

The Odetics Space Odyssey

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Forward

Odetics was founded by six engineers in 1969 with the sole intention of building a better Space tape recorder. We not only accomplished that task but virtually dominated the free world Space tape recorder market for 25 years, setting many notable endurance records.

When one of the founders, Jim Welch, passed away, his family asked for any written documents to commemorate his achievements. Not finding any prompted me to write down my recollections as well as requesting anyone who worked at the Space Division to write down any notable events that they could recall. Anyone interested in participating can forward their stories, pictures, data, etc. to Marlette Morales for assembly into what hopefully will become the Odetics Odyssey Memoirs. A copy will be made available to anyone who requests one.

The Six Founders

This saga began in 1959 where, as a 29-year-old electronic technician, I started working for Leach Corporation in Compton, California. Leach had just started an instrumentation tape recorder Division. About a month or so later, Jerry Muench went to work for the same Division. We were both electronic technicians working on a multitude of programs. Dave Lewis worked there as a Program Manager who frankly scared the heck out of everyone. It took a few years to learn that Dave was really a pussycat with a big heart.

Approximately five years later the Division had grown so large that it was moved to Azusa, California. Our first reaction was—where in the *hell* is Azusa and who would want to work there, since it was a 50-mile commute with no freeways! Leach cleverly paid our commuting costs for three months at which time everyone grew accustomed to commuting and we reluctantly decided to stay.

As the Division grew, other players joined the team. Some memorable names were Gene Farole, George Ritz and Duane Headley in approximately 1964. Joel Slutzky, Jim Reisinger, Gordon Schulz, and Jim Welch joined a few years later.

Around 1964 Leach decided to expand their business through bidding on a Lockheed Space program for 20-plus tape recorders. Everyone was surprised when Leach won the contract. To our dismay, Leach hired a new engineering team from another company to design this space recorder. Watching this team perform was a learning experience in how not to be successful.

A couple of years later when they were having multiple technical problems with performance and deliveries, I was asked to take over the program as the Project Engineer. At the time I thought I was getting a promotion...how naive I was!

Most of the original engineers had left or were not interested in supporting the program. After months of long hours and hard work, we managed to make some deliveries. The first major accomplishment was getting a recorder to work through the launch environment. The second major accomplishment was getting a recorder to work one week in Orbit. When I heard they had hired a young engineer named Jim Welch from the University of Washington, I immediately went to seek his help. Presenting a problem to Jim was like getting a message from heaven. His answer was always, "Ok, let's go fix it!"

After making one of our few deliveries, I received a phone call from Lockheed, Sunnyvale, stating that the recorder had failed in system test and requested that I be there at 8 am the next day to assist in the diagnosis of the problem. I dutifully appeared at 8 am at their Engineering facility and should have known I was in trouble when almost no one would talk to me. Finally at 10 am they said they were ready and would I please go to their conference room. When I walked in, there were 20 Lockheed engineers sitting at the table and I was the only representative from Leach.

Approximately half of the engineers were from the Lockheed recorder group (watch makers recruited from Germany) who had been unsuccessfully trying to market a Space tape recorder. They informed me that they had opened the failed recorder and were extremely upset that they had found contamination from the enclosures solder seal. I replied that Leach had solder sealed all of their hermetic relays for years and that was the only process they felt comfortable with and that probably didn't cause the failure. Not satisfied, they continued to brow beat me over the contamination. In exasperation I finally said it was only fair that they would provide me with one of their tape recorders and let me do a similar analysis.

Cooler heads prevailed and we were able to prove contamination did not cause the problem. Later in the day as I was leaving, one of the Lockheed engineers introduced himself as Guenther S_ _ _ from Germany. With a smile, he boasted that he was in the German Army when he was 16 years old at the Battle of the Bulge, where they had kicked our asses. In total shock I replied, "If you were so good, why did you lose?"

On the flight back to Southern California I was thinking, what kind of country would provide good jobs to our enemy who a few years earlier had been shooting at and possibly killing American servicemen! On the other hand, Les Horvath had escaped from Hungary and made it to the USA with stories that will astound you. I hope Les will provide an exciting chapter on how he escaped from Hungary and made it through all the red tape to get to the USA. Les wound up being a very valuable employee for Odetics for many years.

Back to how Odetics was created...

As we labored on improving the Leach Space tape recorder performance, Jerry Muench, Jim Welch, and I spent many long, frustrating hours, six and sometimes seven days a week resolving problem after problem. One significant event (forever burned in my memory) after working 24 hours on a problem, the President of Leach showed up at 8 am, clean shaven, wearing a pressed suit, shirt, and a tie and asked if we had solved the problem. I replied, "No,

we had not found an acceptable solution.” His answer was, “Well you better resolve it soon or you will be terminated. Engineers are a dime a dozen and I could hire them anywhere.” What a very motivating comment from our leader!

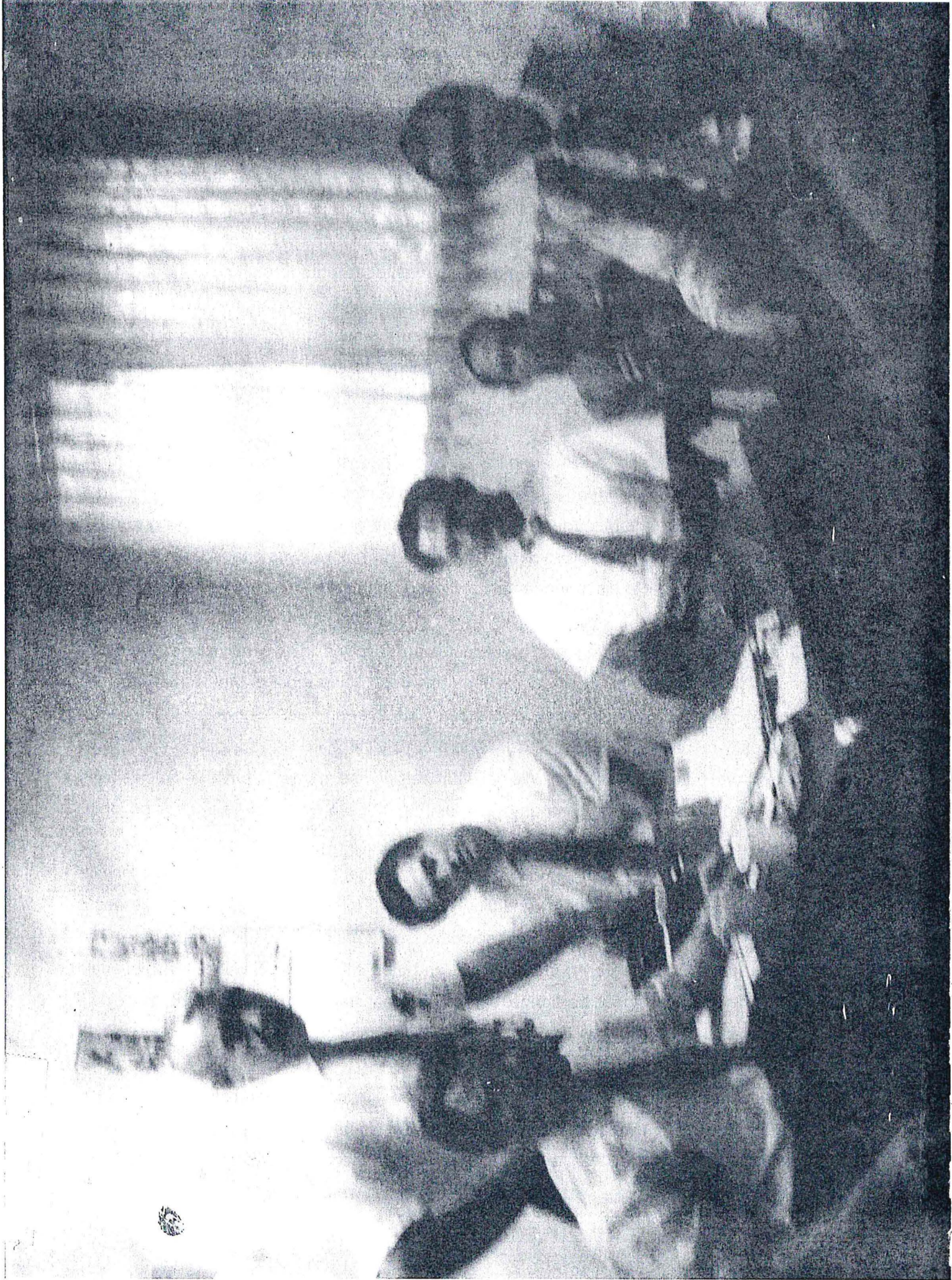
Around 1969 Jim Welch and I were working on another all-out effort and at about 2 am I told Jim, “Why don’t we raise \$500,000 and go start our own Space tape recorder company?” Jim’s answer was, “Ok, let’s do it!” One of the most motivating reasons was that the President of Leach held a company meeting to explain that they wanted to pursue high-quantity and high-production jobs only and therefore would exit the Space tape recorder market. Everyone working in the Space group reasoned that if they exited the market then we would be out of a job. The Space business at that time was about \$3 million dollars per year and profitable. Our simple logic was that if Leach does not want the business then someone else should do it.

We had started purchasing our magnetic heads from a new company named Summit Engineering, who had received funding from a very large company named United Controls. In a casual conversation with the Manager of Summit, I had mentioned that we were trying to raise \$500,000 to start a new Space tape recorder company. His answer was, that it should not be a problem and he would talk to his management at United Controls.

When Jim and I were discussing who we would want involved in this new endeavor, Jerry Muench was the first name we chose since Jerry has been doing most of the Space Recorder Sales and Marketing. When we approached Jerry his answer was, “Show me the money!” Jerry apparently mentioned it to Joel Slutzky who promptly cornered us and said he could raise the money from outside investors. We felt that raising the money from the outside was preferable to working for another company. We said, “What have we got to lose? Let’s go for it!”

We started meeting at Jim Welch’s house and strategized that the team would need to include Gordon Schulz (Mechanical Engineer) and Jim Reisinger (Project Engineer). Since this was a very high-risk endeavor that had to be kept secret, we were reluctant to add more people. The six founders (Joel, Crandall, Jerry, Gordon, Jim, and Jim) all agreed to proceed if Joel could raise the money. We all signed personnel agreements that stated, if Joel raised the money we were committed to go.

Joel took a two week vacation and went on a road show with the shell of a business plan and a terrible video tape that Joel made of the six of us. It was so bad that the people who viewed it had to know we were honest. We set up a secret code. When Joel called we would keep the score on a blackboard. No one was too concerned because we never believed that Joel could



raise the money. Well the money was raised in blocks of \$50,000, so when Joel called and said he had sold 1, 2, and 3 blocks we still were not too impressed. But surprise, surprise... Joel kept right on selling and soon sold all 12 blocks for \$600,000! Panic set in because we had signed commitments to proceed. When Joel returned, we all congratulated him on his gift of gab. It was some years later when we learned that Joel had some rich relatives and friends.

We wanted to leave Leach and our customers on good terms so we all gave 30 days notice with a promise to make it a smooth transition for our replacements. Their first reaction was to terminate us all immediately! Someone finally recognized that they had a problem and agreed to our 30 day notice. Immediately all phone calls were monitored and our briefcases were searched whenever we left work. A few days later the six of us were requested to meet with a lawyer in the Corporate conference room. This lawyer looked and acted like he had just defended the Mafia. He proceeded to read us our rights. He cited everything that we must comply with or we would be sued personally. I was impressed by him so I took nothing.

During the 30 day transaction period, they worked us unmercifully both physically and mentally. Leach management stated that there was no way we could succeed since we were all engineers and had no managers. Our reply was that that was the reason we would succeed since Leach management had taught us how not to manage.

We were still meeting at Jim Welch's house setting priorities for what had to be accomplished when the money arrived. When you start a Company, one of the first and most important things is selecting a name that will be accepted by the copywriter's office of the State and Federal Government. This is not as easy as you might think. You must submit three candidates to ensure that at least one will be allowed. We spent hours trying to create the first two possible names. They were both beautiful (i.e., Transtronix Incorporated and Trans America Incorporated). When we realized we needed a third name someone went to the thesaurus and thumbed through the pages and said, "Here is a quaint name—Odetics." We said, "Fine, put it in as a candidate. It will never be allowed anyway."

Well to our surprise the only name accepted was Odetics. Someone said, "What the hell does that mean?" When we went back to the thesaurus we discovered that it was really 'Geodetics' and they were only trying to emphasize the pronunciation. In frustration we said we would accept Odetics, Inc. as our company name. Since it did not have an interpretation, we decided to call it the Goddess of Love! No kidding—this is a true story of how stupid or lucky we were.

Next, we had to find a building that was centrally located to our houses to minimize our drive time. No one wanted or was afraid to sell their houses for fear of failure. The Anaheim/Fullerton area was selected and on the weekends the six of us would pile in one car and drive around the area looking at buildings. We found one close to the Anaheim Stadium that looked acceptable. We located the owner, John Adams, but he replied, "Too late it's already leased." But he had another building at 1845 S. Manchester that we could lease. After looking at the building we all agreed it was perfect. It was 10,000 sq. ft. with a huge 4 foot tall red neon sign that said "ITT CANNON". By rearranging and adding a couple of letters we had a beautiful Odetics sign right on the freeway. The total cost was approximately \$500. We thought we were so clever.

Our new landlord for the next 10 years was a nice guy but very difficult to deal with. Every time we wanted to move a wall, paint, etc., we had to get his permission and of course he wanted to do the work for a fee. At one of our meetings at Jim's house we said our first priority was to hire a very capable secretary. Gordon Schulz said he knew just the right person. Nice looking, mature, types and takes shorthand over 100 words/minute, knows accounting, etc. We all said, "Gordon she sounds perfect; can you get in touch with her?" We will never forget his answer, "Well, no...she died two years ago."

Joel said he knew someone from his previous company named Dorothy Bookout whom he would ask to come in for an interview. When Dorothy arrived for an interview, our total assets were one tall stool and a card table. Upon her arrival we asked her to sit on the stool in one of the office corners while the six of us stood in a semi-circle preparing our questions to ask her. No one could challenge her. She had an answer for everything. It was unanimous to hire Dorothy immediately!

The 12 investor's checks for \$50,000 each finally arrived. I was chosen to deliver the checks to a bank in downtown Los Angeles where we had set up an account. It was late afternoon, there was bad traffic, bad parking, I could not find the bank, and it closed at 2 pm. Arriving at the bank at 2:30 pm, I walked up to the front door hoping it would be open since I was supposed to deliver the checks to the President of the bank. I looked through the window; it was vacant. I quietly knocked on the door, not wanting to attract attention. Someone immediately unlocked the door and invited me in. It was the Bank President who waited alone for a half an hour for me to show up. Message learned...if you have money you can get attention.

For the first month or so, the seven of us would meet at the building and strategize on what needed to be accomplished ASAP. The list was endless:

- Accounting/Payroll system
- Publication/proposal equipment
- Engineering Electronic Equipment
- Prototype machine shop and lab
- Environmental lab
- Manufacturing equipment
- Quality systems
- Etc.

We divided the tasks amongst everyone and went to work. First priorities were for Jim Welch to develop a new digital decoder that did not infringe on anyone's patents and for Gordon Schulz to develop a new reliable tape drive system. When we started the company in 1969, we had six or seven competitors in the space tape recorder field. In late 1969 the aerospace market crashed. By 1970 there were only three competitors left. Were we worried? HELL YES!

With the aerospace crash, there was lots of equipment available at auctions everywhere. At our first auction we purchased Jim Welch a new/used Techtronix 547 oscilloscope, power supplies, oscillators, etc. We loaded it all in Jim's car with the following instructions for him—take it home, make a lab out of his garage, and do not return until he had developed a new digital decoder. A few months later Jim showed up with a big smile and said, "I've got it!" We called it the Welch code. We received a patent and sold many variations of it for 25+ years.

A new transport design was imperative! So we set up an office for Gordon Schulz with drafting equipment, slide rule, books, etc., with the following instructions—"Don't come out until you have conceived a new design that eliminates all of the failure-prone components from the Leach design." Finally Gordon emerged with the comment that he felt he had a superior design approach. We all said, "Great, explain it to us!"

Gordon said, "First, it utilizes three capstans instead of two that were used on the Leach recorder, which would provide greater friction to the tape, minimizing an old problem called tape slippage. We all chuckled and said, "We have never heard of a three capstan design!" And in jest said, "Why not use 4 or 5 capstans?" Gordon who was somewhat frustrated said, "This will really work, let me explain it to you." In admiration of Gordon's innovative skills we said, "OK, explain it." Gordon went into extreme details as usual and the more he explained it the more excited we became. We all finally concluded, by gosh, that might really work! Gordon named it "Delta Drive". We received a solid patent and over 25 years, delivered 400 tape recorders

utilizing some form of "Delta Drives." Without the innovative contributions of Jim Welch and Gordon Schulz there would never have been an Odetics Space Recorder Division.

Realizing that you could not get Sales without proposals, Joel went to one of our business neighbors, Addressograph Multigraph, and purchased an electrostatic copy machine, offset ink press, etc. for approximately \$20,000. With the addition of a few typewriters for Dorothy, we were in business.

Proposals were a very collaborative effort that everyone participated in. Running the offset press was time-consuming and messy. All seven of us wound up with ink-stained hands and clothes as we labored until the wee hours of the morning trying to produce acceptable proposals so Jerry could start his road shows.

One of the high-priority requirements with a new company was to create a catchy business card that our customers would hang on to. A logo that caught your eye and also represented the company products were a necessity. Jerry Muench, head of Sales and Marketing, was asked to create something that was eye catching and memorable. His logo was a reel of magnetic tape with an unrolled length of tape curled in a pattern of a digital binary code that spelled out the number 6 (i.e., the six original founders that started Odetics, Inc.). The final drawing of the tape reel with the trailing coded number six was drawn and finalized by Jerry's father-in-law Arthur Sheffield. This Odetics business card was used at Odetics' inception in 1969 until we went public in 1981. In addition, the logo was also on all letterheads, envelopes, and on the data blocks for all of our Odetics Space tape recorder blueprints. The logo was recognized worldwide for a technically leading innovative company that produced a very high-quality product.

It's a shame it did not meet the stupid Wall Street criteria that would attract investors.



JERRY MUENCH
Sales and Marketing Manager

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For the first nine months we had no sales even though Jerry had visited virtually every potential customer trying to convince them we were for real. A very difficult task since we had virtually no assets and no hardware to demonstrate. We concluded that Jerry was going to have a tough job selling Odetics unless we had at least a transportable prototype to demonstrate.

Gordon insisted he could not produce any hardware without a prototype machine shop. Agreeing, we purchased Gordon a new Harding Lathe for approximately \$5,000. When it finally arrived Gordon was in seventh heaven. Next, we needed a machinist. Some how we located Hans Thalmeyer who was working at Borg Warner. Gordon must have interviewed Hans a half a dozen times before he came up with an approach that he felt comfortable with. Hans would have to work part-time with no pay until Gordon was satisfied that he had the required skill level.

Hans must have had an extreme inner desire to work at Odetics since it took at least 2 months before Gordon hired Hans permanently. With everyone working until midnight everyday, progress on a transportable prototype was very rapid. The first transportable prototype with reels, capstans drive, heads, etc. were mounted on a ¼-inch flat aluminum plate, since we had no casting ability or suppliers. We later learned that Leach had contacted all of their vendors and threatened them with a lawsuit if they did any business with Odetics.

The prototype was soon unveiled in an enclosed clear plastic box (thanks to Brian Randolph) and powered by a short plug-in cable that was filled with batteries (thanks to Steve Bartholet). Jerry Muench was now well-armed to begin his traveling road show. For the next five to ten years Jerry and this transportable prototype in its own special carrying case accumulated an unbelievable amount of airline miles visiting customers worldwide. In order to win contracts you had to work with the customers during the conceptual phase to make sure your design, size, weight, power, etc. were included in their initial design specification that was then put out for bids from everyone.

The general quote from the industry to our competitors was, "Your too late, Muench has already been here." Everyone made tremendous sacrifices in time away from home because of the long hours, but I think Jerry was gone most with his worldwide airlines trips. I hope his wife Jeanne will document her views for all the wives who endured those difficult times. For instance, Gordon living in the San Fernando Valley had the longest commute. He literally wore a car out in one year. Not wanting to or afraid to sell his house, he came up with a very innovative solution. Gordon owned a very nice Gulfstream travel trailer that he parked in the parking lot in the rear of our building. For a number of years Gordon lived and worked out of that trailer only going home to visit his wife and family on occasional weekends. His wife Shirley and family were real troopers!

When we all worked for the Leach Corporation we witnessed many stupid actions by management that we all vowed not to repeat. For instance, the sales manager and the engineer manager argued for one week on whose reserved parking names would be closest to

the front lobby door. The loser would have to walk another 10 feet to the door. As a result of witnessing this extreme waste of time, one of our first policies was that there would be no reserved parking allocated to anyone. The first person to work got the best parking spot.

Joel pushed everyone to create innovative management techniques that would stimulate camaraderie and teamwork in the same manner that was utilized by football coaches. We spent many long hours in the conference room generating and refining our management philosophy that we eventually referred to as the 13 commandments. They were as follows from the employee handbook:

- The way you become the best is to set up a positive environment—positivism breeds success.
- Create an involved-people environment. Assure all associates that their voice is heard. Maintain open, two-way communication with all associates.
- Recognize the added value of people that are in the organization vs. new hires. Promote from within, where qualified. Do not pay new hires more or even the same salary as present associates with the same skill level.
- Maintain an informal “non-status” approach.
- Salary is relative to contribution.
- Promote personal growth, recognizing that personal growth is necessary for both the associate and the company.
- Hire a person for a specific skill, but with a strong emphasis on attitude and potential.
- Don't tolerate mediocre performance—bring about change.
- Acknowledge the importance of every function within the company or eliminate it.
- Try innovative approaches to problem-solving.
- Maintain a dedication to reliability and to technical excellence. Strive to produce a quality product within a specified time frame.
- Demonstrate an attitude of “will do” as well as “can do” in our jobs.
- At Odetics we work hard, but we also play hard.

For 25 years we encouraged everyone to live by these rules. They were very simple and effective. For the first year we worked long hours on proposals, systems equipment, etc. with no contracts. For the six founders, our employment agreement stated that we would receive \$25,000 per year; however, \$10,000 would be withheld to purchase 10 shares of stock over the next five years. It was a significant salary reduction for everyone and their families.

Watching our initial \$600,000 seed money wither away was extremely nerve-racking. We were desperately trying to win our first contract to establish some credibility. Jerry had bid \$25,000 on a small program to General Dynamics in San Diego. We were all upset that Jerry would bid so low knowing that we would lose lots of money. Jerry believed we had to get our first contract even at a loss in order to gain credibility. There were a lot of mixed emotions when General Dynamics called to inform us that we had won the contract. As we were all nervously debating on how to proceed, General Dynamics called us back the following day and told us, sorry but the entire program had been cancelled. Jerry had the win he desired. As he visited more and more customers he could state, 'Odetics has won its first contract.' He never mentioned that it had been cancelled the next day.

In the meantime, we were all frantically setting up systems, laboratories, and procuring equipment as rapidly as possible. Fortunately with the aerospace crash in 1969 there was a lot of equipment available at very reasonable prices. I was given the task of setting up the environmental lab. Why? I don't know since I did not have much experience with vibration systems, helium leak detectors, thermal vac systems, etc. I scanned the papers for sales auctions, etc. The first good opportunity was from Aerojet General in Azusa where they were disposing of their entire environmental lab. I quickly drove to Aerojet and asked to speak to the person in charge of liquidating their lab equipment. His name was Al Speyers. We made friends immediately when I explained that we were starting a new company and I knew very little about the equipment. I explained what we needed and he proceeded to show me everything they had with a complete history of repairs and maintenance. I pointed out the equipment we desired and then to my surprise he told me how much to bid.

Since I was there before all the junk dealers, I was the only bid he had to accept. Al Speyer was key to me acquiring 80% of the equipment required for less than 10% of the original price. When we had completed our dealings I was so humbled that I couldn't thank Al enough. Al said, "Do me one favor." I asked, "What can I could do?" Al said, "Give my son a job." I said, "Sure Al, how old is he and what can he do?" Al said, "He is 21 and he can't do anything." With such honesty I said, "Send him down and we will find something for him to do."

In 25 years of employment Al's son, Rich Speyers was one of our greatest success stories. He started out as a gofer (driving cars to pick up parts) then progressed successfully through a multitude of positions winding up as a contract officer for one of our divisions (ATL). Rich never turned down a request and always produced at 150% effort for any job you asked him to do.

During Jerry's many sales trips he discovered a small contract awarded to Northeastern University in Boston, Massachusetts. It was a very small contract but they fortunately required a low-cost tape recorder with a short delivery time. Jerry bid \$50,000 to design, build, and qualify one recorder. At that time we had approximately 15 employees who proceeded to work 16-hour days a week for the next year.

By then we had the environmental lab up and running and we were able to completely qualify the recorder with no outside support. This included vibration, helium leak verification, and simulated thermo vac at 1×10^{-6} torr; i.e., 300-mile altitude. A major accomplishment since we even made a small profit on the contract. We impressed a young Air Force Lieutenant on the program who rewarded us on a very large contract two years later. Our name was circulating among the industry and our next contract we bid on was to GE in Pennsylvania, a company we had never dealt with in the past. We bid approximately \$395,000 on a cost-plus contract and were pleasantly surprised to receive a phone call inviting us to a pre-negotiating meeting. Jerry and I immediately assembled all the necessary paperwork and flew back to Pennsylvania. After our arrival we were escorted to a conference room. On the way there we went through a corridor that must have been one mile long. I remarked to Jerry, "This is very impressive, but where are all the workers?" The hallway was empty. Later, we learned GE Aerospace was suffering a major decline which probably aided us as a low-cost supplier.

During the negotiations they analyzed, questioned, and debated all aspects of our proposal. We desperately defended our estimates as best as we could. After a couple of days of brow beating us, they had sufficient information and were all going to another room to caucus. While they were out, Jerry and I discussed what their first offer would be. Normally the first offer is always ~10% to 20% below your asking price (i.e., \$395,000 minus 10% or approximately \$350,000).

When they returned they went through their normal spiel (i.e., we have carefully evaluated your proposal and have determined what we consider to be a fair offer for this contract). We (GE) feel your bid was too low in quality assurance; therefore, we are offering you \$400,000—take it or leave it. Jerry and I were in shock! To our knowledge no one was ever offered more than what was bid. We quickly and as gratefully as possible said, "We accept." Back at the airport, waiting for our airplane, drinking Martinis, we called Odetics to inform them of our win.

Nobody believed we received more money than we had bid. By then after two Martinis we said it was because we were great negotiators. Arriving back in California we immediately asked our wives out to dinner to celebrate our victory. At dinner the centerpiece of our celebration was

LIFE IN THE TRENCHES

Before ODEX I was a twinkle in Steve Bartholet's eye, even before there was lunch hour volleyball, there was an Odetics that consisted of little more than a drafting table, six bosses, Dotsy Bookout and Dave Moore.

Dotsy and Dave, the first two Odetics employees (they had yet to experience the great transformation to Associate), are still with the company. (Dotsy warns us not to tout her longevity as she only recently returned to the fold after several years away.)

What was it like to work for a start-up company with six upstart engineers?

Dotsy was hired shortly after Odetics opened its doors in 1969. She remembers her interview with the company's founders.

"They let me sit on their only drafting stool. There was also a card table, a folding chair and a couple of wood crates in the room," she recalls.

And did they fire off a series of tough questions? "All six of them stood around and looked at each other, waiting for someone else to ask the next question," she says.

"Interviewing was new to us," says Joel. "We probably broke every rule in the book for interview questions -- Dotsy was her usual humorous self and put us down the whole time. We took it because we knew we would have the last laugh when we would tell her what the job paid."

Dotsy won the job -- an honor that afforded her some unique working conditions. "When I first started, I worked at a portable electric typewriter that Crandall brought in from home. It was on a rickety card table and every time I pushed the return key, the whole table moved," she says.

Weathering the rough and tumble early days of Odetics was rewarding. After a few more people were hired, the infamous Odetics practical jokes became standard procedure.

"It got to the point where the practical jokes got out of hand," she said. "One time, during the height of the ping-pong craze at Odetics, Carol Ramsey and I squeezed the ping-pong table into Joel's office. Joel and Cran were in the habit of playing every night, and when they couldn't find the

THE FIRST YEAR

table that night, they searched all over the building. When they finally got to Joel's office, they could hardly open the door and had to crawl under the table to get into the office."

For Dave Moore, joining Odetics began as an experiment.



WOULD YOU BUY A USED RECORDER FROM THESE MEN? FROM LEFT, BACK: JIM R., CRAN, JERRY, JIM W. FRONT: GORDON, JOEL.

"I knew the Odetics founders when we all worked at Leach Corp.," he says. "I wanted to try working for a company that was just starting out, just to see what it was like. I decided to join them for nine months. If it looked like they didn't know what they were doing by then, I'd leave."

Like Dotsy's interview, Dave's was also memorable. "We went into Joel's office and the only pieces of furniture he had were a rickety card table, a

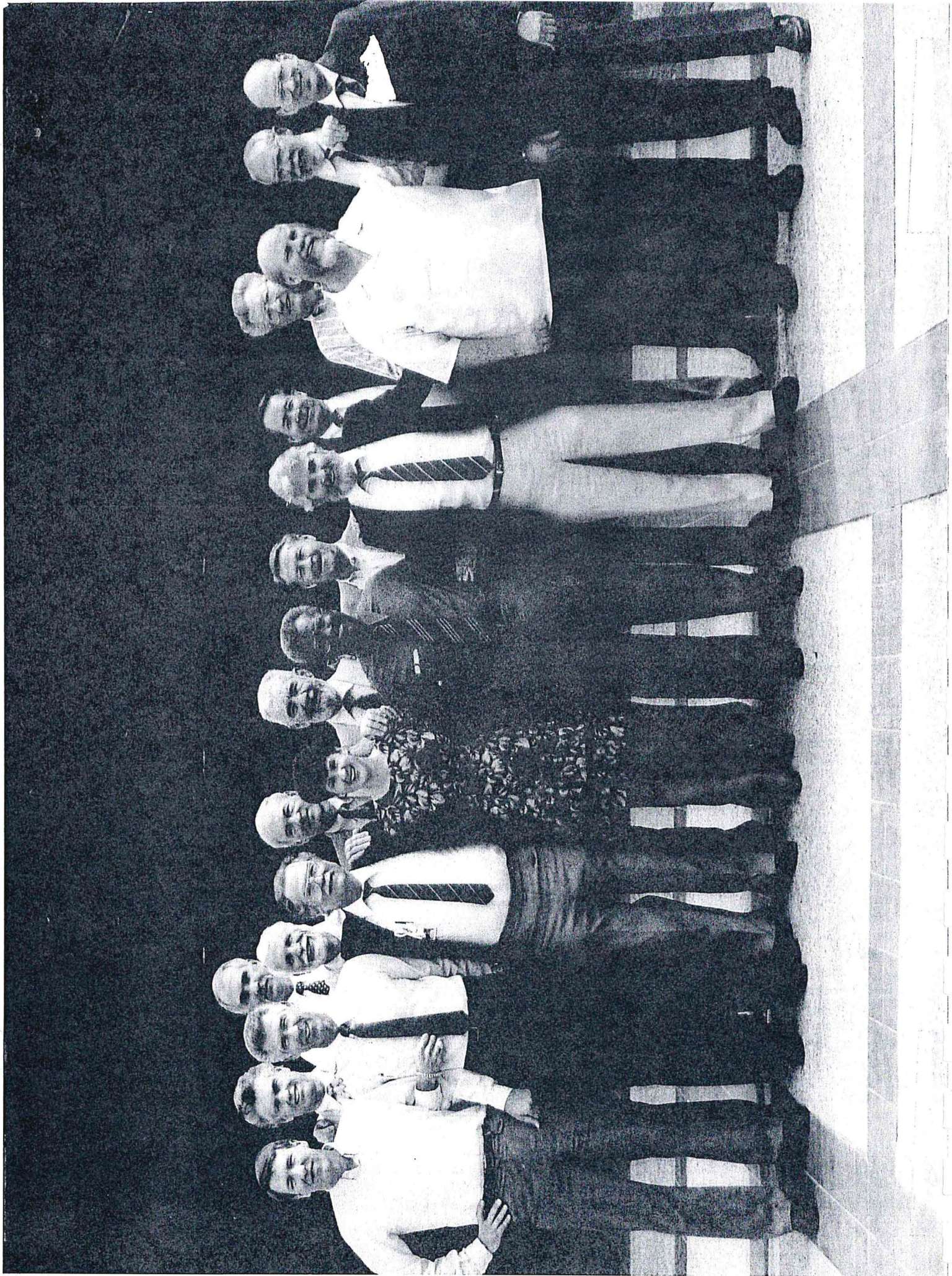
folding chair and a wood crate," he recalled. "Joel offered me the chair or the crate, and I remember thinking that it wasn't much of a choice. Then he started telling me that the company looked great and was really going places."

Many Odetics veterans joined the company during Odetics' big growth year -- 1970. By that time we had our first recorder contract. Marilyn Holden, who started working at Odetics while still in high school, remembers the camaraderie of the early days.

"Everybody did what it took to help the company grow," she said. "When we had to get a proposal out, associates from all departments pitched in to collate or type."

George DeLand was the 28th associate hired. He and Glen Roosevelt, associate number 27, started the Odetics volleyball league. In the early '70s, there was also an athletic league called the Lower Level Lizards and the Upper Echelon Eagles.

"The Eagles were management and the Lizards were everyone else. Joel used to 'promote' people just for the games, and then 'demote' them when the game was over," recalls George. "We played basketball and baseball, and at the end of the competition we awarded a trophy to the winner. Dotsy made the trophy out of a rubber chicken and lizard. When the Eagles won, she put the lizard in the chicken's beak. The next year, when the Lizards won, she stuck the lizard up the chicken's rear."



that we were now in business for good! No more sleepless nights. Soon thereafter we received a call from Boeing asking if we could build a 1 megabit/sec recorder and how much it would cost. We replied, "We don't know, it's never been done before but if we could, it would cost approximately \$180,000 for one recorder." The next day we received a Telex contract saying proceed ASAP. We all gathered together and said, "What do we do now?" We hadn't even agreed that it could be designed. After some heated discussions with Gordon and Jim we all said, "What the hell, let's try."

We completed the contract and delivered the recorder. Boeing launched it and was ecstatic at the results. From then on it was all downhill. Customers were calling us and asking what we could provide for them. One huge customer finally decided we were for real, so they were going to send a team out to survey our facilities and capability. When they arrived, we were up to approximately 30 employees. Their survey team was almost 10 people. Joel cleverly said that we have to look bigger than we are, so as we walked through certain areas we had people working in those areas with colored lab coats on and when they passed that area the workers would run around to the next area and put on a different colored coat. It looked like we had over 100 employees. We thought we were so clever. Some year's later, one of the survey team members said that they knew exactly what we were doing. You could put any colored coat you want on Dave Moore but he would still look like Dave Moore. As everyone knows Dave Moore is a rather portly fellow who tried his best to carryout our plan.

The next significant contract was for Matra, in France. We submitted our proposal which we all thought was very good. Our only competition was a division of RCA located in a converted milk factory in a bad part of New Jersey. As a new entrepreneurial start-up company we had applied and had been waiting two years to gain membership to the exclusive Club 33 at the Disneyland facility. Finally getting accepted was a real coup. It was the only area at Disneyland that served alcohol with lunch and dinner and always requested no photographs of anyone drinking alcohol. The story on how Club 33 started was somewhat bizarre if true. When Walt Disney constructed Disneyland he had 33 main contractors. They complained to Walt that there was no place nearby where they could eat lunch, drink, and entertain their customers or workers. Walt Disney promptly built them a beautiful, hidden dinner area restricted to the original 33 contractors. Suffice to say, he discovered 33 members were not adequate to make a profit so they decided to open the membership to a very restricted list of Orange County companies. The original price was \$100 per card per year. We asked and received 10 cards. Now the price is nearly \$10,000 per card and we have one card shared with another company. The great thing about Club 33 was that we could send all of our employees or customers there, which became a super perk for everyone.

When the French survey team arrived, we arranged a lunch for them at Club 33 with a very attractive French-speaking waitress. They were very impressed and not surprisingly, we won the contract. We completed the contract; the performance was excellent and we won many subsequent contracts with the French. We became very good friends with the French engineers and some year's later one of the original engineers revealed that our first proposal was only so-so but the decision between RCA in New Jersey or Odetics California near Disneyland was a no-brainer. They all voted for Disneyland. Our egos were somewhat deflated but the results were what counted on the bottom line.

As we were growing towards 75 employees we added some very key people. Most notable were Marilyn Holden, a seventeen-year-old secretary fresh out of high school; Tom Bartholet, a brilliant Mechanical Engineer from Rockwell; Dick Vanderpool, head of Quality; Margaret Lamb and Linda Collins who worked for Dick in Inspection and Quality Assurance; Bill Krebs who handled many various positions before replacing me as head of the environmental lab. I will always be thankful to Bill for relieving me of this time-consuming job that always ran until the wee hours of the morning.

As we were growing Joel once remarked that we would never exceed 75 employees since that is a very efficient size. Everyone knows and trusts each other and verbal communication works very well. Above 100 employees you have to resort to more formal memos, procedures, etc. in order to maintain any semblance of control. Well, we rapidly passed 150 employees with 18 contracts, a 50-million-dollar backlog, and found ourselves totally out of control.

We recruited Dick Petit from Leach Corporation as Director of all programs to try to bring order out of chaos. As Dick and I discussed strategy we both recalled our Navy service where each day they posted a plan of the day throughout the ship for everyone's involvement (i.e., today starting at 5 am we will launch 5 squadrons to bomb and strafe Korea or today we will rendezvous with the supply ships to resupply with ammo, bombs, food, etc.).

The idea was that every division knew when they were required to work until your assigned tasks were completed. There were no unionized 8-hour days, 40 hours a week, overtime pay, etc., you just worked until the job was completed; very efficient. Dick's and my reasoning was that if the Navy had a plan of the day that worked well, why couldn't Odetics have a plan of the day that would let everyone know what tasks to concentrate on for that short time period. The plan looked very promising. So with the help of Margaret Lamb and Linda Collins, who had risen

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through the ranks to program managers, the plan evolved into a bonus program that was very effective.

The Odetics Bonus Plan differs from most other incentive plans in that it ties together the work of departments that would seem to be unrelated. As a result, the entire division pulls together to complete a contract milestone. It was not unusual to see quality-control engineers becoming cheerleaders for secretaries or electrical engineers taking a personal interest in the work schedules of machinists. This has also led to improved communication, understanding, and a strong sense of team spirit.

The Bonus Plan was administered by the management of the Government Systems Group. Every 8 weeks marked the beginning of a new bonus period. At the outset of each period, the program managers identified approximately 40 short-term "milestone" tasks. These tasks ranged from completing engineering drawings to finalizing tests of spare recording heads to shipping a critical flight recorder.

Each task was given a deadline for completion. A management committee then assigned a dollar award amount to each task. Critical projects were typically allocated more bonus dollars. The total potential bonus pay-out at the end of each period ranged anywhere from \$25,000 to \$40,000. The milestone list, indicating tasks to be completed and their respective awards, was distributed to all associates and posted in hallways at the beginning of each bonus period.

There were approximately 40 tasks identified each period; therefore, every associate could not directly contribute to completing a bonus task. However, all felt involved because everyone won money if the work was completed on schedule. Besides completion of work, the amount individually earned was also directly related to the associates' attendance. Perfect attendance during the week earns an associate one point, while any time missed other than vacation results in the loss of a point, or a two-point spread. Not surprisingly, the amount of sick time taken was reduced significantly.

At the end of the period, the total bonus dollars earned divided by the total number of points gave the total dollars per point that each associate received. Everyone shared equally other than Management, who were excluded. To maintain the emphasis on high quality, any production unit that passed a rigorous customer acceptance test without a workmanship or design failure added \$1,000 to the bonus pool. Any failure resulted in a \$1,000 decrease.

To keep the Bonus Plan from becoming predictable, there were some tasks for which the dollar amount was hidden. For these jobs, the amount was known only to the administration committee, and the awards were not announced until after the bonus period ended. Some of the original Bonus Plan ground rules were to change certain aspects of the plan to maintain a high level of interest and involvement. Some of the variations included:

- One time the money—over \$25,000—was passed out in cash instead of checks. The cash, in 100 dollar bills, was brought into the meeting by an associate dressed like a Brinks' armed guard with an attaché case chained to his wrist.
- On another occasion, the milestones were placed on a Keno card and named "Kenodetics." Six hundred dollars, in increments of \$300, \$200, and \$100, were awarded to the associates, who at the beginning of the period selected the milestones that would be achieved during the period.

The interest generated was very evident by the questioning of people at all levels on whether a particular milestone would be met on schedule. The real value of the Bonus Plan wasn't the monetary reward; it's the constant reminder that we are all on the same team, working for a common goal.

While the opportunity to earn more bonus money makes the Bonus Plan more exciting, the basic structure of the plan was to enhance camaraderie throughout the divisions. In some cases, a department or a particular associate can't even start on a milestone until another department has completed its identified task. For instance, until engineering drawings are released, parts lists can't be started. That's why associates from diverse corners of the building gave pep talks to each other. In fact, during the bonus period, program managers could often be heard on the company's paging system announcing the completion of a bonus task, followed by a cheer throughout the building.

At the end of each bonus period, the results coincide with a company meeting that often became a celebration. Highs and lows are discussed in a factual, direct manner so that everyone understands how the next period can be improved. The process of recognizing interim milestones required daily involvement of first and second level management due to the high visibility throughout the work force. This was so effective that it was sometimes facetiously referred to as "*Management by Embarrassment.*"

One of the more important products of the Space management team was to create a motivational presentation that would define the Space Division Charter. After many meetings long into the night with a multitude of revisions, we finalized our motivational presentation. It was mandatory for all Space employees to attend the presentation which took about 1 hour with lots of hard hitting questions and comments. Group sizes were approximately 50 people during the lunch hour where Odetics provided a free lunch so it was not too difficult to get all 300 Space employees to attend.

A Corporate worker (name left out intentionally) asked if he could attend one of the meetings. We said, "Sure, why not?" The presentation must have been effective because a few months later he cornered me and said it was one of the best teamwork motivational presentations he had ever attended. We tried to get other divisions to modify the presentation to meet their own divisional requirements to no avail. I think it was very effective in generating a team spirit among the Space employees.

Another motivational technique was to meet periodically with each department and let them vent their spleen on any subject. My favorite recollection was meeting with all of the production assemblers whose main complaint was they wanted a better TV and a new microwave oven in the break room—Needless to say it was done in one day.

I loved to tell the assemblers that everyone in the Company was involved in quality and that if they ran into anything they didn't feel comfortable with (i.e., corroded PC board, bad solder, bad soldering irons or tip, etc.), to inform their supervisor ASAP. If they did not get a satisfactory resolution then they were to call me and I would get it resolved to their satisfaction. No management retribution was guaranteed. I loved to tell the assemblers that every solder joint (up to 10,000/day) was a very important decision for the Company. One bad solder joint that created a space recorder failure cost the Division untold money due to bad publicity. They made thousands of decisions per day—I made four or five per day probably a lot more dollars involved but all equally important.

We continued to grow and mature toward a peak employee count of 300 super people. With only 70,000 square feet available this required very ingenious allocation of space. Many people had to double up in offices but the complaints were very rare. We received a lot of criticism from Corporate and other Division Managers since we rarely fired or laid people off. If an employee had been working for us for one year and was making every effort to succeed we would move them to three or four different positions until we found a position they could succeed in.

After deflecting the criticism many times, we had a manager's meeting to discuss why we were so reluctant to lay people off. We finally concluded that building a successful space tape recorder required in-house training that was not available from other industries or schools (i.e., there was no education curriculum available that would support our specific requirements from the initial design, manufacturing, and test).

One major event during our glory years was a visit from President Bush (#1). It started when Jerry Muench met another successful businessman while attending a business meeting in Long Beach. This gentleman was close friends with the California Governor who was also good friends with President Bush (#1). They had traded a lot of information on how the two companies were started, goals, management, philosophies, etc., which turned out to be extremely important.

President Bush called the California Governor to say he was going to visit California and while he was there he would like to tour a small, successful, high-tech company. The Governor then asked Jerry's new friend whom he would recommend. His friend said, "Why not Odetics in Anaheim?" Joel received a phone call from President Bush's representative asking if Odetics would support a President Bush visit. Joel very quickly said, "Yes, yes, yes!"

The secret service arrived the following week to survey our facilities to determine if there was any area that could hold approximately 400 people and provided adequate security for the President. They quickly ruled out our two largest buildings at 1585 and 1515 S. Manchester because the multistoried Grand Hotel was too close and there was no way to prevent a sniper from using some vantage point in the hotel. Some what disappointed we said we had a small 10,000 sq. foot facility across the freeway near Angel stadium that might be secure enough. After touring the building they exclaimed, "This is perfect!"

In one week the Secret Service had established a secure area, searched the entire building, secured all necessary doors, installed metal detectors, and ran a special phone line to the building. The building had an alley to the rear and a large room with a garage door. Their plan was to have the President's limo drive down the alley through the door and remain in the limo until the door was closed.

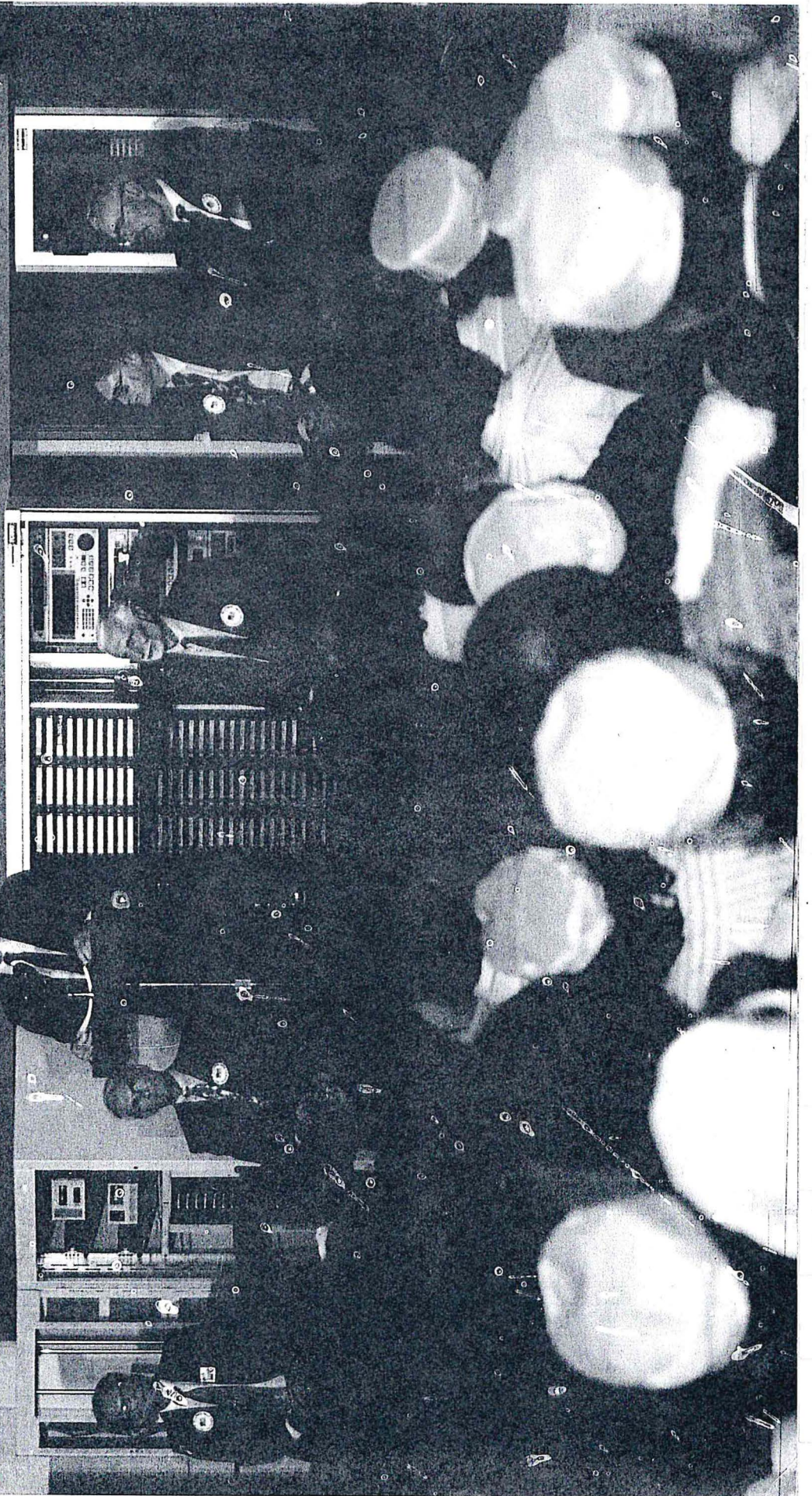
On the day of arrival Joel and I were briefed by a Secret Agent to greet the President in the secure area near the stage and the audience area. The agent told us that when the limo arrived the Secret Service agents will jump out of the limo and quickly scour the area. He told us where



Odetics

Bringing Technology to the World

Anaheim, California



The President of the United States of America

George Bush

V I S I T
T O

Odetics

July 30th 1992



to stand and advised us that when the limo pulls in, do not to make any sudden moves, for our own safety.

Since there was very little auto parking available, we rented buses to transport all employees from our Manchester buildings. The word spread that President Bush was going to visit Odetics, so on that historic day the parking lots started filling up with protestors. No one told them that President Bush was going to another facility. Everyone laughed to watch them protest two nearly vacant buildings.

Odetics' security consisted of Tim Olcott who resided on the facility and one very well trained police dog that would only respond to German commands. As Tim was attending the security briefing meetings with the Secret Service and the Anaheim Police Department, they presented a chart with circles of responsibility. The inner small circle was marked Secret Service; the next larger circle was marked Anaheim Police; a rather large circle was marked Odetics' security with a picture of Tim and his police dog. Underneath the picture were the words...Expendable! Good old Tim took it with great humor.

On the day of President Bush's arrival, all 300 – 400 employees had arrived, gone through the metal detection screening, and were seated in the viewing area with red and white paper hats that had the word 'Attitude' for Odetics' Attitude. It was quite a sight.

Joel and I were in the designated greeting area about 10 minutes early when the limo came roaring through the door and as described the agents jumped out of the car and secured the whole area including us in seconds! The garage door closed and out stepped President Bush. We shook hands and welcomed President Bush to Odetics. Since they were early we had about a 5 minute conversation with the President. I will never forget what a nice personable gentleman he was to talk to. He asked a lot of questions about our business products and how we were doing financially. A truly memorable 5 minutes.

As we walked onto the stage, the audience went crazy waving their hats, clapping their hands, yelling, etc. The Secret Service Agents were visibly nervous. During his speech the audience's response had to excite President Bush, it even excited the Odetics Division Manager's sitting on the stage with President Bush.

After his speech he walked down to the audience area which was roped off. With a Secret Service Agent on each side of him he walked the entire roped off area shaking hands with everyone in the first, second, and sometimes third row of seats. When he reached Margaret

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Earle Walls
 12071 Sunnyside St
 Garden Grove, CA 92840



THE WHITE HOUSE
WASHINGTON

August 27, 1992

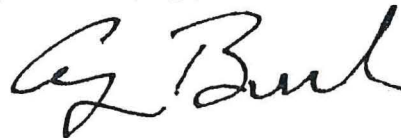
Dear Mr. Schulz:

I was pleased to visit Odetics, Inc. and to have the opportunity to meet the members of your team.

Please extend my appreciation to Joel Stutzky and fellow founders for all that they did to make my visit such a pleasant one. Your gifts of the model robot and the signed SPOT color poster are fine mementos of the occasion.

Best wishes and many thanks, especially to Mrs. Schulz for her warm letter of support.

Sincerely,

A handwritten signature in black ink, appearing to read "G. Bush". The signature is written in a cursive style with a large, prominent "G" and "B".

Mr. Gordon Schulz
President
Odetics, Inc.
1515 South Manchester Avenue
Anaheim, California 92802

Lamb's area she shook his hand and then proceeded to give the President a big bear hug. I'll never forget the expressions on the Secret Service agent's faces. They did not know how to respond. Fortunately they did not overreact for Margaret's sake.

The story we were told later was that as the Bush entourage or parade with motorcycle police front and rear was returning to Los Angeles Airport, President Bush decided he was hungry, so he asked them to drive through a McDonalds where he could order a hamburger. That must have been one surprised McDonalds order taker!

As business continued to grow, some of the very large contracts were untouchable because the Leach Mafia lawyer had warned us not to contact any customers that we had previously contacted while working at Leach Corporation. Our simple interpretation was, we won't contact them but it's OK if they contacted us. There was a large contract called OSO with Hughes Corporation that Jerry had been working while at Leach, so we dutifully did not contact them. The President of Leach did not know this or even take the time to find out, so he requested a meeting with the Hughes Division Manager where he threatened to sue Hughes if they contacted Odetics. In those days Hughes was a rather independent company that did not respond well to threats. After the Leach President had left, he asked one of his managers, "Who in the hell is Odetics? Get them on the phone and request a proposal!" Needless to say we won the contract and there were no lawsuits.

One of our largest and most successful programs was the DMSP (Defense Meteorological Space Program) through Westinghouse in Baltimore, Maryland. While at Leach, we provided an analog recorder to RCA which was only marginally successful. Jim Welch had established a great technical rapport with the top RCA Engineer. The Air Force had decided to convert the total program from analog to digital using the recently developed Westinghouse line scanner.

When the team from RCA, Westinghouse, and the Air Force arrived to discuss the design concepts, we were impressed with a young Air Force Lieutenant named Kevin Daly. The team jelled very well and we were soon under contract to build three prototypes. It was a very complicated multi-speed, six-track serial to parallel design that taxed our Engineering group to the max. After many long days, weeks, months of effort, we finally got the three units working at ambient temperature only. This was a cost-plus contract so money was not a concern. They insisted we deliver the units for system test without completing the temperature tests. A *big* mistake! We then received a fixed price contract for four flight recorders that had to pass all environmental tests including temperature from 0° to 40° centigrade. After many long hours of

work we just could not get the recorder to pass the 0° temperature specification. On a fixed price contract when you exceed the contract value, you have to fund it from your own dollars.

We quickly ran out of money and we were faced with not being able to meet our payroll. We had not met our milestones even though there was still about \$300,000 that was being held until we successfully completed the tests. We had a high-level meeting on how to save the company from bankruptcy. It was decided that I should call the Westinghouse Program Manager and explain our dilemma. I explained our problem and pleaded with him to find a way to pay us early. He promised to see what he could do. In one week we received a check for \$280,000 which saved the company. We will always be grateful to the people who found a way to break through the rules and get us paid. We finally got the recorder to work with a waiver to +5°C.

We then received a contract for 12 more recorders with the same 0°C requirement. The general feeling was, "Let's don't take the contract where we have to bet the Company on meeting the specifications." Jim Welch and I discussed this at length and finally decided what the hell, we can make it work and we accepted the contract. The program was called DMSP which mapped the entire weather on the earth every 24 hours. This was a very critical Air Force program and recorder performance was mission critical (i.e., no recorder—no program). The recorder performance got better and better until five-years orbital performance was considered the norm.

I was invited to attend one of their annual Air Force contractor dinners in Anaheim where they unmercifully roasted the Westinghouse Program Managers in reference to the performance of their optical sensor and the Odetics tape recorders. I was feeling poorly about the tone of the meeting but as I was leaving, the Lt. Colonel in charge of the total program caught up with me and put his arm around my shoulders and said, "This was all in fun—without the Odetics tape recorders this program would have been a failure!" I went home feeling pretty damn proud of the whole Company.

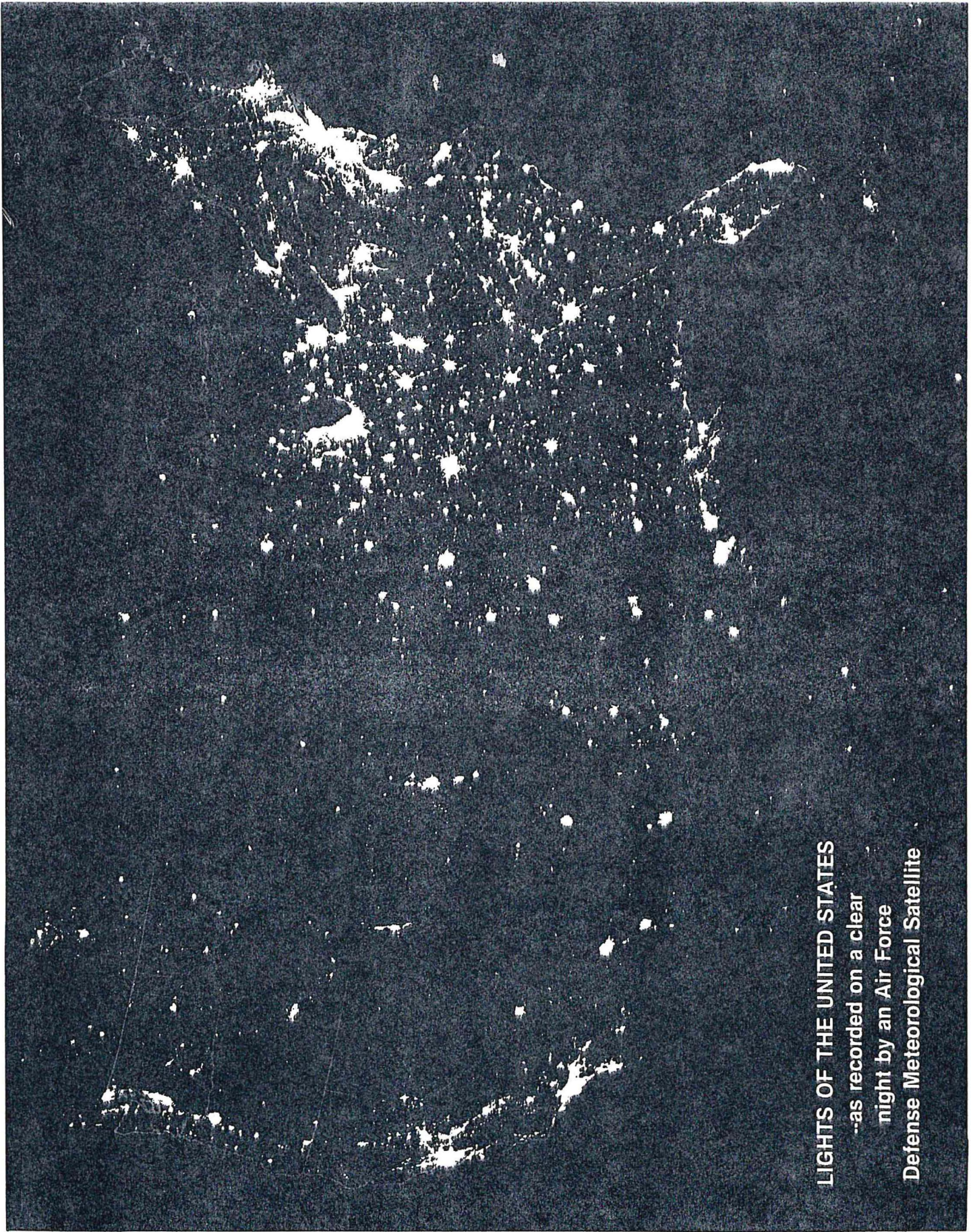
We eventually built 80 recorders over a 20 year period for a contract value of approximately \$100 million dollars. Even though we were performing very profitably on our government contracts, there were periods when our Engineering team had idle time. Strategically we wanted about a 50/50 split between government and commercial work so we created some development programs that we felt could lead towards other business ventures.

One of the first was to modify a Japanese video recorder into a slow-speed time-lapse recorder for security and a multitude of other applications. The goal was to modify the recorder where a one hour video tape could run for 24 hours, much like slow-speed photography. We purchased

a Japanese VHS recorder and Jim and Gordon's teams attempted the required modifications. At that time the PC motors and servos were not very state-of-the-art. The slow tape speeds required were not sufficiently stable to produce the picture quality required. After many frustrating weeks of effort by Jim and Gordon, I asked Jim why he shouldn't try an incremental motor. Jim just smiled and said "Don't worry, I will make this work." Some weeks later with no acceptable progress I continued to pester Jim to at least try an incremental motor. Finally Jim, tired of my nagging said, "OK, Ok I will try one." Lo and behold the incremental motor worked perfectly! It was so good we installed a manual switch where you could record one frame at a time by just pushing a single button (i.e., the speed ratios we could obtain were infinite). An unbelievable breakthrough! Our first production was a multiple-speed versatile thing of beauty. Unfortunately it was so over-designed that at a profitable price it had to retail for about \$4,000.

Not being too astute about the market we felt that our customers would pay any price to get such a terrific product. We sold a few but surprise, surprise one of the first customers was Shebaden of Japan, the very VHS recorder we had selected to modify. We were sure they would copy any recorder we sold them. We debated how to protect ourselves with a license or a patent, etc. but since patents were very expensive and incremental motors had been utilized on linear recorders before, a patent would be difficult to obtain. Probably one of the dumbest decisions we ever made. We finally sold one recorder to Shebaden and it only took them six months to reverse-engineer it. They started selling a simplified, lower-cost machine in the U.S. which everyone was willing to pay for. We were trying to get our act together with our new GYYR division run by Dave Lewis and Gene Farole. They redesigned a lower-cost recorder with incremental motors that ultimately sold in the thousands worldwide. Japan manufactured over 10 million incremental time-lapse recorders before they were able to replace them with stable cheaper DC motors. A small royalty on each recorder would have made everyone working for Odetics very rich!

During the many years working on the DMSP Westinghouse contract, our main interface was with an engineer named Jake Beser. He had a very unique personality, gruff, tough, and right-to-the-point Jake. After some extremely bad encounters, getting to know Jake was a real pleasure. It was a surprise when he informed us that he was the only person who flew on both atomic bomb raids of Japan on the Enola Gay and Bock's Car. This led to many interesting discussions on his philosophies, memories, and regrets. I asked Jake if he or the Enola Gay crew had any sleepless night or nightmares over the many people who died at Hiroshima. His answer was (Jake was Jewish) he only wished he could have dropped one on Germany.



LIGHTS OF THE UNITED STATES
--as recorded on a clear
night by an Air Force
Defense Meteorological Satellite

SPACEBORNE/OMUTEC FIRST NAME PHONE LIST

SEPTEMBER 1986

ABE SHREINER.....	2305	DENIS JOSEPH.....	4111	JOHN GLUTH.....	4121	PAUL FOSS.....	2305	ASSEMBLY.....	2309
A. C. WANG.....	4110	DENNIS BARR.....	2305	JOHN GOERGER.....	2218	PAUL ROTH.....	4113	BEARING LAB.....	2229
ADELINE ANDREAS.....	4118	DENNIS HICKMAN.....	2242	JOHN HOLTHE.....	2208	PEGGY TRIPODO.....	2400/01	CLEAN ROOM.....	2232
ALICE BACKUS.....	2101	DIANE POLLOCK.....	2237	JOHN MCCOLLUM.....	2225	PENNY WARD.....	2229	CONFERENCE ROOM.....	2900
ANGIE TOELLE.....	4118	DIANE RANGEL.....	4115	JOHN NYMAN.....	2203	PETE PIKULIN.....	2223	DOCUMENTATION.....	2400/01/1
ANN WRIGHT.....	2309	DICK VANDERPOOL.....	2008	JON HALES.....	2209	PHIL BLOOT.....	2306	DRAFTING.....	2226
BARBARA ZOELLNER.....	pg.84	DING DANG.....	2242	JUANITA STAMM.....	4118	PHYLLIS MORALES.....	2309	ENGINEERING CONF. ROOM.....	2205
BECKY BURR.....	2017	DOI NGUYEN.....	2305	JUDY ANDERSON.....	2309	RALPH GONZALES.....	2305	ENVIRONMENTAL LAB.....	2328
BETTY KICK.....	2112	DOLORES MAAS.....	2309	JUDY KUENTZ.....	2235	RANDY HEYDON.....	2229	LUNCH ROOM.....	2246
BILL GERO.....	2233	DOLORES MONTANEZ.....	4210	KAREN DEAKIN.....	2316	RAQUEL BRAVO.....	4118	MACHINE SHOP.....	2242
BILL KREBS.....	2328/25	DON NELSON.....	2027	KAREN MCDUFF.....	2150	REESE BUCHER.....	2305	ORIENTATION ROOM.....	2902
BILL PEARSON.....	2230	DON ROBINSON.....	2242	KARIN ANDERSON.....	2301	RICH ANDERSON.....	2019	TEST DEPARTMENT.....	2305
BILL ROBELLO.....	4126	DON VAN SHOELANDT.....	2245/44	KEITH BRUSH.....	2037	RICHARD RINESS.....	2209	TEST FIXTURES.....	2301
BOB ASHER.....	4950	DOTTIE PETERSEN.....	4118	KEITH MEADE.....	2245	RICK ZENDER.....	2308	WAR ROOM.....	2902
BOB HEATH.....	2231	DUC LE.....	4118	KEN KIRKLAND.....	2242	ROBERTA ANDERSON.....	2236	WORK IN-PROCESS.....	2319
BOB LINDNER.....	2202	DUDLEY HALL.....	2023	KEN LONDOT.....	2224	RON EKSTEIN.....	2036		
BOB LLOYD.....	2305	EARL WALLS.....	2224	KIM BUCKLEY.....	2309	RON GARRISON.....	2243	SPACEBORNE PAGE.....	82
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BOB MIDLING.....	2208	ED NEMEC.....	2305	KIRK EMERT.....	2227	ROSA DARKE.....	4119		
BOB PARKER.....	2305	ED ROJAS.....	4119	KUNIO MAEDA.....	4104	ROY CHACON.....	4121	BLOCK HOUSE	6622
BOB SHELLEY.....	2224	ED STEPHENS.....	2214	KURT JEIKOWSKI.....	2228	RUSS MARSHALL.....	2025		
BOB TRIPP.....	2032	ELLIE MANHART.....	2309	LADONNA HUGHES.....	2400/01	RUTHIE STRONG.....	2323		
BRENDA ADAMS.....	2309	ELMO NORTH.....	4105	LANCE DOYLE.....	2207	SAM RO.....	2210		
BRIAN GRANT.....	4117	EMMA HAYNES.....	2315	LARRY GONZALES.....	4004	SANDRA BERG.....	4117		
BRIAN RANDOLPH.....	2244	EVA FERGODA.....	4901	LARRY EGGEMAN.....	2016	SANDY HAINES.....	2301		
BRUCE MARTIN.....	2327	FRANK REID.....	4108	LARIE CLOSSON.....	2329	SANDY JOHNSTON.....	4120		
CARLEN ASHLEY.....	2309	FRANK ROOKS.....	2205	LES HORVATH.....	2219	SHANNON DOEBEREINER.....	2309		
CARLOS MARTIN.....	2226	FRED MCSWAIN.....	2231	LESLIE HOUDEK.....	2301	SHEP PETERSON.....	2020		
CARMEN GLUTH.....	4118	FRED SAUSELE.....	4119	LEONARD TAPIA.....	4121	SHERRY CASE.....	2240		
CARMEN KLEVE.....	2310	FRED YOUNG.....	2029	LILLIAN URBANEK.....	2309	STAN TOMLINSON.....	4902		
CAROLE CATTILINI.....	pg.84	GARY BERRIOS.....	2204	LINDA COLLINS.....	2238	STEVE BAILLARGEON.....	2209		
CAROL NICHOLS.....	4118	GEORGE COONTZ.....	2305	LIZ NEWHAM.....	4550	STEVE CUTTS.....	2242		
CATHY DUGAN.....	2024	GEORGE DELAND.....	4116	LOUISE CLIFF.....	2151	STEVE DUNCAN.....	2305		
CATHY O'BRIEN.....	2504	GLEN ROOSEVELT.....	2004	LYNDA ATWELL.....	4119	STEVE PEREZ.....	2242		
CHERYL SOULE.....	2309	GLENN GAN.....	2108	LYNN ANDREAS.....	4118	STEVE PORTER.....	Pg.82		
CHRIS ANFINSEN.....	2209	GORDON SCHULZ.....	2030	MARIE LOPICCOLO.....	4500	SUSAN RAMSEY.....	2112		
CHRIS CAIN.....	4126	HAI DINH.....	2206	MARGARET KELLY.....	2506	SUSAN WALKER.....	2301		
CHUCK HAMILTON.....	2026	HELEN LOPEZ.....	4118	MARGARET LAMB.....	4002	TAM TRAN.....	4118		
CLAUDETTE OVERBY.....	2111	HELEN TOELLE.....	4118	MARGE GILLETTE.....	2327	TERRI SIMMONS.....	4120		
CLYDE ASATO.....	2305	HENRY MORALES.....	pg.84	MARGEY COLGAN.....	2028	THELMA DAWSON.....	2105		
CRAIG KAWAHARA.....	4109	HIROSHI SUZUKI.....	2201	MARGIE DUNCAN.....	2309	THERESA JAENISCH.....	4118		
CRANDALL GUDMUNDSON.....	2000	HOWARD INTEMANN.....	2211	MARY BOURKE.....	4118	THI DO.....	2210		
DAN MUIR.....	2245	INNA LOKSHIN.....	4114	MARILYN HOLDEN.....	2050	TIEN TRAN.....	4118		
DAN THOMAS.....	2006	IRMA GARCIA.....	2226	MARK MILLER.....	4119	TIM HICKOX.....	2231		
DARLENE WYLAND.....	4004	JACK HOJO.....	2305	MARTHA KUCIK.....	2318	TODD KRETER.....	4112		
DARYL CAMP.....	pg.84	JACK JOHNSON.....	2010	MARY LUNDERGAN.....	2327	TOM SMITH.....	2207		
DAVE BEITER.....	2304	JANICE WANN.....	2226	MARY SUMMERS.....	2310	TONY GREEN.....	4124		
DAVE BOYE.....	2215	JAY HENRY.....	2317	MAYNOR RODRIQUEZ.....	2322	TONY MONROY.....	2226		
DAVE DUFF.....	2305	JEANNIE SIDES.....	2327	MEL LIUFU.....	2305	TRACY HEIDEN.....	2503		
DAVE GREINER.....	2109	JENNIFER CHUN.....	4118	MICHAEL NIESEN.....	2301	TRICIA STAFFIERY.....	2039		
DAVE HOFF.....	2018	JERRY JIROVEC.....	2249	MIKE MORALES.....	Pg.84	VICTOR CROUCH.....	2226		
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DAVE ROSE.....	2905	JERRY NUTTER.....	2220	MINERVA ALMANZA.....	2247/48	VICTOR LEVOIT.....	2305		
DAVE TILLMAN.....	2326	JILL LOFTON.....	2226	MITZI MOORE.....	2301	VIET TA.....	2209		
DAVID MUHONEN.....	2022	JIM BAILEY.....	4101	MUSHTAQ FAROOQUI.....	2231	VIRGINIA HERNANDEZ.....	4118		
DAVID SCHEEL.....	2302	JIM BEAVER.....	4102	NICK COLLICA.....	pg.82	WES MILLER.....	2325/28		
DEAN VU.....	2245	JIM MOORE.....	2222	NICK VALEK.....	4116	WHITNEY ALDEN.....	2502		
DEBBIE FROST.....	0/2550	JIM SHIVELY.....	2153	NORM ENEM.....	4121	WIL LUGO.....	2035		
DEBBIE GREENWOOD.....	4901	JIM WARD.....	2224	OSCAR BARRAGAN.....	4126				
DEBRA BREWER.....	4117	JIM WELCH.....	2012	PASCUAL GUILLEN.....	pg.82				
DEBRA EGGEMAN.....	4120	JOANN HOFERITZA.....	2500	PAT ROJAS.....	4118				
DENNESE KLAMBERG.....	2501	JOE RAMIREZ.....	2225						
		JOHN GARMON.....	2033						

Earl E. Walls
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323-6175

During one of my early contract negotiations with Jake, it was heating up to an explosion. He wanted a 10% price cut and I refused to move citing past losses. I could tell it was getting to the point where he was going to terminate negotiations (i.e., walkout). I told Jake I had to go to the restroom and I would be right back. I quickly cornered Joel and informed him about what was going on and asked Joel to stand in the lobby to intercept Jake as he was leaving.

After re-entering the conference room and a few more minutes of heated negotiations sure enough Jake stood up, closed his notebook, and said he was leaving. As Joel met him in the lobby he could tell that Jake was upset (red faced, swearing, etc.). Joel said, "Jake, Jake, what's wrong? Things can't be that bad." After a few minutes of Jake making a few expletive remarks (i.e., stubborn stupid Crandall) he calmed down and returned to the conference room. We eventually reached an agreement that we both felt comfortable with and from then on we became very close friends. This was one of the few times Joel and I cooperated successfully.

A few years later during one of his visits, my wife (JoAnn) and I took Jake and his wife (Sylvia) for a weekend on our boat Blue Max to Catalina Island. It was a very enjoyable weekend but one event happened that I will never forget. As Jake and I were walking around the docks, we both looked pretty salty, with beards, Levis, sailor hats, etc. A photographer stopped us and asked if he could take our picture. Being ever cautious and suspicious, I asked him "Why?" He said that we looked like a couple of local Catalina bums and he wanted to capture the spirit of the island. Jake and I said, "OK." We stood there on the pier with our arms around each others shoulders as he took the picture. When he thanked us I told him that he had just photographed a very famous guy, and that some day that picture could be worth a lot of money. I would pay a \$1,000 to get a copy of that picture today.

During the early years, the Space Shuttle was under development and they required three onboard data storage recorders per spacecraft (i.e., a very large contract). NASA Houston was in charge of the Shuttle development which had lots of money while NASA Goddard, who was considered the recorder experts, wanted to develop a standard recorder for many various applications but had no money. Goddard convinced Houston that they should cooperate and develop one recorder for both applications with Goddard in charge, which would save the government lots of money.

We had submitted two very different proposals to both agencies based upon very different specifications. We were requested to bring our Engineering team back to Goddard ASAP to see if we could resolve the differentiations. Jim Welch, Gordon Schulz, Dick Petit, Len Welsch and I quickly asked Marilyn Holden to make reservations in Maryland near NASA Goddard.

There was a big basketball tournament at the University of Maryland in progress so there were no rooms available until the second night after the tournament ended. Marilyn finally found us a nondescript motel for the first night that was reasonably close. When we finally found the motel (near the University of Maryland) it looked like a converted prison. It had a small guardhouse in the front enclosed in protective wire and rows of small separate bungalows in the rear. When we walked up to the window and said we had reservations for the night the clerk's question was a classic. He asked if we were going to stay all night. We said "Of course we are—we're not from the University." When we got to the rooms the beds were dirty, unmade, no towels, and no hot water. A complaint to the guardhouse resulted in only—if you don't like it, go somewhere else.

Arriving at NASA Goddard the next morning, feeling a little seedy after a dirty bed and a cold shower, we were escorted to a high conference room filled with about 50 people. As we sat down in the front facing all of the people, the first thing we were told by the lady chairperson was no smoking allowed in the conference room. With that great start we were asked a multitude of questions about our two proposals. It soon became clear that there was a Goddard group and a Houston group who totally disagreed with each other. Houston wanted a one-box approach to simplify installation and removal. Goddard wanted a two-box approach separating the electronics and tape transport so they could be intermixed for added flexibility. After witnessing this rather heated debate we returned to our hotel room (now a nice Holiday Inn) to ponder our problem—Houston had the money and Goddard had the technical expertise. How do we get them to agree?

We all met in one room to brainstorm a solution. After an hour of debate and consternation, Gordon said, "I have an idea! Why don't we build the recorder and electronics in two separate boxes to satisfy Goddard and then bolt them together as one box to satisfy Houston?" We all laughed and said "That will never fly, it's too simple." Gordon as usual said "Let me show you." He grabbed a piece of hotel paper and sketched his proposed solution. After reviewing his drawing, we all said that this might sell. The next morning after a goodnight's sleep and a hot shower, we took the sketch with us to show the two disagreeing groups. Surprisingly the two groups agreed. We signed the contract and returned to California feeling like the matador who had just killed two bulls.

Unfortunately Goddard thinking that they were the technical gurus in the world, thought Gordon's delta drive was too complicated and mandated that we use their design approach which was one capstan with two tape wraps. Gordon was very opposed to the approach but we convinced him for this kind of dollars on a cost plus contract, why not try to make it work.

Surprise, surprise, two years later, well over the proposed cost, we had one prototype built but no matter what we tried it would not track tape properly. Our relationship with the Goddard technical people was getting very testy—they even accused us of deliberately not wanting it to work. Houston was also upset watching their money disappear. Finally Houston in desperation sent out one of their technical troubleshooters—we called him the mad Arabian.

Don A. from NASA was known for his no nonsense, cost effective, creative solutions to any kind of a problem. When he appeared in our lobby professing to have the power of God we were somewhat dubious. We all gathered in the conference room to explain our tape tracking problem with the Goddard imposed one-capstan design. Gordon had explained in minute detail the problems encountered and all of the solutions attempted in vain. Don quickly sized up the problem and said, "OK Gordon, what do you recommend we do?" Gordon seized the opportunity and said, "If we could replace the single capstan drive with a delta drive, the problem would be solved. Gordon proceeded to bring out detailed drawings, sketches, performance data, etc. I thought to myself—Gordon sure looked well prepared for this meeting. Don must have realized this also and quickly made a decision—Ok, do it!" We were flabbergasted knowing all of the technical gurus from Goddard would excommunicate Odetics forever. Since we were in a technical and cost quandary, we decided to follow Don's direction regardless of the consequences. In six weeks Gordon had his prototype with a delta drive working A-OK. Some people from Goddard still think Gordon did this deliberately. Regardless, the progress quickly got back on track and we delivered all of the recorders albeit not without many long hours and numerous crises.

When they were ready to launch the first Shuttle Columbia, Jerry Muench and I were honored to be invited to the launch. Since money was tight we didn't decide to go until the last minute. Marilyn could only find us a room at a porno motel near Cape Canaveral. Not being too picky we checked into the porno motel and went to our rather plain Jane room and found it rather difficult to sleep with all of the entertainment.

Very early the next morning, we boarded a NASA bus and were transported to a viewing sight very close to the launch area. The crowds were enormous for this first historical flight. The viewers were all excited and tense as the count down proceeded down to the last few minutes. Everyone was disappointed when the count was halted due to a technical problem. After about an hour they announced the launch was scrubbed but they would make another launch attempt the next day. While being bussed back to our porno motel we debated whether to stay one more day since the probability of launch was extremely low.



We finally said, "What the hell, we are 3,000 miles from home but let's go check in at the Holiday Inn." As we were checking in at the Holiday Inn everyone was checking out thinking there was no way NASA could turn the launch around in one day. After receiving a room and keys, an announcement came over the radio that NASA would indeed attempt to launch the next day. Everyone immediately ran back to the check in counter trying to get their rooms back—to no avail. We smugly told them that we knew of a rather bazaar porno motel at a very reasonable price.

This time everything went off right on schedule—views of the launch were absolutely awesome! The noise was deafening, the smoke and steam resembled a volcano. As the shuttle climbed, it seemed to bend or turn right over our heads and I commented to Jerry that it looks like they're in trouble. It turns out that was a normal maneuver but no one informed us. Very, very exciting!

Some launches later they discovered if the wind was blowing toward this close viewing site the toxic gasses could kill many people before they could be evacuated. From then on that site was moved to a much more distant viewing area. From then on the launches became so routine the TV channels would not even cover them. We had a satellite dish installed at GYYR so it was simple for us to pick up the NASA channel and distribute it to all of the TV's in the Space building.

When there was a Shuttle launch most of the Space people would make sure they were at work where we would announce the launch time and allow everyone time to view the launches on the NASA TV channel. During the 25th or 26th Challenger launch everything seemed routine until they announced throttle up at 50 to 60 thousand feet. When the Shuttle exploded everyone was in shock and disbelief. Watching a plume of smoke, we all looked for the shuttle to reappear and make a safe landing back at the Cape. After a few minutes we all realized that there was no more Shuttle Challenger. From then on it got very exciting as newspapers and TV stations called inquiring what equipment we had on board and what was its function.

NASA immediately ordered all subcontractors to say nothing without NASA approval. Over the next two to three months NASA searched and retrieved all the debris that could be located from the ocean surface and seabed. They finally announced they had located the cabin which contained the astronaut's remains and five Odetics tape recorders that could provide data on what went wrong. After raising the cabin they removed the tape recorders and placed them in large barrel of sea water and moved them to a secret location in the south. We received a phone call from NASA asking if we would send a team of Engineers and Technicians to assist in retrieving the tapes from the very severely damaged recorders. Gordon Schulz led a five-

ABE SHREINER.....	2305	DARLENE WYLAND.....	2151	EMMA MARTIN.....	2315	JON HALES.....	2209	MIKE ANDREAS.....	4119	TERRI SIMMONS.....	4120
A.C. WANG.....	4112	DARYL CAMP.....	PG84	ERIC THALLMAYER.....	2670	JUAN JIMENEZ.....	4118	MIKE MORALES.....	PG84	THELMA DAWSON.....	2150
ALAIN BIONDI.....	4116	DAVE BEITER.....	2308	FRANCINE LOPICCOLO.....	4800	JUDY KUENZ.....	2235	MIKE STACKER.....	2239	THI DO.....	2305
ALEX LESSIG.....	2223	DAVE BOYE.....	2215	FRANK ROOKS.....	2205	KAREN MCDUFF.....	2150	MUCHTAQ FARCOQUI.....	2227	TIM HICKOX.....	2231
ALICE BACKUS.....	2101	DAVE DUFF.....	2305	FRANK WERNETT.....	4110	KAREN REYNOLDS.....	2316	NICK COLLIKA.....	PG82	TODD KRETER.....	4102
ANGIE TOELLE.....	4418	DAVE HOFF.....	2018	FRED MCSWAIN.....	2233	KAREN SHIMER.....	4118	NICK VALEK.....	2212	TOM FORD.....	PG82
ANN MARIE CHISMAN.....	2309	DAVE MOORE.....	2211	FRED SAUSELE.....	4123	KARIN ANDERSON.....	2301	NORM ENEIM.....	4121	TOM SMITH.....	2032
ANN WRIGHT.....	2309	DAVE ROSE.....	2305	FRED YOUNG.....	4400	KEITH MEADE.....	2245	OK KIM.....	4118	TONY GREEN.....	4124
BARBARA ZOELLNER.....	4120	DAVE SHIFFLETT.....	2245	GARY BERRIOS.....	2204	KELVIN HASSELER.....	2850	OPAL MORGAN.....	2024	TRICIA STAFFLERY.....	2104
BECKY BURR.....	2029	DAVE TILLMAN.....	2229	GENE ZIMMERMAN.....	2851	KEN KIRKLAND.....	2242	FAT HATLER.....	2309	VERNICE GRACE.....	2309
BETTY CRAMER.....	2309	DAVE WILSON.....	2225	GEORGE COONTZ.....	2305	KENT GARDNER.....	2211	FAT ROJAS.....	4118	VICTOR CEPHUS.....	2226
BETTY DEAVER.....	2112	DAVID BERGE.....	2225	GEORGE DELAND.....	4117	KIM BUCKLEY.....	2309	PAUL FOSS.....	2305	VICTOR CROUCH.....	2226
BILL KREBS.....	2325	DAVID SCHEEL.....	2302	GLEN ROOSEVELT.....	2004	KIM JOHNSON.....	PG84	PAUL VU.....	4115	VICTOR LEVOIT.....	2305
BILL PEARSON.....	2230	DEAN VU.....	2245	GORDON SCHULZ.....	2030	KIM SALLSBURY.....	4901	PENNY WEST.....	2226	VIRGINIA HERNANDEZ.....	2309
BOB ASHER.....	4902	DEBBIE BLISS.....	2502	GREG HORN.....	2760	KIRK EMERT.....	2227	PHIL BLOOT.....	2017	VIRGINIA TINOCO.....	PG84
BOB BERNAY.....	2236	DEBBIE BIGLER.....	2218	GUADALUPE MARTINEZ.....	4118	KUNIO MAEDA.....	4104	PHYLLIS MORALES.....	2309	WES WILLER.....	2328
BOB GOUGH.....	2312	DEBBIE RECO.....	2309	HAI DINH.....	2206	KURT JEIKOWSKI.....	2228	RALEPH GONZALES.....	2305	WIL LUGO.....	2216
BOB LLOYD.....	2305	DEBRA EGGEMAN.....	3251	HAL TUBB.....	4440	LADONNA HUGHES.....	2024	RAMON PADILLA.....	4119		
BOB MCRAE.....	2038	DEIDRE BOOK.....	3251	HELEN LOPEZ.....	4118	LARRY GONZALES.....	4004	RANDY BEADLE.....	2305	IN-HOUSE CUSTOMER REPS.	
BOB MIDDLING.....	2208	DELORES MASS.....	2309	HENRY MORALES.....	PG84	LARRY EGGEMAN.....	2016	RANDY CASTILLO.....	2326		
BOB PARKER.....	2305	DENIS JOSEPH.....	4111	HIROSHI SUZUKI.....	2201	LARRY EGEMAN.....	2016	RANDY HEYDON.....	2231	ED WAYSON.....	2955
BRENDA ADAMS.....	4901	DENNIS HICKMAN.....	2243	INNA LOKSHIN.....	4114	LARRY EGEMAN.....	2016	RAY ANDRASIK.....	2226	GERARD BENIGNI.....	2954
BRIAN GRANT.....	4109	DHYANA FITZGERALD.....	2750	JACK CLINKENBEARD.....	4107	LARRY EGEMAN.....	2016	RAY FUENTES.....	2400	HERB PATNAUDE.....	2950
BRIAN RANDOLPH.....	2244	DIANE BRANNIGAN.....	PG82	JACK HOJO.....	2305	LARRY EGEMAN.....	2016	REESE BUCHER.....	2224	JOHN BOONE.....	2956
BRUCE MARTIN.....	2327	DIANE POLLOCK.....	2237	JACK JOHNSON.....	4300	LARRY EGEMAN.....	2016	RICH ANDERSON.....	2019		
BRUCE SANDOVAL.....	2020	DICK BOVITZ.....	2765	JANET SCHOEN.....	2309	LARRY EGEMAN.....	2016	RICH MITCHELL.....	4119	ASSEMBLY.....	2309
BUD WESTENBERGER.....	2209	DICK VANDERPOOL.....	2008	JANICE WANN.....	2226	LARRY EGEMAN.....	2016	RICHARD RINESS.....	2209	BOND ROOM.....	2323
CARLOS DURAN.....	2226	DOI NGUYEN.....	2305	JAY HENRY.....	PG82	LARRY EGEMAN.....	2016	RICK ZENDER.....	2213	CLEAN ROOM.....	2232
CARLOS MARTIN.....	2226	DON NELSON.....	2027	JEFF STECK.....	2039	LARRY EGEMAN.....	2016	ROB GOMES.....	2226	CONFERENCE ROOM.....	2900
CAROL NICHOLS.....	4118	DON ROBINSON.....	2242	JENNIFER CHUN.....	4118	LARRY EGEMAN.....	2016	ROBERTA ANDERSON.....	2236	DOCUMENTATION.....	2400
CAROLE BALES.....	2309	DON VAN SHOELANDT.....	2244	JENNIFER SONG.....	4118	LARRY EGEMAN.....	2016	RON ERSTEIN.....	2306	DRAFTING.....	2226
CHERYLE SOULE.....	2309	DORON BATAN.....	4600	JERRY DOBUCKI.....	4121	LARRY EGEMAN.....	2016	ROSA DARKE.....	4127	ENG. CONF. ROOM.....	2905
CHRIS ANFINSEN.....	2305	DORIS MILLER.....	2550	JERRY JIROVEC.....	2249	LARRY EGEMAN.....	2016	ROY CHACON.....	4121	ENVIRONMENT LAB.....	2328
CHRIS CAIN.....	4126	DOTTIE PETERSEN.....	4118	JERRY MUENCH.....	2002	LARRY EGEMAN.....	2016	RUSS MARSHALL.....	2025	LUNCH ROOM.....	2246
CHRIS STAFFLERY.....	2234	DRU RICHARDSON.....	2151	JERRY NUTTER.....	2220	LARRY EGEMAN.....	2016	SAM HARRIS.....	2108	ORIENTATION ROOM.....	2902
CHUCK HAMILTON.....	2026	DUC LE.....	4118	JIM MOORE.....	2222	LARRY EGEMAN.....	2016	SANDRA BERG.....	4117	SMR ROOM.....	2300
CLAUDETTE OVERBY.....	2111	DUDLEY HALL.....	2023	JIM WARD.....	2224	LARRY EGEMAN.....	2016	SANDY JOHNSTON.....	2327	TEST DEPARTMENT.....	2305
CLYDE ALLEN.....	2221	EARL WALLS.....	2224	JIM WELCH.....	2012	LARRY EGEMAN.....	2016	SHANNON DOEBEREINER.....	2309	TEST FIXTURE.....	2301
CLYDE ASATO.....	2305	ED MORAN.....	2231	JOANN HOFERITZA.....	2500	LARRY EGEMAN.....	2016	SHERRY CASE.....	2248	WAR ROOM.....	2902
CONNIE HERRERA.....	4118	ED NEMEC.....	2305	JODIE BONAVENTURA.....	4500	LARRY EGEMAN.....	2016	STEVE GRAY.....	2305		
CRAIG BULLOCK.....	2035	ED ROJAS.....	4121	JOE RAMIREZ.....	2225	LARRY EGEMAN.....	2016	STEVE BAILLARGEON.....	2209	SPACE PAGE.....	82
CRAIG KAWAHARA.....	4350	ED STEPHENS.....	2214	JOHN GARMON.....	2033	LARRY EGEMAN.....	2016	STEVE CUTTS.....	2242	OMUTEC PAGE.....	84
CRANDALL GUDMUNDSON.....	2000	EDDIE HERRERA.....	2320	JOHN GLUTH.....	2242	LARRY EGEMAN.....	2016	STEVE DUNCAN.....	PG82		
DAN MUIR.....	2245	ELAINA DIAZ.....	2323	JOHN HOUTHE.....	2305	LARRY EGEMAN.....	2016	STEVE MAGGIANO.....	2153	SPACE OPERATOR.....	0
DAN SOUCY.....	2247	ELIZABETH RAMIREZ.....	PG82	JOHN JAHAHN.....	2305	LARRY EGEMAN.....	2016	SUSAN WALKER.....	2301		
DAN THOMAS.....	2006	ELLIE MANHART.....	2309	JOHN NYMAN.....	2203	LARRY EGEMAN.....	2016	TAM TRAN.....	4118	SECURITY OFFICER.....	6996/
		ELMO NORTH.....	4105			LARRY EGEMAN.....	2016			(TIM OLCOTT)	6550

person team to a location that was so secret that no one knew where they were for a week, not even their wives!

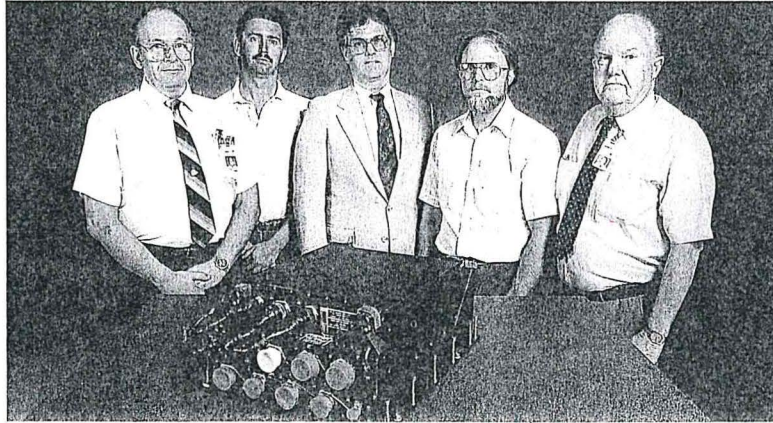
When the shuttle's forward cabin hit the water it must have struck the water flat, belly first since all of the electronic trays collapsed on each other flattening all of the electronic boxes. Gordon and his crew looked at the recorders and concluded that all that could be saved was the tape. Removing the tape with minimal damage was a real problem. Opening the containers with heat, power saws, etc. was immediately ruled out. Gordon and his crew finally decided a hammer and a sharp wood chisel would be the safest method to open the boxes. NASA did not have the proper tools so they went down to the local hardware store and purchased what they required. Voila, it worked perfectly and they were able to extract the tape. After sitting in salt water for three months the tapes were coated with salts. The tapes were sent to an IBM chemical engineer in Arizona where they analyzed how to save the tapes. They finally concluded that soaking in a mild acid would dissolve the salts sufficiently to retrieve the data. They were successful in making one playback pass before all of the oxide shed from the binder. They successfully captured the data they were so desperately looking for.

One of five Odetics' recorders was dedicated to recording the voice communication of the Shuttle crew. The voice data was recorded until the main power was lost. The retrieved tape was played over and over by NASA listening to all of the background noise that might assist in the accident investigation. A major newspaper tried to get NASA to release the voice data under the Freedom of Information Act but NASA refused due to the sensitivity to the crew's families. Allegedly, the last words of the command pilot were "Oh, Oh!" The tape recording of the last few minutes will probably not be released until all of the crew members' close families have passed away.

We received a contract from JPL for a program called Galileo. The program's mission was to orbit the planet Jupiter and photograph all of the nine moons of Jupiter. Receiving a contract from JPL was very prestigious so we were willing to accept the contract at a very low fee. We contractually settled the contract for approximately \$1 million dollars on a cost plus fixed fee that was 1% minimum, 1% technical, and 5% on cost control. This was a very difficult development because the recorder had a very low speed record and a high-speed reproduce. Since JPL considers themselves as the best Engineers in the world, they were constantly in our plant or on the phone directing us on how to design the recorder.

We were the first company to develop and orbit a recorder utilizing a brushless DC motor in conjunction with our motor manufacturer Schaeffer Magnetics. The low record speed required a

RECOVERING THE SPACE SHUTTLE CHALLENGER DATA TAPES



The five Odetics associates who helped recover the tapes from the Challenger recorders.

On the afternoon of Friday, March 14, 1986, Gordon Schulz, Odetics' vice president, mechanical engineering, received an urgent message from NASA's Marshall Space Flight Center: Six weeks after the explosion of the Space Shuttle Challenger, the five Odetics tape recorders on board had been found off the coast of Florida. NASA was requesting that Odetics send a team to Marshall in Huntsville, Alabama, to remove the tapes from the recorders.

"At that point, NASA expected to find the answer to the Shuttle accident from the tapes," says Gordon. "We decided that I would go to Huntsville along with Bill Pearson, our supervisor of precision mechanical assembly, and Fred McSwain, a senior mechanism assembler, both of whom had several years of experience in Spaceborne recorder assembly." These three associates, along with Les Horvath, a senior mechanical designer, were presented with Certificates of Appreciation from NASA earlier this year for successfully extracting the valuable tapes from the Challenger recorders.

The Odetics recorders on board Challenger were used to store a variety of information, including flight in-

strumentation data and cockpit communication among the crew. All the recorders contained magnetic heads made by Odetics' Omutec division.

Gordon, Bill and Fred worked on the recorders in a test lab at Marshall. As they opened the first storage drum, they weren't prepared for the extent of the damage they saw. "It was a shock," says Gordon. "The recorder looked like it had been run over by a truck, then smashed with a sledge hammer. Not only was the recorder crushed in some areas to less than half its original height, but we could see little bumps in the outer shell. We finally realized that the sheet metal had been impelled over the tape pack, causing it to wrap tightly around the internal parts. We began to get a sense of the incredible forces that must have caused the Challenger crash."

After a brief examination of the recorder, the Odetics team determined that the best way to pry open the recorder enclosure was to use a tool similar to a can opener. Says Gordon, "I had a variety of cutters with me, but the sheet metal was impelled so tightly around the tape reels, it was obvious that sheet metal shears would cut right through and destroy the tape."

One solution was to have special tooling made. Gordon explains, "I called Les Horvath at Odetics, and asked him to design a special sheet metal cutter right away. We discussed taking a hard tool bit from our machine shop and grinding it to a defined knife edge." A few hours later, Les called Gordon and informed him that their newly made cutter wouldn't work because it chipped the brittle metal. "As an alternative, Les suggested trying wood chisels," says Gordon. "The next morning I drove to the local Sears and bought six wood chisels and a wooden mallet. Les was right. The chisels worked perfectly."

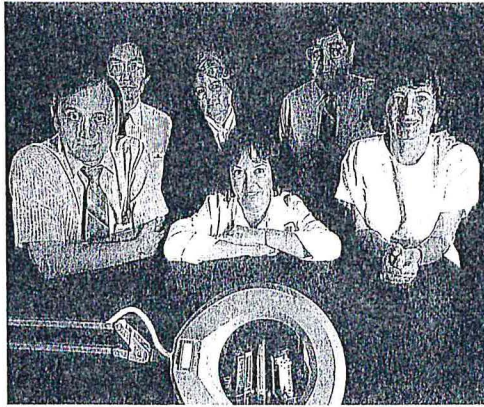
To keep the tape from drying out, the men had to work on the recorder in a sink where it could be continually hosed down with deionized water. "Because of the need to keep the tape wet, we were extremely restricted," says Gordon. "The three of us had to work on each recorder together because it became a six-handed task."

After five 16-hour work days, Gordon, Bill and Fred had successfully extracted the tapes from all five Odetics recorders. But there was still one more task for Les and machinist Dennis Hickman back at Odetics. NASA had planned to clean the tapes by installing each reel on an adaptor and unwinding the tape manually. However, a crack in one of the reels prevented it from fitting on the adaptor. To rectify the problem, Gordon asked Les to quickly design a special adaptor, have it made in the machine shop, and send it down to Huntsville the following day. Les completed the design in a matter of hours and Dennis worked well into the night to complete the adaptor. The next day, Gordon picked it up at the Huntsville airport and delivered it to grateful NASA officials.

In recalling their hectic week, Gordon says, "We knew that everyone at the Spaceborne division would have gladly volunteered to do their part to help the recovery effort if they had had the opportunity. We felt that we were representing all of our associates during our week in Huntsville."

When the crew on a military aircraft has to interrupt a mission to change the tape on their instrumentation tape recorder, both time and supplies are wasted. Yet for years this has been standard procedure. Even with highly sophisticated recorders, data storage capacity has been limited by the amount of data that could fit on the tape. Late last year, however, a team of Omutec associates refined the design of a new magnetic recording

NARROWING THE GAP IN MAGNETIC HEAD TECHNOLOGY



Omutec's new microgap head emerged from a team that included (from left) Mike Andreas, A. C. Wang, Margaret Lamb, Dottie Peterson, Leonard Tapia and Inna Lokshin

head that will eliminate the need for mid-mission tape changes.

By allowing the recording speed to be slowed, Omutec's new microgap head permits twice as much data to be recorded on tape as a standard wide-band head.

The key difference between a microgap head and a standard magnetic recording head is the size of the head's gap, which is the area on top of the head over which the tape passes. According to A. C. Wang, who served as co-project engineer along with Inna Lokshin, "A standard head gap is 25 microinches — 25 millionths of an inch. As its name implies, the microgap head features a gap that has been narrowed considerably — to a mere 12 microinches."

Reducing the gap was only the first step in making a head that would be effective in applications where endurance is critical.

The 12 microinch gap proved to be a two-edged sword. The very element that makes it possible to increase the amount of data on tape — the narrow gap — also leads to a need for improved head-to-tape contact throughout the life of the head. However, with better head-to-tape contact comes the tendency for the head tip to erode faster, thus reducing head life.

Two years ago, Omutec's sister

division, Spaceborne, placed an order with Omutec for a head that offered long life and extremely high track density for a recorder they were building on a development program. This order provided Omutec with the opportunity to develop technologies that would ultimately be applied to the microgap head design. First, the engineering staff devised an innovative method of contouring the head tip. Called the Paracatrum Contour, this new design greatly improves head-to-tape contact.

"For the past two years, most of our energies went into solving problems associated with the microgap technology," says A. C. "Bringing together the new manufacturing processes with long life and high track density was an extraordinary design challenge that often left us thoroughly frustrated."

Although the tip contour was the major technological hurdle, it was by no means the only puzzle to be solved. For instance, manufacturing processes and materials had to be evaluated. "Two processes that are critical to maintaining the tight tolerances required by the microgap head are lapping and bonding," A.C. explains. "Lapping procedures and materials were evaluated by methods engineer Mike Andreas, while Dottie Pe-

erson, an engineering prototype technician, developed new techniques for gluing the head piece parts together."

Another technical challenge was maintaining the necessary tight tolerances while machine slotting the parts. Leonard Tapia, the manager of Omutec's machine shop, tackled this problem and, after several attempts, finally succeeded.

Margaret Lamb, Omutec's director of operations, organized both the prototyping and final production of the heads. In fact, it isn't an exaggeration to say that nearly every Omutec associate made a contribution to the microgap program. Says A.C., "On several occasions we asked other Omutec associates to contribute their ideas and skills, and they always responded with enthusiasm. Everyone in the division recognized the significance of the program."

By the end of 1986, Omutec was successfully building microgap heads on production orders while continuing to incorporate further design refinements.

This past spring, the microgap team experienced a milestone that represented the culmination of the technology honed during the last two years. By completing four high track density, two-inch microgap heads with a 100% yield, it was the first time they had gone from drawings to final test without a single piece part having to be scrapped for non-conformance to the specifications. These particular heads were for a recorder being built by Spaceborne for a classified military program. The customer was aware that Omutec was engaged in the demanding task of pushing the limits of magnetic head processing. Therefore, when the customer joined members of Spaceborne's project team in the Omutec conference room, they were anxious to hear about the status of the heads. "We were extremely proud to be able to report complete success in meeting their requirements," Margaret recalls. "However, we weren't prepared for their response to our good news: a spontaneous round of applause."

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama
35812

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ODETICS, INC.



JUN 2 1986

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EB01

MAY 22 1986

Mr. Gordon Schulz
Odetics, Incorporated
1515 South Manchester Ave.
Anaheim, CA 92802

Dear Mr. Schulz:

I would like to take this opportunity to express my appreciation for your outstanding personal effort in support of the recently completed STS-51L tape salvage operation. Your diligent and dedicated effort made a meaningful contribution to this very challenging task.

Your competent help with developing procedures and special tooling, and in extracting and evaluating the Challenger tapes was invaluable and is greatly appreciated by all those concerned with the tape salvage operation. The technical assistance and expert counsel which you so willingly provided throughout this episode contributed significantly to the salvage operation. Your contributions are particularly valued in light of the extended travel, many long hours of work and personal inconveniences caused you by this task.

Thank you again for your fine support.

Sincerely,

W. C. Bradford
Director, Information and
Electronic Systems Laboratory

cc:
EB31/J. Atherton
EB33/B. Seiler



YOU KNOW THE NEWS—NOW THE REST OF THE STORY

By Gordon Schulz

Sometimes it is best not to disillusion the media, but enough time has now passed, so perhaps this is a good time to set the record straight.

It was December 2, 1983 about two O'clock in the morning. I was awakened by the phone screaming in my ear. "Oh no", I groaned, "who would call me at this time of night." I slowly worked my way to the phone. As I listened, a firm strong voice said, "This is Nasa Houston, could we speak to Gordon Schulz? We are experiencing recorder problems on the Columbia Space Shuttle." (space lab)

Little did I realize that was to be the beginning of a two-hour conference call with Houston and the astronauts in deep space. It didn't take long to get down to business. It seems that we were having problems with the high data rate recorder on the space shuttle. My recall on the problem was that the recorder was exhibiting excessive data errors, but only in certain modes. We continued speaking with the NASA spokesman following the typical NASA protocol which covered the history of the problem and their take on it. Initially the phone conversation was centered around the urgency of the problem and the fact that they needed our help. Mission control was prepared to communicate to the space-craft for immediate action concerning any test or information I needed. After more conversation and working the problem we agreed on a few tests and some hands-on checks which would by the process of elimination zero in on the solution. Some of the tests were done separately, each one being evaluated to determine the next logical step. The results were beamed to Earth as they occurred. I still think this will go down as the fastest turn around response-time from an in-flight space shuttle. Before the night was over we had all the test results and answers which ultimately led to confirming the failure mechanism and suggesting its corrective action. The fall-out of all this pointed to the failure of an anomalous tape guide-roller quill assembly. Fortunately, the problem could be fixed on site. I was able to dictate a simple repair procedure for the mission specialist to follow. This procedure explained each step and what tools to use. Among the tools it called for was the famous "Phillips screw-driver". The astronaut did his job well, and the rest is history.

motor with very low ripple torque which we found varied considerably from motor to motor. Schaeffer could not explain the variations and would not research it unless he was paid. We had a number of motors that we screened to find three that were acceptable for the Galileo program.

When we informed JPL of our findings and recommendations they requested a meeting at Odetics to discuss the problem. We agreed and the next day 20 people arrived from JPL. The conference room was so full only Jim Welch and I could attend the meeting. Jim masterfully explained the problem and said it was no big deal since we had found three acceptable motors. From then on there was nothing but heated discussions between the JPL Engineers. Finally at the meeting's conclusion, the JPL lead engineer stood up and said, "We must understand this problem regardless of the costs," and all of the JPL engineers walked out. The remaining JPL people from their Program Office stood up and said, "Regardless of what the engineers wanted there was no money available to pay for the research," and then they walked out.

Jim Welch and I now alone in the conference room looked at each other and said, "What the hell do we do now?" We finally agreed to proceed with the three acceptable motors until they told us to stop. We never received a directive from JPL but we sure had a lot of sleepless nights. During the development, JPL engineers were driving us bananas with unannounced visits and direct phone calls to all of our engineers. This was having a severe impact on our costs and schedules so we finally informed JPL that all phone calls and visits had to be coordinated with the Odetics Program Managers. JPL was upset by this treatment of such a noble institution but we finally were making rapid progress.

When we finally concluded the contract we had spent approximately \$1.5 million dollars. JPL contracts conclusion was that we were technically superior but poor in cost control and awarded us a 1% fee. The Galileo satellite was designed with two communication antennas, one small fixed for low-speed housekeeping data (i.e., 300 bits/sec) and one large antenna that unfurled like an umbrella (i.e., 150,000 bits/sec).

After the Galileo launched they attempted to unfurl the large antenna but to their dismay, discovered it was jammed—no movement. No one panicked since the satellite had to orbit the earth two or three times in order for it to be slingshot towards Jupiter on a three to four-year journey. After the last earth orbit they still could not resolve the problem so they now had to find a way to utilize a super performing satellite that could only communicate at 300 bits/sec.

One of the JPL engineers came up with a brilliant work around. They would use the recorder to store data at 150,000 bits/sec and then reproduce it at low speed into the on-board buffer in short segments. They would transmit the data until the buffer was empty then reload the buffer from the recorder. Each time this occurred the recorder reproduced a short segment—stop, fast forward the tape, stop, and wait for the next reproduce command. This procedure would stress the recorder through thousands of start/stop cycles; a task it was never designed for. Not finding any other solution JPL contacted Odetics' engineers and asked which component was likely to fail under this approach. After careful analysis Odetics' engineers concluded the first component to fail would be the JPL supplied T05 relays which we bitterly did not want to use. JPL modified the command software, up loaded it to the satellite and surprise, surprise it worked perfectly! Because of the recorder, the Galileo satellite accomplishments were extraordinary. Some of the most notable were: (a) on the path to Jupiter they photographed the backside of the moon from approximately 10,000 miles and discovered a huge crater that was created by a meteoroid strike. When Apollo orbited the moon, they were at such a low altitude they thought these were just large mountains; (b) when the satellite was about 100,000 miles from Jupiter, an astronomer predicted the meteoroids (Shoemaker-Levy) would strike the surface of Jupiter with a force of thousands of atomic bombs. The recorder enabled them to photograph every impact with astounding clarity; (c) after arriving and orbiting Jupiter, they were able to photograph the surface of every moon of Jupiter. At 300 bits/sec it would require two to three weeks to assemble enough bits to make one picture. The photographs of Europa convinced the scientists that it is covered with ice.

The radiation levels of Jupiter are extremely high which created a lot of electronic component failures. Fortunately the tape recorder was fairly tolerant and performed through not only the first mission but two additional extended missions. Credit must be given to Odetics engineer, Dave Hoff, and JPL's engineer Greg Levantis for finding clever solutions that kept the recorder operating. When JPL had all the data they desired and no money to continue the mission, they commanded the satellite to self destruct on the surface of Jupiter. We calculated that the tape recorders' 3M tape was 20 years old at the end of the mission; a remarkable achievement.

When asked what Odetics Space contributed to the Galileo Mission, we were proud to say our \$1.5 million dollar program saved a \$1 billion dollar program and all we received was a paltry 1% profit. Around 1980, we received two contracts from Martin Denver. Venus Radar Mapper (VRM) through NASA and a very classified program through NRL. They could not have been managed differently. NASA had multiple layers of non-decision makers while NRL tried a new concept, one point of contact from the Martin Procurement Office who was responsible for getting all decisions made ASAP. The results were to say the least startling. Everyone who

The Galileo Story By Gordon Schulz

A couple of years ago, at the invitation of Greg Levanas, our family took a trip to JPL in Pasadena and received a tour of the campus and the von Karman Museum. We were especially interested to see a spacecraft and an Odetics tape recorder like the ones that traveled all the way to outer space, specifically, Jupiter. A picture is included of the JPL write-up that appeared beside it.

As I looked at our creation I thought back to the time when JPL gave Dave Hoff and me an invitation to be a part of both the Arrival of the spacecraft at Jupiter and also invited us to the Galileo End of Mission Celebration that was given at JPL on the day they terminated the project, September 21, 2003. To accomplish this they headed the space vehicle into the gravitational pull of Jupiter where it burned up on entry. One of the interesting things we learned through this project is that Jupiter has three times the gravity of Earth, and can pull objects such as wandering meteors into it. That's a marvelous safety device for us here on Earth.

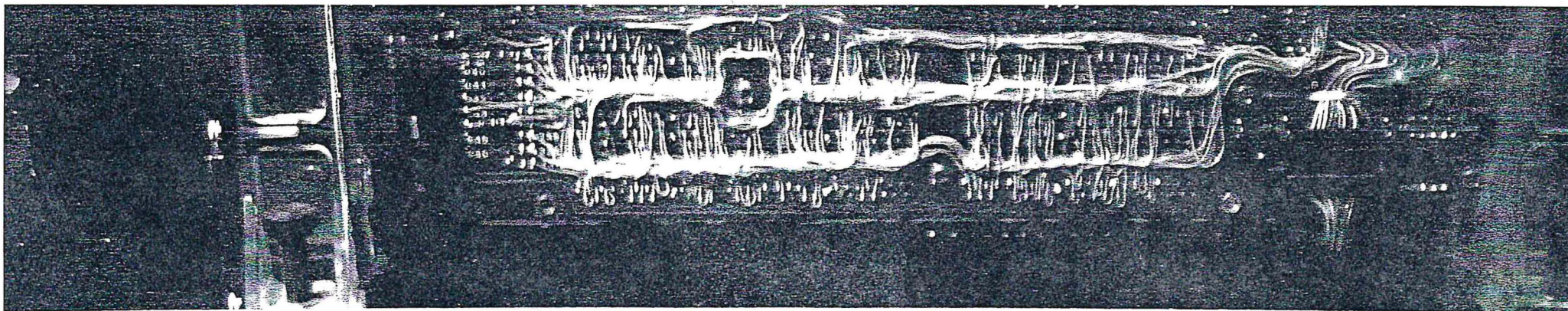
There was a great spirit of celebration at the party, all of us congratulating each other on a very successful mission mapping Jupiter and its many moons. Of these, Europa, Ganymede, and Callisto provide evidence of a thin atmospheric layer and a liquid saltwater layer. It was also discovered that Ganymede has a magnetic field, and Jupiter's ring system is formed by dust kicked up as interplanetary meteoroids smash into the planet's four small inner moons. The outermost ring is actually two rings, one embedded within the other.

Galileo was the first spacecraft to dwell in a giant planet magnetosphere long enough to identify its global structure and to investigate its dynamics.

Galileo was launched in 1989 aboard the Space Shuttle Atlantis, and began exploring Jupiter and its moons in December, 1995. It took nearly seven years to get into position to carry out the mission. I thought back to the history of the development of that tape recorder. It had been conceived in 1978 and we delivered the first unit in 1981. By a little simple mathematics one can see that by the time of completion of the program, the tape recorder and tape were twenty-two years old. Yet it performed so beautifully that it was no wonder that Dave and I did some back-slapping.

There was one glitch along the way, however. This mission was with not with out its moments of frustration. We all know about the antenna failure story which resulted in using the tape recorder in a unique mode, put the recorder up a notch to mission critical function.. As if that were not enough, a few weeks before the spacecraft arrived at Jupiter, during a pre-arrival system test the data recorder exhibited a problem. That's when JPL called Dave and myself to support them in this crises. What happened here is history. But it was one of the more challenging moments of my life. We came very close to losing the recorder and the mission. We had many meetings with JPL. Of course my role was to help translate from the recorder data, what mechanical function or failure could be derived from the data analysis. This process involved a team including

Dave Hoff, Grag Levanas, myself and the unmentioned hero Frank Rooks. For without Frank the whole program might have failed. Frank unbeknown to us, was doing some special tests on a totally different program using an old cast-off test recorder. Frank had heard about the JPL failure problem from the hallways. On a particular test he experienced a tape sticking problem. He mentioned it to us. To compress it down, this became the turning point in the JPL problem. It so happened that the old unit Frank was working on just happened to have almost the same date code magnetic tape as the one in space. This, along with a similar test, led us to understand the basic failure mechanism in the recorder in space and helped us find a solution. Thank you Frank—your observations paid off.



Galileo Tape Recorder

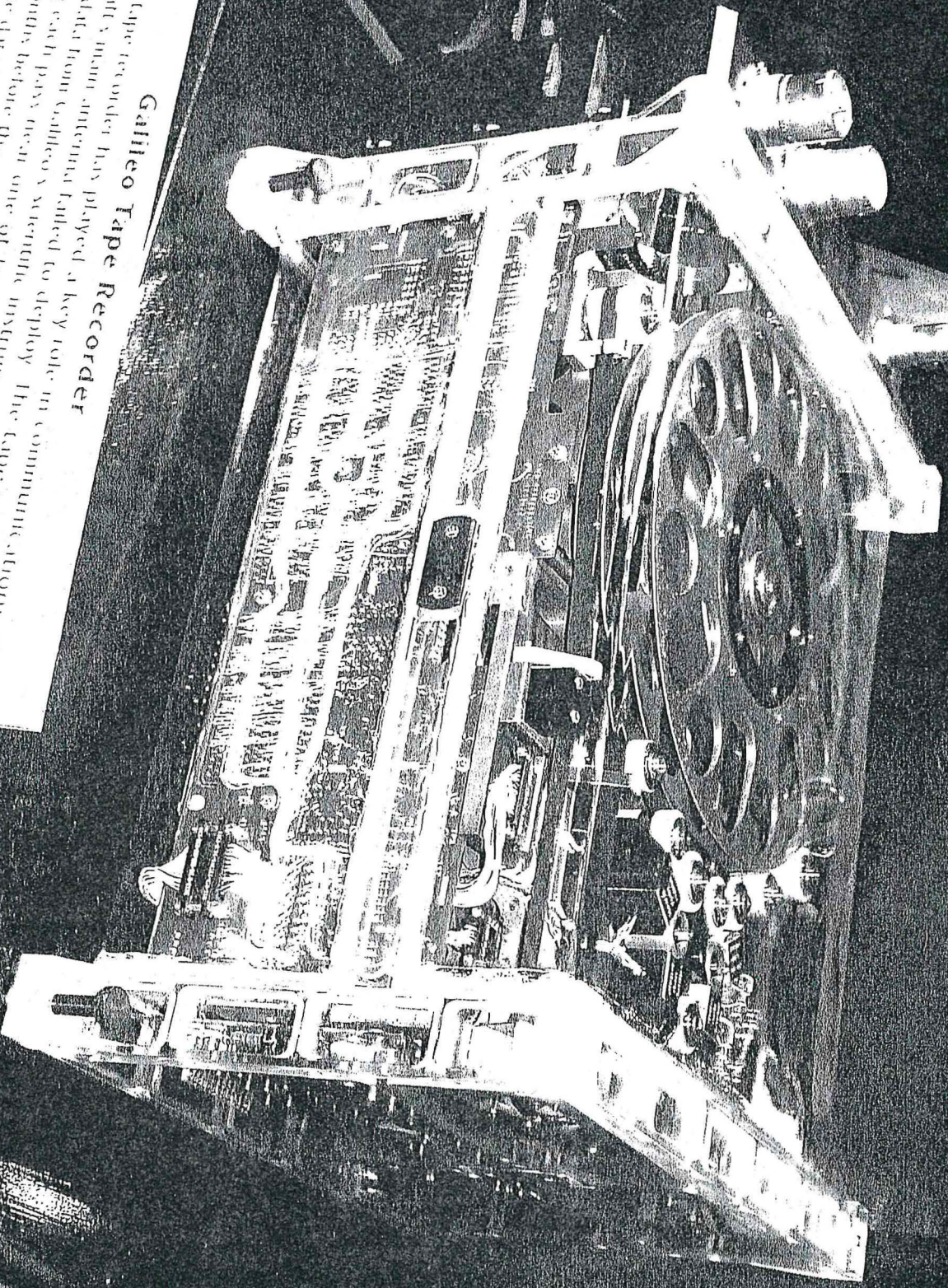
The Galileo tape recorder has played a key role in communications after the spacecraft's main antenna failed to deploy. The tape recorder rapidly stores most data from Galileo's scientific instruments during the few days surrounding each pass near one of Jupiter's large moons. Then, in the weeks or months before the next encounter, the tape recorder gradually plays back the data for transmission to Earth via the spacecraft's low-data-rate secondary antenna.

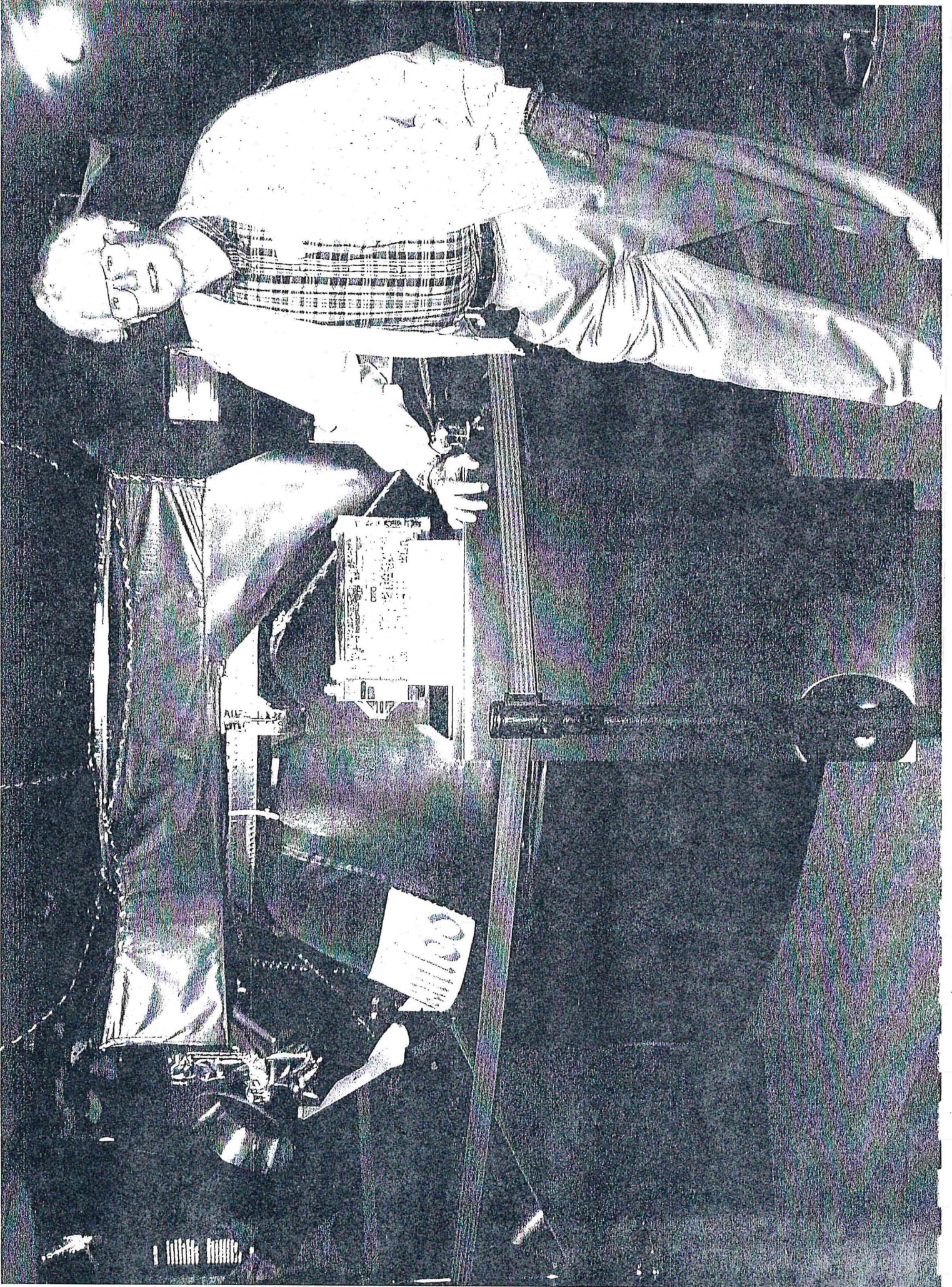
The tape has a storage capacity of 125 million bytes, large for the time at which Galileo was developed, but about one-fifth as much as a compact disc, a more recent technology. Odetics Inc. in Anaheim, California built the tape recorder.

The Galileo tape recorder has played a key role in communications stores most data from Galileo's scientific instruments during the few days after launch. The tape recorder rapidly built the Galileo's capacity of 125 million bytes of data. In the part of the mission when the tape recorder was developed, but about a year before the Galileo mission.

Galileo Tape Recorder

Weeks of months before the next encounter, the tape recorder rapidly built the Galileo's capacity of 125 million bytes of data. In the part of the mission when the tape recorder was developed, but about a year before the Galileo mission.





worked on the NASA program was totally frustrated and we lost money on the contract; whereas, the NRL program proceeded so smoothly that we made an embarrassing large profit. Our explanation to Martin was, if you average the two contracts we both did OK.

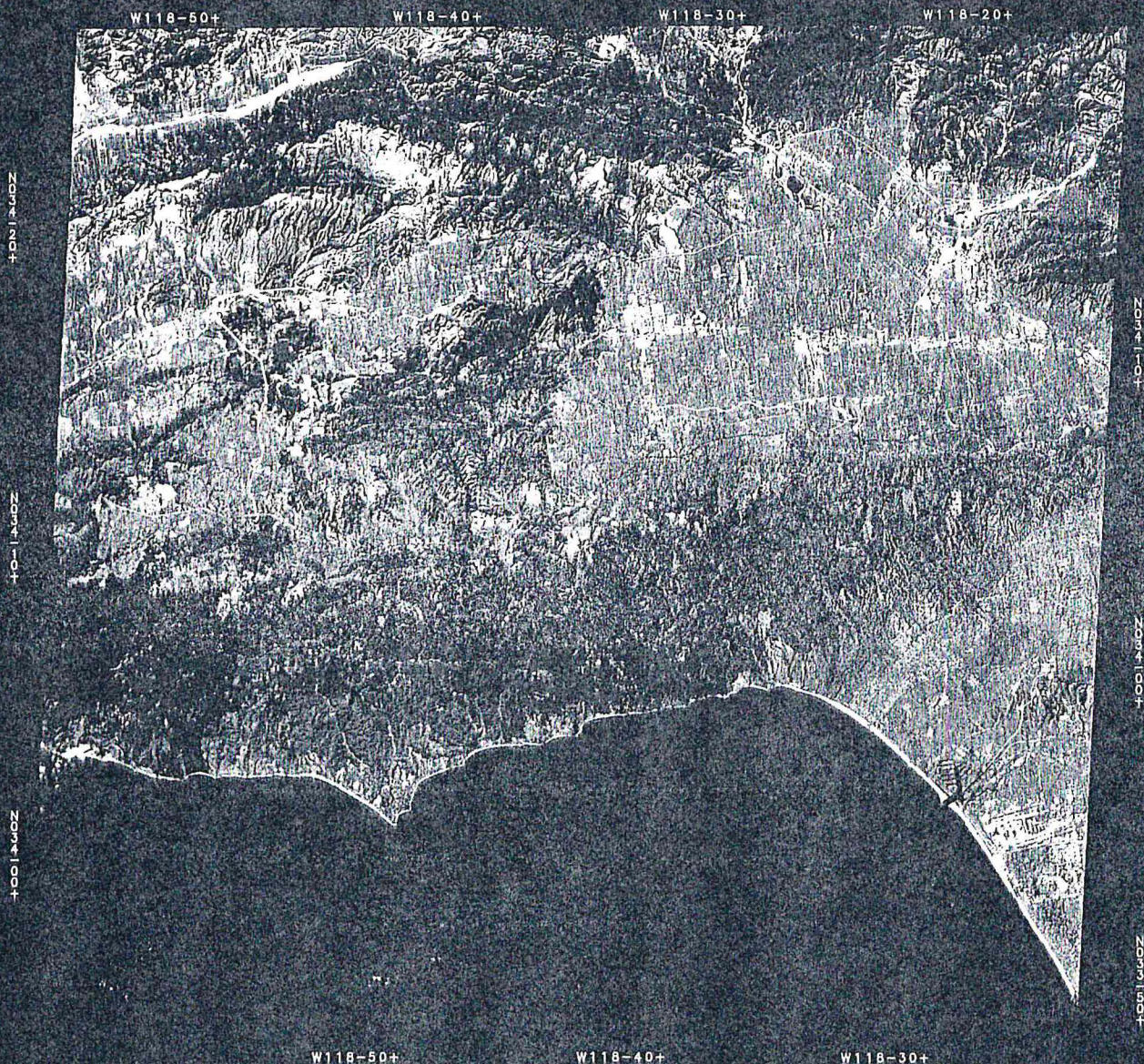
The Venus Radar mapped the entire surface of Venus through the dense clouds and made some significant scientific discoveries. You could only map the backside of Venus by recording the radar data and transmitting the data back to Earth when the satellite was within the line of sight to Earth. Hughes, who built the Radar, received an award, while the Odetics Space Division received a thank you letter. The top secret NRL program performed flawlessly for many years, providing extremely important military data that I hope someday is declassified so that the Odetics Space employees can be informed of their very valuable contributions to the safety of the USA.

The requirements for more and more data storage in Space led us to a very difficult development program named Spot imaging for CNES in France. This was a 1" tape width multiple track recorder capable of recording and reproducing 50 million bits/sec. France wanted to make a major technology jump over the USA. The Spot programs had many development problems, primarily how to control the tape tracking to ± 2 thousands of an inch end to end for 4,000 to 5,000 hours of operations. Gordon Schulz and his gurus finally developed a servo controlled tracking system that worked perfectly. I was invited to a Spot launching from French Guyana (Devil's Island) all expenses paid, which I was told by one of our French engineering friends that it would be a terrible insult if I did not accept. I had to fly from Los Angeles to Paris, where I boarded an Air France Boeing 767 filled with French high-level managers and wives plus many other contractual suppliers for the non-stop flight to French Guyana. Immediately after take off the bar opened and never closed for the entire trip.

Arriving at the French Guyana in the black early morning hours was a real thrill since they must shut down all unneeded lights to save power (i.e., it was so black I thought we were landing in the middle of the ocean). French Guyana is a quaint place with three or four hotels, virtually no trees, nothing but dry brush, and lots of varmints and insects. On a bus tour of the launch sites I was impressed by the low-cost, simple approaches the French design teams utilized. This was a sharp contrast to the American atmosphere where all decisions are political and money unlimited. The week that I spent there was very enjoyable with boat tours of Devil's Island and many large lunch and dinner meetings which were attended by all of the high-level manager's and wives. Apparently every large French contractor was required to host a lunch or dinner prior to the launch day. The French really know how to live but after days and days of partying, I asked one of the French managers where are all of the workers that are feverously preparing

SPOT 2 HRV 2 540-281/5 05 NOV 93

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XS9 LM 018/067
XS2 LM 001/084
XS1 LM 018/077



0 4 8 km

N 34°08' / W118°39' AZ:162°23' EL:38°35' OR:9°41'59" INCID:R11° 18H 41MN 36S N1B

SPOT © PRODUCT.CNES-IGN/DIST.SPOT IMAGE © CNES 1993

for the Spot launching. He just smiled and said, "Don't worry; we know what we are doing." He was right, the launch occurred as planned.

During one of the technical meetings attended by 90 to 100 French engineers and managers, all they could talk about was how to beat the USA in rocket launches. French egos were on display; it was very difficult to not respond. Our new 1" recorder design was recognized around the world and we received some very large contracts from Spar in Canada, ADEOS in Japan, and MSX (a classified program) for the U.S. Air Force. Working with all these various countries was very different but yet very enjoyable.

The Spar engineers from Canada were probably the best people to interface with. The program was called RADARSAT-1 with the mission to launch a synthetic aperture radar in a north/south orbit that would map the ice in the far north of Canada and all of the South Pole to a 5 meter resolution. At that time there was no way to retrieve the data without utilizing a tape recorder. The development program with Canada proceeded very well even with a very difficult requirement of five years of continuous operations. The Canadian engineers were very humorous. (i.e., at one of the technical meetings we were discussing the Iraq War I and all of the world's support to America. One of the Canadian engineers blurted out, "Sure we supported America; we sent two destroyers to Iraq and one of them actually made it out of its home port!") It was very, very funny indeed.

The Spar life test recorder ran for five years and 20,000 tape passes within the required error specifications; a major, major accomplishment. During the manufacturing of the flight recorder, we had to change suppliers of the tape guidance motors. Since they were built to the same specifications we did not anticipate any problems. Much to our surprise we discovered that the new supplier had changed the process which created rust contamination of the motors. While analyzing the extent of the problem (RADARSAT-1 was one week from launch) we felt honor bound to inform the Spar upper management of a not as yet understood problem that could jam the tape guidance system which could potentially jeopardize the entire mission. We had an Odetics meeting at which time we informed Spar of the potential problem; a Spar Senior Manager exploded in anger. My only response was, "Would you rather I tell you now or right after the launch?" Cooler heads did finally prevail and we explained the problem with the information available and the probability of the mission success or failure. After the explanation they asked to caucus alone to make their decision whether to delay the launch. After a brief 20 to 30 minutes they called us back into the conference room and informed us that they were going to launch on schedule. My admiration for that career ending decision will never, never be forgotten. In the USA a decision would never have been made. Within the week the launch

went right on schedule and the recorders worked perfectly for the required five years; accumulating data from the North and South Poles that will be analyzed for years. One of the more significant tasks of RADARSAT-1 was to three-dimensionally map the entire surface of the South Pole to a resolution of 5 meters. This was primarily due to the Global Warming theories that our ice packs are disappearing and our oceans are to rise by 20 feet. During those five years all of the Odetics' Space people were nervously waiting for that dreaded phone call that never came.

During the 25 years that Odetics Space virtually ruled the Space tape recorder market, we had contracts with most of the countries in the free world. In alphabetical order they were Canada, England, France, Germany, Holland, India, Israel, Italy, Japan, etc. In all of our international dealings we found all of the people had the same interests and goals that Americans have. Very, very enjoyable and friendly lifetime contacts were made.

In the U.S. we had contracts with all major Aerospace companies and many Universities that were performing Space research. During this tremendously successful period, Odetics Space designed and manufactured over 400 Space tape recorders. Over 300 were launched into Space where the average life performance was over five years per recorder. This was a magnificent achievement for a very complicated electromechanical device. Imagine designing a car that would run continuously for five years with zero maintenance. At our peak, we performed \$30 million dollars/year and made over \$5 million dollars in profits with 300 hardworking, intelligent, motivated, and dedicated employees. In our total 25 year span we had sales of 280 million and profits of over \$50 million dollars and never had a losing year. While we focused most of our attention to a market we knew best, we all felt that the corporation needed some commercial products, which Joel proceeded to find and develop. There were many creative and innovative attempts from robots, automatic cannons, time-lapse recorders, automated TV broadcast systems, telecom switches, automated data storage, etc. All of which required large dollar investments that were provided primarily by the Odetics Space Division. The only profitable investment was ATL which was started by Jerry Muench through a contract he encountered at E-Systems in Texas. E-systems was trying to solve the problem of creating a data storage and rapid retrieval system for the government's security group. Reams of data stored on rolls of tape collected from all over the world which was sent to a secure warehouse for future analysis. When an event occurred somewhere in the world, they would send a runner to the warehouse to retrieve the most relevant rolls of tape for analysis which took days not hours. A solution was desperately needed. When Jerry described our broadcast rapid tape storage retrieval system their interest was tweaked.

When Jerry returned to Odetics, he asked Les Horvath to sketch up a huge robotic aisle system that would automatically store and retrieve large 1" rolls of tape. At E-systems request, we prepared a proposal on a prototype system. A team went to Texas to successfully negotiate a contract for a prototype system. The development work was performed by a joint Engineering team from the Space and Broadcast divisions. All of the engineers were trying to work multiple programs, so the E-systems contract was suffering for lack of attention. It was then decided to form a totally separate division under Dick Petit to focus on E-systems and other opportunities. Progress improved, key people were hired, and a detailed market analysis that forecasted a huge market for data storage.

One of our sales contracts was with DEC. DEC had performed a similar analysis and had written a specification on the product desired. DEC was a computer company that did not have the mechanical expertise to design and fabricate the product, so we offered and received a contract to build a product to their specifications. Their reliability and testing requirements were far more stringent than anything we had ever encountered before, so Kevin Daly, with a background in statistics, was asked to manage the new ATL division. The dollar investments from the Space Division and outside investors almost drove the company bankrupt. Ultimately, the DEC design was completed and the sales as predicted grew rapidly. At last we had a winner that was noticed by our competition.

Quantum, who was in the hard disk storage market, wanted to diversify so they made a tender offer to purchase ATL. There was controversy on the Odetics Board of Directors on whether to sell to Quantum. The original Odetics board had reasoned that the founding Odetics stockholders had heard Joel's patient money explanations for 25 years and maybe this was the only chance to recoup their investments, so a majority of the board members voted to sell ATL.

The negotiations were very spirited with lawyers and accountants from both sides determined to prove that their extravagant bills were worthwhile. We finally arrived at a value of \$27/share in an all stock trade which Paul Wright and I both felt was acceptable since Quantum was then trading for \$17 to \$18 per share. To our dismay Joel said, "No". Joel said that he would not accept anything less than \$28 per share. In anger, the Quantum reps said they had to talk to their CEO. I fully expected them to return and inform us that the deal was a no-go. After about an hour of nervous waiting, they returned and said "OK, \$28 per share." It was difficult to not stand up and cheer. Joel had read the Quantum CEO correctly. He really wanted to buy the ATL division.

I estimated the value of the agreement at the closing was over \$300 million dollars. A real coup for the patient money folks who were not allowed to sell their stock. Everyone realized that the tape recorder technology could not last forever so many attempts were made to diversify into other product lines in order to maintain employee stability. Some of Joel's new divisions (i.e., Telecom and AIM) were struggling, so Joel asked the Space Division with our strong cash position to manage them back to health.

AIM provided lots of publicity with the first walking robot, an x-ray computer enhancement system, an automatic tank cannon loader, and a robotic system to remove the hickory chips from the Budweiser brewery tanks. All were very interesting and exciting but the bottom-line was they all were losing money. These programs all had great stories or fond memories (i.e., Senator Alan Cranston from California visited Odetics to review all of our products and tried to gain our support as a high-tech Senator rather than a tax and spend liberal Democrat). When we impressed him by demonstrating all of our various products he became fascinated with our x-ray enhancement system which no one had displayed any interest in. When we queried him on his high interest he told us a very funny story. During one of his yearly physicals at the Naval Hospital, his lung x-ray had a spot that they thought might be cancerous. Since their entire medical is free, he decided to undergo exploratory lung surgery. Test revealed the spot was non-cancerous although he had to undergo the risks of major surgery. Senator Cranston was interested in whether our computer enhancement could have prevented his very high-risk surgery. He mentioned that the Navy surgeon who performed the operation had a higher than normal rate of patients dying and when investigated it was discovered that he was blind in one eye. Senator Cranston was obviously counting his blessings for surviving the operation.

For the automatic cannon contract, the Army loaned us a tank minus the gun but with the breech loader. When it arrived on a large flat bed truck, everyone had fun learning how to drive the tank in our rear parking lot. John Cresse was very upset since the tank was chewing up the asphalt. The contract was very demanding (i.e., it had to load and fire three 5" shells in under 30 seconds). This required some very large electrical motors with tremendous surge currents. The lead engineer, Steve Bartholet, had proposed a power system that utilized a large flywheel. When running at high RPM's, the flywheel would have significant inertia to provide the high-surge currents required.

After a year of hard work, Steve was ready to demonstrate his automatic shell loading system. We all gathered around the tank behind the safety ropes to keep people out of harms way from flying debris. Steve proudly started the flywheel where it took a few minutes to reach the desired speed. When Steve pushed the start button the tank, which weighed many tons, jumped about

2 inches into the air, but damn if it didn't work. It was a great concept but unfortunately it was not selected. Some high military brass wanted a canister system rather than conventional shells. The company who received the canister contract unsuccessfully spent millions of dollars and the approach was finally terminated.

The Anheuser-Busch hickory chip removal system was another Steve Bartholet creation that everyone thought was impossible. The robot had to enter through a small 3 foot tunnel then fold out into the 15 foot tank diameter, rake all of the chips from the tank bottom, and back out through the 3 foot tunnel entrance. After \$5 million dollars and three frustrating years the system was ready to demo at their Van Nuys facility. With virtually no help from the Union workers, who wanted the system to fail, they managed to brew one tank of beer and successfully remove the chips. Anheuser-Busch finally concluded that there was no way to gain Union support so the program was cancelled. They sent Joel one can of beer from the tank with a label that read, 'This can of beer cost over \$300,000!'

The Telecom division had manufactured various timing products as well as a very successful product called a Transition Density Analyzer which was conceived by an Odetics Space engineer. The analyzer was well received by our customers and was very profitable for two or three years. Ultimately Hewlett Packard recognized the market's potential and developed a competing product at a much lower price so sales began to decline. When the Space Division assumed responsibility, it was developing a precision timing device that was used in the cell phone networks. Competition was stiff but the South Koreans had a requirement for a dual redundant system where the units could be hot swapped with power on and not interrupt the timing signal; a very difficult task. We asked one of our Space engineers, Robert Drap, if he could find a solution. Robert said, "Let me think about it." In a couple of days he said he had an approach that would work. We said, "Do it ASAP!" It worked and we sold over \$10 million dollars worth of products to the South Koreans at a very good profit margin.

When the Telecom division started producing a good profit, Joel decided to integrate it into a new division called Mariner Networks. Mariner Networks Division was to develop a new telephone switch product. Joel drafted one of Space Division's best managers, Dave Scheel, to run the new division. The product marketing results looked great! The product development went reasonably well but \$25 million dollars and three years later, just as the product development was nearing completion, the telecom market bubble of the late 1990's burst. The resulting market contraction drove several of Mariner's key customers into bankruptcy and spelled the end for Mariner Networks. We had to shut the division down. In the meantime, the precision timing devices were split off from Mariner and managed to survive through the market

contraction. Eventually, the timing group was named Zyfer and was later sold to FEI. A number of capable Space Division Managers and associates went with Zyfer and are responsible for its success, most notably is Steve Strang who is now the President and CEO and Marlette Morales, one of my best office managers.

One of the products from the AIM Division was a video alarm system targeted for Military security systems. The Military never expressed any interest but one of the engineers believed this would be a great product for traffic intersection light control to replace the unreliable wire loops that are embedded in the asphalt roadway. We all believed this product had great potential and after many frustrating starts and stops we assembled a team that could develop the hardware, software, and algorithms required to produce a successful product. We invested \$5 million - \$6 million dollars of Space R&D and three to four years of hard work before we started seeing profitable sales.

This was the era when new public stock offerings were at its peak so Joel wanted to put together a new division named Iteris. Iteris consisted of a Government transportation group, a lane tracking product that we purchased from Rockwell, and the Space Division Vantage product. All this would be managed by Jack Johnson and after it had successfully gone public we would all be very wealthy. Unfortunately the public market collapsed so we had to withdraw the Iteris public offering. A tremendous blow to the Space Division since that was the only product that had future growth potential.

The Space tape recorder market that had a record 25 year run was being obsoleted by low cost solid-state memory devices. We spent three frustrating years developing our own solid-state recorder product which worked very well but we could not compete at the very competitive pricing. We finally threw in the towel and sold the solid-state product line to a low cost female-managed competitor for \$1 million dollars.

The only product keeping the Space Division alive was the Space Shuttle tape recorder support group that was profitable until the day it was shut down. A very sad, sad ending to such dedicated, loyal, and hardworking group of people. The 1585 Manchester building was laid out primarily to support the Space Tape recorder product line. The building was approximately 10,000 sq. ft with two-stories which created a lot of communication problems. It was finally agreed to place the people upstairs who had the least daily interface with the manufacturing area. Management, program managers, secretaries, and the conference rooms all went upstairs with engineering on the first floor and manufacturing occupying the rear of the building. Some very clever layouts from Gordon Schulz and Les Horvath resulted in a very efficient

integrated group dedicated to one goal—design, develop, and manufacture the most reliable, high quality, long-life Space tape recorder in history. This goal was accomplished in spades.

Some of the novel things we created were:

- When you entered the lobby there was large images of Earth which were recorded by an Odetics Space recorder.
- As you walked through the manufacturing area, there were two main hallways which were lined with large glass windows for customer viewing. No one was allowed in the work area without a clean room hat and gown. Our customers were duly impressed.
- Dave Lewis loved to parade his Broadcast customers through the Space area where he could brag—“this is where quality and reliability began.”
- One of the other novel things we mandated to all managers and engineers was that if you received a customer phone call that was urgent, you wrote a telecom report that was distributed to all involved personnel. The Secretaries hand carried copies within one hour or mailed them through our internal system which was delivered twice a day. Many of our customers would make numerous phone calls to various parties to check on the validity of their answers. They often commented on the efficiency of our system.
- Another of our quirks that worked was all outside correspondences had to be reviewed by Marilyn Holden for correct spelling and punctuation. Some people were upset about this procedure but the outside customers thought we were a very capable intelligent group of people since there were virtually zero errors over 25 years of correspondence.

In summary, it is still difficult to recall 30 years of hard work with virtually the same group of people who became more like family than employees. During this time we achieved tremendous scientific milestones that went unnoticed. We tried on numerous occasions to get our local newspaper to write some articles for the morale of our employees but they were only interested in bad news not good news.

The following Odetics flight history summary should make every Space employee extremely proud of their significant accomplishments.

During our peak year, sales were \$30 million dollars with a \$5 million dollar gross profit, accomplished with 300 hardworking, intelligent, and dedicated employees. Over the life span of the Odetics Space Division we had sales of \$280 million dollars with profits of over \$50 million dollars; a performance that all Space employees should be extremely proud of.

08/01/07

ODETICS FLIGHT :

PROGRAM	Units Delivered	Units Flown	Unmanned Flight	Launch Failure	Mechanical Failure
SESP-70-1	2	2	Y	0	0
OAR-901	1	1	Y	0	0
STP 71-2	3	3	Y	0	0
NIMBUS-E	1	1	Y	0	0
ATM. EXPLORER C	2	2	Y	0	0
S3-1	1	1	Y	0	0
OSO-1	2	2	Y	0	0
D2B	2	2	Y	0	0
ATM. EXPLORER D	2	2	Y	0	0
ATM. EXPLORER E	2	2	Y	0	0
S3-2	1	1	Y	0	0
ISS	1	1	Y	0	0
S3-3	1	1	Y	0	0
CLASSIFIED	8	8	Y	0	0
WEC/AF	3	3	Y	0	0
SIGNE-3	1	1	Y	0	0
WEC/AF	3	3	Y	0	0
HEAO-A	2	2	Y	0	0
EXOS-A	1	1	Y	0	0
ISS-2	1	1	Y	0	0
WEC/AF	3	3	Y	1	0
WEC/AF	3	3	Y	1	0
WEC/AF	3	3	Y	0	0
SEASAT	2	2	Y	0	0
HEAO-B	2	2	Y	0	0
SCATHA	2	2	Y	0	0
CORSA	1	1	Y	0	0
78-1	3	3	Y	0	0
WEC/AF	3	3	Y	0	0
HEAO-C	3	3	Y	0	0
MAGSAT	2	2	Y	0	0
MS-T4	1	1	Y	0	0
ASTRO-A	1	1	Y	0	0
DYN EXPLORER	4	4	Y	0	0
ETS-III	1	1	Y	0	0
S81-1	2	2	Y	0	0
WEC/AF	4	4	Y	0	0
IRAS	2	2	Y	0	0
ASTRO-B	1	1	Y	0	0
WEC/AF	4	4	Y	0	0
EXOS-C	1	1	Y	0	0
AMPTE	1	1	Y	0	0
ERBS	4	4	Y	0	0
P80-1	3	0	Y	0	0
GEOSAT	2	2	Y	0	0
SPOT-1	6	2	Y	0	1
MOS-1A	1	1	Y	0	0
WEC/AF	4	4	Y	0	0
SMD	2	2	Y	0	0
MAGELLAN	3	2	Y	0	0
GALILEO	3	1	Y	0	0
SPOT-2	3	2	Y	0	0

08/01/07

ODETICS FLIGHT

PROGRAM	Units Delivered	Units Flown	Unmanned Flight	Launch Failure	Mechanical Failure
MOS-1B	1	1	Y	0	0
HST	4	3	Y	0	0
ROSAT	2	2	Y	0	0
CRRES	2	2	Y	0	0
WEC/AF	4	4	Y	0	0
ERS-1	4	2	Y	0	0
NRL	2	0	Y	0	0
PDMS	13	6	Y	0	0
WEC/AF	4	4	Y	0	0
GRO	2	2	Y	0	0
JERS-1	2	1	Y	0	0
GEOTAIL	2	2	Y	0	0
LANDSAT 6	2	2	Y	1	0
MSX	2	0	Y	0	0
RADARSAT-1	2	0	Y	0	0
SPOT-3	3	2	Y	0	0
SOHO/CLUSTER	8	0	Y	0	0
WEC/AF	30	0	Y	0	0
WEC/AF	4	4	Y	0	0
ADEOS LM/HK	5	0	Y	0	0
ADEOS-1	4	0	Y	0	0
ERS-2	3	0	Y	0	0
ADEOS-2	3	0	Y	0	0
TOTALS	228	146	0	3	1

Appendix A

Odetics Odyssey Memoirs

Notable Event #1 by Crandall Gudmundson

When we employed approximately one hundred people around 1974 our work hours ran from 8 am to 9 pm. At 5 pm most of the clerical and production people who were not critical went home. The phone system was placed on a night bell where anyone available answered the phone. First observation was many agitated spouses called around 6 pm asking why so and so was not home as promised. Our simple, honest answer was he or she is not at work and we don't know where he or she is—wrong answer because they were usually across the freeway at Flaky Jake's drinking beer and playing pool. The number of night bell phone calls got so numerous that we decided to hire a part-time telephone operator from 5 pm to 8 pm weekdays and all day Saturday. We placed a help wanted sign at the mobile home park directly behind the 1845 and 1859 Manchester locations. Immediately an 80 year old crusty gentleman named Harold showed up in our lobby saying he wanted a job. We questioned him on his telephone switchboard knowledge and if he has transportation to work. His answer was brilliant—"Hell I just jumped over the rear wall behind the building and I can learn everything you need." With that response, we just could not say no to Harold. He appeared for work very promptly but the training was a little more difficult. All he was required to do was answer the phone, ask who they were calling for, put them on hold, page the person, and connect them if they were still at work. If they were not at work, Harold was instructed to say they must have just left to preserve home tranquility. It took Harold about a month to learn the correct sequence of button pushing. Many times he hit the page button first and through the entire plant we would hear him say, "Who is this and who the hell do you want to talk to?"

We were very patient and Harold worked out great, becoming a beloved mascot to everyone. Harold worked many enjoyable years for Odetics until old age and health problems forced him to retire. One of many personal Odetics success stories.

Notable Event #2 by Crandall Gudmundson

During the very stressful Space Shuttle development program the entire company was stressed to the point of breaking. One of our ex-contract managers named Jack was drafted by Joel to run a new division named Infodetics. Jack was having similar morale problems so he invited a very good looking belly dancer whose provocative performances would hopefully relieve some tension. Jack invited Jerry and I over to witness her performance. If it turned negative, then Jerry and I would be equally guilty. As it turned out she was great and everyone had a good time. Jerry and I were so impressed we invited her to perform for the Space Division. When she performed she selected Gordon Schulz from the audience to be her straight man. She could not have picked a better person than straight shooter Schulz. Gordon did not want to do it but she would not take no for an answer. Gordon was great. After the performance Gordon was quick to tell everyone how embarrassed he was. All we said was, "Gordon if that's true why did you have such a big smile on your face during the whole performance?" No answer.

I returned to my office feeling great and thinking we had broken the tension for awhile. When I sat down at my desk five upset people walked into my office saying they were going to resign. They were all offended that we had a belly dancer perform on Good Friday, a very religious day. Being somewhat shocked by five key people resigning I thought for an acceptable answer. I finally said, "You know, I apologize for having her here on Good Friday but I do not apologize for having her here. They thought for a moment and then said, "OK, that's fine," and they returned to work. One of many crisis overcome.

Notable Event #3 by Crandall Gudmundson

During our early years of management development 101, we would have staff meetings in one of our large conference rooms that would start around 6 pm and last until 1 am to 2 am.

Subjects were always very provocative, but largely concerning personnel issues (i.e., how to motivate and stimulate people).

At one of the meetings with about 12 people in attendance, tensions were high over some significant personnel issues. Our conference room had two doors on each end which were usually closed due to the loud verbal exchanges between managers. At approximately 10 pm the door opened and a totally nude couple (female and male) raced through the conference room and exited out the front door of the building. We were all in shock! Soon we were asking, "Did anyone get a look at there faces?" No, but the female sure had a nice set of hooters. We never found out who they were. Obviously the meeting adjourned as we all speculated what culprits would have performed such a dastardly deed.

Weeks of intensive investigation proved fruitless, but fun was had by all. We even had some females who tried to confess but we were all able to say, "No, you don't fit the profile." Moral of the story, you can fool a bunch of engineers on a lot of things but not when it comes to approximating dimensions.

Notable Event #4 by Crandall Gudmundson

One of our first very successful European satellite programs was with Dornier for the ROSAT program that monitored all x-ray sources from Space for over five years. Because of our success we were asked to propose and bid on a new European program called ERS-1+2 which was managed by ESA made up of a multitude on countries; Germany, France, Italy, England, Netherlands, etc.

We were requested to send a team with our proposal to Milan, Italy for technical concept review with all of their technical and program gurus. Jerry Muench was on vacation somewhere in Europe. We could not contact him so we had some consternation concerning what team to send to the meeting. We needed a decision maker, Contracts, technical, and quality representation but in the interest of saving money we limited the team to myself, Jack Johnson, and Dick Vanderpool (i.e., very weak technically).

After a thorough briefing of our proposal which was a significant expansion from our standard 2,000 feet of tape to 3,000 feet of tape, five tracks parallel to a serial data stream. The Odetics team was not sure we could make it work. It was a grueling week of meetings trying to explain our far out technical approach without a Jim Welch or a Gordon Schulz to support our approach technically. They said our approach was too risky and expensive at \$5 million dollars. Our competition was cheaper and less risky with a one half inch coplanar design. All of our phone calls to Jerry to ascertain whether our competition had this design were fruitless so we decided to wing it.

On our last day we told them that we could also develop a one half inch coplanar design for about \$4 million dollars and would they please give us enough time to re-propose. They agreed, so when we returned to the USA we frantically gathered all of our engineers together to determine the feasibility of this new design. Electronics were no problem but the Mechanical group was not very supportive. More phone calls trying to get a hold of Jerry to find out what our competition had were still fruitless.

Prodding our Mechanical team to support a new mechanical design was going nowhere. After a few weeks of total frustration we received a contract go ahead on our original proposal at our \$5 million dollar price. What a relief and a cause for celebration. The design went extremely well and we delivered recorders for ERS-1 and 2 on schedule with super performance. They launched ERS-1 on schedule and after four years the satellite was performing flawlessly. ERS-2 was supposed to be a back up if ERS-1 failed. After some evaluation they decided it was

cheaper to put ERS-2 in orbit rather than store it on the ground. They now had two flawless satellites.

One of the experiments was to monitor ocean surface height variation worldwide to accuracies of centimeters. All of this data had to be stored on the Odetics tape recorder and subsequently reproduced back to a ground station in Germany. This data has been accumulated and archived for the past 15 years.

Recently the occurrences of Rogue waves in the ocean has been substantiated through a very credible captain who survived a 30 foot wave that rolled his ship over. He was willing to provide more details. Previous captains who had encountered these waves were reluctant to discuss them for fear of being labeled as a wimp. When this very credible captain who worked for the U.S. Government stated that Rogue waves were for real, ESA decided to analyze all of the past 15 years of ocean height data. The results were startling. They discovered Rogue waves all over the world with heights ranging from 30 feet to 120 feet. The movie Poseidon Adventure was more realistic than anyone could have imagined. Since this discovery, they have re-evaluated many of the unexpected ship disappearances and have confirmed that Rogue waves were responsible for many of the lost ships and crew.

The most recent explanations of how a Rogue wave is created is that a violent thunderstorm can generate huge waves that once created can travel hundreds of miles before disappearing. You could be sailing the ocean on a bright sunny day with calm seas and then wham, a giant wave appears out of nowhere—Could spoil your whole day.

They now consider this problem is so serious they are considering an international satellite system to monitor and warn ships if dangerous waves are in their vicinity. One more significant scientific milestone discovered with an Odetics tape recorder. Three cheers to all who participated!

Notable Event #5 by Crandall Gudmundson

During our early years when the Odetics Space Division was well established, Joel decided to focus most of his attention to starting and nurturing a new Commercial Division. Most of the Space managers attended the weekly Corporate meetings where we met the new managers and reviewed the progress of these new endeavors. One of the new people Joel hired was an accountant by the name of Jack Johnson. I was always impressed with Jack's straight forwardness and bluntness. Jack was definitely not afraid to speak up.

Once he was a little too blunt to Joel. I received a phone call asking if we had a position at Space for Jack Johnson. I was somewhat surprised and told Joel we did not have an opening but send Jack over and we would find something for Jack to do. At that time Len Welsch was a one man show, handling contracts, financial forecasts, cash flow requirements, etc. We decided to have Jack assist Len anyway he could.

Len must have been one hell of a teacher because in a few years Jack became one of our best contract negotiators bringing in lots of dollars for the Space division. Our training must have been pretty good since Jack became a successful CEO for the Iteris Division.

Jim Welch Eulogy
By Crandall, JoAnn, and Family

I met Jim in approximately 1966 when I was a struggling young Project Engineer at Leach Corporation trying to deliver 20 satellite tape recorders without any engineering support. When I heard they had hired a young Electrical Engineer from Washington State University, I immediately asked for help.

Presenting a problem to Jim was like getting a message from heaven. His answer was always, "Ok, let's go fix it!" Jim and I spent many long hours working on various programs. In fact, I spent more time working with Jim than I did with my own family. I soon learned Jim had three priorities in life; Family, Boy Scouts, and Work in that order.

No matter how serious the problem was, at 5 pm to 6 pm Jim would say he had to go home but would return at 9 pm to 10 pm. I soon learned that Jim went home to have dinner and spend some quality time with his family. As soon as his family was OK he would return to work until the wee early hours of the morning. His rationale was so simple. If they don't know I'm gone, then they won't miss me. Later while working at Odetics Jim would schedule his one to two week outing with his beloved Boy Scouts. No matter how serious the problem, Jim would say—"I promised the Boy Scouts, I'm going." I had to explain to our customers that even though Jim was gone, he was still working on the solutions. Incredibly, most of the time when Jim returned to work he had resolved the problems.

In the 40 enjoyable years I spent working with Jim I considered him more of a brother than my own three brothers.

Your loss is our loss. I only hope I am worthy of meeting him again in the future.

The TreePeople program is a great tribute to Jim. We are very happy to participate.

Margaret Lamb's Eulogy
By Crandall Gudmundson

Margaret Lamb was hired by Dick Vanderpool as an inspector in the 1970's. Her progress in the company was astonishing. She went from inspector, to head of manufacturing, to program manager, to Director of all programs, and then to a member of the Odetics Board of Directors in less than 20 years.

Margaret's greatest attribute was always a can do, let's get the job done attitude. She was one great cheerleader as well as a very strong leader. Her greatest strength was her toughness. Her biggest weakness was she was too tough.

One of my policies was to have a total open door policy that anyone in the company could schedule an appointment through Marilyn Holden and get a half hour of total let your hair down discussions of what's right or wrong with the company. I promised no retribution regardless of the comments. One person, Trisha Staffieri, who worked for Margaret, took advantage of this every Friday afternoon at 4:30 pm even when I was trying to get home early. Trisha would show up at my office door promptly at 4:30 pm on Friday afternoon with or without an appointment and proceeded to read me the riot act on what was right or wrong about the company, its managers, policies, direction, etc. By 5 pm I was pretty beat up even though I did not agree with most of her comments. By 5 pm most of my managers would show up at my office and we would generally have a beer while we were all debating with Trisha usually until 6 pm. Fun was had by all in a very relaxed but vociferous debate.

This process was very annoying to Margaret. She was constantly asking why I put up with this crap. My answer was, you know Margaret, I kind of enjoy it and sometimes I even learn something valuable for the company.

Her answer was always—no answer.

Dick Petit Eulogy
By Crandall Gudmundson

Dick Petit and I worked together for many enjoyable years at the Odetics Space Division. Our motto was always—work hard, play hard, and we sure did both! I first met Dick in the sixties when I was a young Project Engineer. Dick Petit and Jim Welch were hired as Electronics Design Engineers to try to improve the very poor Leach electronics systems.

Dick and I worked two years together on a new satellite recorder system for Northrop Corporation. He was a joy to work with. We finished very close to schedule/performance and actually made a profit. I went on to other satellite programs while Dick was recruited for the Apollo program. When six engineers decided to leave Leach and form a new company named Odetics, the comments were frightening.

- A. You will never succeed because you don't have a professional manager from Leach Corporation. Our answer was, "that's why we will succeed—you taught us how not to manage, we won't repeat the same mistakes."

- B. Leach management said they would never let us compete with them, even though at a company meeting they said they wanted to exit the satellite recorder business and concentrate only on high-quantity production products. The Leach lawyer, who looked and acted like he represented the Mafia, warned us that if we contacted any customer that we had been working with at Leach, that we would be sued personally. I believed him. Fortunately, if the customers contacted us it was OK. A little time took care of everything.

When we started Odetics, the first couple of years were extremely stressful. We worked 16 hours per day and were lucky to get a Sunday off. Progress was very painful. We finally delivered a recorder to North Eastern University that provided some credibility in the market place.

Jerry Muench finally had what he needed to go on the road bidding on new contracts. Jerry was bringing in contracts at a rapid rate. The inside joke was they were not contracts they were bears. Jerry would bring in a bear and say, "You hold this one while I go get some more." After four or five years we were totally out of control. We desperately needed someone technically qualified to head up Program Management and bring order out of chaos.

Dick Petit's name came up immediately. We called Dick and asked him if he would accept the job. It seemed like he was there before we hung up the phone. Dick and I and the staff met to try to find a solution. Both Dick and I were black shoe sailors on ships during the Korean War. Dick's favorite saying was, 'We were treated like we were lower than whale shit.' One of the few good things was the ship board Navy did publish a plan of the day every evening for the work schedule for the next day (i.e., we were launching four attacks starting at 6 am. All aircraft had to be checked out, fueled, loaded with bombs, napalms, rockets, 20 mm canon ammo, etc.). All of the required Divisions worked until everything was ready to go. You only got some sleep when everything was completed. No unions, no breaks, no rest; a very smooth operation.

Dick and I reasoned that if the Navy could make a plan of the day work, then why couldn't we have a plan of the week, month, quarter, etc. Our logic was, if you can meet your short-term goals, the long-term goals will take care of themselves. The plan worked great! At our peak we were working on 20 contracts simultaneously with sales of \$30 Million dollars per year and a profit of over \$5 Million dollars per year.

Dick was multi-talented. He would review and interpret customer requirements, help write a proposal, present the proposal to the customer, assist in negotiating the contract, assign the appropriate Program Manager, then coordinate everything internally until the job was finished on time and on budget. Dick was so good we nicknamed him 'the silver tongued devil.'

We were all feeling super; having fun, working hard, and many great accomplishments when Joel decided to draft Dick Petit for a new commercial endeavor. We all told Joel what a hole that was going to leave in our management team. Joel was adamant—you can find a way to self heal. The truth is we never did. Dick's job was divided among three people, but it was never fulfilled adequately. Some years ago, Dick decided to stop drinking any alcohol. He did it cold turkey which shows his strong will power. I think he did it for Cookie and his family.

If we are all fortunate enough to meet Dick upstairs, I am sure he will be giving a seminar on the pros and cons of Budweiser beer. It would be smart if we sat down and listened because of his wisdom.

Thank you.

We Also Serve....(Who Only Stand and Wait.).....
A story of one founder's wife... By Shirley Schulz

I was not long out of university, having graduated with a degree in piano and psychology, and having completed my elementary teaching credential. I had secured a position in the best private school in the Valley. The only problem was getting a driver's license so our sons and I could make the long commute. After several attempts, I finally passed the test with this advice from the officer, "Do me a favor and stay off the freeways". I could live with that because freeways were scarce in the Foothills in 1968. Our little car flew through the canyon every morning, getting us there just barely in time for our classes.

Gordon's commute was in the opposite direction, but when I found a ranch house practically next door to the school which was going to educate our boys through high school and provide employment for me, Gordon approved, and we began to make plans to move. An incurable night-owl, thirty extra minutes in the morning looked good to me.

Before we could make the down-payment, however, Gordon began hearing rumors that Leach was going to let the tape-recorder group go, and he and his fellow engineers began casting about for Plan B. A lot of "what if" thinking took place, and slowly a plan emerged. They would go out on their own! Crucial to this was raising nearly \$600,000. That amount would barely cover the purchase of some basic machinery and salaries for six men, who had agreed to a 50% cut. Joel decided to take a trip to New York to see what interest he could dredge up.

We were not particularly adventuresome, and the fact that we really considered such a step is incomprehensible to me now. It was such a leap of faith, that I'm not ashamed to say, we prayed about it. We decided that if Joel could accomplish his task in two weeks, that would be an indicator that it would be all right to proceed. Joel returned in a week with the money in hand, so we felt committed to the venture.

We took stock of our funds and bills, grateful now for our meager mortgage payment, cut our spending where possible, and took on more students after school and in the summers. Gordon's commute was now very long, so after a few years, we explored Orange County and found another ranch-style house to call home. Thankfully, real estate prices were very low then.

There were plenty of weeks in the first years when Gordon lived in his travel trailer at Odetics, but he did try to get home for weekends. When he could he would wake the boys up early on Saturday mornings and take them out for a 'secret breakfast'. This is when he indoctrinated them in the family wisdom and his hard-work ethic. This is when I caught up on my sleep for the week. On Sundays we took the family to church where I played Organ and Gord led the singing. The boys are following this tradition by participating in worship teams in their individual churches. Our eventual move to Orange County allowed Gordon to be at home in the evenings and keep closer tabs on our sons. I'm not sure they liked that, but they adjusted.

As time went on, Joel would occasionally call all the founders and wives together for one of his up-dates or "state of the business" sessions. Joel was very good at romancing dreamers. We were all hoping for success, and when, 25 years later we were finally able to sell some stock and recoup some of our losses, yes, even make a little profit, we knew Joel's word was golden and we were glad we had gone along for the ride. At these parties, Judy was the hostess. She always served tasty food, and let her artistic flair work for her. These times were such fun for us—real adult conversation—a change

from third-grade repartee.

What were we wives like? Were we Stepford trained, or desperate housewives like those currently on television? Why would we stick around all these years while our husbands sat on Boards and sweat over contracts and contraptions? There are several answers to that: Each of us had a career to pursue, children to rear and guide, and separate groups of friends to sustain us. We may not have known each other well, but we respected each other and we all had a good time when we were together.

Judy Slutzky, who had graduated with an Art degree, used her talents in several ways. She often advised young artists and let them display some of their works in her home, and she served on the Board of the Newport Art Museum for a number of years. Entertaining was nearly a full-time endeavor, and she is brilliant at it. Joanne Gudmundson and Jeanie Muench were both in middle management in different companies. Joanne retired early to pursue her passion for golf. Jeannie always left time in her schedule for travel. Bobbie Welch was a medical office manager and also kept busy with Jim's Boy Scouts. In the beginning of Odetics, the six men met in Bobbie's living room for several months. In the early days, Jim Reisinger went into the practice of law and left the company, so unfortunately, we didn't get to know he and his wife well. As for me, what kept me busy was our sons, Geoff and Craig, and our many dogs—from Dachshunds to St. Bernards and Golden Retrievers. Oh, yes, and there was teaching and music.

What were the perks? Travel was certainly one of them. Gordon and I enjoyed an unforgettable week in Tokyo and a trek through Hong Kong and Shinzen, China. Farmland was actually being plowed by oxen driven by one man, and heavy loads were transported atop ordinary bicycles. Our host engineer invited me to take pictures for my students. "Your children need to know that in much of the world people must work very hard for their food." What a great lesson! Next we were given a tour of a factory primarily engaged in making "boom-boxes". How could we tell them that their technology was too far behind ours to make a partnership practical. We smiled and thanked them for the tour and hoped they could make a profit from their efforts.

On a trip to Switzerland to investigate certain recorder technologies, we enjoyed the beauty of Lausanne, then rented a car to drive through the mountains to Lucerne. Many of the cabins had bells hung from their eaves. We realized these were trophies for raising prize goats and cows. It was so colorful and serene. Lunchtime came, and a restaurant materialized. We walked past a large fish tank at the entrance. I for one do not like to get acquainted with my dinner ahead of time, but there were only two items on the menu, and fish seemed preferable to horse meat. So we ate very fresh fish. In Munich we spent two days going through the National Museum of Science which displayed German invention from the very earliest device, to the Gutenberg printer to the refinements of Aerospace technology. It was serendipity for me to discover a floor devoted to German musicians and composers and to be treated to the playing of 13th century instruments by the resident docent. Capping off that last trip was the "Sound of Music" tour in Austria and a brief peek at Mozart's home. Our heads brimming with culture, we were more than ready to head home to our boys and our St. Bernards.

Odetics was widely known as one of the "100 Best Companies to Work For". There was plenty of reason for that: swimming pool, weight center, personal trainer, cafeteria, picnics, plays, organized sports (Do you remember Gordon doing a handstand at the end of a 5k walk-run?), Lunchtime Bible discussion group, freedom to decorate, such as hanging plants in the machine-shop, and pets like old Gordo the Alligator. (In case you were wondering if he still lurks about, he was given to a zoo.) A Science Club was sponsored by George Westrom who acted as liaison to the public schools to aid the teaching of Science. There were masks and other art on the walls, and artistic effigies of the five

founders lounging around. Something they rarely did.

In the last analysis, the best reason to work for Odetics was its employees—excuse me—its associates. Gordon knew hundreds of clever, hard-working people who were happy being part of a major step for Americans—getting to the moon and circling the planets. I met many casually at picnics and such, but a few stand out. I just want to remember for a moment Steve Bartholet, who was a protege of Gordon's. He was knowledgeable in music as well as engineering and we had many good discussions along the way. When the Crystal Cathedral was built he gave \$500 for a pane of “glass” because he said it was an outstanding architectural achievement that he wanted to be part of. His mind was incredible, and when he conceived the robot and began its production, our Geoff, who had been working on a small robot, was really excited. It was a thrill for him to work with Steve for a year or so. How tragic that we lost Steve so early.

The one who was most helpful to me personally was Gordon's secretary, Margaret Kelly. Beside the awesome job of keeping Gordon organized, she kept me aware of events at the company, and always seemed to know where he was when I needed to get in touch with him. And that was before GPS!

Do I have regrets? Not many. I would have liked to have gone on longer treks through the U.S. And Canada. Our time always seemed to be limited, and wherever we went, even in the middle of Glacier Bay, Alaska, we had to call in to be sure all the wheels were still turning. Regrets are balanced by the pride I feel in being part of Gordon's contributions to Odetics and Aerospace engineering. It was not until we attended the 1988 World's Fair in Canada that I truly grasped the scope of what Gordon and Odetics had been able to accomplish. As my daughter-in-law LeAnn and I walked in and out of the various countries' pavilions getting our “passports” stamped, we saw in six or eight of them the Odetics tape recorders joined in projects with the technology of that country. How exciting to realize what an impact Odetics had had on the world.

I would have loved to have been able to meet the astronauts, but the pictures are nice. The event I did get to participate in was the reception of President George H.W. Bush. We couldn't take our cameras or purses into the hall, but I had written a note to the President ahead of time thanking him for his emphasis on family values. I handed it to a secret service man, and it reached its destination. The company gave several gifts to President Bush that day, including a SPOT colored poster. Apparently no one thought to give him the address of the company, because when he sat down to write his courteous “thank you” note, the only names he had were mine and Gordon's. A copy of his letter is included here, and needless to say, we will always treasure it.

The Odetics story is finished, but there is always something new that requires our attention—grandchildren for example—and there is always something creative to be accomplished if we just stay alert to the opportunities.

Les Horvath's Journey to Freedom

He's Happy to be an American

On December 20, 1956, Les Horvath arrived in the U.S. after a dramatic escape from Communist occupied Hungary. In 1956, 21 year-old Les Horvath lived a relatively carefree life dominated by sailing. In fact he was the national sailing champion of Hungary for three years. However, shortly after the uprising started on October 23, Les's life was to change drastically. At the very beginning he participated in the uprising, joining the resistance and going on patrols and manning road blocks. Since he owned a motorcycle, Les was asked to drive the commander of National Guard troop to Vienna, Austria to negotiate for assistance from the United Nations.

"When we came back from Vienna, the Russians invaded Hungary with 3,000 tanks. They surrounded Budapest and everything looked hopeless," says Les. "I didn't want to leave Hungary, but things looked so bad that a friend and I said tearful goodbyes to our families. We begun our long journey to the Austrian border. We finally reached a point that we thought was the border because we saw Austrian newspapers and cigarette butts lined up on the other side. We found a small deserted village with Austrian signs on the buildings. A very friendly old man greeted us and invited us into a house to sit down and gave us milk and bread. A few minutes later the door burst open and border guards rushed in. I jumped out a window and ran. They shot after me with a burst of submachine gun fire. It turned out that the border guards had fooled us by setting up a fake border."

While Les was leaping out the window, a bullet went through his thigh. "My adrenaline was flowing so fast and I was running so hard, I didn't even feel that I was hit until the guards stopped me and I felt some moisture in my shoe. I thought it was mud. I looked down at my shoe and it was all red," he says.

"We were told later that after the Russians and Hungarian revolt, they reinstated the border guard and we were the first people to be captured at the border. If we had arrived just an hour earlier, we would have made it," he says. Les and his friend were subsequently herded into a truck with other prisoners. In the process, a guard walloped Les in the tailbone, resulting in a wound that was to hinder him later. They were eventually incarcerated in a converted prison where Les spent seven days in a tiny room with twelve other people.

"They fed us bread and a mush made from seeds once a day," he says. "They never gave us medical attention. Meanwhile, my tailbone got infected so bad that for the last three days I was on my hands and knees to relieve the pressure that has built up. Finally the infection drained

and I felt better." After seven days, the prisoners were put on a train which stopped in a train station and waited on the side track in a Hungarian city. One of the men in Les's boxcar had a knife hidden in his boot and they managed to cut the floorboard out.

"All the guards were on the station side of the train," Les recalls. "So we were able to escape one-by-one through the hole and run out on the other side of the train. I happened to have an uncle in this same city so my friend and I went to see him. He had a doctor patch my tailbone and my bullet wound and we found some people to take us across the border. At that time martial law was in effect and the authorities were looking for people who were out after the curfew, especially around the border," he continues. "On our way to meet the people who were going to help us across the border, we had hopped on and off trains. A couple of times we were hiding under bridges and heard guards talking right above us."

With a letter from his uncle, Les and his friend finally made it to the house of the man who would guide them to the border. "The next dawn at 3 am he took us to the next border. On the way we walked right towards a tall guard tower and he said to us 'Don't worry, I know the guards, they're sound asleep.' So we walked right under the tower. All of a sudden we heard screaming, yelling and machine gun fire about 500 meters north of us. Just ahead of us was the Austrian border. The Austrian soldiers were yelling to us 'Come on! Hurry!' So we took off and ran like hell across the border. We found out that a group of about 20 people who were also trying to escape and had run right into a Russian tank."

Les was immediately put into a Vienna hospital for an operation on his tail bone. Shortly afterward, he found an acquaintance from his sailing days in Hungary who expedited the paperwork through the American consulate. In a few days Les and his friend were on U.S. Air Force plane. After they landed in New York on December 20, the Red Cross helped them find a family friend in Los Angeles who agreed to sponsor them." On January 2, 1957, the Red Cross put us on a train in Newark, NJ, with about five dollars between us," says Les. "They put signs on our chest that read 'I am a Hungarian refugee. I do not speak English. I am going to Los Angeles, CA. Please help me find the way.' And we made it all the way through. We met so many wonderful people along the way who helped us."

Les got a job as a patent draftsman in Los Angeles just four days after arriving. Ten years later his parents joined him in the U.S. Les worked at the Los Angeles Drafting Service from 1957 through 1962. He then got drafted into the U.S. Army and served from 1959 to 1961.

While he was on loan from Los Angeles Drafting to CEMSCO (California Electric and Manufacturing Company) he got a job offer and stayed with the firm until 1973, when the

company closed down operations. Les sent out his resumes to about 20 firms and in the morning of Friday, March 30, he got hired by Lear Siegler Corporation. After he got home, his wife told him that a company called Odetics called and wanted him to go for an interview with someone named Gordon Schulz.

Well that interview turned out to be a really unforgettable experience. For two hours Gordon was questioning him about everything from ball bearings to volleyball. Around 3 pm Gordon took Les to see Crandall Gudmundson which was another hour. After that Les went to see Joel Slutzky who wanted to know what sports he participated in. Around 6 pm, Les had enough and he was hungry, tired, and ready to call it quits and go home.

Finally Gordon asked, "How much money are you looking for?" So Les then responded by stating a certain amount (way too low)—Gordon then said, "You are hired and start on Monday!" So this is how Les ended up working at Odetics until 1995, when he took an early retirement. Never regretting his decision because Odetics was really the '100 Best Companies to Work For'—A real great Family.

THE "CLASSIC" JT STORY

Mario Andretti Junior Storms the Bastille

The day dawned full of promise. We had just completed a successful negotiation with CNES, the French space agency on the SPOT program. We had a big team in Toulouse, in south central France. It included Jerry Muench, Russ Marshall, Jay Tuttle, Len Welsch, Larry Eggman, and me. This was my first trip to Europe and I was fascinated and excited by all that was French. The quaint villages, the wonderful food, and the people themselves, with their charming language and calm self-assurance.

Len, Larry, and I decided it was time for an adventure and after a few inquiries of our gracious hosts, we were recommended to visit Carcassonne, a fortified city about an hour away via the Autobahn. We weren't sure what a fortified city was, but we suspected we could probably get some wine there.

After a little negotiating, Len and Larry agreed to let me drive our muscular looking green Renault. They would come to regret that, but not I. As soon as we got on the divided highway, doing a conservative 100 Km or so (about 65 mph), we started getting passed by a lot of cars that seemed to think we were going too slowly (I could tell by the honking). I instantly realized why I liked France so much, and kicked it up to 185 or so. I could tell Len and Larry was getting a little nervous because they stopped talking in the back seat. But, I was having a ball passing a few cars in generally light traffic, fulfilling my life-long dream of going just as fast as I dared. I knew that sooner or later they'd come to realize that I was actually the best driver they had ever rode with in addition to being one heck of a contracts guy. All too soon, we reached the outskirts of Carcassonne,

Mario Andretti Junior Storms the Bastille (Continued)

and I had to slow down as traffic started to build. I thought I detected an audible sigh from the back seat. They must have been disappointed. Or perhaps that was another noise, you never knew with those two guys.

The sight ahead immediately diverted our attention from these thoughts. I wish I could describe better what we saw. The fortified city of Carcassonne was the most amazing thing I had ever seen in my life at that point, and I remember it still. First, it was enormous, on a scale unthinkable in the U.S. It occupied our entire field of view and seemed to extend for miles and the walls, two sets, one slightly behind and above the other, the first one at least 50 feet high and the second one towering over the first. The top of each wall had cutouts for the soldiers to bring their long bows and boiling oil to bear. It looked like it could withstand the siege of many legions, as in fact it had. It looked like it was from an ancient time and place, as in fact it was.

Without giving it much thought, I exited the divided highway and headed in the general direction of the castle, through the town that had grown up around it. There were many signs, of course, but I ignored them, confident I could find the castle without too much trouble; after all, I had already shown that I was an excellent driver! Who could read French anyway?

As we went through the town, the road gradually narrowed. As we got deeper in, there was only room for one car; fortunately none were coming from the opposite direction. I would soon find out why. As we passed a small café, a portly old guy, wearing a beret,

Mario Andretti Junior Storms the Bastille (Continued)

gave us a quizzical look, but I kept on. Just then we came to a tunnel, and I knew it would be very tight. But having supreme faith in my driving skills and seeing daylight at the other end, a hundred or so feet away, I drove forward into the tunnel with confidence and savoir faire. I thought I was doing pretty well when the car came to a sudden halt even though I had not applied the brakes. Boy was I surprised! We were actually pinned in the tunnel, with the rear of the car protruding slightly out. I was starting to feel a little humbled by this experience and Len and Larry were laughing their ___sses off in the back, making sport of my driving abilities and judgment. Looking back, I beheld the old Frenchman, now in the middle of the road, gesticulating with both arms, calling in his countrymen to come out and witness the carnage. Sure enough, people started to come out of the café as though the circus had just come to town.

Back in the car, we couldn't open the doors even an inch. When I rolled down my window and looked down with one eye, I could see the problem. The wall of the tunnel was slightly rounded, narrower at the bottom and just a little wider further up. The wheels of the car were actually pinched in by the walls until no forward progress was possible. We were stuck like a cork in a bottle.

Larry and Len were enjoying themselves immensely. The growing throng of French people was sharing the same joke, despite the language difference. I needed to do something to regain my sacred honor. Fortunately, the Renault was a stick shift. I turned the engine on, revved it up, put it in reverse, and popped the clutch. You could hear a giant sucking sound as we exploded out of the tunnel.

Mario Andretti Junior Storms the Bastille (Continued)

Then in triumph, I did a quick u-turn and roared past the crowd. "Vive la France" I shouted as I waved through the open window. They smiled, waved back, and undoubtedly wondered where that lunatic came from and where he was going.

This story has been retold many times, and always with laughter. And I have become a legend; for my humility and superb driving abilities.

Jack Johnson

ODETICS STYLE

CYD GASKILL

ODETICS STYLE

Odetics was my first job out of high school. It's where I grew up, how could you not - working there. I learned quickly that Odetics had its own style of doing things, that's why I call this Odetics Style. Marilyn Holden interview me and she noticed that we went to the same high school so instead of asking me if I could type, spell and take direction she asked me what families and teachers were still at the school. I guess this was my first introduction to Odetics Style. Thinking she wasn't interested in me working there, you can imagine my surprise when I got the call to start work.

My first memory of Odetics Style was on my first Friday. On my fifth day of work I was instructed by Marilyn, my boss, to attend the Minerva's going away luncheon as these were the people I would be working closely with. After 1 ½ hours I got nervous as no one was making any attempt to leave, and I thought oh this is just great – I go to this lunch because my boss tells me too and then that same person will fire me because I was gone for 2 hours. I soon learned that as long as there was a reason, long lunches was typical “Odetics Style” and something I came to love about working there.

Another great thing Odetics had going on when I hired in was The Odetics Olympics. Sign ups for SOO, Second Odetics Olympics were in progress. Being young and new, I didn't make any attempt to sign up for anything. By being the mail clerk I was starting to get to know some of the great people. Victor Levoit, who to this day remains one of my closest friends, decided to sign me up for the events that he thought I would do well in, which was almost all of them. At first I was upset with him, but after time went by, and I was more secure working there; I wasn't quite so upset with him. After I had won a couple of events, and when I started winning some money I was actually happy that he had taken the initiative for me. Those were great days – I remember people taking bets on a tennis match I had with Carol Ramsey in HR. She was by far the better player, but I was young and could run like the wind, so I just ran her around the court and eventually youth won over experience. This led me to the finals to play against Niki Punsalang. Realizing that money was at stake here I actually trained for this event. I remember my dad and uncle who had trained me came to watch me play. They made me nervous and I was loosing so they decided to leave and they told me they knew I could beat her and to get my head into the game. I guess that was all I needed because I won that competition too. But I think my favorite SOO memory was actually one of the activities that I lost. It was the table tennis match against Brian Grant. I knew there was no way to beat him, so I had to succumb to my feminine wiles. I remember I wore a dress that had an elastic top and waistband that I could pull down to a very low cut top or up into a micro mini skirt if needed. So, when I knew there was no hope in winning, I did what I had to do. I pulled my dress top down and the bottom part up. And that did work for a while, but eventually skill did win out.

Another great memory from my first year there was right around the first Christmas party. Joel Slutzky had asked me if I could take him to get his car from the shop, so I say “are you asking me if I can take you to the shop and get my work done?” He said “yes” and I said “no”, and left to finish my work – well needless to say about five minutes later Marilyn paged me over the PA and explained to me who Joel was and that if he wanted me to drive him then I would. So to get me back – Joel made me play Carol Marrol for him at the Christmas party that year. Being young I was also kind of shy and to stand in front of everyone was embarrassing to say the least. But then after the talent show by the owners, I knew I had nothing to worry about once again. I knew then that it was an “Odetics Style” of party.

It wasn't long before I was promoted to secretary on what was know then as “mahogany row”, with Crandall Goodman, Jerry Muench, Len Welsh and the rest of the gang. I was greeted every morning with two things, a totally stupid joke from Jerry Muench that you had to laugh at and Crandall putting his briefcase on my desk to get his office keys out, I loved that job. But then I started to grow up and decided that although working at Odetics had many perks that maybe there was something more out there – so I decided that I would go back to school, and become a savvy business woman like Margaret Lamb, she was my idol.

As I entered college I also decided that I would prefer a different position to help accommodate my new schedule and so I was transferred to Documentation where I worked with Niki Punsalang who would become and remain my best friend to this date. What a blast, everyone needed prints of one kind or another

and so I got to see a lot of people on a daily basis. Again remember I am all of 19-20 years old at this time. Niki, who wasn't shy in the least, would ask some very personal questions of her fellow employees. Her asking questions would shock me enough, but what was even more amazing to me was that there were very few people who wouldn't answer her. Still, another example of Odetics Style. Boy oh boy did I learn a thing or two working there. It was the most fun a person could have and still get paid for it.

In the many years that I did work at Odetics I fell in love with many of Original members – Crandall is quite simply the absolute best boss in the world – bar none – hands down. Jerry Muench is the absolute kindest person I've ever known. Gordon Shultz now he was a breed all his own. One of the many positions I held at Odetics was expediter where I needed to get the signatures to release the drawings and parts lists. The hardest signature to get was Gordon's. So being young and dumb and not really thinking through consequences I devised a fail proof plan to get his signature. I would run an "E" size blue print paper telling him to come to my desk and sign the document. I would tape this to the door frame in his office so he couldn't miss it. In hind sight I now see that this might not have been the best idea that I have ever come up with, but it did work. I think Gordon was surprised at my boldness that he let it slide, so after a while it just became standard procedure. I remember people walking by and making comments, they couldn't believe that I could get away with this, not with Gordon anyways, but that again was just another example of "Odetics Style".

One of my all time favorite people in the world was also one of the original starters, Jim Welch, what a wonderful and delightful human being. His dedication to everything he did was something to admire. He loved his family and the Boy Scouts, but also loved his job, and his dedication was beyond reproach. He is definitely one person I think of often with the fondest of memories; he pushed when needed and was the biggest teddy bear when that was appropriate too. He was quite simply the best human on earth!

I also had the great pleasure of working with Mr. Dick Petit, as his secretary for a short time. A man I still admire today. He has this gruff voice but a teddy bear demeanor I thought I was the luckiest person to be able to work for him. He would joke with me and ask me to come in and take dictation or what ever he needed at the time and tease me that we would have to play the "office game" and he would pretend to chase me around his desk. On one day when he needed me for something, he called me in and he had his desk pushed to the wall so that when he chased me around it I would get caught! It was all in fun and never went beyond innocent teasing. I also remember the annual Christmas door decorating contest when I came in after Dick left work to decorate his door with his favorite thing at that time, Budweiser beer. At that time I was dating a "Bud Man" myself, and I had him save his cans and I had the machine shop cut them in half and then I glued them together in the shape of a Christmas tree, and got that put up onto his door. What great fun.

As I sit here and write I think of so many people, so many great times. I remember Frank Rooks, John Nyman, Dave Hoff, Bob Macrae, Dennis Barron and Becky Burr. There were Hans and Eric Tallmeyer, and of course Josie from the line. There was Danny Thomas, Glen Roosevelt, Herb Anderson, Steve Bartholet, Sharish Shaw Mustock Faruka, Debbie Lamb, and so many others, the memories just keep flooding back. I remember Gary Barrios, Conrad, Barrios. I was the one who told Cathy Obrien, Jill Waffle, Jackie Negrete, and my sister Whitney to get jobs there. They in turn told some of their friends like Liz Newman. It was where you needed to be. I remember going to Tweeds, a dive bar close to work that a lot of us would go to on Friday nights. I remember the company picnics, the east side of the freeway against the west side of the freeway in a baseball game. I remember the company parties where we would dance on the table tops if we wanted. I remember so much that I could go on forever telling stories. We all worked hard and we played hard too.

But as in all jobs, as close to perfect as Odetics was there were times when I would get frustrated and complain about things. Every time I did, Earl Walls would always tell me that I will never find a job like this, that this place was one of a kind and that I should hold on to it for as long as I can. I wish I had listened to him. I can't even remember the names of some of the places I worked, let alone any of my boss's names. But Odetics now that is seared in my memory, seared in the space that holds the best memories of life. The truth is...I never did find a job that came anywhere close to being what Odetics was to me. Give me Odetics Style any day of the week!

Odetics Legacy
By Jack Johnson

I joined Odetics in 1974, as the Corporate Controller, if memory serves; I was about 16 years old at the time. After that staid world of public accounting, it was an exciting place to work and that's when I first met Joel, Jerry, Crandall, and people like Jim Reisinger, Tom Juengel, Dick Petit, Dick Vanderpool, Jay Tuttle, Gordon Schulz, Jim Welch, and many others.

I still remember my first company meeting. Jerry stood up and told us about all the business we were winning. I'd never heard a menu of so many acronyms in a sentence before in my life. Words like NASA, JSC, JPL, MSFC, CNES, and ESP. It was a language all its own, and I yearned to speak it.

Later I would find that Jerry traveled the entire world looking for business and found a ton of it in exotic places like France, Germany, Italy, Japan, and India. He'd make these two-week trips with only a single garment bag with one suit and a handful of shirts and ties. I've never asked about the underwear and I never will. Jerry always seemed to know what the winning formula was and we won a lot of business.

The truth is, our customers wanted us to win because they liked us and enjoyed coming to see us and they wanted us to succeed. This all started with Jerry. They could see we had a unique culture and that we would do whatever it took to meet our commitments. They also liked our parties, which I'll get to in a moment.

Then there was Crandall, not polished like Jerry and not the articulate showman that Joel was. Crandall had one great quality and that was true grit. If you had a problem you could go to Crandall, one human being to another, and he would help you in anyway he could—as many associates will testify.

Crandall could be tough when he needed to and he wasn't afraid to tackle the difficult issues. If you ever seen Crandall with a beet red face, eyes flashing, pounding his fist on the desk, you didn't want to repeat the experience. Crandall was a father figure to all of us and often described his job as "like herding cats." One of the neatest things about working at Odetics and the Space Division was we all felt we were doing something important, contributing to the exploration of the last frontier—outer space.

Crandall and Jerry took the commitments very seriously and the rest of us did too. It was not unusual for a team to work around the clock for weeks at a time to meet a crucial launch commitment. That sense of commitment was in evidence through the entire organization. There probably wasn't a person in the company who didn't play a key role on a major program at some point in time.

But when the work was done, we sure knew how to celebrate. They started with the first pop top being flopped at about four in the afternoon and continued until well into the evening. Rumor has it that some were still going the next day, although we'll never know, will we?

This group knew how to work hard and to play hard.

Who remembers?

- The stalker who livened up a staff meeting?
- The belly dancer enticing Gordon Schulz with her charms?
- The Bud man, Dick Petit, and the Budweiser sextuplets?
- The test department howling at the moon?

They weren't all happy times. There was the crushing blow that was the loss of the Challenger including astronauts who had trained at Odetics. There wasn't a dry eye in the place on that fateful day.

Through all of this, Crandall and Jerry provided the inspiration and leadership. Our technical and production

Job interview at Odetics.

June 1979.....I was returning home after accepting a job at Ford Aeronutronics Div on Jamboree Rd. in Newport Beach. Heavy traffic made me take side streets back toward Anaheim. This took me past the Odetics buildings on Manchester. I noticed a job posting for a technician position on one of the buildings. I stopped, filled out the application turned it in and left. Odetics was only two miles from our house.

One or two days later I was called back for an interview with Jess Lerma, the interview went fine and he asked me to take a test. I was led to a large meeting room and I started answering the test questions, as I was finishing up a man (Frank Rooks) walked into the room looking for someone. I told him that I was taking a test. He walked up, looked at my test papers a while and advised me to rethink one or two of my answers which I obviously had wrong. He didn't tell me the correct answer/s, he just suggested to double check my results.

A short while later Jess Lerma returned, he went over the test results with me and told me I had passed. He asked me to return for a 2nd interview and I said ok. I returned for the 2nd time, the interviewer was none other than Dick Petit he asked me some job related questions and about my prior job experience. Then he asked if I had any prior military service, I told him I had served in the Navy. This broke the ice, he had also served in the USN, and the rest of interview went very smooth and was almost fun.

After the interview Dick tells me that he would like me to meet the company president (Crandall), I thought this was a little strange but I said ok. We walked into an office where there were already a few people with Crandall. Dick introduces me to Crandall and then I notice that everyone in the room is drinking beer. It happened to be Friday and Odetics was having a company party. Crandall then

tells me that he is going to ask me just one question and if I answer it correctly, I can look forward to working at Odetics. The question was: Ralph, what kind of beer do you drink? I looked around the room and then noticed the beer that was in front of Crandall and I answered that I drank the same kind of beer. We all laughed and the rest is history.

Ralph Gonzalez

Gene Farole Story

Told by

Pat Roosevelt

I had been with Odetics a few years when I went down to Videodetics to be their accountant. Dave Lewis ran Videodetics then and Gene Farole was the Production Director (and wore a lot of other hats). Everyone I spoke to about the move warned me about Dave Lewis. The stories about Dave's temper were common, and I was not looking forward to dealing with him.

One of the first mornings I was at Videodetics, I was talking with Gene. Gene's and my desks were in the same office. Dave came in first thing and was very angry about something, and went on a few minutes yelling and waving his arms. I was very glad at the moment that he was not mad at me.

Well, Dave finally stopped to take a breath (I think). Dave's face was still red and the veins were popping out of his forehead. Gene simply replied to him,

"What ever happened to 'Good Morning' ?"

I loved Gene!!!!!! Also, Dave turned out to be one of my favorite supervisors.

Another Great Odetics Story, my introduction to the Odetics Family,

Introduction Party

The year is 1976, United States Bicentennial, and I am at my first week working at Odetics. What is really surprising is at the end of a couple of weeks working in the drafting department, we have a celebration on a Friday for new associates and major goals in recorder shipments. I remember being introduced along with Emma Hayes as new associates joining the Odetics Family.

I remember Bill Krebs adjusting the huge ovens temperature and noticed that he was actually cooling bottles of wine and beer! Two guys were conversing with Bill and asking how long before the stuff will be cold, those guys later to be known as Dick Petit and Dick Vanderpool, the two Dicks. Crandall stuck me as a very good speaker and a very funny guy at that. I was new with this company, new faces, new places, and new routines.

So when all was said I indulged in a bottle of beer and proceeded to play table tennis, a good way for a new guy to meet everyone slowly. I was already acquainted with Glen Roosevelt because he was responsible for me being hired along with Dick Vanderpool and Crandall. We partied well into the evening and I remember calling home to say I will be home later than usual because they were throwing a party for me.

Picnic in the Park

The staff members would cook for the associates at the annual bar-b-que picnic at Ponderosa Park. I was shy and not very comfortable being a new associate. I got in line and received a hamburger and a hotdog with chips and a soft drink. I sat on the grass and proceeded to feed my face. I went back for seconds and resume eating. Meantime not being aware, the guys had chosen sides and were starting a friendly flag football game. I finished consuming my lunch and stood up to watch the action.

Glen Roosevelt noticed that I was one of the few guys not participating in the game so he called out to me if I wanted to join in. I was happy to go into the huddle and be accepted as one of the guys. While in the huddle, a thin frail bearded man takes over and asked the question, "Can any body throw a football?" After a dead silence for what seems to be a long period, knowing that no one was going to answer, I replied that I could throw a football. He looked me over in amazement and said to call the play. I asked who the receivers were. Glen, Gerald, and this man all acknowledged. I instructed Gerald to spit wide left and go 10 and corner right. I instructed Glenn to play the right slot go 5 and corner left. I instructed the bearded man to spit wide right and go 10 and post, to keep running and do not stop. Hike on the count of 3.

So we line up and I call the cadence and the ball is hiked to me in the shot gun position. I look left and I look straight and fake a throw towards Glen's position which draws the safety a step in. That is the step I was looking for. The line was holding well. I plant my feet and cock my arm and threw the football down field as far as I could throw. I noticed the bearded man had a step on the safety and this was going to be a great play. About 40 yards down field, the bearded man comes to a stop. He looks up and the football goes flying well over his head. Incomplete pass! We all return to the huddle for the next play calling. I look at the bearded man and asked why he stopped running. His reply was "I did not think that you could throw a football that far! The bearded man I later found out was Joel Slutzky. So this is my first encounter with the CEO and from that day on I earned his respect.

Victor Levoit

Tom Juengel Story
Told by
Pat Roosevelt

In 1972, I had only been with Odetics a few months working as the Accounts Payable Clerk; and was making a "whopping" wage of \$2.05/hr. I am a very conscientious worker and was concerned because my payables were getting so far behind each time I had to type up a proposal. Proposals were the "hot" item and all other work could wait when we had to get out a proposal.

Carol Ramsey, a secretary at the time, could see I was getting upset and asked if she could help. That's all I needed, and I started to cry. Carol told Tom, and he called me into his office.

After I explained my feelings and how concerned I was about the work getting so piled up, he replied to me,

"Pat, you don't make enough pay to get this upset!"

Well, I instantly went from tears to hysterical laughter. Tom was usually right and could usually make me laugh.

Crandall Gudmundson Story

**Told by
Pat Roosevelt**

I had been with Odetics nine months. The Accounting Dept at the time was located down the street at the old Altec Building by the Dunn-Edwards paint store.

Marilee Caswell and I went to Crandall to ask if we could have dancing at the Christmas Party that year. We thought it would be fun since the accounting dept was in a separate building and had plenty of room. We wanted to decorate and bring in a record payer (yes, a record player) and “dance the night away”.

Well Crandall replied that he didn't know if we should since there were quite a few married associates and the spouses were not invited. He specifically asked if there would be “slow” dancing. This specific movie was not even made at this time, but now when I think back about the whole issue – I think it could well have been a scene out of “Footloose”. =)

We did end up having dancing and everyone had a great time – even Crandall!!! I think we had dancing every year after that at the Christmas Parties.

Being the Westinghouse Quality Engineer (QE) I received the privilege of hand delivering several Westinghouse Tape Recorders "Wec Recorders" to Baltimore. The Wec Recorders were the size that met the Airline's requirements for carry-on luggage. The recorders could not leave my sight so they could not be checked as baggage nor put in the overhead compartment but had to go under the seat in front of me.

I arrived at the airport with my security letter in hand. The letter described what the recorders were and why they could not be opened or x-rayed. It included United Airlines corporate security phone number, Crandall's home phone number and Tim Olcott's (Odetics Security Officer) home phone number.

I checked in with the ticket agent and explained what I had and per Airline Line policy she would have to walk me to security and verify that she had checked my identification. She got on the phone with airport security telling them I had a radioactive device I wanted to take on the plane. I got on the phone with security and explained what I had and that the symbol on the side wasn't a radioactive sign but Electro Static Discharge (ESD). Security let me into the boarding area but kept my ticket and boarding pass until they could check me out.

The pilot came out to talk with me to make the final decision on whether or not to allow me on the plane. I explained to him what I had and showed him a picture of the inside of the recorder. He told me he had called my president (Crandall) at home to check me out and that he was upset because he had woken him up, but that he wasn't as near upset as the first person he called because he called the wrong number the first time. I laughed; he returned my ticket and boarding pass. Subsequent recorder deliveries were uneventful.

Bruce Martin
Quality Engineer

Odetics Memoir on Jake Beser by Victor Levoit January 2005

History of Jake Beser

Jacob Beser was a 24-year-old radar specialist aboard the Enola Gay on Aug. 6, 1945, when it dropped the "Little Boy" atomic bomb on Hiroshima. Three days later, Beser was aboard Bock's Car when "Fat Man" was dropped on Nagasaki. He was the only person who crewed in the attack aircraft of both missions. His responsibility aboard the planes was to monitor the workings of a fuse-device that set off the bomb when radar beams bounced off the ground indicated that the weapon had fallen to a precise altitude for an air burst of maximum destructiveness. In Hiroshima, the altitude was 1,850 feet. His other job on the flight to the targets was to make sure that there were no enemy radars using the same frequency as the fuse -- which could have set off the bomb prematurely.

Q: *When people talk to you about the whole experience, what question do they ask you most often?*

A: *Would you do it again.*

Q: *Would you do it again?*

A: *Given the same circumstances in the same kind of context, the answer is yes. However, you have to admit that the circumstances don't exist now. They probably never will again. I have no regrets, no remorse about it. As far as our country was concerned, we were three years downstream in a war, going on four. The world had been at war, really, from the '30s in China, continuously, and millions and millions of people had been killed. Add to that the deliberate killing that went on in Europe, [and] it's kind of ludicrous to say well, geez, look at all those people that were instantly murdered. In November of 1945 there was an invasion of Japan planned. Three million men were gonna be thrown against Japan. There were about three million Japanese digging in for the defense of their homeland, and there was a casualty potential of over a million people. That's what was avoided. If you take the highest figures of casualties of both cities, say, 300,000 combined casualties in Hiroshima [and] Nagasaki, versus a million, I'm sorry to say, it's a good tradeoff. It's a very cold way to look at it, but it's the only way to look at it. Now looking into tomorrow, that's something else again. I don't have any pat answers for that.*

A quote from history

As we again experience the annual attempt by some to rewrite the history of World War II, I offer a quotation from Jacob Beser who was the Radar Countermeasure Officer on the Enola Gay and Bock's Car and, as such, flew both missions to Hiroshima and Nagasaki:

"I, for one, to this day cannot forget the impression the Japanese made on me as a youth and at Pearl Harbor and Bataan and Shanghai. I felt then as I do today, in the context of 1945, that the Japanese, like the Germans, earned everything they received."

--from Hiroshima and Nagasaki Revisited, Jacob Beser, copyright 1988

--David W. Carroll

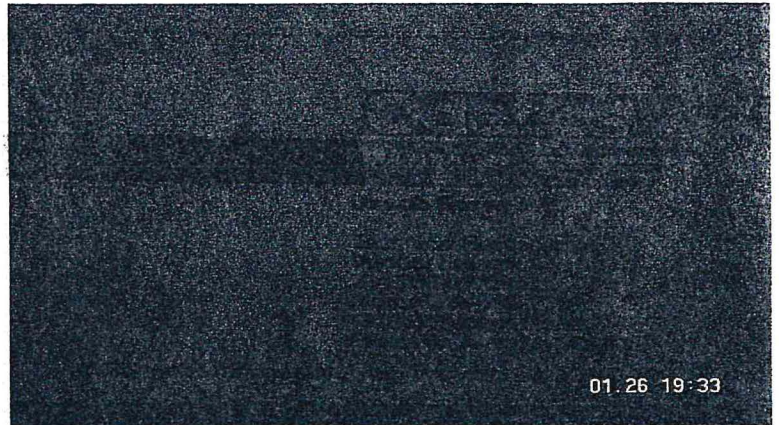
Jacob Beser worked in Washington DC with Weston House Corporation for whom we built classified tape recorders. We had no idea where the recorders were used. Mr. Beser then worked as a consultant with Odetics. It was here he would autograph his book "Hiroshima & Nagasaki revisited" and distribute to us with a signing session.

Mr. Beser would sign his book to my sons, Nathan and Derek, with best wishes, Jake Beser, 9 / 27 / 88. I also had another book "Hiroshima" by John Hersey. It was a small hardcover book that was copyright in 1946. It is the story of six human beings who survived the explosion of the atom bomb over Hiroshima. I found the book at an elementary school book sale and bought it for \$0.25. I showed the book to Mr. Beser and he acknowledged that he was a good friend of John Hersey. Mr. Beser asked me if I wanted him to autograph that book also. I happily responded with a positive reply. What he wrote in the book was: Jake Beser, 1st Lt. USAAF, Radar countermeasure observer, Enola Gay – Bock's Car, Hiroshima – Nagasaki, Aug 6 – 9, 1945. Mr. Beser then replied if I were ever to sell this book not to ask anything less then \$200. I still have that book today.

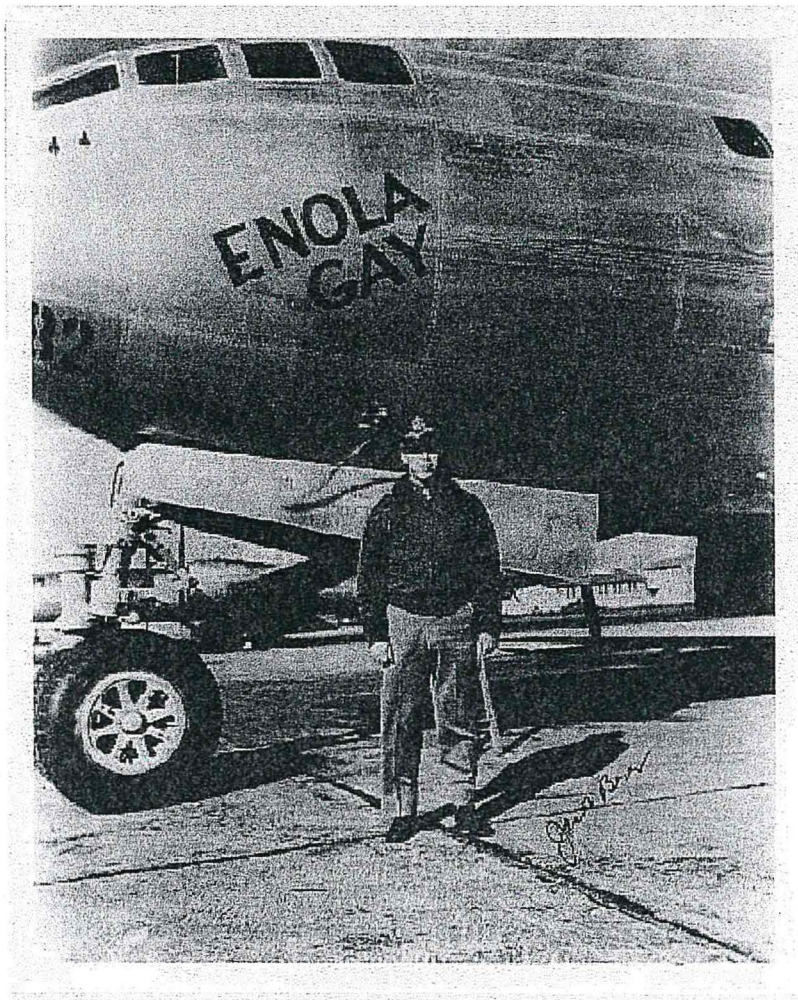
Can anyone ever image being in his position at the time of war. But he really did not know of his secret mission until just a few hours from flight. Mr. Beser's experience from the first flight mission got him on the Nagasaki Mission at the last minute. I am so lucky to have crossed paths with a very special person that will be forever remembered in history.



Jacob Beser



Jacob Beser Odetics Business Card



ENOLA GAY

FLIGHT CREW :

Col. Paul W. Tibbets, 509th Group CO and pilot

Capt. Robert A. Lewis, co-pilot

Lt. Jacob Beser, radar countermeasure officer

Navy Capt. William "Deak" Parsons, Manhattan Project Scientist

Sgt. Joseph S. Stiborik, radar operator

S/Sgt. George R. Caron, tail gunner

Pfc. Richard H. Nelson, radio operator

Sgt. Robert H. Shumard, assistant engineer

S/Sgt. Wyatt E. Duzenbury, flight engineer

Lt. Col. John Porter, ground maintenance officer

Capt. Theodore J. Van Kirk, navigator

Maj. Thomas W. Ferebee, bombardier

Jacob Beser was born on 15 May 1921 and died 17 June 1992 in Baltimore, Maryland at the age of 71 of cancer.

THE BOMBING OF HIROSHIMA

On August 6, 1945, a United States Air Force B-29 aircraft, called the "Enola Gay", dropped the "Little Boy" atomic bomb on Hiroshima, Japan.

It was the first atomic bomb ever used in war. It ended up killing between 130,000 to 150,000 people.

The bomb leveled Hiroshima to the ground. It exploded with the force of 12,000 tons of TNT. The heat from the explosion exceeded 50 million degrees Fahrenheit at the center of the fireball.

For decades after the bombing, historians, survivors, and politicians have debated the atomic bombing of Hiroshima.

NAGASAKI

On August 9, 1945, a Trinity-type weapon of about 20 kilotons was exploded about 1,800 feet above Nagasaki. Nagasaki was chosen as a target because it was a major naval and shipbuilding center. The Nagasaki shipyards were the largest privately-owned shipyards in Japan.

The original intended target was Kokura, however, cloud cover made it impossible to drop the bomb on Kokura. So the fallback target of Nagasaki was chosen instead. Within days Japan surrendered.

DAMAGE CAUSED BY THE ATOMIC BOMB EXPLOSION :

Levelled Area...6.7 million square meters

Damaged Houses :

Completely Burned....11,574

Completely Destroyed....1,326

Badly Damaged....5,509

Total....18,409

Casualties :

Killed....73,884

Injured....74,909

Total....148,793



Hiroshima and Nagasaki Revisited by Jacob Beser
An out-of-print publication by a man who held the distinction of being the only person to serve as a strike crew member aboard both the "Enola Gay" and the "Bock's Car." Paperback

ON SALE !!!
(Regularly \$40.00)

\$25.00 Add To Cart



Shannon

Victor



Nathan

Derek

Shannon Boomer started at Odetics in February 1985

Victor Levoit started at Odetics in March 1976. Victor worked as an electronic technician on many programs but the ones that were most rewarding were S.P.O.T. for France CNES, and Galileo with J.P.L. It was the Galileo tape recorder that heavily supported the success of the Galileo program to Jupiter. Galileo was launched from the cargo bay of Space Shuttle Atlantis in 1989 and ended its mission September 2003 by entering the atmosphere of Jupiter. The S.P.O.T. satellite was responsible for the success of "Desert Storm" by taking real time photos of troop movements in the Middle East.

Links to Jacob Beser

www.brucegoldfarb.com/beser.htm

www.ehistorybuff.com/besser1.html

www.childrenofthemanhattanproject.org/collections/mp-pfil/pages/MPP-PF...

JB Quote www.lani.gov/orgs/pa/News/letter2000-149.html

www.theenolagay.com/event.html

photos www.theenolagay.com/photo.html

enola gay crew www.nasm.si.edu/galleries/gal103/EG_crew.html

enola gay flight www.vnaairshow.com/tibbets.html

Japanese eye witness accounts www.mthoiyoke.edu/~mfujita/hiroshimanagasaki.htm

Reflection Nagasaki www.uwosh.edu/home_pages/faculty_staff/earns/olivi.html

en.wikipedia.org/wiki/Enola_Gay

www.eastlineweb.com/~steve23/enola.htm enola gay and bockcar

www.brainyencyclopedia.com/encyclopedia/e/en/enola_gay.html

www.zvis.com/nuclear/showexpinfo.shtml?data/littleboy.dat

history1900s.about.com/library/pmm/blbombthatended2.htm

www.thejeffreport.com/logic.htm

www.military.cz/usa/air/war/bomber/b29/eg/eg_en.htm

interview www.brucegoldfarb.com/clips

movie us.imdb.com/Title?0080689

wendover www.gototahoe.com/hubbard/hub_enola.html

ks.essortment.com/whatwasenolag_rkpe.htm

aftermath pictures www.nvccom.co.jp/abomb/giseie.html

Odetics life and times from John Gluth,

I worked in the model shop at the original 1859 S. Manchester building.

It was 1981.

Of course in those days there was no cafeteria. On day at lunch I bought a large Chile Dog from the Hamburger Hooker. Back in the shop I set the Chile Dog on the table at my workstation while I went to the washroom.

When I returned to enjoy the Chile Dog and Soda, I immediately noticed a large bite had been taken from the Chile Dog! Glancing down to the other end of the shop there was Ron Garrison looking back trying to smile with his mouth stuffed!

I said nothing to Ron even though it surprised me. Stifling my temper I simply cut the bitten part off with my kitchen knife and ate my abbreviated Chile Dog!

3 months went by. Then one day someone was selling See's Chocolate bars with almonds for a fundraiser. Ron left most of his chocolate bar unattended. Upon returning Ron discovered the entire bar was bulging in my cheeks at the other end of the shop! He didn't say a thing. He only nodded. Ron had a mannerism of shallow nodding with the neck and head together meaning, "Yeah" like "OK, you finally got me!"

Of course Ron was always doing something irritating at every opportunity. Eventually, thank God, I came to understand he thought he was funny.

Aloha Victor!

The only funny story I had was from a corporate staff meeting when Jack Johnson was leaning back in his conference room chair, a bit too far, fell back on his ass and cut an enormous fart all at the same time!

Oscar Wright

Perception – a story on following procedure and protocol by JW

Final ATP was always a critical time when performing testing on any Odetics tape recorders. The environment was even made more complex with in-house representative constantly taunting and asking questions as major test functions are being performed. We want to impress our peers as well as the customer to show that our machine will perform flawlessly.

(It is that little “extra” testing that is not required or to veer slightly from the procedure. Only to know at this time a significant “problem” may occur. An experience technician would never take this avenue.)

More so when a problem occurs and more tests are run unexpectedly only to cover and mask the results making it much more difficult to solve the original problem.

Jim Welch would be summoned and after reviewing the situation knowing the technician performed the wrong course of action would become irate and walk in circle pounding his fist into his hand.

Jim would settle everybody back to normal with his perception story.

“It is the bottom of the ninth inning with two outs and the home team is down by a run. The bases are loaded and the batter is ahead of the count 3 and 1. The management and pitching coaches are collaborating because they know the pitcher very well. The signal is sent to let the next pitch go by with out swinging. The pitch is delivered and the batter sees an opportunity, the ball is thrown perfectly in his strike zone, so he swings at the ball. He connects and the ball is hit very hard looping towards right field. The crowd is silenced; all eyes are on the ball as it sails toward the homerun fence. All the ball players are leaning out of the dugout to witness the out come.

The ball is in the air for a lengthy time as it returns to earth it is projected to be near the right field fence but it comes down a few inches from the out reach glove of the right fielder and clears the home run fence. HOMERUN! The game is won. The batter is applauded and the fans are ecstatic.

The perception is that the batter is a hero in the eyes of the fans but questionable in the eyes of the baseball management decision makers and players, who knew the call. This is a rare situation of defying authority but come up smelling like a rose. Is this guy a hero or is he to be trusted as a team player?

Stick to the game plan and do not veer. In the case of the tape recorder problem, stop at the next convenient test and observe and record all telemetry and measurements to do a successful problem determination. If not, be ready for another lengthy conversation with JW.

JOHN Hales
VICTOR LEVIT

My favorite Jim Welch story was that he and Gordon disagree on where a head preamp should be located. Jim wanted it as close to the heads as possible. We were all in the conference room and Jim was standing next to the light switch. He was telling us how important it was to minimize line losses. As he talked he was slapping the wall. With every point he raised (and he had a list of them in his mind), his voice got louder and he slapped the wall harder. On the last point, he was almost shouting and his slap became a closed fist hit. To all of our amazement, including Jim's, his fist went through the wall. As we helped him extricate his hand, I said "Jim, I think you made your point". We all decided to move the preamps closer to the heads.

Joel

ODETIC STORY

6/12/06

Thanks for the invite to share my experience at Odetics. It's been over 30 years since I was part of the crew. However, I think not a week goes by that I don't think of some event or person or application to what I'm doing, but something comes to mind in relationship to the time I spent with the big O. I'll try to relate as many stories and thoughts as I can remember.

I was hired as number 11 on staff as a circuit board designer. I believe Norma was just before or after me on the team. (I'm sorry I can't remember her last name). Jim Welch was my boss. I'll have my Jim story later. Glen Roosevelt came along about the same time. Glen was tall, slim, and athletic with dark long hair. Glen was great to work with and at one point started the volleyball at lunch. That was a great time for me. I really enjoyed the time we spent batting the ball. He was a bit more competitive than I was, but I had more fun than he did. Glen proved to be a good supervisor for the drafting and document control department.

My friend George DeLand showed up and did the mechanical design stuff. At one time I owned this great 1956 Ford pickup truck. I had overhauled the engine not long before and wanted to sell it. So George, being the trusting guy that he is, said "I'll buy it from you." Well, two weeks later, George and I spent a few evenings together replacing the head gasket. I did hear a few years later that it was still running and making trips to the dump.

Jerry Nutter came into my life (neat and clean Jerry). He was the most neat and clean draftsman I ever met, always happy and of course the cleanest teeth of any person I ever met. If any food went in his mouth, the toothbrush was right behind. I always enjoyed Jerry.

Jim Moore was a great companion. He was my equivalent on the mechanical design side. Jim was always gracious and long-suffering when I wanted to put my transformer where his brace had to go. So I just moved his brace (ha).

When we worked more than our standard 110% the company would buy dinner and I think it was at Dandel's. The BeefEater was best sourdough bread, Swiss cheese and sliced beef sandwich. I think it was then fried in butter, only about 3000 fat calories. We had good times together at the table, but my young wife thought it best for me to be with the family. So I began to spend my overtime dinners at Maggie's Kitchen, I still eat at Maggie's Kitchen some 30 years hence.

Then there was Steve Barthelet. Well I have some stories and I'm sure you have many more. There was the Bar bomb under the balcony. Boy, was that hair-raising and the magnesium 50 gallon barrels in the dessert that caused quite the stir at the desert police station. And how about the hydraulic experiment in the dorms at school... "Let's all flush at the same time and see what happens." Well it happened, you go figure. I was so pleased to see an article in our local paper about the robot he designed not too long after we moved up to Grass Valley. I continued to watch for any more info on the robotic field that Steve might have been involved in. I was very saddened to her of Steve's passing. What a loss of an inventive mind and risk-taker!

Now lets talk about Hans Tolmeier. Wow, what a machinist! I used to be able to stand and watch that man work, or I should say make music on his machines. In some ways it's a shame C. D. machines were invented. I have always wondered if he still has his long hair and beard. With all that rotating machinery they must have gotten just a little shorter at times. Hans was the chief in his house. I'll never for get how he signaled

time for the family to start eating. At our house we thank the Lord for what we have, but for Hans it was and could still be fork and knife held up right and then he said "EAT!" You may not know, but Hans is responsible for us choosing Grass Valley CA to move to. He vacationed in Grass Valley in about 1970 and came back and told me, "Al, you have to go to G V and take a look around. So we did and fell in love. GV was a small struggling town at that time, but had Grass Valley Group, a TV switching systems design and manufacturing company. For five years we worked to find a way to move and finally decided to go into construction.

Along with Hans worked Jerry (I can't remember his last name). Jerry was a very inventive guy. If Jerry had more than 10 of any one thing, he could build something worthwhile. I remember one time our families went apricot picking together. While we were at his house he showed us a man's suit he had sewn by himself (as his first sewing project!). If it took a machine and some material he would tackle the job.

Well, shall we move on. Then there was Connie in assembly. I would design something that was hard to assemble and good ol' (I did not say old) Connie would come to me and say, "Al, it can't be done." We would sit together and work and work and she would do it and make me look good. Thanks Connie. Over the years I have interfaced with many assembly people and found the best advice comes from the people who have to put it together. If we listen, the product is better and everyone is happier thanks to the shop people. They are very important to the company.

You know this brings me to something that was probably the thing I have missed most after leaving Odetics. It was the ability to sit in somebody's office such as Jay's or Davey's and just show them on a blackboard a problem and have them say what do you think about this or that. Most of the time they didn't have the answer nor did I, but it evolved to a solution.

Now on to Dick Vanderpool, the mohair-bearded guy. I don't think I have ever seen a more dense even beard. This reminds me of the beard contest created by Mr. Joel. I have never removed my beard since that contest. I did lose my mustache when my wife mentioned the big D word. I felt I could compromise so the beard stayed less the mustache. I have been introduced as "my Mormon friend", "that white-bearded guy" one time on the job when I was being a jerk. My kids and grandkids have never seen me without a beard thanks to Joel.

Now that Joel's name has come up in conversation, about a month or so ago I contacted him for a lunch date. He was gracious to set up a time with some of the old guys (I think Les Horvath had something to do with it also). Boy, what a delightful time that was for me. Some of the guys looked just like I had remembered. They were some balder and whiter, but behind the changes were the same wonderful personalities. I felt I had just been on a short vacation and was catching up on what went on while I was away.

At the lunch, Joel asked me what was my best memory of Odetics and I replied it was the most fun place I ever worked. But after pondering the question on the way home, I believe the best thing Odetics did for me was to empower me to develop a self-confident can-do attitude and give me the encouragement to think outside the box. Very rarely did anyone say, "You can't do that." Usually it was "Let's try it. At least we will know if we're wrong." Thanks Joel for your leadership and creative ideas relating to personal life, business, and sports. The swimming pool was fun, but...

Mr. corncob pipe (I loved you, Crandall). You were Mr. Mellow and I'm sure Joel growled at you when you said, "Well let's just think about it for awhile." Thanks Crandall.

The first time I met Jim Welch was one evening I was moonlighting to design a small circuit board for him. I think it was for a video camera. We met in the old Odetics building to talk about what he needed in the way of layout. Jim and I seemed to just know what each of needed from the get go. Jim was very good at laying out his schematics. So my job to layout the circuit board was simple. Just follow his schematic for circuit flow. But Jim, being the guy he was, would give me the credit for being so smart to know just what he had in mind. This brings me to, I think, the biggest effect he had on my life. He gave me self-esteem by telling me, "You can do it, Al. You always have in the past."

Boy, was Jim decided to the job. Jim and I had an unwritten, unverbilized bet to see who could get to the unwashed, baked on coffee pot in the morning around 5:30 or 6:00 a.m. The problem was, I think he was the guy that left the pot on the night before. I never verified that. Anyhow the drill was grumble about who did this dastardly deed, then hot water, pink boraxo, elbow grease and rinse. The reward was that rich aroma of fresh coffee in a clean pot and a smile from Jim.

Jim was a good mentor. He had standards for me to live by, but was very willing to let me go "outside the box". He trusted me and encouraged me to try new things. I don't remember a time he was angry, but he would give good directions.

Jim and I had a good relationship. He always had time for me. However, he liked to answer the phone when I was in his office and let me sit and wait. So I began to think outside the box. I called him on the phone even though I would rather work face to face.

I've been gone over 30 years, but not much time goes by that I don't think of Jim and our work relationship. The classic event was one day I went in the restroom and there stood Jim at the urinal with a pencil and paper pressed against the wall designing a circuit (multi-tasking). But here is the best part. (He was a true mentor.) Not long ago I realized I was standing at the toilet with a piece of paper and pencil designing a tool for my equipment (multi-tasking) and had to stop and think, I'm just like Jim.

Each of us has many someones that shape us and Jim was one of those special people. Thanks, Jim, and you are missed.

(I hope someone told about the cigarette ash.)

Well you might want to know a bit about what I have been doing for the last 30 years. By the way, the send-off you guys gave me was an honor beyond what anybody could have even dreamed of. My son still has the table saw you gave me and I still have the memories. Thank you, thank you.

Well, back to history on me. I built speculation homes and custom homes for about 8 years and then we had a housing crash. So my first thought was to go to work at Grass Valley Group but CAD design had come into vogue. (I still design with paper and pencil). So I got 3 houses to build in Long Beach CA to wait out the slump. But I decided to start a concrete construction business. I worked up to about 8 employees with jobs spread out about 50 miles from home and apart from each other. This went ok until I made one of business's fatal mistakes. I had never done any job larger than \$150K but I took on a \$350K job. Well, Joel can tell you (it was probably in his so you want to get

gray hair class. Never double the size of jobs you are used to.) Then we had 19 days of rain, It took 6 of us 3 weeks to clean mud from trenches before we could pour concrete in the trenches and get paid for the work.

This all made me reevaluate what I was doing. At that time I was nearing 50 years old. Concrete work is about like football, 45 years old and time's up. So I looked at the options. I owned a tractor when we moved up to GV, and in the meantime had been running an excavation business in conjunction with the concrete business. If given the chance I would rather run the tractors than most anything else. So now I am known as the "Earth Sculptor" here. I love what I do. It is like taking a blank piece of paper and creating a work of art only on a big scale. Every lot in the area is rolling hills and the challenge is to get the road, house pad and septic system to all flow together (no pun intended).

I am currently the chairman of our local fire protection board (an elected position). I am an appointed member and chairman of a sewage disposal advisory board to our county board of supervisors and have been an elder of our church for more than 10 years. Also, 3 years ago my son and I started an Urke Enterprises, Inc bubble which has proven to be a very successful septic tank pumping business. It all smells like dollars to us! And I can tell you more than you want to know about septic systems, i.e., 40% of all dwellings in the US are on septic systems and the percent is growing as people move to the hinterlands to escape the big city.

So I'm a long way from Aerospace. But I want you to know the thing I get the biggest kick out of is designing tools and equipment to enhance our business. Thanks for setting me up at Odetics for a fun-filled adventure. Hope to see some of you again before we pack it in.

Thanks,

Alvin U

Even though Steve Bartlett wasn't part of Spaceborne Div, I recall the Mona Lisa spin off we did of him in the Spaceborne lunch room where we played the Mona Lisa song by Nat King Cole and presented Steve with a altered picture of Mona Lisa with his face instead, it was one of many memorable moments.

I also recall, with pleasure, my favorite of all Odetics Christmas parties, the Hawaiian themed party at the Grand Hotel, with Mel Liafu doing fire swallowing and his family doing Polynesians dances. Crandall, Joel, and a couple of other from Space ran around the perimeter of the room in provocative Hawaiian clothes.

Michael Niesen

Dick Petrich (petrich@meggitt-ce.com) +Add contact

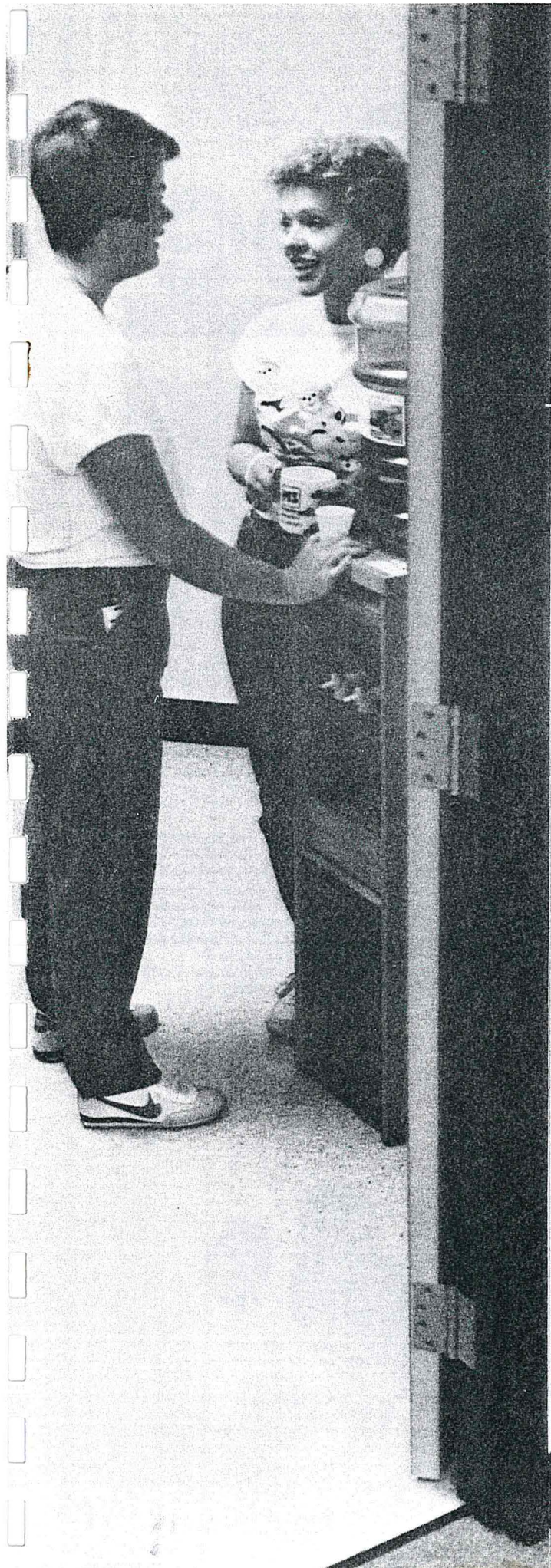
To:

"Victor Levoit" <viclevoit@hotmail.com>

Subject:

RE: odetics story book

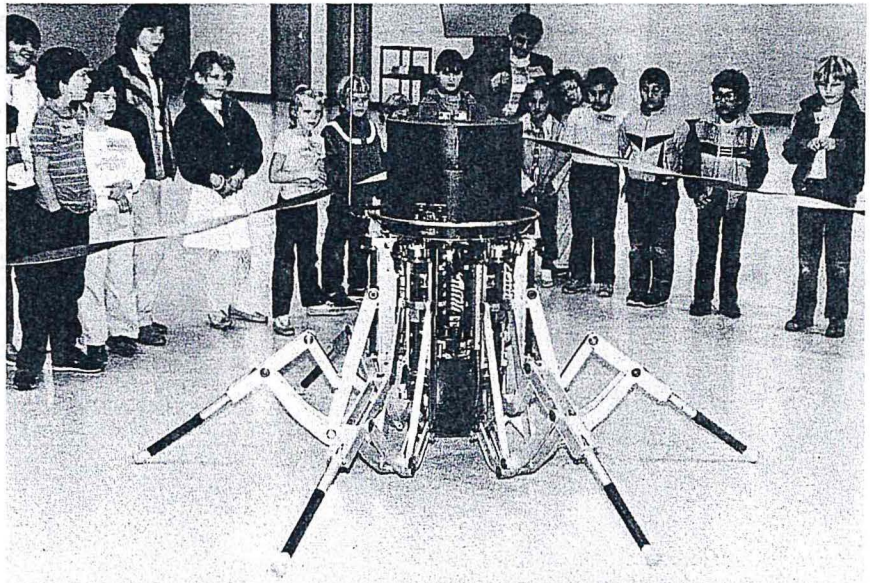
I'll tell you one Victor. Crandall called me one day and said, Petrich I know you drink Budweiser, get us some empty cans from them so we can build a replica of the Space Shuttle. So upon command from the big guy, I called Budweiser and told them what we had in mind. They said they would get back to me in a couple of days. Well in two days they called and said there is a slight problem with our request. I asked what the problem could be and they explained it would cost too much to shut a line down to cap empty cans. They asked if we would accept full cans instead. I hesitated for about two microseconds and said well, if you insist. So what do they do, they sent this big Budweiser truck to my house and unloaded these cases in my garage. My wife had a fit, thanks a lot Crandall. She couldn't even park her car in the garage. But needless to say, with the expertise we had at Odetics the Space Shuttle was built. The best part is yet to come. It would have been much too heavy using full cans, so we had to carefully drain the beer out of each can. You ask, so where did the beer go? We had ingenious ways of getting rid of it.



Familytree

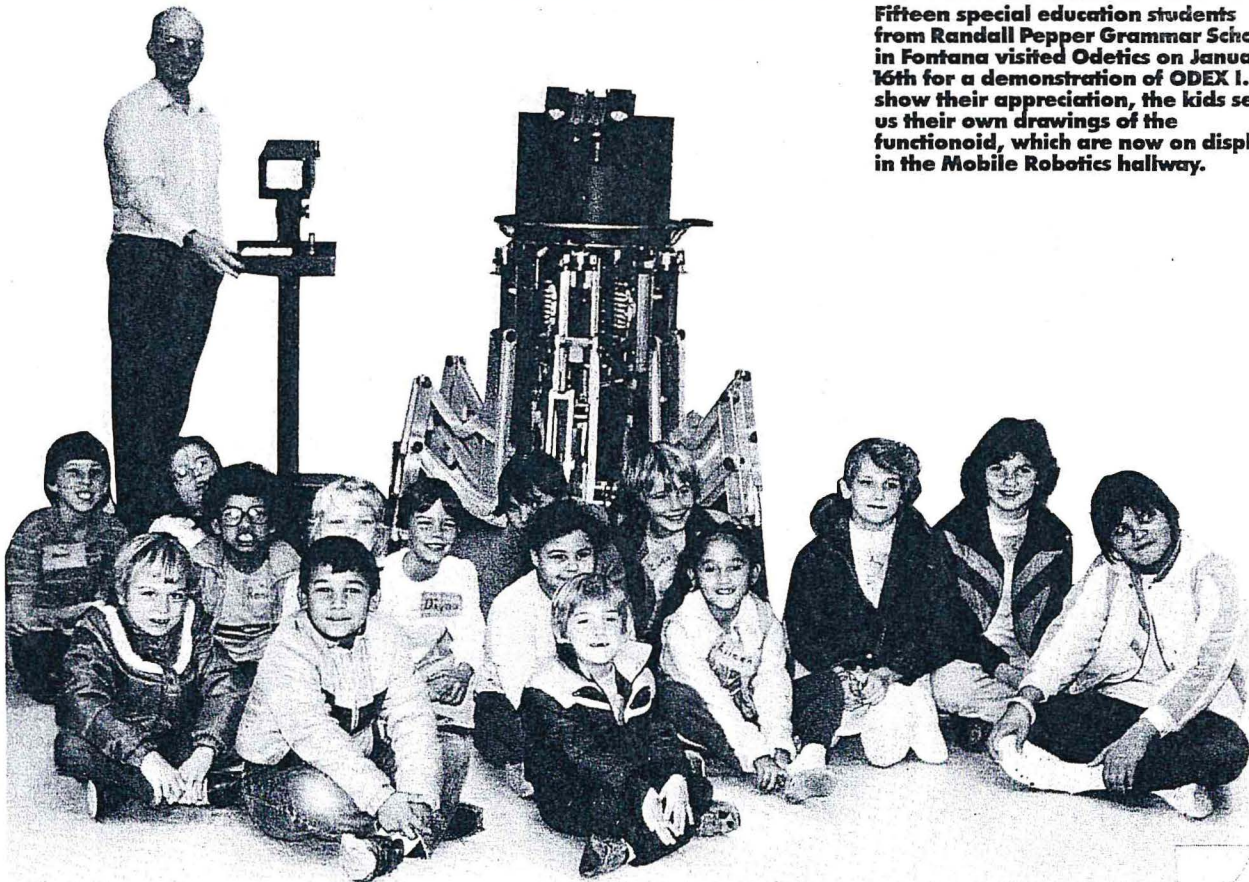
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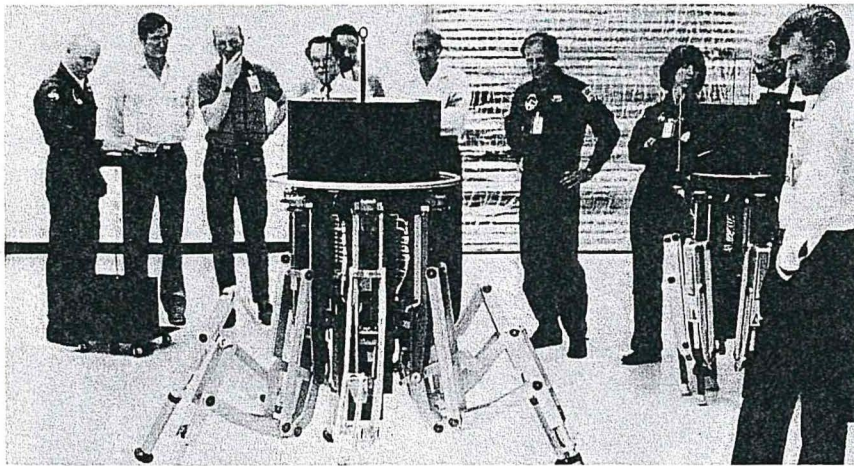
Vol. 4 No. 2



STUDENTS MEET PROFESSOR ODEX I

Fifteen special education students from Randall Pepper Grammar School in Fontana visited Odetics on January 16th for a demonstration of ODEX I. To show their appreciation, the kids sent us their own drawings of the functionoid, which are now on display in the Mobile Robotics hallway.





ASTRONAUT STORY MUSGRAVE (FAR LEFT) OPERATES ODEX I DURING RECENT VISIT TO ODETICS FOR TRAINING ON SPACEBORNE'S HIGH DATA RATE RECORDER. HIS AUDIENCE INCLUDES (LEFT TO RIGHT) STEVE SLYKHOUS, STEVE BARTHOLET, CRANDALL GUDMUNDSON, STEVE DUNCAN,

JERRY MUENCH, ASTRONAUTS NORM THAGARD AND BONNIE DUNBAR, RUSS MARSHALL AND DICK VANDERPOOL. OTHER ASTRONAUTS WHO LANDED AT ODETICS FOR TRAINING WERE ROY BRIDGES AND GUY BLUFORD.

SPACEBORNE BITS AND BYTES

Let it never be said that Russ Marshall and his wife Jean aren't good sports.

When astronaut Story Musgrave visited Odetics in April, Russ drove him to Newport Beach to meet a friend with whom Story planned to spend the night. But when they arrived at the appointed meeting place, the friend wasn't there. So Russ and Story had dinner and continued looking for the elusive friend.

"By this time it was getting late, so I suggested he stay at my house in Irvine rather than drive back up to Anaheim and try to get a room where the other astronauts were staying," says Russ. They arrived at the Marshall home at about 10 p.m., much to the surprise of Jean, who wasn't expecting the overnight guest. However, a warm bed was quickly arranged and Story dropped off into slumberland, no doubt wishing he could take some of the Marshall hospitality with him on the Space Shuttle.

Jim Peel was fed up with wandering in and out of the row of

anonymous offices that line Spaceborne's engineering department. So he took matters, and his Thesaurus, into his own hands and came up with names to post over each office. "It was just a joke, but no one has taken them down," he says. Now, thanks to Jim, visitors and associates can find the likes of Berrios Barrio and Tripp's Trap, just down the road from Peterson's Pad and Schulz's Shelter.

Dennese Klamberg, a seven year Odetics associate, joins Spaceborne's contracts department from GYYR Service.

The Spaceborne softball team is licking its wounds after a 6 win, 4 loss spring season that earned them the runner-up spot in the Anaheim Parks and Recreation Industrial League. Manager Glen Roosevelt hastens to point out that we shouldn't jump to the conclusion that GYYR is a better team just because GYYR won their division championship. According to Glen, Spaceborne competes in a tougher league.

WALKING WITH MOBILE ROBOTICS

Susan LaBar and husband Mitch are expecting their first child - it looks now like Christmas Eve will be the time of birth.

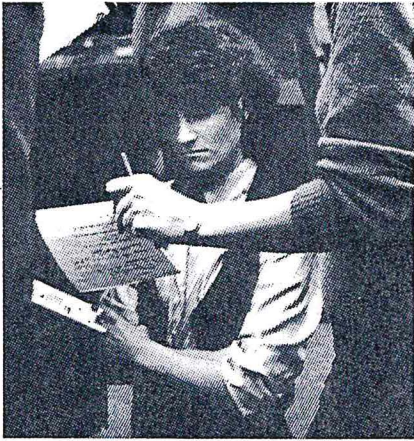
Sam Harris has joined "Mob Rob" as manager for aerospace systems. He will be responsible for marketing, market planning and development, and sales support for the company's advanced robotic systems and components as applied to the aerospace industry. Sam joins Odetics after a 27 year career with McDonnell Douglas Corp. During his last nine years with McDonnell Douglas, he was involved in the company's work on NASA's proposed manned space station.

A technical paper prepared by Ejner Fulsang was recently published in the proceedings of a machine intelligence seminar held at Oakland University, Rochester, MI in April. Entitled "Autonomous Battlefield Robots", the paper demonstrates that such robots are both operationally and technically feasible in the relative near term.

Tom Bartholet has also been scratching his head and trying to put words down on paper. He has written a report entitled 'Technology Developments in Intelligent Machine Systems', which will be included in the proceedings of the Association of Unmanned Vehicle Systems convention, which will be held in July in Anaheim.

If it seemed like ODEX I was dancing during its open house demos, well one could hardly blame it for doing so. Geoff Schulz put the driving disco soundtrack together as well as scripting the narration.

Continued on page 8



SALLY RIDE, AMERICA'S FIRST WOMAN IN SPACE, WORKS WITH THE HDRR AS ASTRONAUT KATHY SULLIVAN HOLDS AN INSTRUCTION SHEET FOR HER.

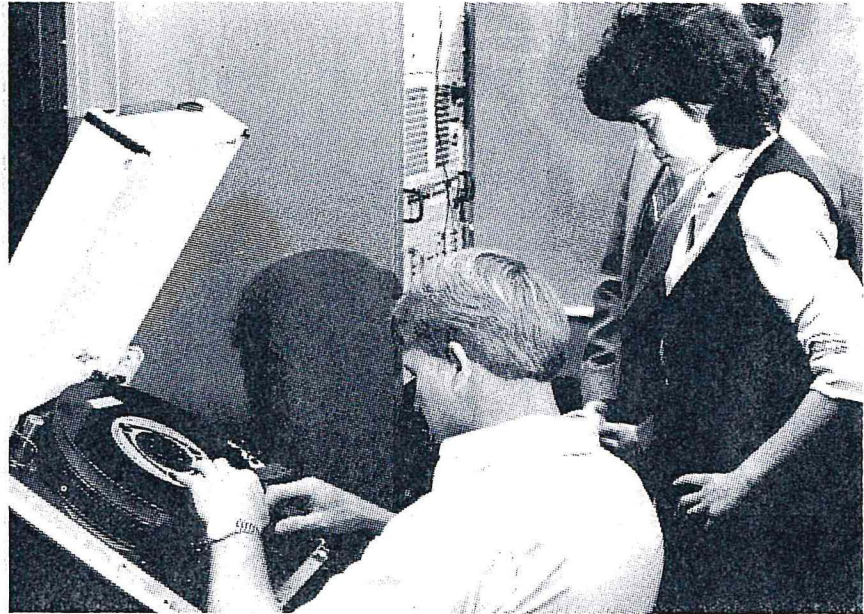
SALLY RIDE & COMPANY VISIT SPACEBORNE

Anaheim Bulletin photographer Mike Pilgrim leaned over to Bulletin reporter Mary Archer and quietly said, "I may have to do something unprofessional here - I'd like to get Sally Ride's autograph."

That's exactly what Mike did after taking pictures of Ride and two other astronauts who were at Spaceborne Feb. 17 to practice tape changing on the High Data Rate Recorder (HDRR). One could hardly blame anyone at Spaceborne that day for at least wanting to do some autograph seeking. As the first American woman in space, Ride is not only an astronaut, but an international celebrity.

Astronauts Kathy Sullivan and Jon McBride, along with Ride will be crew members aboard the space shuttle Columbia when it lifts-off Aug. 30. This flight is expected to be the 14th for America's Space Transportation System (STS).

The three were all selected as astronauts by NASA in 1979. Ride, mission physics specialist, is the only one of the three with prior



ASTRONAUT JON McBRIDE PRACTICES TAPE CHANGING PROCEDURES ON THE

HIGH DATA RATE RECORDER AS SALLY RIDE LOOKS ON.

experience in space, having completed her historic mission last June aboard the seventh STS flight. Sullivan will be aboard as a mission specialist researching spaceborne remote sensing. McBride will serve as pilot for the shuttle, having already piloted 40 different types of military and commercial aircraft.

The astronauts trained on the HRDD from 10 a.m. to close to 12:30. Reporters and photographers from the Bulletin, the Los Angeles Times, KABC-TV and Popular Science arrived around noon to cover the action.

After training, the astronauts watched a videotape of the ODEX I press conference over lunch and met employees at a division meeting held in the early afternoon.

This marks the third visit within a year by U.S. astronauts. Robert Parker on Mar. 8, 1983, and Owen Garriott last Nov. 17, both of the European Space Lab, had previously visited Spaceborne to train on the HDRR.

VIRGINIA'S DATE BOOK FILLS '84 FARE

Asking Virginia DeLand, Odetics resident cruise director, what's new is like opening the gates of Hoover Dam.

So, to answer the question we'll ask you to get out your pencil and calendar and go down the menu with us.

By the time you read this, Odetics' day at the San Diego Zoo Feb. 25 and March 29th ORT musical review will be history. But fear not, there's plenty more:

- April 27 - An Odetics Dinner Dance at the Grand Hotel Chrystal Ballroom for associates and their guests.

- May 1, 2 & 3 - Auditions for the Odetics Repertory Theatre (ORT) fourth annual production. This time it is the hit Broadway musical "Damn Yankees".

- May 19 - Catalina Cruise featuring roundtrip boat crossing and optional tours.

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ODETICS

SPACE DIVISION CHARTER

- WHAT:
 - AN ELECTROMECHANICAL DESIGN/DEVELOPMENT/MANUFACTURING TEAM
 - DEDICATED TO HIGHLY SPECIALIZED SPACE SYSTEMS WITH SUPERIOR PERFORMANCE MARGINS
 - PROVIDING CUSTOMER SATISFACTION
- WHY:
 - SUPPORT A NICHE SPACE MARKET
 - PROVIDE FINANCIAL STABILITY
 - PROMOTE TECHNICAL LEADERSHIP
- HOW:
 - EVOLUTION RATHER THAN REVOLUTION
 - CONTROLLED TECHNICAL INNOVATION AND IMPLEMENTATION
 - FLEXIBLE MANAGEMENT PHILOSOPHIES
 - SUPERIOR RELIABILITY/QUALITY PERFORMANCE

ODETICS

HOW TO BE A TEAM MANAGER

- YOUR RESPONSIBILITIES AS A MANAGER OR SUPERVISOR TAKE ON NEW DIMENSIONS DAILY. YOU NOT ONLY HAVE TO HANDLE YOUR USUAL DAY-TO-DAY DUTIES, BUT ALSO YOU HAVE TO MANAGE THE CHANGE PROCESS ITSELF.
- AS YOUR JOB GROWS IN COMPLEXITY, YOU HAVE MORE BASES TO COVER, PLUS YOU WILL FIND THAT SOME OF YOUR OLD HABITS AND ROUTINES IN THE WAY YOU SUPERVISE YOUR PEOPLE JUST WON'T WORK.
- NEW DEVELOPMENTS IN THE WAY WORK IS CONDUCTED CALL FOR NEW BEHAVIORS FROM YOU. KEEP UP WITH WHAT IS HAPPENING AROUND YOU BY CHANGING YOUR APPROACH, YOUR EMPHASIS. ADAPT! A MEDIOCRE FOOTBALL TEAM PLAYING AS A TEAM WILL ALWAYS BEAT A GROUP OF SUPER STARS WHO CAN'T OR WON'T PLAY AS A TEAM.
- AS A MANAGER YOU HAVE THE FREEDOM TO MANAGE CREATIVELY WITHIN TECHNICAL AND PRODUCT ORIENTED GUIDELINES.
- SUCCESS REQUIRES FLEXIBILITY AND ADAPTABILITY ON YOUR PART.
- **A GOOD TEAM MANAGER WILL NEVER SAY "YOU" OR "I." ONE SHOULD ALWAYS SAY "WE" OR "US."**

ODETICS

DO NOT GIVE AWAY YOUR POWER

- MANAGERS AND SUPERVISORS FREQUENTLY BECOME MORE TENTATIVE, MORE CAUTIOUS, MORE CAREFUL, MORE UNCERTAIN REGARDING THE EXTENT OF THEIR AUTHORITY AND DECISION-MAKING LATITUDE.
- THIS SORT OF WAIT-AND-SEE ATTITUDE MAKES YOU LESS EFFECTIVE. DO NOT SIT AROUND WAITING FOR PERMISSION. INSTEAD, ASSUME AN ACTIVE STANCE. IF YOU WAIT FOR CRYSTAL CLEAR SIGNALS FROM ABOVE REGARDING WHAT YOU CAN AND CAN NOT DO, YOUR PART OF THE ORGANIZATION IS GOING TO LOSE MOMENTUM.
- YOU ARE GOING TO LOOK BETTER IN THE EYES OF BOTH YOUR SUPERIORS AND SUBORDINATES IF YOU ATTACK YOUR JOB WITH CONFIDENCE AND AUTHORITY. YOU BEST PROTECT YOUR CAREER WHEN YOU KEEP IN MIND THE PRINCIPLE, "THE BEST DEFENSE IS A GOOD OFFENSE."
- **EMPOWER YOURSELF TO GET THE RIGHT DECISIONS MADE.**

ODETICS

ATTITUDE

- YOUR ATTITUDE AS A MANAGER OR SUPERVISOR WILL BE A MAJOR FACTOR IN DETERMINING WHAT THE CLIMATE IS WITHIN YOUR WORK GROUP. AND YOUR ATTITUDE IS ONE OF THE FEW THINGS THAT IS TOTALLY UNDER YOUR CONTROL.
- BE UPBEAT, POSITIVE, AND ENTHUSIASTIC, THE ATTITUDE AND MORALE OF YOUR SUBORDINATES WILL BE FAVORABLY INFLUENCED. THEY WILL PERFORM BETTER, AND THAT MAKES YOUR JOB AS A SUPERVISOR A LOT EASIER.
- **KEEP A POSITIVE ATTITUDE.**

ODETICS

PROVIDE YOUR TEAM WITH CLEAR-CUT DIRECTIONS AND GOALS

- YOU NEED TO MANAGE IN SUCH A WAY THAT YOU MINIMIZE THE AMBIGUITY, AND CLEAR UP THE "UNKNOWN" AS MUCH AS POSSIBLE.
- CONSIDER WHETHER YOU NEED TO SUPERVISE IN A MORE STRUCTURED FASHION. IN OTHER WORDS, MAKE SURE THAT YOU GIVE YOUR PEOPLE GENEROUS MANAGEMENT DIRECTION. FRAME OUT THEIR DUTIES AND ASSIGNMENTS IN SPECIFIC TERMS, RATHER THAN LEAVING THINGS GENERAL AND VAGUE.
- ALSO ESTABLISH DEFINITE DEADLINES AND TIMETABLES REGARDING WHEN WORK IS TO BE COMPLETED.
- CLEAR GUIDANCE FROM YOU HELPS KEEP YOUR PEOPLE ON TRACK, AND REDUCES THE ODDS THAT THEY WILL SHOW A DROPOFF IN PRODUCTIVITY.
- **BE SPECIFIC.**

ODETICS

FOCUS ON SHORT-RANGE OBJECTIVES

- ONE WAY OF MAXIMIZING EFFECTIVENESS IS TO OPERATE WITH CLEARLY DEFINED GOALS AND OBJECTIVES. THAT ENABLES YOU TO GET THE BEST MILEAGE OUT OF YOUR PEOPLE.
- LONG-TERM GOAL-SETTING REQUIRES MORE TIME AND EFFORT, AND THERE IS MORE GUESSWORK INVOLVED. ALSO, YOUR PEOPLE WILL BENEFIT FROM SEEING THE SHORT-RANGE GOALS ACHIEVED. IT PUMPS THEM UP, BUILDS CONFIDENCE, AND RESTORES MOMENTUM TO THE DIVISION GOALS.
- CONCENTRATE ON QUARTERLY, MONTHLY, AND EVEN WEEKLY PERFORMANCE TARGETS. ONCE THESE HAVE BEEN ESTABLISHED, YOU MUST DO AN EQUALLY GOOD JOB OF COMMUNICATING THEM TO THE PEOPLE WHO WILL BE RESPONSIBLE FOR THEIR ACHIEVEMENT. THIS CALLS FOR A LOT OF PUBLICITY.
- KEEP THE SPOTLIGHT ON YOUR SHORT-TERM GOALS, AND GIVE YOUR TEAM GENEROUS FEEDBACK REGARDING PROGRESS THAT IS BEING MADE TOWARD GOAL ACHIEVEMENT.
- MANAGING THE INPUT TO A JOB (I.E., RAPID EARLY CONSISTENT DECISION MAKING) IS FAR MORE EFFICIENT AND EFFECTIVE THAN TRYING TO MANAGE THE OUTPUT OF A JOB. IT IS HARD TO PUT SPILT MILK BACK IN THE BUCKET.
- **STRESS THE IMPORTANCE OF MEETING YOUR COMMITMENTS.**

ODETICS

ESTABLISH CLEAR PRIORITIES

- THERE WILL BE MANY PEOPLE AND PROBLEMS VYING FOR YOUR TIME. THOSE WHO MAKE THE MOST NOISE SHOULD NOT NECESSARILY GET THE MOST ATTENTION. IT IS EASY FOR A MANAGER TO END UP IN A FIRE-FIGHTING MODE, GETTING SIDETRACKED BY LOW PRIORITY ISSUES THAT CHEW UP A LOT OF TIME AND ENERGY YET HAVE LITTLE PAYOFF.
- ALSO TAKE PAINS TO KEEP YOUR PRIORITIES CLEAR IN THE MINDS OF SUBORDINATES WHEN YOU DELEGATE WORK TO THEM. FREQUENTLY YOUR TEAM SEEMS TO ASSUME THAT THE LAST ASSIGNMENT IS THE MOST IMPORTANT ONE, PURSUING IT AT THE EXPENSE OF MORE MEANINGFUL TASKS.
- **WHEN IN DOUBT ASK YOUR TEAM TO REPEAT THEIR ASSIGNED PRIORITIES BACK TO YOU.**

ODETICS

NAIL DOWN EACH PERSON'S JOB

- MEET WITH EACH OF YOUR TEAM MEMBERS TO REDEFINE JOB RESPONSIBILITIES. BE VERY SPECIFIC, ESPECIALLY ON ISSUES SUCH AS DECISION-MAKING AUTHORITY, PERSONAL ACCOUNTABILITY, AND REPORTING REQUIREMENTS.
- DO THIS FOR INCUMBENTS AS WELL AS ANY NEWCOMERS TO YOUR TEAM.
- MAKE SURE ALL SUBORDINATES HAVE A PRECISE UNDERSTANDING OF THE STANDARDS OF PERFORMANCE THEY WILL BE EXPECTED TO ACHIEVE. HELP EACH TEAM MEMBER IDENTIFY WHAT THE "CRITICAL FEW," "MAKE-OR-BREAK ASPECTS OF THE JOB REALLY ARE.
- CONSIDER PUTTING THE KEY POINTS OF THESE CONVERSATIONS IN WRITING, WITH COPIES MAINTAINED BY YOU AS WELL AS THE TEAM MEMBER.
- SET ASIDE TIME TO REVIEW THIS INFORMATION WITH THE SUBORDINATE PROMPTLY UPON YOUR OBSERVATION OF ANY SIGNIFICANT PERFORMANCE SHORTFALLS.
- **FUZZY INSTRUCTIONS WILL CAUSE FUZZY WORK.**

ODETICS

RAISE THE BAR

- ASK MORE OF YOUR TEAM MEMBERS.
- WHY?
- ACTUALLY, IT IS BETTER FOR THEIR MENTAL HEALTH AND FOR COMPANY MORALE IF THEY ARE EXTREMELY BUSY AND DO NOT HAVE TIME ON THEIR HANDS TO SPEND WORRYING ABOUT THE FUTURE OR ROMANTICIZING THE PAST.
- THE PERFORMANCE STANDARDS YOU SET AND THE OBJECTIVES YOU PUT BEFORE YOUR PEOPLE SHOULD BE CHALLENGING, BUT NOT UNREALISTIC. STRIVE TO ENGINEER SUCCESS EXPERIENCES FOR ALL OF YOUR PEOPLE. REQUIRE PERFORMANCE IMPROVEMENTS, BUT DO NOT SHOOT FOR GOALS THAT ARE LIKELY TO BE AN EXERCISE IN FRUSTRATION AND FAILURE.
- **ALWAYS STRIVE TO REACH NEW HEIGHTS.**

ODETICS

DO NOT TRY TO COVER ALL THE BASES YOURSELF

- THERE ARE TWO PARTICULARLY GOOD REASONS WHY YOU SHOULD CONCENTRATE ON EFFECTIVE DELEGATION. FIRST, IT CAN KEEP YOU FROM SPREADING YOURSELF TOO THIN AND BECOMING TOO SCATTERED. SECOND, GOOD DELEGATION GIVES YOUR TEAM MEMBERS A SENSE OF INVOLVEMENT.
- TOO OFTEN MANAGERS AND SUPERVISORS FEEL INSECURE. AS A SELF-PROTECTIVE MEASURE THEY START TRYING TO POLICE ALL ACTIVITIES.
- USUALLY IT DOES NOT WORK. PEOPLE GROW MORE FRUSTRATED AND LOSE SOME OF THEIR INITIATIVE. THUS, THE PROBLEM BEGINS TO FEED ON ITSELF. THE BOSS IS INCREASINGLY OVERCOMMITTED AND LESS EFFECTIVE.
- GOOD DELEGATION LETS YOUR TEAM MEMBERS FEEL MORE IN CONTROL OF CIRCUMSTANCES AND EVENTS. IT ADDS TO THEIR SENSE OF PARTICIPATION, GIVING THEM THE FEELING THAT THEY HAVE MORE CHOICES AND MORE INFLUENCE.
- AS A RESULT, THEY ARE LIKELY TO FEEL BETTER ABOUT DECISIONS THAT ARE MADE AND WILL SHOW MORE COMMITMENT IN CARRYING THEM OUT.
- **A SUCCESSFUL MANAGER DELEGATES - DELEGATES - DELEGATES.**

ODETICS

CREATE A SUPPORTIVE WORK ENVIRONMENT

- IF YOUR PEOPLE FEEL THREATENED, INSECURE, OR VULNERABLE, THEY GROW INHIBITED. THEY WILL BE RELUCTANT TO GO OUT ON A LIMB. THEY BECOME MORE CAUTIOUS, TENTATIVE, AND MORE LIKELY TO FAIL.
- SO CONCENTRATE ON *SHAPING* PEOPLES BEHAVIOR, INSTEAD OF *GRADING* PEOPLE'S BEHAVIOR. BE A COACH, NOT A JUDGE OR UMPIRE. GIVE POSITIVE REINFORCEMENT AS SOON AS YOU SEE THEIR WORK BEHAVIOR MOVING IN THE RIGHT DIRECTION, INSTEAD OF WAITING FOR THEM TO GET IT PERFECT.
- PROVIDE A WORK ENVIRONMENT WHERE THEY CAN COMFORTABLY PRACTICE THE NEW SKILLS OR WORK APPROACH WITHOUT FEELING THAT THEY ARE BEING CRITICALLY JUDGED OR EVALUATED BY YOU OR THEIR COWORKERS. MAKE IT EASY FOR THEM TO EXPERIMENT AND ASK QUESTIONS WITHOUT FEELING STUPID OR INCOMPETENT.
- PEOPLE VERY QUICKLY GET A FEEL FOR YOUR STANCE AS THE BOSS. THEY CAN TELL WHETHER OR NOT THERE IS MUCH SAFETY IN TRYING TO DO THINGS THE NEW WAY...THEY JUST WATCH WHAT HAPPENS WHEN PEOPLE FAIL OR FALL SHORT TO SOME DEGREE.
- THE ATMOSPHERE YOU CREATE NEEDS TO BE ENCOURAGING AND AFFIRMING. IN THE WORDS OF *THE ONE-MINUTE MANAGER*, YOU SHOULD "CATCH PEOPLE DOING SOMETHING RIGHT." THIS CREATES AN ENVIRONMENT WHERE PEOPLE FLOURISH, AND WHERE CHANGE CAN TAKE ROOT.
- **THE DUMBEST QUESTION IS THE UNASKED QUESTION.**

ODETICS

PROVIDE CONTINUAL JOB TRAINING

- IT IS YOUR RESPONSIBILITY TO ENSURE THAT SUBORDINATES GET THE NECESSARY EDUCATION AND TRAINING. YOU PERSONALLY MAY NEED TO FUNCTION MORE AS A TEACHER, TRAINER, OR COACH, AND NOT JUST AS A BOSS.
- ASSIST YOUR PEOPLE IN DEVELOPING ANY NEW SKILLS NEEDED TO PERFORM COMPETENTLY. THEY WILL MORE READILY GIVE UP THE OLD METHODOLOGY AND ESTABLISHED PRACTICES IF THEY HAVE THE KNOW-HOW TO DO THINGS THE NEW WAY.
- **LEARN SOMETHING NEW EVERYDAY; TEACH SOMETHING NEW EVERYDAY.**

ODETICS

PASS OUT MORE "PSYCHOLOGICAL PAYCHECKS"

- THERE IS NO LIMIT TO THE INTANGIBLE REWARDS YOU CAN PROVIDE FOR SUBORDINATES. THESE "PSYCHOLOGICAL PAYCHECKS" REQUIRE LITTLE EFFORT ON YOUR PART AND COST THE COMPANY NOTHING. THEY REPRESENT AN EXCELLENT WAY FOR YOU TO COMPENSATE YOUR PEOPLE FOR THE EXTRA EFFORT REQUIRED OF THEM DURING TIMES OF TRANSITION AND CHANGE.
- DO NOT UNDERESTIMATE THE VALUE PEOPLE PLACE ON SIMPLE THINGS SUCH AS A WORD OF ENCOURAGEMENT OR A COMPLIMENT FROM YOU. GIVE THEM A LISTENING EAR, AND SHOW EMPATHY. ASK THEIR OPINION ABOUT THINGS. CALL THEM BY THEIR NAME, ASK ABOUT THEIR FAMILY, SAY THANKS WHEN THEY DEMONSTRATE THE RIGHT ATTITUDE AND EFFORT. WRITE A SHORT MEMO EXPRESSING APPRECIATION FOR QUALITY WORK, TIMELINESS, INITIATIVE, ETC. WHEN YOU HOLD MEETINGS, SINGLE OUT INDIVIDUALS IN PUBLIC AND GIVE THEM A WORD OF PRAISE OR COMMENDATION FOR GOOD JOB PERFORMANCE.
- **RECOGNITION AND SIMPLE GRATITUDE HAVE MANY FAR-REACHING BENEFITS.**

ODETICS

"BEEF UP" COMMUNICATION EFFORTS

- GOOD COMMUNICATION IS A TWO-WAY STREET
 - FIRST, PROVIDE A VARIETY OF OPPORTUNITIES FOR YOUR PEOPLE TO PROVIDE FEED BACK TO YOU, AND BE A CAREFUL LISTENER. TAKE MORE TIME WITH PEOPLE. BE AVAILABLE. ASK MORE QUESTIONS. GET THEIR OPINIONS AND REACTIONS. MAINTAIN MORE VISIBILITY BY CIRCULATING ("MANAGING BY WANDERING AROUND") AND JUST MAKING IT CLEAR THAT YOU ARE AN ACCESSIBLE BOSS.
 - THE OTHER PART OF GOOD COMMUNICATION, OF COURSE IS GETTING THE INFORMATION TO YOUR PEOPLE THAT THEY WANT AND NEED. KEEP EVERYONE UPDATED ON A REGULAR BASIS. JUST KEEPING THEM POSTED REGARDING THE FACT THAT YOU DO NOT HAVE ANY NEW INFORMATION IS MEANINGFUL INFORMATION TO THEM.
 - STRIVE TO BE SPECIFIC RATHER THAN VAGUE, CANDID RATHER THAN GUARDED. CLEAR UP THE RUMORS AND MISINFORMATION THAT CLUTTER THE INFORMATION CHANNELS.
 - IF YOUR WORK GROUP HAS COMMUNICATION PROBLEMS, REST ASSURED THESE WILL RESULT IN OTHER *SECONDARY* PROBLEMS.
 - **IT IS ALMOST IMPOSSIBLE FOR YOUR TO OVERCOMMUNICATE.**

ODETICS

GO LOOKING FOR BAD NEWS

- PART OF YOUR JOB IS TO FIND, AND THEN FACE UP TO THE PROBLEMS AND AGGRAVATIONS THAT ROUTINELY OCCUR.
- OFTEN THE SOLUTION TO ONE PROBLEM GENERATES A NEW SET OF PROBLEMS REQUIRING ADDITIONAL SOLUTIONS.
- SO EXPECT TROUBLE. TO DO OTHERWISE IS TO KID YOURSELF. THEY WILL BE OUT THERE...SOMEWHERE. IF YOU ARE NOT AWARE OF ANY PROBLEMS, THAT IS A PROBLEM IN ITSELF. GET IN TOUCH WITH YOUR ORGANIZATION.
- INVITE BAD NEWS. YOU NEED TO KNOW WHAT YOU ARE UP AGAINST. YOU CANNOT LEAD IF YOU ARE ONE OF THE LAST TO KNOW. YOU CANNOT COME TO GRIPS WITH PROBLEMS WHEN YOU ARE OBLIVIOUS TO THEM. MAKE IT EASY FOR PEOPLE TO TELL YOU THOSE THINGS YOU DO NOT NECESSARILY WANT TO HEAR.
- DISCIPLINE YOURSELF TO REWARD PEOPLE WHO IDENTIFY PROBLEMS AND REPORT ORGANIZATIONAL BREAKDOWNS.
- DIAGNOSIS IS THE FIRST STEP TOWARD TREATMENT, SO DEPUTIZE EVERY TEAM MEMBER. IF YOUR PEOPLE SAY THERE IS A PROBLEM, TAKE IT SERIOUSLY. THEY SEE THINGS YOU *CANNOT* SEE, AND THEY LOOK AT THE THINGS YOU *CAN* SEE IN A DIFFERENT LIGHT THAN YOU DO. THEIR PERSPECTIVE MAY BE BETTER THAN YOURS. AT THE VERY LEAST, THEIR VIEWPOINT IS IMPORTANT TO THEM, AND THUS SHOULD BE IMPORTANT TO YOU.
- KEEP PROBLEMS IN PERSPECTIVE; ATTEMPT TO SOLVE THEM WITHIN YOUR OWN GROUP.
- **DO NOT SHOOT MESSENGERS WHO CARRY BAD NEWS. MAKE IT CLEAR THAT THE TRUTH IS WELCOME.**

ODETICS

PROMOTE QUALITY AND CUSTOMER SERVICE

- STUDIES SHOW THAT IT COSTS FIVE TIMES AS MUCH TO DEVELOP A NEW CUSTOMER AS IT COSTS TO KEEP AN EXISTING ONE.
- AS THE PERSON IN CHARGE, YOU SHOULD BE VERY VOCAL UPHOLDING THE STANDARDS FOR PRODUCT QUALITY AND CUSTOMER SERVICE.
- EVEN IF YOUR DEPARTMENT DOES NOT HAVE DIRECT CUSTOMER CONTACT, YOU ARE SERVING OTHER WORK GROUPS WHO DO . SO EITHER WAY, YOU HAVE A REAL INFLUENCE ON THE COMPANY'S REPUTATION IN THE MARKETPLACE.
- MAKE CUSTOMER SATISFACTION THE TOP PRIORITY . THINGS MAY BE CHANGING INSIDE YOUR COMPANY, BUT THE NEED FOR SATISFIED CUSTOMERS NEVER CHANGES.
- EVERYONE IS RESPONSIBLE FOR QUALITY. YOU CANNOT INSPECT QUALITY INTO A PRODUCT. QUALITY MUST BE BUILT IN FROM THE VERY BEGINNING.
- **REMEMBER - IF YOU HAVE KNOWLEDGE OF A PROBLEM, YOU HAVE THE RESPONSIBILITY TO RESOLVE IT.**

ODETICS

BE MORE THAN A MANAGER OR SUPERVISOR...BE A LEADER

- MOST ORGANIZATIONS AND WORK GROUPS ARE MANAGED, RATHER THAN LED.
- IT IS EASY ENOUGH FOR THE COMPANY TO PUT YOU IN CHARGE, TO MAKE YOU BOSS, THEY CAN GIVE YOU A TITLE AS MANAGER OF THIS OR SUPERVISOR OF THAT. BUT THE COMPANY CANNOT MAKE YOU A LEADER. THAT IS UP TO YOU.
- THERE IS A TENDENCY FOR TOP EXECUTIVES, MIDDLE MANAGERS, AND SUPERVISORY PERSONNEL TO BLAME THEIR LACK OF LEADERSHIP EFFECTIVENESS ON THE SITUATION, OR ON "HIGHER MANAGEMENT." BUT THAT IS A COP-OUT. WHEN LEADERSHIP GETS KILLED, IT IS THROUGH SELF-INFLICTED WOUNDS. THE THINGS YOU PERSONALLY DO, OR DO NOT DO, DETERMINE WHAT CALIBRE LEADER YOU WILL BE.
- **A GOOD LEADER SHOULD PROVIDE RECOGNITION TO HIS OR HER TEAM. "LEADER" IS A REPUTATION...AND YOU HAVE TO EARN IT.**

ODETICS

BE SUPPORTIVE OF COMPANY GOALS

- MAKE SURE THAT THE TEAM'S EFFORTS ARE IN ALIGNMENT WITH COMPANY GOALS AND OBJECTIVES. BE KEENLY AWARE OF PRIORITIES, AND ADJUST ACCORDINGLY.
- BE FORGIVING OF ERRORS, OR WHAT LOOKS TO YOU LIKE FAULTY DECISIONS. WHAT YOU CONSIDER A MISTAKE MAY BE PRECISELY THE RIGHT MOVE, OR A LEAST THE BEST MOVE UNDER THE CIRCUMSTANCES. KEEP IN MIND THAT OTHERS CAN SEE THINGS FROM A DIFFERENT PERSPECTIVE, AND THEY MAY HAVE ACCESS TO IMPORTANT INFORMATION THAT IS NOT GENERALLY KNOWN. THIS IS NOT AN ARGUMENT FOR BLIND LOYALTY, BUT RATHER FOR A WILLINGNESS TO GIVE OTHERS THE BENEFIT OF THE DOUBT.
- ANOTHER ASPECT OF BEING A GOOD SUBORDINATE IS HAVING THE GUTS TO REPORT PROBLEMS. SOMETIMES YOU MAY BE BETTER INFORMED AND YOU WILL NEED TO DEMONSTRATE MANAGERIAL COURAGE IN CONFRONTING THE ISSUES AND DEFENDING YOUR CONVICTIONS.
- FINALLY, BE BIG ENOUGH TO ASK FOR HELP. YOU CAN BE A BETTER SUBORDINATE IF YOU ARE NOT TOO PROUD, OR TOO AFRAID, TO LET YOUR BOSS KNOW THAT YOU ARE HAVING TROUBLE.
- DO NOT REPORT AN EDITED, SANITIZED VERSION ABOUT THE BUSINESS THAT YOU THINK IS "SAFE," "ACCEPTABLE," OR "WHAT TOP MANAGEMENT WANTS TO HEAR." REPORT THE TRUTH, ALL OF THE TRUTH, INSTEAD OF HIDING YOUR SHORTCOMINGS OR GLOSSING OVER PROBLEMS THAT ARE DEVELOPING. YOU ARE SUPPORTING THE COMPANY WHEN YOU LET IT BE KNOWN YOU NEED HELP.
- **BE A LOYAL SUPPORTER!**

A DAY IN THE LIFE OF!!!

PROGRAM MANAGER

- 8:00
- ASSESS CUSTOMER COMMITMENTS FOR DAY/WEEK (TWXS, LETTERS PHONE CALLS, ACTION ITEMS)
 - REVIEW GOAL/BONUS PLAN ITEMS/STATUS REPORTS
 - INITIATE CONTINGENCY PLANNING
 - OBTAIN STATUS FROM FUNCTIONAL MANAGERS
 - CALL TEAM MEETING TO REVIEW DAILY ACTIVITY--INFO. EXCHANGE
 - COORDINATING PROBLEM SOLVING
 - CUSTOMER ACTIVITY (TWO OR THREE PROGRAMS)
 - STATUS/PHONE CALLS
 - SCHEDULES (CUSTOMER) HARDWARE/SOFTWARE
 - PROGRESS REPORTS
 - CDRL PREPARATION/SUBMITTAL
 - ACTION ITEMS
 - PROPOSALS
 - CONDUCT MEETINGS, INTERNAL/CUSTOMER
 - COORDINATE TECH, INTERNAL/CUSTOMER
 - BUDGETS
 - MANPOWER
 - COORDINATE PROBLEMS/APPROVALS WITH CUSTOMERS
 - CHANGES: FOLLOW UP WITH AFFECTED FUNCTIONAL MANAGER
 - COORDINATE OVERTIME/SECOND SHIFT ACTIVITY--ADVANCE PLANNING
 - DEBRIEF WITH TEAM (COORDINATOR, QUALITY ENGINEER, TEST TECH)

FUNCTIONAL MANAGER

- 8:00
- OBTAIN DEPARTMENT STATUS (HARDWARE/SOFTWARE/RESOURCES)
 - DAILY GOAL SHEETS AND BONUS PLAN REVIEW/STATUS/CHANGES
 - COORDINATE DEPARTMENTAL WORKLOAD, INTERNAL/EXTERNAL
 - TECHNICAL
 - OTHER FUNCTIONAL
 - PROGRAM MANAGEMENT
 - SOLVE IMMEDIATE INTERNAL DEPARTMENT PROBLEMS
 - DELEGATE TASKS TO SUPERVISOR IF MANAGER HAS COMMITMENTS; I.E., CUSTOMER MEETING, DESIGN REVIEW, PROGRAM MANAGER
 - UNSCHEDULED EVENTS
 - ASSESS IMPACT ON SCHEDULED EVENTS
 - CREATE WORK-AROUND WITH PRIORITY AND RESOURCES
 - IF AFFECTS SCHEDULE TASKS, CONFIRM PRIORITY; COORDINATE REPLANNING OF THE SCHEDULED TASK - OTHER FUNCTIONAL MANAGERS/AFFECTED PROGRAM MANAGERS
 - PROGRESS MONITORING - AS REQUIRED (HOURLY, DAILY, OR?)
 - SUPPORT PROGRAM MANAGERS' CUSTOMER ACTIVITIES
 - FOLLOW UP ON DAILY GOALS - COORDINATE WITH AFFECTED FUNCTIONAL MANAGER
 - ARE WE ON SCHEDULE?
 - DID NEW SCHEDULED ACTIVITY ARRIVE?
 - IS THERE ANY HARDWARE/SOFTWARE THAT SHOULD NOT BE IN MY AREA?
 - COORDINATION FOR OVERTIME/SECOND SHIFT PLANNING

