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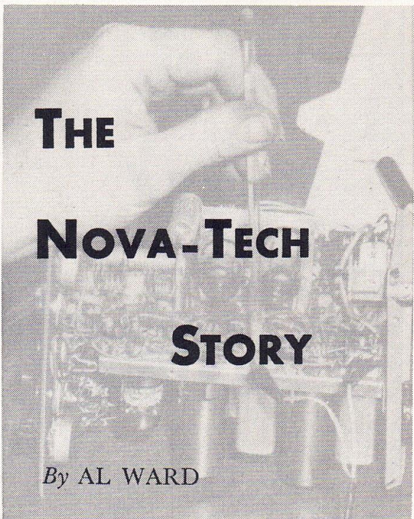
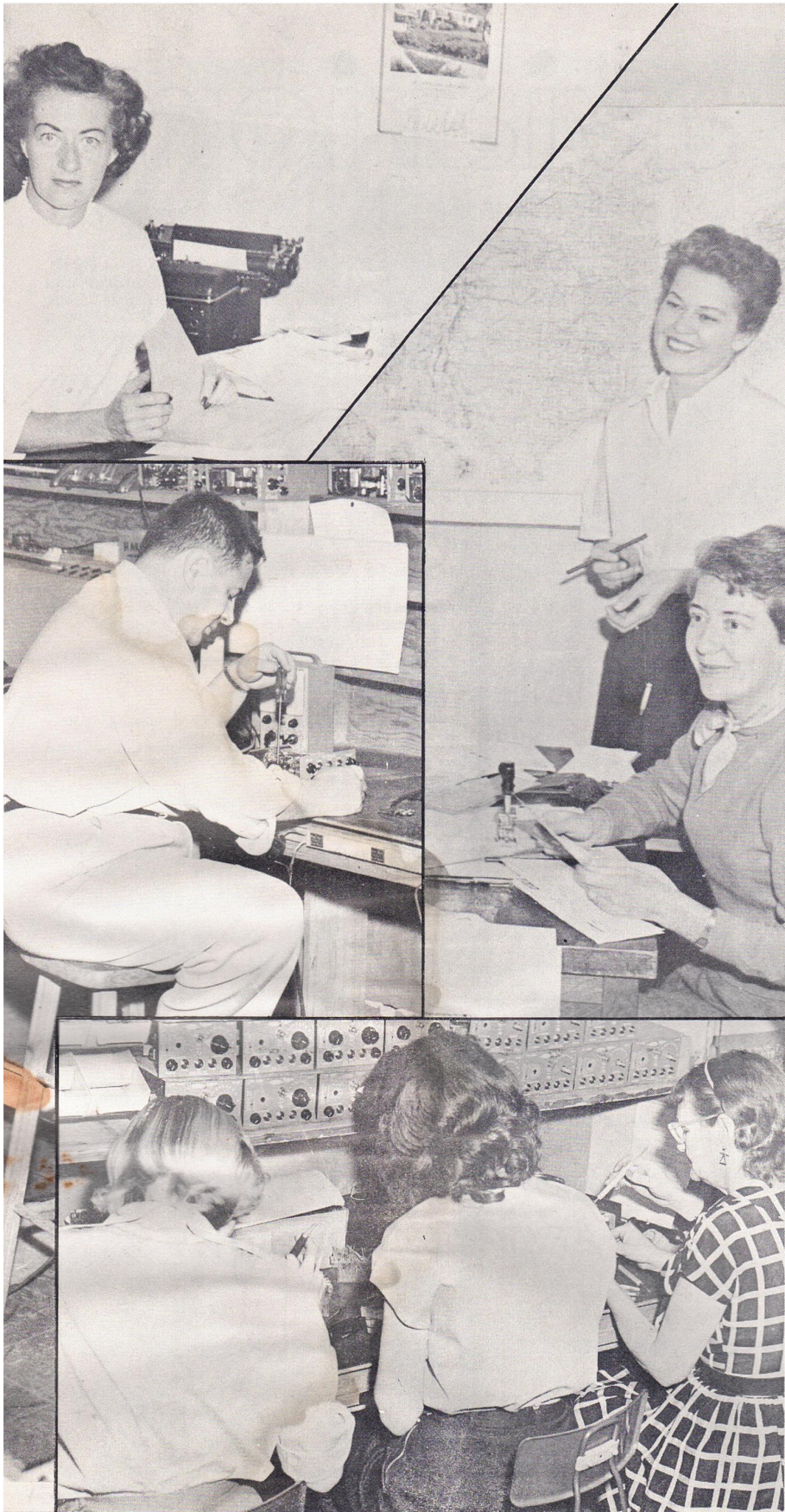
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THE NOVA-TECH STORY



THE NOVA-TECH STORY

By AL WARD

My interview was almost over. The President of Nova-Tech had relaxed to the point where I felt it was safe to ask him personal questions.

"Mr. Held," I said, "Nova-Tech has been remarkably successful under your guidance. Do you attribute this success to your personal ability? Or did luck play a large part?"

Sidney P. Held smiled. The President of Nova-Tech was a pleasant appearing man of 37 and apparently did not object to this line of questioning. "I suppose I should admit that luck played a major part. But that would give the wrong impression. As a matter of fact I will go to great lengths to avoid any situation where luck appears as a major factor.

"However," he went on, "I think the major factor behind Nova-Tech's rapid growth was my scientific background and training."

Held was on firm ground when he started to talk about science. He is a graduate of New York University with a degree in Electronic Physics and Mathematics. His post-graduate work continued at Yale, Harvard, and MIT. During World War II he served as Air Force Radar and Communications Officer. His career was continued in industry as a Research Engineer and he specialized in the radar and missiles fields. This engineering background was evident in his business methods. When Nova-Tech invaded the aircraft communications field it was only after Held had conducted an exhaustive analysis of the market.

"We had to establish how many

Sidney P. Held, the founder and President of Nova-Tech, Inc. He expects in excess of \$1 million annual gross this year.

AVIATION ADVERTISER MAGAZINE



planes needed radio equipment and what type of equipment was needed. How much money could be spent for radio? A \$20,000 plane could easily be equipped with a \$2,000 radio. But what about the \$2,000 airplane? It was ridiculous to consider such an inexpensive light plane with so much radio equipment installed. Even if their owners could afford it, most of those planes could never get off the ground carrying so much weight."



Betty and Adrienne do the bookkeeping for the Export Department. The export volume exceeds \$10,000 per month.

The analysis pointed in two directions. Held could choose to enter the luxury market with expensive equipment, which would mean a leisurely pace of low production with high profits per sale or else he had to commit Nova-Tech to the mass production of light weight, compact radio equipment that would sell at an unheard-of low price. It could have been a dangerous decision but Held insists that Nova-Tech could have made money with ei-



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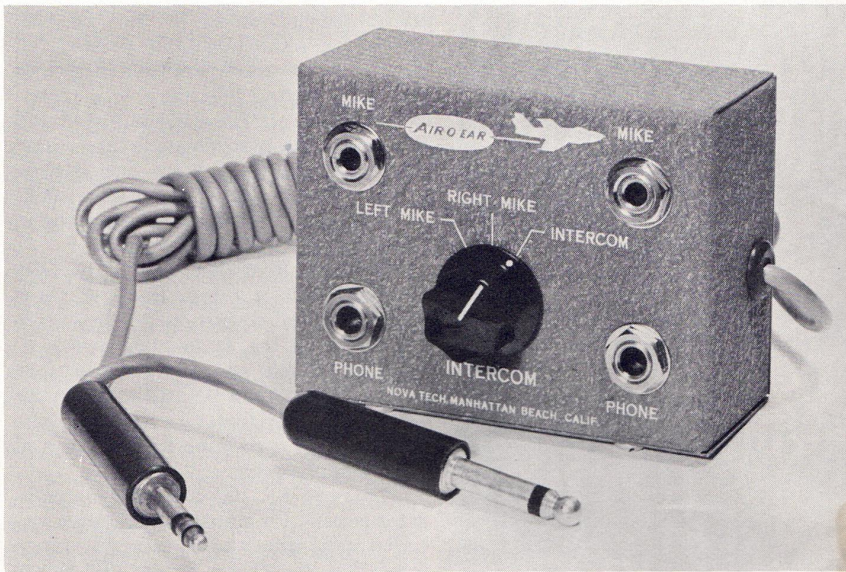
"The reason I selected the very light plane market is because I own an Erco—coupe—and I feel a kinship with other small plane owners. I feel differently about big planes. I admire the pilot of a Cessna 310 but I don't feel any emotional association with him; I'm just not sympathetic with his problems."

Perhaps a more practical reason for his decision was that the company owned an Erco and flight tests could be made easily. Held is a VFR pilot and the entire program would have been set back if it were necessary for

commenced the development program I felt like a true pioneer."

The design problem was very complex because Held was not willing to reduce performance or reliability in order to achieve a reduction in cost. It became necessary, however, to eliminate non-essential circuits. The TR-102, as the Nova-Tech radio was named, does not provide cabin speaker operation as a result of that design philosophy.

"The audio amplifier and output transformer (which cabin speaker operation would require) add size, weight, and expense to a radio," Held ex-



The INTERCOM plugs into the TR-102. No other wires are needed.

him to qualify as a twin-engine pilot. But whatever the reasons were, three years ago Nova-Tech entered the light plane communications field.

Today the factory ships an average of \$3,000 worth of radio equipment every day. The company payroll will exceed a quarter of a million dollars by the end of 1958. The "Air-O-Ear" trademark appears in 21 foreign countries including, among others, the Belgian Congo and Iceland. Nova-Tech has become an important supplier of communication equipment and is now recognized as a prime source of light plane radios. There is no doubt that Held's analysis of the market was correct.

"Certainly the market existed," Held stated. "We knew that. We even knew that the price had to be less than \$200. Our two-way radio for light planes not only had to perform as well as any existing equipment, but it also had to be more compact, lighter in weight, and it had to sell for less than \$200. We knew what we wanted but nothing like that had ever been done before. When I

plained. "But a cabin speaker adds nothing to performance, and certainly most light plane pilots would have to use head-sets anyway due to the high level of cabin noise."

Held didn't realize, at that time, that the TR-102 would be widely used as spare, stand-by equipment on the more sophisticated aircraft that *did* have sound proof cabins, and whose pilots were accustomed to cabin speakers. In response to their inquiries he said, "Of course, if a plane has existing radio equipment with cabin speaker facilities then the TR-102 can easily provide an audio signal to the existing amplifier and speaker—but I don't advise it," cautioned Held. "If the TR-102 is to be used as emergency equipment it should not be dependent on the success or failure of any other equipment. Reliability is increased when the TR-102 stands alone."

The decision to eliminate the cabin speaker and amplifiers had far reaching consequences—far greater than Held had anticipated—for a technical reason.



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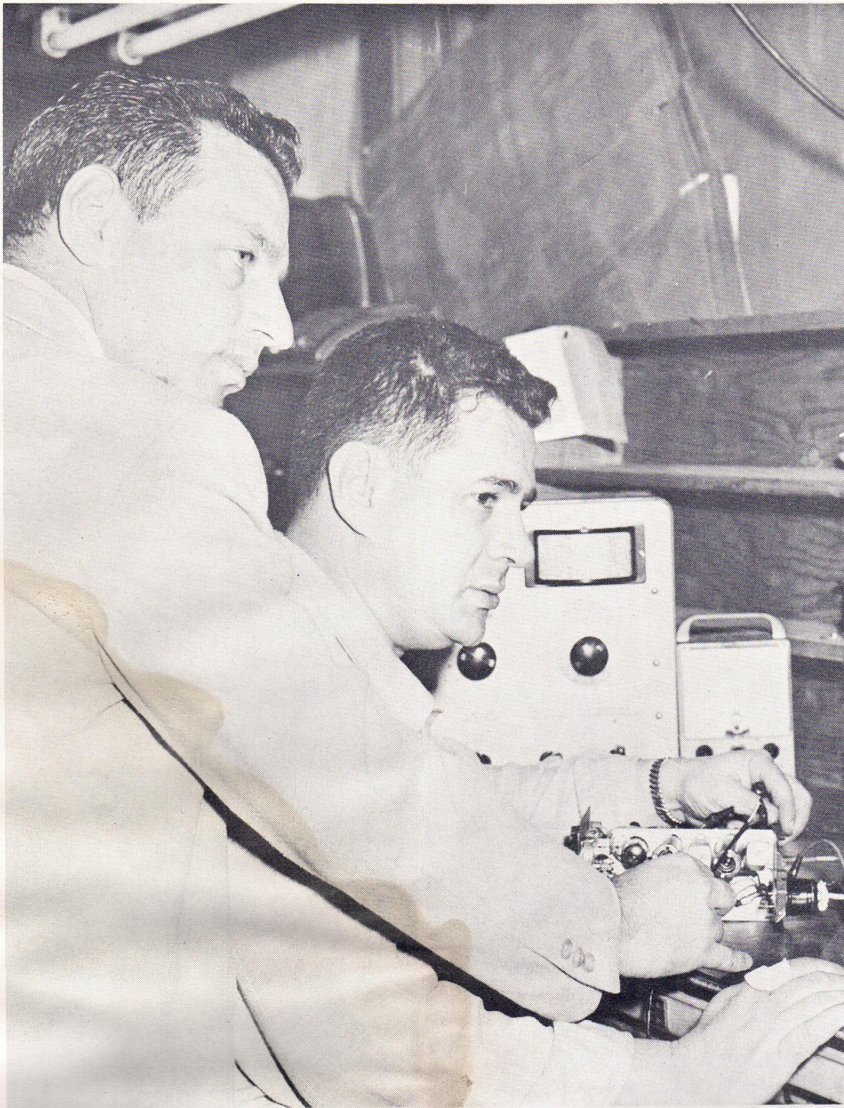
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THE MARTIN COMPANY



The President of the company makes a transmitter adjustment. Held never loses contact with the technical aspects of the TR-102.

Held explained that the amplifiers are used for two purposes. Not only do they provide speaker power when the radio is receiving, but when the radio is transmitting the amplifiers are also required to produce speech power.

"It looked as though we had to have the amplifiers in any case—that is, unless I could design a new way of producing speech power for the transmitter. I finally worked out a method that received world-wide patents and my application of this method was largely responsible for the remarkable success of the TR-102.

"In other conventional radios all the receiving tubes are idle when the unit is transmitting. Not so in the TR-102. When the mike button is pressed, all our receiving tubes are switched into the transmitting circuits by a relay. When the transmission is completed and the mike button is released, these same tubes are connected back into the receiving circuits. This results in the highest efficiency and the fewest parts in order to produce a given result.

"As a result of this patent, the TR-102 uses only 5 tubes. Each of these tubes are dual-construction; they have two tubes in the same glass envelope. The remarkable performance produced by the TR-102 can be attributed to the fact that these five tubes provide the equivalent of a six-tube transmitter and an eight-tube receiver."

The new TR-102 achieved immediate success. Its transmission range exceeded sixty miles and its receiving range somewhat less. Many seventy and eighty mile contacts are on record, although Nova-Tech claims only thirty to sixty mile performance. This is done to indicate what an average light plane owner might expect.

"That doesn't tell the full story," Held points out. "When a plane is in

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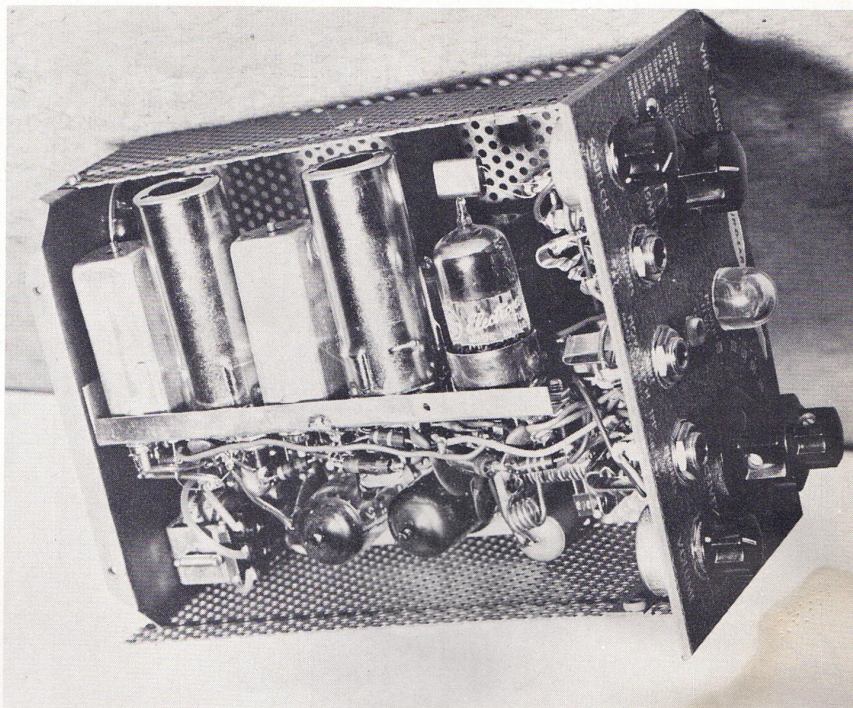
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the air there are too many factors that affect maximum range. A strong transmitter on the ground is a big help. Altitude is a big help. The higher the altitude, the greater is the transmission range. The higher a plane flies, the stronger its receiver appears to be. But the prime factor in long distance reception is the plane's ignition noise. A low-frequency receiver is not too affected by this ignition noise but it will completely disable a VHF receiver. An enormous pulse of radio energy is produced every time a spark plug fires. This makes VHF reception a practical impossibility in the average light plane with unshielded ignition systems. If a light plane owner had to shield his ignition it might add as much as \$200 to the cost of installation."

Held felt that low cost radio would be a hollow mockery if the installation costs exceeded the cost of the radio equipment, and he spent months in perfecting receiving circuits that were practically immune to ignition noise. As a result of these highly refined noise-clipping circuits, the TR-102 will not be disabled by ignition noise and at this writing the Nova-Tech unit is the only transmitter-receiver that can operate in planes with no ignition shielding whatever.

There doesn't seem to be much question about Held's technical ability. The correspondence file labeled "Complimentary Letters" attest to the enthusiastic congratulations he has received from engineers and laymen alike. The advanced features incorporated in the TR-102 (such as providing a 23-channel transmitter—when most manufacturers were content to produce transmitters with only 4 channels) received grateful recognition. For the first time a light plane could be equipped with high performance VHF radio for less than \$200. The TR-102 was priced at \$150 complete. The price included two transmitting crystals and the power supply. A whip antenna was also included in the purchase price. The dire predictions of financial disaster resulting from this low price proved to be correct, and the price increase to \$189 was the result.

However, from the very beginning orders poured in. The future of Nova-Tech seemed to be assured. The daily mail included letters from all over the world. Local university instructors provided translation facilities. The mail came in a never-ending stream. The company had no preparation to handle this overwhelming volume of correspondence produced by the initial announcements. In a few weeks they appeared to be hopelessly bogged down. The Correspondence Secretaries estimate that at one time Nova-Tech was twelve weeks behind in answering let-



All tubes are accessible when the bottom plate is removed. The compact construction has been praised by the entire industry.



Only women are used in the assembly of the TR-102. Many of them have more than 10 years' experience.

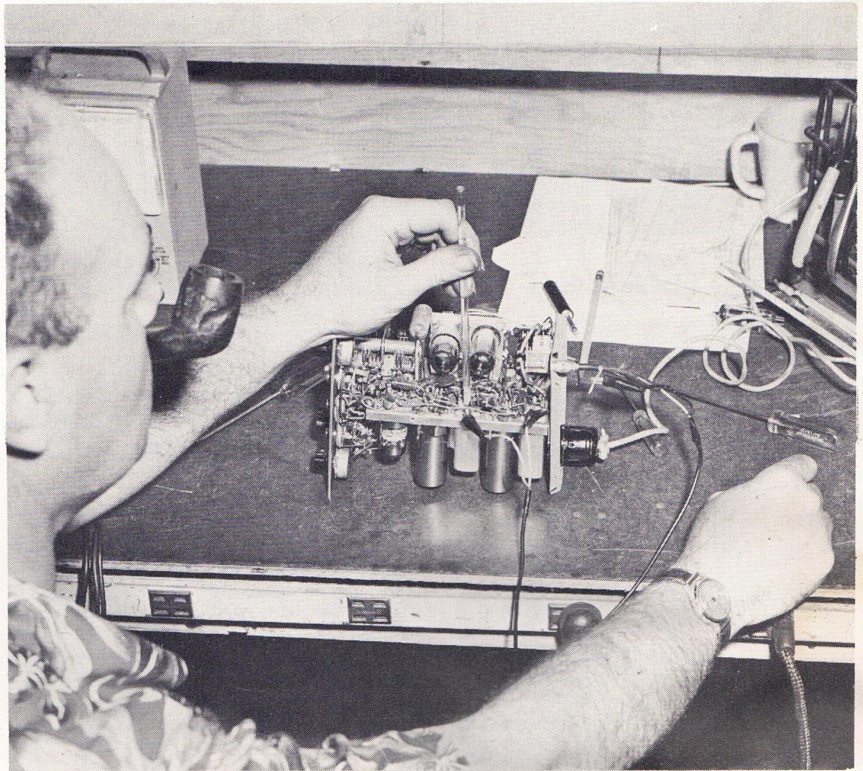
ters. Held realized that a great amount of good will was being sacrificed because he was unwilling to increase the office staff.

"We were committed to the manufacture of a low cost item. Every available dime had to go into the purchase of parts and test equipment. We had to set up a factory in a hurry. If we diverted time and money in order to keep current on this crushing load of correspondence, we never would have been able to get into production. The operating budget of the company did not permit an expanded correspondence department. Our initial budget did not even permit a sales department. Our organization had to exist in Spartan simplicity in order to be successful in the manufacture of complex equipment whose low price must be maintained. We assumed that our equipment, with its quality performance and low price, just had to sell itself. I knew that the initial flurry of letters would gradually diminish to an amount that our corresponding secretaries could handle, and that it would just be a matter of time until the girls would be caught up. Our three girls in the correspondence section answer as many as one hundred letters a day and it wasn't long before they were current. Right now they often answer the daily mail the same day as received.

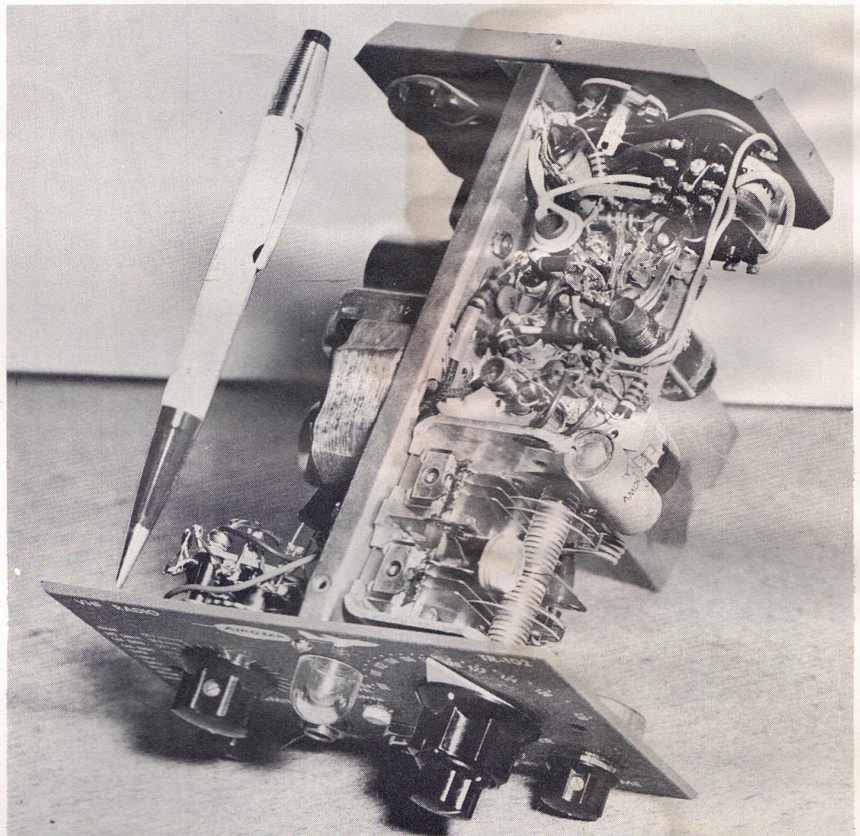
"Our profit margin on each unit was small, and if our costs increased slightly we would find ourselves in the role of humanitarians — providing wonderful equipment to the aviation field and not making any money. It was a real juggling act. Purchase orders had already been placed for our first production run. Parts were delivered daily. We couldn't find room to stack them and in one instance we spent days trying to get a condenser supplier to expedite delivery on a critical item—only to find that it had been in our plant for weeks. On top of all the confusion the mail and cables and long distance phone calls kept pouring in.

"Of course, we could have had everything in apple-pie order if we had to. We could have expanded our staff of office girls. We could have instituted a rigid inventory control system. We could have utilized all the modern methods designed to solve the problems we encountered in our early days. But I was firm in my insistence that no cash be diverted from production. We might be able to catch up with the mail at a later date but every extra dollar we paid for office over-head or any other over-head, increased the cost of the TR-102. In order to make a profit at this low price, real sacrifices had to be made."

Held absolutely refuses to carry charge accounts. His objection is based



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on the fact that the company would have to hire two additional girls for a billing department, and the bookkeeping system would become more complicated. In many instances his policy proved to be extremely detrimental to the company. Some of the blue-chip airlines simply had no method of payment that provided for cash with the order. Cities and municipalities also had no facilities for cash payment, and many orders were lost. Nevertheless Held refused to accede to the mounting demand. "If we are required to extend the same credit terms that are offered by our competitors, then we will have to sell our equipment for the same price."

Nova-Tech has been reluctant to encourage dealer business. It seems evident that dealers in aircraft radio are accustomed to large discounts. In many cases, when dealers sell other radios their discount exceeds the total sale price of the TR-102, and yet there are many dealers who welcome the appear-



The TR-102 is subjected to rigorous tests and very few radios arrive at their destination in-operative.

ance of a low cost transmitter-receiver, and who are willing to participate in a program that could not possibly enrich them. Nova-Tech dealers are satisfied with smaller profits per sale. Although they must sell three or four TR-102's in order to equal the profits they would enjoy on another brand, they point out that TR-102 sales are easier to make because of its low price. The company's



Military approved parts are used in the TR-102. The chassis are cadmium plated die-cut steel.

large advertising budget also helps the dealers. The dealers report that the customer finds it difficult to believe that such an inexpensive, compact unit can produce the advertised performance, and usually it takes a dealer demonstration to convince him. The majority of dealers, however, are unwilling to handle communication equipment at such low profit and at present the factory is considering a price increase for their benefit, and it will go into effect only if dealer sales become absolutely necessary to the financial well-being of the company.

Possibly the greatest factor responsible for Nova-Tech's rapid expansion was the policy of Direct Sales. In order to maintain a low sales price Nova-Tech decided on a sales policy that had never before succeeded in the aircraft communication field. The sale of radio equipment traditionally required "two-step" distribution—where the factory sells its equipment to a distributor who in turn sells it to dealers. The dealer finally sells the equipment to the pilot who must pay the costs of two extra profits. A direct sales program would eliminate these extra profits. Such a program required equipment that could be easily installed, that needed no adjustments on installation, and that was rugged and reliable, and that could be handled on a do-it-yourself basis. (The reason the whip antenna was included with the TR-102 was to relieve the customer from the necessity of tuning his

transmitter circuits to match his antenna. This is now a factory adjustment.)

Nova-Tech's direct sales policy was an immediate success. The installation of the TR-102 was so simplified that it no longer required the over-haul of the plane's ignition system. Literally, anyone could do it. Their sales went skyrocketing and of course, the greatest sales aid was the proud pilot who actually made his own installation. Complimentary performance reports were received daily. In some of these, pilots who never had the convenience of two-way radio, reported in astonishment, forty and fifty mile contacts. In a light plane this represents perhaps thirty minutes of flying time!

The key to the direct sales program is the factory service that backs it. If a customer has difficulty in getting good operation, the factory service department sends a replacement radio in order to determine whether the installation was faulty or, as has happened several times, to determine whether the radio itself was inoperative.

"Occasionally we have had to refund the customer's money because of poor performance. In almost every case when the radio was returned, it was found to be normal, and so we can only assume that something peculiar happened in the installation. It is very difficult to give on-the-spot service to a pilot located thousands of miles away and although we try our best to help him,

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sometimes we cannot help him sufficiently in order to satisfy him. In those cases, we institute an immediate refund."

Held pointed to a file folder labeled "Customer Refunds." "We average five refunds for every hundred sales. All of these refunds could have been avoided if the customer had competent help, such as he would receive from a dealer. But what is most astonishing is that 95% of all sales result in completely satisfied customers who are enthusiastic

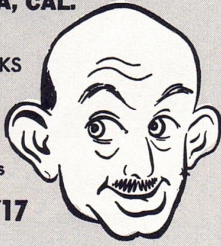
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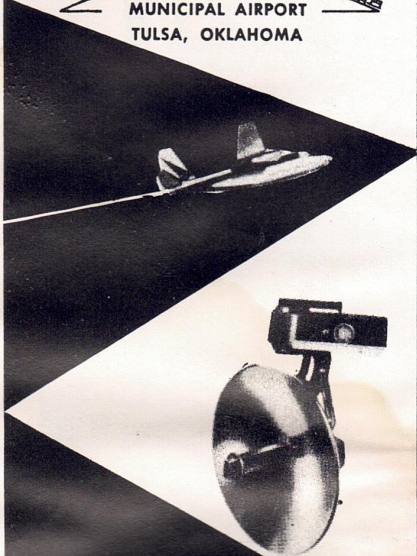
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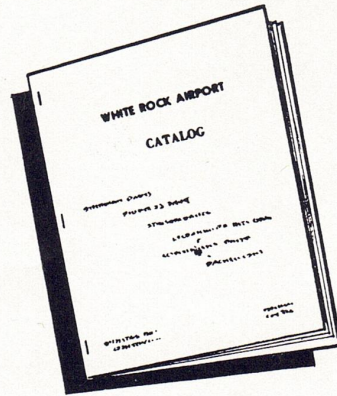
supporters of Nova-Tech and its products."

The TR-102 is manufactured under a rigid inspection system. The Inspection Department gets the choicest equipment for test purposes. Held understands that these expenditures are absolutely necessary since his company ships radios all over the world and it would be disastrous if the equipment arrived in an inoperative condition to a pilot in Australia, or Trinidad, or Iceland.

An annual volume that is expected to exceed a million dollars is good evidence that the direct sales policy has succeeded. The company's large advertising budget, in addition to producing its direct sales, also simplified the dealer's sales efforts. Pilots throughout the world are now familiar with the TR-102 and a dealer is spared the advertising expense since the customer on the local scene is generally pre-sold and merely requests a reassuring demonstration. After all, it takes a trusting and daring soul to send away for radio equipment, and thousands of pilots absolutely will not do it. They will make their purchase from their local dealer—or not at all. The price increased contemplated by the company would increase the dealer profit margin, and would help to strengthen the dealer organization. Held considers such a step to be absolutely contrary to company policy and yet he is prepared to put this new policy into effect if direct sales fall off.

When Held was asked whether Nova-Tech was showing a good profit, his answer was rather straight-forward.

"I own the entire company," he said. "I have no stockholders or partners. I think we are selling as many radios right now as all others combined, but so far I haven't made a dime. All the money is plowed back into the company to expand production and to develop new products. For example, our new Air-O-Ear Omni will cost more than \$100,000 to put into production. It will be the least expensive Omni in production and will be designed especially for the small plane owner. I am certain that another new product, the Air-O-Ear InterCom, will be a prized possession of every light plane owner. It plugs right into the front panel of the TR-102 and provides complete inter-phone facilities. In addition, by merely turning a switch in the appropriate position, either the pilot or the passenger can communicate directly to the ground. No other company offers inter-phone facilities for light planes. Our new CAP program is almost in production. We will produce for the CAP a combination unit. In one all-purpose radio the CAP member will not only have the standard VHF equipment but he will also be able to receive and



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