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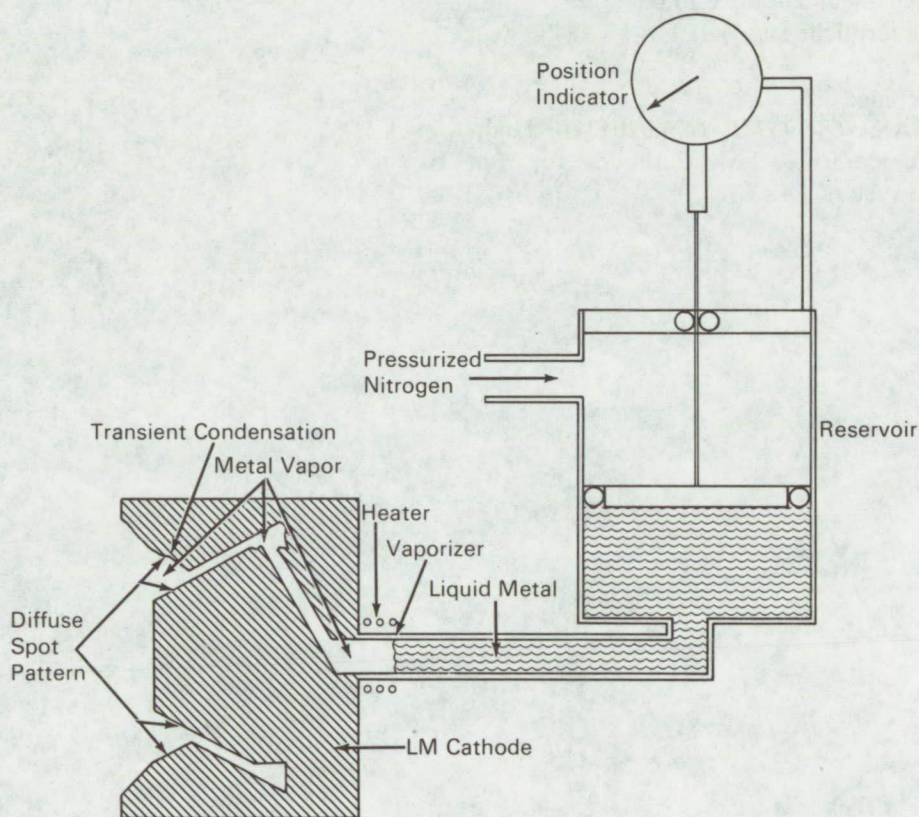
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NASA TECH BRIEF



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Vapor Feeding of Liquid Metal Cathodes



Liquid Metal Cathode Apparatus Modification

A liquid metal (LM) cathode apparatus has been modified to permit vapor feeding in the diffuse spot-pattern (DSP) mode.

The vapor-fed cathode possesses certain advantages over liquid-fed systems. These are: 1) higher efficiency and lower specific thermal loading should result from thermally decoupling the pool-keeping struc-

ture from the evaporator (the required electron-to-atom emission ratio may be obtained with less vapor flow constriction downstream from the electron-emitting zone); 2) a vapor-fed LM cathode can use the same feed system and isolator as are used for electron-bombardment thrusters with other cathode types permitting more flexibility in cathode choice;

(continued overleaf)

3) it may be possible to achieve such high electron-to-atom emission ratios that only a fraction of the total expellant flow needs to be fed through the cathode.

The feed system conversion was accomplished by omitting the flow impedance, electron-beam welding a stainless-steel vaporizer mesh into the feedline, and wrapping a heater around the feedline portion between vaporizer and cathode.

Note:

The following documentation may be obtained from:

Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Single document price \$3.00
(or microfiche \$0.65)

Reference:

NASA-CR-93771 (N68-20121), High-
Temperature LM Cathodes for Ion
Thrusters

Patent status:

No patent action is contemplated by NASA.

Source: W. O. Eckhardt of
Hughes Aircraft Company
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