FILM SCRIPT

for

SATURN QUARTERLY FILM REPORT NO. 10

(Covering October, November, and December, 1961)

| FILM | NARRATION |
| --- | --- |
| Fade in<br>Confidential<br>~~UNCLASSIFIED~~ title | MUSIC |
| Dissolve | |
| Open with night shot<br>of SA-1 vehicle on<br>launching pad at Cape | |
| Superimpose first title:<br>The<br>GEORGE C. MARSHALL<br>SPACE FLIGHT CENTER<br>Presents... | |
| Then, superimpose second title:<br>SATURN QUARTERLY FILM REPORT NO. 10<br>(Covering October, November, December, 1961) | |

| FILM | NARRATION |
| --- | --- |
| Launching of SA-1<br>(several views) | (SOUND EFFECTS: LAUNCH)<br>(THEN, LOWER SOUND EFFECTS, AND VOICE OVER:)<br>A history-making milestone in the Saturn program was reached during this report period, when the first Saturn flight vehicle, known as SA-1, was successfully launched from Cape Canaveral, on the morning of October 27th. Flight of the vehicle--consisting of the S-1 booster, S-IV dummy second stage, S-V dummy third stage, and dummy payload--appeared perfectly normal, and all test objectives were satisfactorily attained. |

| FILM | NARRATION |
| --- | --- |
| Daylight shot of SA-1 on pad (with men at work around base of vehicle); cut to CU of men at work | For over a month before the actual launch, engineers and technicians of Marshall Space Flight Center's Launch Operations Directorate had been at work testing and checking out components of the complex vehicle in every way necessary to assure a successful test firing. |
| Lox load test (let film run a little longer than narration in this test and following two tests) | Typical of the numerous tests conducted were this Lox load test..., |
| Cable mast eject test | ...cable mast eject test..., |
| Support and holddown arms checkout | ...and support and holddown arms checkout. |

| FILM | NARRATION |
| --- | --- |
| Simulated flight test (several scenes of men at controls in blockhouse; similar scenes will be used later, for actual launch) | In simulated flight tests, launch personnel in the Saturn blockhouses went through all the motions of an actual launch to thoroughly familiarize themselves with procedures and equipment. |
| Installation of heat shields (sometimes called flame curtains) | An important part of pre-launch preparation of the vehicle was installation of heat shields to protect the booster engines' fuel pumps, valves, instrumentation lines, control equipment, and other critical components. Temperatures around the booster's base would reach about 2,500 degrees Fahrenheit during flight. |
| Testing of heat shields during static test firing | Numerous static firings back at the Marshall Center had already tested various materials of the heat shields. A specially insulated fiberglass fabric was finally chosen. |

| FILM | NARRATION |
| --- | --- |
| Gimbal testing of heat shields | Structural tests were also run to determine flexibility and strength of the heat shields during gimbaling of the booster's four outer engines. |
| Quick overall look at SA-1 on pad; then show filling S-IV and S-V with water | For this initial Saturn research and development firing--the first of 10 scheduled in the C-1 program--the inert upper stages were filled with water to simulate the weight of live stages. Total weight of SA-1 at lift-off was approximately 925,000 pounds. |
| Fueling booster with RP-1 fuel | Fueling of the SA-1 booster, or first stage, with RP-1 fuel began two days prior to launch time. The other part of the propellant loading operation, addition of the liquid oxygen, would begin only about 5 1/2 hours before launch. |

| FILM | NARRATION |
| --- | --- |
| Night shot of SA-1 on pad; then, several scenes of countdown inside blockhouse | At 11 p.m. Eastern Standard Time on Thursday, October 26th, the 10-hour countdown for the first Saturn launching began in the Saturn blockhouse. Not a single technical "hold" interrupted the countdown, although two "holds" were called because of low cloud layers which would have interferred with visual tracking and observation of the in-flight vehicle. |
| Lox fueling (let film run long) | Automatic fueling and sequencing operations were conducted satisfactorily. |
| Final countdown scenes (let film run long) | The countdown proceeded. |

| FILM | NARRATION |
| --- | --- |
| Launch in slow motion (start with long shot; cut to closeup; then back to long shot) | At 10:06 a.m. Friday, October 27th, space history was written as the powerful 162-foot-tall rocket roared from its launch pedestal. Lift-off came 3.9 seconds after beginning of ignition. As planned, only 3/10ths of a second separated ignition of all eight H-1 engines, which generated thrust levels of 165,000 pounds each for a scheduled total stage thrust of 1.3 million pounds. Overall performance of the booster during flight was considered highly satisfactory. Wind shear encountered near the region of maximum dynamic pressure resulted in a predicted 4 1/2 degree engine deflection, but the disturbance was handled by the control system without difficulty. Structural integrity of the booster was maintained throughout. Performance of the propulsion system was very good. Ignition, transitions, mainstage, and cutoff were as expected, with the measured combustion chamber pressures showing no major deviations. |

| FILM | NARRATION |
| --- | --- |
| Launch pedestal after firing (include scene showing twisted cable mast) | After the firing, inspection of ground support equipment and firing accessories indicated that only minor damage normally sustained for a flight of such nature was experienced. General condition of the GSE was better than expected. |
| IBM 7090 operation at Computation Div. (stock footage) | Post-flight evaluation of telemetry tapes processed later back at the Marshall Center's Computation Division verified the near-perfect functioning of the SA-1 vehcile and its ground support equipment. |
| Static firing (stock) | Static test firing of the booster for the second Saturn flight vehicle, SA-2, was completed at Marshall this quarter, with the final test on October 31st. |
| Modification and repair of booster in ME Div. (stock) | After static tests, modification and repair of the SA-2 booster was carried out in Marshall's Manufacturing Engineering Division. |

| FILM | NARRATION |
| --- | --- |
| Booster in Quality Assurance Div. (stock) | Final checkout of the SA-2 booster began November 22nd in the Quality Assurance Division. Launching of the SA-2 vehicle is scheduled for the first quarter of 1962. |
| Final assembly of booster (stock) | Assembly of the booster for the third Saturn vehicle, SA-3, was completed on December 26th. Fabrication of the booster for the fourth vehicle, SA-4, is complete, and assembly is due to begin in January, 1962. Current plans are for nine such boosters to be built at the Marshall Center. |
| Animation: map of southeast U.S.; zoom in on Michoud area | Approximately twenty more C-1 boosters will be made at Marshall's new Michoud Operations, 14 miles east of New Orleans, under a contract recently negotiated with the Chrysler Corporation. |

| FILM | NARRATION |
| --- | --- |
| Aerial view of Michoud; cut to views of main buildings, sign, etc.; Then back to aerials | Rehabilitation and modification of the $50,000,000 facility, formerly the Michoud Ordnance Plant, began in mid-October. With almost 43 acres of usable area under one roof, Michoud is one of the nation's largest single-floor buildings. Chrysler's contract, for approximately $200,000,000, and extending through 1966, calls for the company to build, check out, test, and launch C-1 first stages. An advanced Saturn booster--the S-IB, with three million pounds of thrust, or double that of the present S-I booster--will also be built at Michoud, by a different contractor, the Boeing Company, of Seattle. The $300 million contract, running through 1966, calls for development, construction and test of 24 flight boosters, plus several ground test versions. |

| FILM | NARRATION |
| --- | --- |
| Again, map of southeast U.S.; CU of Mississippi Test Facility area; pop on overlay of shaded area representing test site | About 50 miles from Michoud, in southwest Mississippi, will be the site of a huge new static test facility for Saturn and Nova-class launch vehicles. Operation of the site will be under direction of the Marshall Center. Construction will require two to three years, with six or more large test stands planned. |
| Site of new MSFC headquarters building; CU of sign; construction scenes; model of completed building | At Marshall, construction began this quarter on the Center's new nine-story, $4,000,000 Central Laboratory and Office Facility, nerve center for direction of the Saturn program, as well as other NASA space programs, for work done both by Marshall and by its numerous contractors throughout the United States. |

| FILM | NARRATION |
| --- | --- |
| Choose best two or three scenes from Scenes 28 through 33, Douglas Input #13, ending with Scene 33 | At Douglas Aircraft, contractor for the S-IV stage, the cold flow test program in underway, with Lox flow from storage tank to battleship tank carrier out this quarter. |
| Choose best two or three scenes on Steam Ejectors Installation, Douglas Input #14 | Installation of steam ejectors on Test Stand No. 1 at Sacramento was also accomplished. In operation, these ejectors create the high-altitude vacuum necessary to start the S-IV's engines at the proper exit pressures. |
| Choose from scenes on Diffuser Installation, Douglas Input #14 | The diffusers had already arrived from the vendors and were installed in the test stand. |
| Choose from scenes on Hard Mockup Engine Installation, Douglas Input #14 | Two hard mockup RL10A-3 engines have been received by Douglas from Pratt and Whitney Aircraft, and installed on the S-IV stage mockup. |

| FILM | NARRATION |
| --- | --- |
| Scene no. 1, P&W input--overall view of P&W Center | At Pratt and Whitney's Florida Research and Development Center in West Palm Beach...., |
| Two or three of best scenes of horizontal firing | ...the RL10A-1 engine--prototype of the A-3--successfully completed its preliminary flight rating test, on November 4th. Including acceptance tests, there were 26 firings, totaling 3,204 seconds. The total elapsed time to complete the PFRT endurance test was less than five days. |
| Cut briefly to Scene no. 34 (block house control center) to break the monotony, then back to firing scenes | Prior to successful completion of the PFRT, the RL10A-1 design was subjected to 712 development firings, totaling over 70,000 seconds. |
| Vertical firing scenes | These tests included firing in vertical as well as horizontal altitudes, with several runs lasting over 10 minutes. |

| FILM | NARRATION |
| --- | --- |
| Scene 32 | The success of these firings was primarily attributed to many hours of component development testing, such as this propellant injector flow calibration. |
| Scene 14 | The torch ignition system was proven reliable in over 150 firings in an ignition rig. |
| Scene no. 43 (A-3 mockup and A-1 engine side by side) | The A-3 version of the RL10 liquid hydrogen rocket engine--a mockup of which is shown at left alongside an A-1 engine--is being developed with higher specific impulse for the Saturn S-IV stage and advanced Centaur vehicles. |
| Scene no. 44 (propellant utilization valve) | Minimum modifications to the A-1 engine--such as this propellant utilization valve..., |
| Scene no. 44 (common manifold) | ...and this hydrogen collector manifold--are being incorporated into the A-3 for improved performance. |

| FILM | NARRATION |
| --- | --- |
| Scene no. 41<br>(North Engine Test Complex) | The North Engine Test Complex at The Pratt and Whitney Center has been modified to test the A-3 engines at Saturn S-IV conditions. |
| Open with CU of drawing of S-II; pull back to show man with pointer; North American Aviation sign; aerial view of NAA plant | Looking further to the future, development of an S-II upper stage for the C-3 version of Saturn has been contracted to North American Aviation's Space and Information Division at Downey, California. |
| Static test facilities at Santa Suzanna; Rocketdyne sign and aerial views<br>(All the above scenes from NAA's S-II proposal film.) | The new stage will use ~~four~~ five liquid oxygen-hydrogen engines, delivering a total thrust of ~~800,000~~ one million pounds, which are being built by the Rocketdyne Division of North American, under a separate contract. The 10-vehicle S-II development program will be under technical direction of the Marshall Space Flight Center. |

END.