



Amateur Water Rockets

'Lemonade Bottle Rocket Science'

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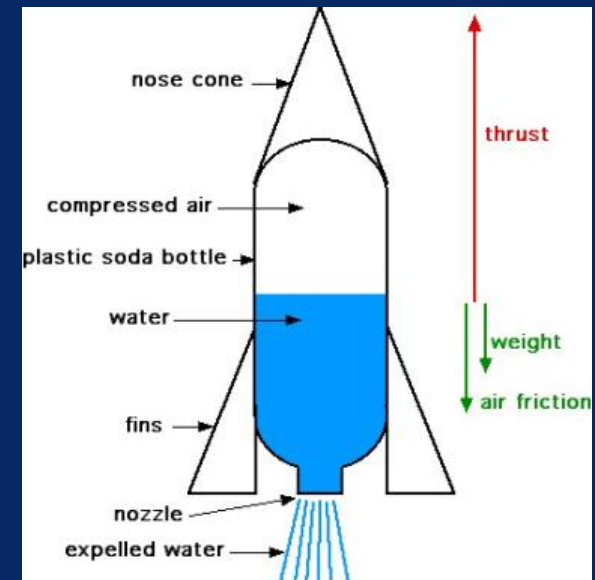
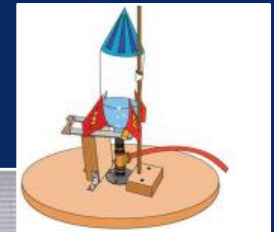


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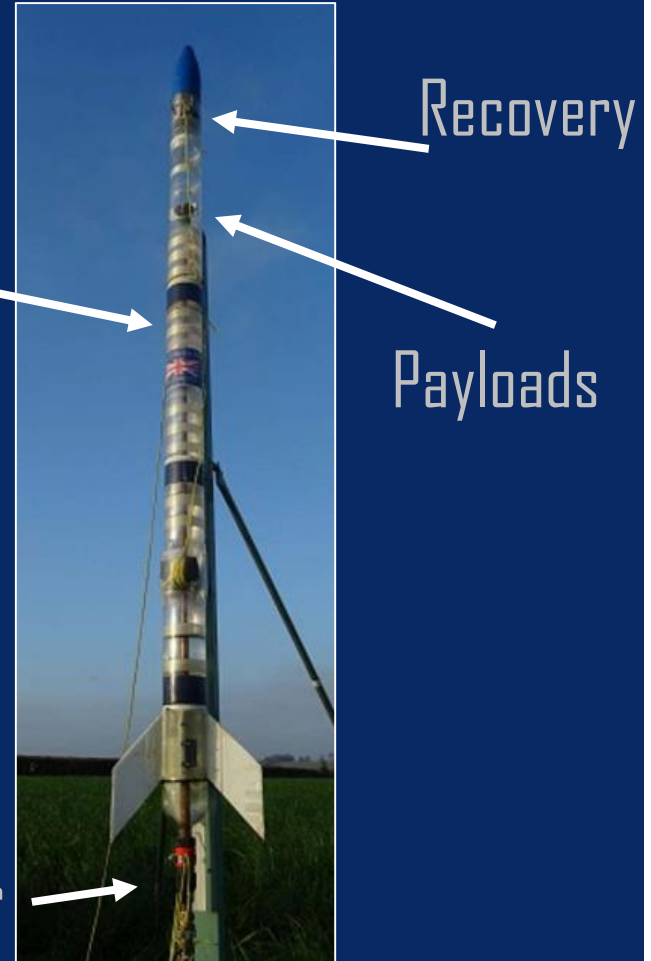
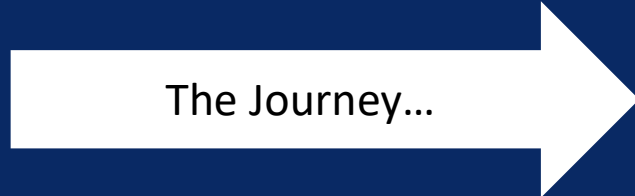
An Overall Introduction

- What is a Water Rocket?
- Perceptions?
- How do they work?
- My Early experiences & efforts.





My Presentation

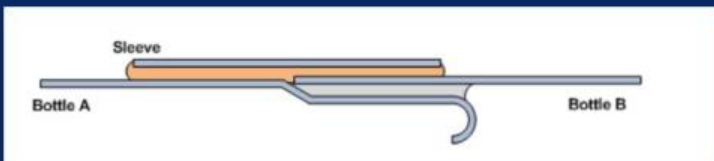


- Look at the most recent developments.
- Quest for Altitude.



Improving the Pressure Vessel

- Using the common thread between 2l bottles & kit nozzles I wanted to make larger rockets where all the bottles make up the pressurised volume.
- Testing and understanding materials was key- Frequent Tests.
- First discovery of online community and resources they provided.
- Process of 'Splicing' was tried, tested and adopted successfully.

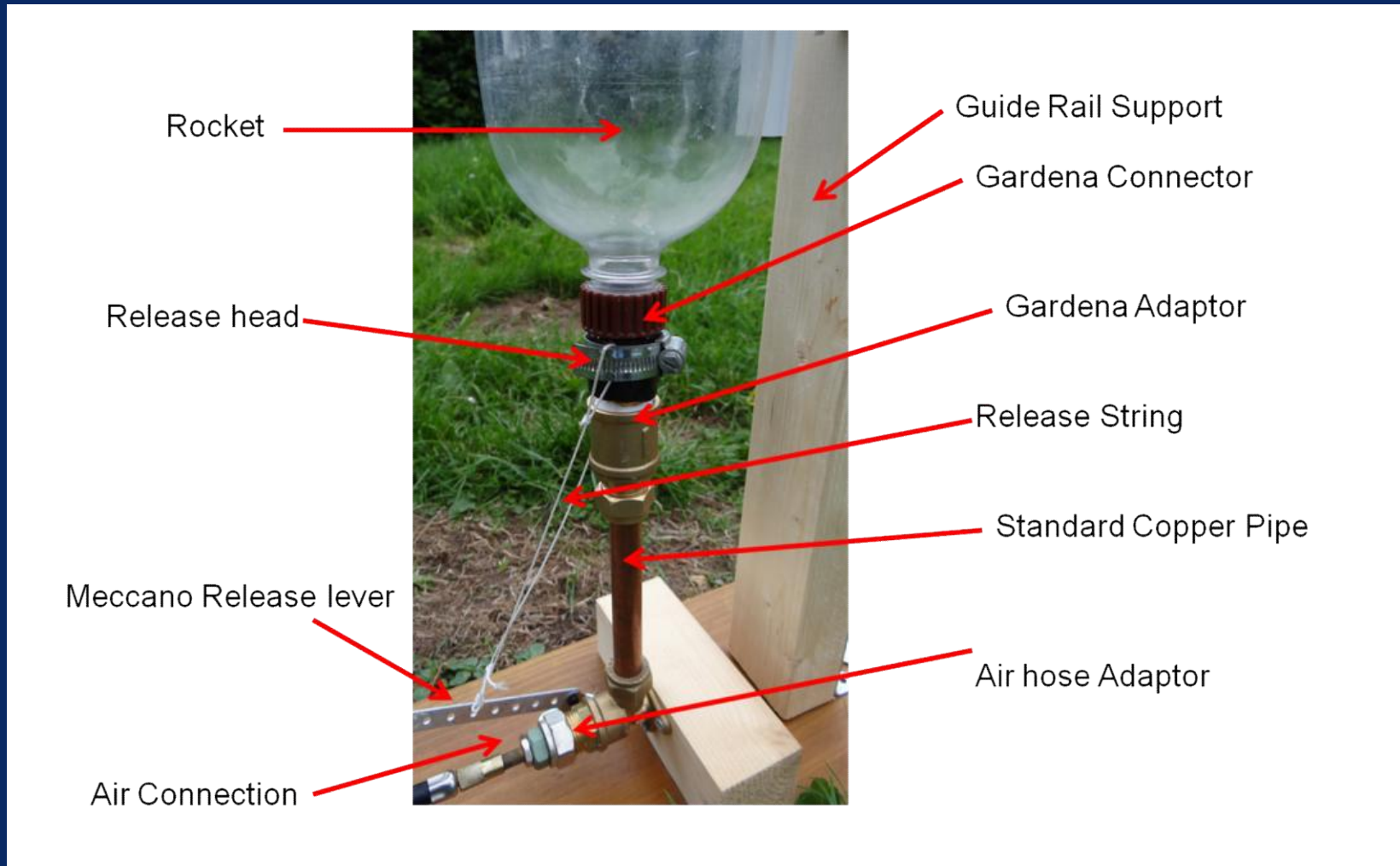




Developing the Launcher

- Alongside bottle research, a new launcher was constructed. (similar design to Maplin's kit).
- Guide rail made launch procedure safer, along with release valve.
- Launcher was more robust- 20m airline & new compressor included in the design.
- Used common materials- all from local DIY shops.
- Larger rockets required a larger nozzle- development of adaptor.

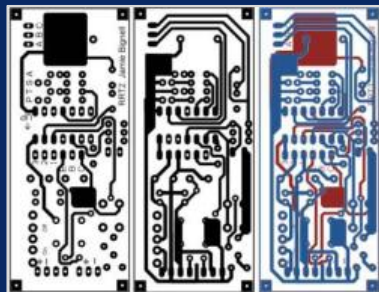






Recovering the Rocket from Apogee

- Rockets flight profile was now effective- enough to reach scary altitudes!
- Fins and nosecone were further developed, rocket was a lawn-dart!
- Online research lead to construction parachute release mechanism.
- Different parachutes tried with Side-Deployment mechanism.
- Success (at a lot of expense!)- wanted to automated the procedure.
- Development of Flight Computers. Investigation into trigger options, servo modes etc.
- Most recent FC now has emphasis on Software.





Payloads

- With a successful recovery system- more fragile equipment can be added.
- Examples: secondary parachute, camera, altimeter or eggs!
- Still looking at new features to add.





Pressure vs Volume

- Further increase altitude- reinforced bottles.
- Fibreglassing- time-consuming, expensive, lost advantages of PET bottles.
- Principle worked- still limited by equipment.
- Mothballed, started looking at further increasing volume with same nozzle size.
- Using Boosters allows more effective use of +15l volume- researched more online. Proven design adopted.
- Booster mechanism designed and launcher adapted- high specific impulse.
- Adapted launcher uses 22mm PVC pipe, standard plumbing fittings and Araldite!





Fibreglass Launches

For video, Please see

<https://www.youtube.com/watch?v=ultlyCTTfFO>

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Thanks for Listening.



Any Questions?



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