

B. R. Harrison

TECHNICAL SERVICES

MANAGEMENT REVIEW

1971

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- 7000 - TECHNICAL SERVICES
- 7010 - SAFETY & PROJECT PLANNING OFFICE
- 7100 - PLANT SERVICES DIVISION
- 7200 - TEST INSTALLATIONS DIVISION
- 7300 - FACILITIES OPERATIONS DIVISION
- 7400 - FABRICATION DIVISION
- 7500 - EQUIPMENT & SUPPLY DIVISION

7240 - Tunnels, Altitude Chambers and Flight Branch

E. E. Meilander, Chief

The Tunnels, Altitude Chambers and Flight Branch (7240) is composed of three sections. These are the Altitude Chambers Service Section (7241), Flight Operations Service Section (7242) and the Wind Tunnels Service Section (7243). Branch personnel total 107 technicians and 14 supervisors. This branch provides support for four research divisions on 48 projects. These three sections cover the support furnished to the following buildings and areas: chambers 1 and 2 in PSL S&A, tanks 3 and 4 in PSL ETB, Space Power Chambers (SPC), Icing Research Tunnel (IRT), Icing Research Tunnel Annex, Flight Research Building (Hangar), Selfridge field research station, Temporary Building, noise area on the Hangar apron, 10x10 Tunnel, 10x10 noise area, 8x6 Tunnel and the 9x15 Tunnel.

Major accomplishments of the Branch in the past year have been the Quiet Fan project involving the installation and testing of the three quiet engine fans now used on the first quiet engine, blown flap configuration and V/TOL and STOL configurations. A unique program was conducted on the Garrett engine at PSL S&A. This test was very successful.

Preparations were started in 1971 for a full scale OAO nose cone separation test in chamber #2, SPC. This will be completed in late 1972. This is a major effort and is governed by a flight restraint date.

The activity in the Flight Research area has increased in tempo. Four aircraft are active daily. Two of these are basic research aircraft and two are a combination of research and administrative aircraft. A total of six (6) research projects are currently installed or will be installed on the two administrative aircraft. The major development in this area has been the building of a new noise testing facility. This involved the construction of a new test area, a new control room complex and a new engine and stand assembly area. This has necessitated the doubling of the personnel in this area in order to meet research objectives.

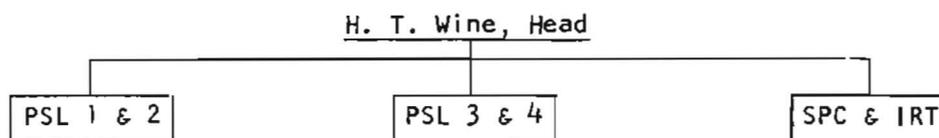
In 1972, manpower will again be a problem if anticipated research goals are to be achieved. Several persons have been added to this Branch in late 1971 in order to handle the increased workload. In the near future, 12 to 15 people will have to be added to the Altitude Chambers Service Section if the running schedule for the new PSL ETB complex is to be staffed in order to run in late 1972 or early 1973. The personnel level in the noise area will have to remain at its present level or even be increased to keep up with research requirements.

A major effort in 1972 in this Branch will have to be in the direction of even better utilization of manpower, more flexibility and closer coordination of Branch and Section activities. Safety of the entire operation certainly will have to be a major consideration as manpower becomes more limited.

The Branch will continue to coordinate communication, safety, branch meetings and close observation of manpower needs to handle urgent research needs. Manpower is such that any deviation from utmost efficiency will cause a project to be slowed down or completely stopped. Under these conditions, the proper use of the proper man for the job becomes imperative.

Any crash type of research program will result in seriously slowing down projects already being worked on, or the stopping completely.

7241 - Altitude Chambers Service Section



C. Betz & P. Rennick,
Foremen

W. Pincombe, Foreman

14 ASM

3 ASM

4 ASM

4 EM

1 EM

1 EM

2 E

1 E

1 E

1 L

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The present manpower for this section is 32 technicians with three foremen. Our purpose is diversified, in that we run jet engines at simulated altitude conditions at PSL, run icing and noise tests at the IRT area and do jet engine buildup and environmental testing of spacecraft components at SPC.

We support four different research divisions in these areas. The following are examples of these activities.

PSL - Tank #1 - Evaluate altitude and cold temperature performance and fuel consumption of a new Garrett TFE 731-2 engine.

PSL - Tank #2 - Investigate J-85 compressor dynamics and develop a new electronic dynamic distortion indicator. Also evaluate exhaust pollution from this engine.

PSL - Tanks #3 & 4 - This facility is presently under construction and should be ready for operation in January, 1973.

SPC - Shop Area - This area is engaged in the repair, buildup, overhaul and modification of TF-30, J-65 and J-57 jet engines. In addition, this area is also building up the Research Propulsion Module mock-up for Plum Brook.

SPC - Chamber #2 - OAO nose fairing separation tests are being prepared for March testing.

IRT - This area is used primarily in support of outside contractors for icing studies. Four companies have utilized these services over the past year, with additional tests due in July.

IRT Annex - Jet exhaust noise studies associated with STOL/VTOL aircraft are carried on in this area.

1972 Projections

In PSL #1, the Garrett engine program will run until June, at which time a TF-30 A/B and controls program will start. The program will run into March, 1973. Two new programs, the F-401 and TF-41, are being considered for further downstream testing.

In PSL #2, the J-85 program will be tested intermittently with as many as six different Low Cost Ordnance engines. Then in about October, the TF-30 engine distortion program should begin.

At PSL #3 and 4, additional preparation and manpower will be needed to support the systems checkout and blowdown tests scheduled in July. In order that we might continue to staff this new area for the GE Quiet Engine program starting in January, 1973, a 260 hour formal training program (see attached) is presently being carried on at PSL Shop. This schedule is based on the assumption that sufficient engineering and mechanical manpower will be made available to staff PSL 3 and 4 without diluting efforts at PSL 1 and 2.

In the SPC area, we have been able to maintain our engine buildup and OAO separation test schedule by moving men into this area from PSL, as the needs arise. In view of the present manpower situation, this practice will continue on for the extended D-1-A separation tests that will be starting in September and running into December.

The IRT and IRT Annex areas will continue on with the same two mechanics presently assigned.

This Section is anticipating no retirements during this next year and if additional manpower could continue to be directed into PSL, and our training program for the new building, all of the existing schedules can be maintained.

B. R. Harrison

TECHNICAL SERVICES

MANAGEMENT REVIEW

1972

NASA
LEWIS RESEARCH CENTER



TECHNICAL SERVICES.....	J. F. CONNORS
SAFETY AND PROJECT PLANNING OFFICE.....	R. A. MAURER
INSTRUMENT APPLICATIONS OFFICE.....	C. C. GETTELMAN
PLANT SERVICES DIVISION.....	J. C. EVERETT
TEST INSTALLATIONS DIVISION.....	B. R. HARRISON
FACILITIES OPERATIONS DIVISION.....	A. B. SZUHAI
FABRICATION DIVISION.....	F. VAN HOFF
EQUIPMENT AND SUPPLY DIVISION.....	L. R. HOWE

7240 - Tunnels, Altitude Chambers and Flight BranchE. E. Meilander, Chief

The Tunnels, Altitude Chambers and Flight Branch (7240) is composed of three sections. These are the Altitude Chambers Service Section (7241), Flight Operations Service Section (7242) and the Wind Tunnels Service Section (7243). Branch personnel total 127 technicians and 13 supervisors. This Branch provides support for six research divisions on 71 projects. These three sections cover the support furnished to the following buildings and areas: Chambers 1 and 2 in PSL S&A, Chambers 3 and 4 in PSL ETB, Space Power Chambers (SPC), Icing Research Tunnel (IRT), Icing Research Tunnel Annex, Flight Research Building (Hangar), Selfridge field research station, Temporary Building, Noise Area on the Hangar apron, 10'x10' Tunnel, 10'x10' Noise Area, 8'x6' Tunnel and the 9x15 Tunnel.

Major accomplishments of the Branch in the past year have been the support of the Quiet Fan project involving the installation and testing of the three Quiet Engine fans now used on the first two Quiet Engines, Blown Flap configuration and V/TOL and STOL configurations. A unique program was conducted on the Garrett engine at PSL S&A. The second Garrett engine is now being tested in Chamber #1, to be followed by TF-30 Controls and Afterburner programs. Chamber #2 is being prepared for the Low Cost Ordnance engine altitude test followed by TF-30 Air Distortion tests. This area is operating with a minimum of personnel. To achieve the proposed schedule in these chambers will take careful planning and the complete cooperation of engineering, Technical Services and Fabrication Shops. Any loss of personnel in this area will affect the anticipated schedule.

In 1972, the Full Scale QAO Nose Cone Separation test was conducted. A follow up and phase 2 of these tests will be conducted in February 1973. This particular area has had one retirement at the end of 1972 and another is anticipated in mid-1973. A manpower shortage is being felt here.

The 10'x10' Tunnel and 8'x6' Tunnel and Noise Areas are scheduled very tight. Three men have been moved from this area to the PSL ETB area. Any reduction in the number of men in this area will definitely affect the tunnel schedules.

The activity in the Flight Research area has increased in tempo. Five aircraft are active daily. Three of these are basic research aircraft and two are a combination of research and administrative aircraft. A total of seven (7) research projects are currently installed on the two administrative aircraft. The major accomplishment in the Noise Area at the Hangar was the successful completion of the testing of the Quiet Engine Fan A configuration. Fan C engine is now being installed for its test program. Even after reducing the number of personnel in this area, a J-85 Sonic Inlet program was installed and now is being tested. The personnel in this entire area must remain at its current level if schedules are to be followed.

In 1973, manpower will again be a problem if anticipated research goals are to be achieved. Several persons have been added to this Branch in 1972 in

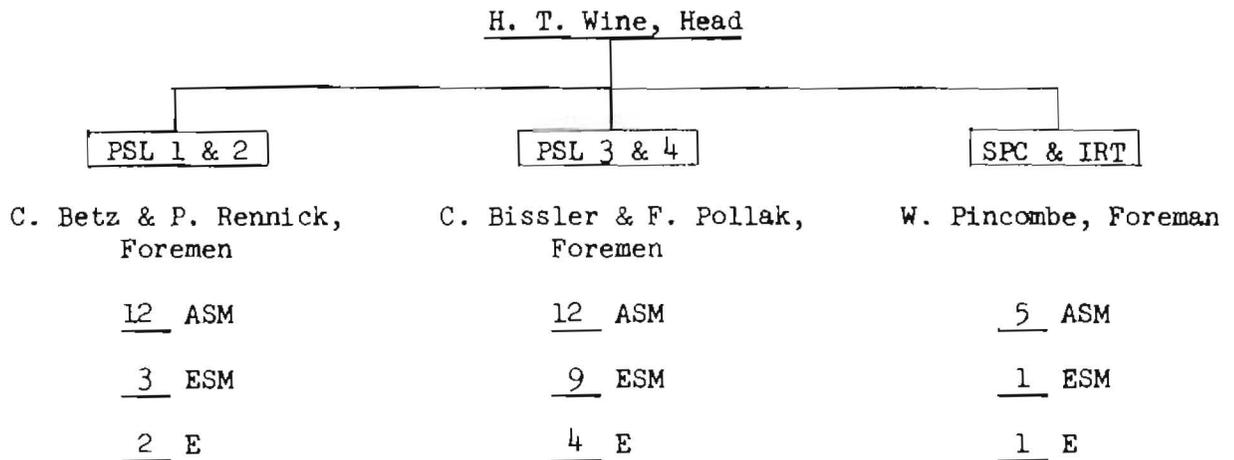
order to handle the increased workload. In the near future, eight to ten people will have to be added to the Altitude Chambers Service Section if the running schedule for the new PSL ETB complex is to be achieved. The personnel level in the Noise Area will have to remain at its present level to keep up with research requirements. Any reduction in force in this area will have to be replaced or serious schedule delays will be encountered.

The retirement outlook is hard to predict. However, at this time, it would appear that there is a potential retirement of three (3).

A major effort in 1973 in this Branch will have to be in the direction of even better utilization of manpower, more flexibility and closer coordination of Branch and Section activities. Safety of the entire operation certainly will have to be a major consideration as manpower becomes more limited.

The Branch will continue to coordinate communication, safety, branch meetings and close observation of manpower needs to handle urgent research needs. Manpower is such that any deviation from utmost efficiency will cause a project to be slowed down or completely stopped. Under these conditions, the proper use of the proper man for the job becomes imperative.

Any crash type of research program will result in seriously slowing down or stopping projects already being worked on.

7241 - Altitude Chambers Service Section

The present manpower for this section is 49 technicians with 5 foremen. Our purpose is diversified in that at the PSL complex we run jet engines at simulated altitude conditions and at SPC-IRT we do jet engine overhaul, environmental testing of spacecraft components and run icing, noise and nozzle study tests.

We support four different divisions in these areas and the following are some of these activities.

PSL - Tank #1 - Evaluate altitude and cold temperature performance of new Garrett TFE 731-2 and ATF-3 jet engines.

PSL - Tank #2 - Investigate the effects of thermal distortion on J-85 compressor stability and Lewis Low Cost engine altitude performance.

PSL - Tank #3 - Determine the effects on altitude performance of the Lewis Quiet Engine with acoustical treatment.

PSL - Tank #4 - Calibrating the J-58 exhaust emission characteristics for stratospheric wake experiments.

SPC - Shop Area - Repairs and overhauls jet engines in support of PSL, ECRL, Hangar and 10x10 SWT areas.

SPC - Chamber #2 - OAO and Centaur D-1A noise fairing altitude separation tests.

IRT - Primarily outside contract icing and deicing tests along with Lewis V/STOL Jet Velocity Decay testing.

IRT - Annex - Nozzle tests to determine velocity decay, thrust loss and noise attenuation.

1973 Projections

In PSL #1, we have completed all of the test objectives of the Garrett TFE 731 engine program and are presently involved with installing the Garrett ATF-3 engine in support of an Air Force development contract. Altitude certification and flight readiness tests on this engine are required by April 1, 1973. At that time a TF-30/P1 engine program to develop an Integrated Propulsion Control System (IPCS) along with an afterburner performance and flameholder program will continue into July.

In PSL #2, we have just completed a thermal distortion program on the J-85 compressor stability and are presently preparing the test cell for the Lewis Low Cost engine altitude tests. At the completion of these tests a J-85 program to study the effects of simultaneous pressure and thermal distortion on compressor performance will be conducted.

In PSL #3, we are installing the Lewis Quiet Engine for altitude performance testing starting about mid-February. This program is to evaluate the effects on performance that the acoustical treatment might have.

In PSL #4, the basic objective of the J-58 program is to develop an understanding of the inner action of supersonic jet exhaust with the upper atmosphere to provide data which can be used to assess jet wake impact on the natural atmospheric composition. These tests are due to start in July.

In the SPC area, the shop is engaged in the repair and buildup of TF-30, J-65 and J-57 jet engines in support of several research areas throughout the Lab. There is also a proposal to utilize Chamber #1 for the Environmental Protection Agencies research program on automotive emission pollutants up to 10,000 foot altitude. Chamber #2 has completed a series of OAO Nose Fairing Separation tests at altitude and has started on a series of Centaur D-1A separation and jettison tests. These D-1A modified nose fairings have never flown and these tests are necessary to verify operations and jettison performance in order to establish confidence for flight use.

The IRT is used primarily in support of contract testing, such as McDonnell Douglas Aircraft Companies DC-9, modified for noise suppression, inlet and NASA's jet velocity decay tests for the V/STOL program. In addition the IRT Annex supports various nozzle configuration studies to determine jet noise, thrust loss and wing lift characteristics in support of the STOL/VTOL aircraft program.

This Section has sustained one retirement and is anticipating another one plus a draft loss, sometime this year in the SPC-IRT area, and it is obvious that some additional manpower in this area will be required. In PSL, with the #3 tank becoming operational in February, on a three shift basis, the existing manpower here will also have to be increased by about 8 mechanics. This is necessary in order to support two shifts for the installation and checkout of the Air Force's J-58 program scheduled for July in tank #4.

For the past several months at PSL 1 and 2, we have been operating a facility training program to provide altitude chamber experience for the many new men assigned to this Section. This training has proved invaluable for the staffing of PSL 3 and 4. At PSL 3 and 4, in addition to this continued on-the-job training for mechanics, an informal computer familiarization course is being conducted daily with a formal two week seminar covering detailed systems operation and maintenance procedures scheduled in March. Added to this formalized training are frequent meetings which are held throughout the Section by supervisors and research engineers to discuss research goals and objectives on current and future programs.



SPLITTER PLANE MOOEL OF QUIET ENGINE IN LEWIS ICE TUNNEL



OAO SEPARATION SHROUD IN SPC