



A SPACE “LEAF BLOWER”

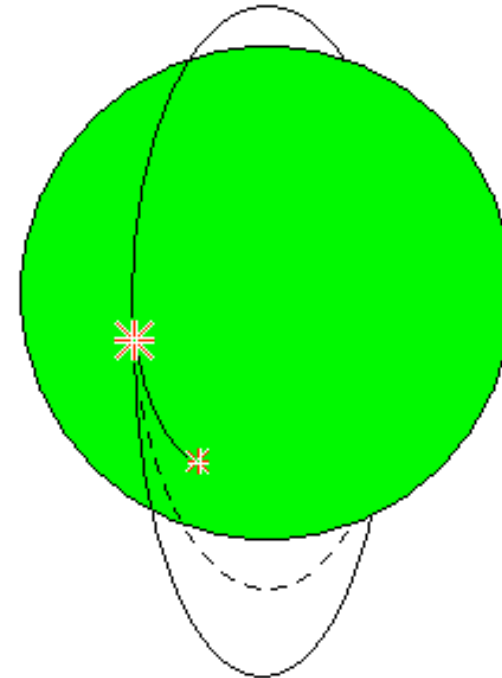
GAS-BLAST ORBIT MODIFICATION

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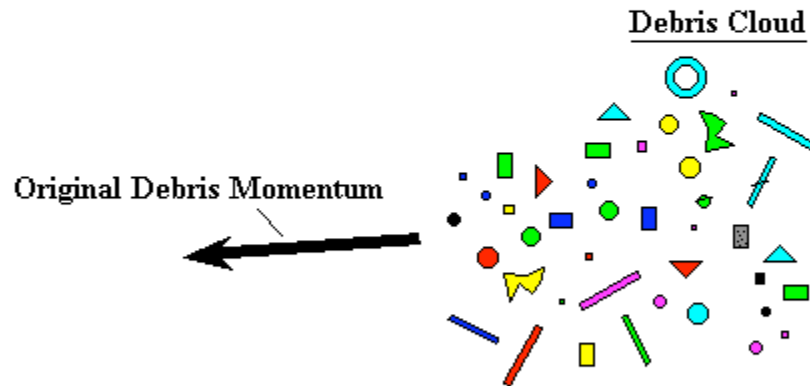
gcooper@qi-solutions.com



NON-DOCKING ORBIT ALTERATION



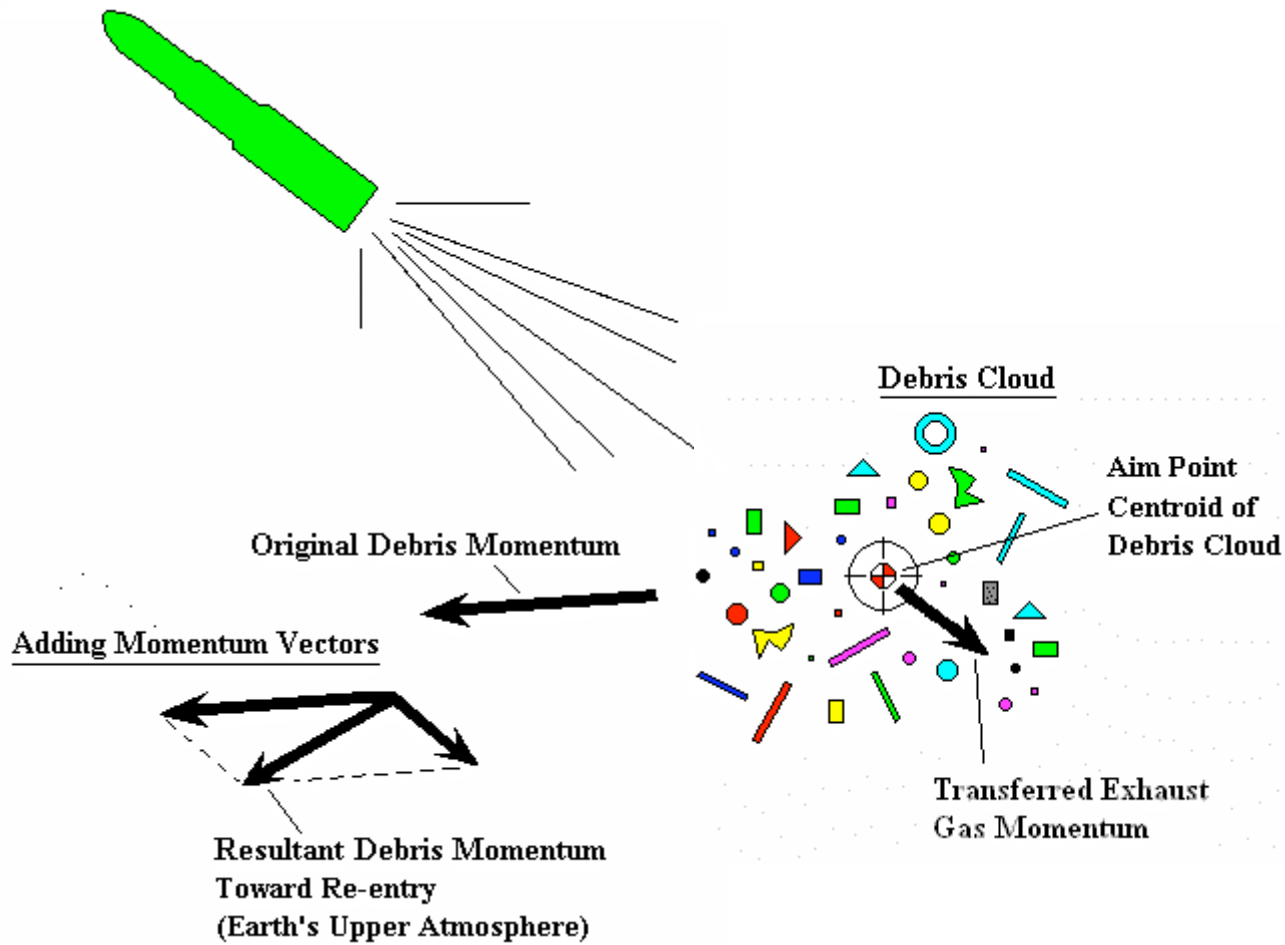
The Problem...



DEBRIS (MAN-MADE & NATURAL) IS INCREASING



The Solution...

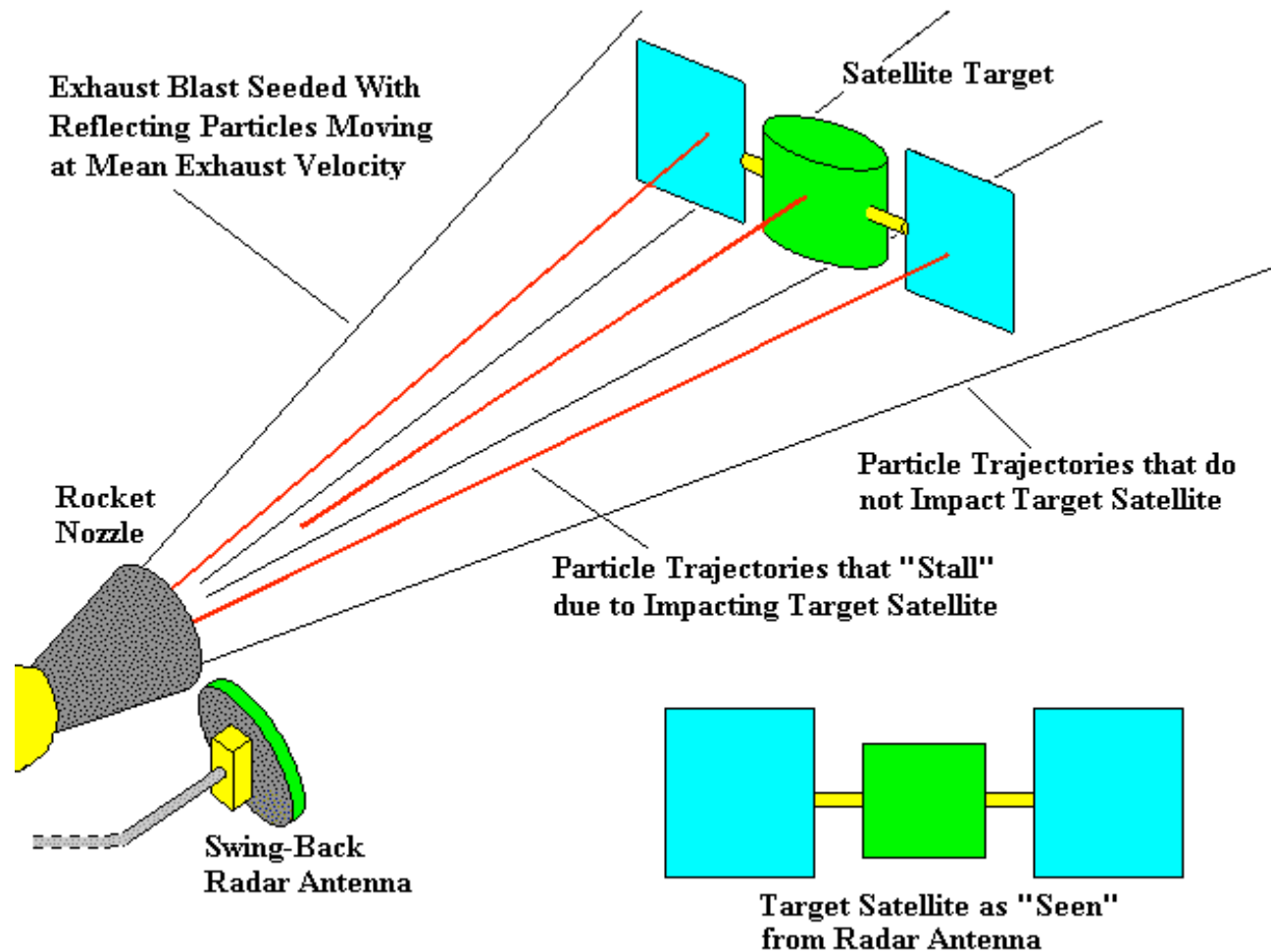


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2007 Planetary Defense Conference



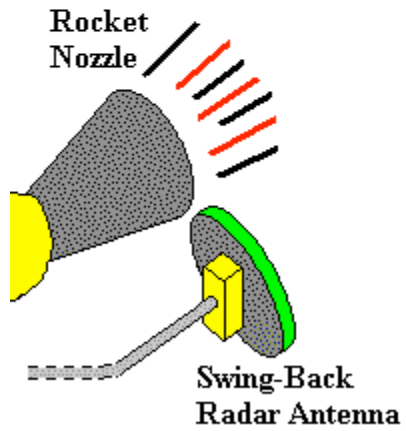
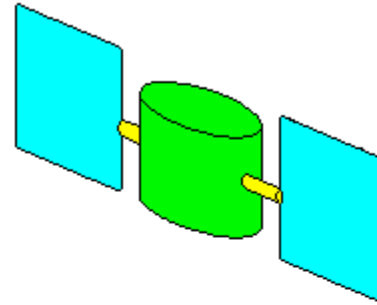
Another Application...



TARGET "IMAGED" BY RADAR-TRACKED EXHAUST PARTICLES



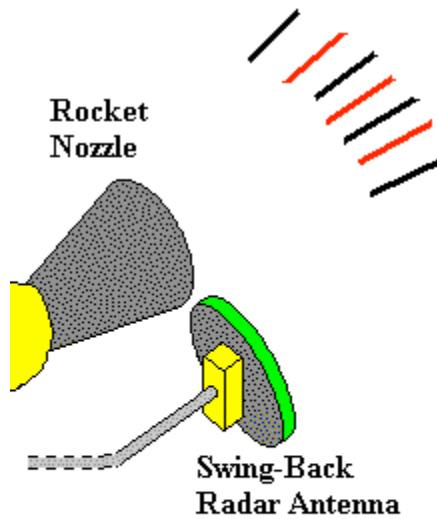
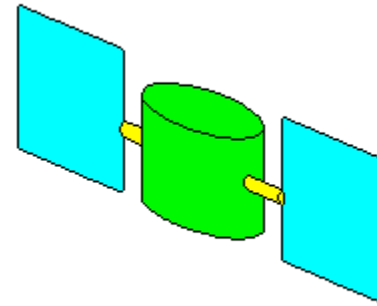
A Space "Leaf Blower" – Gas-Blast Orbit Modification



A BRIEF LOW POWER MOTOR BURN



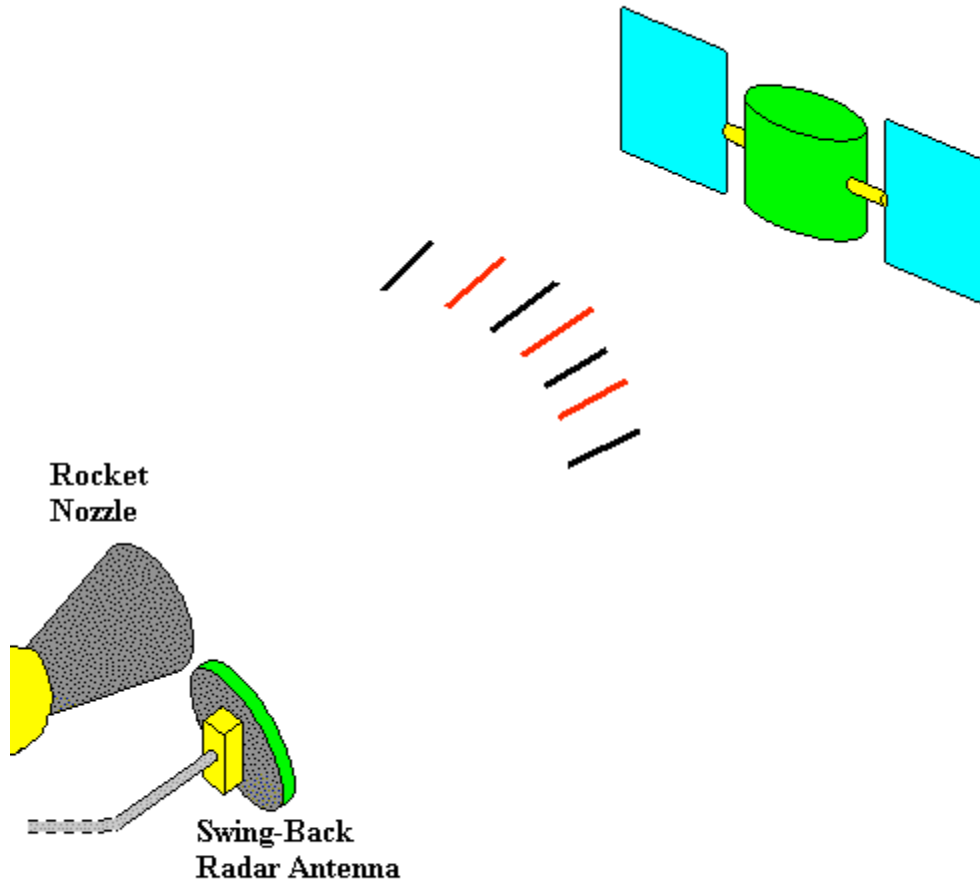
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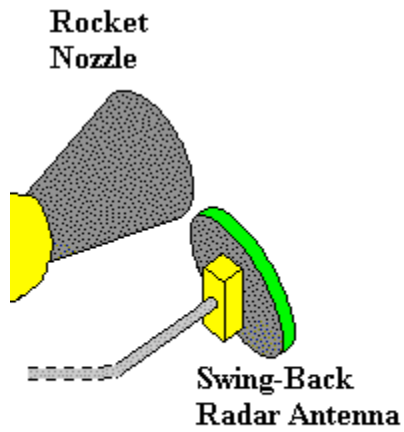
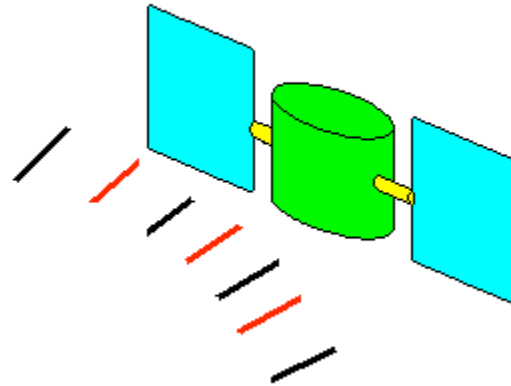
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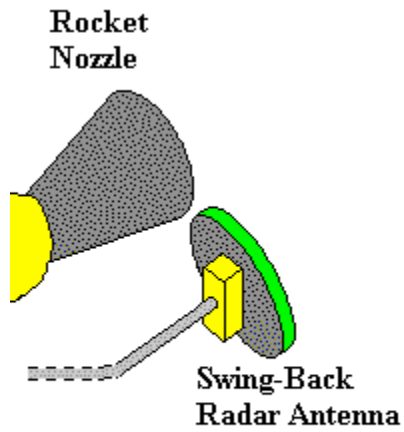
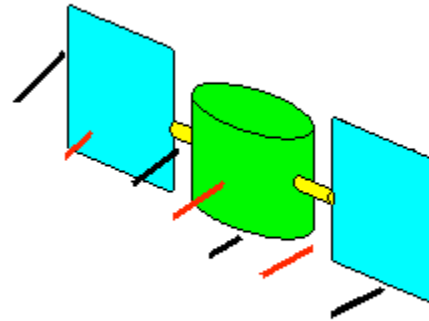
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A BRIEF LOW POWER MOTOR BURN



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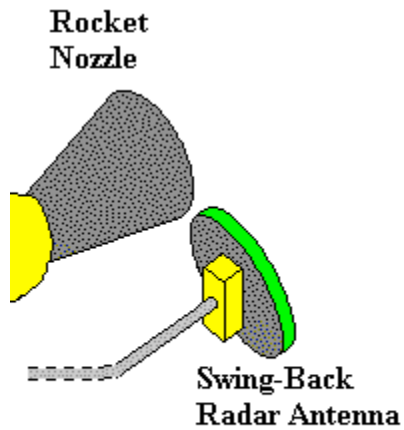
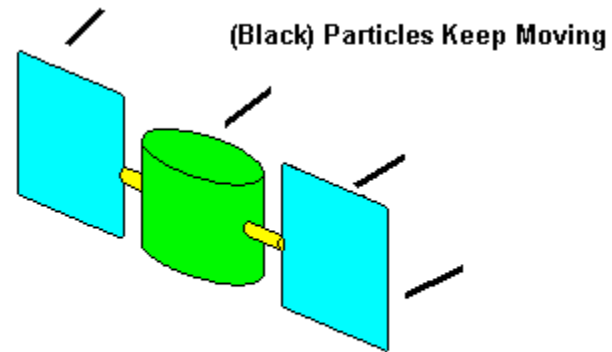


A BRIEF LOW POWER MOTOR BURN



A Space “Leaf Blower” – Gas-Blast Orbit Modification

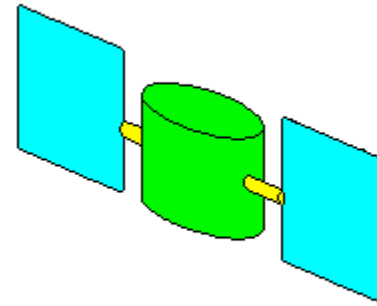
(Red) Particles Have Been Stopped by the Target



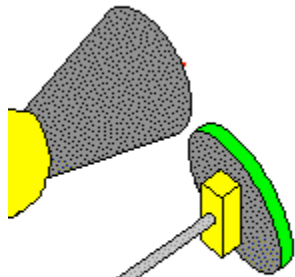
A BRIEF LOW POWER MOTOR BURN



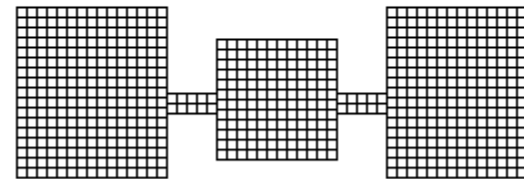
A Space "Leaf Blower" – Gas-Blast Orbit Modification



Rocket
Nozzle



Swing-Back
Radar Antenna



Target Satellite as "Seen"
from Radar Antenna

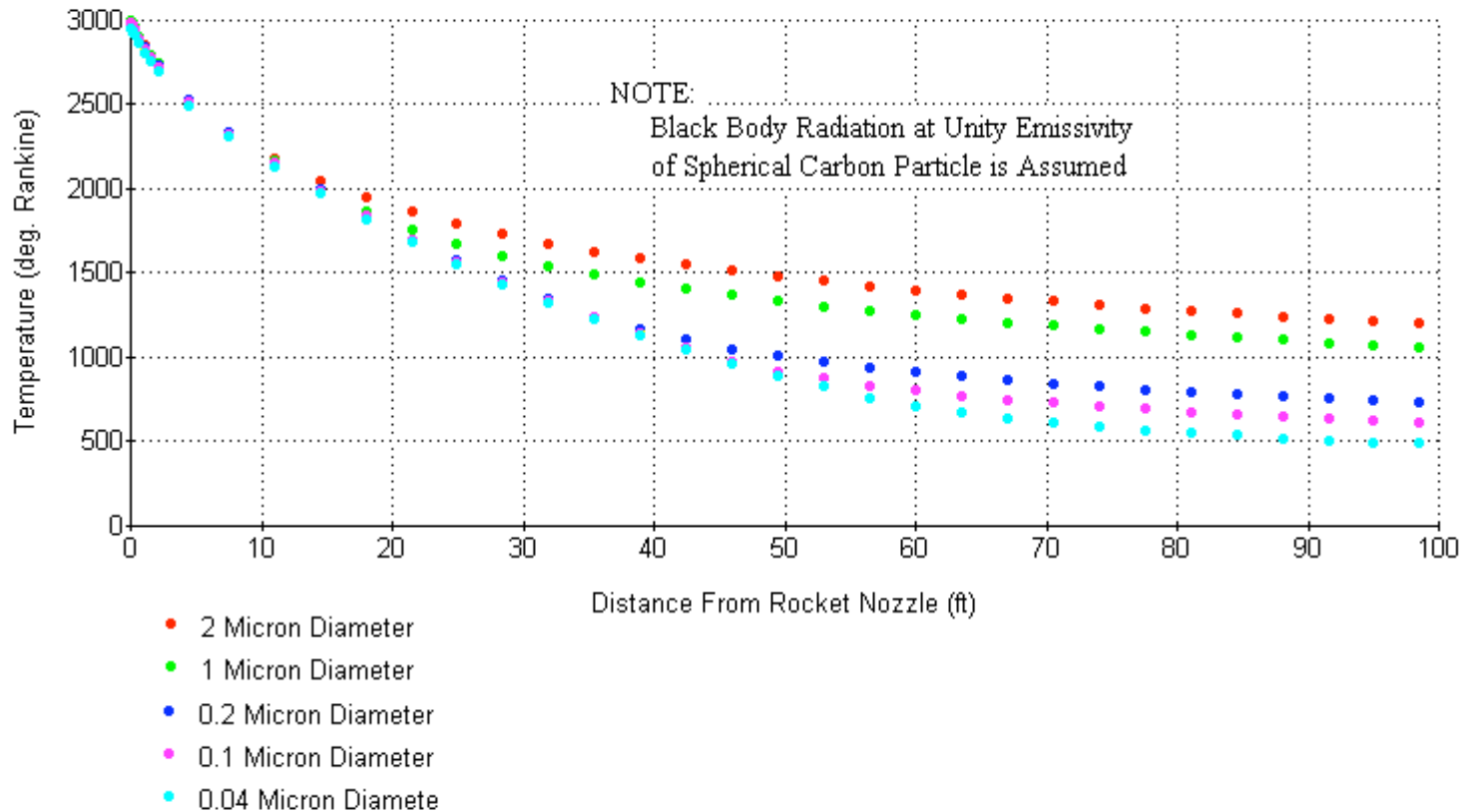
THE TARGET IS NOW "IMAGED"



Supporting Data...

CARBON PARTICLE COOLING WITH DISTANCE

Rocket Exhaust Velocity = 6000 (fps)

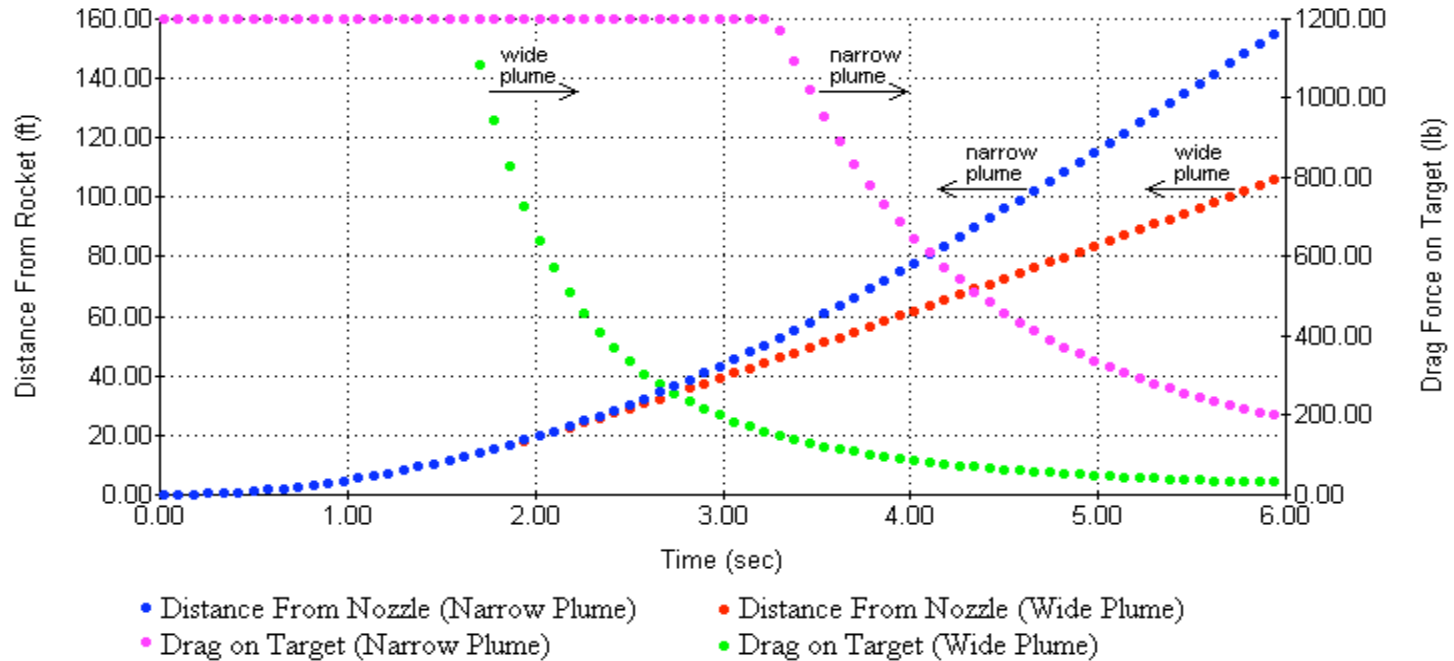


RADIATION COOLED EXHAUST PARTICLES BECOME A COLD MOLECULAR WIND



Supporting Data...

TARGET RESPONSE TO INTERCEPTOR EXHAUST PLUME
Narrow & Wide Exhaust Plume



Assumed Initial Conditions:

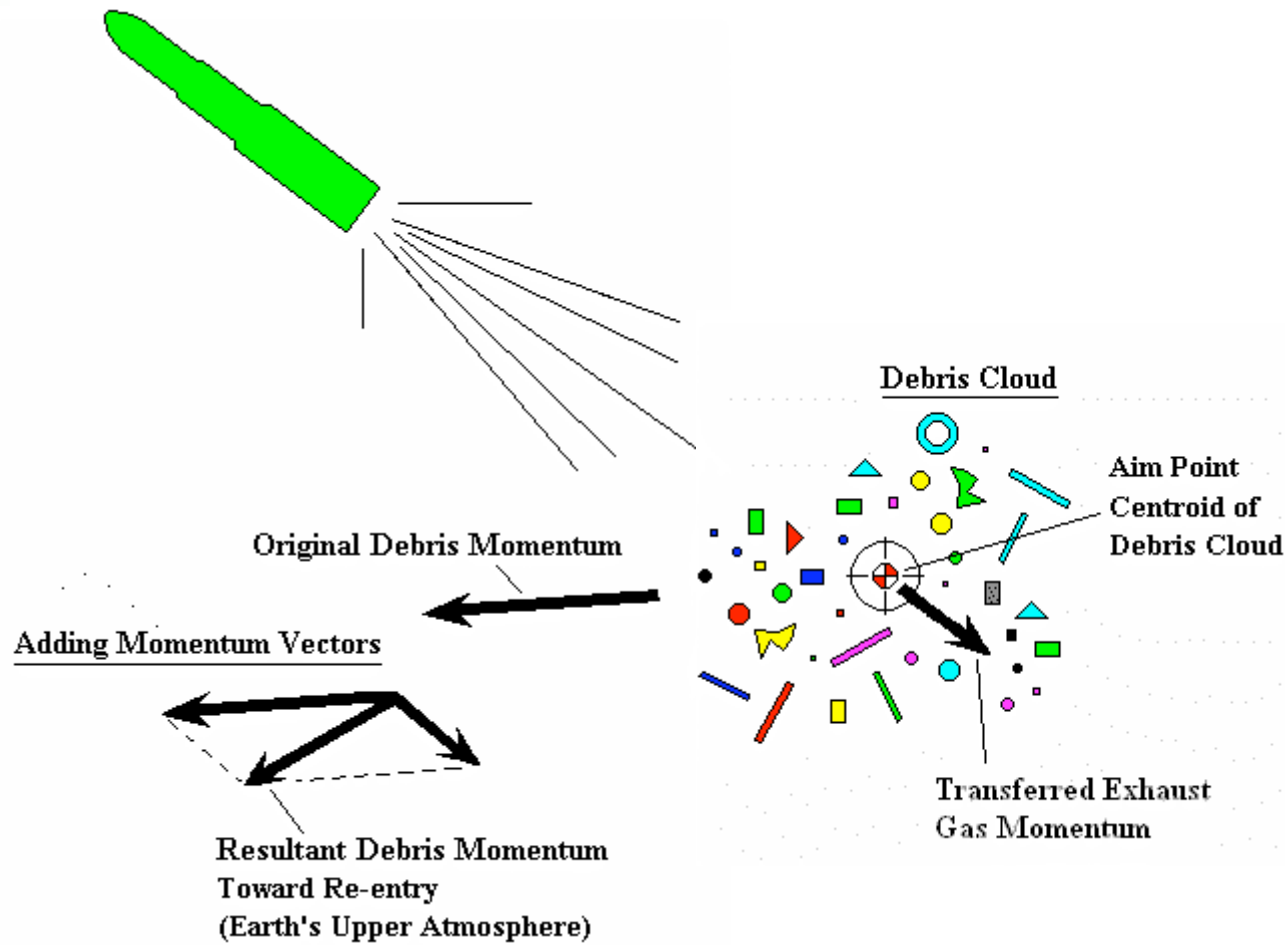
Exhaust Velocity = 6000 fps
 Propellant Flow Rate = 21.45 lb/sec
 Weight of Target = 4000 lb

Reference Area of Target = 40 ft²
 Target "Drag" Coefficient = 0.6
 Area of Rocket Exhaust = 3.1416 ft²

FORCES ON TARGET AS IT RECEDES FROM INTERCEPT MISSILE



Conclusion...

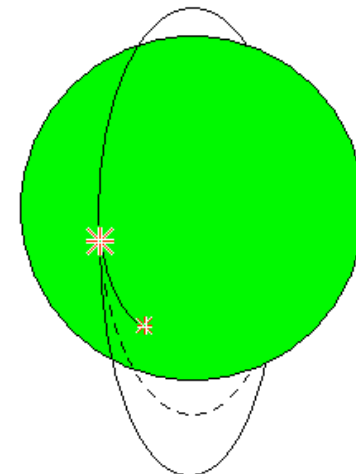


CLEARING OF DEBRIS (MAN-MADE & NATURAL)



Next Steps...

- Follow-on Discussions This Week
- Technical Interchange Meetings (TIM)
- Conduct Studies
- Plan & Execute Subscale Testing
- Test The Real Thing ??



NON-DOCKING ORBIT ALTERATION