



SOUTHWEST OHIO ROCKETRY ASSOCIATION (SORA) NATIONAL ASSOCIATION OF ROCKETRY SECTION #624 ANNUAL REPORT YEAR 2025

By Rick Forrester, SORA Vice-President

WOW! Year 2025 was a bizarre year for the club. The Lebanon Library, where we hold our Tuesday night monthly meetings, began an extensive remodel. This required several meetings to be moved to the Loveland Library. Luckily, the new space was as good as Lebanon's for our 28 members to teach young rocketeers, conduct rocket builds, watch professional instructional videos, present hands-on lectures, and solve rocketry issues. The Lebanon Library is scheduled to re-open in Jan/Feb 2026. We also agreed to move our monthly indoor meetings to Thursday nights (starting in March) to reduce conflict with Dayton's Wright Stuff Rocketeer Club, who also have their meetings scheduled on Tuesdays.

A big shoutout THANKS to Robb (President) for running the 12 business/training meetings, running range safety at the launches, and managing the interfacing with the various park, NAR, and governmental organizations. He was also pivotal for obtaining a \$1000 donation from the Optimus Club. Thanks to Rick (Vice-President/Treasurer) for also running range safety, for keeping finances on track, managing the launch database, and writing launch/annual reports. Thanks also go to Harold (Secretary) for writing monthly meeting reports and for presenting multiple lectures throughout the year. We know a lot more about parachute science because of his lectures and demonstrations!

The weather gods were certainly giving us a run for our money with a THIRD of our launches cancelled due to bad weather. But the launches we did have were great. Here are the overall stats for the year:

The Club conducted 8 launch days, which was the lowest since 2019. Even the rescheduled launches were often cancelled due to the weather!

There was a total of 292 rockets launched, which is down from 2024's total of 424. 292 of the flights were 100% fully successful from launch to touchdown. This corresponds to an overall 78 % success rate which is slightly lower than 2024's 84% data. As usual, the majority of unsuccessful flights involved parachute problems.

There were 69 launch rocketeers versus 149 in 2024. A "rocketeer" is counted only once per launch date even if they launch multiple rockets during the day. 99% of our rockets were recovered, which is better than 2024's percentage of 98%. We are getting better in managing chute size, delay times, and compensating for drift. We had good attendance from visitors and family members with 138 in 2025 compared to 211 in 2024. Given the number of cancelled launches, we actually had a greater number of visitors/family per launch.

SORA participated in the Hisey Fall Festival and helped educate dozens of visitors on the STEM (science, technology, engineering, math) benefits of model rocketry.

We did not have an American Rocketry Challenge team in 2025, but we did have a 4-H group launch their rockets in July. We had one SORA rocket competition concerning launching a "brace" of rockets. A brace is where a rocketeer tries to launch rockets in order of Total Impulse. Rick Forrester won the brace for launching rockets with the following Impulse levels: 1/8A, 1/4/A, 1/2A, B, C, D, and E all on the same launch day in August. There were two NARTREK (**N**ational **A**ssociation of **R**ocketry **T**raining **R**ocketeers for **E**xperience and **K**nowledge) certifications (Bob). NARTREK is a national educational program designed to have students build/fly/certify rockets with specific characteristics.

It was our best year ever for high power rocketry in the club. Rick Forrester achieved his Level 2 national certification in April with a LOC/Precision HyperLoc 300 on a J420 Redline motor using a 14 second delay. It achieved an altitude of 4,295 feet. Bob Maxwell achieved his Level 2 certification in November with a large LOC/Precision 5.5" diameter I-Roc using a J270 White Lightning with an 8 second delay. He reached an altitude of 2,847 feet. In compliance with our agreement with the park board and due to the fact that the park is within 5 nautical miles of an airport, HPR rockets cannot be flown at Hisey. So, Rick and Bob launched their rockets at the Cedarville launch site managed by Dayton's Wright Stuff Rocketeers Club. That site has a 10,000' altitude waiver with the Federal Aviation Administration. Several additional club members have completed building their Level 1 HPR rockets and are scheduling their launches for 2026. We wish them the best of science and luck!

The Club improved on launching "complex" rockets (clusters or multi-staged). We had 14 multi-staged (versus 10 in 2024), and 4 clustered versus 2 in 2024 rockets being launched. It is nice to see the successful launches of more complex rockets showing how the knowledge base of the club is expanding.

From a safety perspective, there were no ground fires, no medical incidents, nor any damage to vehicles. Safety is our primary concern and we did a great job in 2025!

Money, money, money! We took in \$488 in donations or purchases of t-shirts/mugs, food/drink. This is down from \$255 in 2024 but given we had only eight launches, we did very well. The Club also received a \$1000 donation from the Optimus Club of Lebanon Ohio that helped pay for educator packs of rockets for "build nights", rocket giveaways at launches to first time rocketeers, and supplies for maintaining the launch pads and wireless launcher modules.

Now, on to motors....

The sum of Total Impulse (power) of low/mid-power motors used in 2025 dropped from 2024 (again due to the fact 2025 only had 8 launches compared to 15 in 2024). In 2024 the Total Impulse was 6605 newtons and in 2025 we had 4313. However, given we had only 53% of the launches compared to 2024, we had a ratio of 65% of the Total Impulse comparing the two years. This means for an average launch, we actually did better than 2024. We used more powerful or more motors per launch day.

There were a total of 310 motors used in 2025 which includes two/three staged rockets and clustered rockets. "C" impulse motors were the most popular (same as 2024). Compensating for the fact that 2025 only had 53% of launch days as 2024, proportionally more "B" motors were used in the launches followed by F, C, then D. Proportionally, less 1/4A, 1/2A, A, E, and G motors were used.

As scientists, we take very seriously any rocket launch that does not perform as planned. We learn from mistakes and make corrections to our standard operating procedures and construction techniques. Two computer design programs were used by our members in 2025 - RockSim by Apogee Components and the open source OpenRocket. ThrustCurve.org was used out in the park to match rocket characteristics (weight, diameter, etc.) to known types of motors to give the best flight.

As typical of every year since we started keeping records, parachute/shock cord issues were number one with 34 of our rockets having these issues. The most common failure was the shock cord breaking thereby not having the chute inflate to slow the rocket body down to land safely. In 2024, the most common issue was failure of the parachute to eject out of the airframe. So, we were a little different than the previous year. The second most popular issue was shroud lines attached to the chute becoming tangled or ripping out of the chute where they are attached.

Motor and retainer issues were next with 16 total failures. The most popular motor problem was improper thrust (underpowered or overpowered) with 8 issues. Seven CATOs (Catastrophe On Take Off) were due to motors that were either made poorly by the manufacturer, old age of the motor, or improper storage. The result is usually a crack inside the motor that runs the full length of the motor through the propellant grains, delay charge, and the ejection charge. Instead of igniting from the bottom of the motor and then igniting each section in sequence, with a crack, all three sections can ignite at the same time resulting in a CATO and/or RUD (rapid unscheduled deconstruction) as NASA call it. One rocket lost its motor retainer after ignition.

Construction issues had 4 rockets stuck during launch rod (too tight of a launch tube), 2 with unstable center of gravity/center of pressure, 2 with body tube issues (nosecone separation from rocket), and one with a fin loss during flight.

Three rockets flew fine but were lost in high weeds or trees.

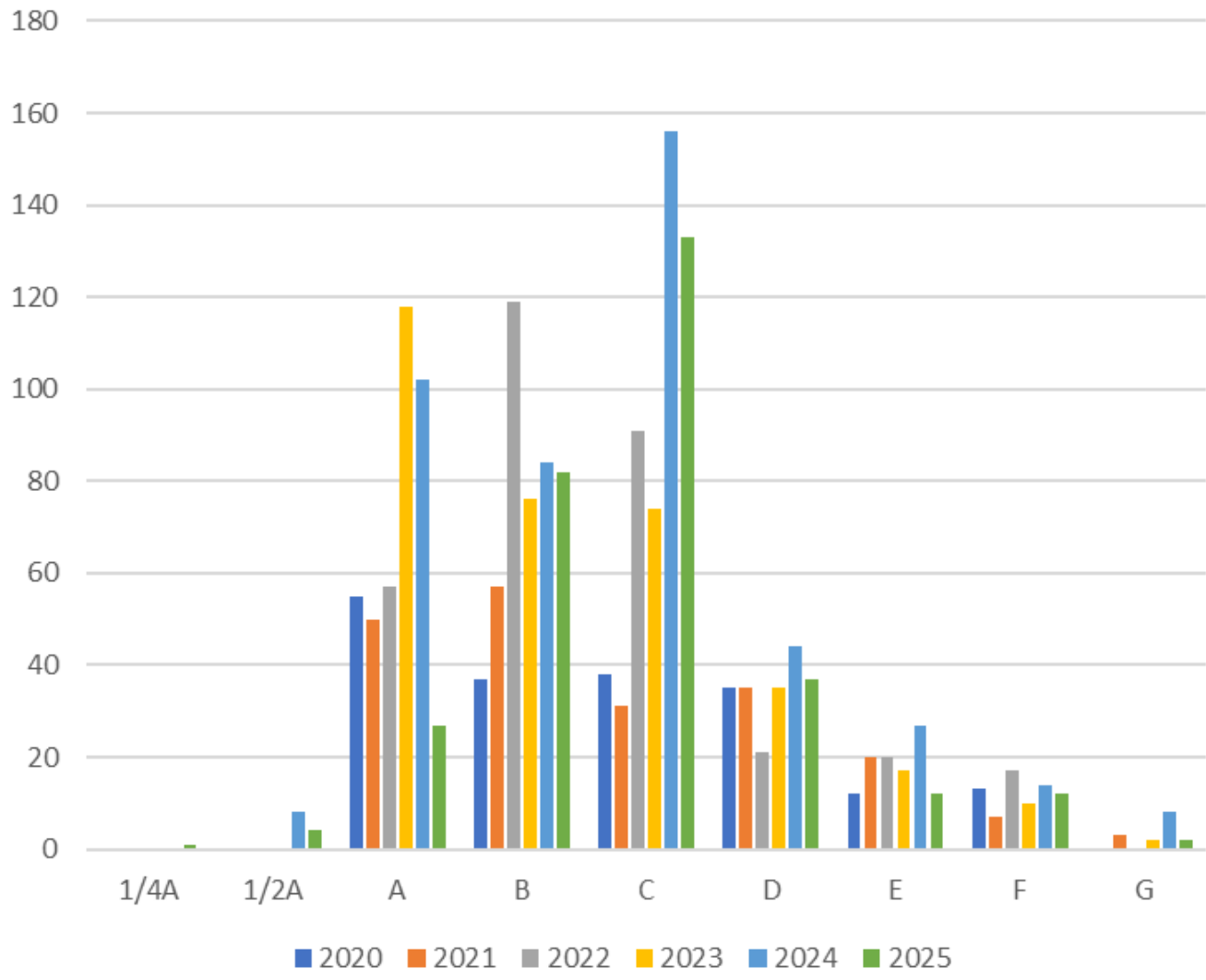
Overall, these were pretty "typical" failures. We did fall short of our stretch goal for perfect flights of 90% but we plan on doing even better in 2026!

DATE	# Launches	# 100%Fully Successful Flights	% Successful	# Rockets Recovered launched this day	% Recovered	Launch Participants	# Family /Friends / Observers	SORA Competitions	NARTREK Cert Launch Attempts	Clustered	Multi-staged	TARC Launch Attempts	# Groups: Scouts 4-H Home School Super Saturday
1/27/2025, weather cancel no launch													
2/9/2025, weather cancel no launch													
3/9/2025, weather cancel no launch													
4/13/2025	43	36	83.7	42	98	9	20	0	0	0	0	0	0
5/11/2025	33	21	63.6	33	100	10	4	0	0	0	2	0	0
6/8/2025	41	31	75.6	41	100	10	6	0	0	1	0	0	0
7/6/2025	41	31	75.6	39	95	11	8	0	0	0	1	1	1
8/10/2025	42	37	88.1	42	100	11	6	1	0	1	3	0	0
9/14/2025	31	23	74.2	30	97	7	2	0	0	2	3	0	0
10/4/2025	32	26	81.3	32	100	4	75	0	0	0	0	0	0
11/23/2025	29	24	82.8	29	100	7	15	0	0	0	5	0	0
12/7/2025, weather cancel no launch			#DIV/0!		#DIV/0!				2				
TOTALS	292	229	78.4	288	99	69	136	1	2	4	14	1	1

DATE	Motors									Ground Fires	Medical Incidents	Damage to Vehicles or Buildings	Donations / purchases
	1/4A	1/2A	A	B	C	D	E	F	G				
1/27/2025, weather cancel no launch													
2/9/2025, weather cancel no launch													
3/9/2025, weather cancel no launch													
4/13/2025	0	2	8	6	22	2	2	1	0	0	0	0	\$0.00
5/11/2025	0	0	4	3	18	6	0	3	0	0	0	0	\$70.11
6/8/2025	0	0	3	15	15	7	1	1	0	0	0	0	\$135.00
7/6/2025	0	0	2	16	17	3	3	1	0	0	0	0	\$87.00
8/10/2025	1	2	7	13	12	5	3	1	1	0	0	0	\$36.00
9/14/2025	0	0	1	16	12	5	2	1	1	0	0	0	\$25.00
10/4/2025	0	0	1	8	15	4	1	3	0	0	0	0	\$44.00
11/23/2025	0	0	1	5	22	5	0	1	0	0	0	0	\$91.00
12/7/2025, weather cancel no launch													
TOTALS	1	4	27	82	133	37	12	12	2	0	0	0	\$488.11

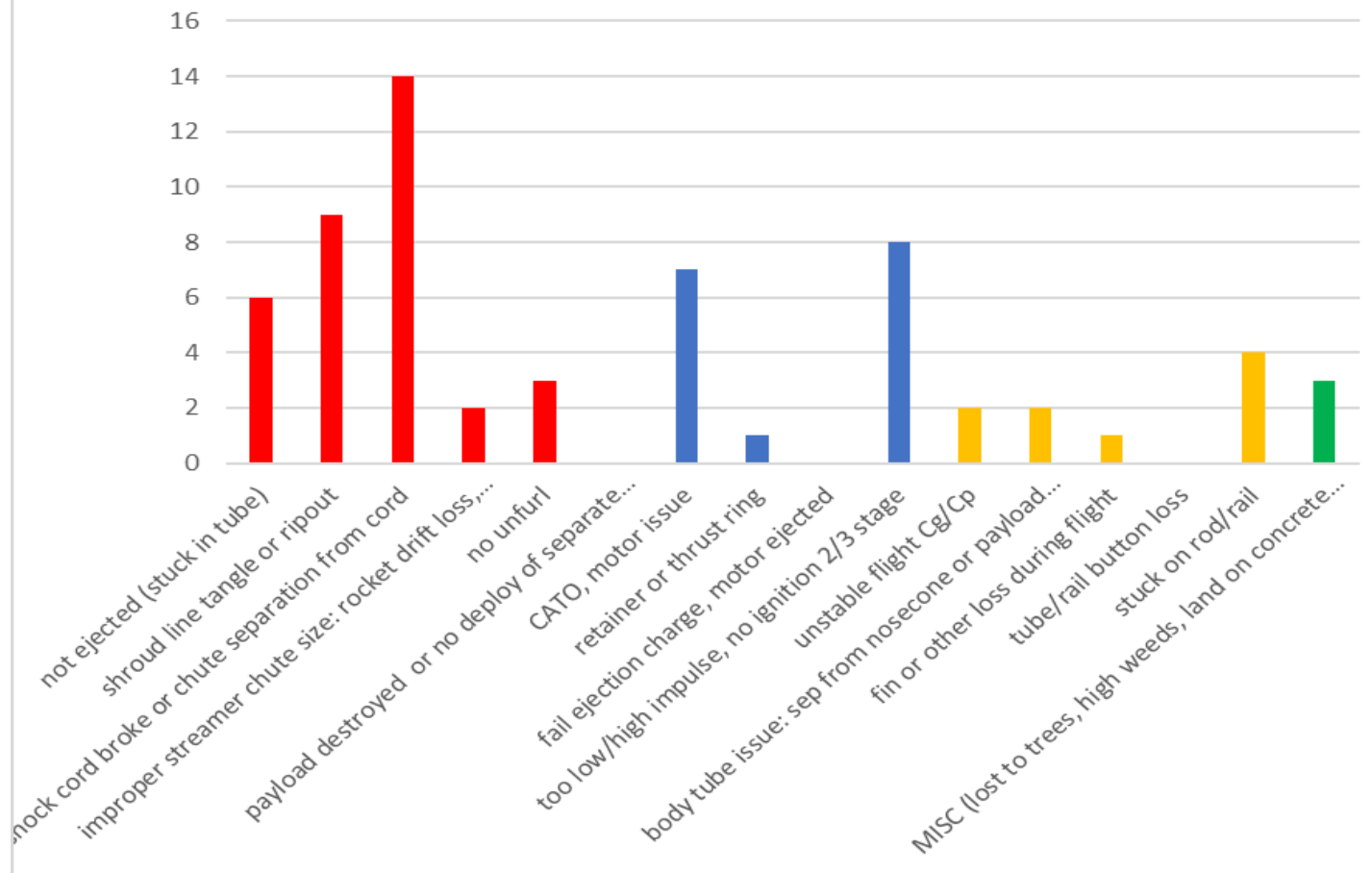
DATE	FAILURE MODES															
	PARACHUTE						MOTOR				CONSTRUCTION				OTHER	
	not ejected (stuck in tube)	shroud line tangle or ripout	shock cord broke or chute separation from cord	improper streamer chute size: rocket drift loss, hard impact	no unfurl	payload destroyed or no deploy of separate payload chute	CATO, motor issue	retainer or thrust ring	fail ejection charge, motor ejected	too low/high impulse, no ignition 2/3 stage	unstable flight Cg/Cp	body tube issue: sep from nosecone or payload section, not parachute or cord issue, 2/3 stage did not release, etc.	fin or other loss during flight	tube/rail button loss	stuck on rod/rail	MISC (lost to trees, high weeds, land on concrete complete destruction, etc)
1/27/2025, weather cancel no launch																
2/9/2025, weather cancel no launch																
3/9/2025, weather cancel no launch																
4/13/2025	2	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
5/11/2025	2	0	3	0	2	0	0	0	0	3	1	0	0	0	1	0
6/8/2025	0	1	2	1	1	0	0	0	0	0	1	0	1	0	2	0
7/6/2025	0	4	3	1	0	0	1	0	0	0	0	0	0	0	0	1
8/10/2025	0	1	1	0	0	0	0	0	0	2	0	1	0	0	0	0
9/14/2025	1	1	2	0	0	0	2	0	0	2	0	1	0	0	0	1
10/4/2025	0	1	3	0	0	0	0	1	0	1	0	0	0	0	0	0
11/23/2025	1	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0
12/7/2025, weather cancel no launch																
TOTALS	6	9	14	2	3	0	7	1	0	8	2	2	1	0	4	3

Motors



Green is 2025 data

2025 Rocket Failure Modes



Red = parachute and shock cord issues

Blue = motor issues

Orange = construction issues

Green = miscellaneous (lost in weeds, unretrievable in tree, landed on concrete with severe damage to rocket, etc.)



Robb's nicely built Space Shuttle



X-15 rocket plane



Bob's successful High Power Level 2 I-Roc



Robb at launch control



Dave's Initiator on a F20 motor



Rick's high power Level 2 HyperLoc 300 up at Cedarville



Cars lined up on the field



Chirp! Chirp! Captain Cicada ready to fly. (No harm done to him/her!)



Looking cool as a new rocketeer!



Keeping cool under the shade



Harold's collection of rockets built from scratch



Perfect helicopter landing of Harold's Elnath Explorer

Yes, it is supposed to do that! Helicopter fins give a soft nosecone-first landing



Dave's Totally Tubular



Calvin and his first rocket. Well done!



Transporter glider rocket



Rick's AGM-84 on the high power pad



Being safe on the high power pad – fire blanket and water extinguisher and a perfect launch.



Wiring up a two-motor cluster rocket.



Electronic launch controller modules



Mars lander ready to head into orbit.

If you have ideas for year 2026, let us know. We are always open to suggestions!

Look for announcements regarding business/build meetings at the Loveland or Lebanon Library, monthly launches at Hisey, and special events.

Website: <https://rocketryohio.com>

Thanks for a bizarre and fun year!

Our club motto – “Sapientia ducet ad astra” – Wisdom leads to the stars!

SOUTHWEST OHIO ROCKETRY ASSOCIATION - NAR Section 624