

The NACA's High Speed Flight Research Station and the Development of Reaction Control Systems

Christian Gelzer

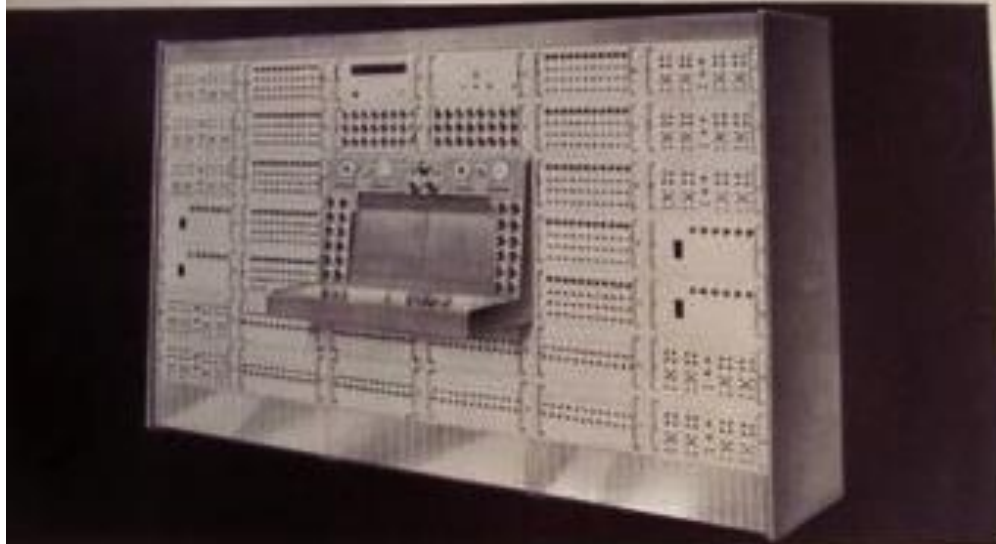
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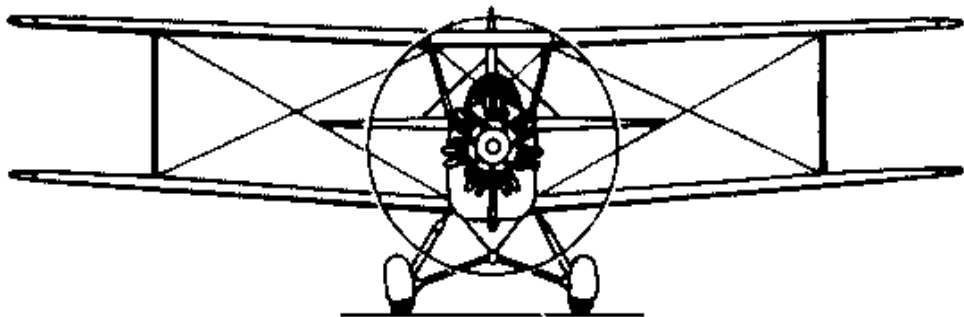
The Bell X-2 and the support equipment and personnel necessary for a flight.

The Air Force bought the GEDA to model the X-2's flight in a simulator.

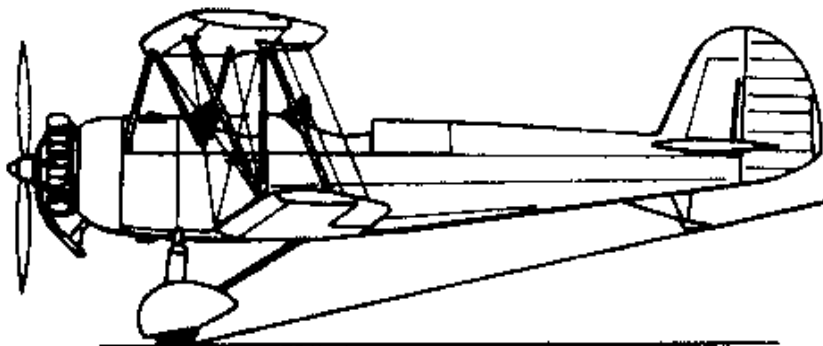
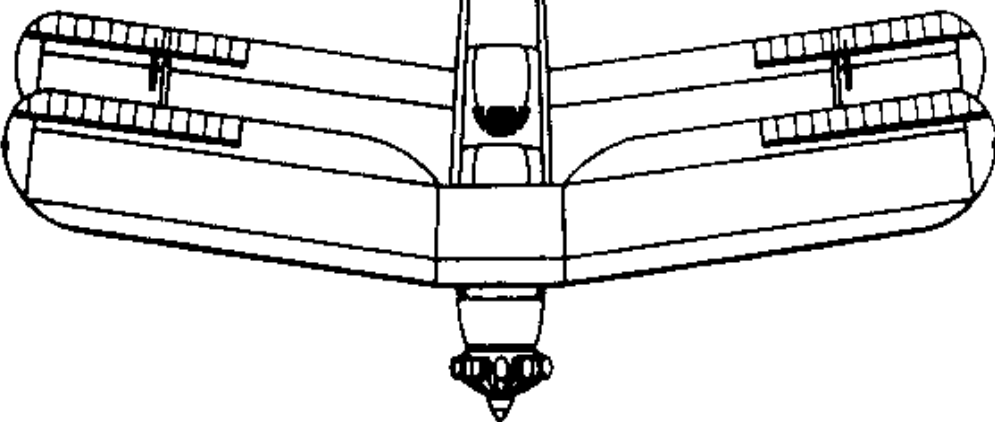




The Bell X-1B. The HSFS engineers created their RCS simulation based on this second generation X-1 rocket plane.



He 72 Kadett



**NATIONAL ADVISORY COMMITTEE
FOR AERONAUTICS**

JUL 10 1947

TECHNICAL MEMORANDUM

No. 1170

REPORT ON ROCKET POWER PLANTS BASED ON T-SUBSTANCE

By Hellmuth Walter

Translation

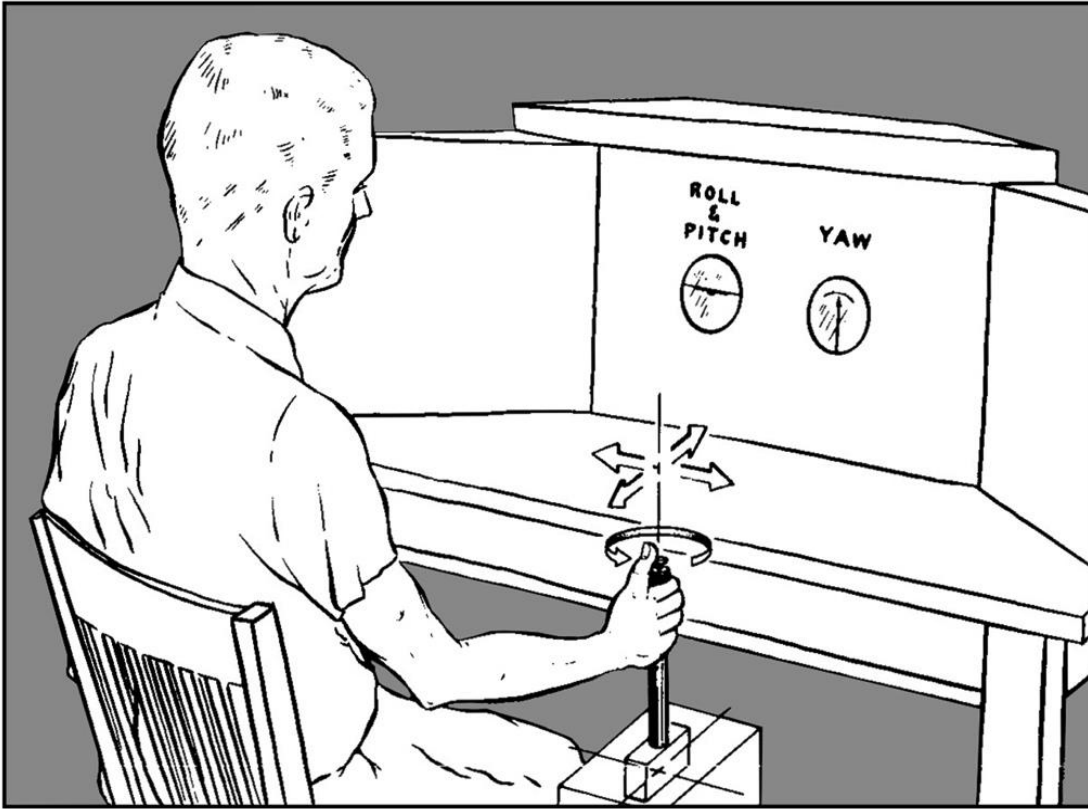
"Bericht über die R-Triebwerke auf Grundlage des T-Stoffes."
R-Antriebe, Schriften der Deutsche Akademie der Luftfahrtforschung
Heft 1071, Nr. 82, 1943



Washington
July 1947

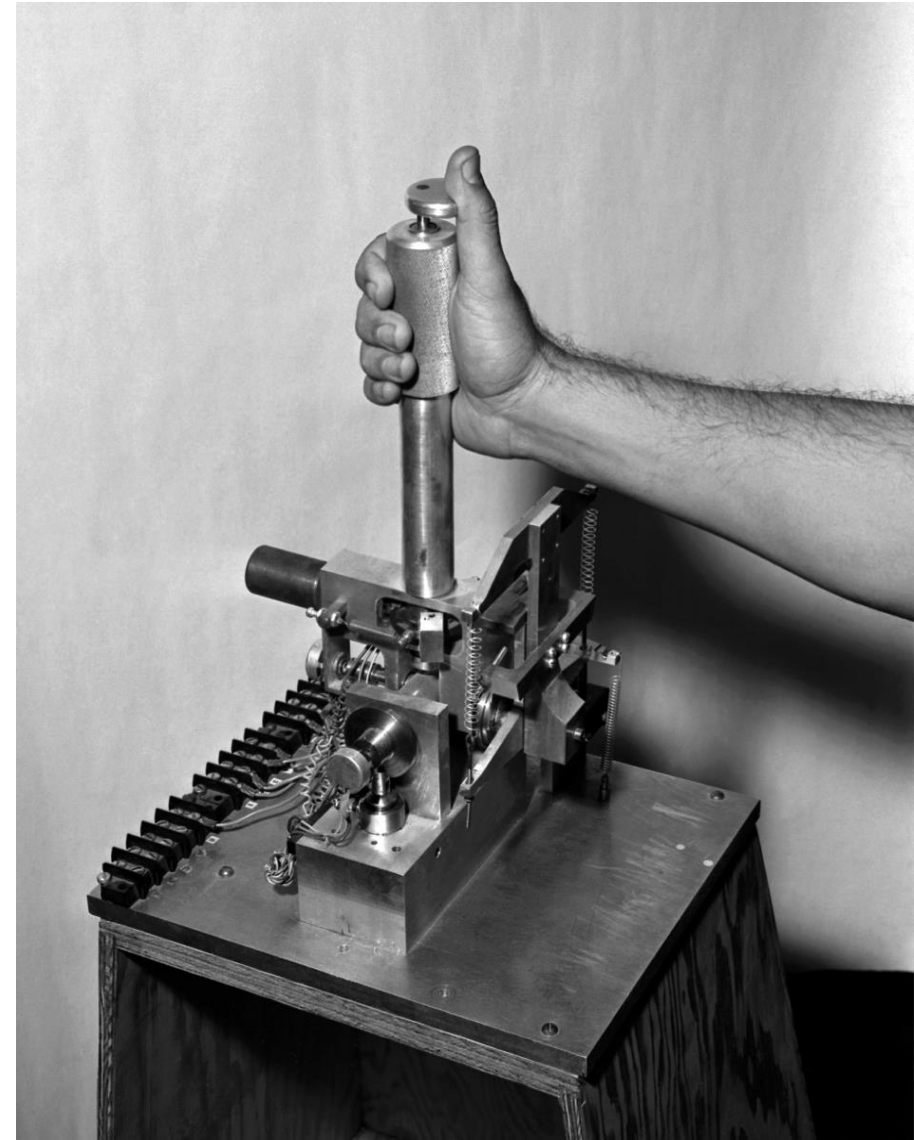
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ANALOG CONTROL AND PRESENTATION



An illustration from the first report on RCS testing showing the very basic simulator the pilots were asked to fly.

Photograph of the control stick the pilots used in the simulation.





Stan Butchart, in 1956, piloting the Iron Cross in hangar 4801 (Loads Calibration Hangar), while engineers, a few pilots, and technicians look on.



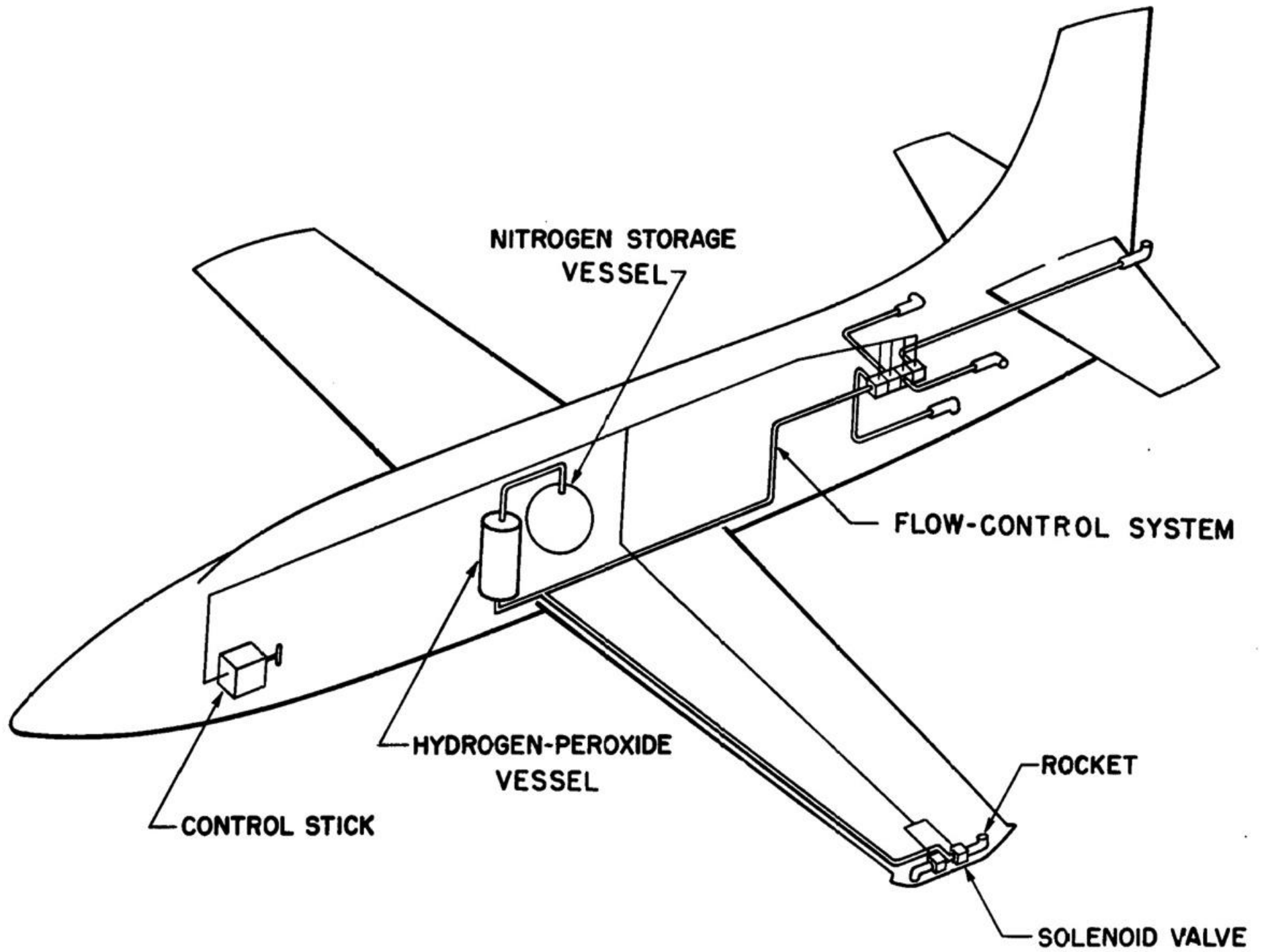




The final version of the Iron Cross, now fully enclosed to prevent the pilot from using visual cues while flying.



The Bell X-1B modified with its RCS. Barely visible are the exhaust nozzles at the left wing tip, the fuselage aft of the Air Force marking, and just above the rocket exhaust. Not visible is the nozzle under the fuselage.

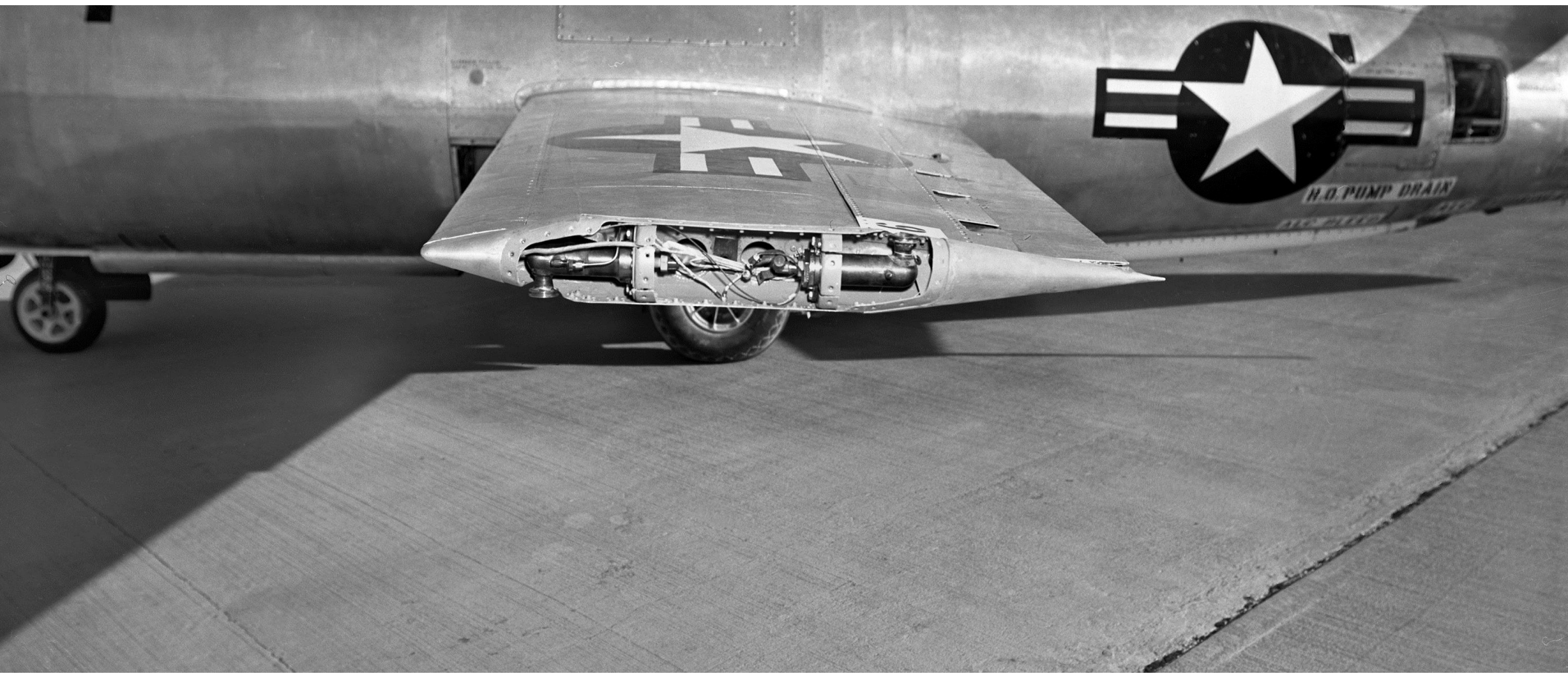




The RCS controller in the X-1B sticking out from the left side of the instrument panel.



The other wingtip nozzle fires up ...



Uncovered, you can see the two nozzles for roll control, one pointing up, the other pointing down.



The Station's YF-104 that, in 1958, became the second RCS testbed.

Now the JF-104, slightly shrouded in steam from decomposed H_2O_2 . Note the added wingtip pod and the exhaust nozzle in the nose.







The beneficiaries of all this:
the X-15s at the Flight
Research Center, (1964).

The LLRV in the fall of 1964 squirting steam from its thrusters.



