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NEWS AND COMMENT

Houston MSC: Community with a Space Complex

Houston, Texas. The moment an Apollo spacecraft lifts off from Cape Kennedy, Florida, a futuristic room in a windowless building hundreds of miles away outside Houston becomes the brain and nerve center for America's mission to the moon. The handful of engineers and scientists who sit in the mission control room of NASA's Manned Spaceflight Center (MSC) live with tensions produced by knowing that they are making decisions which will affect not only the lives of the astronauts and the success of the Apollo program but, quite probably, the future of the American space effort. These unique pressures, shared in some measure by the 4600 NASA people at MSC as well as the 9000 employees of 125 private firms working on NASA business in the area, helped to shape this space-age community.

In the early 1960's, when the space program was young and NASA needed friends, officials made glowing prophecies of the "fallout" benefits of the space effort and predicted that NASA space establishments like MSC would precipitate major economic and social change around them. After 4 years of running at top speed, it can be reported that MSC's presence has not transformed Houston into a "science city." The Houston area, after all, was and is the biggest petrochemical-industry center in the country and is going its own booming way. The injection of $140 million a year in NASA money and the impact on the life of the area of NASA workers—some 2500 of them R & D scientists and engineers—and of the 9000 employees of the 125 private high-technology firms serving MSC has so far had surprisingly little measurable effect. But meanwhile the space community has developed its own special character with its own style of life and its own special goals.

That the space community would become something less than a well-integrated part of the area seemed a logical consequence of the decision to locate the center 23 miles southeast of Houston. The original 1000-acre site was part of the estate of the late J. M. West, a Texas oilman who donated the land to Rice University (which then offered it free to NASA as an inducement to set up shop in the area). Later NASA purchased 600 acres from the Humble Oil Company, which still owns much of the area's land. The cost of clearing the 1600-acre site and of relocating a few cows was negligible, and construction started promptly in 1962—thanks in part to the efforts of then Vice President Lyndon Johnson and the Houston congressman Albert Thomas (who happened to be chairman of the House committee assigned responsibility for NASA appropriations). By mid-1965 the $245-million center was finished, and so was narrow, twisting Farm Road 528, which was widened, straightened out, and renamed NASA Road 1.

NASA has rightly pointed out that there were other motivations behind the choice of the Clear Lake site, as it is called, in addition to the low cost of the land and the political influence of some politicians who wanted the benefits of the space program to fall on Texas. For example, said NASA, nearby Houston provides a major source of manpower. The nearby ship canal offers access to the third largest deep-sea port in the country, at Galveston. Nearby universities such as Rice and the University of Houston provide educational opportunities for employees. And, finally, the choice of Houston fit neatly into the so-called "Big Crescent" constellation of space centers in the South, including Cape Kennedy and the Eglin Air Force Base in Florida; the Marshall Spaceflight Center at Huntsville, Alabama; and the huge Michoud Saturn and Nova rocket assembly plant near New Orleans. At these latter places, incidentally, NASA's social and economic impact seems much greater than at Houston.

Physically, MSC today looks like a college version of the Astrodome, Houston's major civic monument. The 50 MSC buildings are more uniformly modernistic and imposing than anything else in the area, and not even the inevitable mod motels and hamburger stands along NASA Road 1—the space community's main street—prepare one for the cluster of gleaming, imported NASA buildings set down on the humid Gulf Coast flatlands.

Most of the NASA workers who came to MSC couldn't have cared less how the center looked, why it was where it was, or why NASA said it

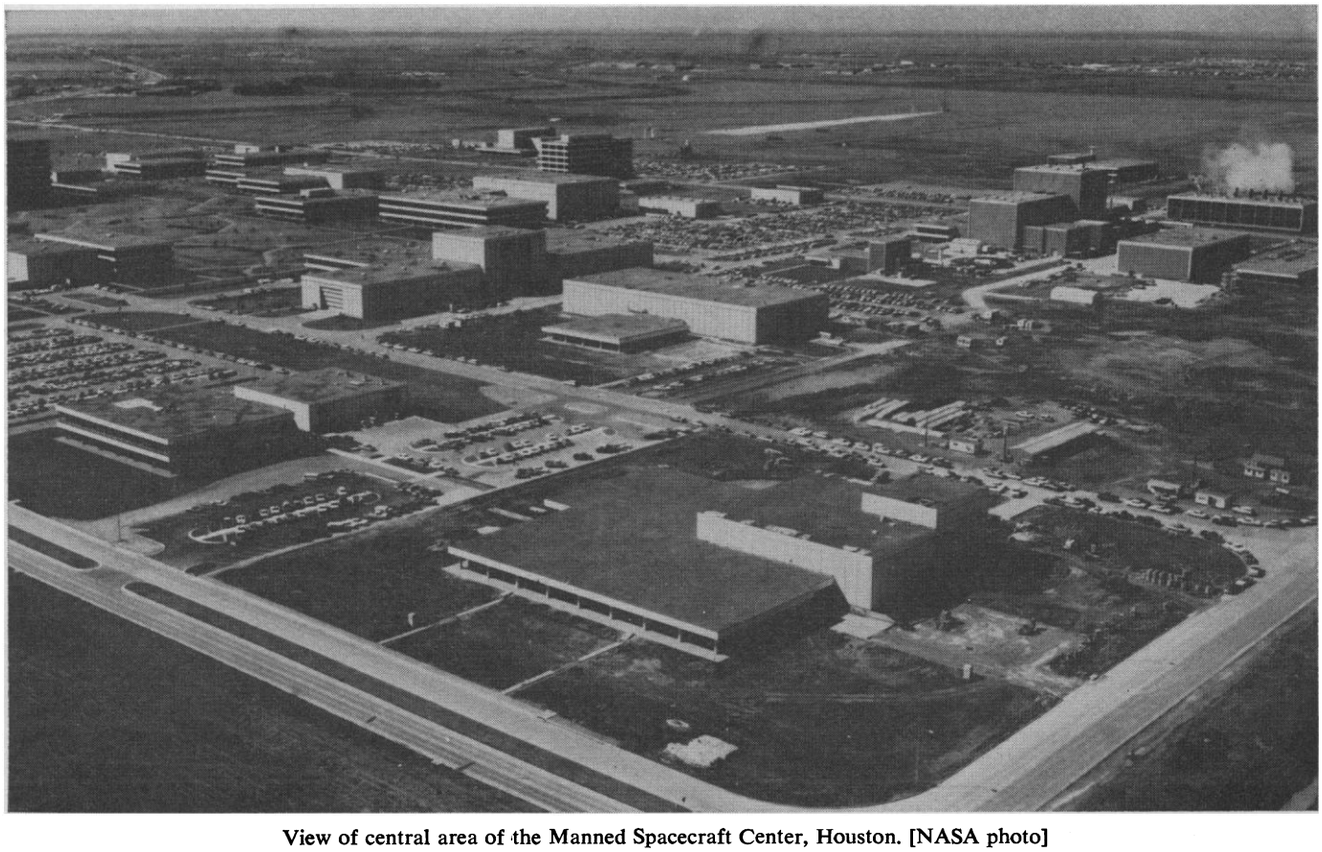
was there. Even though some two-thirds of the NASA team came from out of state, and though, as astronaut Don Lind says, "there are a lot of people here a long way from home," everyone was much too involved in Gemini and Apollo to feel homesick. This was particularly true of a small coterie of spaceworkers farther away from home than most—a group of about 25 ex-Englishmen and Canadians such as Dennis Fielder (an electrical engineering graduate of Farnborough), Jim Chamberlain, and John Hodge (a key flight-control engineer whose British accent is still a bit of a shock in Texas). The English and Canadians came to the U.S. space program after the Canadian Government in 1959 canceled a major aircraft contract and threw some 14,000 men out of work at A. V. Roe (AVRO) in a single weekend.

Thus the Houston center benefited from a British-Canadian brain drain in much the same way that Huntsville benefited from immigrant German scientists. But whereas Wernher von Braun's Huntsville is primarily a research center, Robert Gilruth's MSC is mainly a management center. Much of the pure research is farmed out to prime contractors, and most MSC engineers spend more of their time coordinating projects and supervising contractors than actually doing research and developing new technology themselves. And the emphasis at the center seems to be less on individual effort than on overall team play. "This is a place where 12,000 men can feel like Columbus," said one computer engineer. "The men here work like a well-drilled football team," added Glynn Lunney, the chief flight director for Apollo 10, "and we go into each game with the confidence that we can handle any problem." Astronaut Lind, who has a doctoral degree in physics from Berkeley, agrees that "at this center there are far more technicians and managers than scientists; but Columbus had to discover a New World before you could send a team of scientists to Antarctica."

The men of MSC seem content with their managerial responsibilities. In fact, a recent study suggests that the inner needs of the technical man are best met by jobs that in fact offer a "mix" of activities—administrative, managerial, and technical—which is a fair description of the work many of the MSC professionals do. Moreover, adds Richard I. Evans, a social psychologist at the University of Houston, "this is one technological industry that does give almost artisan satisfaction because these men can see almost immediately the effects of what they've been doing. There's a very basic and very dramatic payoff—the space shot." Certainly many MSC workers seem enthusiastic. "The guys who just put in their eight hours, their 9 to 5," observes Jack Heberlig, adviser to Maxime Faget, the assistant director for engineering and development, "don't know what's going on here and why we're so happy."

It is probable that more than a few NASA space engineers could make better salaries in private industry. NASA salary scales are comfortable if not cushy—from $10,000 to $27,000 yearly for astronauts and other MSC professionals; a division chief, who coordinates the work of dozens of MSC engineers and private contractors, makes between $20,000 and $25,000 a year. Each astronaut receives additional income from a group contract with *Life* magazine, which may amount to $16,000 a year for the next few years.

But the very managerial system in effect at the center which in the short run has proved so successful and, for the employees, so enjoyable, may in



View of central area of the Manned Spacecraft Center, Houston. [NASA photo]

the long run produce some serious problems. Some critics of the system say that it is almost impossible for an MSC manager to keep on top of technical advances in his field. Argues one MSC division head, "It won't be long before there won't be more than a handful of people who actually know anything about the technical projects they're supposed to be supervising and coordinating. And some of these contractors can give you a terrific snow job." He recommends that the center hire many more engineers on civil service status, reduce outside contracting work as much as possible, and do much of the technical work in-house to maintain as high a level of technical competence as possible. The general rule at MSC is that in-house research is undertaken only when other NASA centers or prime contractors do not have appropriate research facilities for the job. Some of MSC's most creative research has been done with its vacuum chamber—reportedly the largest in the world. And the MSC Lunar Receiving Laboratory will provide a scientific quarantine for possibly contaminated returning astronauts and their moon treasure.

"Zero Defects"

It is also argued that spaceworkers who lose their technical grip on projects under their supervision are more likely to make mistakes whenever the decision-making pace speeds up. "Sometimes the most maddening thing about this place is the schedule," admits Heberlig; "You want to get your work done on time but you want it to be done right without sacrificing quality." But sometimes the pace is relentless and the decision-making situations multiply. "The space industry operates under a principle of what they call 'zero defects,'" explains Evans. "At one time they would allow a margin of error but now they operate on the notion that there is no room for error. It has a definite effect on personnel." There is no question that behind much of the anxiety lurks, like Banquo's ghost, the specter of the 1967 flash fire that killed astronauts Grissom, White, and Chaffee. "If we didn't catch that danger," said one MSC worker, "what other ones have we missed?"

It is no surprise that the wives and even the children of the spaceworkers in part reflect the pressures and insecurities, as well as the prestige, of life at the center, but such reflections some-

European Notes: Quids Pro Quo

London. Outside of the menace they pose to health, tobacco and nuclear power would seem to have nothing in common. But for the British government, the two are closely tied these days. The reason is that the United Kingdom Atomic Energy Authority earlier this year entered into a deal under which the Greek government would receive a $60-million power reactor in return for sending Britain 40,000 tons of tobacco over a 12-year period. Admittedly, it's an odd way to do business, but it is business; and that's what Britain is looking for, especially in the field of atomic energy, which, despite vast government investment, had previously made only two major foreign sales.

Jubilation over the Greek deal had barely subsided, however, when it became apparent that it might not go through, after all. The difficulty, it seems, is that British tobacco manufacturers concluded that Greek tobacco has an aroma that might not appeal to British smokers. The Atomic Energy Authority and the Greeks insist that the tobacco is "neutral" in flavor, and it is reported that the government is pressing the manufacturers to reconsider the matter. So far, the cigarette companies have publicly announced only that, "Although Greek leaf so far remains unacceptable to British tastes, the manufacturers recognize the importance to Greece of finding a new market for her tobacco crop and will continue to keep in touch with the Greek market." But, considering how finicky cigarette smokers often are about their preferences, it appears likely that the publicity, if not the aroma, will squelch the deal. It has been suggested that the packs containing Greek tobacco might be labeled: "Cigarette smoking is beneficial to the balance of payments."

In another part of the European nuclear field, there are also some peculiar happenings. Last year, the British government announced that, because of financial considerations, it would not take part in the construction of the 300-Gev accelerator planned by the European Organization for Nuclear Research (CERN). The decision was a serious blow to CERN, since Britain was to pay about 25 percent of the cost. It was also a blow to the prestige and confidence of the uppermost science advisory councils in Britain, which had strongly recommended British participation and had even proposed scaling down domestic high energy physics to meet the costs.

The very reverse of this advise-and-ignore process has occurred in the Netherlands. There, the Science Advisory Board told the government that high energy physics was absorbing too big a proportion of the Dutch research budget, and that it would be inadvisable to take part in paying for the new accelerator. The government responded that, in terms of scientific priorities, it might not be a good idea, but that, politically, it was desirable since CERN provides an inspiring example of Europe's ability to cooperate in a large and complex project, thus promoting European unification, which is an object of Dutch foreign policy. A final decision has been held up so that the Science Advisory Board can reconsider the matter.

Meanwhile, Britain, though a dropout from the 300-Gev project, has become the first CERN member to ratify an agreement that says the project can take place. The agreement is necessary since the present CERN convention restricts the organization to the laboratory that it now operates near Geneva. The site there is fairly well filled up, and the new machine will have to be located at another site, which is yet to be selected. Ratification costs nothing and serves as a reminder that Britain has indicated that it plans to join the project once it gets its financial affairs in order. Letters of intent to support the 300-Gev machine have been received from France, Germany, Italy, Austria, Belgium, and Switzerland, and sites are being considered in all but the last. No hitches are anticipated, and it is expected that the site will be announced by October.—D. S. GREENBERG

Mission Operations Control Room for Apollo flights. [NASA photo]

times take forms that are a bit unusual. For one thing, the women are forced to take on added responsibilities at home because husbands are away frequently on trips to Cape Kennedy or Washington (if not to the moon!). "For days at a time you won't see a man on this block," says one wife of an engineer—a resident of El Lago, one of a half dozen spacetown communities around Clear Lake, where many MSC families live. The pattern seems to be for the space people to vote Republican, play the stock market in the $100 to $200 lot, and, like any other middle-class workers, worry about retirement policies.

Despite special MSC efforts to hire members of minority groups, only 4 percent of the total MSC work force is black. The NASA explanation is that few blacks so far have been able to meet the high technical requirements. So in this respect, too, MSC has had limited impact as an agent of social change in the Houston area.

Organizational Impulse

The area's women, partly in response to loneliness, have joined study groups, started a welcoming committee for new residents, helped establish a youth center—to be named after Edward White, one of the astronauts killed in the 1967 spacecraft fire—and so forth. But loneliness isn't the only reason for the plethora of organizations around the space center. "If you have a fairly insecure population, then people will seek security through joining something," says Evans. "This is after all something less than a high-tenure industry"—and something less than a settled community, for families in which the husband works for contractors characteristically reside in an area for only a few years before moving on. "It's not an unusual thing," says one MSC engineer, "to wave to a family one day and then see them pull up stakes and move out the next." And the physical appearance of the space city itself is standard suburban. The shopping centers, motels, and savings banks could straddle any street in any contractor-developed area. There is no main street or town square—no real focus for a community except MSC.

In a sense, the mission-dedication of the fathers and the organization-mindedness of the mothers is reflected in the goal-orientation of the children. For example, the community's children seem to attack athletic challenges with a relish and schoolwork with a vengeance. The Clear Creek Consolidated Independent School District is regarded as perhaps the best school system in Texas. The subjects which the parents excelled in, science and math, are emphasized by the school—to the point where the ghost of Sputnik seems to hover over math classes and science labs (which include, for example, a cloud chamber). In national competition, the students do exceptionally well: 10 percent of one junior class qualified as semifinalists in the National Merit Scholarship competition, a remarkable record. "Our brightest children often go to M.I.T., Rice, and Caltech," says Arthur C. Goforth (appropriately pronounced "go forth"), principal of Clear Creek High School. "We have nine students at Rice now; eight are on the Dean's list."

The fathers, however, are far less enthusiastic about formal schooling, feeling, for one thing, that the center itself is the best space science university in the world. "What you have to know here you really can't learn in any course," says Lunney. Only a few hundred spaceworkers take advantage of NASA's liberal continuing education program at Rice, which has a space science department offering master's and doctor's degrees, or the University of Houston, which encourages part-time and evening study. In fact, educationally, the Houston area seems to be moving closer to the center. The state legislature refused to approve an appropriation for a Clear Lake branch of the University of Houston, but it seems likely that the campaign for private financing of the campus, through bond issues and donations, will succeed. And there is no doubt that the ties between MSC and the area universities are potentially exciting. Astronauts Don Lind and Curt Michel are research associates at Rice University.

Self-Contained Community

Thus, even in the educational sector where the ties of the center with Houston should perhaps be closest, the pattern is still that of a self-contained community. Perhaps the very insecurity of a space community serves to keep the old and the new at a distance until it becomes clear whether the new is indeed the wave of the future or just a temporary carry-over from the Sputnik era. "Everyone's very worried about the future," says Enoch M. Jones, 36, the assistant chief of the guidance development branch, "especially guys like me who have been with the program for ten years." "Our job is practically done for Apollo," says R. W. Moorehead, 28, a systems analyst, "and the agency hasn't decided where to go yet."

Perhaps astronaut Don Lind best expresses the frustration of many such

space workers: "The space program has become the pet gripe for everyone: How can we put a man on the moon, people say, and not make a can opener that works? We have all sorts of enemies after our money. But you can't put this program back much more without dissolving this team." And, for many MSC workers who are members of America's space program first and the aerospace team second, dissolving "the team" that will put Americans on the moon would be like holding back traveling money from Christopher Columbus and the explorers who followed his lead.—THOMAS GORDON PLATE

A writer for Newsweek *magazine, Thomas Gordon Plate was recently a member of a reporting team covering preparations for the Apollo 11 flight in Houston.*

HEW Security Checks Said To Bar Qualified Applicants to PHS

Among many government officials the Department of Health, Education, and Welfare (HEW) has the reputation of running one of the most rigid security operations in Washington. This reputation has nothing particularly to do with the new Nixon Administration; it is a bureaucratic fact of life that is traceable through the Johnson and Kennedy Administrations at least back to the period when Senator Joseph McCarthy waxed strong during the early part of the Eisenhower Administration.

The security procedures established during these earlier periods continue with momentum many years later, impervious to changing administrations or, it often seems, to the political control or even knowledge of top governmental officials. On 27 June, *Science* published an article (p. 1499) detailing how the HEW security process had barred prominent scientists from serving on advisory panels. In response to this article, HEW Under Secretary John G. Veneman has written *Science* that "We are seriously reviewing the procedures by which investigations are made of persons being considered for positions on advisory councils." On 30 June, the Washington *Post*, in an extensive article by staff writer William Greider, elaborated on the ways in which the HEW security system barred some scientists from advisory panels.

After these articles appeared, further complaints about the HEW security system were received by *Science*. One high-ranking health official in the Johnson Administration, HEW Deputy Assistant Secretary George A. Silver, now of the Urban Coalition, said that he had learned that qualified young doctors were being barred from commissions in the Public Health Service on the basis of HEW security investigations. In Silver's opinion, there is no reason to have security clearance investigations for such doctors. "Most of these Public Health Service doctors are at the National Institutes of Health, in the Indian Health Service, on Coast Guard icebreakers, or in public hospitals. What possible security problems would they represent?" Silver exclaimed. In Silver's view, these security procedures "sharply limit the opportunity to get creative people with an innovative viewpoint" in the Public Health Service (PHS) and in other parts of HEW.

The threat that political considerations may bar some qualified applicants from PHS commissions is troubling to some medical people, especially to young doctors and medical school students who are opposed to American participation in Vietnam. Medical school graduates face the prospect of almost immediate induction for 2 years of service as physicians in the armed forces. A significant number of graduates have grave political and moral reservations about military service, especially when it often means being sent to Vietnam. Among this group, acceptance of a 2-year stint in the Public Health Service in lieu of military service seems a far preferable alternative.

However, if the case of one physician, Henry S. Kahn, is an accurate indicator, anti-Vietnam war views may be a factor in denying some people PHS commissions. Doctor Kahn has charged that after being selected by the PHS for sponsorship for a commission last August, his commission was rejected in December on the basis of a governmental security check. Kahn's assertions are supported by evidence supplied by Republican Senator Edward Brooke (Mass.). Senator Brooke's assistance was obtained partly through requests on Kahn's behalf by Robert H. Ebert, dean of the Harvard Medical School of which Kahn is a graduate, and Norman G. Levinsky of the Boston City Hospital where Kahn is working.

Most of those rejected for positions on the basis of governmental security checks have no idea of the information being used against them. However, through the intervention of Senator Brooke, Kahn did find out two items of information that were used against him. After Brooke had queried Surgeon General William H. Stewart, head of PHS, on two occasions early this year about Kahn's rejection, HEW officials met with Brooke's administrative assistant who concluded that derogatory information unrelated to Kahn's professional qualifications had been uncovered in the HEW security check. Two items of information about Kahn were revealed to Brooke's administrative assistant. One was a newspaper account of an antiwar demonstration in which Kahn is said to have participated. The other was a letter signed by several people, including Kahn, suggesting a memorial to Negro author W. E. B. DuBois.

In a two-and-one-half-page letter about Kahn's case to HEW Secretary Robert H. Finch, Brooke termed the two items about Kahn "of doubtful relevance." Brooke rather wryly noted that "I am myself a member of a committee formed to raise private funds for a memorial to DuBois in his hometown of Stockbridge, Massachusetts." Brooke, who served as Attorney General of Massachusetts before election to the Senate, argued that there are all kinds of antiwar protests and that "the mere fact of this kind of activity, unless it be proven to be specifically illegal or subversive in intent, should hardly be conclusive in determining a man's qualifications for a PHS commission."

"The arbitrary fashion in which Dr. Kahn's application has been denied does serious injury to him personally and professionally," Brooke wrote Finch. Brooke termed the Kahn case