MELPAR-A-GRAPH

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MELPAR AWARDED $2 MILLION CONTRACT FOR HELICOPTER SIMULATOR

Melpar, Inc., has been awarded a $2,124,372 contract by the U.S. Naval Training Device Center, Port Washington, N.Y., to design, develop, and produce a helicopter flight simulator of exceptional flexibility.

According to Kenneth C. Streeter, Computer Department Manager, the simulator will be the first to use a digital computer to solve, in real time, the complex equations describing helicopter characteristics. The computer system and programs are to be organized so that a program can be developed for any helicopter and inserted in the machine. Present helicopter trainers use custom-built analog computers, carefully matched to the characteristics of a given type of craft, for solving simulation equations.

The simulator under development, called Device 2B10A, will be programmed initially for two radically different helicopters: the single-rotor Sikorsky SH-3A and the tandem-roter Vertol CH-46A (HRB-1), known commercially as the Vertol 107. The 2B10A will simulate the flight, engine, and aircraft-system characteristics of either the SH-3A or the CH-46A at the flight instructor's option.

Company Developing Instrumentation For Hydraulic Mining

Melpar, Inc., was recently awarded a contract with the Bureau of Mines, Department of the Interior, to develop instrumentation for the hydraulic mining of coal.

At an anthracite coal mine near Wilkes-Barre, Pennsylvania, the Bureau of Mines is experimenting with an automatic hydraulic coal-mining machine. The machine, called Jumbo, is designed to cut coal from a vein with a high-pressure jet of water.

A critical factor in Jumbo's operation is the regulation of the depth to which the jet penetrates the vein. In Melpar's Research Division, scientists of the Physical Instrumentation Section, headed by Julian Chaudet, are now developing an ultrasonic detector to measure and control this depth.

The principle of the detector is similar to that of sonar. With the jet of water acting as a waveguide for the ultrasonic waves, the detector will develop a signal that indicates the depth of the cut and that can be used for automatic control of the jet.

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Christmas Party Set for Dec. 22

On Sunday, December 22, from 2:00 to 5:00 P.M., Melpar will welcome its employees and their families to a Christmas party in the Falls Church cafeteria.

Plans for the party are well under way, according to Michael N. Ingrisano, Jr., chairman, and Mel Allen, vice chairman, of the committee appointed to make arrangements for the affair. There will be music, entertainment, refreshments, and a return visit by Santa Claus, with toys for all the children.

Watch the bulletin boards for details!

BENTON LECTURE ON UNIVERSE DRAWS 250

The evening technical lecture by Ray Benton of the Exploratory Research Laboratory on November 19 drew an audience of approximately 250, the largest yet to attend such a lecture. In his talk in the Falls Church cafeteria, Benton examined modern theories of the origin and end of the universe and showed some striking color slides of heavenly bodies.

38 PARTICIPATE IN WRITING SEMINAR

How to Write Better, a seminar in effective writing, was conducted at Melpar on November 18, 20 and 22 by Lloyd Spangler of Communication Techniques. Sessions were from 7:00 to 9:00 A.M. on the three days. Emphasis was on the modern, direct, informal approach to business writing, as contrasted with the stiff, wordy style once in vogue. Nearly all activities in the Company sent representatives to the seminar.

SIMULATION LAB STUDIES IR LAND-MASS-DETECTION SYSTEMS

Under a contract with the United States Naval Training Device Center, Melpar's Simulation Laboratory is investigating methods of simulating infrared land-mass-detection systems. The 12-month study is intended to keep the military training capability abreast of the rapidly advancing state of the art of operational IR equipment.

First objective of the study is to establish the operational characteristics of IR land-mass-detection systems. Since these characteristics vary widely from system to system, the next step will be mathematical analysis and simplification of the information collected. The study will then be directed toward determining optimum data-storage and data-display techniques. The final objective is to recommend one or more simulation systems as worthy of hardware evaluation. The results of the study will be presented in a series of six technical reports.

According to Thomas Walkinshaw, manager of the Simulation Laboratory, simulation of IR land-mass-detection systems is a more challenging problem than simulation of visual or radar land-mass-detection systems. Radar systems present less of a problem because their resolution capability is not so great as that of IR systems, and visual systems are easier to simulate because the image characteristics they display do not vary so much with time, temperature, and other parameters as IR systems do.

Holiday Work Schedule

Christmas Eve will not be a scheduled work day. Instead, the following Saturday, December 28, will be a scheduled work day. December 25 and January 1 will be observed as paid holidays.

Cost Shavings

For the first six months of 1963 the Value Improvement Program reported annualized savings of over $887,000. These savings are the result of the efforts of Melpar employees to improve work methods, trim the unnecessary from daily routines, reduce the costs of purchased materials, and use time-saving equipment to help them perform their work.

Last month the VIP was expanded to include a Company-wide suggestion program for cost reduction. Since then 35 cost-saving ideas have been proposed. Some of these are now being put into effect; others are still being evaluated. It is expected that the number of suggestions will increase in the months ahead and that Melpar will achieve even greater savings.

In November we added to the ranks of cost shavers the following persons, each of whom submitted one or two suggestions:

William G. Andrews, Minuteman Division; John H. Awl, Research Division; William K. Barrett, Research Division; Vaughn N. Berry, Reliability and Quality Control; Joseph M. Birmingham, Minuteman Division; and Roy S. Boreen, Engineering Division.

Mary Buckmaster, Contract Management; E. James Caskey, Reliability and Quality Control; Sybil Charbonneau, Minuteman Division; Phyllis Christ, Administration; Alexander Cseh, Contract Management; and William Cullipher, Administration.

William R. Davis, Contract Management; Jackie L. Dodd, Research Division; Charles Feldman, Research Division; R. Keith Felty, Manufacturing; David J. Fromme, Contract Management; and Elmer R. Fulkerson, Minuteman Division.

Robert M. Goisse, Reliability and Quality Control; Clifton G. Grimm, Minuteman Division; Keene Hepburn, Minuteman Division; Wilford H. Ingrum, Manufacturing; Melvin F. Krause, Minuteman Division; and O. Faye Morton, Administration.

David H. Oglesby, Contract Management; Alan O. Plait, Reliability and Quality Control; Horace F. Sykes, Contract Management; P. David Vachon, Research Division; William M. White, Reliability and Quality Control; and Joseph L. Zobay, Reliability and Quality Control.

We would like to add your name to next month's list of cost shavers.

GOING UP!

Congratulations to those who won promotions in October! Here are their new job titles:

Sam S. Brody, Branch Supervisor; Walter F. Dailey, Field Service Engineer A; and John M. Dubuc, Planning Coordinator.

John K. Hall, Planning Supervisor, and Nicholas P. Heon, Senior Draftsman B.

Ronald E. Irons, Project Engineer; Charles E. Isbell, Project Engineer; and Eleanor M. Lavelle, Administrative Assistant.

William S. Moulton, Manager of Area Technical Liaison Office; James F. Mullen, Senior Programmer; and Oscar M. Sessions, Junior Electrical Engineer.

Orlando K. Sexton, Field Buyer-Expediter; Gerald C. Stanley, Electrical Engineer; and James R. Toler, Project Engineer.

Hydraulic Mining

(Continued from Page 1)

The contract with the Bureau of Mi calls for Melpar to develop a penetration-depth detector, automate Jumbo, and provide field service for the system. It also calls for a study of the feasibility of remote control of Jumbo by means of closed-circuit television.

On a field trip to the anthracite-coal region of Pennsylvania, Melpar senior mechanical engineer Leonard Goldstein (right) dresses for the occasion and poses with Abner Browning of the Glen Ald mine.

TOUCH-UP ARTISTS. Winner of the August - September Group Performance Award was the P-Series Touch-up Group, supervised by Mary Jane Barentine. Mrs. Barentine is at center, holding the award plaque. Standing at rear is Assembly Supervisor Virgil Van Cleef.

Five other groups made the August - September competition a close one: Shipping, under Billy J. Barber; Component Test, under Kenneth W. Friend; Component Test, second shift, under Sam W. Poorbaugh; Shipping and Materials Handling, under Richard A. Markham; and Functional Test, second shift, under Casimir F. Wojtunik.

DR. RITT CITED BY AEROSPACE MONTHLY

An article in the November issue of *Aerospace Management* spotlights the role played by Dr. Paul E. Ritt in Melpar's reorientation of its capabilities to the aerospace market.

In one of its regular features, "The Men Behind the Progress," the month magazine calls Dr. Ritt, Vice President for Research, "one of the architects of the overall transition to a full spectrum of research, engineering, production and their management."

Pilot Plant Will Point Way to Future Business

Melpar is a firm believer in the build-a-better-mousetrap philosophy. For proof, look at the step the Company is taking now to increase its already impressive capability in manufacturing hi-rel electronic assemblies: it is setting up, in the LP #2 building, a pilot plant for advanced electronic packaging processes.

The new plant is expected to go into operation early in 1964. It will be part of the Process Control Laboratory of Minuteman Division. According to G. Thomas Viglione, supervisor of the laboratory, the purpose of the pilot plant is to develop mass-production processes for advanced electronic packages.

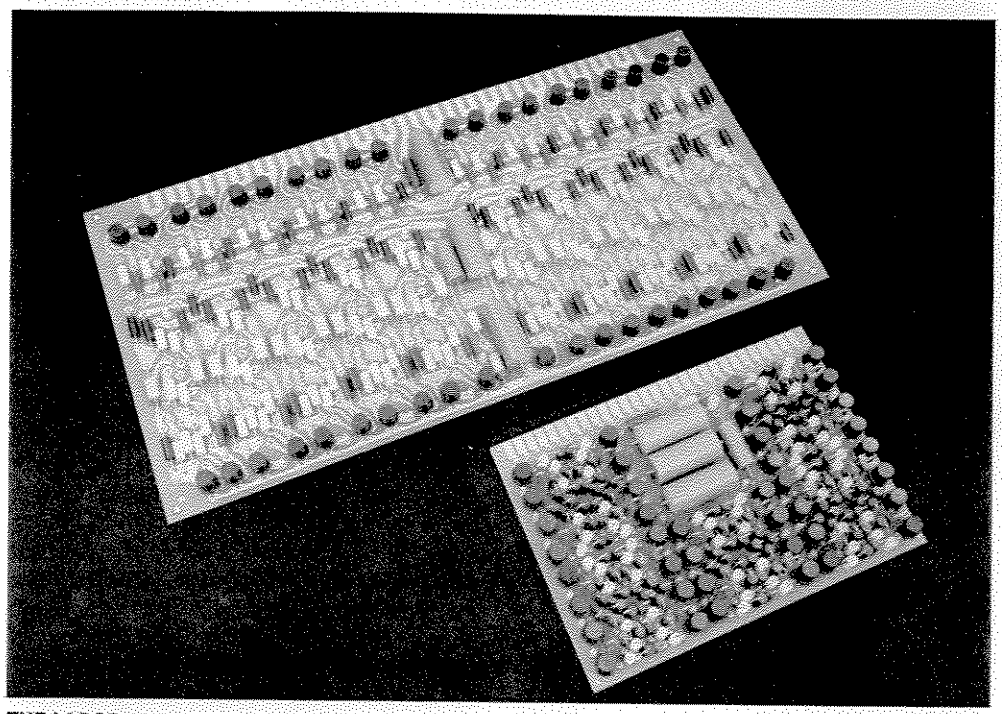
The primary objective in developing new electronic packages, and processes for mass-producing them, is to increase the component density, or number of components per unit volume, of electronic assemblies. Component density is of obvious importance in aerospace applications.

How much the packaging can contribute to component density is illustrated by two techniques being used and further developed by Viglione's group. They are the multilayer technique and the *Cordwood* technique.

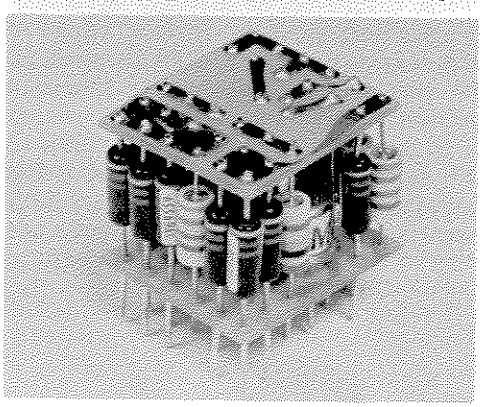
Conventional electronic plug-in module boards have their connections etched or printed on the top and bottom surfaces of the board on which the components are assembled. Multilayer modules have their connections etched or printed on as many as 17 thin (0.004 inch) leaves of glass-filled epoxy. The leaves are placed one atop the other, along with layers of insulating material, and laminated to form the board on which the components are mounted.

In the *Cordwood* technique the components are mounted on end, so that their axes are parallel. A top view of a *Cordwood* assembly calls to mind an end-view of a woodpile—hence the name.

At the top of the large photo above is a conventional module. Its component density is 33,000 components per cubic foot. Below it is a *Cordwood* multilayer module made of exactly the same electronic components in exactly the same configuration. Its component density is 88,000 components per cubic foot. An even higher density can be achieved with the same components in a *Cordwood* wafer assembly. An example of *Cordwood* wafer construction is shown in the small photo.



THE LARGE AND SMALL OF IT. At top is conventional electronic module board; below it is a *Cordwood* multilayer board, made with the same components in the same electrical configuration, that takes only three-eighths the space of top board. Small photo below shows *Cordwood* wafer construction.



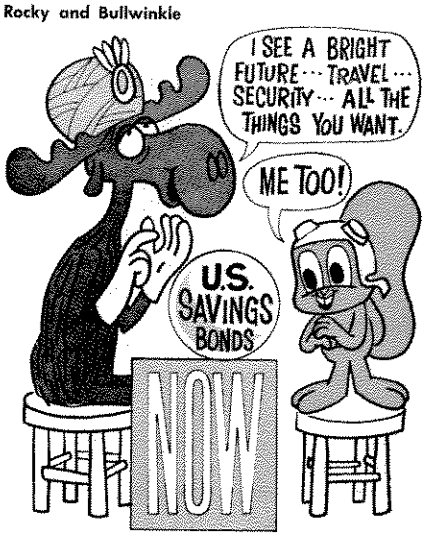
If a circuit serving the same function is constructed by the multilayer technique but with microminiature transistors, resistors, and other components, the component density goes up to 280,000 components per cubic foot.

In view of what has already been achieved in reducing the size and improving the packaging of electronic components, half a million components per cubic foot is not an unreasonable goal for the near future. It's a mark for the new pilot plant to shoot at.

Sales, Net Income Up First Three Quarters

Sales of $51,518,410 and net income of $1,228,209 were achieved by the corporation for the first nine months of this year. These totals are the consolidated figures for Melpar and it subsidiaries: Television Associates of Indiana, Inc., Microwave Physics Corporation, and Melpar West Virginia Corporation. These results substantially exceeded sales of $27,449,476 and net income of $720,500 recorded during the first nine months of 1962.

Rocky and Bullwinkle



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Fallin' Angel Says He's No Daredevil

To hear Charles Thurber tell it, skydiving is a nice, rather exhilarating diversion for a Sunday afternoon. The 20-year-old chemical technician from Melpar's

Charles Thurber

Exploratory Research Laboratory has made 57 parachute jumps, many of them with the Fallin' Angels Sport Parachute Club, which operates near Centreville, Virginia.

"We're not a bunch of daredevils," says Thurber. "Skydiving is extremely safe. Mishaps due to equipment failure have been practically nonexistent. The few accidents that have happened were nearly all due to human failure—lack of skill or failure to react properly."

To reduce the likelihood of human failure, Fallin' Angels and other organized skydivers have 15 to 20 hours of instruction in normal and emergency procecures before they make their first jump. Their first five jumps are of the static-line type: chutes are deployed automatically within two or three seconds of the time the skydiver leaves the plane.

When the neophyte graduates to free-fall jumps, he first limits himself to five seconds of free fall before he pulls the ripcord. As his skill grows he increases his free-fall time.

Thurber's longest free-fall to date is 60 seconds. That was experienced during a dive from 12,000 feet.

Here's how he describes a free-fall skydive (not all dives follow the same pattern):

"In the first ten seconds or so you accelerate and reach a velocity of one hundred twenty miles per hour. Then, if you don't start any maneuvering, the acceleration becomes zero and you feel as though you're floating down on a soft cushion of air. At twenty-five hundred feet, you pull the ripcord. When the chute opens, you get a shock of nine G's. But its only momentary. Then you ride down."

There you are! Nothing to it! But what was that about maneuvering?

According to Thurber, a free-falling skydiver can do anything an airplane can do except climb. (That's a big *except.*) He can execute loops and barrel rolls. He can even have dogfights with other divers. These maneuvers he manages by changing his body position. In fact, he can in this way vary his speed by as much as 80 mph and can also achieve a certain amount of horizontal movement.

A skin diver at 11, a SCUBA diver at 15, and a skydiver at 20, Thurber has had his share of perils. But they don't seem to have aged him. A few weeks ago he was stopped on the way to Melpar by a policeman. The policeman thought Thurber looked to young to drive.

Glittenberg, Cradlin Article Describes Novel Slide Team

The November issue of *Reproducti Methods for Business & Industry* describes an ingenious method devised by Melpar's Photo Lab for making 35mm slides of art work. Details of the method are given in an article, "Slide Team: Copy Camera & 35mm," by Melpar Senior Photographer Helmer O. Glittenberg and Publications Production Supervisor William T. Cradlin.

The Photo Lab has a great demand for the production of 35mm slides from black-and-white or colored art work. The slides, of Company products or facilities, are used for technical presentations and other industrial needs.

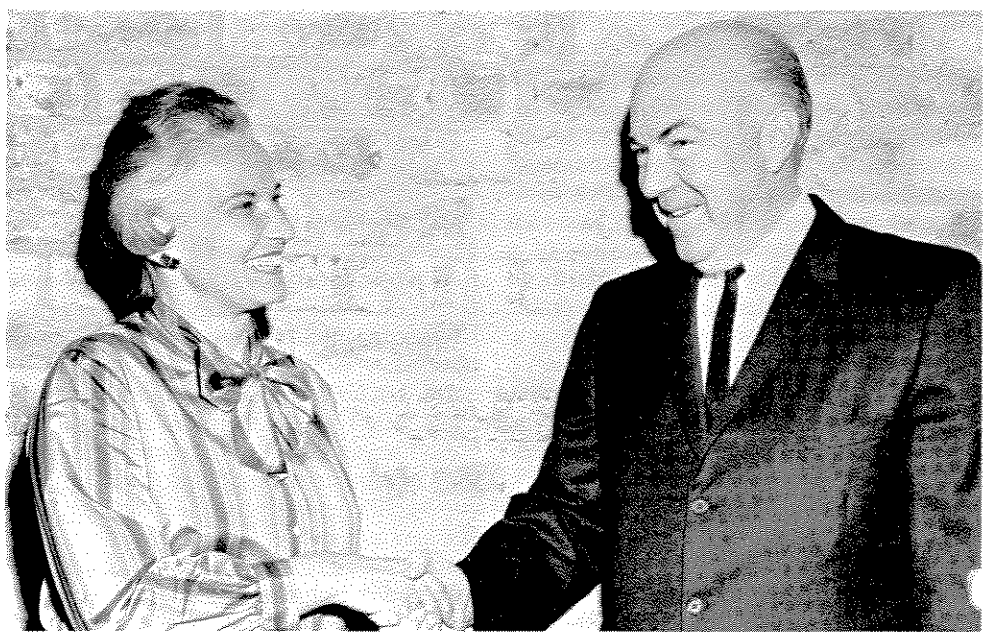
Standard copying techniques (art work taped to wall, camera on tripod, for example) are unsatisfactory for several reasons. The unusual solution arrived at by Melpar photographers was to team a copy camera (Brown Model 1822) with a 35mm camera (Besseler-Topcon). These two cameras are not ordinarily considered compatible. So that they could be combined, Photo Lab personnel designed and applied several adapters and other devices. These are described in the article.

The novel slide team eliminates th costly guesswork of standard method and assures top-quality, distortion-free reproductions.

Thompson Addresses Standards Engineers

Philip A. Thompson, Manager of Minuteman Quality Control, presented a technical paper, "Reliability Through a System of Standards," at the 12th Annual Meeting of the Standards Engineers Society. The meeting was held September 23-25 at the Statler-Hilton in Washington, D. C. Co-author of the paper, with Thompson, was Donald E. Lewis, Q. C. Supervisor.

In his slide-illustrated presentation, Thompson traced the contribution of standardization to the overall reliability of Minuteman electronic equipment.



DINNER SPEAKER WELCOMED. Willard Brown, Vice President for Sales of Judd and Detweiler, Incorporated, a Washington printing firm, was the principal speaker at the management dinner meeting held November 13 in the Falls Church cafeteria. He is shown here being greeted by Joan T. Lafrank, Manager of Management Analysis.