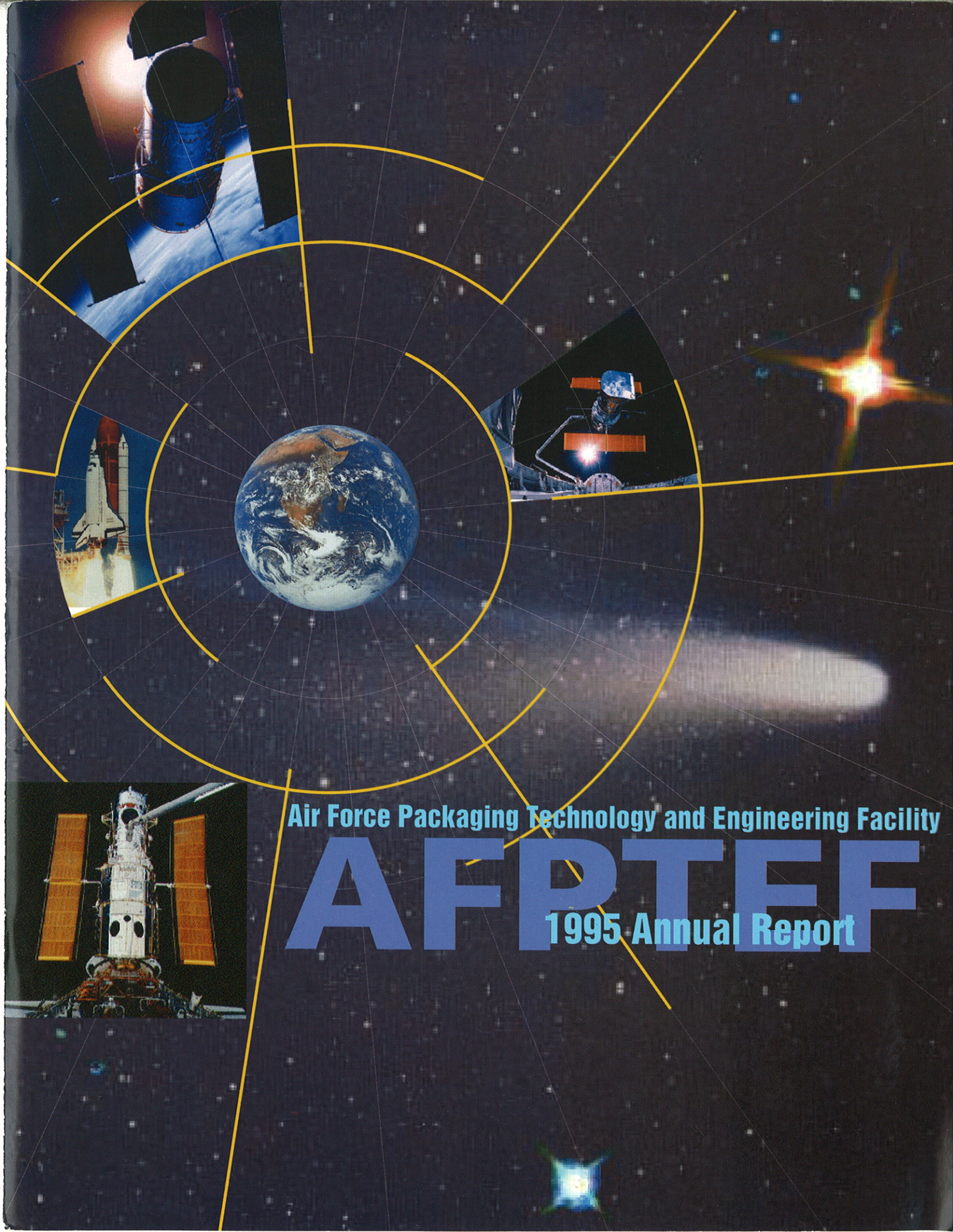


Air Force Packaging Technology and Engineering Facility

AFPTEF

1995 Annual Report

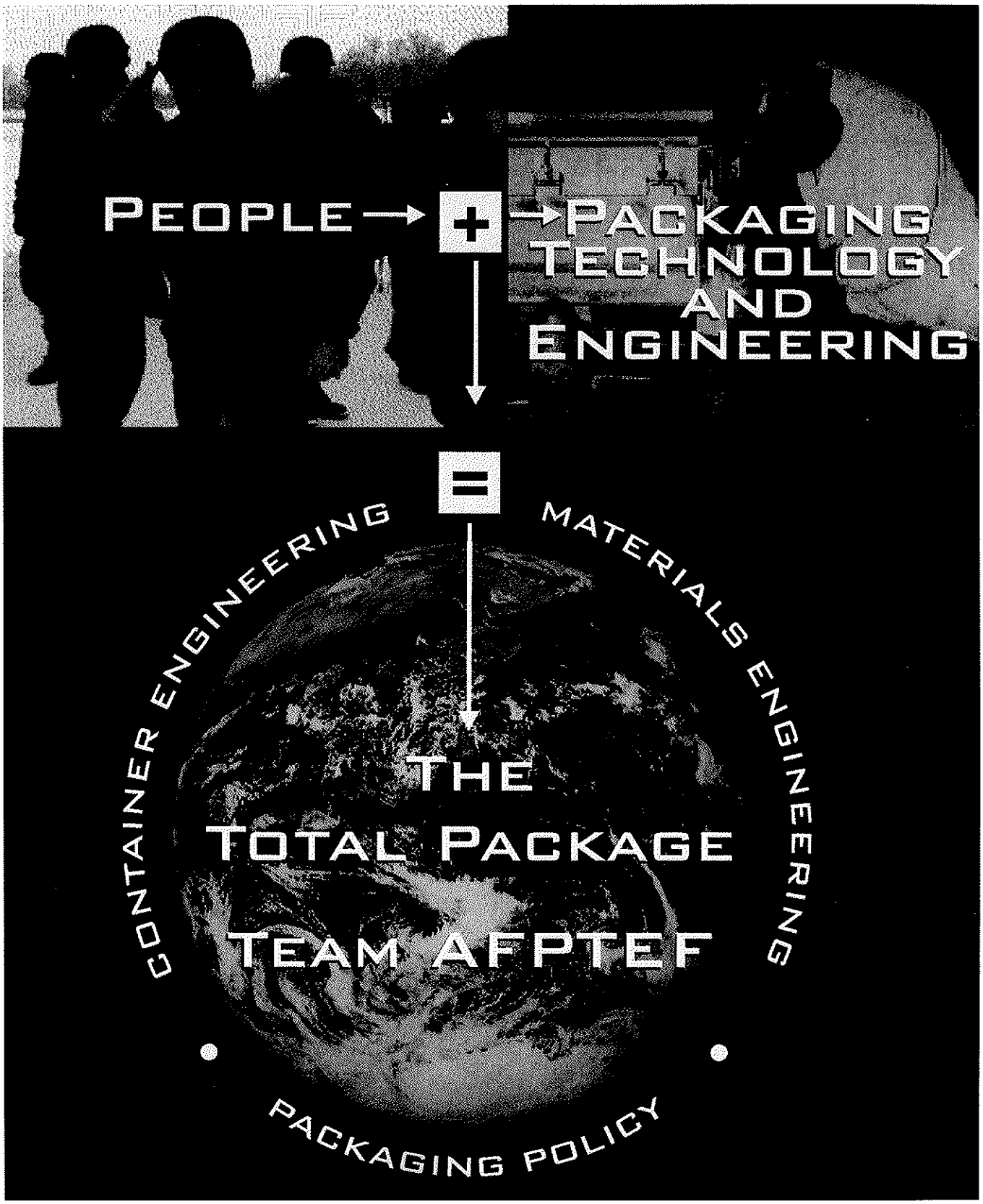

PEOPLE
PACKAGING TECHNOLOGY AND ENGINEERING
CONTAINER ENGINEERING
MATERIALS ENGINEERING
PACKAGING POLICY
THE TOTAL PACKAGE TEAM AFPTEF

TABLE OF CONTENTS

DEPARTMENT OF THE AIR FORCE
Air Force Materiel Command
Wright-Patterson AFB OH 45433-5501

Air Force Packaging Technology and Engineering Facility

AFPTEF

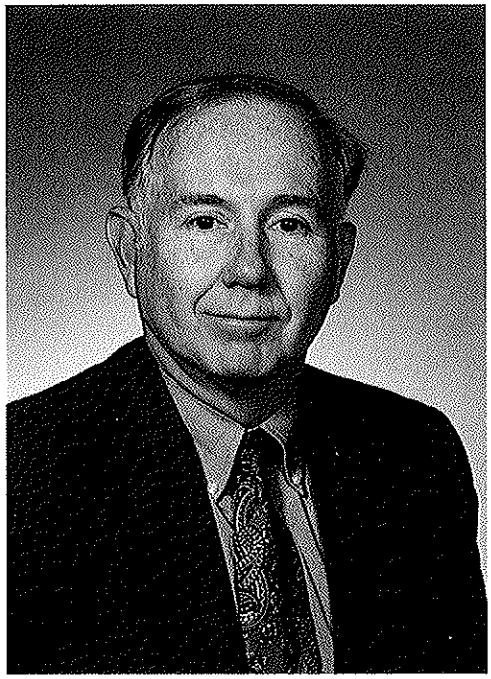
1995 Annual Report

3 May 1996

No. of Printed Pages: 36
OPR: AFMC LSO/LOP
Approved by: Howard English
Editor: Darryl Meade
Brochure design and layout by the Multimedia Center

Table of Contents

Highlights from the Chief



The people at the Air Force Packaging Technology and Engineering Facility (AFPTEF) strive to meet our customer needs everyday. In order to do this, we are continually evaluating our customers' requests and inquiries to get a true picture of their total needs. We have found that many times the customer needs more than just a specialized container or a material tested. We need to start at the beginning to find out what are the policy related stumbling blocks. What are the environmental conditions? Can the item be transported commercially or on a military aircraft? The customers really have many questions and possible problems beyond just a container.

From these unique problems our customers have, we have taken a different approach to the entire packaging solution. We are looking at each request from our customer with what we like to call our "total package support" approach. This "total package support" approach brings together each functional area within AFPTEF as a team to see what is required to meet the customers needs. Our Policy Branch looks at the request to see what policy and procedure issues are involved. What is the movement restriction on the item? Are there any international requirements that must be met? Our Materials Branch looks at any environmental issues that may impact packaging the item. They also begin to look for cushioning materials that could be used. With the necessary information in hand, the Design Branch will work very closely with the customer to begin design of the new container. As we design and prototype the container, we bring in the customer to assure that the container design really does meet their needs. Modifications can easily be made at this point. After finalizing the design and building a prototype, the Materials Branch begins testing the container to ensure that it meets all design requirements. After completing all of the tests, the container design is complete.

At this point, the customer will decide if they would like to procure the containers or have AFPTEF buy and accept the containers. Either way, the customer will have a container that will meet their needs. It will also cost the customer much less than if they allowed the prime item contractor to supply the container.

The item you put into a container is too costly these days to take a chance that it will reach your customer in an inoperable condition. AFPTEF can provide you with the "TOTAL PACKAGE SUPPORT."

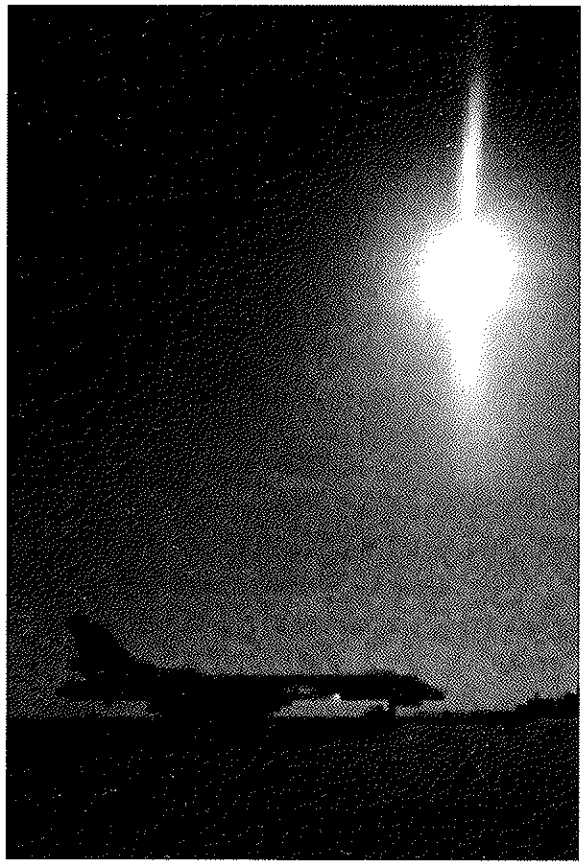
Leslie K. Clarke III

BUDGET ACTIVITY

by Phyllis Offutt

The Air Force Packaging Evaluation and Engineering Facility (AFPTEF) experienced another prosperous year providing packaging services to outside activities. A major contributing factor to a successful year is the number of projects completed for various DoD components. AFPTEF is an Operations and Maintenance (O&M) funded organization. The receipt of project funds supplements our budget and allows us to continually modernize our facilities and equipment. During the fiscal year, AFPTEF received approximately $670K of customer project funds.

AFPTEF receives funds from customers by Military Interdepartmental Purchase Requests (MIPRs), Project Orders, and Purchase Orders. These funds are used to design, develop, and/or manufacture/procure containers to satisfy our customers needs. The funds are also used for travel related to the particular project. Materials, supplies, and equipment necessary to complete the project are also charged to the project funds. The supplemental funds from our customers allows us to remain current with technical advances in the packaging field. Over the past three years, our customer base has continually grown. Thus, the receipt of project funds also grows. This growth indicates that we are meeting our customer needs in a timely and cost effective manner.



WHATS NEW !!

by Les Clarke

The Air Force Packaging Technology and Engineering Facility (AFPTEF) , also known as "The Packaging Lab" has recently completed a complete renovation of thier office area. This renovation includes the installation of systems furniture and the new single-line phone system. Along the way, we had to go through the asbestoes abaitment process. After that was completed, new ceiling tiles were installed. Prior to installing the systems furniture, all new carpet was installed and all of the walls received a new coat of paint. Much of the work was accomplished as "self-help". Everyone can put up ceiling tile and has renewed their painting skills. It was a "Total Team" effort to make our home-away-from home a better place to work.

We are very proud of our new home. Drop by Building 70 and see what a Team can do! We welcome everyone.

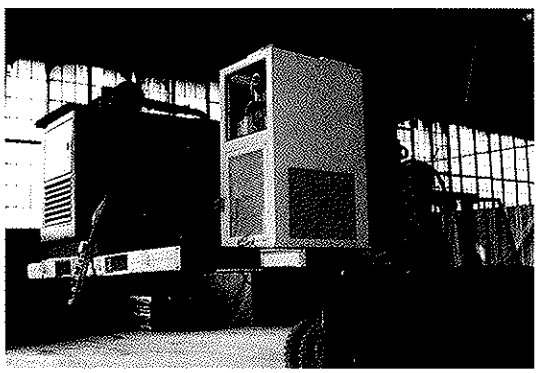
HUBBLE SPACE TELESCOPE (HST) ENVIRONMENTAL CONTROL SYSTEM (ECS) PALLET DESIGN

by Jason M. Gilreath

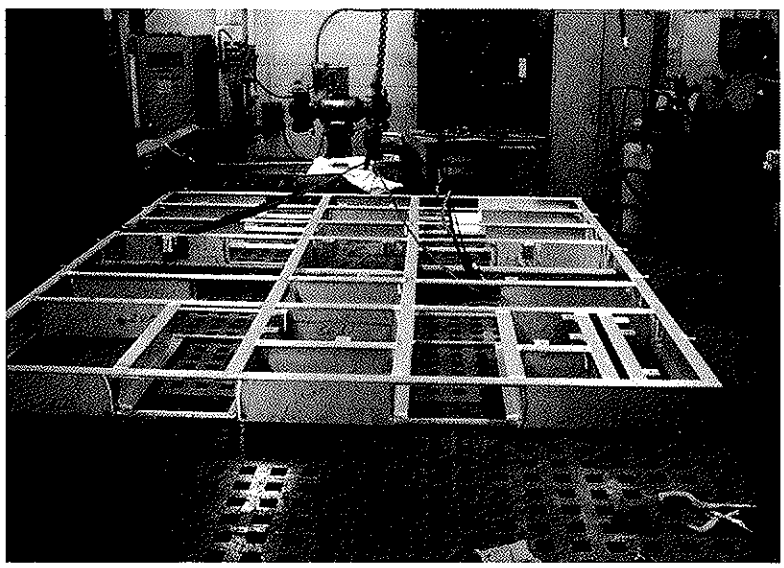
In support of an AFPTEF project, managed by Mr. Ronald DeLuga, working with NASA Hubble Space Telescope, a large pallet was designed to transport various heavy items along with the actual container and item. These items include a diesel powered generator, environmental control unit, electrical control panel, and nitrogen-purge cart that is used to purge the container atmosphere for shipment. The need for these items to be transported along with the container is to strictly control the environment inside the container.

The pallet dimensions are 120" X 100" (LW) and is fabricated primarily from 6" structural aluminum channel with four way forklift entry. Such a large channel was needed to support the combined load of greater than 5000 lbs. Because of the considerable number of pre-existing attachment points on all of the different items, special attention to tolerance build-up had to be given.

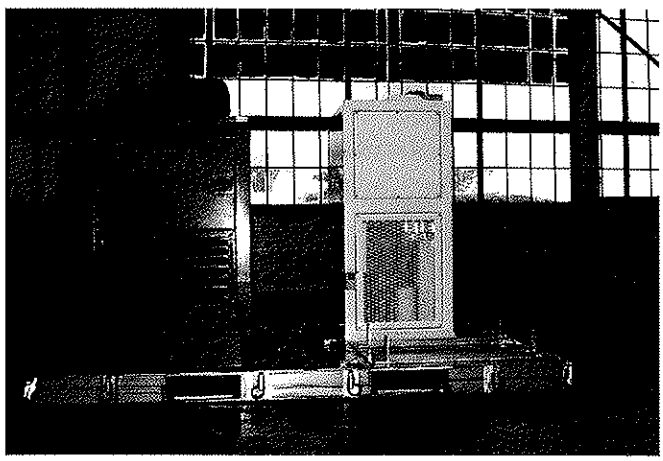
All of the items did fit onto the pallet with minimal deflection of the pallet during lifting.



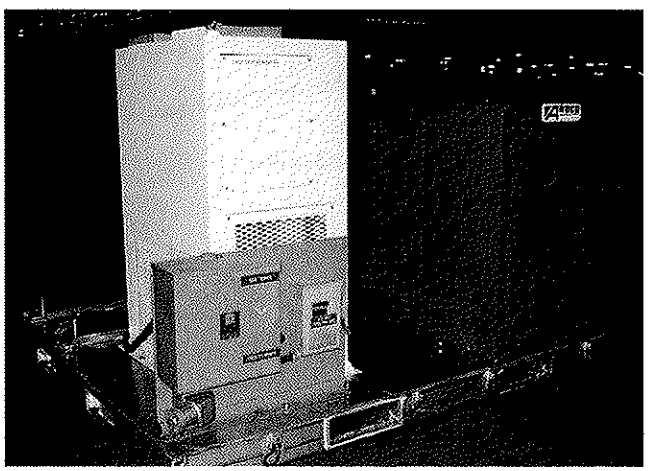
Forklift handling test.



Pallet fabrication



HST ECS pallet configuration



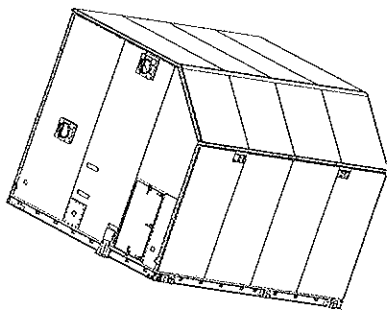
HST ECS pallet configuration

HUBBLE SPACE TELESCOPE (HST) FLIGHT SUPPORT SYSTEM (FSS) SHIPPING CONTAINER

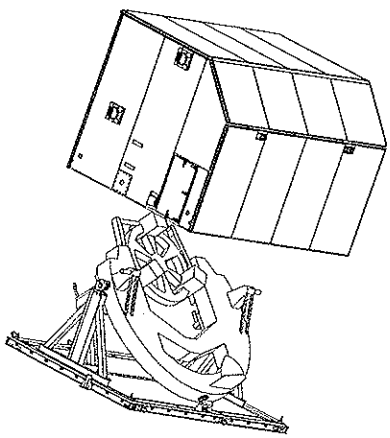
by Ronald E. DeLuga

The Hubble Space Telescope (HST) Flight Support System (FSS) Shipping Container is a joint project between The Air Force Packaging Engineering Technology Facility (AFPTEF) and the HST Repair and Servicing Project Group at Goddard Space Flight Center (GSFC). This project is going to provide the HST Project Office with a shipping container for the FSS, that meets all of the specialized requirements to ship such a unique item. The container has been completely designed using Parametric Technology's Pro/Engineer Three Dimensional Solids Modeling software. In addition, a complete structural analysis was performed using Structural Research's Cosmos/M Finite Element software.

The uniqueness of the transportation container starts with its overall size, nominally 220" x 168" x 168". These overall dimensions chosen and the cube (3600 ft^3) allows the container to be moved using any mode of transportation from C-5 air lift, over the road transit, and sea board transit by barge. The FSS item is hard mounted inside the container using a three point attachment designed by GSFC and fabricated by AFPETF. In addition to the overall size of the container several other features stand out adding to the uniqueness of this container. First, the internal environment will be completely temperature and enviromentally controlled using an environmental control system (ECS). The internal environment will also be filtered using a 99.99% efficient HEPA filtration system and must maintain strick temperature and cleanliness requirments. Other features include two personnel access doors, instrumentation access ports, integral grounding points, ECS input and return air ports, tag line attachment points, cover alignment guides, and a weather proof storage compartment for transportation recorders.



Overall container (base & cover assembly)



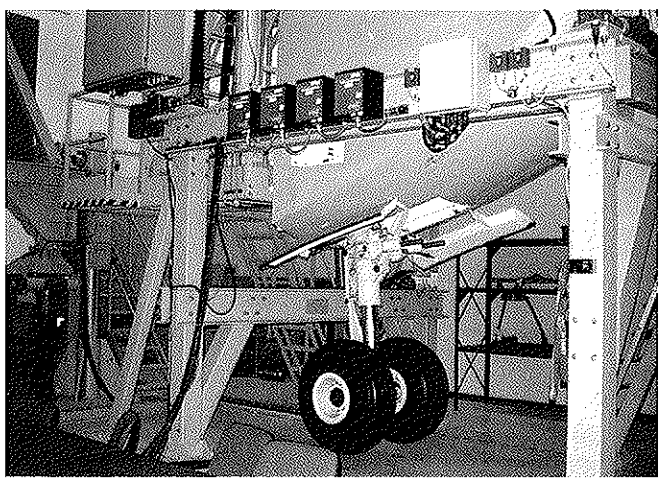
Overall container (cover raised showing FSS placement)

The overall design is a single structural welded and riveted skid fabricated from aluminum sheet, I-beams, wide flange H-beams, and Divinycell foam insulation material. The cover will be fabricated from five individual panels. Each panel design will be a welded and riveted structure consisting mostly of aluminum sheet, 2.0" square tubing, angle shaped extrusion, and Divinycell foam insulation material. The panels will then be permanently (or semi-permanently) bolted together to form a five sided cover.

C-17 MAINTENANCE TRAINERS PROGRAM SUPPORT

by Robbin L. Miller

ASC/YWMF requested AFPTEF engineers to evaluate the fully operational suite of C-17 maintenance trainers, located at Charleston AFB SC, to determine the long term storage requirements for a second non-operational suite of trainers. The C-17 program is in the process of receiving this second suite of trainers and with the uncertainty of a second wing of C-17's, the second suite of trainers would have to stored indefinitely. The main decision to be made was whether the trainers could be stored in a semi-disassembled mode with all pertinent parts preserved for storage or whether they had to be fully assembled and routinely maintained. AFPTEF evaluated the trainers and determined that if necessary they could be preserved and stored in a semi-disassembled state.



C-17 maintenance trainer

C-17 CRASH RECOVERY BAGS CONTAINER

by Jason M. Gilreath

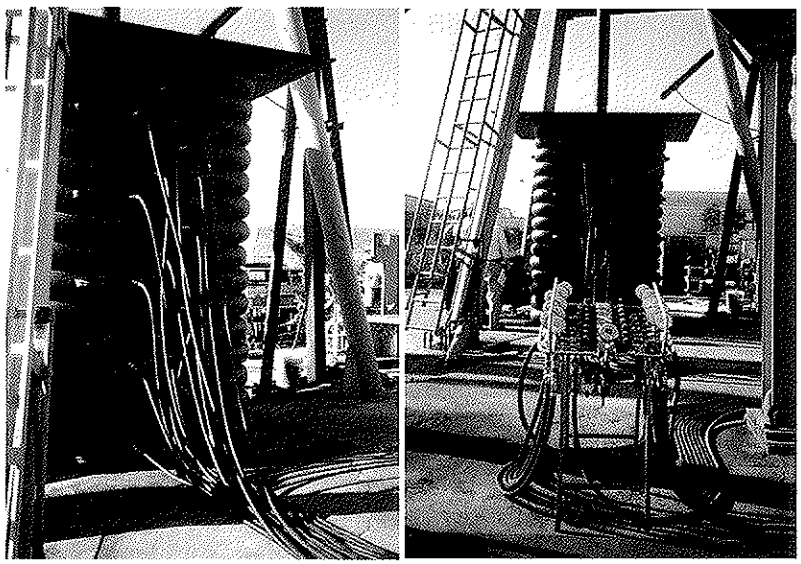
The San Antonio Air Logistics Center's Aerospace Support Equipment Directorate (SA-ALC/LDEE), Kelly AFB TX, approached AFPTEF in early 1995 to design and build a container for the new crash recovery air bags which they were procuring for the C-17 program.

The current method of storing the older bags is in two unsealed wooden crates per bag set. One crate holds an inflation control console, and the other holds the bags and air hoses. Thus the crash recovery team must keep track of two crates before, during, and after deployment. These bags see infrequent use and are stored both in a warehouse and outside on a flatbed trailer ready for deployment. A problem with these wooden crates is that they do not provide adequate protection for the items. The inflation control console, for example, is frequently damaged during shipment. During a shipment from Charleston AFB to Wright-Patterson AFB, the crate holding the bags and hoses had broken open and spilled the contents out onto the transport truck.

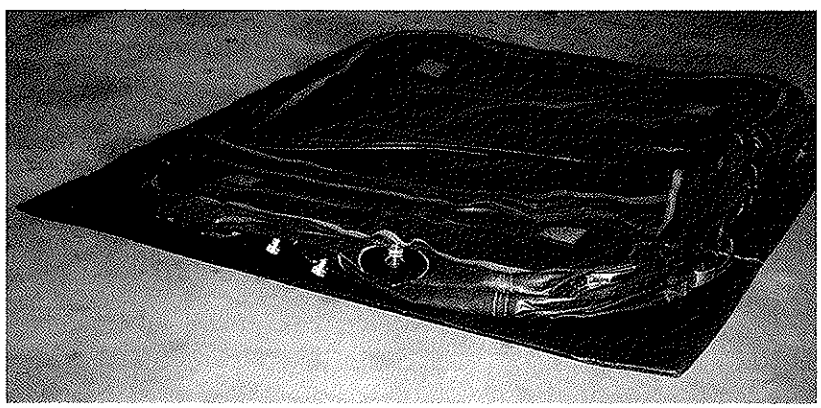
There are three components to the new bag system design: five bag modules with three bags per module, fifteen inflation hose sets, and one inflation control console. The users, 437 MXS/LGSMA, at Charleston AFB SC, requested that all of these components be stored inside a single container for ease of storage and deployment.

The exterior container is designed using a modification of a previous AFPTEF aluminum container design which has been entered into our automated solids modeling software Pro/Engineer, thus greatly reducing development time. Exterior dimensions are expected to be 3556mm (140")L x 1219.2mm (48")W x 1524mm (60")H with tare and gross weights at 700 lbs and 1600 lbs respectively. This is a sealed container and uses standard latches, pressure/vacuum relief valve, air filling valve, and tie down rings. The exterior will be bare, unpainted aluminum. This reduces long-term maintenance costs involved with repainting and the environmental impact of the paint itself.

The container is in the last stages of development and will undergo a full battery of tests to insure a sealed container.



C-17 air bag weight/stack tests.



15 ton C-17 air bag module

COMBAT TALON II KU-BAND ANTENNA CONTAINER WHEEL MODIFICATION

by Robert S. Tekesky

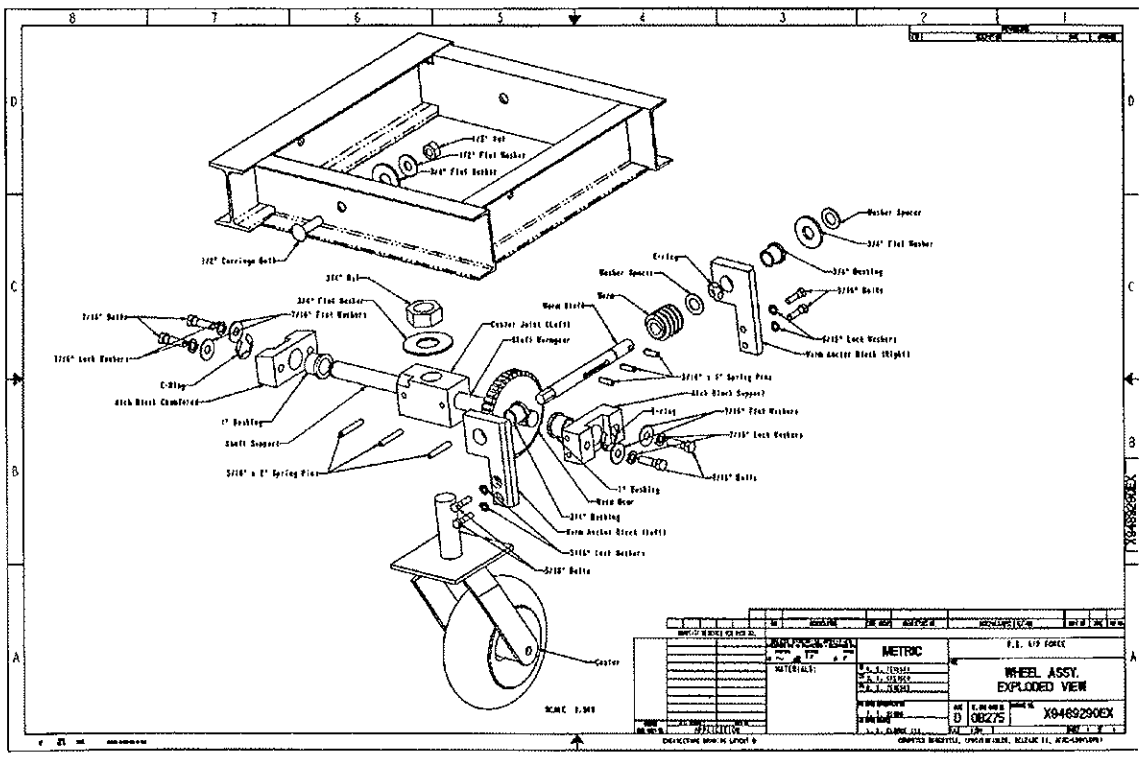
The Air Force Packaging Technology Engineering Facility (AFPTEF) provided engineering support to the Combat Talon II (CTII) program office this past year. CTII is a modified C-130 aircraft designed for special operations. Back in 1988, AFPTEF designed the KU-Band Antenna Container for the CTII program. The container is an aluminum extrusion design with a special design feature. CTII required the container to be mobile about the aircraft. Therefore, instead of procuring a special piece of ground support equipment for handling the antenna, AFPTEF design the ground support equipment directly into the container. The container lid incorporated with demountable caster wheels allows personnel to temporarily store and maneuver the down loaded, broken antenna from under the aircraft. The container base, incorporated with retractable wheels, allows personnel to maneuver the new antenna into position and up load the antenna to the aircraft. Personnel also utilize the retractable wheels on the base to tow the container across the flight line to the antenna maintenance facility and maneuver the antenna inside the maintenance facility while repairing the antenna.

In 1994 CTII program came back to AFPTEF requesting a modification to the retractable wheels in the base of the container. CTII required the ground clearance of the base of the container to be increased to ten inches. Be able to raise the container with the retractable wheels without the aid of a forklift and without have to reach into the wheel well. AFPTEF was able to fulfill all of CTII requirements and design, modify, and test the prototype container in less than 6 months.

In 1995 CTII program came back to AFPTEF requesting to have all 39 fielded containers modified with the new wheel design. AFPTEF worked closely with CTII program office to modify a small group of containers at one time. The completed containers were shipped to field units to switch containers and shipped the old containers back to AFPTEF for the modification.

With AFPTEF's unique in-house prototyping shop and three highly skilled model makers, we were capable of accomplishing the work request. Our flexibility allows us to adapt to the aggressive CTII schedule for modifying the containers. The small quantity and time frame that is required by CTII would not be cost or time effective to contract out. Another advantage CTII will see by having AFPTEF complete this production is if any changes or problems encountered, they can be corrected on the spot without delay in scheduling.

AFPTEF has completed 37 container modifications. AFPTEF's capability to perform small production modifications proved beneficial to the CTII program in terms of cost savings and time.



Combat Talon II KU-Band Antenna container wheel modification.

F-15 CANOPY CONTAINER PROCUREMENT

by Robbin L. Miller

In July of 1991 WR-ALC depot maintenance requested AFPTEF to design an environmentally sealed container for the one and two man F-15 canopies. The canopies were experiencing problems of elongation and deformation of the canopies while they were in the wood boxes used for transportation and storage. It was determined that humidity was the culprit and had to be eliminated. For each canopy that was deformed, the Air Force was out $26,000.00.

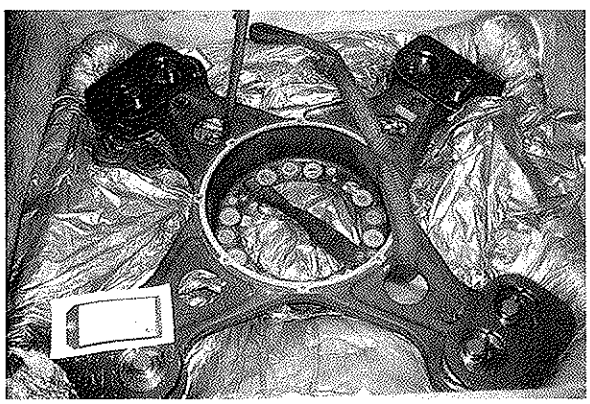
AFPTEF designed, fabricated, and tested prototype — an aluminum, long-life, environmentally sealed container for the canopies. In addition to solving the humidity/deformation problem AFPTEF designed and incorporated into the container cradle system a canopy handling fixture. Similar handling fixtures were being procured for the depot for a cost of $7,000.00 each. The total project was completed in a one year time frame.

The aluminum container was used in the field for approximately one year and ascertained great reviews. With the design thoroughly proven, the program office requested AFPTEF to procure 100 of these containers for field usage. AFPTEF and Wright-Patterson contracting officials were able to award this contract, via open competition, in a 6 month time frame. Total cost to manufacture 113 containers was $519,687.00 ($4,599.00 each). The cost of manufacturing the containers will be recuperated in the first 20 canopies that the containers save from deformation.

FAMILY OF AVIATION SPARE PARTS CONTAINERS #2, #5, AND #6

by Jason M. Gilreath

The Aviation and Troop Command (ATCOM) St. Louis MO AMSAT-I-SDP program office requested engineering assistance designing a small number of reusable, sealed, aluminum containers that would replace their existing line of many specialized wooden crates.

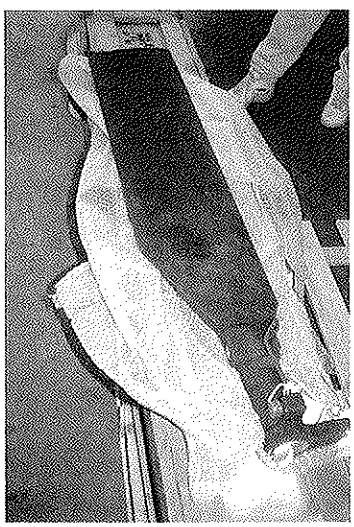


Bifilar assembly.

ATCOM's major goals were not only to have better containers for their items, but also to reduce the number of different containers from more than 20 down to only 4, thus greatly simplifying their warehousing needs. The three container sizes are 1675 (66") L x 510 (20") W x 457.2 (18") H, 1297 (51") x 1220 (48") x 533.2 (21"), and 1345 (53") x 1270 (50") x 1132.1 (45"). Item weights will range from 0.9 kg (2 lb.) to 70 kg (154 lb.). All containers will use a polyurethane foam for the cushion system.

Three of the new container designs utilize an existing AFPTEF design that has already been proven to be structurally sound and sealed. These stackable containers are forkliftable and will use standard latches, pressure/vacuum relief valves, air filling valve, desiccant port, and tie down rings. They will be manufactured exclusively from aluminum. Most of the prototype components will be fabricated using a computer numerically controlled (CNC) 3-axis milling machine with machine code generated on Pro/Engineering software. Standard latches, pressure/vacuum relief valves, air filling valves, and tie down rings will be used.

Yoke assembly, main rotor.



Blade, rotatry rudder.

Inlet assembly, engine.

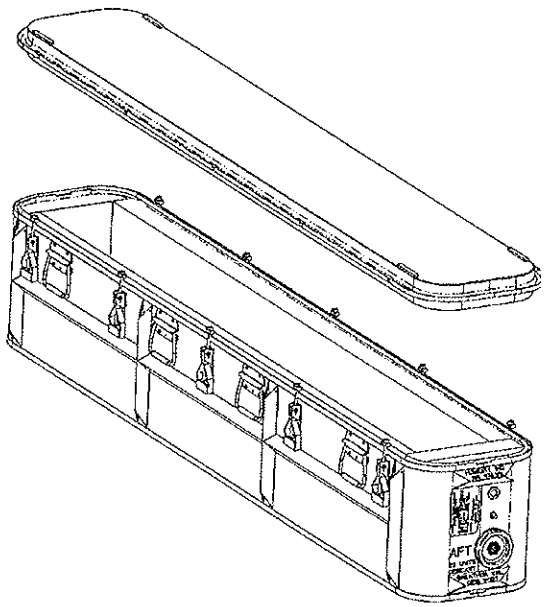
FAMILY OF AVIATION SPARE PARTS CONTAINERS #3

by Robert S. Tekesky

The Aviation and Troop Command (ATCOM), AMSAT-I-SDP contacted the Air Force Packaging Technology and Engineering Facility (AFPTEF) for assistance. ATCOM had a requirement for an environmentally sealed container to replace their current wood containers. ATCOM in an attempt to consolidate their packaging of aviation spare parts, is taking advantage of a multi-purpose aluminum container. The multi-purpose container will house several different items eliminating the need for different size wood containers and allow maxium use of shipping and storage space. The multi-purpose container will be designed for a maximum gross weight of 68 Kg (150 pounds). The containers internal dimensions are 2,388mm L x 381mm W x 394mm H (94" x 15" x 15.5") and a tare weight of 45.4 Kg (100 pounds).

The container is constructed out of two aluminum extrusions and sheet aluminum for the top, bottom and sides. The container will have a cam-over-center latch, desiccant port, pressure relief valve, humidity indicator, and air filling valve. Stacking pads will be located on top of the container for easy lock-in-place stacking. Palletized loads will be made easier with this container's size and stackability. Life cycle of this container will be 20 years.

The container is scheduled for prototyping and qualification testing early spring 96. Manufacturing drawings will be generated and ready for procurement of the container this summer. ATCOM currently has plans for AFPTEF to procure 200 containers of this design.



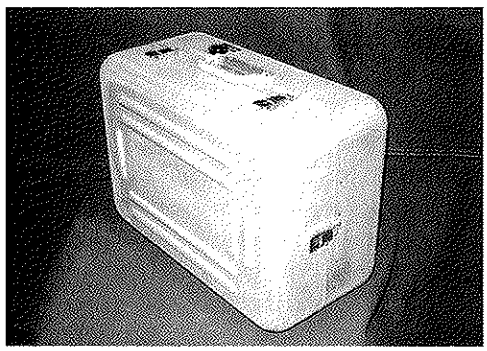
Environmentally sealed aviation spare parts container.

JOINT STARS RTMM TRANSIT CASE PROCUREMENT

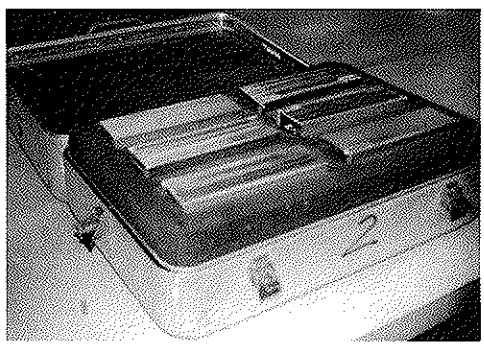
by Robert S. Tekesky

The Electronic System Center (ESC) at Hanscom AFB, MA requested the Air Force Packaging Technology and Engineering Facility (AFPTEF) assistance in designing a carrying case for the Joint STARS Program. The Joint STARS Program requires a carrying case to transport Remote Transportable Memory Modules (RTMM). The RTMM's are similar to a hard disk drive in a computer. Upon completion of a Joint STARS mission, the RTMM's are removed from the aircraft and transported to a base facility where the information collected on the RTMM is downloaded to a main computer. After reviewing Joint STARS requirements, AFPTEF determined the best case design to be an off the shelf transit case. The weight of the case and the number of RTMMs required per mission were the driving factors in the design. AFPTEF chose a water resistant, thin wall aluminum case. The case has four cam-over-center latches, pressure relief valve, one handle, and anti-static foam that houses six RTMM units. The case measures 20.65" L x 13.75" W x 10" D with a tare weight of 13 pounds and a gross weight of 42 pounds.

This year, AFPTEF procured fourteen cases for the Joint STARS program. AFPTEF prepared all procurement documentation and performed first article inspection of the cases. The Joint STARS program was able to benefit from AFPTEF's expertise in container design. AFPTEF's knowledge and capabilities to manage container procurements ensured the program office would receive the correct item to meet their requirements. WR-ALC is currently working to have this carrying case stock listed.



Joint Stars RTMM transit case.



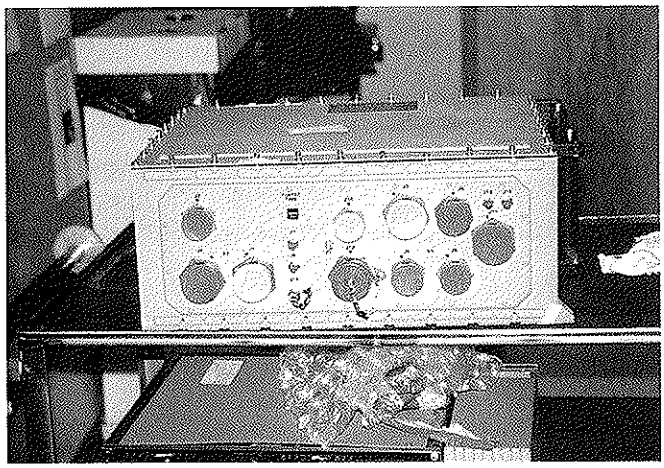
Joint Stars RTMM case configuration.

ADVANCE WARFARE ANTENNA DEFENSE SYSTEM APQ-175 CONTAINERS

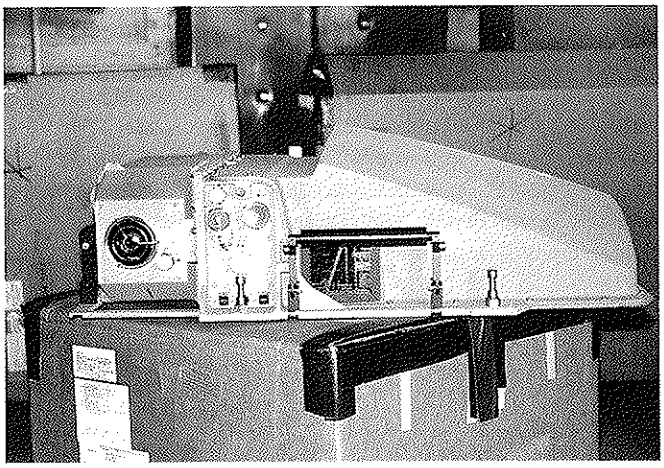
by Robbin L. Miller

The Advance Warfare Antenna Defense System (AWADS) consists of the main Ka-Band antenna and seven support units. AFPTEF was asked by the C-130 System Program Office to design containers for three of the largest support units. The Ka-Band Receiver-Transmitter, the X-Band Receiver-Transmitter, and the Radar Data Processor. The other four support units are small and lightweight and can best be packaged in standard Air Force Fast Packs.

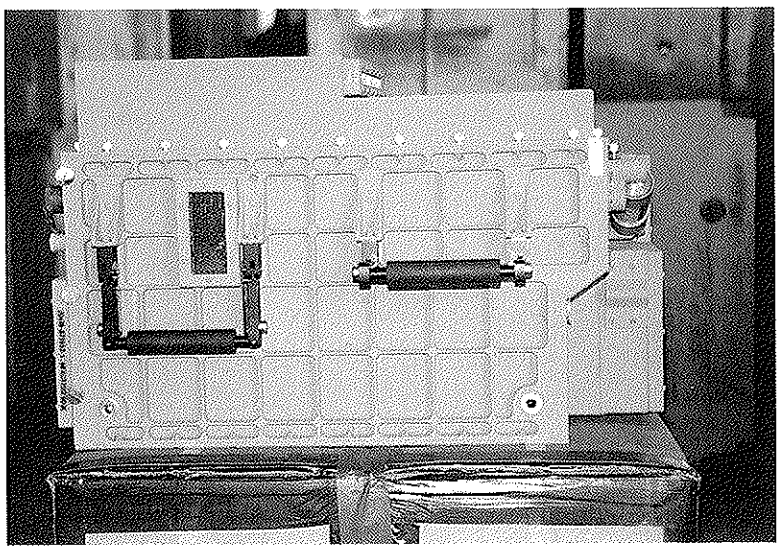
Some of the program requirements for the new containers are that they must be environmentally sealed for outside storage and item corrosion protection, protect the item from shock and vibration over 35 G's, and be user and logistic friendly. The containers are being designed using a standard and proven in-house design. The design features an easy item access, low base design, fork-lift entries, standard field replaceable hardware, and a polyethylene foam shock isolation system. The containers are scheduled to be completely designed, fabricated and tested by the end of March 1996. The AFPTEF production level drawing package will be used to procure approximately 30 of each design.



AWADS Radar Data Processor.



AWADS Ka-Band Receiver-Transmitter.



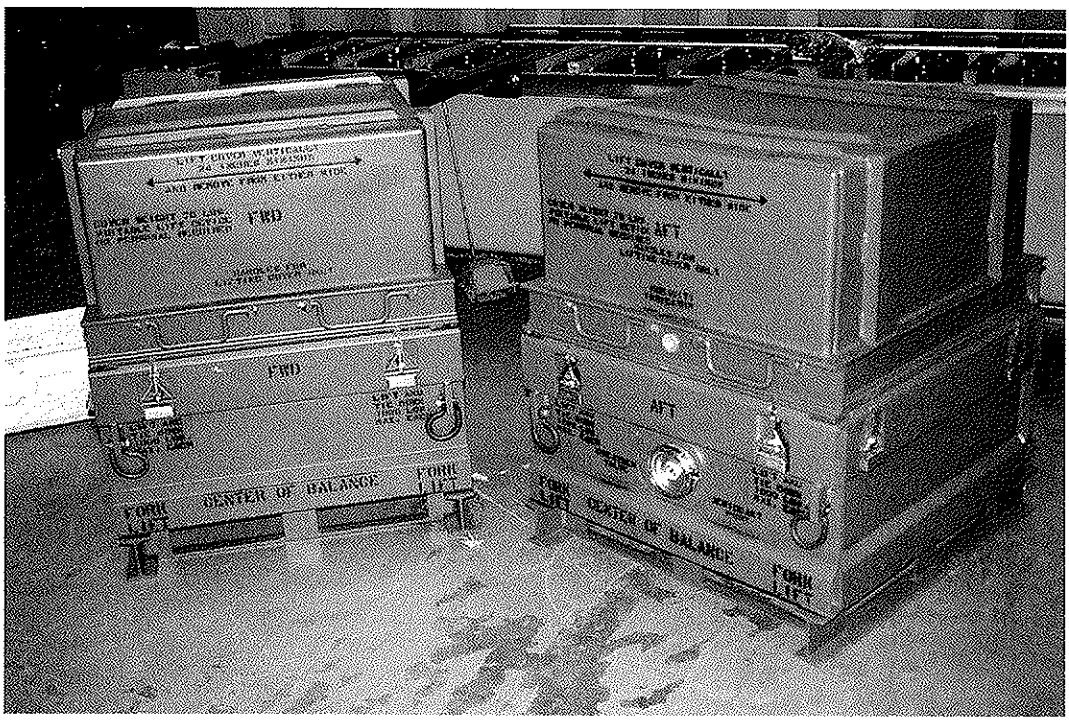
AWADS X-Band Receiver-Transmitter.

C-130 COMBAT TALON II CONTAINER PRODUCTION

by Robert S. Tekesky

The Air Force Packaging Technology and Engineering Facility (AFPTEF) provided engineering support to the Combat Talon II (CTII) program office this year. CTII is a modified C-130 aircraft designed for special operations. AFPTEF supported the CTII program by producing additional shipping and storage containers for the depot. CTII required two additional Infrared Detection Set (IDS) containers, two KU-Band Antenna containers, and three Nose Radome containers. CTII required these containers within six months. The short time constraint imposed on the CTII program limited their flexibility to procure these containers. With AFPTEF's unique prototyping shop and three highly skilled model makers, we were capable of accepting the work request. Our flexibility allows us to change along with the CTII schedule for producing these containers. The small quantity and time frame that is required by CTII would not be cost or time effective to contract out. The IDS and KU-Band Antenna containers and one Nose Radome container has been completed and delivered to the depot. The two remaining Nose Radome containers will be completed and delivered this spring.

Nose Radome mounting fixture.



Infrared Detection Set (IDS) containers.

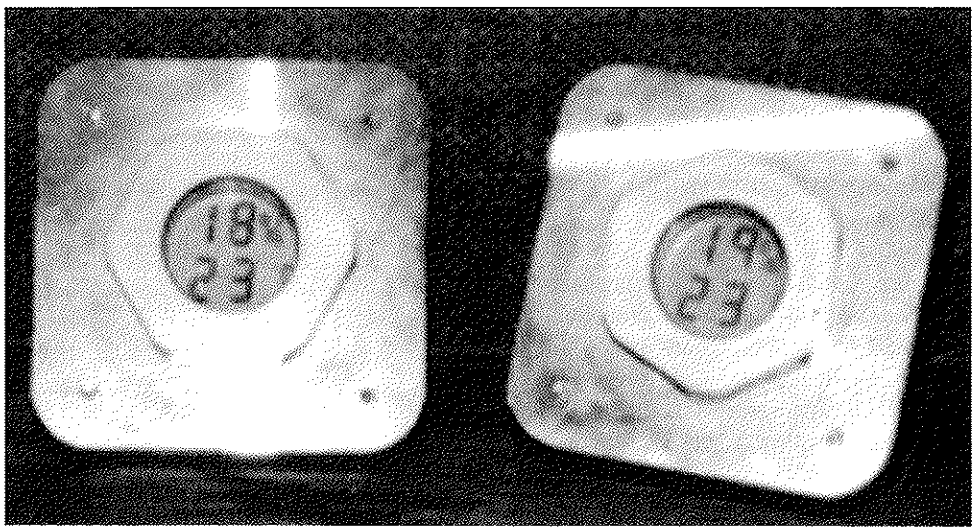
"SMART" SENSOR PACKAGING TECHNOLOGY FOR MUNITIONS PACKAGING

by Carey Scott Gravenstine

The AFPTEF is responsible for the development of an electronic humidity indicator as part of their work with the Defense Ammunition Packaging Council, DAPC, Project J4 "Smart Sensors for Packaging". The AFPTEF has received 26 "prototype electronic" humidity/temperature indicators (EHTI) from the Physical Sciences Laboratory, New Mexico State University. The EHTI prototypes shown are the first of two "electronic" concepts intended to be used as an alternative and direct replacement to the current MIL-I-26860 type "color change" reversible humidity indicator.

The first concept prototypes are based on the Hy-Cal IH-3602-C sensor which allows the EHTI to measure and display temperature from -40 to +85 °C. Accuracy's of this prototype are 0-20% and 80-100% ± 5% RH, 20-80% ± 2% RH and -40 to +85 ± 1°C.

Taking into consideration our storage and distribution system, the objective was and to minimize the risk of physical and environmental damage to both the microprocessor and display clock generators. Protected in an environmentally sealed aluminum case the most fragile component is the LCD glass, however, it is closely contained within the acrylic plastic window. The EHTI indicators are specifically designed to interface with a shipping container and are expected to operate for approximately two years while providing an increased reliability over the current "color change type" humidity indicator. Potential loss and repair maintenance of packaged assets will be significantly reduced if not eliminated by the use of such a device.



Electronic humidity/temperature indicators (EHTI) sensor.

B-1 OXYGEN ANALYZER TESTING

by Warren Assink

AFMC's Productivity, Reliability and Maintenance (PRAM) and the B-1 SPO requested AFPTEF to perform military transportation, handling and operational tests on a newly developed analyzer to determine if it complies with the military requirements. The B-1 aircraft has an onboard generator which supplies oxygen to the crew. Field maintenance uses the analyzer to determine if the generator is operating properly. The current analyzer exhibits high failure rates, inability to measure air flow, and requires complex mathematical calculations to determine other measurements. This analyzer was designed to correct these exhibited deficiencies. For more information contact Ray Blacklock, B-1 SPO at DSN 785-9180.

CUSHION RESEARCH

by Caroline J. Buckey

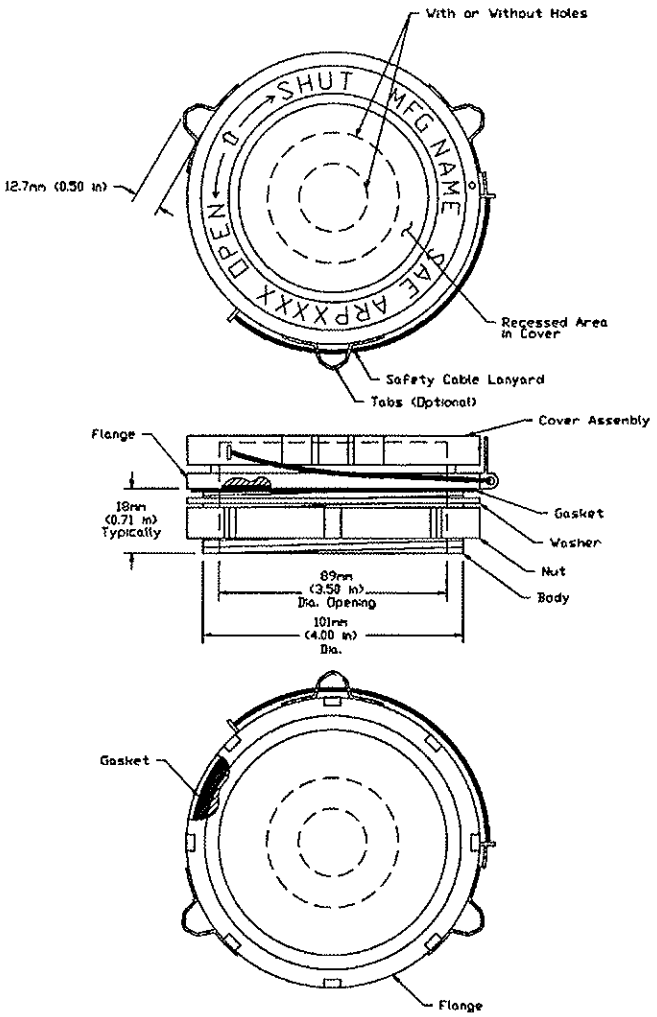
In response to the Defense Ammunition Packaging Council (DAPC), AFPTEF commenced DAPC Project J3, "Development of Improved Anti-static Cushioning Materials and Dynamic Performance Testing for Ammunition Containers" for fiscal years 1994 and 1995. This is a joint-service project managed by the AFPTEF and coordinated with the US Army Packaging Division, Picatinny Arsenal, NJ, the Packaging Handling, Storage and Transportability Center at Naval Weapons Station Earle, NJ and the US Marine Corps, Naval Surface Warfare Center, Crane IN.

This year's research consisted of development of cushion curves for anti-static, non-ozone-depleting and non-flammable cushion materials. Container designers will use the cushion curves to determine the cost, type and amount of cushioning needed in the containers to protect the item. Lansmont Corporation is performing the cushion curve testing. To date, they have data and cushion curves on three of ten materials. AFPTEF is analyzing the data and we will determine if the material is suitable for use by the DOD community. If a material proves to be useful, we will update the Package Designer Program and Military Handbook 304, Package Cushion Design.

DESICCANT PORT TESTING

by Susan J. Misra

The Materials Branch of the Air Force Packaging Technology and Engineering Facility (AFPTEF) conducted leak testing on a sealed container in order to determine the sealing performance of several desiccant ports, from two manufacturers. A comprehensive set of leak tests, pneumatic pressure and vacuum retention, were repeatedly conducted on each port. The ports were also evaluated for their ease of use as one type of port had tabs on the cover assembly and the others were without tabs. Results of this testing were reported to the Container Design Working Group. Information is available upon request.



Desiccant port assembly.

CUSHION TESTING MACHINE EVALUATION

by David Filsinger

AFPTEF, in cooperation with The National Institute of Packaging Handling and Logistic Engineers (NIPHLE), is conducting a round robin comparative testing program on dynamic cushion testers. The purpose of this program is twofold; first to determine the repeatability of test data using AFPTEF's molded four pyramid solid polyurethane test cushion and second to use this cushion for cushion tester comparison. Data has been received from 12 participating organizations and we have generated 15 data sets from our own tester. Each data set is divided into subsets according to tester platen weight.

Evaluation of the AFPTEF data suggests that with a given set of instrumentation and environmental conditions the repeatability deviation due to the cushion alone is less than one and one half G's. Deviations greater than this amount are attributable to mechanical and or electrical system problems. Temperature and humidity effects will be investigated after completion of round robin testing.
Data from half of the participating organizations contain subsets with repeatability variations greater than 10 G's. With repeatability errors of this magnitude we are unable to make valid comparisons between cushion testers. Investigation into and elimination of this variation is necessary and round robin testing repeated before valid cushion tester comparisons are possible.

VIBRATION TABLE ACQUISITION

by David Filsinger

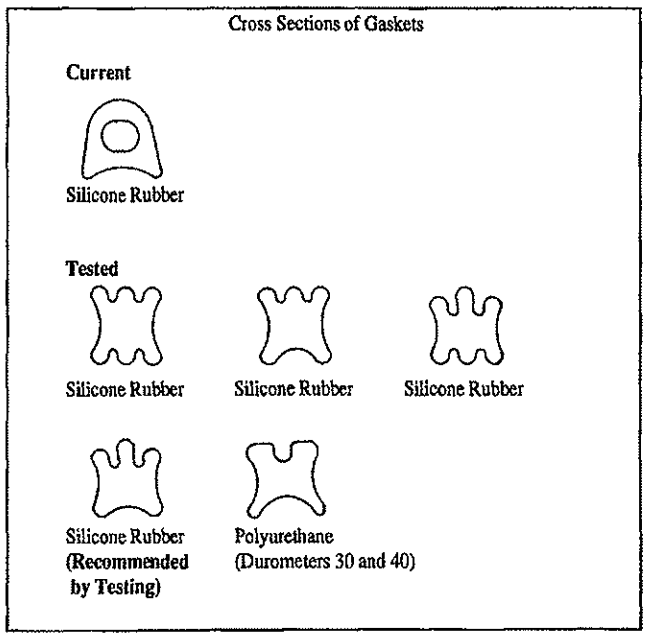
A new servo-hydraulic vibration table has been purchased to replace our large mechanical table This new system will accommodate a maximum load of 2000 pounds on a 48 inch square table top over a frequency range from 5 to 200 Hz. Items requiring a larger surface can be accommodated by replacing the top with a 120 inch by 48 inch top. Using this larger surface reduces the maximum item load to1000 pounds and the frequency range to a maximum of 100 Hz Servo control of the table is maintained using a PC computer and associated software to permit both random and sinusoidal single axis table motion.

GASKET TESTING

by Susan J. Misra

The Materials Branch of the Air Force Packaging Technology and Engineering Facility (AFPTEF), in support of the Defense Ammunition Packaging Council (DAPC) J7 Project on gasket research conducted leak testing on a sealed container using seven different gaskets. The gasket materials and shapes were developed by the Design Branch of the AFPTEF and forwarded to the Materials Branch for determination of the best gasket design. A comprehensive set of leak tests, pneumatic pressure and vacuum retention, were repeatedly conducted on each gasket before the final recommendation was given to DAPC. This research lead to the recommendation of a gasket design that exceeds performance of the gasket design currently in use.

Information is available upon request.



PACKAGING POLICY

by Michael D. Werneke

Our office continues to strive to provide better communications and service to our customers. We have started on the long and difficult task of re-engineering packaging. We will continue to need everyone's help and support as we go through these turbulent times. In addition, we have also started a new revision of both AFI 24-202 and AFJMAN 24-204. I cannot emphasize enough that everyone in our office is committed to improving communication and providing better service to our customers.

However, our office will only be able to continue improving through customer communication and feedback. Our office is available to provide expertise on packaging policy, hazardous materials policy, packaging data systems, and training requirements. If you have any questions or comments please contact myself or anyone in our office.

PACK YACK INFORMATION LETTER

by Joan Radcliffe

The PACK YACK information letter is distributed throughout the Department of Defense in order to share packaging policy, hazardous material, and logistical information. It has become so popular that we can hardly keep up with the demands of an ever-growing circulation. Today, PACK YACK is available through our Hazardous Material Electronic Bulletin Board which resides in the Worldwide Web (WWW) system. Soon we will be able to access PACK YACK via PACKWeb which is an Air Force packaging information server, and PACKWeb is also accessible through the WWW.

It is probable that any activity with e-mail capabilities has internet access and can connect to the WWW. Local computer support offices can help with configuring personal computers and establishing access to the WWW. Our Customer Support Office at Wright-Patterson AFB, AFMC CSO/SCMD, is available to provide technical guidance to the computer support offices that assist field activities. Air Force activities should contact their major command for guidance with connectivity. Activities outside the Air Force should contact their Service or Agency Focal Point for assistance.

AIR FORCE REUSABLE CONTAINER PROGRAM

by Darryl K. Meade

Savings in logistics costs are being realized by the Air Force Reusable Container Program. By taking maximum advantage of reusing and reclaiming the universally designed reusable containers, packaging costs are reduced. This program is designed to pay minimum cost in packaging and maintaining high levels of protection for assets during storage or shipment. AFI 67-1 and AFI 24-202 outlines responsibilities and overall implementation guidelines for establishing and executing an effective Reusable Container Program. These instructions establishes Air Force-wide reporting procedures and special holding accounts for reusable containers.

A key advantage of reusable containers is versatility. Thousands of serviceable and repairable parts require special containers for shipment to repair activities. Containers must maintain a high rate of reuse due to the nature and value of these items and DoD's diverse logistical requirements. About 90% of the items assigned to fastpacks are either in the slide or star type pack. The remarkable versatility of fastpacks is evident when you have over 10,000 line items which can be packed in 4 sizes of slide packs.. Consequently, new acquisitions of expensive containers are minimized, labor and materiel costs are reduced, and mission support is enhanced through the continuous flow of serviceable parts. The Reusable Container Program is a efficient and effective program to satisfy the most demanding packaging requirements.

The benefits of reusable containers are apparent in mobility and sustainment operations. For example, your supply squadron resupplies NATO-LED forces in Bosnia in support of US air activities. You have to resupply a Combat Logistics Support Squadron (CLSS) with 100 spare parts. In your advance planning, you have enough space calculated for squaring up the pallet nicely. Ninety-nine items arrive to you and are packed in assigned reusable containers. The one hundreth item is packed in a box which is three feet longer (with a lot of bubble wrap) than your other containers. The oddball container throws you off in your calculations and you might have to build-up another pallet to accomodate this item. This expends more funds and time. With reusable containers such as fastpacks, you know exactly how much space or footprint you need for each part on a pallet and you can pre-plan accordingly. If you are using a variety of different packs/boxes, you would not know what sizes you needed. Reusable containers ensure your advance planning pays off. You know specifically what sizes of containers your parts will be packed in so you can execute pallet build-up in the most cost effective and efficient packaging manner possible. Assets are offered superior packaging protection and performance in the toughest conditions

AFPTEF will continue to explore and add any packaging technology to improve the overall identification and availability of reusable containers within the Air Force. A major problem of controlling and tracking these containers is that they are stored in various areas of each shop/unit. We seek to improve this problem by proposing to use Automatic Identification Technology (AIT) such as barcoding with an already developed generic inventory management system which will provide tracking, inventory, visibility and availability of all reusable containers. Surplus or excess containers can be identified in the database by NSN and shop/unit code for immediate availability to other logistics support squadrons needing them.

AFPTEF provides a central resource where people can tap our expertise for packaging engineering design, modification, test and evaluation capabilities. Air Force personnel, in particular the Reusable Container Monitors, are to be commended for their proactive efforts in this effective program. Their work saves Air Force funds and provides superior protection and performance of our spare parts — essential to accomplish mission objectives.

HAZMAT NEWS

by Duane A. Pfund

In April 1995, this office participated with the Air Force National Security Negotiations Office, Office of the Secretary of Defense, and the US State Department in negotiations with the German Ministry of Defense (MOD) in Bonn GE. Over the preceding three years MOD had been working to update their military air hazmat regulations to include sending states (NATO countries staying in the Federal Republic of Germany) operating to, from or within German airspace. This effort was directly related to sovereignty issues born from the reunification of Germany. The problem was in MOD's insistence on compliance with the international commercial air regulations in total, long prior notification timelines, and MOD approval or rejection authority for DoD shipments. The issue could potentially have a large adverse impact to DoD readiness and support. This meeting was the first designed for technical experts from each side to discuss the impasse and come to a resolution prior to a mandated MOD implementation date. The US explained that DoD standards are based on the United Nations Recommendations on the Transport of Dangerous Goods, and only vary in those areas related to operator requirements and areas necessary to meet our military obligations overseas. DoD maintains an excellent safety record in military air operations. Ultimately, both sides agreed to continue to allow the use of AFJMAN 24-204 under the authority of prior NATO Standard of Forces and STANAG Agreements.

The Packaging Policy Office hosted a Hazardous Material Packaging and Transportation Conference in October 1995. There were approximately 115 attendees from the Services/ DLA present. The three day conference was designed to provide an open forum of discussion for input into the next revision to AFJMAN 24-204. Along with AFJMAN 24-204, presentations were provided on:

Computer Support
Air Force HAZMAT Bulletin Board
Hazardous Material Information System
Tools for Classification and Description
Automated Shipping and Certification Programs
Air Force Shipper's Certification Program
PC-POP Computer Program and Packaging Video
Special Packaging Instruction Development and Distribution System

Training
Air Force Exportable and Technical Specialist Training
Army Customer Field Support Program

Military Airlift Areas of Interest
AMC Aerial Port Problem Areas
Passenger Protection from Toxic Smoke and Fumes
Antarctic Support Program
Transporting Liquid Missile Propellants
C-17 Presentation

AFJMAN 24-204, PREPARING HAZARDOUS MATERIALS FOR MILITARY AIR SHIPMENT

by Duane A. Pfund

AFJMAN 24-204 began distribution in January 1995 with a publication date of 25 November 1994. Mandatory compliance began 1 May 1995. This revision reflected the single largest change in the history of hazardous material regulations as the DoD kept in step with commercial conversion to the United Nations Standards. Along with the incorporation of Performance Oriented Packaging and new hazard classification criteria, came changes to stowage and segregation requirements, training, military airlift policy, and use of the commercial Shipper's Declaration for Dangerous Goods form. Additionally, this was the first joint service manual the Air Force pursued under its new document development procedures resulting in extensive format changes. In a time of high government and public interest, the hazardous material arena is continuously evolving. Our challenge will be to respond to this task to increase efficiency in military airlift procedures, improve safety, and facilitate harmonization with international transport requirements.

MARKETING PROGRAM

by Robbin L. Miller

This was a very busy year for AFPTEF's marketing program. Our marketing brochure was updated to include our new equipment such as the salt-fog cabinet and solid-modeling engineering workstations. Our marketing display unit seen a lot of travel miles this year. It was set up and manned by AFPTEF personnel at many of the prominent industrial and military conferences. It also seems that the last couple of years of hard work publicizing AFPTEF's capabilities finally began to pay off. Requests for AFPTEF's services increased considerably in the last year. A total of 15 sales proposals were sent out to requesting customers. The proposals detailed the customers requirements, how AFPTEF was going to meet those requirements, a cost breakdown, and a detailed schedule of how long the entire program would last. Out of the 15 proposals sent out 10 were accepted and are in the process of being worked as new container design projects, engineering support projects, shop fabrication/ modification projects, testing projects, and container procurement projects. Some of our new customers are NASA, Army Tank Command (ATCOM), Army Missile Command (MICOM), WR-ALC/LBMA, WR-ALC/LFLA, SA-ALC/LDEE, and HSC/YAM. NASA projects include the design and fabrication of a Hubble Space Telescope Flight Support System Transportation Container and an Earth Observing Satellite Transportation Container. Army projects include the design and development of a family of multi-purpose aviation spare part containers and an Integrated Sight Unit container. Air Force projects include the design and development of a family of LRU containers for the Advance Warfare Antenna Defense System (AWADS), a C-17 crash recovery bag system container, the testing of a plastic off the shelf storage container, and the procurement of 100 AFPTEF designed F-15 canopy containers.

Marketing display.

AFPTEF is very happy with the progress of our marketing efforts and will continue to promote AFPTEF's capabilities and our customer oriented way of doing business. If your office needs packaging support or would like more information on the services we can provide, please contact us.

SPECIALIZED CONTAINER DESIGN

by Ted Hinds

The Air Force Packaging Technology and Engineering Facility (AFPTEF) is providing container engineering, design, fabrication, testing, and procurement support to a wide variety of customers. Container consulting and engineering support is provided to customers who have decided to hold the prime contractor responsible for specialized container design. In many cases the prime contractor sub-contracts to vendors who supply them with the container design and production quantities. The prime contractor retains management oversight. This works well except in many cases the sub-contractors vendors are not committed to being cost conscientious, and the cost of both the design and the production quantities escalate. Especially if there are Engineering Change Proposals (ECPs) associated with a new container requirement.

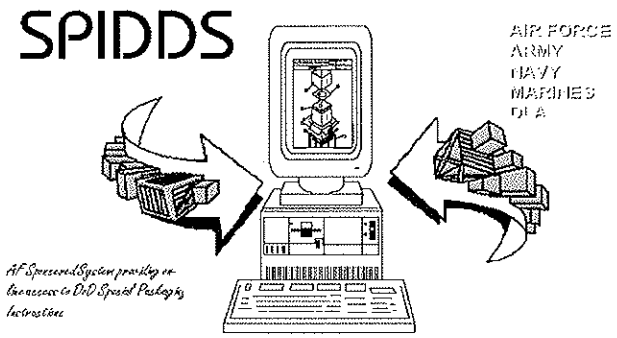
Program offices, item managers, and field activities who choose to utilize AFPTEF's vast array of expertise find it very cost effective. The length of time required to complete a container design and be ready for procurement is approximately six months form the date the Memorandum Of Understanding (MOU) is signed. Some projects can be accomplished in three to four months depending on workload, availability of program requirements, and complexity of design. The cost will be approximately 10 — 20% of what it would cost to have the prime contractor do the same job. In many cases we have the advantage of knowing what the logistical and operational requirements are, which puts us in a better position to do the work. Engineering and Program changes can be made without major impact on the container program itself.

Prior to commencing work on any project, AFPTEF will develop an MOU for both organizations to sign. Funds within the Air Force can be transferred using an AF form 185 Project Order or DD Form 448 Military Interdepartmental Purchase Request (MIPR). The AFPTEF will host or chair the technical requirements review, the preliminary design review, the critical design review, and functional configuration audit. The customer is invited to visit our facilities at any time and witness container qualification testing.

AIR FORCE SPECIAL PACKAGING INSTRUCTION DEVELOPMENT AND DISTRIBUTION SYSTEM (SPIDDS)

by Carey Scott Gravenstine

The Special Packaging Instruction (SPI) Development and Distribution System, SPIDDS started as an AF initiative designed to support the AF and DoD customer in getting critical packaging information in a timely fashion (Ref. AFPTEF Annual Reports 1993, pg. 27 and 1994, pg. 20-21).



SPECIAL PACKAGING INSTRUCTION DEVELOPMENT AND DISTRIBUTION SYSTEM

SPIDDS consists of over 5000 AF SPIs for "distribution" in the Microsoft Word format. A tremendous effort by each ALC SPI Development Team has occurred. The Air Force hopes to have by the beginning of FY97 AF SPIs available through this system. Until such time SPIs not on the system will still have to be obtained by calling the appropriate ALC responsible for the item to be packaged. Such request will be faxed manually or mailed.

For SPIDDS, "SPI Distribution" has been the prime focus over the past year. Customers can currently call DSN 986-1860 or Commercial (513) 476-1860 to access the SPI Storage and Retrieval System, SPISRS. They may use their touch tone phone to obtain a SPI by fax by entering a fax number, and the nine digit SPI number (i.e. comm., DSN or Overseas). The SPISRS will then fax a copy of the latest SPI to the caller automatically, 24 hours a day. Often refereed to as "SPIbyFAX."

The "Super Information Highway," a common household term these days, has also affected SPIDDS. Our customers may access SPI's via the Internet. SPIDDS "home page" is located at:

http://wpdis10.wpafb.af.mil/SPIDDS

This server supports Netscape and Mosaic equally well. The SPIs are in MS Word format and our customers may "double click" on a SPI file to download it directly to their PC. This allows for an easily look at the SPI. MS Word allows the customer to zoom in and pan around the SPI as well as print it to their local printer.

Sparking much interest by the other Services SPIDDS was presented to the DPPG, Defense Packaging Policy Group, as a potential DoD standard system. After much discussion and examination SPIDDS has been recommended by the DPPG and JEDMICS to fulfill the DoD SPI Development and Distribution needs.

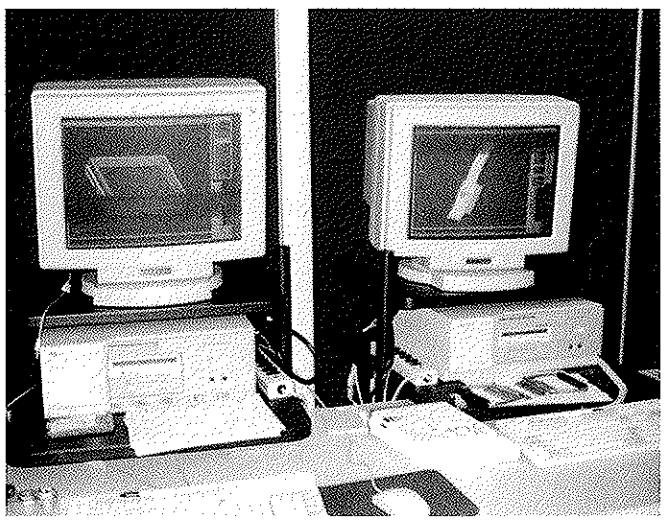
Over the next year advancements will continue to improve and expedite the way SPIs are obtained. The mission of SPIDDS is improved customer SPI service.

SOLIDS-MODELING SYSTEMS

by Robbin L. Miller

AFPTEF's increase in work load has led to the requirement for a fourth engineering workstation and it's matching package of Pro-Engineering solids-modeling software. It became impossible for our four design engineers to share three systems and maintain their program schedules. The fourth Hewlett Packard workstations was recently added and configured as a PRO-Server to allow the checking out of our new PRO-E sheetmetal module by any of the four stations. This module will allow AFPTEF engineers to create bend line drawings of all bent sheet and stock material parts used in their container designs. A task that previously took manual calculations.

AFPTEF is very pleased with our workstations and solids-modeling software. The new systems have allowed us to design, create drawing packages, and create manufacturing code for our CNC milling machines at a time and cost savings and with much higher accuracy and quality.



Pro-engineering solids-modeling workstations

PACKWEB

by Carey Scott Gravenstine

The AF Packaging Information Server, "PACKWeb" is being populated with information which our customers may need. Supported only by AFPTEF and using the Internet packaging information is available for the DoD to access at:

http://wpdis10.wpafb.af.mil

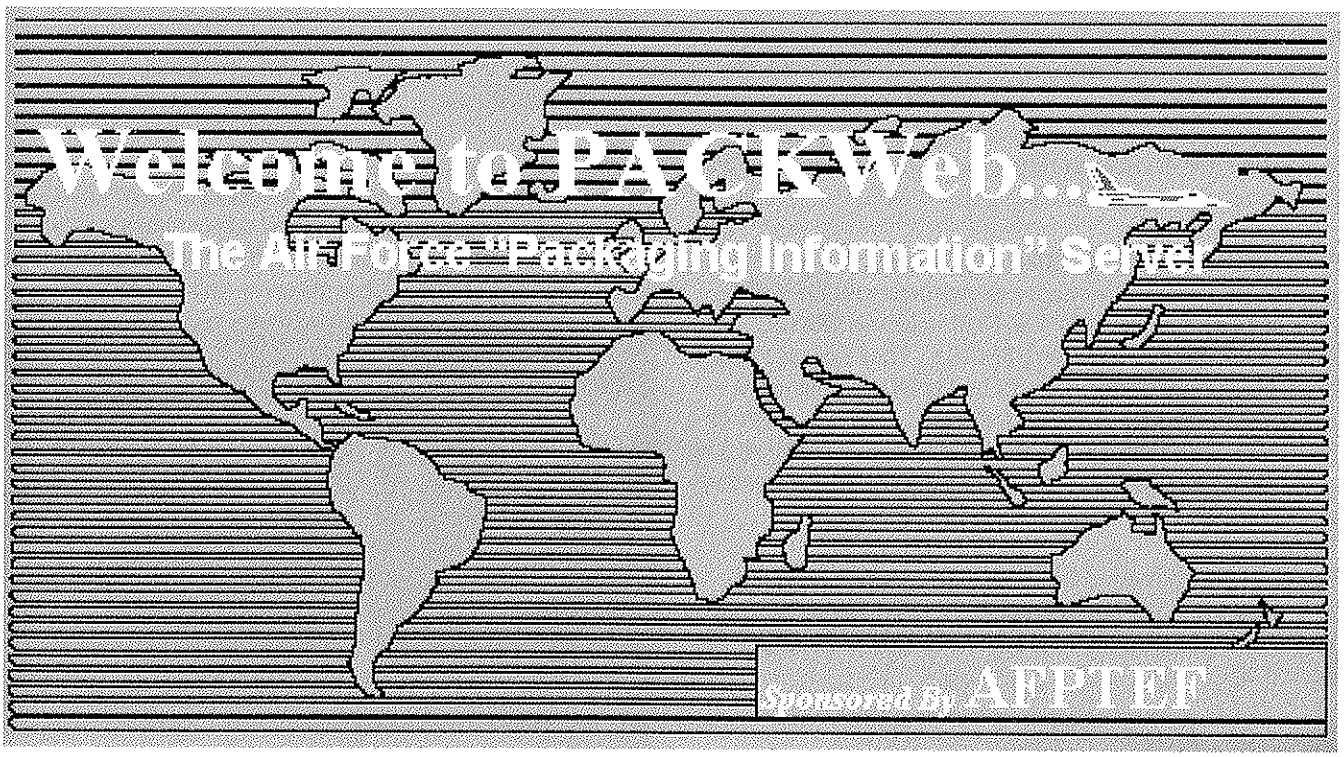
PACKWeb placed on-line over a year ago has been going through growing pains like most Web servers. PACKWeb will be relocated as a new server by May 1996. The new Universal Resource Locator (URL) will be:

http://packweb.wpafb.af.mil

This upcoming transition will provide the latest technology updating our capabilities and enabling the server to give our customers easier more user friendly access and search capabilities.

AFPTEF has been participating in the Defense Ammunition Packaging Council, DAPC, Project J1 on Tri-Service Coordination. Managed by the Army the J1 project's intent is to open communication between services and increase the exchange of information related specifically to "packaging" issues. Coordinated with similar efforts by the Army, Navy and Marines PACKWeb holds a Tri-Service page which provides information on the efforts by the Container Design Working Group, the Cost/Container Data Base and a Vendor Listing specific to container design. All Tri-Service functions. PACKWeb also points to the other Services' efforts so the customer can click and review a world of packaging information.

Keep in touch, PACKWeb will be continuing to grow as information comes "on-line."



OFFICE AUTOMATION (O/A) AND COMPUTER SYSTEMS

by Robbin L. Miller

AFPTEF's Office Automation (O/A) Network System was upgraded this year from it's thin-net cabling to twisted pair cabling. This upgrade was performed to increase the speed and quality of data transfer while communicating in-house and outside with other organizations. In addition our software, (i.e. Word, Excel, etc.) was upgraded to their latest releases.

AFPTEF personnel continued to use our networking capabilities and the user friendly Windows environment to increase productivity and to make every document look professional. However, AFPTEF has outgrown it's current computing assets and is in the process of upgrading each individual's personal computer. The new PC's will have a faster processors, more RAM and a higher capacity hard drive. This will allow users to perform the more memory intensive requirements such as adding graphs and charts to in-house written specifications and graphics to proposals and reports. Tasks that currently can not be performed.

We are looking forward to this added capability and will continue to keep AFPTEF at the leading edge of computer capabilities.

AIR FORCE HAZARDOUS MATERIAL BULLETIN BOARD SYSTEM

by Duane A. Pfund

The Hazardous Material Bulletin Board System (Hazmat BBS) became fully functional in early 1995. This system is designed to provide an additional avenue for access to hazardous material information. It is intended to supplement the official message distribution system. It's need developed from the monumental urgency for information at all organizational levels and the uncontrollability of existing distribution systems. The Hazmat BBS contains all clarification messages issued by this office, policy changes and interpretations, scanned in copies of DOT-Exemptions, Certifications of Equivalency, and Competent Authority Approvals, a complete AFJMAN 24-204 in Microsoft Word 2.0, and packaging policy correspondence including PACK YACK. It is accessible 24 hours a day on the World-Wide Web at:

http://www.afmc.wpafb.af.mil or http://wpdis10.wpafb.af.mil

The World-Wide Web is a "network" of computers with an easy to use interface that makes it simple to find and retrieve information via the Internet. See your local computer support office to establish access to the Hazmat BBS.

PACKAGE DESIGNER

by Susan J. Misra

The Package Designer is a Windows-based, user-friendly, software package that is intended to help determine the packaging requirements for items. The packaging requirements include consideration of the type and amount of cushioning required for safe transportation. The cushioning requirements must take into account the peak acceleration that the package might experience during transportation and the possible height from which the item may be dropped during transportation. The program was nitially created in 1974 as the "Air Force Packaging Evaluation Activity (AFPEA) Packaging Design Program" and was run on a VAX system. In 1988, the program was converted to run on a PC. In September of 1993, we undertook the task of modifying the "Packaging Design Program" into the Windows-based system.

This modification allows the user to save computer-generated design data and user-defined inputs, for future use. Additionally, on-line help is now available at any stage of execution. The program is accompanied by a detailed user's guide.

Funding for this project came about as part of the Defense Ammunition Packaging Council (DAPC) J3 cushioning research project.

The current program is now available to industry and foreign customers through the Federal Computer Products Center, National Technical Information Service, (703) 487-4650, FAX (703) 321-8547. The order number is PB95-500369GEI. All U.S. federal agencies can still request the program from AFPTEF. Package Designer is a valuable asset to any organization dealing with packaging.

CONTAINER DESIGN WORKING GROUP MULTI-SERVICE COORDINATION

by Ted Hinds

The Air Force Packaging Technology and Engineering Facility (AFPTEF) is a member of the Multi Service Container Design Working Group (CDWG) Team. The Team is working to standardize container hardware, container design, and ensure a cross feed of information between the services. Regular members of the CDWG Team are from the Army, Navy, Marines, and Air Force. The team meets three times a year in an effort to accelerate the effectiveness of their efforts.

The CDWG Mission:

To bring together packaging professionals directing the engineering, design, testing, production and repair of reusable containers. Standardize the requirements for common hardware and functional features of all Department of Defense reusable containers. Review relevant military and Federal standards and specifications and convert them to performance based specifications, commercial item descriptions or non-government standards.

The CDWG Goals:

1. Identify commonalties among the services' design, performance, and production practices, policies, and materials.

2. Standardize container hardware, components, configurations, construction materials, performance testing, and validation procedures.

3. Foster the conversion of Government standards and specifications to performance specifications and standards, non-government practices (standards), or commercial item descriptions for hardware, components, processes, and test procedures.

4. Facilitate communication between the services.

The following is a brief listing of some of the projects we are working:

• AIR FILLING VALVE	TED HINDS	AF
• DESICCANT PORT	TED HINDS	AF
• RECORD RECEPTACLE	JOE PIAZZA	ARMY
• VIEWING PORT	MARK SHELLY	NAVY
• HUMIDITY INDICATOR	FRANK NIEHAUSE	USMC
• PRESSURE RELIEF VALVE	CHRIS DZURY	ARMY
• HANDLES	MARK SHELLY	NAVY
• LATCHES	RON WILSON	AF
• SOURCE LIST	MIKE BROWN	ARMY
• WELDING WIRE USED ON ALUMINUM CONTAINERS	TED HINDS	AF
• ASTM D4169 CONTAINER TESTING	JOHN HARTSELL	ARMY
• TIE-DOWN / LIFTING RING	TED HINDS	AF
• CUSHIONING MATERIALS PERFORMANCE SPEC.	MARK SHELLY	NAVY
• DRAIN PLUG	RICK ARTER	NAVY
• COST DATA BASE	TED HINDS	AF
• STACKING PINS AND SOCKET PROVISIONS	JOHN PRATER	ARMY
• ELECTRONIC HUMIDITY INDICATOR	TED HINDS	AF
• SMART SENSOR	AL GALONSKI	ARMY
• ADHESIVES AND CLEANING METHODS	MARK SHELLY	NAVY

POTENTIAL NEW PROJECTS FOR FUTURE WORK:
- TEST PROCEDURES
- PRODUCTION SPECIFICATION
- DESIGN SPECIFICATION
- EMI/EMP SHIELDING
- CUSHIONING-FOAM / FLEX MOUNTS / COMPOSITE MOUNTS

DRAIN PLUG — The CDWG Team supports the adoption of the Society of Automotive Engineers (SAE) Aerospace Standard 4863, Plug, Pipe, External thread (part number AS4863 J 06) as the recommended drain plug for new container designs. Material for this plug is 304 CRES, passivated per QQ-P-35, Type VI, or VII, with 750-14 ANPT threads.

AIR FILLING VALVE — The CDWG Team has written and supports the adoption of the Society of Automotive Engineers (SAE) Aerospace Standard 5017, Air Filling Valve as the recommended Air Filling Valve for new container designs. There are two know manufacturers that currently provide valves which meet specification requirements.

DOD STANDARDIZATION

by Warren Assink and Darryl Meade

AFPTEF is actively engaged in the DoD and Air Force Standardization Programs, including the responsibility of Lead Service Activity for standardization actions in Federal Stock Class 8145, specialized shipping containers. Our organization has reduced the number of documents we prepare from nearly 40 documents a few years ago to less than half that number. Many of the documents were transferred IAW OASD(ES) policy to the procurement activities (DLA or GSA); others have been canceled or converted to non-government standards. The documents that we currently maintain include:

MIL-HDBK-304	Handbook for Packaging Cushioning Design
PPP-B-587	Boxes, Wood, Wire-bound Pallet Style
PPP-B-850	Cushioning Material, Polystyrene Expanded, Resilient (For Packaging Uses)
PPP-C-1120	Cushioning Material, Uncompressed Bound Fiber For Packaging
PPP-B-1672	Boxes, Shipping, Reusable with Cushioning
MIL-C-4150	Cases, Transit and Storage, Waterproof and Water-Vaporproof
MIL-B-8111	Box Set, Wood, Nested, Organization Equipment Type MG-1A
MIL-C-9897	Crates, Slotted Angle, Steel orAluminum, For Lightweight Airframe Components and Bulky Items (For Maximum Loads of 1363 Kgs (3000 pounds)
MS24344	Holder, Maintenance Records,Assembly of
MIL-B-26195	Boxes, Wood-Cleated, Skidded, Load-bearing Base
MIL-PRF-26514	Polyurethane Foam, Rigid or Flexible, For Packaging
MIL-I-26860	Indicator, Humidity, Plug, Color Change
MIL-V-27166	Valve, Pressure Equalizing, Gaseous Products
MIL-P-83668	Plastic Board (For Packaging Applications)
MIL-C-83669	Containers, Nestable or Collapsible, Reusable, Shipping and Storage, Assembled External Aircraft Fuel Tanks
MIL-F-83671	Foam-In-Place Packaging Materials, General Specification For

SOCIETY OF AUTOMOTIVE ENGINEERS

by Ted Hinds

The Air Force Packaging Technology and Engineering Facility is an active member of the EG-1D/1G subcommittee on Propulsion Transportation Equipment and Special Tooling. The two subcommittees will be combined under EG-1D Packaging, Handling, and Transportability. The current documents being worked by the committee are:

SAE ARP 1967	Containers, Shipping And Storage, Aircraft Engines and Modules, Reusable
SAE AIR 4732	Cover Shipping Flexible
SAE AS 4960	Valve, Relief, Gaseous Products
SAE ARP 1135	Hydraulic or Geared Torque Wrenches with Upper Limit of 1,000,000 Pound-Inches
SAE ARP 581	Universal Horizontal Assembly Stand for 10,000 Pound Weight Class Turbine Engines
SAE ARP 680	Universal Turnover Assembly Stand for Small Gas Turbine Engines and Components
SAE AS 5017	Air Filling Valve
SAE AS XXXX	Desiccant Port and Desiccant Port Holder

Many of the documents currently being worked on by the Container Design Working Group Team will be turned over to SAE EG-1D subcommittee for adoption. The SAE ARP 1967 is being revised. The AFPTEF has been using ARP 1967 as a baseline for all container designs. Instead of writing a new specification each time, ARP 1967 is tailored via a one or two page statement of work. We have found this a very effective way to save time in designing containers.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

by Robbin L. Miller

AFPTEF continued their involvement in the joint military and industrial subcommittees of the ASME. The progress of the Y14.100 subcommittee in the conversion of MIL-STD-100 to an industry controlled document continues to move forward. Other subcommittees that AFPTEF participates in are Y14.1 Drawing Forms and Y14.5 Tolerancing and Dimensioning. AFPTEF plans to continue to represent the Air Force in these committees.

AMERICAN SOCIETY FOR TESTING AND MATERIALS COMMITTEE D-10 ON PACKAGING

by Keith A. Vossler

AFPTEF is represented on the American Society For Testing and Materials, ASTM, Committee D-10 on Packaging. The scope of this committee is the promotion of knowledge in, and the development of standards for packaging. Standards include terminology, practices, test methods, specifications, guides and classifications (including dimensions).

AFPTEF is a voting member of the committee and reviews the ballots of all seventeen D10 Subcommittees for issues affecting the Air Force. A few of the D-10 Subcommittees and Task Groups AFPTEF has been active in during the past year are listed below.

The ASTM/DoD Federal Agencies Packaging Liaison Group addresses mutual government/industry packaging issues. A major concern of the Group is identifying and prioritizing which government packaging specifications should be converted to ASTM specifications. MIL-STD-731 (Quality of Wood Members for Containers and Pallets), scheduled for cancellation, has been identified as necessary for document conversion to allow crate and pallet document conversions to proceed.

The D10.12 Subcommittee on Shipping Containers is converting several Military and Federal container specifications such as wood cleated containers (PPP-B-591, 601, and 621), crates (MIL-C-52950), and pallets into ASTM format.

AFPTEF is co-task group chair of the D 1596 (Dynamic Shock Cushioning) Test Method revision which is part of the D10.13 Subcommittee on Interior Packaging. Another subcommittee activity is developing a specification for sorbent materials used in hazardous material packaging which will include vermiculite and other recently developed materials.

D10.16 Subcommittee on Instrumentation is developing a Practice for Instrumenting Products During Package Shock Impact Testing. AFPTEF is co-task group chair of this effort to develop guidelines and procedures (similar to MIL-HDBK-304) for instrumented package testing.

The new D10.19 Subcommittee on Recycling /Disposability is developing guides to assist users of packaging foam and flexible materials recycle, reuse, and dispose of these materials Terminology relating to environmental terms is also being developed. ASTM Standard Guides D 5833 (rigid containers) and D 5834 (fiberboard) have been developed to cover recycling, reuse, and disposability of these materials.

MIL-HDBK-304 REVISION

by Caroline Buckey

The Air Force Packaging Technology and Engineering Facility is extensively updating MIL-HDBK-304, Package Cushioning Design to bring the handbook up-to-date technically and to make it more user-friendly. The draft is in coordination as of April 1996. The following are some of the changes in the revision:

- Conversion to both English and Metric Units
- The Chapters have been arranged in a Six-Step Design Approach
- Previous version's Chapter 5 (MIL-C-26881 - Ramifications in Cushioning Design) has been deleted
- Transmissibility Curves have been moved to Volume 2
- Figures have been Incorporated into the Text
- Reflects changes to the Cushion Design Computer Program now called "Package Designer"
- An Index has been added

MODEL MAKERS WORLD

by Donald Vance, Larry Hatter and Joe Hofele

The Air Force Packaging Technology and Engineering Facility currently has three model makers. The model makers do an outstanding job in fabricating prototype containers and dummy models for use in container qualification testing. They provide assistance during container testing and modify containers (whenever necessary) that have been provided by other organizations or companies as necessary to facilitate testing completion. The model makers are responsible for identification and acquisition state of the art equipment needed to maintain the shops high standards of precision and performance. The following is a partial listing of the projects the shop worked on during the past year:

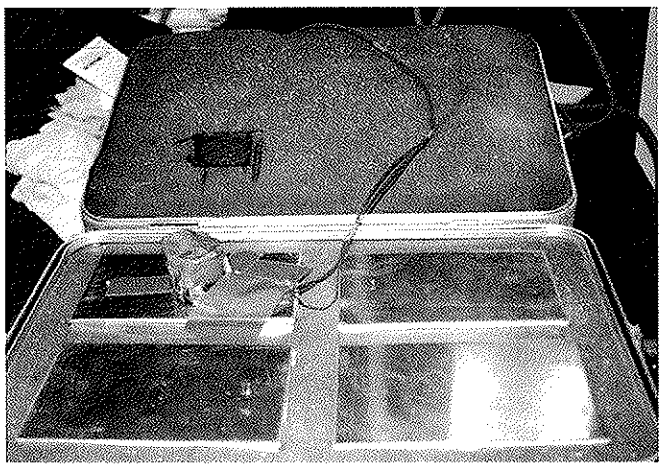
TASK		CUSTOMER
Combat Talon II	- Fabricated One Radome Container - Fabricated Two IDS Containers - Modified 39 Ku-Band Antenna Containers - Wheel Modification on Ku-Band Container	ASC/SDXAL
Family of Multi Purpose Aluminum Containers for Aviation Spare Parts		ATCOM (Army)
Advance Warfare Defense Antenna (AWADS) Containers		WR-ALC/LBMA
Gaskets and Container for Gasket Testing		AFPTEF (DAPC)
Received and Installed New Shear and Milling Machine		AFPTEF
Flight Support System for Hubble Telescope Servicing Mission		NASA (Goddard SFC)
Wrote Specification for New Break and Handled Procurement		AFPTEF
Fabricated a New Light Weight Small Aluminum Container		AFPTEF (DAPC)
Provided Assistance in Obtaining Larger Facilities for NASA Work		AFPTEF
Office Renovation Self Help		AFPTEF

CONTAINER TESTS

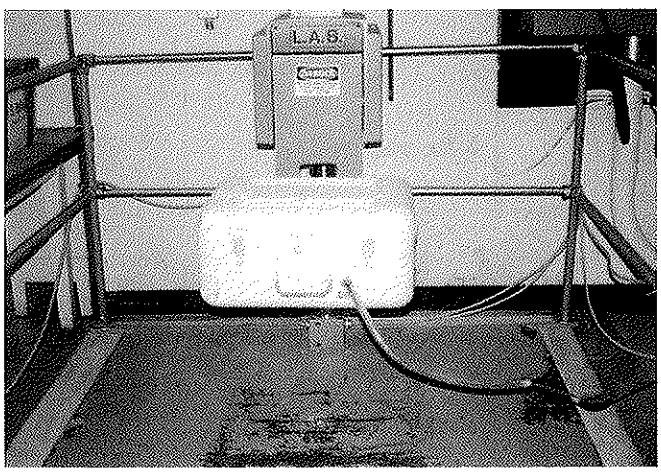
- EXAMINATION OF PRODUCT
- HOISTING STRENGTH TEST (SINGLE RING)
- HOISTING STRENGTH TEST (FOUR RING)
- HANDLE PULL TEST
- FORKLIFT HANDLING TEST
- HIGH TEMP/HUMIDITY STACKING TEST
- ROUGH HANDLING TEST (HOT & COLD)
- VIBRATION RESONANT DWELL
- VIBRATION REPETITIVE SHOCK
- PENDULUM IMPACT
- STRUCTURAL PRESSURE/VACUUM TEST
- UN DROP TESTS (ALL FIVE)
- UN STACKING TEST (HIGH TEMP)
- INSTRUMENTATION
- TIE-DOWN TEST
- STACKING TEST
- COVER LIFT TEST
- PUSH/TOW TEST
- LATCH STRENGTH TEST
- CONDUCTIVE TEST
- LEAK TEST
- FORM/FIT TEST
- WEIGHT TEST
- STAND-OFF TEST
- GASKET PULL TEST

CUSHION MATERIAL TESTS

- ELECTRO STATIC DECAY (ESD)
- CREEP
- COMPRESSIVE SET
- COMBUSTIBILITY
- DYNAMIC CUSHIONING
- PLIABILITY
- WATER ABSORPTION
- HYDROLYTIC STABILITY
- LOAD DEFLECTION/COMPRESSIVE STRENGTH



Accelerometer location



Flat drop test

FACILITIES AND TEST EQUIPMENT

1. LOW TEMPERATURE WALK-IN ENVIRONMENTAL CHAMBER:
(OPERATIONAL AUG 96)

TEMPERATURE RANGE:	-65 to +185 degrees Fahrenheit (F) (-53.9 TO +85 degrees C)
HUMIDITY RANGE:	20 TO 95 percent (Limited by +68 degree F (+20 degree C) dry bulb temperature and +40 degree F (+4.5 degree C) dew point
INSIDE DIMENSIONS:	8 feet (2.44m) width x 15 feet (4.57m) depth x 9 feet (2.74m) height
DOOR OPENING:	6 feet (1.83m) width x 6 feet (1.83m) height
HOIST CAPACITY:	5000 pounds (2268 kg)

2. VIBRATION EQUIPMENT:
a. VIBRATION TABLE (SERVO-HYDRAULIC):
(OPERATIONAL JUNE 96)

TABLE SIZES:	48 length x 48 width (121.92 cm length x 121.92 cm width) 120 length x 48 width (3048 cm length x 121.92 cm width)
FREQUENCY RANGE:	48 x 48: 5Hz to 200 Hz 120 x 48: 5 Hz to 95Hz
AMPLITUDE RANGE:	.02 to 1.0 Double Amplitude (DA)
MAXIMUM LOAD:	48 x 48: 2000 pounds (907.18 kg) 120 x 48: 1000 pounds (453.59 kg)

b. VIBRATION TABLE (SERVO-HYDRAULIC):

TABLE SIZE:	48 length x 48 width (122 cm length x 122 cm width)
FREQUENCY RANGE:	1 to 200 Hertz
AMPLITUDE RANGE:	0 to 6 DA
MAXIMUM FORCE RATING:	6000 pounds peak sine (2722 Kg)
ENVIRONMENTAL CHAMBER:	–40 to +140 degrees F (–40 to 60 degrees C)

3. TEMPERATURE/HUMIDITY WALK-IN ENVIRONMENTAL CHAMBER:

TEMPERATURE RANGE:	–65 to +185 degrees F (–53.9 to +85 degrees) C
HUMIDITY RANGE:	20 to 95 percent (Limited by +68 degree F (+20 degree C) dry bulb temperature and +40 degree F (+4.5 degree C) dew point
INSIDE DIMENSIONS:	10 feet (3.05m) width x 16 feet (4.88m) depth x 9 feet 6 inches (2.90m) height
DOOR OPENING:	10 feet (3.05m) x 9 feet 6 inches (2.90m) height
HOIST CAPACITY:	5000 pounds (2268 kg)

4. PENDULUM IMPACT TESTER:

CAPACITY:	5000 pounds (2268 kg)
CONTAINER MAXIMUM SIZE:	104 width x 216 length x 144 height (263 cm width x 549cm length x 366 cm height)

5. RAIN/SALT-FOG/WIND WALK-IN ENVIRONMENTAL CHAMBER:

TEMPERATURE RANGE:	Ambient
RAIN CAPABILITY:	2 or 5 inch (5 or 13 cm) rain/hour
SALT-FOG CAPABILITY:	5 percent salt solution by weight
WIND VELOCITY:	40 miles per hour (64 km/hour)
INSIDE DIMENSIONS:	76 width x 160 length x 78 height (193 cm width x 432 cm length x 198 cm height)
DOOR OPENING:	62 width x 79 height (157 cm width x 201 cm height)

6. ALTITUDE CHAMBER:

TEMPERATURE RANGE:	–100 to +350 degrees F (–73.3 to +177 degrees C)
ALTITUDE:	Site Elevation to 100,000 feet (30,667m)
INSIDE DIMENSIONS:	48 width x 48 length x 48 height (122 cm width x 122 cm length x 122 cm height)

7. THERMAL OVEN:

TEMPERATURE RANGE:	+100 to +500 degrees F (+40 to +260 degrees C)
INSIDE DIMENSIONS:	48 width x 117 length x 60 height (122 cm width x 297 cm length x 152 cm height)
DOOR OPENING:	48 width x 60 height (122 cm width x 152 cm height)

8. DYNAMIC CUSHION TESTER (HARDIGG TYPE):

CUSHION SIZE:	8 x 8 (20 cm x 20 cm)
DROP HEIGHT:	90 maximum (229 cm)
STATIC STRESS RANGE:	065 to 1.6 pounds per square inch
LIFT SYSTEM:	Variable speed electric motor
GUIDE BEARINGS:	Linear ball and radial ball

9. DYNAMIC CUSHION TESTERS (LANSMONT MODEL 23):

(2 DIFFERENT BEARINGS: SLEEVE BEARING PLATEN & LINEAR BALL BEARING PLATEN):

CUSHION SIZE:	8 x 8 (20 cm x 20 cm)
DROP HEIGHT:	60 (150 cm)
STATIC STRESS RANGE:	.065 to 1.6 pounds per square inch
LIFT SYSTEM:	Electric motor
GUIDE BEARINGS	Linear ball
BRAKES	Air operated

10. PROGRAMMABLE SHOCK TESTER:

TABLE SIZE:	24 x 24 (61 cm x 61 cm)
TABLE WEIGHT:	235 pounds (107 Kg)
SPECIMEN WEIGHT:	600 pounds maximum (272 Kg)
LIFT SYSTEM:	Hydraulic
GUIDE BEARINGS:	Bronze
WAVE FORM LIMITS:	Half sine - 600 Gs at 2 ms Sawtooth - 100 Gs at 4 ms Square wave - 200 Gs at 2 ms Trapezoid - 200 Gs at 5 ms

11. CONTAINER DROP TESTER:

CONTAINER SIZE:	20 x 24 maximum (51 cm x 61 cm)
CONTAINER WEIGHT:	80 pounds maximum (36 Kg)
DROP HEIGHT RANGE:	12 to 84 (30 to 213 cm)

12. XENON ARC, WATER-COOLED, LIGHT-EXPOSURE APPARATUS:

LIGHT SOURCE:	3500 Watt Water Cooled Long Arc Xenon Lamp
TEMPERATURE CONTROLS:	Automatic, Digital Set Point Black Panel/Dry Bulb
HUMIDITY CONTROLS:	Automatic, Digital Set Point Wet Bulb
Depression/Condition	Water

Meets the requirements for ASTM G-26, Standard Practice for Operating Light-Exposure Apparatus (Xenon Arc Type) with and without water for exposure of nonmetallic materials.

13. UVCON ULTRAVIOLET/CONDENSATION SCREENING DEVICE:

TEMPERATURE RANGE:	50 to 95 degree C
LIGHT SOURCE:	8-40 Watt Fluorescent Lamps
SAMPLE SIZE:	26 Holders for Samples Up to 3" x 12" (8 cm x 30 cm)

Meets requirements for ASTM G53, Recommended Practice for Operating Light and Water-Exposure Apparatus, and ASTM D4329, Operating Light and Water-Exposure Apparatus.

14. CONSTANT TEMPERATURE/HUMIDITY CABINET:

TEMPERATURE RANGE:	18 to 93 degree C (O to 200 degree F)
HUMIDITY RANGE:	5% to 99% RH
INNER DIMENSIONS:	26 x 25 x 18 (66.04 cm x 63.5 cm x 45.72 cm)

15. ELECTROSTATIC DECAY (ESD) TEST AREA:

a. TEST CHAMBER:

TEMPERATURE RANGE:	Ambient
HUMIDITY RANGE:	8 to 15 percent
DIMENSIONS:	36 length x 24 width x 18 height (91 cm length x 61 cm width x 46 cm height)
DOOR OPENING:	12 x 12 (30 cm x 30 cm)
CONTROL:	Passive and active "Desiccant" systems

b. STATIC DECAY METER:

PEAK CHARGE:	+5Kv
DECAY TIMER:	0.01 to 99.99 seconds
SAMPLE SIZE:	3 x 5 (8 cm x 13 cm)
TEST METHOD:	Federal Test Method Standard 101C, Method 4046

c. KEITHLEY ELECTROMETER:

RANGE:	100 ohms full scale to 1014 ohms in twenty-five linear 1x and 3x ranges
ACCURACY:	+3 percent of full scale on 100 to 1010 ohm ranges using the largest available multiplier setting; +5 percent of full scale on 3 x 10 ohm ranges.

16. DIGITAL PRESSURE/VACUUM MANOMETERS (2):

RANGE:	–15 to +30 PSI
ACCURACY:	±0.03% of reading +0.01% of full scale

17. PORTABLE COMBUSTIBLE GAS INDICATOR:

CALIBRATED FOR:	Isobutane, R142b, HFC 152a
RANGE:	0-1000% Lower Explosive Limit (LEL)
INITIAL SETTING:	10% Lower Explosive Limit (LEL)

18. UNIVERSAL TENSILE/COMPRESSION TESTING MACHINE:

CAPACITY:	35,27 oz to 30,000 pounds (1000 g - 13607.77 kg)
CROSSHEAD TRAVEL:	42.51 in (107.95 cm)
CROSSHEAD SPEED:	0.006 in/min to 40 in/min (0.015 cm/min to 101.6 cm/min)
WIDTH BETWEEN COLUMNS:	25.0 in (63.5 cm)
FULL LOAD CAPACITY:	up to 4 in/min (10.16 cm/min); 25% of load capacity thereafter
ENVIRONMENTAL CHAMBER:	-250 to 600 degrees F (-156.7 C to 315.6 C)
INTERIOR DIMENSIONS:	14 width x 14 depth x 34 height (35.56 cm x 35.56 cm x 86.36 cm)

19. TIE DOWN/HANDLE PULL TESTER:

MAXIMUM FORCE RATING:	6,500 pounds per Actuator (4 Actuators)
ELECTRONIC READOUTS:	Forces from 100 to 10,000 +/- 10 pounds
CONTAINER SIZE:	Tester adjustable, Maximum 10 feet x 20 feet without special adaptation

20. PORTABLE HIGH/LOW TEMPERATURE CHEST:

TEMPERATURE RANGE:	–85°F to +140°F (–65°C to +60°C)
INSIDE DIMENSIONS:	13 width x 25 length x 14 depth (37.02 cm x 63.5 cm x 35.56 cm)

21. SALT/FOG CABINET:

INTERNAL VOLUME:	68 ft3
TEMPERATURE RANGE:	–80° F to +160° F (–26° C to +71° C)

PROGRAMMABLE

EXTERNAL COLLECTION PACKAGE AND MIXING TANK FOR UNINTERRUPTED TESTING

Leslie K. Clarke III
Chief, AF Packaging Technology
and Engineering Facility
257-2638
lclarkc@wpgate1.wpafb.af.mil

Rosemary Vaughan
Management Assistant
257-3475
rvaughn@ wpgate1.wpafb.af.mil

Phyllis Offutt
Management Assistant
257-2979
offutt@ wpgate1.wpafb.af.mil

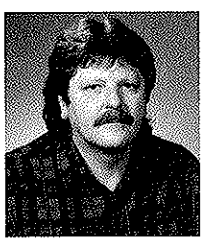
Ted Hinds
Chief, Design Branch
257-3120
tedhinds@ wpgate1.wpafb.af.mil

Robert Tekesky
Mechanical Engineer
257-8436
rtekesky@ wpgate1.wpafb.af.mil

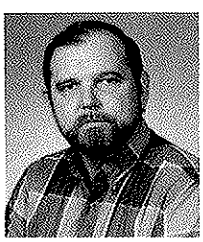
Robbin L. Miller
Mechanical Engineer
257-3362
rmiller@ wpgate1.wpafb.af.mil

Carey Scott Gravenstine
Mechanical Engineer
257-8236
gravens@ wpgate1.wpafb.af.mil

Ronald DeLuga
Mechanical Engineer
257-8162
rdeluga@ wpgate1.wpafb.af.mil



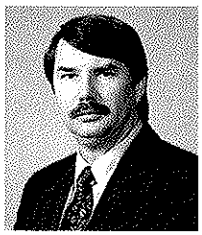
Donald Vance
Model Maker
257-3734
dvance@ wpgate1.wpafb.af.mil



Larry Hatter
Model Maker
257-8428
hatter@ wpgate1.wpafb.af.mil

Joe Hofele
Model Maker
257-8059
hofelej@ wpgate1.wpafb.af.mil

Jason Gilreath
Mechanical Engineer
257-3106
gilreaj@ wpgate1.wpafb.af.mil

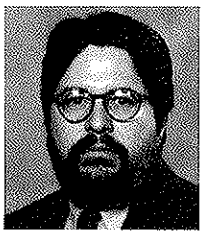


Michael Werneke
Chief, Packaging Policy Branch
257-7166
mwerneke@
wpgate1.wpafb.af.mil

Duane Pfund
Packaging Specialist
257-4503
pfund@ wpgate1.wpafb.af.mil

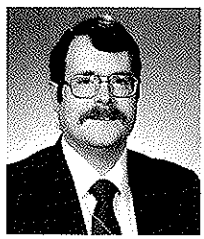
Tonita L. H. Davis
Packaging Specialist
257-1984
tdavis@ wpgate1.wpafb.af.mil

Joan Radcliffe
Packaging Specialist
257-2081
radcliff@ wpgate1.wpafb.af.mil



Jose Orsini
Packaging Specialist
257-3023
orsini@ wpgate1.wpafb.af.mil

Darryl K. Meade
Packaging Specialist
257-8062
meade@wpgate1.wpafb.af.mil



Larry Wood
Chief, Materials Branch
257-4519
lwood@ wpgate1.wpafb.af.mil

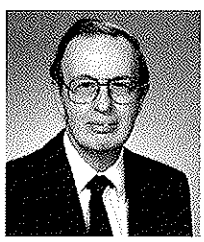
Caroline J. Buckey
Mechanical Engineer
257-8434
cbuckey@ wpgate1.wpafb.af.mil

Keith A. Vossler
Mechanical Engineer
257-9812
kvossler@ wpgate1.wpafb.af.mil

Susan J. Evans
Materials Engineer
257-7445
evanssj@ wpgate1.wpafb.af.mil

Warren Assink
Materials Engineer
257-4234
assink@ wpgate1.wpafb.af.mil

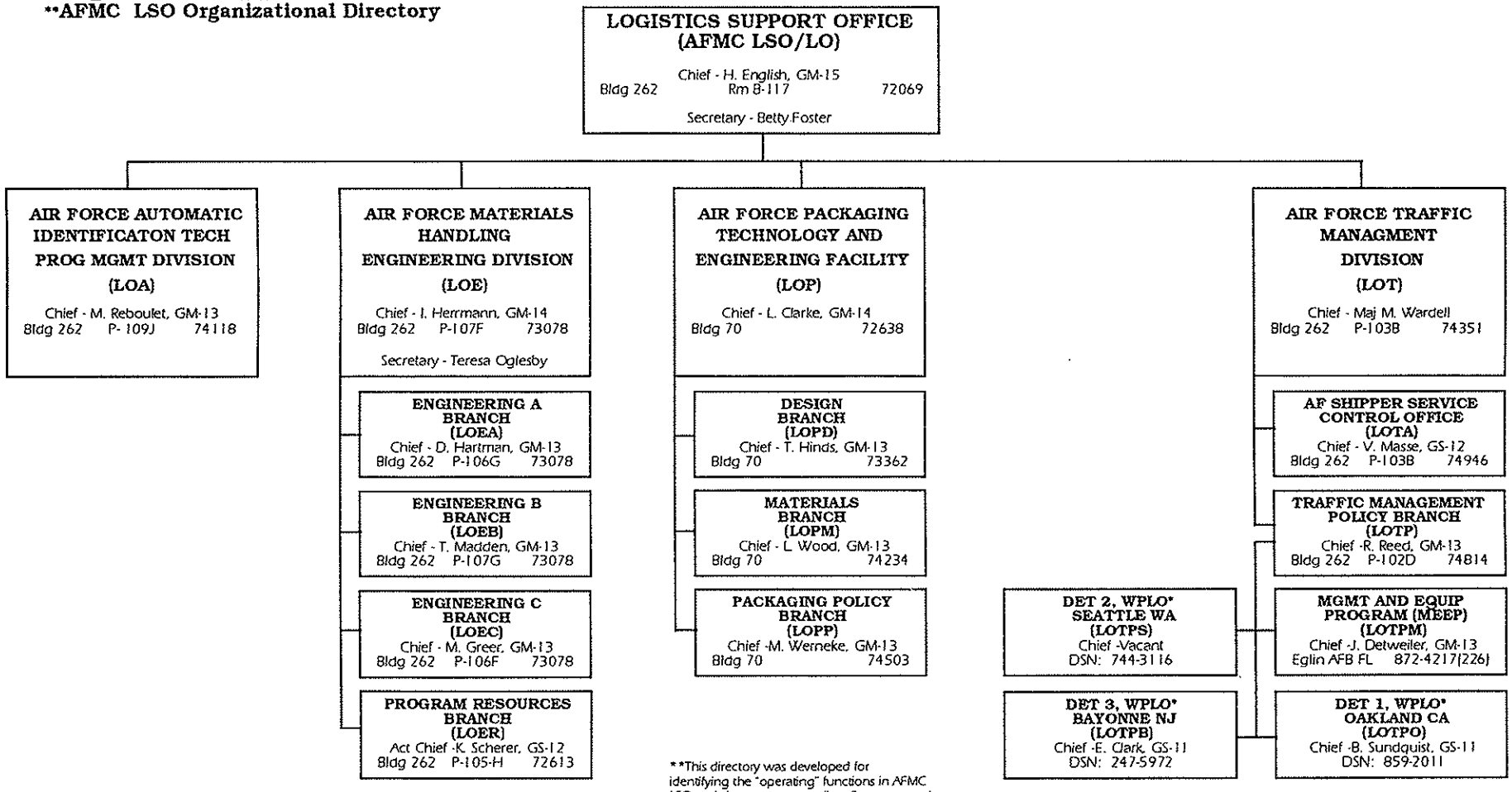
Susan J. Misra
Materials Engineer
257-8061
misra@ wpgate1.wpafb.af.mil



David E. Filsinger
Mechanical Engineer
257-6971
filsinge@ wpgate1.wpafb.af.mil

Air Force Materiel Command
Logistics Support Office
****AFMC LSO Organizational Directory**

Headquarters Air Force Materiel Command (AFMC)
Wright-Patterson Air Force Base, Ohio 45433-5006
Commercial (513) - 257 - (plus last four digits) DSN 787 - (plus last four digits)

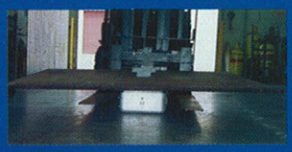


**This directory was developed for identifying the "operating" functions in AFMC LSO and does not necessarily reflect approved organizational structures on the Unit Manpower Document.

*Water Port Logistics Office (WPLO)

At AFPTEF, one vision drives everything we do: Building a world-class packaging engineering center of excellence by providing cost-effective, timely and flexible packaging products and services into the 21st century.

REPETITIVE SHOCK TEST



CONCENTRATED LOAD TEST

CORNERWISE DROP TEST

RESONANCE STRENGTH AND DWELLTEST

RAIN TEST

LEAK TEST

ONE TEST IS WORTH A THOUSAND EXPERT OPINIONS

Officially formed on 21 April 1952, AFPTEF's roots go back to World War II when a packaging branch was formed under the Army Air Corps' Engineering Standards Division. For more than four decades, AFPTEF contributed to the advances in packaging technology and engineering. Packaging that ensures the superior protection and performance of critical Department of Defense assets during handling, storage and transportation

AFMC LSO/LOP 5215 THURLOW STREET WRIGHT-PATTERSON AIR FORCE BASE OHIO 45433-5540
http://packweb.wpafb.af.mil/afptef

AIR FORCE PACKAGING TECHNOLOGY & ENGINEERING FACILITY
PACKAGING POLICY
MATERIALS ENGINEERING
QUALITY
COST
CONTAINER ENGINEERING
AFPTEF