



Challenges

For Business



Submission Form Preview

Section 1: Introduction

Title *

Give your submission a catchy title that describes the idea and gets people interested.

Title

0/50

Short description

Provide a brief description of your idea. Be clear and concise.

Short description

0/140

Image



An Image boosts your message by illustrating your solution. Ensure your image is at least 650 pixels wide by 366 pixels tall for clarity.

Supported File Types: **PNG, JPG**



Upload Image

How did you hear about this challenge?

How did you hear about this challenge?

0/100

Section 2: Eligibility

Choose Your Team *

- 100 Aeronautical University in Queretaro 101 Arizona State University 102 Atilim University 103 Auburn University 104 Austin Community College 105 Baskent University 106 Baylor University 107 Bethel University 108 Boise State University 109 California State University, Chico 110 Chosun university 111 Clarkson University 112 Clemson University 113 Djillali Liabes University 114 DUZCE UNIVERSITY 115 Eastern Washington University 116 Edmonds College 117 Ege University 118 EskiÅŸehir Osmangazi Åœeniversitesi 119 Facultad de Ciencias de la IngenierÅœa y TecnologÅœa 120 Florida International University 121 Gebze Technical University 122 George Fox University 123 Illinois Institute of Technology 124 Instituto Militar de Engenharia 125 Instituto Politecnico Nacional –Guanajuato 126 Instituto TecnolÅœgico de Buenos Aires 127 Instituto TecnolÅœgico de Estudios Superiores de Monterrey 128 Instituto Tecnologico de Hermosillo 129 Istanbul Technical University 130 Istanbul University–CerrahpaÅœa 131 Kathmandu University 132 KoÅœ University 133 Lenoir–Rhyne University 134 Liberty University 135 McMaster University 136 Michigan State University 137 Michigan Technological University 138 Middle East Technical University 139 National Yang Ming Chiao Tung University 140 New York University Abu Dhabi 141 Old Dominion University 142 Pamukkale University 143 Queen's University 144 Rochester Institute of Technology 145 Rowan University 146 Royal Melbourne Institute of Technology 147 San Jose State University 148 Sapienza University of Rome 149 Selcuk University 150 Seoul National University 151 South Dakota Mines 152 Southern Methodist University 153 Tarleton State University 154 Texas A&M University 155 The University of Alabama 156 The University of Arizona 157 The University Of Texas RGV 158 The University of Tulsa 159 TOBB University of Economics and Technology 160 Tufts University 161 Universidad AutÅœnoma de Baja California 162 Universidad de Antioquia 163 Universidad Nacional de AsunciÅœn–Facultad Politecnica 164 Universidad Nacional de Ingenieria 165 University Sains Malaysia 166 University Teknologi Malaysia 167 University College London 168 University of California, Berkeley 169 University of California, Merced 170 University of California, Santa Cruz 171 University of Cincinnati 172 University of Florida 173 University of Georgia 174 University of Kentucky 175 University of Louisiana at Lafayette 176 University of Manitoba 177 University of Michigan–Dearborn 178 University of Nebraska–Lincoln 179 University of Nevada, Las Vegas 180 University of New Mexico 181 University of Oran 182 University of Pennsylvania 183 University of Utah 184 University of Virginia 185 University of Western Australia 186 University of Wisconsin – Madison 187 Utah State University 188 Vellore Institute of Technology 189 Virginia Commonwealth University 190 Virginia Polytechnic Institute 191 Washinaton State

University192 Wentworth Institute of Technology193 Wichita State
 University194 Worcester Polytechnic Institute200 Ateneo de Davao
 University201 Brigham Young University202 Carleton University203 Case
 Western Reserve University204 Chulalongkorn University205 Concordia
 University206 Houston Community College207 Manipal Institute of
 Technology208 Mississippi State University209 National University of
 Science and Technology POLITEHNICA Bucharest210 New Mexico Institute of
 Mining and Technology211 New Mexico State University212 Politecnico di
 Torino213 Princeton University214 Texas A&M University215 The
 Pennsylvania State University216 The University of Melbourne217 The
 University of Texas at Austin218 The University of Texas at El Paso219
 University of Alberta220 University of British Columbia221 University of
 Houston222 University of North Dakota223 University of Strathclyde224
 University of Texas at Arlington225 Youngstown State University300 Clark
 College301 Embry–Riddle Aeronautical University, Prescott302 Federal
 University of ABC303 Federal University of Rio de Janeiro304 George
 Washington University305 Indian Institute of Technology Bombay306 Kent
 State University307 King Mongkut's University of Technology Thonburi
 (KMUTT)308 Oregon State University309 Purdue University Main
 Campus310 Rio de Janeiro State University311 Saint Louis University312
 Texas Tech University313 Universidade Federal de Juiz de Fora314 University
 of California, Irvine315 University of Pittsburgh316 University of Sao Paulo317
 University of Texas at Dallas318 University of Windsor400 Duke
 University401 Federal University of Santa Catarina402 Massachusetts
 Institute of Technology403 Rensselaer Polytechnic Institute404 The Ohio
 State University405 University of Maryland, College Park406 University of
 Minnesota Duluth407 University of Minnesota, Twin Cities408 University of
 Texas at San Antonio409 University of Washington – Seattle410 West
 Virginia University500 FIRAT UNIVERSITY501 Toronto Metropolitan
 University502 Université Laval503 University of South Alabama600
 Rutgers University – New Brunswick601 Technische University Munich602
 The University of Akron603 University of Missouri–Columbia604 University
 of New South Wales, Sydney700 Cornell University701 Indian Institute of
 Technology Madras702 Iowa State University703 Monash University704 The
 University of Sydney705 University at Buffalo706 University of Calgary800
 Rice University900 Ecole de Technologie Supérieure901 Polytechnique
 Montreal902 Rice University

University City/Province and Country *

Enter the location of your university (City, State/Region, Country (Ex: Tucson, Arizona,

USA)

 

Rocket/Project Name *

 0/3000

Category *

- 10k - COTS30k - COTS10k - SRAD Solids30k - SRAD Solids10k - SRAD Hybrid30k - SRAD Hybrid30k - 2 stage45k - 2 stageNon-Competitive Demonstration Flight

Student Lead *

Name / Email / Phone (All Required)

 0/3000

Alternate Student Lead *

Name / Email / Phone (N/A if not applicable)

 0/3000

Faculty Advisor *

Name / Email / Phone (All Required)

 0/3000

Alternate Faculty Advisor *

Name / Email / Phone (N/A if not applicable)

 0/3000

Mailing Address for Awards *

This is the address we'll use for mailing awards

Ex:

Rocketry Team SPUD
1234 Palmetto St.
Sienna, Nevada, 77423

Mailing Address for Awards

0/1000

Team mentor

Required for all teams -

* Name, TRA or NAR number, Cert level, email address, phone number.

Please enter the individual(s) from one of the Rocketry Organizations (Tripoli, NAR ...) who have worked with the team on your project. This resource can also be the flyer of record.

Team mentor

0/500

Flyer of record

Required for all teams -

* Name, TRA or NAR number, Cert level, email address, phone number.

This will be the certified level 3 resource that WILL BE AT THE EVENT and be the official flyer of record for your team. For SRAD solids this must be a TRA resource.

Flyer of record

0/500

Social Media Site(s)

URLs for website, Facebook, Twitter, Instagram, X, etc.

Social Media Site(s)

0/500

Identify the previous IREC competition(s) your team competed in?

Leave blank if team has never competed

2017201820192021 (Virtual)202220232024

Section 3: Rocket Information

PLEASE ENTER NUMERIC DATA ONLY!

Use periods as decimal separator (e.g., 14.2 not 14,2)

Overall rocket parameters

Vehicle Length (meters) *

Vehicle length, tip to tail, when ready for launch (meters) - Numeric data only.
(all stages)

Vehicle Length (meters)

0/3000

Airframe Diameter (mm) *

Airframe diameter (mm) - Numeric data only
(if project has different diameters, please list all)

Airframe Diameter (mm)

0/500

Number of fins *

Number of fins
(if 2-stage - record the booster fins here)

34Other

Fin Semi-span (mm) *

Distance between root cord to tip cord (mm) - Numeric data only
(if 2-stage - record both the booster AND SUSTAINER fin semi-span here)

Fin Semi-span (mm)

0/500

Fin attachment *

Describe the construction method and materials used for securing the fins to the airframe.

Fin attachment

0/5000

Fin Flutter Analysis *

Please describe the method and results used to determine the "not to exceed flutter" velocity or the divergence velocity.

Fin Flutter Analysis

0/5000

Vehicle Weight (kg) *

All vehicle, electronics, and recovery (kg) - Numeric data only
DO NOT include motor case, propellant, or payload weight

Vehicle Weight (kg)

0/3000

Empty motor case/structure weight (kg) *

Empty motor case(s) and closures/structure weight (kg)- Numeric data only motor case and closures. Liftoff weight needs to be equal to the sum of the above weights

Empty motor case/structure weight (kg)

0/3000

Propellant weight (kg) *

All propellants (solid/liquid/gaseous) including any pressurizing gasses (kg) - Numeric data only (all propellant combined if multiple motors)

Propellant weight (kg)

0/3000

Payload weight (kg) *

Must be at least 2 kgs per IREC Rules (kg) - Numeric data only

Payload weight (kg)

0/3000

Liftoff weight (kg) - should equal all weights *

Total Vehicle weight with all components included (kg) - Numeric data only - Should equal all the above weights added together (all stages)

Liftoff weight (kg) - should equal all weights

0/3000

Static Stability (Calibers) *

Please enter the Static Stability (Calibers) . Numeric data only.

Be sure to label this point on your competition rocket.

Static Stability (Calibers)

0/3000

Rocket construction narrative/ additional information *

Discuss the construction of your rocket including airframe, couplers, interstage couplers, nose cone, fins, fin attachment, composite materials, and identify commercial or SRAD components

Rocket construction narrative/ additional information

0/5000

Section 4: Propulsion System

For 2-stage projects - Use the following fields to describe the booster. Add sustainer information in the Propulsion Narrative field.

Cluster Projects - Use the following fields to describe the largest one of the motors and provide the same level of detail in the Propulsion Narrative for additional motors.

Propulsion Type *

Propulsion system

SolidHybrid

COTS or SRAD *

SRAD - Student Researched & Developed

COTS - Commercial Off The Shelve

SRADCOTS

Propulsion Manufacturer *

If 2-stage, please use Propulsion Narrative to detail each additional motor/engine.

AerotechCesaroniAnimal Motor WorksLokiSRADOther

COTS Motor - Manufacturer Designation

Example:

Aerotech N2220DM

Cesaroni 6800M3700-P

Loki M3000-LW

COTS Motor - Manufacturer Designation

0/3000

Motor Letter Classification *

Motor impulse letter classification

LMNO

Average Thrust (N) *

Average Impulse (N) - Numeric data only (Newtons)

Average Thrust (N)

0/3000

Total Impulse of all Motors (Ns) *

IREC entries shall not exceed 40,960 Newton-seconds (Ns). Non-competing Research, Demonstration, and Exhibition teams asked to submit this form shall alert ESRA immediately if a project exceeds 40,960 Ns. - Numeric data only (Newton seconds)

Total Impulse of all Motors (Ns)

0/3000

Motor Burn Time (s) *

Numeric data only (Seconds)

Motor Burn Time (s)

0/3000

SRAD Motor - Maximum Pressure (psi)

SRAD motors only - Numeric data only (Pounds per square inch)

SRAD Motor - Maximum Pressure (psi)

0/3000

SRAD Motor - How was maximum pressure determined? Simulated or through testing. If simulated, identify the application used.

Explain how you determined the maximum pressure. Through simulating or static motor testing. If simulated, list the application software used.

SRAD Motor - How was maximum pressure determined? Simulated or through testing. If simulated, identify the application used.

0/5000

SRAD Motor - Initial Kn

SRAD Motors only - Numeric data only

SRAD Motor - Initial Kn

0/3000

SRAD Motor - Maximum Kn

SRAD Motors only - Numeric data only

SRAD Motor - Maximum Kn

0/3000

SRAD solid motor design file

SRAD motors only

Upload Burnsim (BSX) or Openmotor (RIC) design file.

Note: Greg Deputy, owner, and developer of the BurnSim software has offered free academic year licensed copies for competing teams. BurnSim printouts are required for SRAD solid category team reports.

You can download the software from his website.

Contact Greg directly with your Team name and ID # for your license key.

BurnSim@blastzone.org

<http://www.burnsim.com>

Supported File Types: **BSX, OR, RIC**



Choose File

SRAD motor - Static fire

It is a requirement that all SRAD motors must be static fired before the competition.

Please describe your static motor testing methodology.

SRAD motor - Static fire

0/5000

Static Fire Test Results

Test fire Results:

Time Stamp, Pressure, force/thrust

Supported File Types: **CSV, XLSX, PDF**



Choose File

Propulsion Narrative

Provide any comments here and additional motor details if staged or cluster motors are used.

Please use a new line for each motor/engine in the following format:

COTS Format - [Stage]: [Manufacturer], [Letter Class], [Total Impulse], {Average Impulse}

SRAD Format - [Stage]: [Motor/Engine Type], [Propellant mixture], [Letter Class], [Total Impulse]

Example:

- COTS Solid, CTI, M, 6117.8Ns, 3075.0N
- SRAD Solid, XX pounds of aluminum-HTPB-AP composite propellant, X Class, ZZZZ Ns
- SRAD Liquid, XX pounds of ethanol propellant and YY pounds of LOX, X Class, ZZZZ Ns
- SRAD Hybrid, XX pounds of acrylic fuel and YY pounds of nitrous oxide, X Class, ZZZZ Ns

Propulsion Narrative

0/5000

Section 5: Switches and Arming Electronics

Wiring diagram (Required) *

Please add a wiring diagram in PDF format for your recovery electronics.

Two-stage projects - the wiring diagram needs to include the electronics used for staging ignition, stage separation, and recovery.

Supported File Types: **PDF**



Choose File

Switches *

Please describe all your arming switches: Mechanical, Magnetic, Bluetooth ...

Note: Two-stage projects require a switch between the electronics that light the igniter and the igniter itself.

Switches

0/5000

Redundancy *

Please describe the redundancy built into your recovery electronics.

Redundant flight computers that control the recovery events must be completely independent of each other. This includes the switch, power, and electronics.

Redundancy

0/5000

COTS Staging Electronics

For two-stage projects only - what COTS staging flight computer is going to be used to light the sustainer?

COTS Staging Electronics

0/3000

Arming Sequence *

Please describe your arming sequence once the rocket is vertical on the pad.

Arming Sequence

0/5000

Switches and Arming Electronics Narrative *

Please add any additional detail needed to give the reviewers a clearer picture of your switches and arming electronics sequence.

Two-Stage projects - Specifically describe the mitigation procedures that will be used to prevent the motor from lighting on the ground.

Switches and Arming Electronics Narrative

0/5000

Section 6: Predicted Flight Data and Analysis

The following stats should be calculated using rocket trajectory software or by hand.

Pro Tip: Reference the Barrowman Equations, know what they are, and know how to use them.

Launch Rail *

Specify in comment below if "other"

Team-provided ESRA Provided Rail Other

Rail Length (meters) *

Write "5.18" if using ESRA provided rail - Numeric data only.

Rail Length (meters)

0/3000

Liftoff Thrust-Weight Ratio (X:1) *

5:1 thrust to weight ratio is the recommended minimum for a single-stage and 8:1 for two-stage projects - Numeric data only (just record X)

Anything less needs to provide additional detail in the narrative below

Liftoff Thrust-Weight Ratio (X:1)

0/3000

Launch Rail Departure Velocity (meters/second) *

30mps is a highly recommended minimum. Anything less needs to provide additional

detail - Numeric data only. Simulation should utilize winds of 15mph!

Launch Rail Departure Velocity (meters/second)

0/3000

Length of Rail (meters) used to calculate the Launch Rail Departure Velocity

Length of Rail (meters) used to calculate the Launch Rail Departure Velocity

Length of Rail (meters) used to calculate the Launch Rail Departure Velocity

0/3000

Minimum Static Margin During Boost *

Stability ratio between rail departure and burnout. Measured in Calibers. 1.5 is highly recommended minimum - Numeric data only.

Minimum Static Margin During Boost

0/3000

Maximum Acceleration (G) *

Measured in G forces - Numeric data only

Maximum Acceleration (G)

0/3000

Maximum Velocity (meters/second) *

Measured in mps - Numeric data only

Maximum Velocity (meters/second)

0/3000

Target Apogee (feet AGL) *

Feet above ground level

10,000 ft 30,000 ft 45,000 ft Other (specify in comment below)

Predicted Apogee (feet AGL) *

Feet above ground level - Numeric data only

Predicted Apogee (feet AGL)

0/3000

Flight Simulation file *

Please attach your Rocksim, OpenRocket, or RASAero II

Supported File Types: **RKT, ORK, CDX1, DO, NOT, SUBMIT, A, CUSTOM, TEAM, BUILT, SIMULATION, FILE**



Choose File

Flight Profile Graph *

A graph of altitude, velocity, and acceleration versus time in PDF format for the flight as planned.

Supported File Types: **PDF**



Choose File

Predicted Flight Data Narrative

Use this field to discuss your flight profile. Additionally, include methods & software utilized to produce the flight data.

Two-stage projects please include a description of the flight profile and the means that will be used to inhibit ignition in the event of a non-nominal flight (to include the required altitude check strategy and a description of the tilt detection method if used)).

Predicted Flight Data Narrative

0/5000

Section 7: Payload Information

NOTE: To compete in the SDL Payload Challenge, you MUST follow the instructions on the IREC Documents and Forms Page. The information provided here is for ESRA purposes only.

See <http://www.soundingrocket.org/irec-documents--forms.html>

Payload – Deployed or Attached *

Will the payload stay attached and recover with the main rocket recovery system or is it deployed and recovered independently?

Attached – recovers attached to the rocket recovery system

Deployed – independent of the rockets recovery system

AttachedDeployed

Deployed Payload – Deployment Mechanism *

If the payload is deployed, how is it deployed?

Use the Payload Narrative field to provide details.

**Not ApplicableDeployed with droguePayload BP Ejection chargePayload
CO2 EjectionPayload MechanicalOther (Please detail in Payload Narrative)**

Deployed Payload – Deployment Altitude (feet) *

Numeric data only.

Deployed Payload – Deployment Altitude (feet)

0/3000

Deployed Payload – Altimeter *

If the payload is deployed and the recovery system on the payload is dependent on altimeter deployment, which altimeter is used?

Use the Payload Narrative field to provide details.

Not ApplicableNA, deployed with the drogueCOTSSRAD

Deployed Payload – Recovery System *

If the payload is deployed, what is the recovery system?

Use the Payload Narrative field to provide detail.

Not applicableParachuteParafoilRC ControlledOther

Deployed Payload – Main Decent Rate (m/s) *

If the payload is deployed, what is the decent rate (m/s) before it touches down? –
Numeric data only

Deployed Payload - Main Decent Rate (m/s)

0/3000

Deployed Payload - GPS *

If the payload is deployed, what is the GPS tracking system?

Use the Payload Narrative field to provide detail.

Not applicableCOTSSRAD

Payload Narrative *

Please help us to help you, by filling this box out as completely as possible. Identify whether the payload is functional or inert. Include a description of its purpose (if applicable) and its recovery scheme (if applicable). The more information we have the better we can help you.

Payload Narrative

0/5000

Section 8: Recovery

Describe your recovery system; dual-deploy, size and style of chute, number of chutes, length of shock cord.

"Chute Release" commercial products no longer approved.

COTS Altimeter *

Enter the manufacturer and model of your COTS altimeter.

NOTE: IREC Design, Test, & Evaluation Guide 3.3.1

COTS Altimeter

0/3000

Redundant Altimeter *

Enter the manufacturer and model of your COTS altimeter or enter SRAD for a student-built flight altimeter and provide detailed information in the Recovery Narrative below.

Redundant Altimeter

0/3000

Drogue Primary & Backup Deployment Charges (g) *

Enter energetics, primary charge (g), backup charge (g)

e.g., Black Powder, 4g, 5g

e.g., CO₂, 6g, 12ge.g., CO₂, 6g, Black Powder, 5g**Drogue Primary & Backup Deployment Charges (g)**

0/3000

Drogue Deployment Altitude (feet) *

Please add an explanation in the Recovery Narrative if drogue is deployed after apogee - Numeric data only.

Drogue Deployment Altitude (feet)

0/3000

Drogue Decent Rate (meters/second) *

Enter the decent rate of the rocket under drogue in meters/second - Numeric data only

Drogue Decent Rate (meters/second)

0/3000

Main Primary & Backup Deployment Charges *

Enter energetics, primary charge (g), backup charge (g)

e.g., Black Powder, 4g, 5g

e.g., CO₂, 6g, 12ge.g., CO₂, 6g, Black Powder, 5g**Main Primary & Backup Deployment Charges**

0/3000

Main Deployment Altitude (feet) *Enter the main deployment altitude - Numeric data only
IREC Design, Test, & Evaluation Guide 6.4.1 - no higher than 1500 ft

Main Deployment Altitude (feet)

0/3000

Main Decent Rate (meters/second) *

Enter the decent rate of the rocket under the main chute in feet/second - Numeric data only

IREC Design, Test, & Evaluation Guide 6.4.3 - less than or equal 11 m/s (36 fps)

Main Decent Rate (meters/second)

0/3000

Shock Cords and Mechanical Links *

Provide the following data for each shock cord used in the recovery system:

Material, Length, Strength, Attachment point & Mechanical linkage 1, Attachment point & Mechanical linkage 2, Notes.

Shock Cords and Mechanical Links

0/5000

Flight profile Graphic *

Attach a graphical representation of your predicted flight, from lift-off to touch down demonstrating the flight. This is not a flight profile graph; it is a graphic.

Supported File Types: **PDF**



Choose File

Recovery Narrative *

Please help us to help you, by filling this box out as completely as possible. Identify every independently recovered part of the launch vehicle and its recovery scheme. As appropriate, identify its associated recovery events, means of event triggering (e.g. barometric, magnetometer, other...), the redundancy of those event triggers, and the altitude those events should occur at. The more information we have the better we can help you.

Recovery Narrative

0/5000

Section 9: GPS Tracking**Reference: IREC GPS Tracking Requirement and Recommendations****GPS Tracker Manufacturer ***

If SRAD tracker is used, add details in the GPS Narrative field.

If Multiple Trackers are used, add details in the GPS Narrative field.

GPS Tracker Manufacturer

0/3000

Wavelength Band / Frequency Range *

70 cm / 420.0 - 450.0 MHz 33 cm / 902 - 928 MHz other

Licensed Team Member Name, HAM Call Sign

If using the 70 cm band, enter the name and call sign of licensed team member.

Licensed Team Member Name, HAM Call Sign

0/3000

GPS Tracker Narrative

Please help us to help you, by filling this box out as completely as possible. For SRAD GPS Solutions provide a narrative around your solution. The ability to easily change frequency, utilize APRS, and extensive testing of the solution should be included. The more information we have the better we can help you.

GPS Tracker Narrative

0/5000

Section 10: Test Plan

Please include all systems

Planned Tests *

Please keep brief, use these headers in your response:

Date, Type, Description, Status, Comments.

Planned Tests

0/7000

Section 11: Media

Team Video Challenge Participation *

Do you intend to participate in the Team Video Challenge?

<https://www.soundingrocket.org/team-video-challenge.html>

YesNoUnsure

Live Rocket Video Challenge Participation *

Do you intend to participate in the Live Rocket Video Challenge?

<https://www.soundingrocket.org/live-rocket-video-challenge.html>

YesNoUnsure

Onboard Footage Submission *

Do you intend to submit onboard rocket footage?

Yes, recorded 1080pYes, recorded 4kYes, recorded other formatYes, LivestreamUnsureNo

Section 12: Additional Comments

Any other pertinent information *

Please add any additional information that adds clarity to your submission.

Any other pertinent information

0/7000

Link to additional reference file share

Please place a link to a share location where you will post additional reference files your safety reviewers may request.

Link to additional reference file share

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No