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AIA AEROSPACE INDUSTRIES ASSOCIATION  
 National Association of Rocketry  
 Post Office Box 407  
 Marion, IA 52302  
 www.rocketcontest.org  
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 Post Office Box 407  
 Marion, IA 52302

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Team America Rocketry Challenge  
 AIA & NAR  
 The Plains, VA 21908

PAY TO THE ORDER Team America Rocketry Challenge Winner  
 www.rocketcontest.org \$ 8,000

Date May 20, 2006  
 Mark B. Burchick  
 John W. Douglass, President, AIA



















# 2012 by the numbers

**679** Teams

**6,000** Students

**48** States and the US Virgin Islands

**409** Teams submitted qualifying scores

The top 100 teams represent **29** states and US Virgin Islands



# Why are we doing

it? • **23%** of the aerospace workforce will be eligible to retire in 2014.

- Only **63%** of an approximately 70,000 U.S. engineering graduates are eligible for aerospace careers.
- TARC graduates are entering the aerospace workforce.
- **4** out of **5** TARC alumni say TARC had a positive impact on their course of study.

# Supporters

- Great Meadow Outdoors Foundation
- Aerospace Industries Association
- National Association of Rocketry
- Department of Defense
- American Association of Physics Teachers
- AIA Member Aerospace Companies

***And many educational organizations nationwide***<sub>2</sub>



# Activities

- Rocket flight demonstrations
  - Opening ceremony
  - High-power rockets at 2:00 and at 4:15
- 12:30 Team Presentation competition
- 11:00 Team Rocket-Building competition
- Free lunch and ice cream social for participants
- Free BBQ dinner for participants (\$20 for others)
  - Your credentials are your meal ticket

**What does**

**NASA**

**stand for?**



# Awards Ceremony

- Starts at 5 PM,
- Lasts no more than 1 hour
- Significant VIP and media participation
- Only top 10 teams have assigned seats
- Only students are allowed in the fenced in area
- Please stay as we will be announcing our winners and a our special prizes

# Prizes

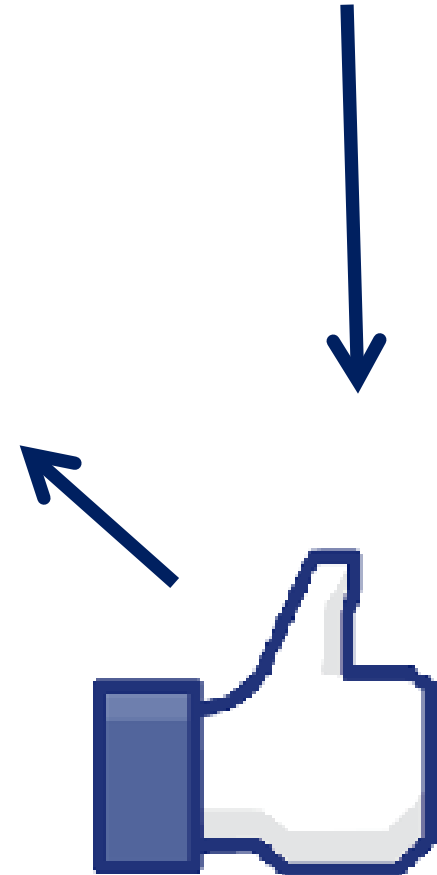
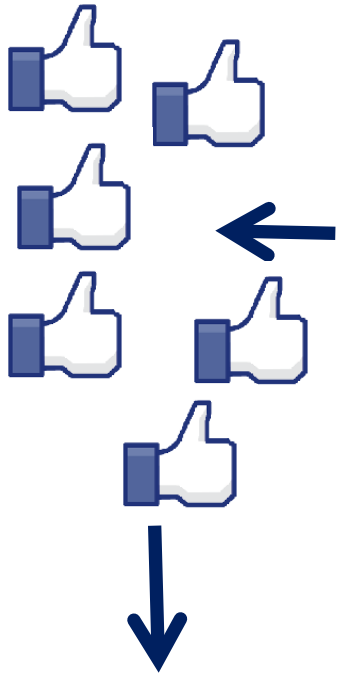
## Special Awards:

- Best Rocket Craftsmanship
- Best-Dressed Team
- Spirit of TARC
- Best Mission Design
- Presentation Competition
- Rocket-Building Competition

facebook®



Team  
America  
Rocketry  
Challenge



\$100







# **Raytheon** sponsored trip to the **Farnborough Air Show**



**@MathMovesU**

**#TARC12**

# Press

- Camera Crews and Reporters
- All participants filled out permission forms in case TARC is featured on a broadcast
- Live tweet with us #TARC12





# **EVENT OPERATIONS**

# Presentation Competition

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- Optional event, \$300/200/100 prizes for 1<sup>st</sup> – 3<sup>rd</sup> places
- 12 teams each do 6-minute presentation plus 2 minute Q&A on their TARC project to judging panel
  - Starts 12:30 PM, 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 Dr. Ted Cochran 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

# Rocket-Building Competition

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- Optional event, two \$100 prizes 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 11:00
  - 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)

# Special Notes

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- Perfectflite altimeters available at NAR booth
  - Emergency replacements only
- 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



# NAR Event Operations Staff

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- Flight Director: Trip Barber
- Registration: Eric Robinson
- Range Operations: Jonathan Rains
- Range Equipment: Greg Bock
- Results: Chris Kidwell
- Awards Ceremony: John Hochheimer
- Range Safety Officers: Dr Jay Apt & Dr John Langford
- Chief Timer: Jim Barrowman
- Public Address Announcer: Alan Williams
- And 100 others -- all volunteers

# Topics

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- Safety
- Schedule
- Flight Procedures
- Event Rules

# Safety First

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- Follow the NAR Safety Code and the Range Safety Officer (RSO) directions
- Listen to the PA and FM radio 92.9 MHz, **stay off FRS channel 7** (NAR/AIA operations)
- No one within 30 feet of a liftoff
- No one on the flying field unless flying
- Do not tilt launch rods 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

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6:15	Range crew on the field
6:30	Contestants on field, eggs available
6:30	Check-in opens for rockets (first window)
8:30 – 1:30	Contest flying (5 one-hour “windows”)
11:00 – 4:00	Rocket-building competition
12:30 – 1:30	Available for allowed initial-round re-flights
12:30 – 3:30	Presentation competition
2:00	High-power rocket demonstration
2:00	Notification of 24 teams selected for flyoff
3:00 – 4:00	Flyoff round 2 <sup>nd</sup> flights for 24 teams
4:00 – 4:30	High-power & TARC rocket flight demonstration
4:30	Deadline for rocket returns from 2 <sup>nd</sup> round
5:00	Award ceremony
6:00	BBQ dinner

# Flight Windows

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- Check rocket in up to 2 hours before “flight window”
- May not load rocket on pad until 1 hour before
- Must fly during assigned one-hour “window”

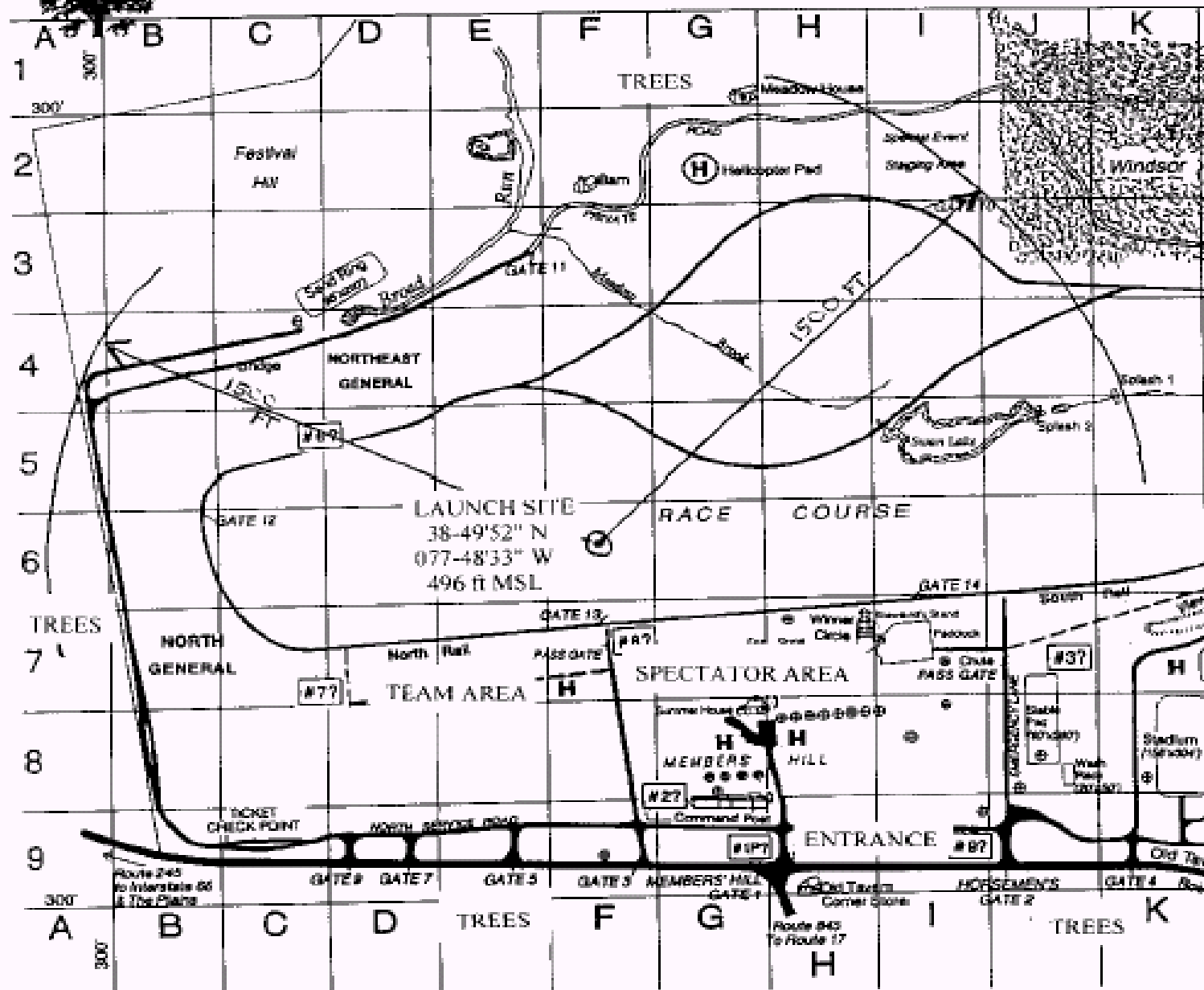
<u>Round</u>	<u>Load Time</u>	<u>Flight Window</u>
Goddard 1	7:30 AM – 8:30 AM	8:30 AM – 9:30 AM
VonBraun 2	8:30 AM – 9:30 AM	9:30 AM – 10:30 AM
Goddard 3	9:30 AM – 10:30 AM	10:30 AM – 11:30 AM
VonBraun 4	10:30 AM – 11:30 AM	11:30 AM – 12:30 PM
Goddard 5	11:30 AM – 12:30 PM	12:30 PM – 1:30 PM
Flyoff Goddard 6	2:00 PM – 4:00 PM	3:00 PM – 4:00 PM



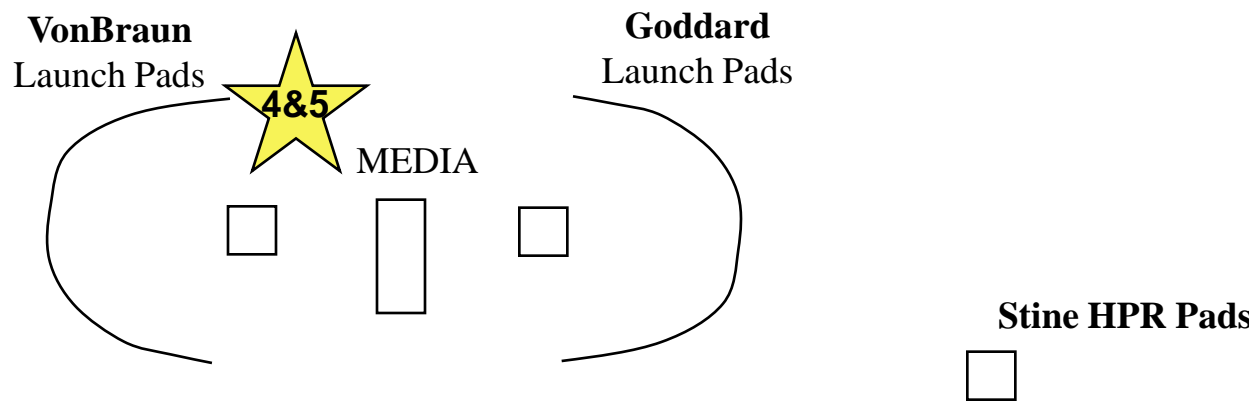
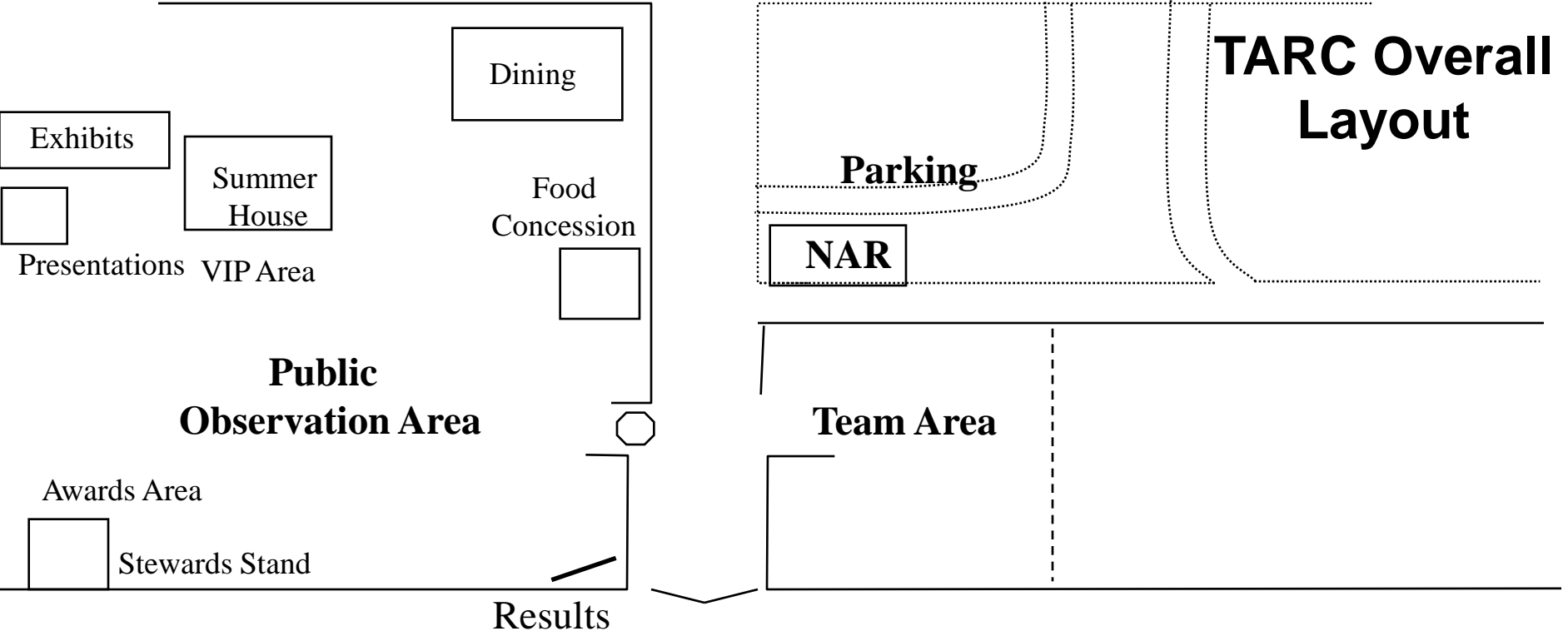
# Great Meadow Grid Site Plan

as of 1/90

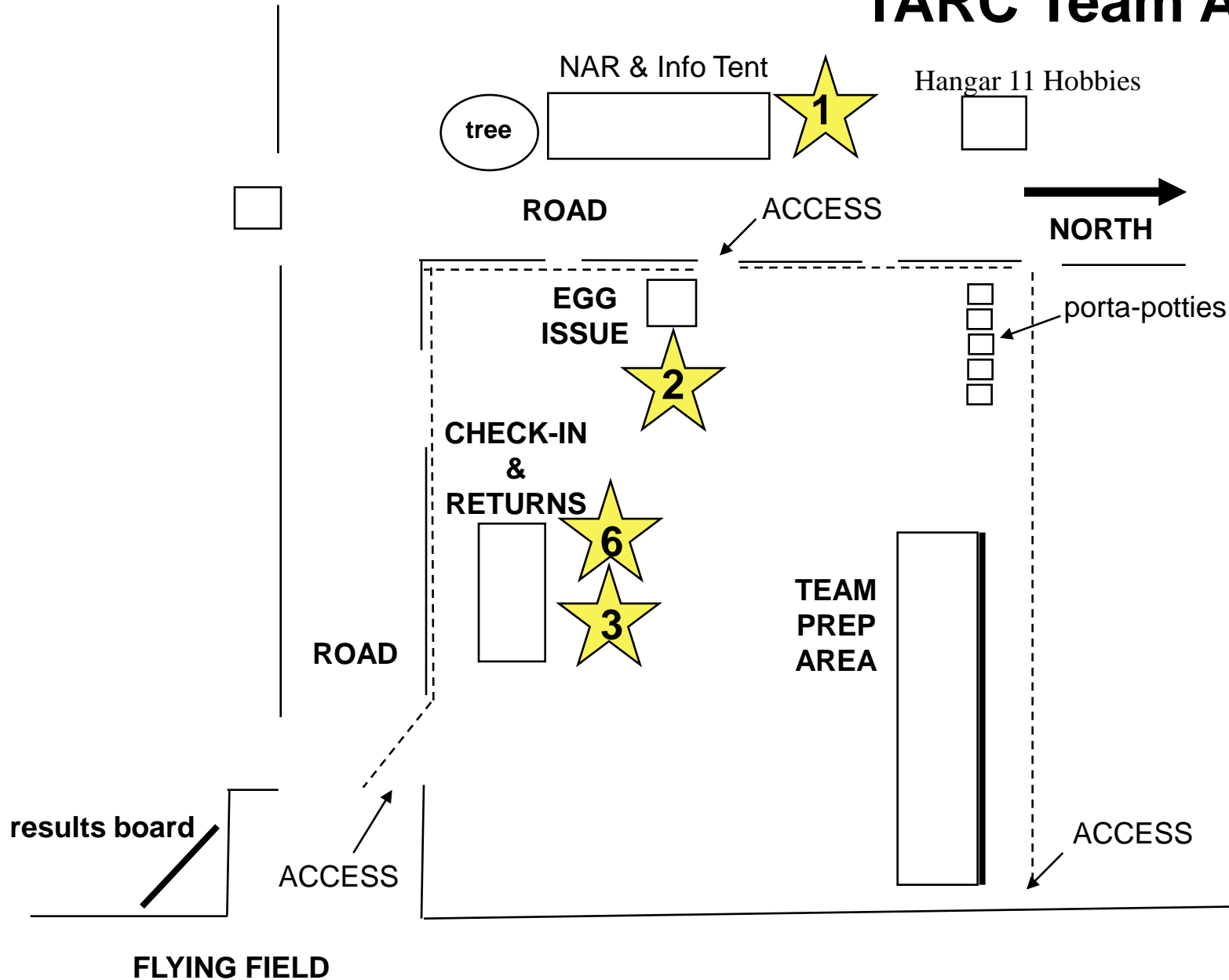
HIGH Mid-70's, LOW Mid-  
60% SUNNY



Great Meadow  
Main Entrance



# TARC Team Area





# Flight Procedures 1

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- First: go to REGISTRATION, get team materials
  - Name badges, parking pass, food tickets
  - Any rockets shipped ahead to Aurora
  - 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

# Flight Procedures 2

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- When teams arrive at the field Saturday, please park in the General Parking area
  - Do not arrive earlier than 6:30 AM
- Second: teams go to EGG ISSUE and select 2 eggs
  - Each has its weight written on it
- 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

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- Third: up to 2 hours before “flight window” opens (but no later than 15 minutes before it closes) take complete rocket, with egg inside, altimeter and parachute 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 and your parachute
  - State exactly what engines from our list are in the rocket; do not exceed 80 N-sec in combined total impulse
  - Be prepared to show where “Center of Pressure” is located
  - Launch pad number has been pre-assigned

# Flight Procedures 4

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- Fourth: after checkin, but no earlier than one hour before “flight window”, students (only) go to assigned LAUNCH PAD and set rocket up
  - Pads are “hot” from previous round until 1 hour before yours
  - OK to use your own rod/rail/pad; we provide a 1/4-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

# Flight Procedures

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**Each pad this year has a new 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

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- Fifth: Fly it! Do this anytime during your assigned one-hour flight window, your choice
  - Stand by your pad, hold up numbered “paddle” when ready to fly and have one team member join your timing team
    - 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 must step back when a pad is being flown – 30-foot standoff for everyone
  - 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

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- Sixth: return the eggs and altimeter by 2:00 PM
  - Take to RETURNS before you leave the flying field
  - Leave eggs & altimeter in rocket, remove when told
  - May have to return other parts of rocket if the RSO says so, due to rules-compliance concerns
  - 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

# Flight Procedures 7

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- 24 teams from first flights will fly a 2<sup>nd</sup> flight in a “flyoff”: top team from each round plus next 19 best
  - Top 20 places awarded based on sum of 2 flight scores
  - Remaining 80 places awarded based on 1<sup>st</sup> flight scores
- Top 24 teams posted on event scoreboard by 2 PM
  - Checkin opens as soon as these teams are announced
  - Flight window 3 PM to 4 PM, returns close at 4:30
  - Can keep original egg or get new one
- 25<sup>th</sup> – 29<sup>th</sup> place teams can fly again at 4 PM for a VIP demo launch (not scored) – checkin at 3 PM
- Top 25 teams remember to pick up your NASA SLI invitation packet when checking in for your 2<sup>nd</sup> flight

# Key Event Rules

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- Egg/altimeter section must land without being caught and must use only parachute recovery
  - Rest of rocket may recover separately if desired and may use any safe means for recovery
- Every part that comes to earth separately must do so safely – recovery system or unstable tumbling
  - Ejected engine with no recovery system = DQ

# Event Rules: Reflights

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- 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
- Allowed if the egg/altimeter section 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 12:30 PM to 1:30 PM, must be returned by 2:00.



# Event Rules: Disqualification

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- “DQ” means flight score does not count
- Judged by RSO, can be appealed to 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
  - Non-compliance of rocket with event rules

# Summary

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- 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

