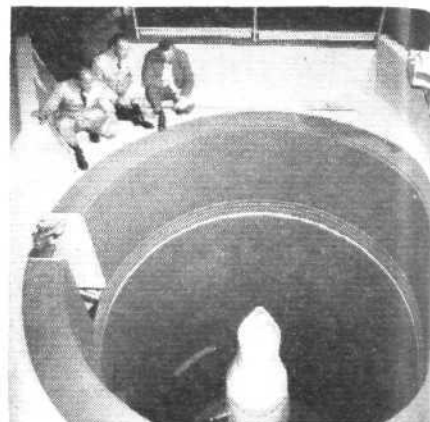
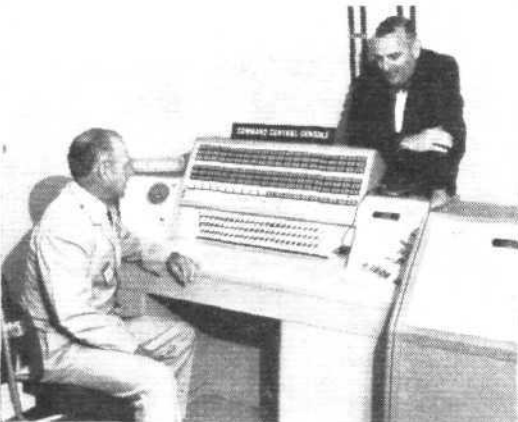


6  
MINUTEMAN...



(6) Model of Minuteman train. (7) Command control-console mock-up. (8) Communications car of train. (9) Mock-up silo at Seattle

nozzles are made by many firms, those in the picture coming from Allison.

In the second illustration one can see the smoke halo which always shoots out of the silo ahead of the main first-stage exhaust. As the picture dramatically shows, the fierce first-stage flame fills the silo and streams out of the opening before the missile leaves. It was feared that it would severely damage the missile, and Boeing conducted 5,200 sub-scale tests to explore cold and hot flow before starting to build the first full-scale rig. Various types of W and U silo, with *ad hoc* ducts for the rocket gas, were explored before it was decided simply to dig a hole, put in a missile and fire it. At Edwards AFB on September 15, 1959, the first full-scale silo shot took place (picture 3), and the programme with this silo was so successful that the final ten of the programmed 18 shots were eliminated. Even relatively simple tests of this nature need plenty of instrumentation (picture 4).

Structural testing of the airframe was done by Boeing's responsibility, and recent illustrations depict the dynamic-test Minuteman suspended for a test in the Minuteman Developmental Center (picture 5). Seven flight conditions were simulated: launch; 1st-stage engine part-filled, 2nd and 3rd full; 1st-stage empty, 2nd and 3rd full; 1st-stage disconnected, 2nd and 3rd full; 2nd-stage empty, 3rd full; 2nd-stage disconnected, 3rd full; 3rd-stage burn-out. This work is virtually complete, but if it becomes necessary to treat structural dynamics separately from fuel dynamics it may

production panels except for variations in the number of missiles handled (20 in the mock-up). Seated at the panel is the commanding general of SAC, Thomas S. Power, and talking to him is T. A. Wilson, Boeing's Minuteman programme manager.

The concept of an ICBM fired from a train is not new, but in the Minuteman programme has reached its zenith. Ten trains will form one squadron, and each will have three to five missiles; a typical train will consist of a launch car for each missile, one or two power cars, a launch-control car, a communications car and several Pullmans for the crews. The heart of the train will be the communications car (picture 8), equipped with very powerful SSB radio and special aerial systems. It has not yet been determined whether the USAF should keep a permanently crewed locomotive on each train or whether the trains should thumb rides on the back of passing freights (a cheaper, but less controllable, method). Autonetics have developed a gyrocompass system for precise position-fixing, and missiles could be launched from any location, although for best accuracy the train would come to rest in a predesignated siding.

A major hurdle surmounted by the Minuteman system was the recent successful completion of the development engineering inspection at Seattle. In the ninth illustration Col James H. Foster (AMC Ballistic Missile Center) and Samuel Phillips (Minuteman programme director for AFBMD) are poised with T. A. Wilson on the brink of the mock-up silo.

SINGAPORE'S NINE-DAY AIR SHOW

A NINE-DAY international air show is being held at Singapore Airport, Paya Lebar, from April 8 to 16 this year. It has been planned in conjunction with the opening of a new operations block at the airport, and as part of the "Visit the Orient Year" being organized for 1961. On three of the days, April 8, 12 and 16, there will be flying displays.

Singapore's Deputy Prime Minister, Mr Toh Chin Chye, has extended an invitation to aircraft operators and manufacturers to attend, and among countries which have already expressed interest are Great Britain, the United States, France, Germany, Holland, Japan and the Soviet Union. The SBAC is not being officially represented, but the main groups in the British aircraft industry have intimated their intention to exhibit, as have Rolls-Royce, Handley Page and Scottish Aviation. The US industry is being represented by Lockheed, Sikorsky and Bell; the Russians are sending a Tu-104; West Germany is showing radar, airfield lighting and electronic telecommunications equipment; Japan's exhibit will consist mainly of radio electronics. BOAC are show-

ing a Comet and Boeing 707, and the RAF and Commonwealth Air Forces are participating.

All enquiries should be addressed to the Singapore International Air Show, c/o Masters (1959) Ltd, 16c Cecil Street, Singapore.

US CLAIM RECORDS

A CLAIM for a long-distance closed-circuit flight record has been made by the USAF for a B-52G which landed at Edwards AFB, Cal, recently after flying 10,000 miles non-stop without refuelling. It had taken off from Edwards at a gross weight of 480,000lb, with a crew of seven commanded by Lt Col R. Grissom, and was airborne for 19hr 45min. Previous record was 8,854 miles by a B-29 in August 1947.

The US Navy has also claimed a world record for another flight made recently from Edwards, by a North American A3J Vigilante which climbed to a height of 91,450ft (over 17 miles) with a payload of 1,000kg. Pilot and navigator were Cdr L. A. Heath and Lt H. L. Monroe. The existing record height for this load, 67,096ft, was set up by a Russian aircraft last year.