HEC

Ammonia Hotrod

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HEC

Objective

- To build the first vehicle fueled solely by ammonia
  - Reduce America's dependence on foreign oil
  - Establish ammonia as a viable alternative fuel
  - Demonstrate that a zero emissions ammonia solution is available now
  - It can be adapted to existing equipment
  - Prove that ammonia is a performance fuel

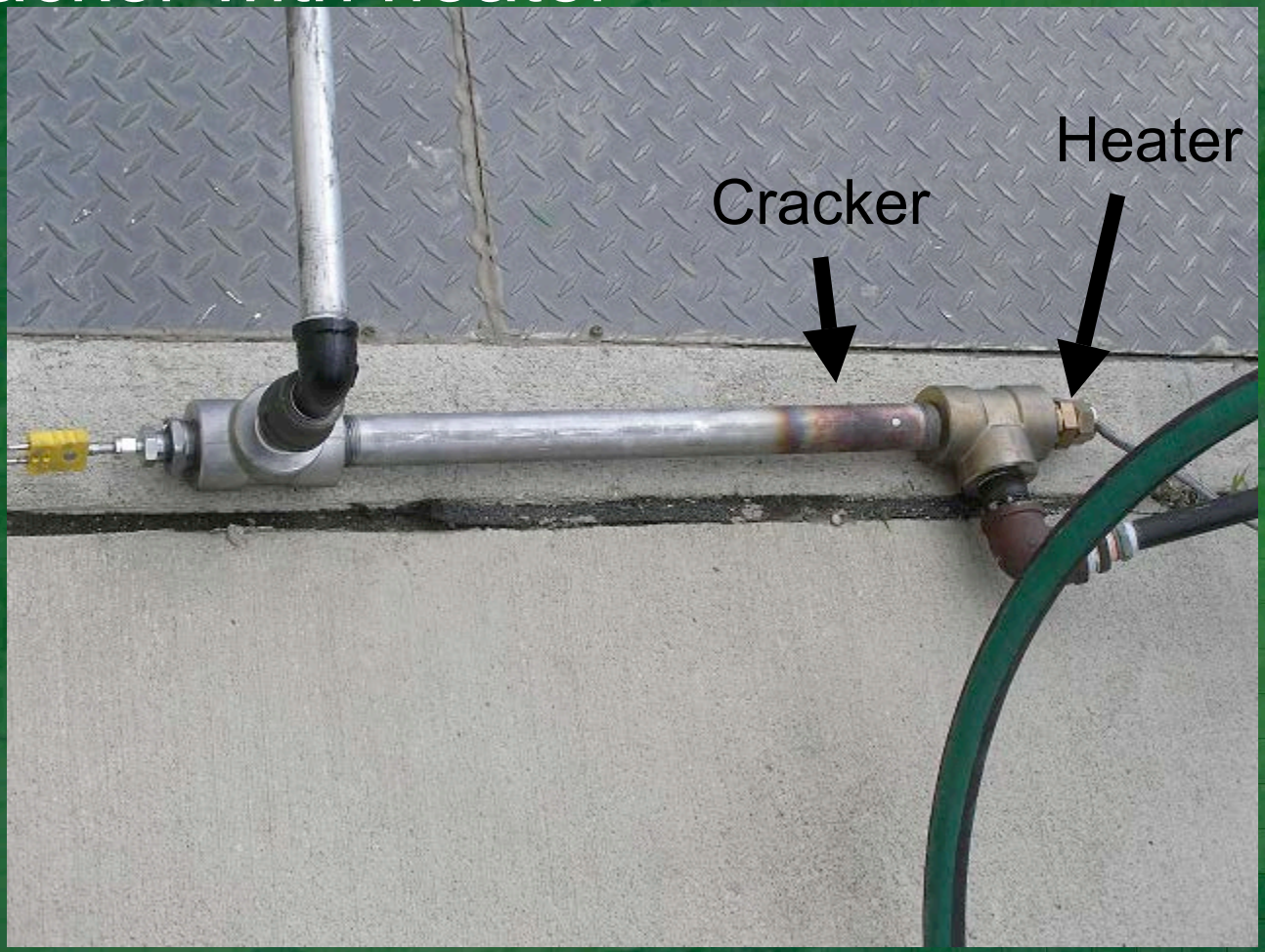
Burning ammonia

- Ammonia is considered non-flammable
- Hydrogen is considered a very clean fuel
- Ammonia will burn IF a combustion promoter is added
- Hydrogen is the best combustion promoter
- Ammonia can be the source of the promoter

Here's how we did it

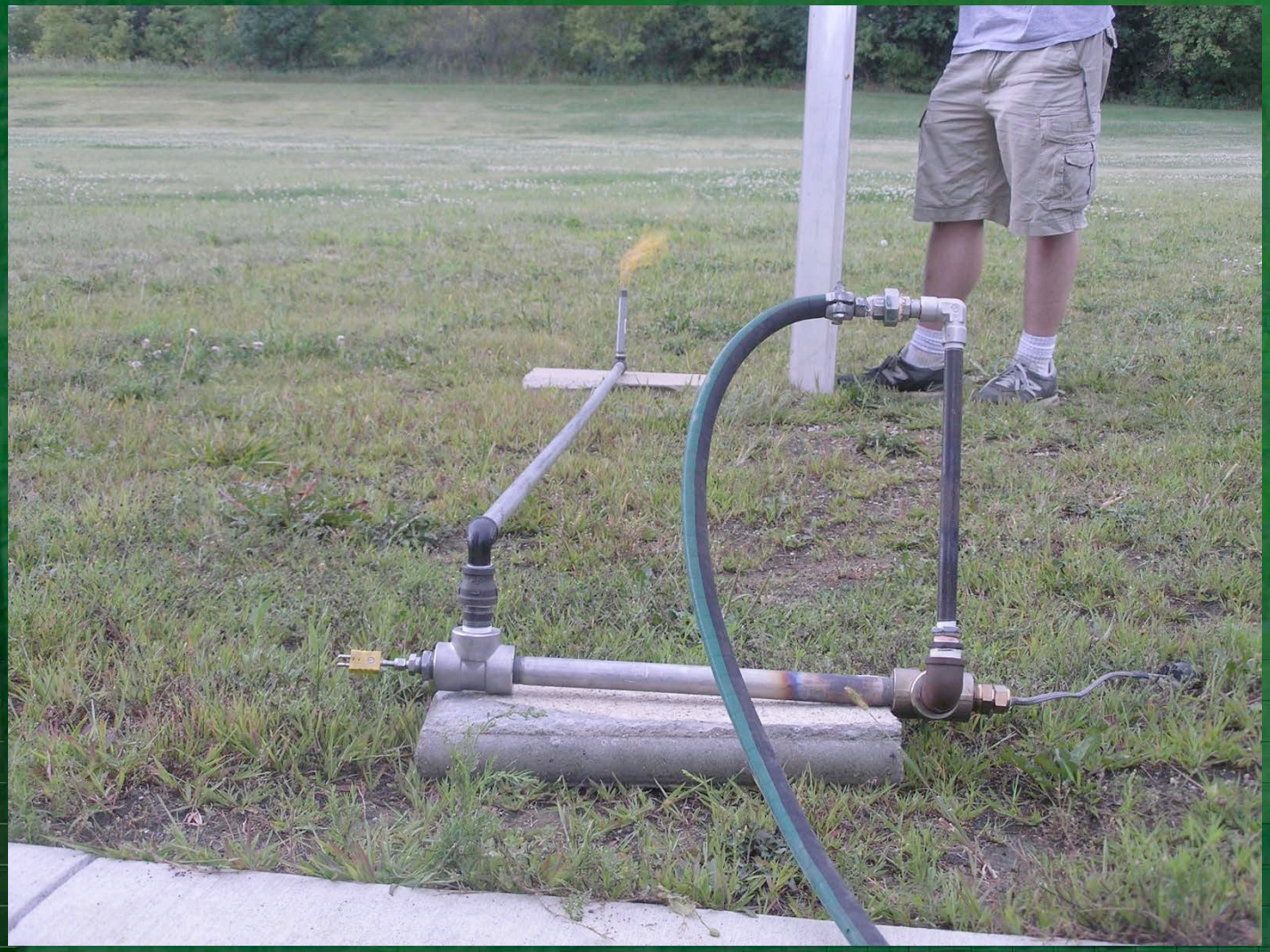
Ammonia cracker

- Cracker with heater



Ammonia cracker

- Cracker testing (Jason's legs)

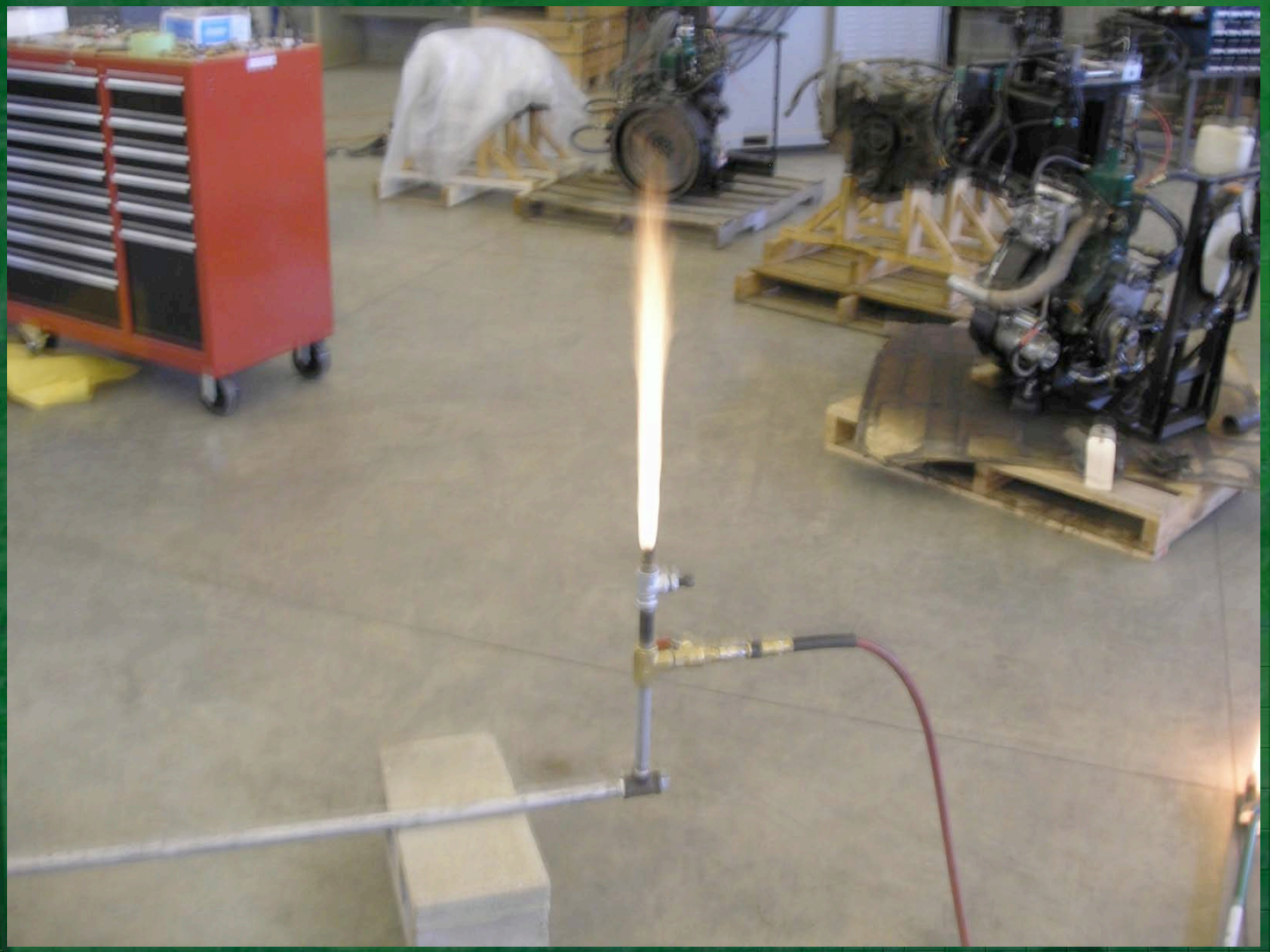


Cracked Ammonia burning

- Note the fly on the pipe.

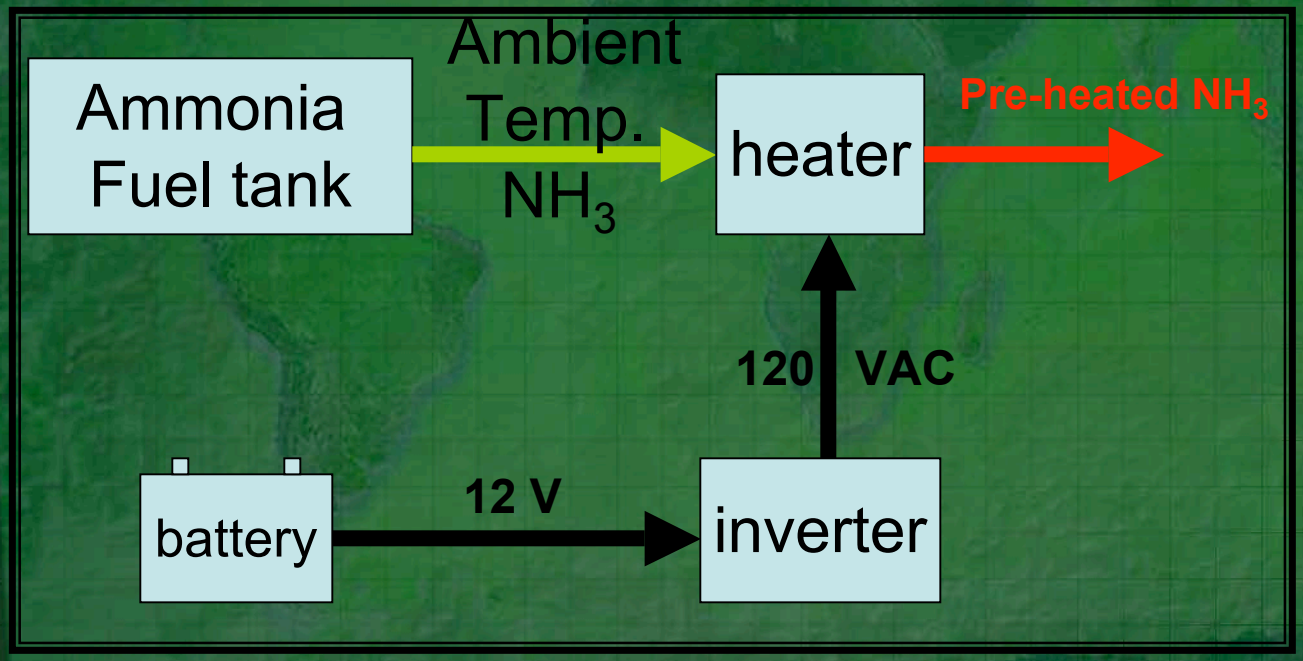
Ammonia cracker

- Cracker with air added



Ammonia fuel

- The initial energy (cold start) for heating will come from a battery thru an inverter.



Hotrod

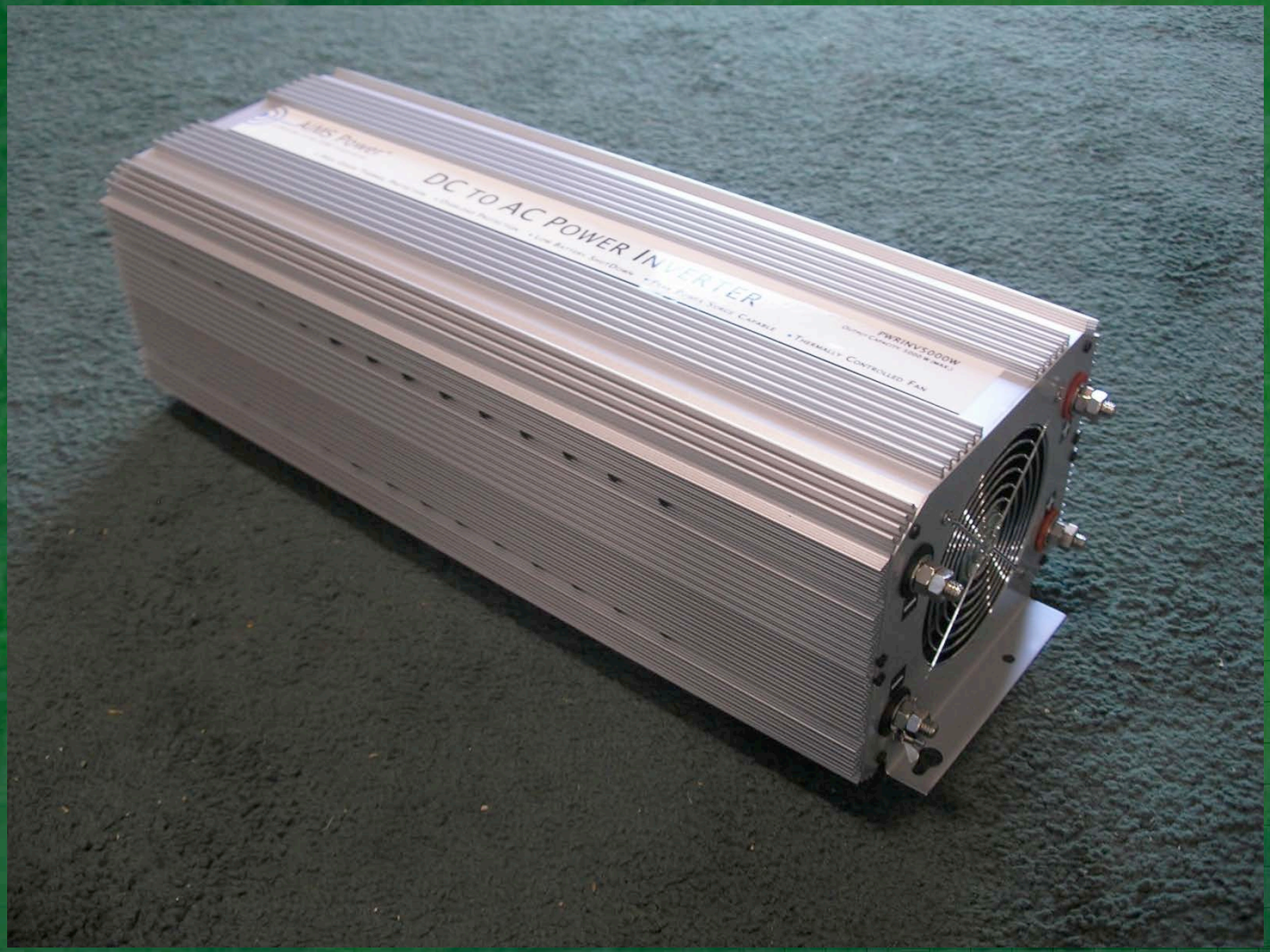
- Double walled ammonia tank

Hotrod

- The heater

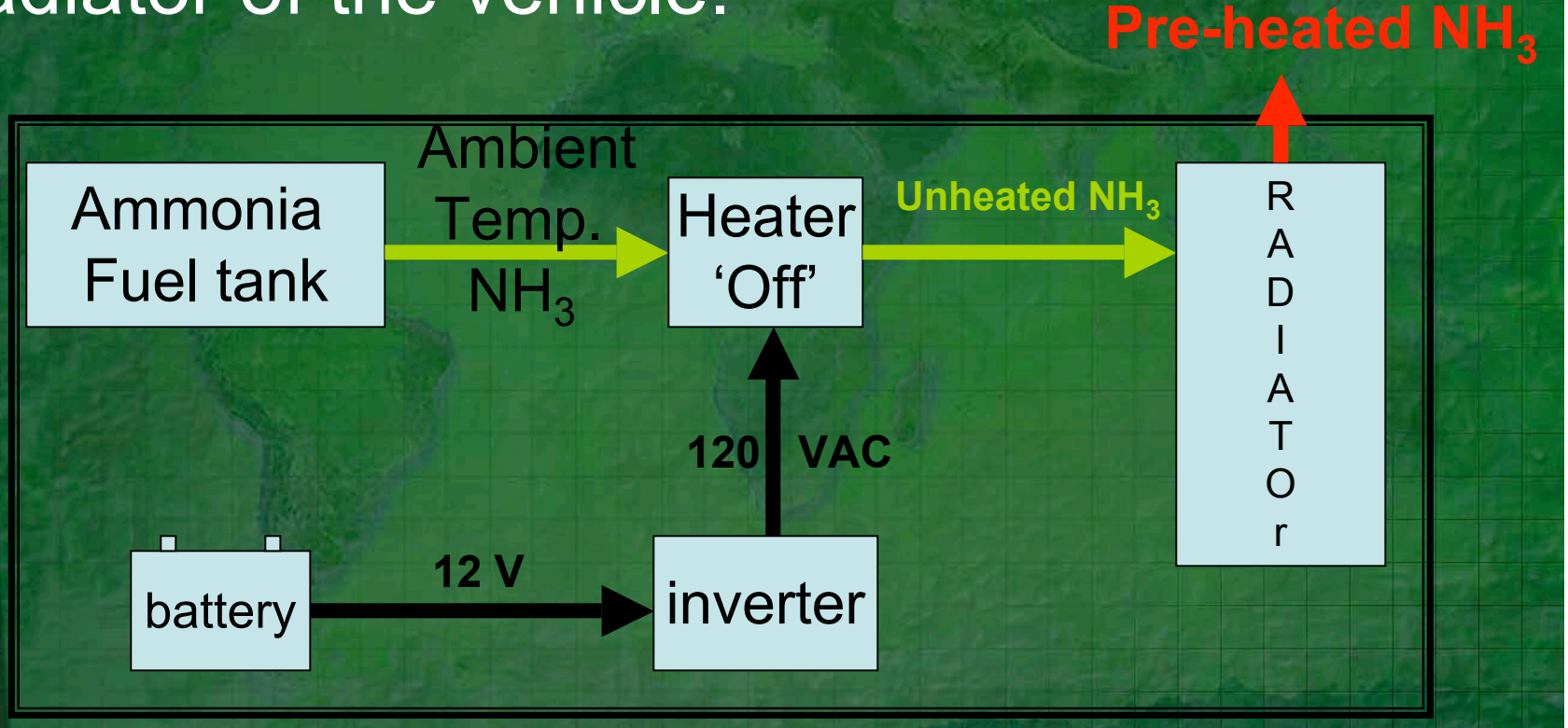
Hotrod

- The inverter (it's in the trunk)



Ammonia fuel

- The ‘running’ energy will come from the radiator of the vehicle.

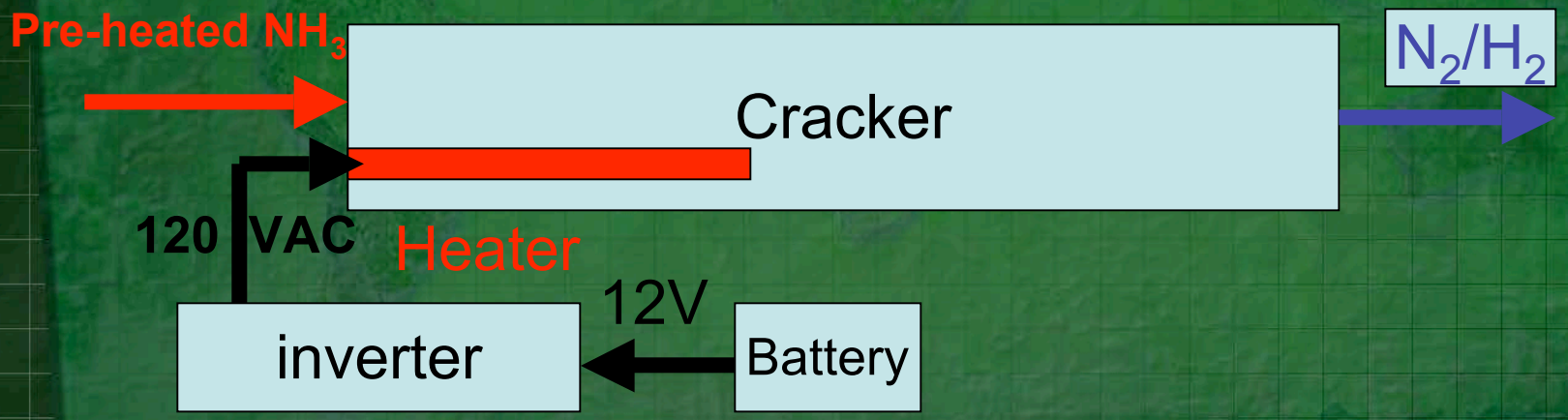


Hotrod

- Engine and chassis

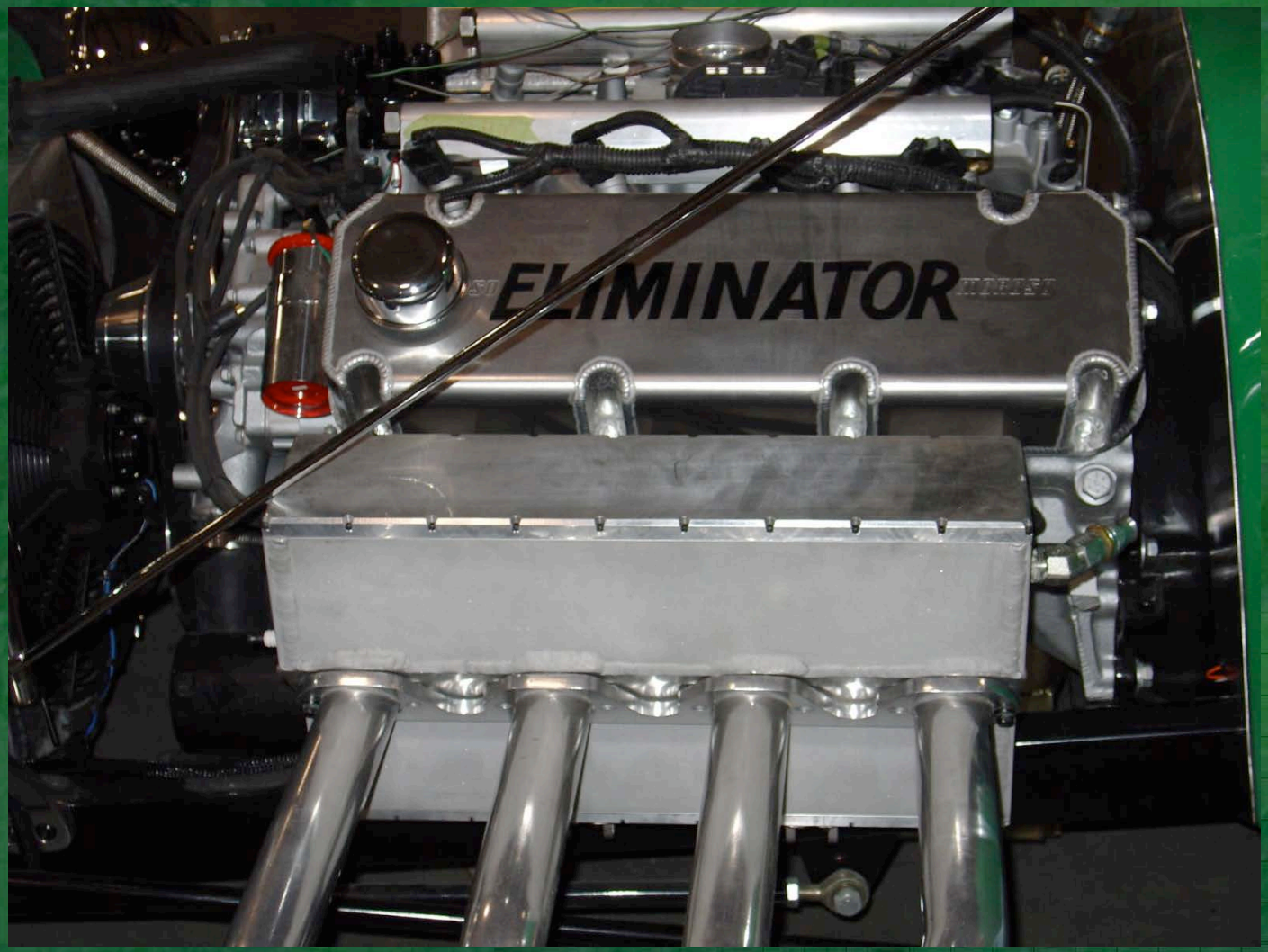
Ammonia to hydrogen fuel

- Ammonia can be ‘cracked’ if passed thru a heated catalyst
  - We used a low temperature catalyst
    - Higher cracking per cent in our temperature range
      - More energy efficient



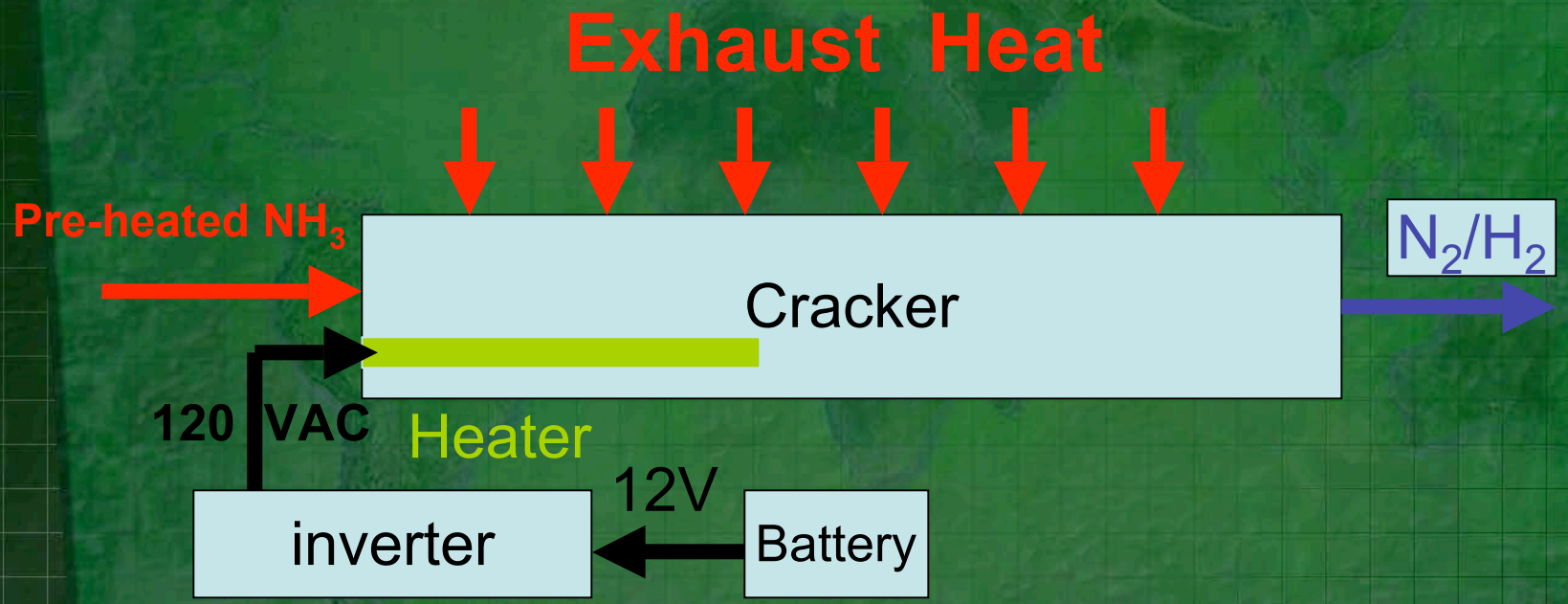
Hotrod

- The cracker



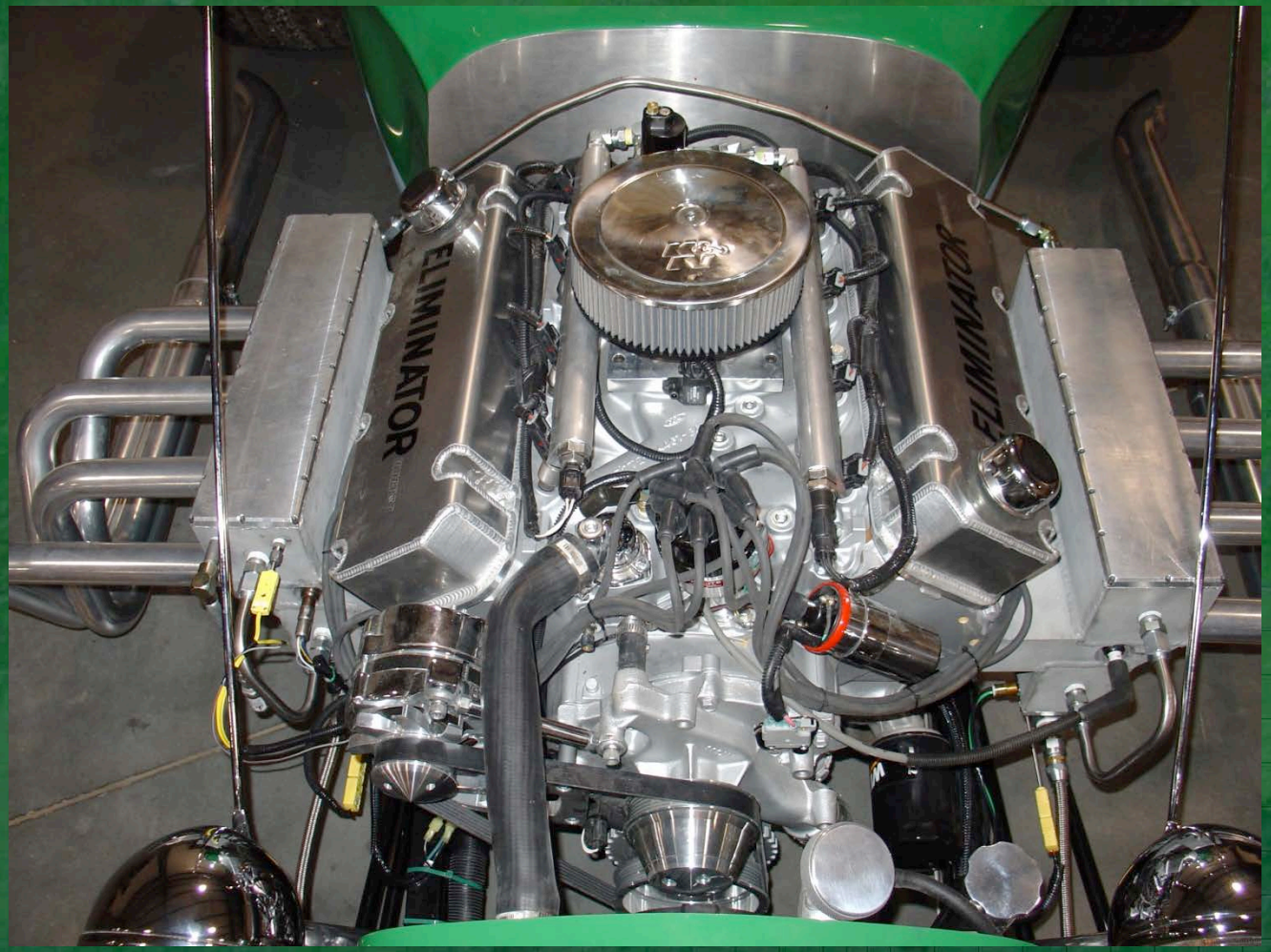
Ammonia to hydrogen fuel

- Cracking can be sustained by use of exhaust heat



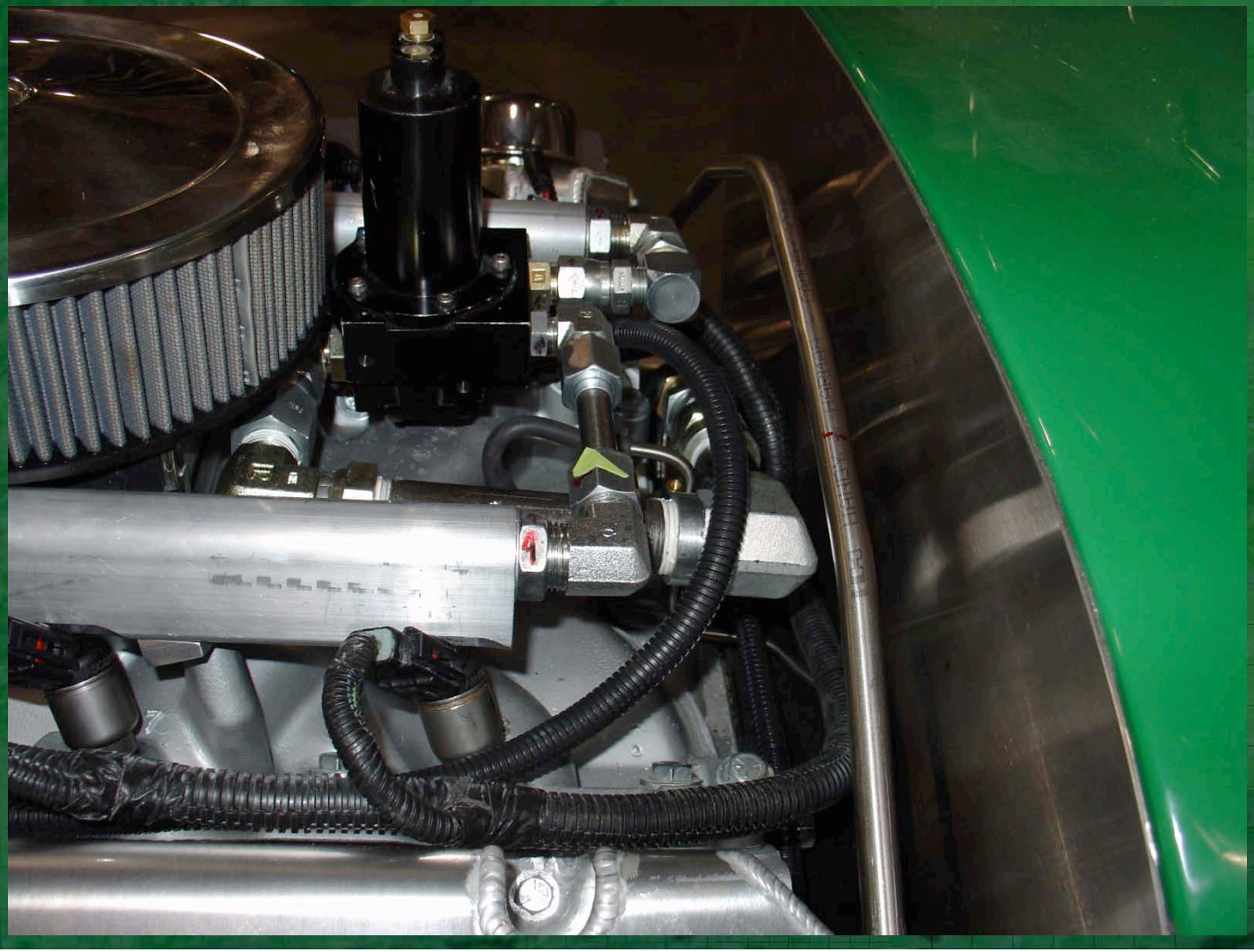
Hotrod

- Engine with fuel injection and fuel pressure regulation



Hotrod

- Pressure regulator for fuel injection



Hotrod

Controls are key to success

Hotrod

- Hotrod with no exhaust

Hotrod

- Dressed for the show but no fuel tank

Hotrod

- Tank installed

Hotrod

- Ready to show

What are the next steps?

- Complete tuning and testing
- Fully characterize cracker performance
- ‘Tweak’ the design
- Demonstrate performance
  - acceleration
- Do emissions testing

Clean cooking by Chef Norm Olson

Thank You!