

**Docket No. SA-522**

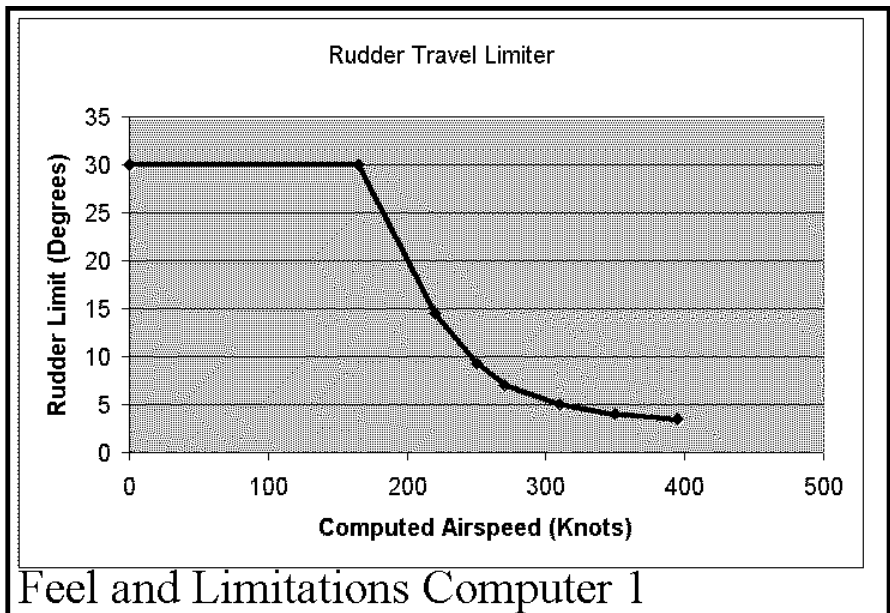
**Exhibit No. 9-D**

**NATIONAL TRANSPORTATION SAFETY BOARD**

**Washington, D.C.**

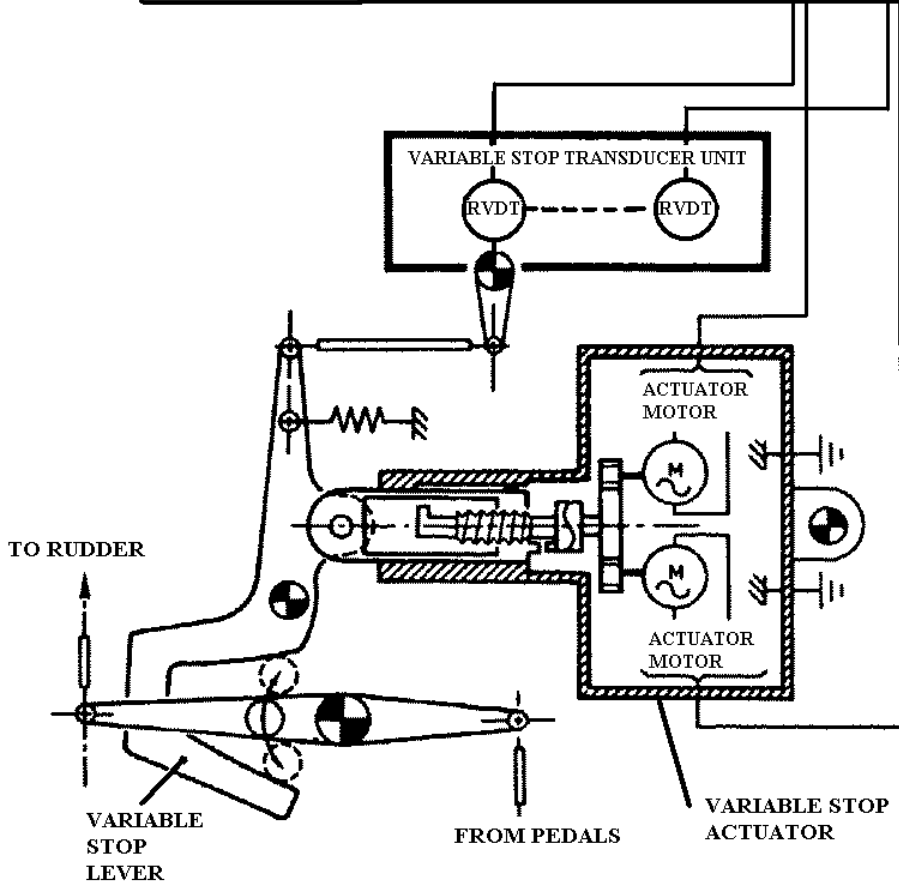
A300-600 Rudder Travel Limitation System

(7 Pages)



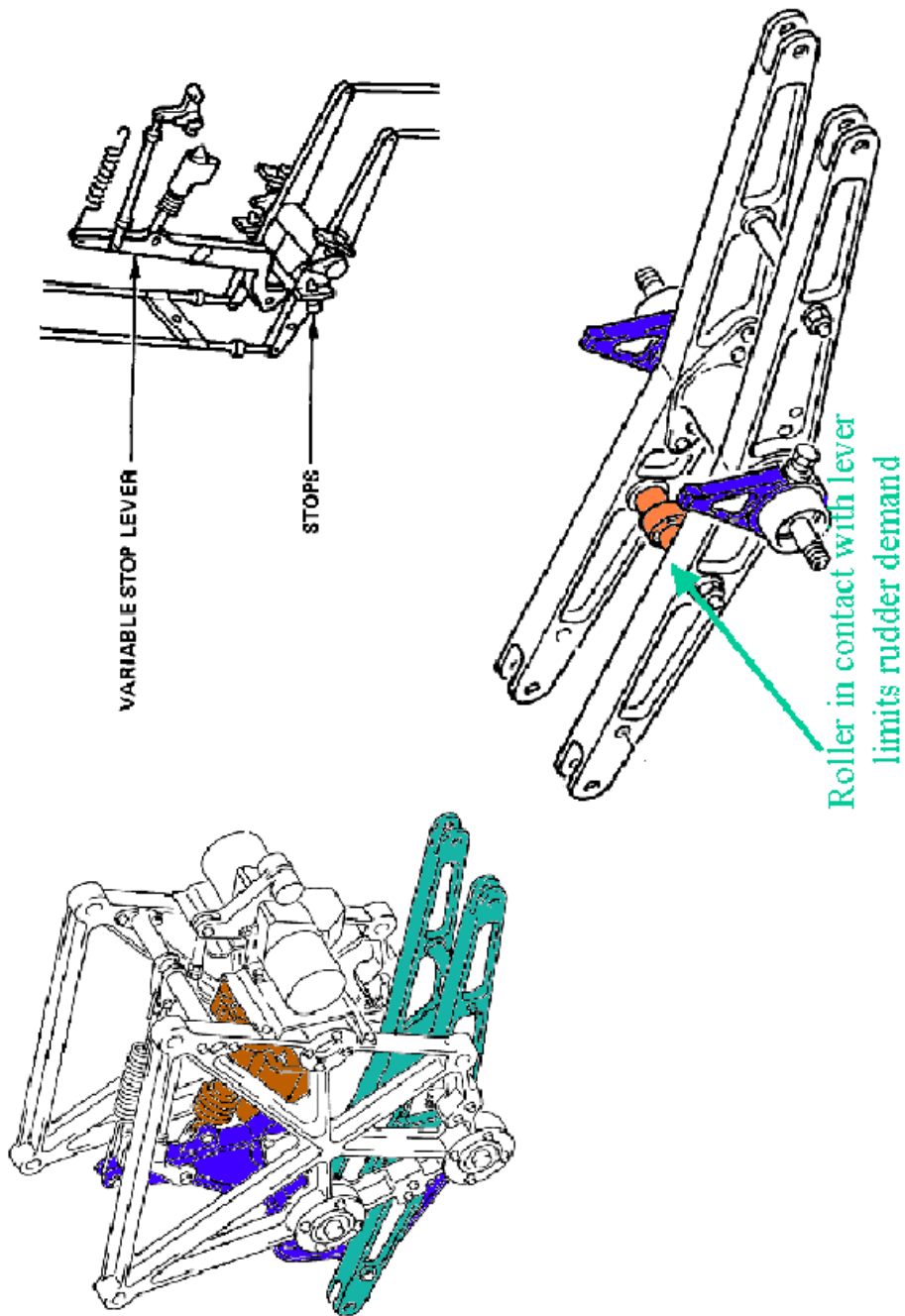
Feel and Limitations Computer 1

Feel and limitations Computer 2



RUDDER TRAVEL LIMITATION SYSTEM

Source: Airbus France Presentation Dec 6, 2001.





## AIRCRAFT MAINTENANCE MANUAL

### 3. Component Description

#### A. Variable Lever Arm Unit

##### (1) Description (Ref. Fig. 003 )

The variable lever arm unit is made of a hydro-mechanical unit consisting of a pivoting rod and lever linkage actuated by two electro-hydraulic actuators. The actuator hydraulic and electrical systems are independent of each other. Each actuator is servoed to a computer which receives information from an air data computer (ADC).

The variable lever arm unit varies rudder travel. In high speed flight, rudder travel can be reduced to 5 deg. left or right. Two spring boxes return the actuators to the low speed configuration, when the actuators are no longer pressurized.

##### (2) Operation (Ref. Fig. 004 )

The low speed configuration corresponds to the retracted position of actuating cylinder VV'. For an angular displacement X of input bellcrank EOA, there is a corresponding angular displacement Y of output bellcrank BO'S.

The high speed configuration corresponds to the extended position of actuating cylinder VV'. For an angular displacement X of input bellcrank EOA,, there is a corresponding angular displacement Z of output bellcrank BO'S. The ratio between output rotation and input rotation varies proportionally with actuating cylinder extension.

Of the two actuating cylinders, follow-on transmission is provided by the one having extended the furthest, and consequently having actuated the mechanical assembly the first. The second cylinder follows, ready to take over automatically should the other actuating cylinder fail.

In the event of low pressure in the actuators, bellcrank DO'V, actuated at point R by the spring boxes, returns the actuator to the retracted position and repositions the linkage in the low speed configuration.

#### B. Artificial Feel and Trim Unit (Refer to 27-22-00)

#### C. Variable Lever Arm Unit Actuator Electrical Control

##### (1) Description

##### (a) Control and Monitoring

R \*\*ON A/C 001-003, 031-035, 038-043, 045-046, 051-054, 091-096,

##### (Ref. Fig. 001 )

The electrical servo system controlling the position of the hydraulic actuator cylinders includes :

- Two artificial feel computers 1CY1 (1CY2) in LH electronics rack 80VU
- Two servo actuators 4CY1 (4CY2) between STA5158 (FR84) and STA5211 (FR85)
- RUDDER TRAVEL section of overhead panel 31VU in the flight compartment. Two switches on the panel, 9CY1 and 9CY2, enable each circuit to be activated, and two warning lights, RUDDER TRAVEL 1 7CY1 and RUDDER TRAVEL 2 7CY2, indicate failures and allow the circuits to be tested.

EFFECTIVITY: ALL

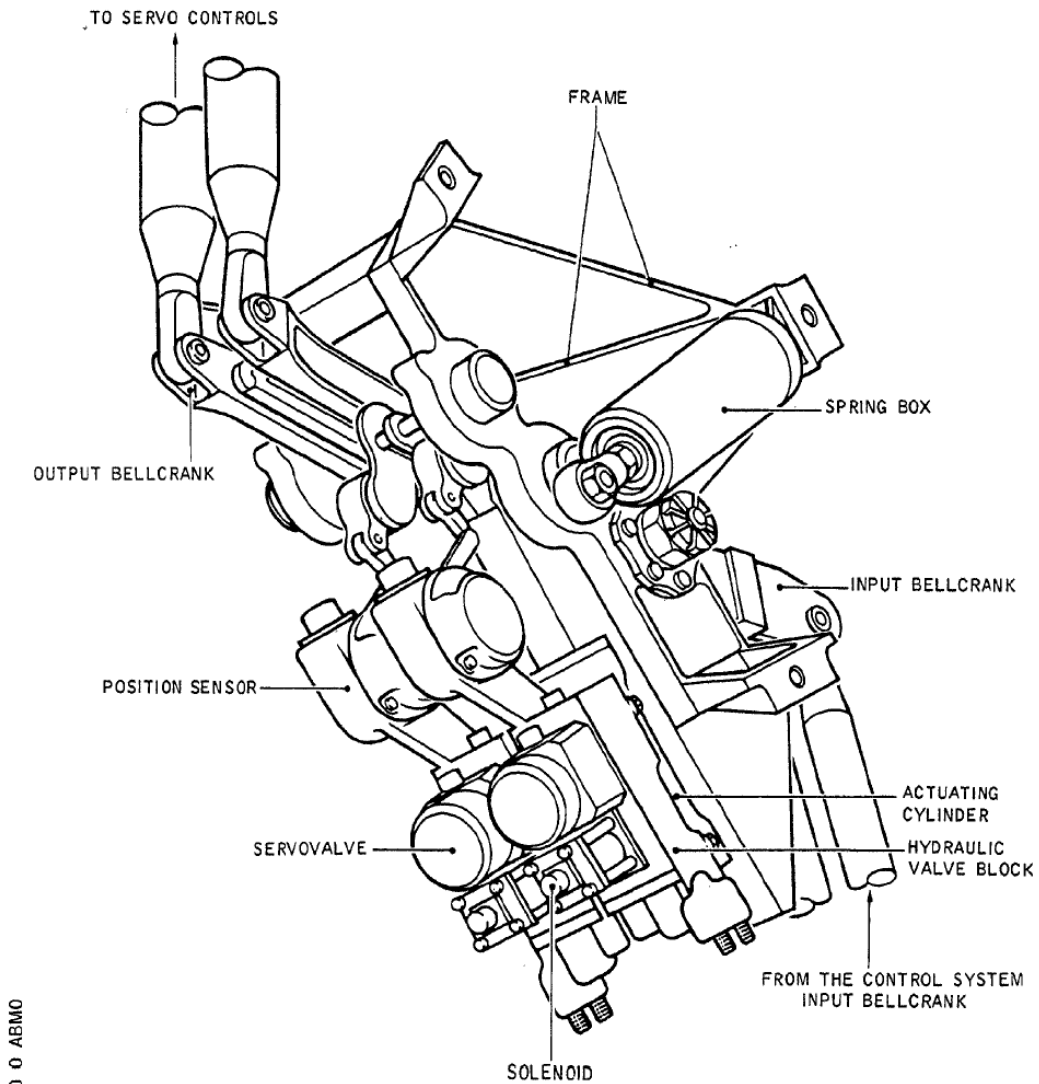
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Variable Lever Arm Unit  
Figure 003

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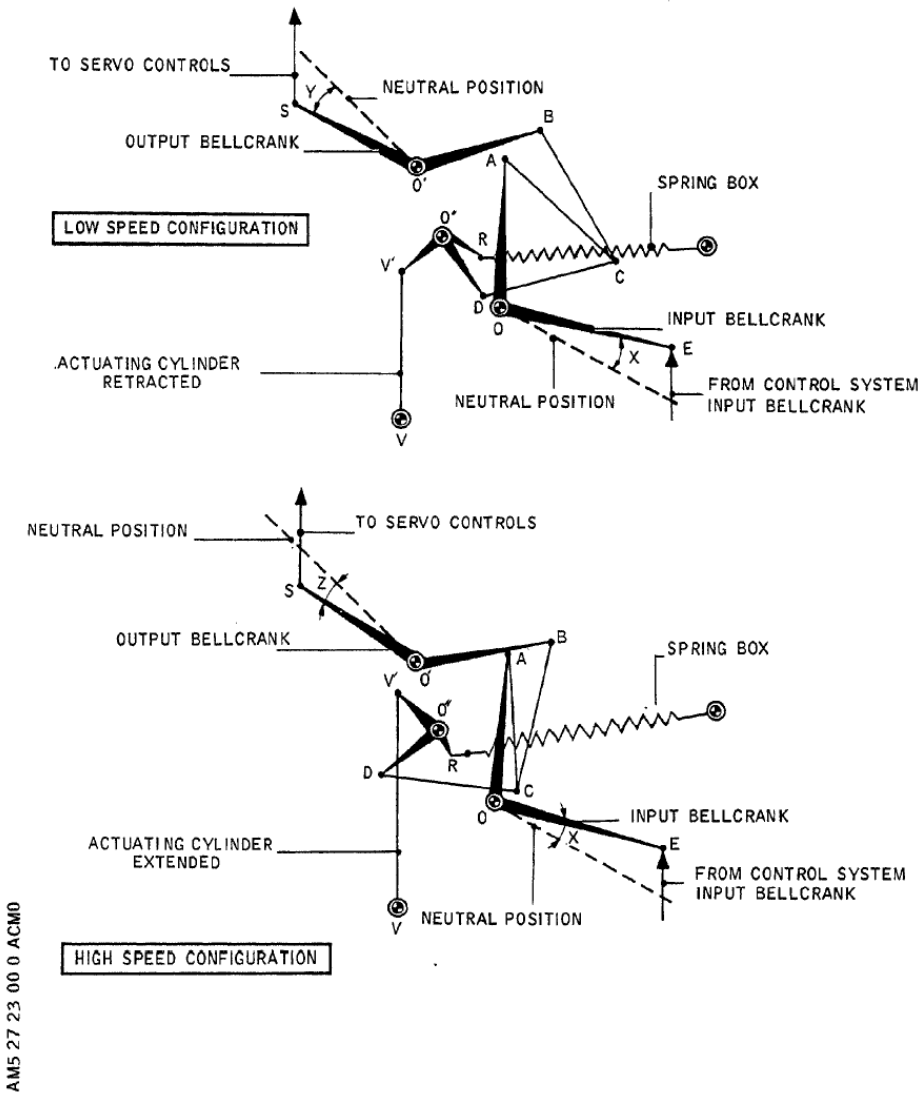
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**AIRCRAFT MAINTENANCE MANUAL**



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Variable Lever Arm Unit Linkage - Schematic  
 Figure 004

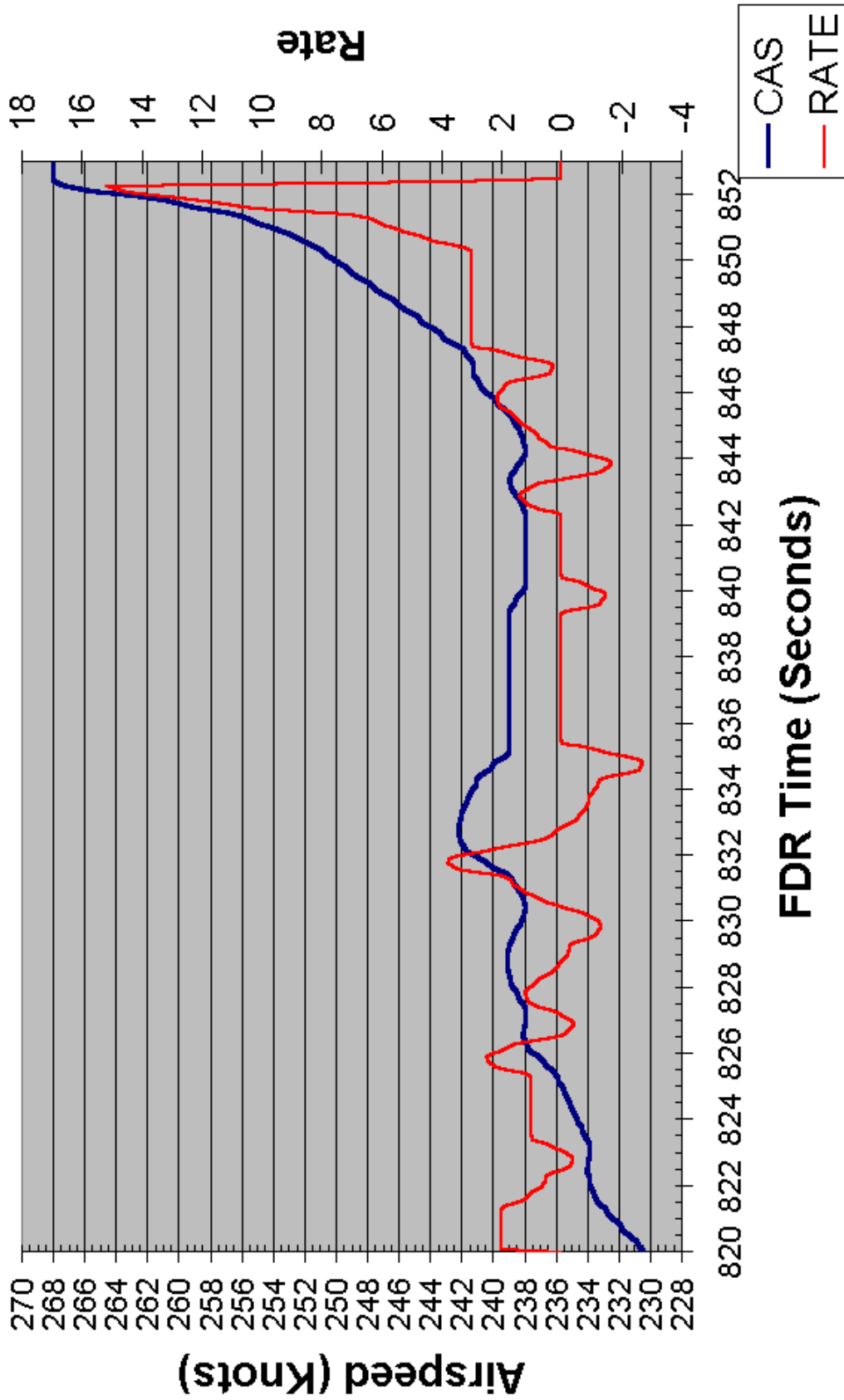
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# Computed Airspeed



Source: Developed by NTSB.