

**THREE TO MAKE READY** — Astronauts Frank Borman, William Anders and James Lovell, Apollo 8 primary crew, participated in final CDDT Wednesday, expressed confidence that entire team, and the hardware, would be ready for historic lunar orbit mission, to be launched Dec. 21.

## COMPANY'S ANNUAL REPORT LOOKS TO NEW MARKETS

The company invested a record \$111,215,000 to expand and modernize key facilities during the fiscal year ended Sept. 30, 1968.

The 1968 annual report, mailed this week to shareholders, revealed that the amount so invested was 20.3 percent over the \$92,459,000 expenditures for land, buildings and equipment during 1967. Commitments for capital additions and improvements are budgeted at approximately \$102 million for the 1969 fiscal year.

Commenting in the annual report on accomplishments of the past year, J. L. Atwood, president and chief executive officer, and Willard F. Rockwell, Jr., chairman of the board, also pointed to: 1) acquisition of five companies with com-

bined 1968 sales of over \$100 million; 2) launching of several joint activities with other firms in such areas as the electrostatic spinning of yarn, solid electrolyte timers and batteries, and undersea oil and gas production systems; and 3) continued strong support of research and development in the company's principal activities as well as in a number of emerging industries.

Among those in the last-named category which show promise for the future, the report cited nuclear energy, information systems and ocean systems.

Other accomplishments during the year pointed out by Atwood and Rockwell: 1) establishment of a technical and management organization to combine the company's capabilities in design and proposal efforts for major new military aircraft programs; 2) participation in crucial Apollo/Saturn Saturn flight programs that successfully demonstrated the integrity of company-built Command and Service modules, SII stage of the Saturn V vehicle and all the booster engines; 3) completion of a corporate staff of top executives to provide effective management of the company's overall activities; 4) rearrangement and expansion of the company's lines of credit; 5) intensification of activities in developing and marketing new products; and 6) initiation of projects to exchange technology between the Aerospace and Systems Group and the Commercial Products Group to improve their processes and products.

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## Four Employees Named to View Apollo 8 Launch

Four employees have been selected through the PRIDE Program to attend as guests of the company the launch of Apollo 8.

Flying to Cape Kennedy for the launch, scheduled a week from tomorrow, will be Steve Avakian, lead engineer, Apollo CSM Test Operations; Thomas H. Doyle, purchasing coordinator Saturn S-II Material; Cornelius Glover, Jr., equipment construction mechanic, Facilities and Dino E. Cocchi, manufacturing liaison engineer, Apollo CSM Manufacturing.

Avakian was the Environmental Control System lead engineer during CSM 101, 103, 104 and 106 checkouts at Downey. During the CSM 101 (Apollo 7) checkout cycle alone, Avakian worked 30 consecutive days and about 186 uncompensated extra hours. Also, during the CSM 101 testing, he instigated and implemented a method to replace a failed water glycol pump package without draining and reservicing the complete water glycol systems.

Doyle, since March, 1966, has been assigned the responsibility of resolving major problem areas at subcontractors' facilities which have affected the S-II Program. Doyle's most recent assignment has been to resolve schedule delays on the Saturn S-II disconnects which had been a problem area for years. During company fiscal 1968, Doyle spent 355 hours of uncompensated overtime and was the recipient of a letter of commendation from the Division

(Continued on Page 3, Column 3)

# Countdown Begins on Monday

## No Delays Presently Foreseen for Planned Dec. 21 Lift-off

Official countdown for the Apollo 8 mission is to begin Monday at NASA's Kennedy Space Center, leading to launch Saturday of the most ambitious space mission in the history of the nation.

With the Countdown Demonstration Tests (CDDTs) completed earlier this week at KSC, no delays were foreseen in the Dec. 21 lift-off which may place the astronauts in lunar orbit Christmas Eve.

Primary crewmen, Commander Frank Lovell, Command Module Pilot James A. Lovell, Jr., and Lunar Module Pilot William A. Anders, participated in the final CDDT test Wednesday and expressed confidence that the entire team, including the hardware, would be ready.

The astronauts acknowledged that the mission was risky — Borman compared the flight to a fighter pilot's tour in Vietnam — but said that the risks were acceptable and that the mission would provide invaluable data for the lunar landing flight next year.

In an earlier interview, Dr. George E. Mueller, NASA associate administrator for Manned Space Flight, said that an Apollo 8 lunar orbit mission would advance the Apollo Program by:

- Providing valuable experience in validating the Apollo CSM communications and navigation systems at lunar distance;
- Completing the final verification of ground support elements and onboard computer programs;
- Increasing the understanding of environmental conditions

(Continued on Page 3, Column 1)

## Apollo Film Slated; May be Borrowed

The special television program, "Log of Apollo 7" will be telecast over KCET Los Angeles (Ch. 28) Sunday, beginning at 9:30 p.m. After Jan. 1, 16 mm color films of the program will be available from Space Division Public Relations for borrowing to show to civic groups.

## Company Lists Semifinalists for Scholarships

The names of 71 semifinalists, including 4 from Atomics International, 19 from Autonetics, 8 from Columbus, 4 from Executive Offices, 9 from LAD, 9 from Rocketdyne, and 18 from Space, were announced this week by Francis Tappaan, Aerospace and Systems Group vice-president and chairman of the Scholarship Committee.

A total of 766 applicants took the examination in late October. The 71 semifinalists — 27 girls and 44 boys — scored highest on the test, which was scored by Educational Testing Service. ETS is a non-profit corporation associated with the College Entrance Examination Board.

The Scholarship Committee noted that an extremely large number of applicants in addition to the 71 semifinalists made very high test scores, indicating excellent college and career prospects. Forty-nine percent of the 766 high school students taking the test scored higher than the average college senior.

The 71 semifinalists will take a further test in January, and about 25 final winners will be announced in March. Winners will be chosen on the basis of merit; the amount of each scholarship stipend will be based on financial need, with annual stipends ranging from an honorary \$250 to \$2,200.

Space Division employees whose children are among the semifinalists are:

William Leseman, Jr., D085; Charles Macias, D302; Owen Bird, D595; Emil Blum, D093; John Carlton, D603; James Cook, D534; Richard Harris,

(Continued on Page 3, Column 1)



**SECURITY SPEAKER**—Guest speaker at next Thursday's National Security Industrial Assn. dinner in Los Angeles will be Thomas O. Paine, acting administrator of NASA.



**'TIS THE SEASON** — Santa Claus, who arrived at Downey Recreation Center by helicopter, was kept busy handing out Christmas stockings to the 2,000 children who attended the division's annual Christmas Party held at his Rec headquarters Saturday.



## BARELY A SPECK OF DUST . . .

## Clean Room Aids Apollo Success

Picture yourself arriving at work, entering a building through a shower of filtered air, sticking your feet in a machine to have your shoes cleaned, and donning immaculate white cap and smock before passing through another filtered air shower to enter a scrubbed and glistening room.

What's your line: Surgeon? Lab technician? Scientist? You could be. Or you could be a steelworker, pipe fitter, or a welder helping assemble the Apollo spacecraft that will carry U.S. astronauts to the moon.

Final assembly, test and checkout of the National Aeronautics and Space Administration's Apollo command and service modules are accomplished in a vast environmentally controlled cleanroom in a building at North American Rockwell's Space Division. Apollo 7 — the first manned Apollo spacecraft — was assembled and tested there. So was Apollo 8, the spacecraft which may orbit the moon this Christmas.

Those division personnel who work in this large cleanroom are playing an important part in America's immense effort to send three astronauts to the moon and bring them back safely after they had explored the lunar surface.

North American Rockwell's Space Division builds the command (crew) and service (supply) modules of the Apollo spacecraft, and the second, or middle, rocket stage of the six-million-pound Saturn lunar launch vehicle.

The finishing touches are put on the command and service modules in the hangar-like cleanroom after they are turned out in a huge open manufacturing area where thousands of aircraft were built during World War II. The modules come to the cleanroom as relatively bare structures. About 350 workers install wiring, components, instrumentation, controls, indicators, and other gear, and then conduct a maze of tests to see that everything works properly.

The size of the cleanroom — believed to be the world's largest — and its equipment, are what set it apart from a spic-and-span medical area. The room contains 2,322,300 cubic feet of air space and 45,000 square feet of floor space. It is 410 feet long, 110 feet wide and is separated into two bays, one 63 feet high and the other 42 feet.

The air in the room is changed three times each hour. The humidity is kept at about 50 percent, the temperature at 73 degrees. Higher pressure inside prevents dust from entering the cleanroom.

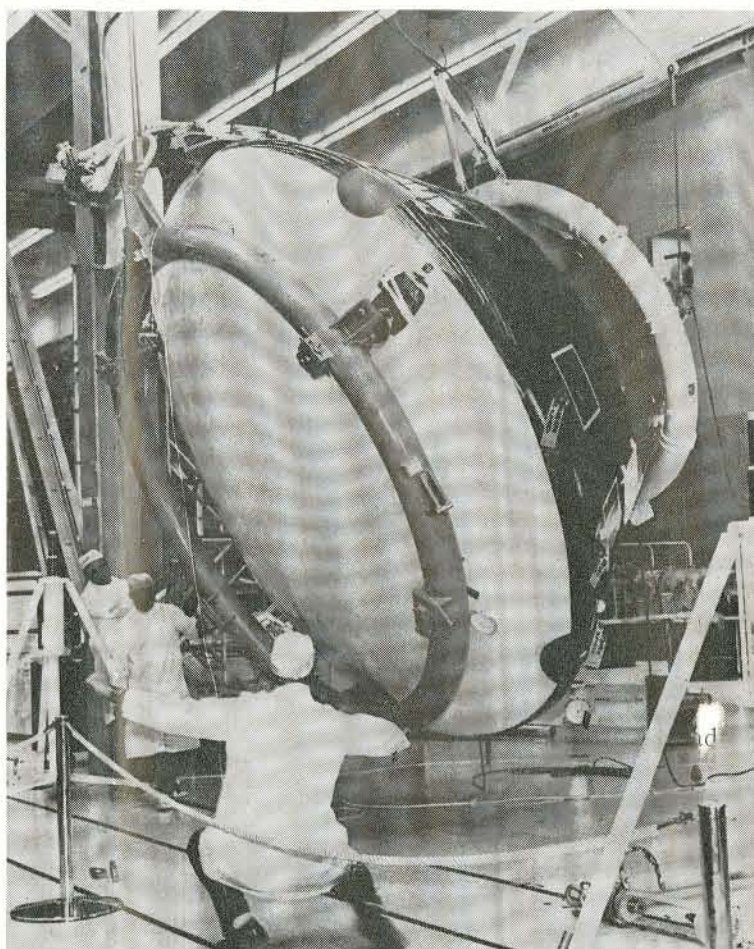
There are glassed rooms on either side where even higher levels of cleanliness are maintained during component assembly. There is a small airlock through which ultra-clean tools are passed to the assemblers, and two large airlocks through which the modules themselves must enter and leave the cleanroom. In the airlocks, the modules are vacuum-cleaned and tumbled so that no loose dust or other particles remain.

Each large airlock is served by two doors — one from the outside and one to the cleanroom inside — that are prevented by protective devices from being opened at the same time. When each door closes, a bladder inflates around the edge and seals the opening crack.

Inside, four big bridge cranes run the length of the cleanroom on overhead tracks. Two serve the low-bay area, which is used for final assembly, and two are in the high-bay area, which contains the spacecraft checkout facilities.

Besides the spacecraft modules themselves, the room contains huge steel stands for testing the modules and their systems, a cleaning and rotating fixture for the command module, work stands, storage platform, heat shield installation stand, and modification and maintenance stand.

It also has final assembly areas for both the command module and the service module, and a weight-and-balance fixture.



**SPACECRAFT WEIGHS IN** — Apollo 8 spacecraft command module goes through weight-and-balance check in world's largest cleanroom in Bldg. 290, prior to shipment to Florida. Spacecraft systems are installed under dust-free conditions.



**PRESENTATION** — Gov. Dewey Bartlett, left, has appointed Col. W. F. Rockwell an Ambassador of the state of Oklahoma. Photo shows presentation made recently during Governor's Ball.

## Management Courses Arranged with U of C; Offered to Employees

Eleven managerial courses will be offered at Downey and Seal Beach to division employees, beginning in January. Registration will be Dec. 19-20.

The courses were arranged with the University of California by Manpower Development. Interested persons may sign up at Downey in the Educational Programs Office in Bldg. 5, grids E85-S278, and at Seal Beach in the Educational Programs Office, Bldg. 81.

Downey — Incentive Procurement Procedures, Jan. 7; Intro-

duction to Project Planning Techniques, Jan. 8; Program Management, Jan. 6; The Technical Management Process, Jan. 8; Legal Aspects of Purchasing, Jan. 6; Reliability in Equipment Development, Jan. 7, and, Cost Schedule Planning and Control Systems, Jan. 9.

Seal Beach — Methods and Procedures for Information Systems, Jan. 2; Managerial Accounting, Jan. 6; Contract Changes and Terminations, Jan. 7, and, Legal Analysis for Business Managers, Jan. 8.

## PLANT DECORATION RULES ANNOUNCED

Noting a distant jingling of sleighbells, Industrial Security has issued the following regulations for employees intent on decking the halls with boughs of holly.

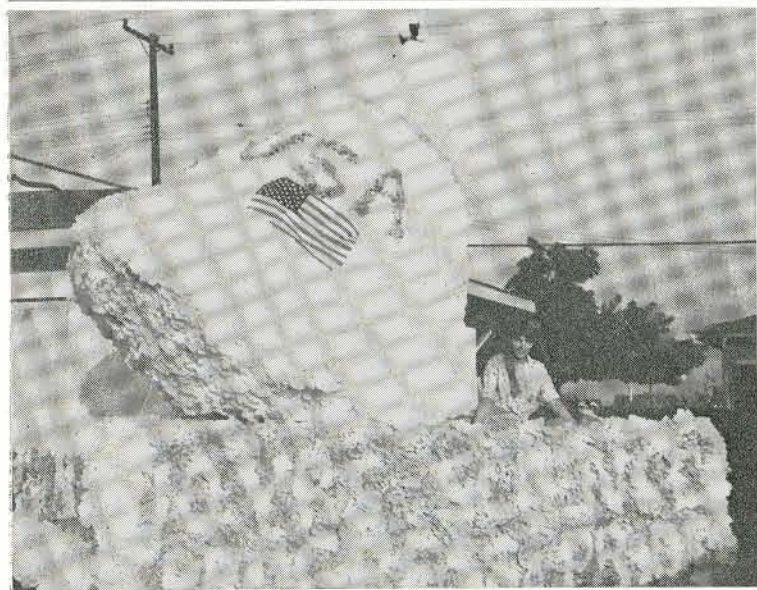
Christmas trees not exceeding four feet in height, preferably flameproof, may be brought into the plant beginning immediately and must be removed not later than Monday, Dec. 30. Only non-flammable decorations and Underwriters' Laboratories - approved electric lights may be used to decorate trees. All decorations are subject to approval of Industrial Security.

Gift packages will be permitted into plants only on Friday, Dec. 20, and must be removed the same day. All packages will be subject to inspection at gates. Obviously, no liquor, firearms, or contraband items will be permitted in the plant.

## Young Antypas Wins Top AF Design Award

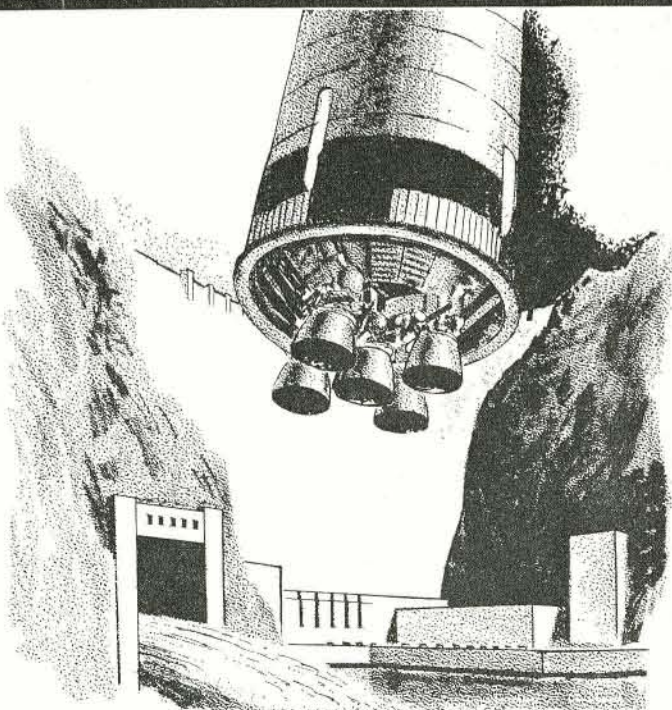
William George Antypas, Jr., son of W. G. Antypas, senior research engineer, Space Division's Central Systems Engineering, won the annual State-wide Air Force Association "sweepstakes prize," for his design of an aircraft.

At 12, the boy is the youngest ever to win the "sweepstakes" prize, most coveted among 10 prizes. The award included a \$100 U.S. Savings Bond, and a model of the X-15. Last year, he won first prize for spacecraft design in the AFA competition.



**CREW CONGRATULATIONS** — Kathleen Fitzpatrick, 15, daughter of Leo Fitzpatrick, Apollo Scheduling, sits atop prize-winning float which drew a telegram of praise "for ingenuity and interest" from Apollo 7 crewmen, Astronauts Wally Schirra, Walter Cunningham and Donn Eisele. Float was built by Science Club at Mayfair High School, Lakewood, of which another one of the Fitzpatrick daughters, Mary, 17, is Club president.

## HOW ABOUT THAT!



**THE FIVE 225,000-POUND THRUST J-2 ENGINES THAT POWER THE SECOND STAGE OF THE SATURN V LUNAR LAUNCH VEHICLE GENERATE THRUST EQUAL TO ABOUT 95.4 BILLION WATTS, OR THE POWER OF 72 HOOPER DAMS.**



## Mick O'Mach &amp; Buster



"Ya know Buster, I can't tell if you're puttin' mayonnaise on my hamburger or if I'm puttin' ketchup on your salad!!"

## Four Employees ...

(Continued from Page 1, Column 3)  
Director of Material.

Glover is responsible for operating the Downey Facility proofload test stand which verifies the structural and mechanical integrity of Material/Personnel Handling Equipment. In the course of his daily activity, Glover is required to proofload forklifts, bridge cranes, work platforms, special handling fixtures and other items of handling equipment. Testing may vary from a multiple item set-up to single item tests requiring as much as eight hours of set-up time. This effort includes continuous liaison with Quality and Reliability Assurance inspectors. From 1965 to the present, the proofload testing activity has increased from 2800 to 4000 items a year. In the same period, Glover has implemented method improvements which have re-

duced the proofload testing time requirements by some 5000 man-hours a year with no loss of test integrity.

Cocchi devised and implemented a method of removing 54 bonded details from CSM 101 and adding 69 new details in 3½ days instead of the 9 days estimated — while maintaining cleanroom standards. The only way to remove the bonded details was through grinding which could have caused excessive contamination. Cocchi designed and fabricated a transparent cover to which a vacuum cleaner was attached. Moreover, he worked out a detailed job plan for every mechanic on each of three shifts, and arranged for a boilerplate vehicle on which his ideas could be tried out. After this "practice," the entire task was accomplished on CSM 101 in 3½ days with zero defects.

## Annual Report ...

(Continued from Page 1, Column 2)

"Looking ahead," the two executives declared, "we recognize the virtual explosion of population and technology around the world is inevitably broadening present markets and creating new ones. We intend to assume a significant role in this process 1) by expanding utilization of our research, development and manufacturing capabilities; 2) by finding ways to increase the applications of our fund of technology in both our aerospace and commercial business; 3) by applying both advanced technology and systems management techniques to major needs of society; 4) by strengthening our means of marketing these varied capabilities, and 5) by acquisitions and joint ventures with strong potentials."

In reporting the distribution of the company's sales, the annual statement disclosed the four largest markets: space systems 24.8 percent or \$656 million in 1968, vs \$619 million in 1967; electronics 21.8 percent or \$575 million in 1968, compared with \$511 million in 1967; aircraft and missiles 15.1 percent or \$399 million, against \$315 million in 1967; and truck, trailer and bus components 11.3 percent or \$298 million, vs \$275 million in 1967.

## VOLUNTEER OBSERVES ALERT FOR SAFETY'S SAKE

## Community Radio Watch lends eyes, ears to police ...

"2064 to KNO-76, I have a Community Radio Watch report ..."

A call similar to this from any division radio-equipped driver sets off a chain of events under a system that is helping the city of Downey provide immediate response to emergency situations.

Community Radio Watch is a crime prevention program aimed at providing additional "eyes and ears" for community police departments. It is sponsored on a national basis by the Motorola Radio Corp.

Space Division is one of 23 businesses and industries participating in the program with the Downey Police Dept.

"Drivers from these companies are travelling throughout our city during the day, giving us a potential of almost 300 persons who can provide us assistance in reporting emergency or suspicious events," says Lt. Ferice Childers, commander of community relations for the Downey Police Dept.

Lt. Childers explained that participating drivers are given instruction in how to report such things as street crimes, fires, accidents, suspicious acts, and unusual occurrences including faulty traffic lights, flooded areas, a power line that is down, or a fallen tree in the roadway.

"We don't want the drivers

to attempt to apprehend anyone committing a crime, to be a hero, or to arrest anyone — that's our job," said Lt. Childers. "In fact, we try not to get them involved in any way except in their report of the event."

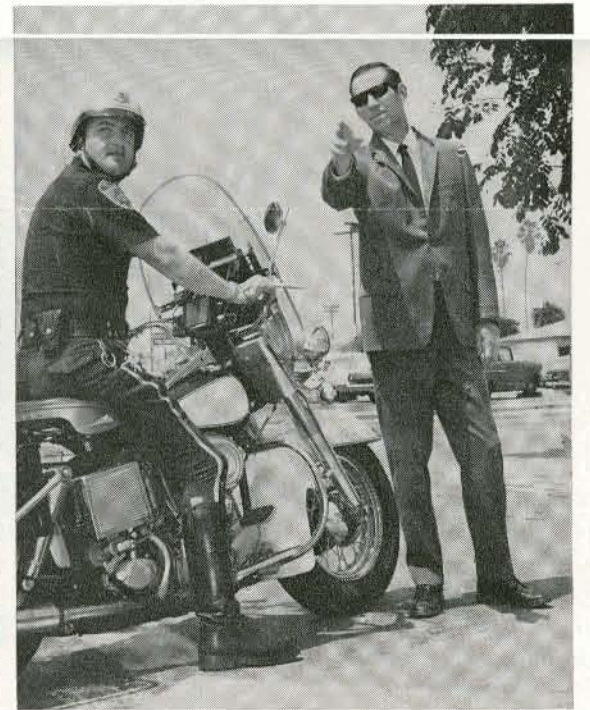
A typical example of the

program would begin with a traffic accident observed by a division driver. He would make his radio report to the division traffic dispatcher, who immediately would relay the call to the Downey Police dispatcher for broadcast over the police network.

Pointing to the need for the Community Radio Watch program, Childers said that crime across the nation has grown five times more than the population. Major offenses in Downey since 1960 have increased 76 percent, while the population has grown by 13 percent.



COMMUNITY RADIO WATCH — Division Chauffeur Ken Dirks, left photo, puts in CRW call that sets off chain reaction that results in aiding City of Downey in providing immediate response to emergency situation. In photo at right, Dirks explains



situation to Downey police officer Ron Arrington. Program is designed to provide additional "eyes and ears" for community police departments. Reportable events range from street fights, to hold-ups, fires, accidents or burned out traffic lights, etc.

## Countdown ...

(Continued from Page 1, Column 4)  
in deep space and in the proximity of the moon;

- Confirming the ability of the crew to see, use and photograph landmarks during a lunar mission, and,

- Providing new measurements of variations in lunar gravitational potential discovered in NASA's lunar orbiter program.

## Scholarships ...

(Continued from Page 1, Column 5)

D181; Loyd Schemper, D562; John Sincock, D147; Everett McMullin, D695; Charles Moore, D603; Kenneth Auston, D695; Charles Eldridge, D695; Jack Grace, D099; Philip Heine, D682; Donald Adling, D595; Wesley Ahlberg, D190; B. W. Griggs, D695.

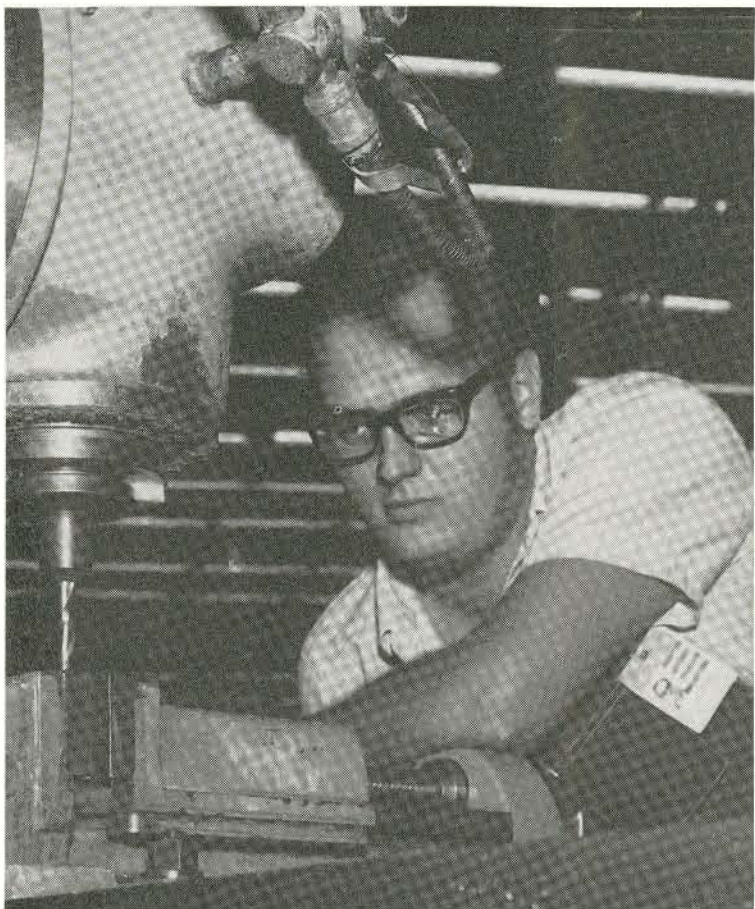


ON THE WAY — Dirks' Community Radio Watch call goes from him in the field to division Downey Traffic Dispatcher office, left photo, where Carl Yonkers, at left, or Earl Jones immediately relays call to Downey Police Communications Cen-



ter, right photo. Total of 13 firms in city participate in program, giving police depth potential of almost 300 persons driving through the city daily at all hours who can assist in reporting emergency situations, cutting police response time.





**WISE OWL CLUB**—Greg Offner, Space Division machinist, was happy he was wearing safety lenses on one recent occasion. While milling, a drill bit broke and a section of the bit flew up, cracked but did not shatter his left eyeglass lens. Safety lenses are available to employees through company optical plan.

## NewsWire

A micromini computer, dressed in micro-micromini electronic components, the most advanced in industry, was introduced this week by Autonetics' Data Systems division.

The tiny general purpose computer, known as the D200, was unveiled during the Fall Joint Computer Conference in San Francisco.

It weighs in at nine pounds, is five inches wide, seven inches high and six inches deep. It consumes only 10 watts of power. Designed for aircraft and other navigational purposes, it has many other potential applications, particularly where low power is a factor.

A new 90-foot extension is planned for the Structural Machining Center's Cincinnati Skin Mill complex on Douglas St., giving LAD what is believed to be one of the largest machining facilities in the country. Foundation work is expected to start early next year. When the additional section is added to the LAD skin mill, it will have a working surface 375 feet in length and 12 feet wide.

## Natural Resources Lecture Scheduled

Dr. John E. Estes, geography professor at UCLA, will speak on "Remote Sensing and Natural Resource Surveys" Monday, beginning at 5 p.m. in Conference Room 113 on the second floor of Bldg. 2. All employees are invited. Further information may be obtained from Dr. James Haffner, Extension 2426.

## Skywriter

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Published weekly by North American Rockwell Corporation, 12214 Lakewood Blvd., Downey, Calif. 90241.

## RECENTLY NOTCHED 1,000TH MILE

# Bob Heath Jogged Himself Out of 200-Pound Class

Nobody will ever be able to convince Space Division's Bob Heath that jogging is just a passing craze.

A project engineer in the Apollo Applications Program, Bob recently notched mile number 1,000 to become the all-time champ among employees who do their running at the Downey Recreation Center.

Bob began running in April, 1967, at noon and after work hours and has tried to keep it up every day since. He said he tries to go about three miles a day, which takes him from 20 to 25 minutes depending on whether he runs hard or takes his time.

He pointed out that he initially took up running to lose weight. "I was 210 pounds then, about 35 over my college weight," he noted.

At the same time, he began cutting down on his food because, as he explained, "I couldn't see carrying all that weight around with me when I was running."

He got down as low as 170

pounds, but has now stabilized to a steady 182 pounds on his 5-foot, 9-inch frame.

Even more important, Bob noticed that the jogging produced an important side effect. "I used to suffer quite a bit from sinus, but about three months after I started jogging I found I didn't have any more problems, probably because I had built up and strengthened my lung capacity."

## DeAraujo Heads Trapshooting Team, Victors in Service Meet

Space Division's Al DeAraujo headed a four-man civilian team that shot its way to the top spot in the recent eighth annual Interservice Championships at Fort Benning, Ga.

DeAraujo, of Saturn S-II Stage Checkout, captained one out of four international trapshooting championship teams representing the west, midwest, south and east regions of the country.

The matches marked the first time civilians participated in the event. In addition to the regional champion squads, taking part were four Army teams, two from the Air Force, a Marine

## NR TO SPONSOR SPECIAL AWARD FOR DESIGNERS

Sponsorship of the American Institute of Aeronautics & Astronautics Specialist Award in Spacecraft Design by North American Rockwell Corp. was announced this week.

B. D. Haber, senior vice president—Research and Engineering, A&S, said NR decided to sponsor the new award because the "designer, in our view, still remains clearly the true source of the design," despite the new emphasis on analytical techniques and other specialties.

Corps team, and a Canadian championship team.

The quartet captained by DeAraujo, who is a member of the U.S. International Trap Team, also swept the high overall individual title and had the high individual scorer in each match. They took home eight of the 12 awards presented in the competition.

On the heels of its victory, the four-man team has been invited to compete in a match against 11 South and Central America national teams. The event will be held in April at Lackland Air Force Base, Texas.

## Classified Ads

### FOR SALE

#### AUTOS

- '55 Porsche, w/out engine, 714-847-5756.
- '66 Volvo, A/C, \$1850, 714-892-2902.
- '63 Lincoln, 429-9549.
- '66 Ford Wagon, Auto., A/C, 27,000 mi., 213-867-1423.
- '66 Galaxie, 213-941-7062.
- '65 Mustang 2+2, \$1595, 255-6137.
- '63 Dodge Dart, 828-1965.
- '65 Corvette Fastback, 433-8818.
- '57 Chev., 2 dr. Hdt., 866-2120.
- '62 GMC Cab/camper, ¾ ton, 213-379-1484.
- '65 Catalina, A/C, \$1200, 772-0293.

#### HOUSES

- 3 bdr., Mod. Horse Property, 336-2436.
- 3 bdr., Garden Park, 714-894-1195.

### FOR SALE

#### MOTORCYCLES

- '68 Harley-Davidson, 2 cycle, \$250, 630-2737.
- Honda S-90, 421-2935.
- '67 Honda 305 Scrambler, 865-7014.

#### MISCELLANEOUS

- Sony TC-8 Cartridge Recorder, TO 2-7001.
- Dry Chlorine, \$1.10 per lb., 595-2675.
- 8 mm movie camera, 925-8083.
- '62 VW disassembled, w/o body, 714/892-2650.
- Knife and Bayonet Collect., 962-0722.
- Camper, 8 ft., \$650, 714/827-2745.
- Header Masters, 205, \$50, 213/243-1524.
- Hospital Bed, 421-2935.
- Redwood Playhouse, 8x6 ft., 866-4279.
- '58 VW Body, \$10, 828-7583.
- Wells Skill Saw, 8" blade, 433-7707.
- Slide Projector, manual, 925-2772.
- Violin, Child's size, 596-5269.
- King Trombone, Model 2B, Squarecase, 374-5627.

#### WANTED TO BUY

- Transportation Car, Small, 865-7014.
- 8' Camper, W/Stove etc., 327-1292.
- '59 - '61 VW Body, 374-5627.
- Outboard Motor, 6 h.p., 714-894-1195.
- Drafting Machine, Under \$50, KE 3-3940.
- Johnson or Evinrude Motor, small, OX 5-8622.

#### RISE OFFERED

- Magnolia & Talbert, 7:30-4 S/B, 926-4139.

#### FOR RENT

- Furnished Bachelor Apt. \$90, 433-1828.
- Cabin, Big Bear, Sleeps 7, 714-537-7299.



**JOGGING CHAMP**—Bob Heath, project engineer in the Apollo Applications Program, already has notched 1,000 miles of jogging. Ellie Mason, of the Downey Recreation Center, helps Heath get started on his second 1,000 miles of jogging.

## Tom Logsdon Authors Book About Space

"The Rush Toward the Stars," a book reviewing the technologies man has developed in his assault on the space frontier, has been written by Tom Logsdon of Saturn S-II Flight Performance.

The book, scheduled for publication in mid-December, explains a number of aerospace phenomena. Included are the Venus swingby maneuver, the bi-elliptic transfer, gravity losses, mechanical launch schemes, gravity gradient stabilization, sun synchronous satellites, optimal trajectory shaping, and ballistic reentry.

Much of the material for the book is derived from the "Space Exploration" classes Logsdon presents for division employees in Manpower Development.

In his work assignment at Seal Beach, Logsdon performs trajectory simulations and statistical analyses for the Saturn S-II stage. In his spare time, he lectures on space exploration topics at aerospace facilities, colleges, and high schools in the Los Angeles area.

## Delivery of Sixth Apollo Craft Will Keep 'Six in '68' Promise

An Apollo Test Operations slogan, forged in optimism, has been brought to realization through untiring efforts.

The slogan, "Six in '68," established early this year, had as its challenge the shipment, or the readying for shipment, of six spacecraft by Jan. 1.

There were a few doubters when SC 2TV-1 was not shipped until April. This spacecraft was shipped to NASA's Manned Spacecraft Center, Houston, for use as a test vehicle.

Then came the spacecraft for Apollo 7, shipped in May; the spacecraft for Apollo 8, shipped in August; the spacecraft scheduled for Apollo 9, in October, and, the spacecraft believed intended for Apollo 10, which was shipped in November.

The sixth spacecraft, believed destined for Apollo 11, has completed Integrated Systems Checkout and unsparing effects are being exerted to ship this one before the scheduled shipment date of Jan. 17th.

Norm Casson, manager of Apollo Spacecraft Checkout and originator of the slogan, "Six in

'68," said that "all Space Division personnel should feel proud of the roles they played in assuring that these properly configured, quality tested Apollo vehicles were shipped in accordance with program requirements."



**SIX IN '68**—Norm Casson (left), manager of Spacecraft Checkout and originator of the slogan, "Six In '68," proudly reviews year's accomplishments with Al Schmuck, test project engineer.