

# NASA TECH BRIEF

## Ames Research Center



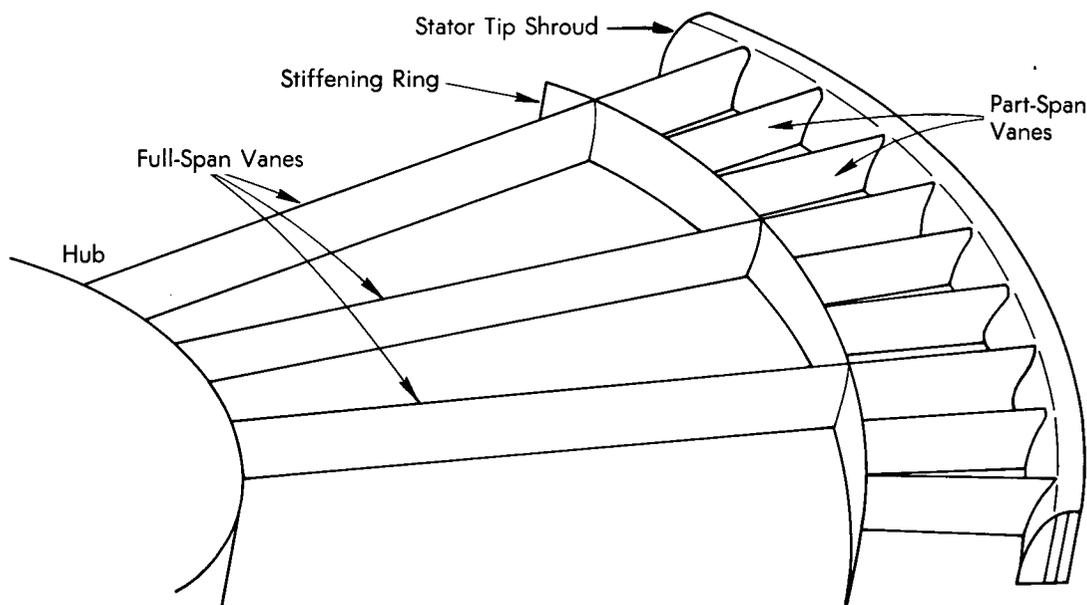
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### Split Stator Vane Row for Fans and Compressors

#### The problem:

To reduce the operating noise of fans by reducing the interaction that takes place between a rotating blade row and the stationary vanes of compressors or turbines.

tribution of acoustic energy in the annulus of most fans or compressors, and the majority of noise is generated in the outer annulus region near the tip, a high vane-to-blade ratio need be applied only in this region.



#### The solution:

Add part-span vanes to the vane row of the stator, reduce the number of full-span vanes, and maintain a vane-to-blade ratio of about 2 to 1.

#### How it's done:

A unique feature of this design is that additional vanes need be added only to the outer annulus region. Because there is a nonuniform radial dis-

tribution of acoustic energy in the annulus of most fans or compressors, and the majority of noise is generated in the outer annulus region near the tip, a high vane-to-blade ratio need be applied only in this region. The length of the added vanes does not affect the concept, nor does the addition of a stiffening ring. The stiffening ring can also be an acoustic splitter, a ring structure incorporating acoustic material on each side. Moreover, a reduction in the number of full-span stator vanes reduces the performance and weight penalties imposed by stiffening rings (part-span shrouds) or other structures that are incorporated to ensure adequate strength of the vane row.

(continued overleaf)

**Notes:**

1. The following documentation may be obtained from:

National Technical Information Service  
Springfield, Virginia 22151  
Single document price \$3.00  
(or microfiche \$0.95)

Reference:

NASA CR-1493 (N70-22699), Study Program for Lift Fan Noise Reduction and Suppression.

2. No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer  
Ames Research Center  
Moffett Field, California 94035  
Reference: B71-10528

**Patent status:**

No patent action is contemplated by NASA.

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