



Suggestions for a Successful Entry

Some Thoughts on Having
a Successful TARC
Experience

What Makes a Winning TARC Team and Entry?

- Start Early
- Start Simple
- Many Hands Make Light Work
- Make Use of the Tools
- Practice, Practice, Practice
- Learn From Your Mistakes
- Do Not Get Discouraged

What Makes a Winning TARC Team and Entry?

- KISS: Keep It Simple Silly
- Determine the Real Goal
- BP vs AP Motors
- Getting the Straightest Flight Possible
- Take Your Time and Do it Right
- Safety Issues

Start Early

- It takes longer than you think
- Do your homework; your rocketry homework, that is!
- Allow time for multiple designs, simulations and test flights
- Allow time to make mistakes, and time to correct them

Start Simple

- Don't start with building and flying your 'full up' rocket
- If new to rocketry, build and fly a single and two stage rocket (and maybe a cluster rocket)
- For two stage rockets, test the upper stage before flying both stages
- Practice clustering and staging without eggs or expensive hardware, then try it all together once you've mastered the basics

Many Hands Make Light Work

- Divide up the work load; don't let one team member try to do the whole thing!
- Some areas that could be split up:
 - Design and simulation (tools specialist)
 - Ignition and Staging
 - Recovery
 - Airframe construction
 - Payload design and construction
 - Fundraising

Make Use of the Tools!

- The RocSim and SpaceCAD software are excellent design and simulation tools
- Another useful simulation tool is wRASP
- The internet is a wonderful tool: there is a LOT of rocketry information out there
- Make use of any available mentors

Practice, Practice, Practice

- The most successful teams in the 2003 and 2004 TARCs averaged over a dozen test flights each
- Test each design concept and module first, then all together
- Keep notes on your test flights!

Learn From Your Mistakes

- Don't be afraid to make mistakes
- Evaluate what went wrong and why
- Document the problem and the fix!
- Implement the correction(s)
- Try again

Do Not Get Discouraged

- Winning teams in the previous TARC all suffered failures along with successes
- Don't be afraid to ask for help – use the mentors

Keep It Simple Silly (KISS)

- Complexity adds more chances for something to go wrong
- This does not mean the simplest rocket design will win
- KISS means to implement the simplest design that will achieve the desired goals
- Most of the winning rockets in past years were pretty straightforward designs

What are the Real Goals?

- To design, build and successfully fly a rocket carrying one or two eggs to a duration of exactly 60 seconds
- To do the above in a ***consistently repeatable*** manner
- This means you are building for reliability and consistency, not ultimate efficiency or performance or sophistication!

BP vs. AP Motors

- Black powder motors ignite more easily and quickly than AP based motors
- Black powder booster motors can directly ignite black powder upper stage motors
- If you use an AP based core motor in the booster stage then you must use electronic ignition in the upper stage
- Upper stage AP motors are not allowed

Getting the Straightest Flight Possible

- A straight flying rocket is a key to obtaining consistent flights
- Take extra care aligning everything external to the main body: fins, external boosters, launch lugs, etc.
- Make sure your rocket gets off of the pad fast enough: > 10 meters/sec is a good rule of thumb

Take Your Time and Do It Right

- Don't rush construction work; be patient
- Don't be afraid to start over and repeat a step – especially if you are unhappy with the current results
- Do a 'trial run' of any construction step – test fitting parts, sub-assemblies, etc.
- Make sure you are clear on each step

Safety Issues

- Wear non-latex disposable gloves anytime you are working with epoxies or cyanoacrylate (CA, super glue)
- Always wear safety goggles when using any type of power tool
- Remember that hobby knives and single edge razor blades are **SHARP!**

In Conclusion...

- Start early
- Don't rush
- Use the tools
- Practice, practice, practice...
- Don't get discouraged
- Keep it simple
- **Have fun!!**