25°; and $e > 0.1$; ΔV_{tot} for the three-impulse method is less than that for the single-impulse method of plane change.

The normalized ΔV_{tot} differences similar to Fig. 2c for $v = 135°$, 225° and $v = 45°$, 315° are shown in Figs. 3a and 3b, respectively. These show the combinations of v, θ, and e for which the three-impulse plane change is preferred.

If this transfer is considered analogous to the Hohmann orbit transfer, the question arises whether a transfer analogous to an infinite bielliptic transfer might require an even smaller ΔV_{tot}. However, the versatility of using this plane change for any orientation of the major axis is lost, since the three-impulse method is applicable to any orientation of the line of nodes with respect to the major axis of the orbit.

Spark Igniter for High-Temperature Applications

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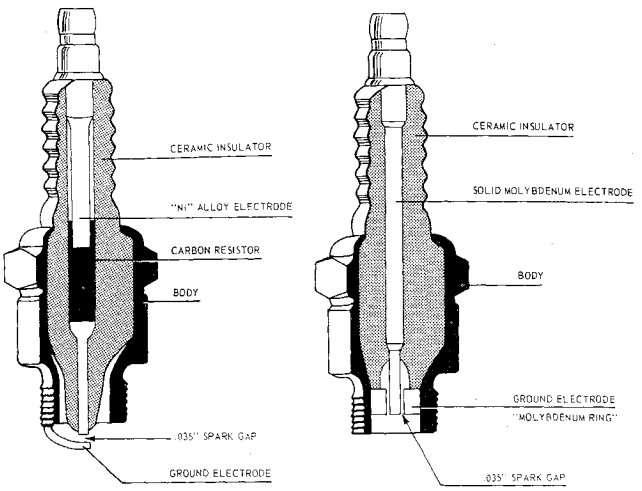
A NEW igniter that has been constructed and tested in the Lab-Roc V Test Rocket† should find various applications in corrosive high-temperature environments. The test rocket was operated at 50 to 120 psig chamber pressure and 2300° to 3000°K with H_2–CO–N_2–O_2 propellants. Under these conditions, the projecting electrodes of the conventional spark plug‡ recommended for the rocket (Fig. 1a) melted within 20 sec after ignition, and pieces of the ceramic insulator, cracking from thermal shock, fell into the combustion chamber and were ejected through the nozzle at high velocities. Besides the danger of ricochet of these ceramic projectiles, there is the possibility of one or more pieces wedging in the nozzle with subsequent rupture of the rocket motor.



a) Typical plug. b) High-temperature design

Fig. 1 Comparison of spark plugs.

The molybdenum electrodes of the new igniter (Fig. 1b), which have a usable surface area ten times that of the conventional spark plug, are recessed to be in close proximity to the water-cooled combustion chamber wall and are self-cleaning by volatilization of the molybdenum oxides formed.

The igniter test model was made by coring the tip of a conventional spark plug to accept a molybdenum ring and replacing the center electrode with a solid molybdenum rod. This test model, powered by a 6-v d.c. supply and a Ford "Model T" tickler coil, has operated successfully for more than 5 hr in H_2–CO–N_2–O_2 fuel-rich and fuel-lean flames, under the previously described conditions, without observable evidence of thermal shock or appreciable electrode erosion.

Received June 24, 1965; revision received August 18, 1965.

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† This rocket is manufactured by Astrosystems International, West Caldwell, N. J.

‡ The conventional spark plugs tested were automotive type Champion, a.c., Allstate & Auburn.

Technical Comments

Erratum: Man-in-the-Loop Space Station Navigational and Control Simulation

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[J. Spacecraft Rockets **2**, 1003-1005 (1965)]

The incorrect figures were published with the above Note. The correct ones are shown below.

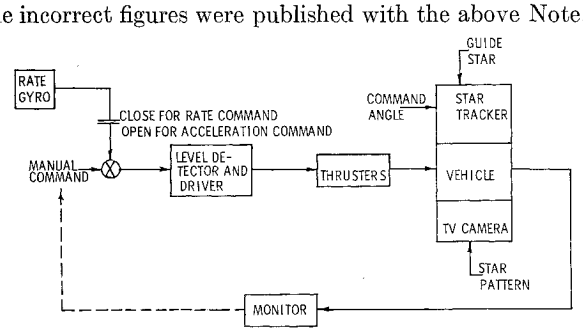

Fig. 1 Manual acquisition block diagram.

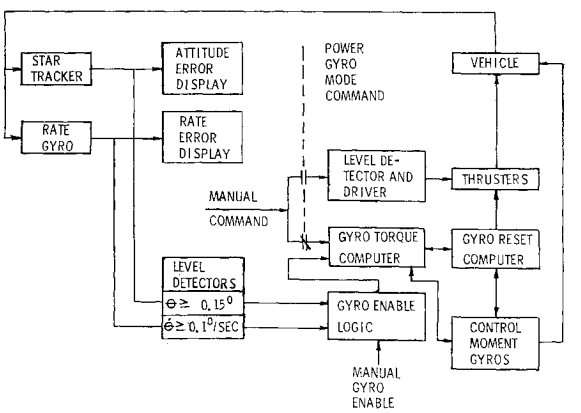

Fig. 2. Manual precision control block diagram.

Received December 21, 1965.

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