National Aeronautics and
Space Administration

Langley Research Center

NASA

Langley Researcher

SPECIAL ISSUE

Dr. Floyd L. Thompson
1898-1976

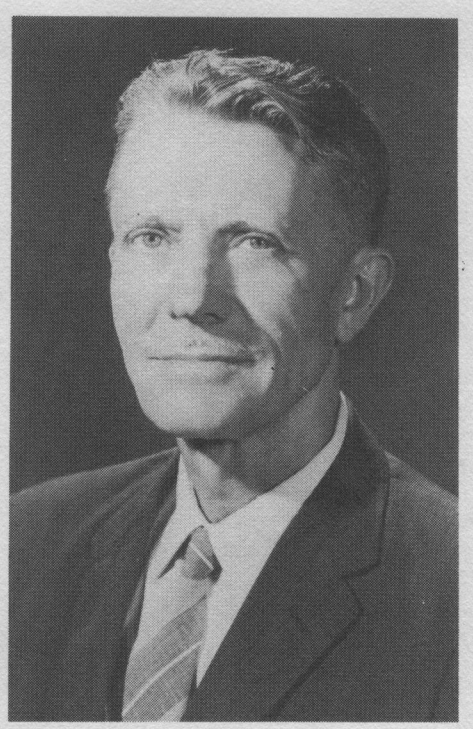
Dr. Floyd L. Thompson, Director of the Langley Research Center from 1960 to 1968, died on Saturday, July 10, 1976.

Dr. Thompson was born in Salem, Michigan, on November 25, 1898. He graduated from Salem's South Lyon High School in 1917 and served in the U.S. Navy for the next four years. He then entered the University of Michigan, where he received a Bachelor of Science degree in aeronautical engineering in June 1926.

He began his science career July 8, 1926, as an aeronautical engineer in the Flight Research Division, becoming Chief in July 1940. In 1943, he was named Assistant Chief of Research and, from November 1945 to September 1952, he was Chief of Research.

He became Langley Associate Director September 14, 1952 and continued in that job until he was appointed Director on May 23, 1960. He left that position in May 1968 to become a Special Assistant to the NASA Administrator. In November 1968, he retired from active government service, but remained a consultant to the Administrator until January 1, 1973.

Dr. Thompson helped advance the engineering and science industry through service on several research committees, and as a consultant on special technical committees, in the United States and as a NASA representative in foreign countries.



1961, Langley Director

He served two years as Chairman of the NASA Policy Planning Board at NASA Headquarters, and he was Chairman of the Apollo 204 Review Board, appointed to investigate the Apollo accident that occurred in January 1967.

Dr. Thompson received many honors during his career. He was elected a Fellow of the American Institute of Aeronautics and Astronautics in 1949, and served as AIAA President in 1968. He was cited by the University of Michigan as a distinguished alumnus in 1953 in recognition of his outstanding career in the aerospace sciences.

Thompson welcomes Alan B. Shepard, Jr., one of the original seven astronauts, to Langley.

Federal Official Starts Out As Rabid Reformer, Winds Up Busy, Bewildered

By ARTHUR EDSON

WASHINGTON (AP) — That mystery man, the federal official, was pictured Wednesday as one who may arrive hot for reform, may soon become bewildered, and may finally wind up so busy he has to do his thinking, if any, while shaving.

The federal official is defined as someone outside Civil Service who has a policy-making job. Maybe he's the head of an agency, or is a deputy.

Around 1,100 are on political appointments. Another 500—and here the description doesn't fit—are career men who usually stay on no matter what happens election day.

Collectively, they mind a vast and most complex store, hiring 2,400,000 civilians and 2,800,000 military men and women. Each year they have a hand in spending more than 70 billion dollars.

Although many are big wheels in business or industry back home, they come and go here almost unnoticed. Who are they? And what do they do?

The Brookings Institution, an independent organization engaged in research and education in the social sciences, has held eight roundtable discusions in which government executives took part.

The results have been put into a book, "The Job of the Federal Executive," (Brookings, $3.50). It was written by Marver Bernstein, a Princeton political science professor who sat in on the meetings.

From the 241 pages, this picture emerges:

The man who gets his appointment and rushes to Washington to save his country will soon learn that business was never like this.

He rarely is told exactly what he's expected to do. He may be redhot to make decisions, only to learn that his work overlaps other agencies.

"It's not easy to discover who should be consulted," one said, "and whose toes must not be stepped on."

A businessman is accustomed to practical matters, things to be made or sold, profits. In government, he has no way of telling how well he's doing — and he feels frustrated.

And then, there's always Congress.

"No business executive," one roundtabler said, "ever had to deal with a board of overseers like Congress."

"During the last investigation that concerned me," another said, "I spent 90 per cent of my time testifying before committees or else getting ready for the next day's appearance."

His uninspiring conclusion: "My work day is pretty long. I get to the office about 8:30 and leave about 6 or 6:30, and I take work home with me almost every evening. Perhaps the best time I have for thinking is when I am shaving."

A new political executive sized up the situation and said: "The best thing for the political executive to do is to work closely with his career executives, appreciate them fully, and thank God every night for having them around."

Yet even here he must be wary lest he become a captive of the permanent staff, unable to make decisions on his own.

Except for times of emergency, and for dramatic political changes such as the Republican victory in 1952, almost every president has had trouble getting the man he wants to take the job.

Yet many who take the plunge are glad they did.

"One of the most satisfying experiences I have had," a former businessman said.

A former government executive returned to a job paying five times as much.

"When I went back to the clubs I was going to before," he said, "I found that people were talking about the same things they were when I left four years before.

"I felt I was back in a little boy's game."

Businessmen Hear Of Redevelopment

Progress on Hampton's urban redevelopment plans and street planning and parking facility development will be discussed by City Manager C. E. Johnson at a meeting of the Downtown Hampton Better Business Association at 7:30 tonight at the city hall.

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2 Pedestrians Ask Damages

Three motions for judgments for damages in automobile matters, two of them involving youngsters struck by cars, were filed in Newport News Wednesday.

A $50,000 award is sought by the mother of two-year-old Vida Graves, (Mrs. Shirley Ann Graves), on behalf of the tot who was struck by a car Sept. 1 at the intersection of 27th and Madison Ave. Named defendant is Frederick R. McCullam of Newport News.

The father of four-year-old Linda Joan Young, Timothy Root Young, seeks $25,000 damages on her behalf as a result of injuries alleged to be the result of the child being struck Aug. 27 in the 700 block of 72nd Street by a vehicle operated by Davis R. Trivette, 18, of 19 South Mallory St Hampton while he was acting a an agent for Harvey J. Cook 848-36th St. named a co-defendar in the suit.

Mrs. Clara B. Kirk, 124-30th S instituted suit for $25,000 again Center Car and Truck Sales, In The complaint charges negligenc on the part of the agency. Mrs Kirk seeks to recover for dam ages suffered Aug. 30 when th brakes allegedly failed on a ca she purchased at the agency July 18. The complaint states this alleged mechanical failure caused her to smash into a tree and other objects when the vehicle failed to brake sufficiently to turn a corner.

The first two motions were filed in George DeShazor's Clerk of Courts office for Circuit Court, Part Two. The last was filed in F. Baxter Barham's Clerk of Courts office for Circuit Court, Part One.

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In the proper utilization of personnel, a prime consideration has been the assignment of duties that require full utilization of the skills of highly trained personnel to insure that skilled manpower is not wasted by assignment to duties that could better be performed by others of lesser or more appropriate skills. This policy gives rise to what we call a "balanced organization". A particular aspect of this policy is that in the utilization of complex and costly laboratory equipment and facilities for experiment and testing, extensive use is made of highly trained and competent mechanics and technicians in the preparation for and execution of experimental test programs. Engineers and scientists are able to devote full time to those duties for which they alone are uniquely fitted and are not required to devote large segments of their time to tasks that can be performed equally well or better by highly skilled mechanics or technicians. Experience has shown that by encouragement to this aspect of personnel management high morale and full utilization of all personnel are achieved.

A further aspect of Langley Research Center management that is very important relative to the full utilization of personnel is the centralization of services. The centralization of services has been developed over a considerable period of years to insure the proper and effective management of the skills involved and at the same time meeting the requirements of responsiveness to the varying demands of scientific and engineering

personnel involved in the execution of research programs. A very important aspect of such centralization is that the supervisory personnel heading up these services shall be fully aware of and capable of coping with the requirements of these varying demands. Unless such services are headed by such supervisors, centralization can produce a very troublesome situation. Thus, the selection of supervision for the services is an extremely important matter.

FLT. R
March 5, 1965

9/18/64

NOTES ON RECRUITING AND RETENTION OF TECHNICAL PERSONNEL

INTRODUCTORY POINTS

HISTORY

GROWTH

RECRUITING AND RETENTION

More than 20 years ago, gave up trying to compete for large numbers of people who have spent 7 years in college.

(1)

Instead, have concentrated on hiring at entrance professional levels and on developing high-level technical proficiency through in-house training and graduate education.

Have looked at this training and education as a process that will continue throughout an employee's total career. The nature of the advanced research that we do requires that the employee continually go into new fields - whether or not he's the type that opens up new fields.

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About 1940, extended the total career development concept to the technician area with the establishment of the apprentice school.

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In the early 1950's (1952), extended the training for our professional type of work into the undergraduate area - with the co-op program. Have recently expended the program to include more than 100 co-ops from 16 schools.

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Have had to work out new management techniques - NACA's graduate study leave authority (1950) - and new arrangements with educational institutions - VARC. Have proposed some that were not accepted - Stack Plan.

INTRODUCTORY NOTES (con't.)

RETENTION particularly

Select technical line management from among those of top-flight technical ability. Because of recognized technical ability of line management, only rarely find that a technical man is unwilling to move into management position.

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(2) Have long recognized non-supervisory work at high levels as well as supervisory.

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Maintain a flexible, dynamic organization - continually change organization to meet requirements of advancing technology - also build the organization around the people available.

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With the flexible, dynamic organization - and with the total career development philosophy - have had substantial blocks of top-flight people "carved out" a number of times - for new centers and new programs. The amazing thing about this is not the number of times it has been done, but that it has been done time and again without disruption to ongoing Langley programs - that developing scientists and engineers have been available and able to step in and carry on - and that Langley remains a productive, creative research center.

NOTES FOR DISCUSSION PERIOD

CEILINGS

Bureau of the Budget is attempting to freeze average grade and the numbers of positions in GS-14 and higher grades at the FY 1964 level. They claim that the average grade of Federal employees has risen substantially in the past few years. The assumption seems to be that grades have been inflated unwarrantably to help offset the disparity between Government pay scales and pay scales in private industry for similar work. Then, it is further stated, since the new Government pay scales are more closely comparable with those of industry, "upgrading" must cease.

Effect on Langley - In our dynamic type of organization, where the organizational structure and the definition of work into position assignments are build around available people on a current basis, practically all of our promotions look like "upgrading." The mechanical type of controls over numbers at particular grade levels is not compatible with the philosophy of developing and encouraging employees to continually increase their capabilities and to give them assignments that exploit their increasing capabilities.

3

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ORGANIZATION

Maintain a flexible, dynamic organization - both horizontally and vertically.

Horizontally - Encourage informal consultations with recognized experts anywhere in the organization.

Also - establish temporary committees for attacking all major aspects of a problem.

Organization for project management?

DISCUSSION PERIOD NOTES (con't.)

ORGANIZATION (con't.)

Vertically - Do not work on the basis of static manning tables with established and limited grades. In effect, tell the section head - here are a number of people and here are your functions - get the job done and develop your people so that they continually take on more advanced work.

However, we make centralized review of employee development and utilization (what is not delegated is just as important as what is delegated, as far as being different from many Government organizations is concerned) through prior approval of promotions at top management levels. Through the manpower utilization committees consistency is maintained throughout the various divisions of the Center.

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One way of keeping organization flexible and responsive to top management direction is by not having manning tables and by not delegating authority below top management levels for authorizing new (or replacement) positions. By abolishing all vacated positions, position strength can continually be adjusted in response to redirection of research emphasis, reducing the need for more formal methods of shifting concentrations of personnel.

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MANPOWER UTILIZATION COMMITTEES

It would probably shock some of these people to know that we have had our committee-type of review since the early 1940's. Up until about 1941 or 1942, all personnel actions were made by NACA Headquarters. When

DISCUSSION PERIOD NOTES (con't.)

MANPOWER UTILIZATION COMMITTEES (con't.)

appointing authority (including promotions, etc.) was decentralized to Langley, the committee-type of approval of promotions and utilization was initiated. Since then, as other new Government-wide programs have come along, their operations have been integrated into our overall personnel management program very carefully -

position classification of field positions in 1945

formalized training agreements (including virtual contracting for promotion upon completion of training)

merit promotion program - 1958 and 1959

incentive awards - we have been particularly careful with the performance type of incentive awards - that the utilization of this type of award is compatible with other programs

quality increases - October 1962

1. Develope our own experiences thru training
2. Reorganize non supervisory salary requirement
3. Build around people (not manning tables)
   & abolish positions created by reorganization with control of new positions retained in head office
4. Use manpower utilization committees

Dr. Thompson -

Meet GM's New President

In early 1924, less than a year after Alfred P. Sloan became president of General Motors, he was interviewed by FORBES *founder B.C. Forbes. Here are some quotations from that interview, showing Sloan's creativity as a management pioneer:*

"I never give orders.

"To attain the fullest measure of success for his company, an executive must sell himself, must sell his ideas to his associates.

"Perhaps an executive, through years of building up confidence, might get to the point where he could afford to say, 'You do this because I ask you to.' But an executive is wrong so many times himself that this would be a dangerous course to follow. He would miss so many opportunities for obtaining wise counsel. It is better to appeal to the intelligence of a man than to the military authority invested in you.

"In our corporation, arbitrary orders are not issued from the top. Even though we may start from many positions which seem to be different, we always thrash a thing out until we reach a point where we can agree.

"What is the hardest problem of all in handling other men? From my own experience and from the experience of heads of other large corporations, it is this: You must grant a large measure of responsibility to the man placed in a highly responsible position. Such a man has, of course, unusual ability, unusual brains. But it is often hard to bring home to such a man in such a position that he does not know it all, and that he could profit by counseling with others.

"All of us have some weaknesses. But most human beings do not like to admit even to themselves that they have human weaknesses and limitations. Therefore, it is often extremely difficult to get a man in the frame of mind where he will gladly seek to gather from other people in the organization what would offset, what would remedy his own weakness. Yet this must be done in a large organization to bring about a maximum of efficiency and effectiveness.

"The human problem is far more delicate and difficult to handle than any production problem or distribution problem or engineering problem or financial problem. The ability to get people to work together is of the greatest importance. Psychology and personality constitute at least 50% of the material requisite for success as an executive. I have seen men with fine minds who failed to make their plans effective because they lacked understanding of how to work with people. In our business, I should say that psychological ability and personality are 75% of the necessary equipment.

Young Mr. Sloan

"In modern, large-scale industry, there are two major forms of organization: centralized or decentralized.

"If General Motors were to be centralized, we would have one man in supreme charge of all sales, another in supreme charge of engineering, another in supreme charge of manufacturing, and so forth.

"We are organized on a decentralized plan. Each operation, like Buick, Cadillac, Chevrolet, Oakland, or Olds car or GMC truck, is headed by the best man we can find for that job, and he is charged with full responsibility for the success of his entire organization. In this way we develop greater initiative, greater enthusiasm and a greater sense of responsibility.

"Looking ahead and trying to analyze the future of the auto industry, I can see no reason why our industry should not follow the trend followed in most other large-scale industries such as steel, woolen, brass, copper, packing, harvesting machinery. We can expect to see in the next few years, first, the elimination of many companies, for the basic reason that from an economic standpoint, they have no right to exist—sentiment does not enter into the operation of economic law. This will bring about a limited number of large institutions.

"Second, there doubtless will come consolidation of some of these into groups. These groups will each manufacture a complete line of cars, from low-priced to high-priced, where quantity production justifies such a policy.

"There is every reason why an institution like GM, if properly managed, should attain and maintain a powerful place in the automotive field. For some years to come—how many no one can foretell—those concerns having the brains capable of originating the best new ideas will enjoy a tremendous advantage. The auto industry, it would hardly be an exaggeration to say, is still in its experimental stages. Many things which now enter our daily life, and which we now take as a matter of course, started as pure theories, and those who propounded them usually were derided as 'nuts.' So it has been in the auto industry, and so it will continue to be.

"But General Motors is so constituted that it should be able to reduce the time required to take hold of new ideas and theories and put them into practicable application. We have an extraordinarily fine research department under Mr. Kettering—who has the most wonderful analytical mind of any man I've ever met and who combines with this faculty unlimited vision and courage.

"Under the generous inducements of our Managers Securities company plan, providing for liberal profit-sharing for those who carry on the actual management of the business, we are in a position to hold and, whenever necessary, to reach out for the brainiest men in the whole industry.

"The future of any executive who becomes associated with our corporation and renders satisfactory service is abundantly assured. The advantages derivable from having employees become stockholders are almost beyond comprehension.

"In General Motors we have an institution embodying all the possibilities of tremendous development and increased effectiveness and efficiency. We face the future without fear, with faith. We have within ourselves the power, the brains, the resources, the experience to do tremendously bigger things than ever before." ■

LANGLEY

Washington 25, D. C.
November 26, 1951

From NACA Headquarters
To Langley - Attention: Dr. Reid

Subject: Fiscal Year 1953 Estimates of Appropriations

1. The following table presents a comparison of NACA estimates of appropriations (Salaries and Expenses only) with the amounts approved by the Bureau of the Budget for inclusion in the President's Budget and with the amounts finally appropriated by the Congress for the fiscal years 1950, 1951, and 1952. The current status of our 1953 estimates is as shown.

	Request	President's Budget	Appropriated
Fiscal Year 1950	9,913 $57,144,000	8,500 $48,700,000	7,295 $43,000,000
Fiscal Year 1951	8,576 48,721,000	8,000 46,100,000	7,770 45,750,000 1/
Fiscal Year 1952	10,760 65,889,000	8,961 55,000,000	7,803 50,650,000 2/
Fiscal Year 1953	10,757 68,752,728	8,400 3/ 54,234,000 3/	

1/ Includes supplemental of $3,250,000

2/ Includes anticipated supplemental of $1,400,000 (unabsorbed portion of classified pay act costs)

3/ To be kept confidential until the President's Budget Message is presented to Congress

2. The facts indicate that the NACA has for several years operated at levels considerably below the levels recommended in its estimate submissions to the Bureau of the Budget. It appears that we are confronted with a similar situation in the fiscal year 1953. Comparatively speaking, the situation for 1953 is more serious than indicated by the table. The table indicates the Bureau of the Budget is approving approximately the same amount for 1953 as it did for 1952. The 1953 figure, however, includes over $2,000,000 for the recent classified pay act costs; the 1952 figure included no pay act costs. In effect, therefore, the Bureau of the Budget is approving a lower level of operations for 1953 than they did for 1952.

3. In the past it has been most difficult to obtain any specific reason or basis for the Bureau of the Budget action in so markedly reducing our estimates. From recent informal discussions with the Bureau of the Budget examiners we have pretty good reason to believe that we may expect similar treatment in the future unless we clearly and specifically set out the harmful effects of such treatment. Their position might be summed up in two of their "64-dollar questions".

a. How has the nation been hurt by the fact that the NACA has not received all the money it requested for the last few years?

b. What harmful effect, if any, may be expected if the NACA appropriation for 1953 is leveled off to the 1952 amount?

4. We will shortly appear before the Congress to defend the appropriation amount approved by the Bureau of the Budget. Here again, we are going to be confronted with considerable pressure to "level us off" or worse. To prepare for our Congressional presentation your best thinking is solicited on answers to the two 64-dollar questions set out above. Answers to these questions, to be useful, must be in terms of the end product toward which the NACA effort is directed - specific performance figures for military "hardware". Generalities, however sound and logical, have little appeal. Statements concerning the "state of the art," the need for maintaining a continuous flow of basic fundamental research, and statements that our work is essential to the success of the expanding military procurement programs do little more than counteract the drive to reduce our appropriation below its present level. The need for an increase, or conversely, the harmful effect that has resulted or will result if the increase is not granted must be translated into specific terms relating to the performance of the end product, the military aircraft.

5. The difficulty of preparing answers to these questions in the terms suggested is recognized; answers will probably involve predictions of research results, the date they may be forthcoming, and the time involved in applying them to military hardware. Nevertheless, you may have some ideas that might make our presentation more effective and your cooperation is urgently desired.

6. May we please have your comments not later than December 15, 1951?

Hugh L. Dryden
Hugh L. Dryden
Director

REU:lbg

Mr. F. L. Thompson
Assistant Chief of Research

NACA - Langley

Langley Field, Va.
November 22, 1944

MEMORANDUM for Mr. C.A. Hulcher, Chief of Training Division

Subject: Report on meeting of Conference Group R-3, November 9, 1944; topic, "Getting Out The Technical Report."

1. The purpose of the conference was to discuss the difficulties and the methods of getting out a technical report on a research project. The topic was suggested by a number of section heads who have found that, after the experimental or theoretical investigation is completed, there is required what appears to be entirely too much "blood, sweat, and tears" on the part of the section head in getting the project between covers as a finished paper.

2. Mr. F.L. Thompson, Assistant Chief of the Research Department, came to the meeting to act as guest speaker, to answer questions put to him by the group members, and to tell his experiences in connection with the problem that was to be the topic of discussion. Mr. Thompson spoke approximately twenty minutes. The pertinent points of Mr. Thompson's talk and of the ensuing discussion are given in the following paragraphs. The order of presentation is approximately chronological. The purpose of this report, copies of which are being sent to all members of the group, is to act as a stimulant to the memories of the members by recalling to them the comment of Mr. Thompson and other members on various parts of the problem.

3. Mr. Thompson made the following points in his talk:

(a) Causes of the difficulty of getting out a report are:

(1) The report lies on the desk of the reviewer after the author has made his first rough draft. In many cases, this bottleneck is the section head.

(2) Confused thinking by the author.

(3) Lack of understanding by those carrying out the project of what was done and why it was done.

(4) The introduction is the most difficult part of a report and is therefore an obstacle that the authors have difficulty in overcoming.

(b) Some things that can be done to solve the problem:

(1) Keep doing something on the report all the time. Don't let it die for days and weeks without looking at it.

(2) If you, the section head, are the bottleneck, try to develop someone who can review the report for you. Remember, the important thing is to have someone working on the report all the time.

(3) Exercise care and judgment in the work you assign to the various individuals in the section. That is, do not give anyone an extremely difficult or impossible job on which he is sure to fail. Sometimes reports don't get finished just because their writing is assigned to individuals who can't write them properly.

(4) Hard work - just plain hard work - on the part of the author and reviewer is something for which no good substitute has yet been found.

4. On the general problem of getting a report written, the following points were made during and after Mr. Thompson's talk:

Pearson: Sometimes an author is greatly helped in getting a report written if a more experienced person writes an introduction.

Stickle: It is not good practice to have someone other than the author write introductions because the introduction writer may become the bottleneck on several reports.

Seidman: It sometimes happens that the reviewer who can think clearly becomes the section head, and he then must develop someone else to be a good reviewer. The degree to which a section head then becomes a bottleneck in getting out the

reports depends a great deal on whether he continues to review all the reports himself or whether he develops someone else to be the reviewer.

5. On the subject of having the report written by expert writers who are not otherwise connected with the project:

Thompson: It is done to some extent in the laboratory, but in general, it does not appear to be good practice when you rely on one such expert writer. You are not developing your engineers into report writers.

McHugh: It might be a suicidal course because some day you might lose the expert writer.

Schuette: It may create a morale problem if the would-be author resents having someone else do the writing for him.

Someone else: You lose the valuable contributions to the report that might be put in by the people who observed and did the work.

Thompson: It may be necessary to do it if the time element is urgent; but otherwise, the practice should not be built up to an important degree.

6. On the subject of report outline:

Thompson: An outline usually exists; if not formally written, then in the minds of the authors or in the notes made by the author, or even on scraps of paper the engineer writes on during the course of the investigation.

McHugh: In the Pressure Tunnel section, the author and one other person get together and prepare the entire organization of the paper. This organization constitutes the outline and is often more elaborate and complete than the usual outline.

Thompson: It is good practice to have some experienced person talk over with a young engineer his research project so that he understands what is to be done and why it is to be done.

Schuette: An outline prepared after the rough draft of a report is written can be used as a check on the quality of organization of the report.

7. On the subject of time spent in training engineers to write technical reports.

Niehouse: It is a serious problem to decide how much time should be spent in training engineers who work on projects to write the reports. It is especially difficult now, when so much emphasis is placed on getting reports out quickly.

Thompson: It is very difficult to state just where a section head should draw the line between getting a report out and spending time on training people to write. Some training must be done or the section head will find that in 2 or 3 years he will have no one who can write reports.

Pearson: One good method of doing some training of prospective authors is to make them members of editorial committees on which experienced authors and critics are also members.

8. On the subject of editorial committees and editorial clerks.

Thompson: The old system of having formal editorial committees review papers was, in many ways, a good system. Some degree of resumption of that system may take place.

Others: There was general agreement that the pre-war editorial committees were beneficial to improving NACA reports.

Thompson: One or two sections have tried to develop girl computers into reviewers of reports - that is, reviewers who would really do some critical reviewing of the engineering or mathematical work in the paper. However, this idea has not succeeded fully, and the girl reviewers have become editorial clerks who check the report for agreement with established rules on form, arrangement, etc.

9. On the subject of what might be a test for a report to determine if it is good, the following were suggested:

(a) Have someone other than the author read the report to a listener who is familiar with the general subject, but not with the particular investigation. If the listener can follow the report text without difficulty, it is a good indication that the report is written well.

(b) Prepare an outline of the report as written. If the outline shows good organization and logical development, it is an indication that the report is written well.

(c) Have an engineer not entirely familiar with the project read the report. It he reads the report and understands it, without halting, stumbling or re-reading it, it is a good indication that the report is written well.

10. At the conclusion of the meeting, the group members selected for the next meeting a discussion of some problems encountered in operating a section. Each of five members of the group will bring in a problem for discussion. It is hoped to complete the five problems in one meeting, but in the event that the group members wish to continue the discussions and the results appear worthwhile, additional time as necessary will be spent on the problems and may be added.

Joseph N. Kotanchik
Conference Leader

JNK:drc

Conference	Cost Breakdown	Research Manhours	Total Manhours	Total Cost
16th Gen. Inspec. Langley (5/20,22,23, 28/47) EAA882	Res. $43,886.44 Serv. 18,545.20 Mat. 6,373.53	22,142	34,365	$68,805.17
Super.Aero.Conf. Langley (6/19 & 20/ 47) EAA892	Res. $ 4,702.56 Serv. 1,644.27 Mat. 116.73	1,706	2,891	$ 6,463.56
Boundary-Layer Conf. Langley (8/14/47) EAA898	Res. $ 1,990.32 Serv. 482.16 Mat. 112.46	867	867	$ 2,584.94
Amer.Towing Tank Con. Langley (10/7/47) EAA902	Res. $ 1,191.30 Serv. 83.93 Mat. -	616	681	$ 1,275.23
Transonic Conf. Ames (11/5 & 6/47) EAA905	Res. $11,261.00 Serv. 1,271.00 Mat. 1,426.00	4,503	5,378	$13,958.00
Aircraft Loads Conf. Langley (2/18&19/48) EAA915	Res. $18,055.00 Serv. 3,706.00 Mat. 271.00	10,096	11,040	$22,032.00
Structures Conf. Langley (5/20/48) EAA929	Res. $ 9,323.00 Serv. 1,363.00 Mat. 33.00	4,285	5,265	$10,719.00
University Conf. Langley (6/21,22, 23/48) EAA927	Res. $ 9,546.00 Serv. 2,717.00 Mat. 640.00	3,798	5,850	$12,903.00
Ames Inspection Ames (7/13&14/48) EAA925	Res. $ 7,180.00 Serv. 266.00 Mat. 300.00	2,663	2,843	$ 7,746.00
Supersonic Conf. Ames (8/31/48) EAA936	Res. $ 9,771.00 Serv. 1,671.00 Mat. 147.00	3,763	4,889	$11,589.00
Seaplane Conf. Langley (11/16/48) EAA941	Res. $ 4,191.00 Serv. 540.00 Mat. 66.00	1,750	2,104	$ 4,797.00
GRAND TOTALS		56,189	76,173	$158,123.87

Typed 2/18/49 - mgm

Conference	Cost Breakdown		Research Manhours	Total Manhours	Total Cost
16th Gen. Inspec. Langley (5/20,22,23, 28/47) EAA882	Res.	$43,886.44	22,142	34,365	$68,805.17
	Serv.	18,545.20			
	Mat.	6,373.53			
Super.Aero.Conf. Langley (6/19 & 20/ 47) EAA892	Res.	$ 4,702.56	1,706	2,891	$ 6,463.56
	Serv.	1,644.27			
	Mat.	116.73			
Boundary-Layer Conf. Langley (8/14/47) EAA898	Res.	$ 1,990.32	867	867	$ 2,584.94
	Serv.	482.16			
	Mat.	112.46			
Amer.Towing Tank Con. Langley (10/7/47) EAA902	Res.	$ 1,191.30	616	681	$ 1,275.23
	Serv.	83.93			
	Mat.	-			
Transonic Conf. Ames (11/5-6/47) EAA905	Res.	$11,261.00	4,503	5,378	$13,958.00
	Serv.	1,271.00			
	Mat.	1,426.00			
Aircraft Loads Conf. Langley (2/18&19/48) EAA915	Res.	$18,055.00	10,096	11,040	$22,032.00
	Serv.	3,706.00			
	Mat.	271.00			
Structures Conf. Langley (5/20/48) EAA929	Res.	$ 9,323.00	4,285	5,265	$10,719.00
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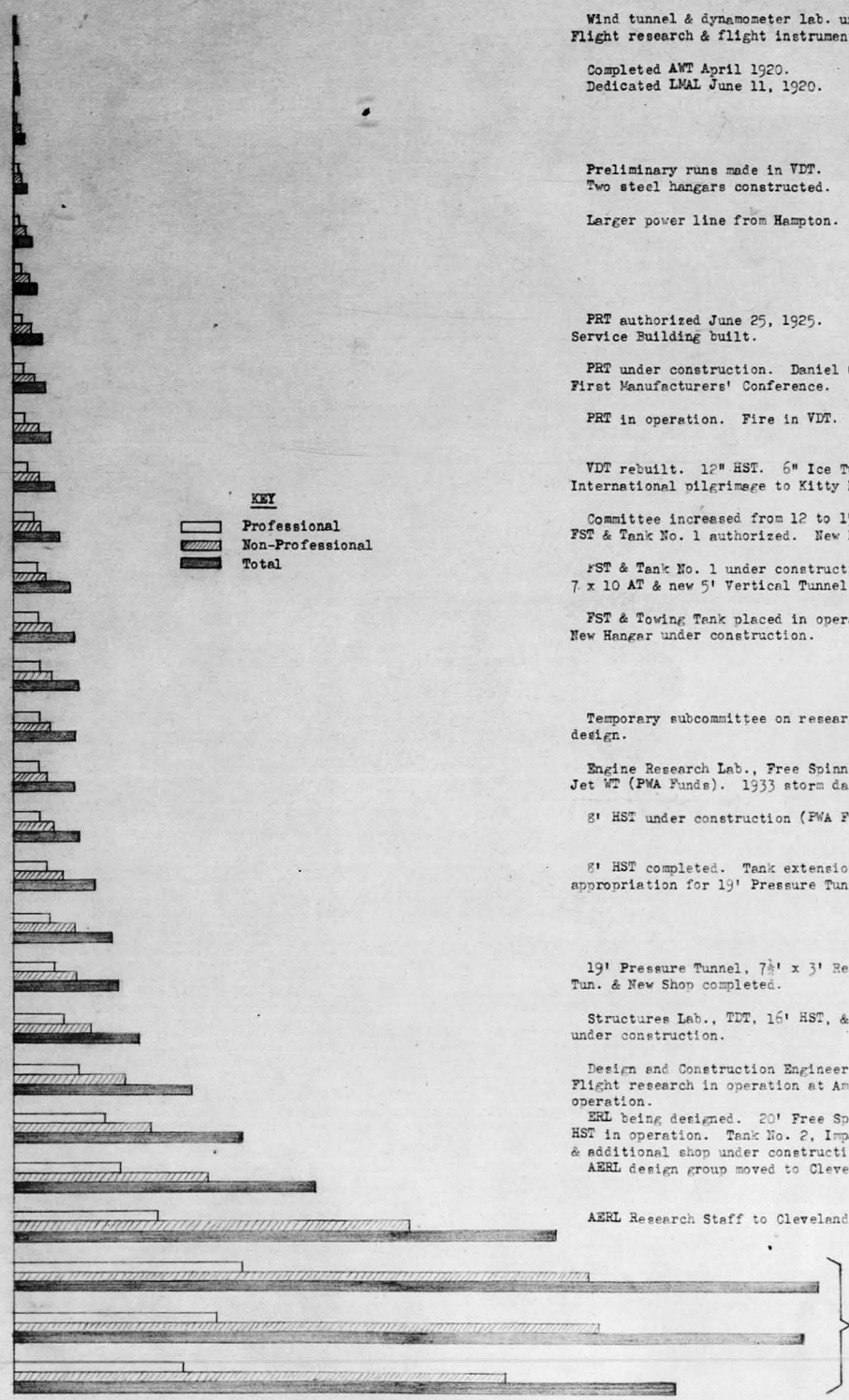
NACA Conferences, 1947 and 1948

16th Annual Inspection	Langley	May 20,22,23, 1947
Supersonic Conference	Langley	June 19-20, 1947
Boundary Layer Conference	Langley	August 14, 1947
Transonic Design Conference	Ames	November 5-6, 1947
Aircraft Loads Conference	Langley	February 18-19, 1948
Muroc Conference	Muroc	May 20, 1948
Structures Conference	Langley	May 20, 1948
University Conference	Langley	June 21-23, 1948
Biennial Inspection	Ames	July 13 & 14, 1948
Supersonic Conference	Ames	August 30-31, 1948
High-Speed Seaplane Design Conf.	Langley	November 16, 1948

Typed - mgm - 11/16/49

GROWTH OF LANGLEY LABORATORY STAFF - PROFESSIONAL, NON-PROFESSIONAL, AND TOTAL

Fiscal Year	Professional	Non-Professional	Total	Some Notable Events
1919	4	7	11	Wind tunnel & dynamometer lab. under construction. Flight research & flight instrument development.
1920	12	15	27	Completed AWT April 1920. Dedicated LMAL June 11, 1920.
1921	12	32	44	
1922	18	38	56	Preliminary runs made in VDT. Two steel hangars constructed.
1923	23	52	75	Larger power line from Hampton.
1924	36	62	98	
1925	39	72	111	PRT authorized June 25, 1925. Service Building built.
1926	44	92	136	PRT under construction. Daniel Guggenheim Fund set up. First Manufacturers' Conference.
1927	45	104	149	PRT in operation. Fire in VDT. Lindbergh's flight.
1928	60	108	168	VDT rebuilt. 12" HST. 6" Ice Tunnel. International pilgrimage to Kitty Hawk, N. C.
1929	79	110	189	Committee increased from 12 to 15 members. FST & Tank No. 1 authorized. New hanger requested.
1930	100	128	228	FST & Tank No. 1 under construction. 7 x 10 AT & new 5' Vertical Tunnel replace old AT.
1931	102	155	257	FST & Towing Tank placed in operation. New Hangar under construction.
1932	111	159	270	
1933	110	150	260	Temporary subcommittee on research program on monocoque design.
1934	109	140	249	Engine Research Lab., Free Spinning Tun., & 24" High Vel. Jet WT (PWA Funds). 1933 storm damage.
1935	111	164	275	8' HST under construction (PWA Funds).
1936	138	203	341	8' HST completed. Tank extension started. Supplemental appropriation for 19' Pressure Tunnel.
1937	149	253	402	
1938	166	260	426	19' Pressure Tunnel, 7½' x 3' Refrigerated Tunnel, Free-Flt. Tun. & New Shop completed.
1939	204	320	524	Structures Lab., TDT, 16' HST, & 20' Free-Spinning Tunnel under construction.
1940	277	462	739	Design and Construction Engineers transferred to Moffett. Flight research in operation at Ames. Structures Lab. in operation.
1941	369	571	940	ERL being designed. 20' Free Spin, Stab. Tun., TDT, & 16' HST in operation. Tank No. 2, Impact Basin, Elect.Gen.Plant, & additional shop under construction. AERL design group moved to Cleveland (Jan.).
1942	439	804	1243	
1943	594	1624	2218	AERL Research Staff to Cleveland (Jan. to May).
1944	937	2351	3288	West-area construction program and Pilotless Aircraft Research Laboratory at Wallops Island
1945	832	2388	3220	
1946	692	2005	2697	



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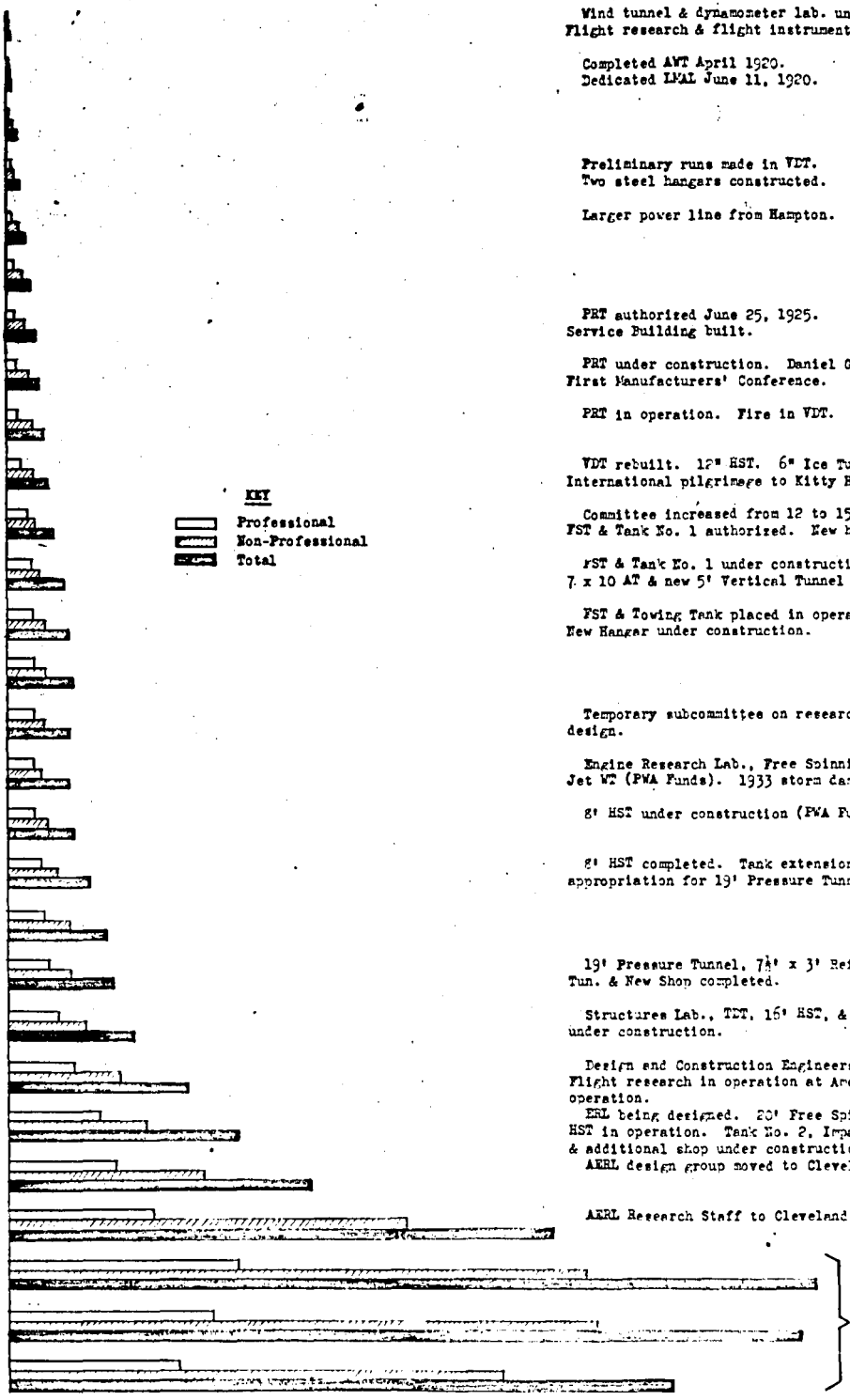

Langley Field, Virginia
December 27, 1957

MEMORANDUM For Associate Director

Subject: Travel during Calander Year 1957.

1. The following is a list of employees performing travel during calander year 1957, the total amount expended by NACA, and the number of days on travel.

NAME	Amount	No. Days
Mr. F. L. Thompson	$ 866.95	28 3/4
Mr. John Stack	230.45	51 1/4
Mr. H. A. Soule'	2,205.08	59 1/2
Mr. R. R. Gilruth	1,057.64	29 3/4
Mr. M. N. Gough	1,971.77	64 1/2
Mr. C. J. Donlan	1,213.49	37 1/2
Mr. J. V. Becker	950.54	26 1/2
Mr. I. E. Garrick	252.87	6 3/4
Mr. E. C. Draley	515.85	9 3/4
Mr. J. B. Parkinson	455.51	21
Mr. E. C. Buckley	937.98	22
Mr. J. A. Shortal	201.81	11 1/2
Mr. H. A. Fedziuk	260.25	8 1/4
Mr. T. A. Harris	201.22	10
Mr. R. R. Heldenfels	293.19	10 3/4
Mr. C. E. Brown	517.00	15
Mr. H. A. Wilson, Jr.	115.57	4 1/2

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PREPARED BY FISCAL DIVISION

List of

PARTIAL TRAVEL PERFORMED DURING FISCAL YEAR 1958 to date May 21.

NAME	NO. OF DAYS NACA	NO. OF DAYS OTHER	NACA TOTAL COST
Aiken, William S.	17-1/4		$ 738.64
Alford, William L.	20-1/2		902.35
Anderson, Roger A.	37-1/4		1,110.80
Andrews, Robert E.	24-3/4		444.60
Becker, John V.	49-3/4		1,288.97
Brown, Clinton E.	32-1/4		1,316.95
Buckley, Edmond C.	14	10	491.05
Busemann, Adolf	37-3/4	11	1,094.21
Derring, Eldridge H.	32-1/4		972.10
Dodgen, John A.	14-1/4		664.25
Donely, Philip	32-3/4		1,156.05
Donlan, Charles J.	16-3/4		354.65
Ellis, Macon C.	17		508.31
Faget, Maxime A.	37-1/4		2,002.55
Fedziuk, Henry A.	19		609.95
Fuhrmeister, Paul F.	20-3/4		671.06
Garrick, Isadore E.	19-1/4		503.13
Gilruth, Robert R.	54-1/4	3-1/4	1,637.60
Gough, Melvin N.	68-1/4	10-1/4	2,220.40
Heldenfels, Richard R.	19		622.94
James, John L.	42-1/4		819.90
Korycinski, Peter F.	17		546.10
Kreiger, Robert L.	14-3/4		320.06
McKinney, Marion O.	40-1/4		1,069.66
Martin, Dennis J.	5		392.45
Mathews, Charles W.	11-1/2		362.05
O'Sullivan, William J., Jr.	39-1/2		943.06
Piland, Robert O.	21-1/4		818.42
Press, Harry	19-3/4		764.26
Purser, Paul E.	39-1/2		855.30
Regier, Arthur A.	35-1/2		864.56
Reid, H. J. E.	32		713.90
Runyan, Harry L	7-1/4		400.45
Schnell, Charles E.	30-1/2		480.35
Silsby, Norman S.	53-3/4		981.90
Smith, Francis B.	34		1,299.73
Soule', Hartley A.	75-1/2		3,147.95
Stack, John	11-1/2	46	434.94
Staib, Richard O.	22-1/4		596.80
Stoller, Morton J.	16-1/2		983.05
Taback, Israel	16		669.89
Thibodaux, Joseph G., Jr.	19-1/4		672.20
Thompson, Floyd L.	37-1/2		1,087.35
Vavra, Paul H.	23-3/4		818.97
Vogeley, Arthur W.	28-3/4		1,040.80
Woodling, Carroll H.	55-1/2		1,087.83
Zimmerman, Charles H.	54	27	2,059.08
			$43,541.57

NACA - Langley

Langley Air Force Base, Va.
February 23, 1949

MEMORANDUM For Chief of Research

Subject: Analysis of free-falling-body research conducted by the Flight Research Division and Instrument Research Division

1. A short analysis has been made of the research effort that has been spent by the Flight Research Division and Instrument Research Division on free-falling-body tests. Of particular interest is the amount of effort that has been expended at Langley on free-falling tests made for the Cleveland laboratory on their 16" ram-jet project.

2. The cost office has supplied the amount of manhours spent by the above two divisions on job orders which cover work using the free-falling technique. The manhour figures have been supplied for four quarters of 1948. These four quarters are, however, not of equal length; that is, the first and third quarters are six pay periods long, and the second and fourth quarters cover seven pay periods.

3. The following table indicates the average number of personnel for each quarter for each of the two divisions and for the whole laboratory. These figures include both professional and non-professional personnel.

	Quarters			
	1st	2nd	3rd	4th
F.R.D. Personnel	137	139	149	150
I.R.D. Personnel	233	238	288	306
Research Personnel	1222	1215	1290	1316
Total Research and I.R.D.	1455	1453	1578	1622

4. The following table indicates the number of manhours, both by professional and non-professional, spent by the two divisions per quarter on Cleveland projects and Langley projects:

		Quarters			
		1st	2nd	3rd	4th
Cleveland)	IRD	908	1707	2228	2382
Projects)	FRD	1912	1749	1596	1808
Langley)	IRD	1105	1427	1909	3294
Projects)	FRD	3867	4018	3872	5207
TOTAL		7792	8901	9605	12691

(The manhours that have been spent on maintaining the B-29 and the radar sets have been divided between Langley and Cleveland projects. As a matter of interest, the following number of manhours have been spent on maintaining the B-29:

1st quarter - 3515
2nd quarter - 3116
3rd quarter - 2962
4th quarter - 3487

5. Assuming that there is a total of 220 working days during the year, there are therefore available 406 manhours of research per man for the first and third quarters, and 474 manhours available per man for the second and fourth quarters. It is therefore possible to compute the available number of manhours that each division has for each quarter.

6. Using the information from the preceding two paragraphs, the following table indicates the percent of research effort that each division has spent of its own available manhours:

		Quarters			
		1st	2nd	3rd	4th
Cleveland)	IRD	0.96	1.51	1.90	1.65
Projects)	FRD	3.44	2.66	2.64	2.54
Langley)	IRD	1.17	1.26	1.63	2.27
Projects)	FRD	6.97	6.10	6.40	7.34

7. As a matter of interest, the following table indicates the percent of available laboratory manhours (Research Department plus I.R.D.) spent by the Flight and Instrument Research Divisions on free-falling-body tests (includes Langley and Cleveland projects):

	Quarters			
	1st	2nd	3rd	4th
% Total Research Effort	1.32	1.29	1.50	1.65

Henry A. Fedziuk
Aeronautical Engineer

HAF.mgm

ROUGH DRAFT

SUBJECT: Management

The rapid advances in technology supported by and created by great research and development activities programs, particularly in the world of aerospace activities, have given rise to much that is finding application in other areas. For example, the term "systems approach" has been the subject of much discussion recently as a case of the methodology of aerospace development that may have considerable use in application to the solution of urban and social problems. One wonders whether there is not something unique and valuable in other areas in the methodology of management that has evolved in activities where research and development constitutes a major predominant aspect of the business involved. I am thinking particularly of the system that has become known as the "matrix management system."

It is interesting to observe that the inventiveness of the aerospace sphere of activities has been applied to systems of management as well as to the technical matters involved. When we consider that one definition of management is "to achieve one's purpose," perhaps we should not be surprised to see that the imagination and inventiveness have been applied to that area. Unique methods of management have been devised as a means to the end of achieving a method that is suited to the particular requirements of a unique problem without allowing the fascination of the machinery of the system itself to detract attention from the purpose and substance of the system which is being managed.

What we term as matrix management as a system was developed for and is particularly applicable to a type of activity or business in which

research and development rather than manufacturing plays the dominant role. Briefly, it can be described as a dual system in which a more or less permanent line organization remains essentially intact while overlayed on it is another organization of a more temporary nature superimposed for the express purpose of managing a project or program of relatively short duration. The two organizations could be termed vertical and horizontal, forming, when shown in a diagram that delineates the channels of authority, responsibility, and communication appropriate to the two systems, a matrix. This, of course, is only a very general description for the detailed arrangements by which the dual systems are accomplished to suit the wide range of requirements to which they are applied and are widely variable in detail.

A matrix management system is admittedly complex, but so are the organizational and management problems that prompted its development. It is particularly applicable to the requirements of an organization engaged in research and development as a major activity and possessing by virtue of its staff and facilities a capability for handling a broad variety of technically complex and difficult research and development projects. Such projects are normally expected to be of relatively short duration. The matrix system provides an orderly method by which the organization can apply its full capabilities to a continuing series of such projects and also handle more than one at a time. Through interlocking, carefully worked out relationships between the program or project management and the permanent line management, the assignment of responsibilities can be delineated, communication links provided, and the

total resources of the organization assigned as required to support the project and the solution of the many different technical problems that arise. When the project is completed, realinement can be created for follow-on projects without major upheavals in the organization.

In a large organization where the work is primarily research but in a multiplicity of disciplines, the general aspects of this method can be applied to a multiplicity of research projects that do not involve development through a carefully planned system of assigned responsibilities. In fact, it is the very nature of the matrix system that responsibilities for judgment and decisions are delegated to large numbers of workers. The delegations must be carefully worked out so that they are consistent with the working relationships involved and are understood by the parties involved. Reporting systems and lines of communication must be carefully worked out so that they are also consistent with the requirements of the complex organization involved.

A particular advantage of such a system in a large research organization is that is permits a large group of research workers, whose knowledge of the areas in which they are working is being continually updated through their research efforts, to be brought in as active and responsible members of the team assigned at this moment to a particularly difficult technological problem. The assignments of responsibilities are definite though of short term but do require that a particular specialist in a given area of technology bear responsibility for the best advice obtainable on a particular subject

involved. The research career of such people, however, is only temporarily interrupted so that their knowledge is continually updated and advanced through the research programs in which they are involved.

Communication and reporting does not necessarily involve large amounts of paper work, although paper work is an essential feature. It does mean that communication must be conveyed in a timely and meaningful fashion appropriate to each level of responsibility in the organizational elements of the system.

Perhaps here too, as in other parts of the methodology of the aerospace activities and research and development, there is application to other fields than the one that prompted this development.

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It is interesting to observe that the inventiveness of the aerospace sphere of activities has been applied to systems of management as well as to the technical matters involved. When we consider that one definition of management is "to achieve one's purpose," perhaps we should not be surprised to see that the imagination and inventiveness have been applied to that area. Unique methods of management have been devised as a means to the end of achieving a method that is suited to the particular requirements of a unique problem without allowing the fascination of the machinery of the system itself to detract attention from the purpose and substance of the system which is being managed.

What we term as matrix management as a system was developed for and is particularly applicable to a type of activity or business in which

research and development rather than manufacturing plays the dominant role. Briefly, it can be described as a dual system in which a more or less permanent line organization remains essentially intact while overlayed on it is another organization of a more temporary nature superimposed for the express purpose of managing a project or program of relatively short duration. The two organizations could be termed vertical and horizontal, forming, when shown in a diagram that delineates the channels of authority, responsibility, and communication appropriate to the two systems, a matrix. This, of course, is only a very general description for the detailed arrangements by which the dual systems are accomplished to suit the wide range of requirements to which they are applied and are widely variable in detail.

A matrix management system is admittedly complex, but so are the organizational and management problems that prompted its development. It is particularly applicable to the requirements of an organization engaged in research and development as a major activity and possessing by virtue of its staff and facilities a capability for handling a broad variety of technically complex and difficult research and development projects. Such projects are normally expected to be of relatively short duration. The matrix system provides an orderly method by which the organization can apply its full capabilities to a continuing series of such projects and also handle more than one at a time. Through interlocking, carefully worked out relationships between the program or project management and the permanent line management, the assignment of responsibilities can be delineated, communication links provided, and the

total resources of the organization assigned as required to support the project and the solution of the many different technical problems that arise. When the project is completed, realinement can be created for follow-on projects without major upheavals in the organization.

In a large organization where the work is primarily research but in a multiplicity of disciplines, the general aspects of this method can be applied to a multiplicity of research projects that do not involve development through a carefully planned system of assigned responsibilities. In fact, it is the very nature of the matrix system that responsibilities for judgment and decisions are delegated to large numbers of workers. The delegations must be carefully worked out so that they are consistent with the working relationships involved and are understood by the parties involved. Reporting systems and lines of communication must be carefully worked out so that they are also consistent with the requirements of the complex organization involved.

A particular advantage of such a system in a large research organization is that is permits a large group of research workers, whose knowledge of the areas in which they are working is being continually updated through their research efforts, to be brought in as active and responsible members of the team assigned at this moment to a particularly difficult technological problem. The assignments of responsibilities are definite though of short term but do require that a particular specialist in a given area of technology bear responsibility for the best advice obtainable on a particular subject

involved. The research career of such people, however, is only temporarily interrupted so that their knowledge is continually updated and advanced through the research programs in which they are involved.

Communication and reporting does not necessarily involve large amounts of paper work, although paper work is an essential feature. It does mean that communication must be conveyed in a timely and meaningful fashion appropriate to each level of responsibility in the organizational elements of the system.

Perhaps here too, as in other parts of the methodology of the aerospace activities and research and development, there is application to other fields than the one that prompted this development.