CONTESTANT BRIEFING 2014

Welcome

Team America Rocketry Challenge 2014

Co-Sponsored by:

Aerospace Industries Association

Audrey Murphy, TARC Contest Director

National Association of Rocketry

Trip Barber, TARC Contest Director

Why We're Doing It

- Much of the U.S. aerospace workforce is nearing retirement.
- Eight of the top ten majors associated with the highest median earnings per year are in engineering.
- The median annual earnings of an engineer with a bachelors degree is $75,000
- The median annual earnings of an aerospace engineer is $87,000
- We have already seen a number of students who took part in TARC graduating from college and entering the aerospace workforce.
- **Model rocketry is a fun way to inspire students to study math and science and pursue careers in aerospace!**

Event Background

- 12th year of a largest model rocket contest in the world
  - 712 teams, 5,000 students, from 48 states and U.S. Virgin Islands
  - 413 teams submitted qualification flights
  - 101 teams selected to come to the fly-off, representing 25 states and the U.S. Virgin Islands

Supporters

- Great Meadow Outdoors Foundation – Our host
- AIA and its member companies – The prizes and the staff that handled all the PR and team entries
- NAR – Team mentors nationwide and the 105 volunteer rocketeers running the flying range
- NASA
- Department of Defense
- American Association of Physics Teachers
- 21 AIA Member Aerospace Companies

And many educational organizations nationwide

TARC Sponsors

Activities

- Team Presentation competition starting at 11:00
- Team Rocket-Building competition starting at 10:00
- Free lunch and ice cream social for participants
- Free bottled water (NAR Info Tent)
- Free BBQ dinner for participants ($20 for others)
  - Your credentials are your meal ticket

Best Dressed Booth

- Be sure to show up to Great Meadow decked out in team uniforms/costumes to be considered for this year's award!
- **Where:** Photo Booth – Exhibit Area
- **When:** 1:00 pm – 2:00 pm
- Winning team will be announced at the awards ceremony at the end of the day.
- Be sure to take your own photos and share them on TARC's Facebook page and tweet them @RocketContest!

Prizes

- $60,000 in cash to top 10 teams
- Winning team gets trip to Farnborough Air Show in July courtesy of Raytheon
- Special Award Plaques: Best Rocket Craftsmanship, Best-Dressed Team, Spirit of TARC, Best Mission Design
- Presentation and rocket-building competitions

Awards Ceremony

- Starts at 5:00 PM, lasts no more than 1 hour
- Significant VIP and media participation
  - Dr. Mica Endsley, Chief Scientist of the Air Force
  - Dr. Roosevelt Johnson, Acting Associate Administrator of Education, NASA
  - Aerospace Executives
- No pre-assigned seats – you have to be there to find out who won!
- We will announce the **TARC 2015 Rules**

Tweet with us!

@RocketContest

#rocketcontest

EVENT OPERATIONS

NAR Event Operations Staff

- Contest Director: Trip Barber
- Registration: Eric Robinson
- Range Operations: Jonathan Rains
- Range Equipment: Adam Martin & Mitch Guess
- Results: Dr Chris Kidwell
- Awards Ceremony: Dr John Hochheimer
- Range Safety Officers: Dr Jay Apt & Dr John Langford
- Chief Timer: Jim Barrowman
- Public Address Announcer: James Duffy
- Presentation Competition: Kevin Johnson
- Rocket-building Competition: Dr Carl Curling
- And 92 others -- all volunteers

Special Notes

- **We will not be posting scores from flyoff rounds, the winner will be a surprise**!
- If there are afternoon thunderstorms that force suspension of flying, only 1 flyoff round (24 teams) will be held
- Perfectflite altimeters of both types available at NAR booth
  - Emergency replacements only until 4:00, then first-come
- NAR booth also selling TARC T-shirts ($15), and NAR books and emblematic items
- Hangar11 Hobbies will be selling rocket motors, parachutes, etc on field next to NAR booth
- Please do not stay in the student “prep area” after you have flown, make room for follow-on teams

Presentation Competition

- Optional event, $500/300/200 prizes for 1st – 3rd places, courtesy of SpaceX Corporation
- 12 teams each do 6-minute presentation plus 2 minute Q&A on their TARC project to judging panel
  - Done in the "Spring House" building, not in a tent
  - Starts 11:00 AM, order of presentations already published
  - Order will be adjusted to let any teams that make flyoff go first
- Electronic presentations must be turned in by 9:30 PM Friday to Kevin Johnson for loading on our computer
- If you are one of the 12 but are not ready or want to withdraw, tell us tonight by 9:30 so alternates can present
- All are welcome to attend and watch – except teams that are presenting cannot watch others until after they present their own

Presentation Competition

Presentations start at 11:00 AM, approximately 4 per hour

Team #	Team Name	City	State	Order
14470	Harlingen HS Engineering & Tech	Harlingen	TX	1
14006	Deford Dazzlers 4-H – Tulsa MSUE	Deford	MI	2
14155	Georgetown 4-H	Georgetown	TX	3
14282	Northview HS (Team 4)	Sylvania	OH	4
14036	Immaculate Conception School (Tm 4)	East Aurora	NY	5
14207	West Forsyth HS	Clemmons	NC	6
14078	St Vincent-St Mary HS (Team 1)	Akron	OH	7
14089	Newark Memorial HS (Team 5)	Newark	CA	8
14031	Math for Service (Team 2)	Irvine	CA	9
14280	Northview HS (Team 2)	Sylvania	OH	10
14002	Girl Scout Troop 353	San Gabrield	CA	11
14053	Frenship HS	Wolfforth	TX	12

Rocket-Building Competition

- Optional event, two $500 prizes courtesy of SpaceX Corporation, plus trophies
- 32 teams each have 70 minutes to build a flyable rocket solely from the bag of parts provided
  - Done at a tent up in the exhibit area
  - 8 teams at a time in 4 “windows” starting at 10:00
  - Basic building supplies provided, may bring own tools
  - Sign up Friday night with Dr. Carl Curling, standbys taken for teams that end up making the flyoffs
- Judged by NAR for creativity of design (1 prize) and quality of workmanship (1 prize)

Topics

- Safety
- Schedule
- Flight Procedures
- Event Rules

Safety First

- Follow the Range Safety Officer (RSO) directions
  - Don’t make us shout!
- Listen to the PA and FM radio 92.9 MHz, **stay off FRS channel 7** (NAR/AIA operations)
- No one within 30 feet (4 pads) of a liftoff
- No one on the flying field unless flying
- Do not tilt launch rods/rails toward spectators
- Do NOT try to recover rockets from power lines, or from trees above where poles reach

NAR Safety Code

- Key to the hobby's safety – always in effect
- Lightweight non-metal nose, body & fins
- Certified, unmodified commercially-made motors
- Everyone 30 feet or more away at launch
- Launch electrically within 30 degrees of vertical
- No launches into clouds or with winds >20 mph
- Wait 60 seconds to approach pad after a misfire
- All rockets must have a recovery system

Event Schedule

6:30	Check-in opens for rockets in first launch window and egg issue opens
7:00	Pads open for loading on Goddard range
8:15 – 12:30	Contest flying (5 “windows”, 45-60 min each)
10:00 – 3:00	Rocket-building competition
11:45 – 12:30	Available for allowed initial-round re-flights
11:00 – 2:00	Presentation competition
1:00	Deadline for rocket returns from 1st rounds
1:15	Notification of 42 teams selected for flyoff
2:30 – 4:00	Flyoff round 2nd flights for 42 teams (2 rounds)
4:15 – 4:45	High-power rocket flight demonstration
4:30	Deadline for rocket returns from flyoff rounds
5:00	Award ceremony
6:00	BBQ dinner

Flight Windows

- Check rocket in before “load time” for “flight window”
- May not load rocket on pad until previous round on that range is over
- Must fly during assigned “window” – be ready

Round	Checkin Time	Load Time	Flight Window
Goddard 1	**6:30 AM**	**7:00 AM**	**8:15 AM – 9:15 AM**
VonBraun 2	**7:15 AM**	**8:00 AM**	**9:15 AM – 10:00 AM**
Goddard 3	**8:00 AM**	**9:15 AM**	**10:00 AM – 11:00 AM**
VonBraun 4	**9:00 AM**	**10:00 AM**	**11:00 AM – 11:45 PM**
Goddard 5	**9:45 AM**	**11:00 AM**	**11:45 PM – 12:30 PM**
Flyoff Goddard 6	**1:15 PM**	**1:15 PM**	**2:30 PM – 3:15 PM**
Flyoff VonBraun7	**2:00 PM**	**2:00 PM**	**3:15 PM – 4:00 PM**

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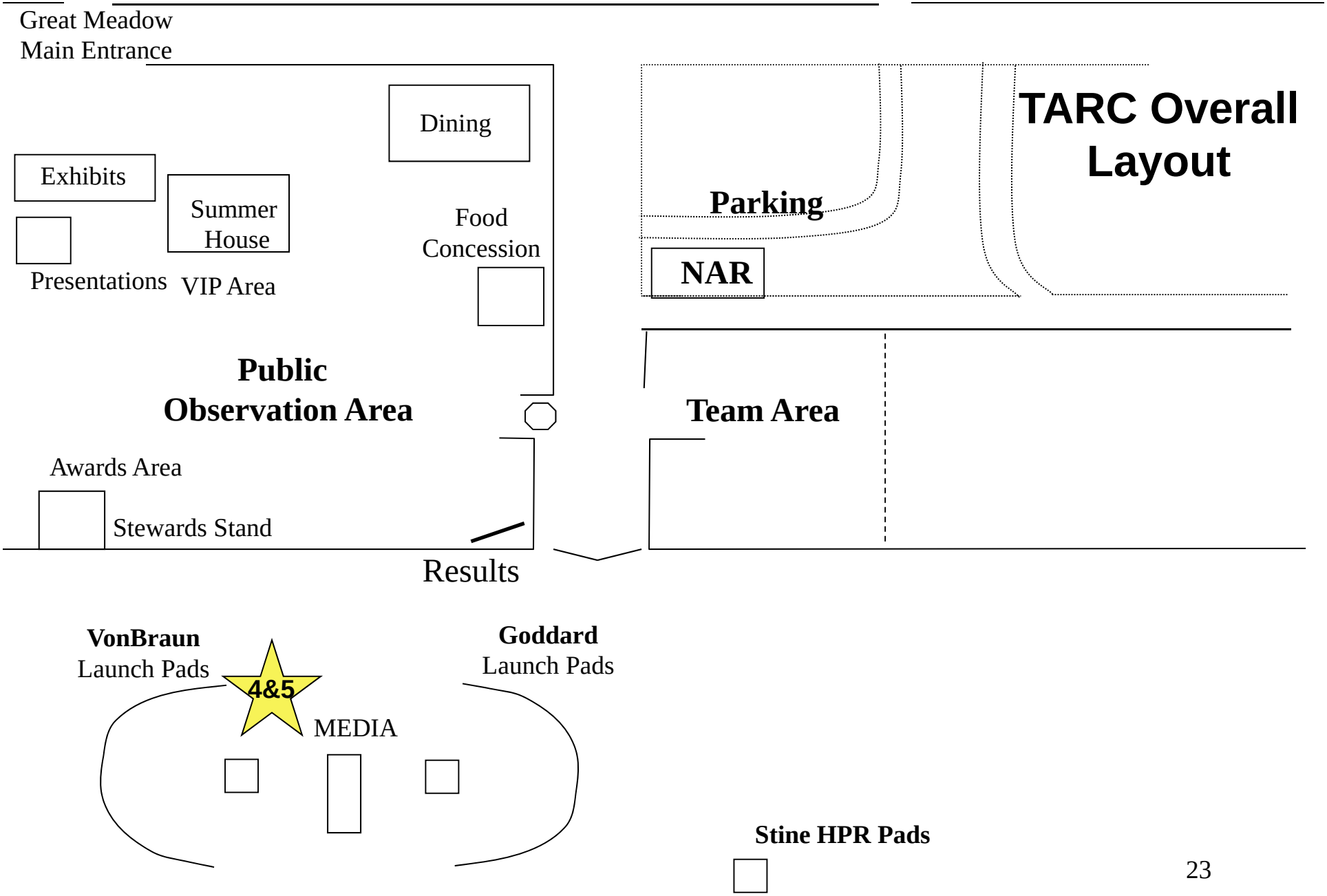
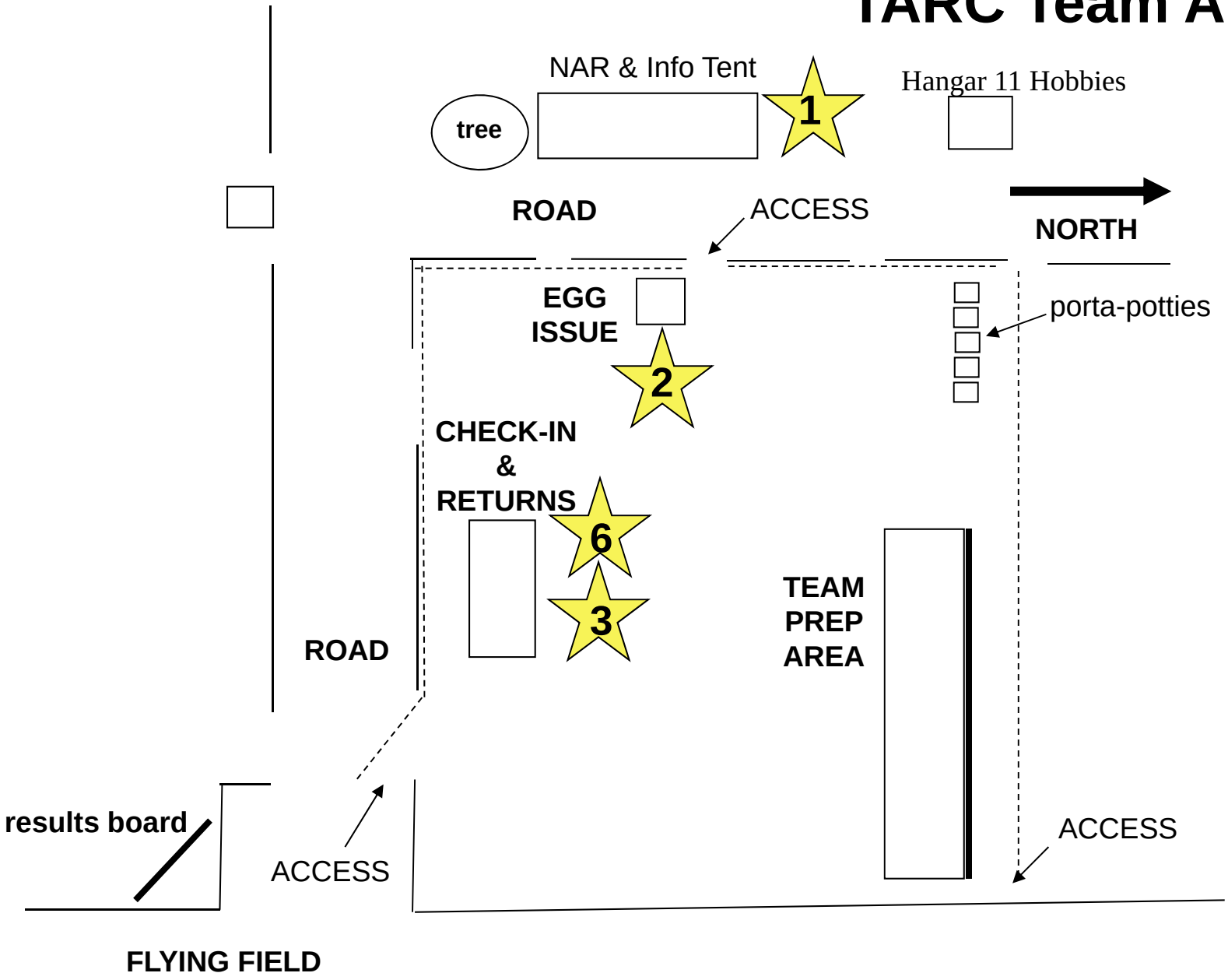


TARC Team Area



Flight Procedures 1

- First: go to REGISTRATION, get team materials
  - Name badges, parking pass, food tickets
  - Registration today until 9:30, Saturday on the field
- Hangar11 Hobbies available tonight and on the field for pick-up/sale of rocket engines & supplies
- Rockets shipped ahead to Aurora Flight Sciences available for pickup tonight
- Courtesy check of parachutes available until 9:30 tonight

Flight Procedures 2

- When teams arrive at the field Saturday, please park in the General Parking area
  - Do not go to Check-In earlier than 6:30 AM
- Second: teams go to EGG ISSUE and select 2 eggs
  - Each has its weight written on it, 57-63 grams
- Only student team members from this point on
  - All rocket prep, checkin, pad loading, etc. by students only – no advice by cell phone!
  - No one else in prep area or on the flying field
  - OK to have help for recovery outside flying field

Flight Procedures 3

- Third: Starting at assigned "checkin time" for your flight round (but no later than 15 minutes before round closes) take complete rocket, with eggs inside, altimeter and parachutes outside, to CHECKIN
  - Certify that your team (students) and no one else built rocket, and it has flown before
  - Rocket will be weighed in flight-ready configuration, with engine(s) & eggs: <650 grams
  - Show your altimeter – make sure the jumper plug is tight
  - We will measure your two parachutes by laying them out
  - State exactly what engines from our list are in the rocket; do not exceed 80 N-sec in combined total impulse
  - Launch pad number has been pre-assigned

Flight Procedures 4

- Fourth: At assigned "load time" for your flight round students (only) go to assigned LAUNCH PAD and set rocket up
  - Pads are "hot" until the round before yours starts, do not go out if your range is still flying its previous round
  - OK to use your own rod/rail/pad; we provide a ¼-inch/6-foot rod or 1010 rail (your choice at every pad) with 2 clips (12 VDC/18 amp) on an adjustable base
  - NAR "pad monitors" will help and direct you
  - Do not angle launch rod/rail toward the spectators
  - If you have your own launch equipment, go to the pad early
- We have weather station data readouts at each range
- Be ready to fly when your flight window time begins

Flight Procedures

Each pad has a launcher base

- Adjustable in angle but not in rotation
- Can use either rod or rail, both provided
- NAR pad manager will help switch between rod and rail

Flight Procedures 5

- Fifth: Fly it! Do this anytime during your assigned flight window, your choice
  - Stand by your pad, hold up numbered "paddle" when ready to fly
    - Verify your altimeter is still beeping "flight ready" signal just before countdown starts
  - Once Range Safety Officer designates your pad for next launch, step 30 feet back and wait – wave to the crowd!
  - People at adjacent pads (four in each direction) must step back when a pad is being flown – 30-foot standoff
  - If no flight by the end of "window," you're out
    - If your paddle is up by then and delay is ours, can still fly

Flight Procedures 6

- Sixth: return the rocket by 1:00 PM
  - Take to RETURNS before you leave the flying field
  - Leave eggs & altimeter in rocket, remove when told
  - If your rocket is on a power line LEAVE IT
  - If your rocket is in a tree, come get an NAR “returns judge” and a recovery pole
  - Reflight if rocket is seen but is not safely reachable due to being in one of these unsafe places

Flight Procedures 7

- 42 teams* from first flights will fly a 2nd flight in two "flyoff" rounds: top team from each 1st round plus next 37 best
  - Top 40 places awarded based on sum of 2 flight scores
  - Remaining 61 places awarded based on 1st flight scores
  - 1st through 24th place from first round are in Flyoff Round 6 on Goddard Range; 25th-42nd in Flyoff Round 7 on VonBraun
- Top 42 teams posted on event scoreboard by 1:15 PM
  - Checkin for first round opens as soon as these teams are announced
  - Flight windows open starting 2:30 PM, returns close at 4:30
  - Can keep original eggs (preferred) or get new ones

* If afternoon thunderstorms interrupt the flying schedule there will be only one flyoff round of 24

Key Event Rules

- Rocket must land without being caught
- Every part that goes up together must come down connected together under 2 parachutes of same size
  - Ejected engine or dropped part = DQ
  - “Same size” means outer edges of 2 canopies must be within 1 inch of each other all around; spill holes and shroud lines can be different

Event Rules: Reflights

- Allowed if a rocket engine suffers a “catastrophic failure”, as judged by RSO/CD
  - Crashes or partial ignition of clusters are not “catastrophic failure”
  - Delay time errors must be massive and obvious to RSO
- Allowed if the rocket lands in a place too dangerous to recover, as judged by NAR
- Allowed if an altimeter is judged by NAR to have failed to function despite being used properly
- No other reasons for 2nd flights, no 2nd flights in flyoff
- Flight window for these is 11:45 AM to 12:30 PM, must be returned by 1:00.

Event Rules: Disqualification

- "DQ" means flight score does not count
- Judged by RSO, can be appealed to NAR Contest Director
  - Decision by CD on the field is final
- Based on one of three major factors:
  - Involvement in the flight or its preparation by people other than student team members
  - Performance of rocket in flight – heavy pieces falling from sky at unsafe speed, no recovery, unstable
  - Non-compliance of rocket with event rules

Summary

- Safety is paramount – flight and recovery
- The rules are the rules for everyone
- Only the student team members participate
- Good sportsmanship is expected
- Scheduled events happen at scheduled times
- Everybody stays for the awards ceremony
- Treat the Great Meadow facility gently


team america
rocketry challenge