



**FIRST NATIONS LAUNCH (FNL) COMPETITION
APRIL 19-22, 2018 (TBC)**

- Informational Telecon:** October 2, 2017 @ 7:00 pm (Telecon #: 262.551.2124)
- Notice of Intent to Compete Due:** October 16, 2017
- Selection Announcement:** October 30, 2017
- Virtual Kick-off Meeting:** November 6, 2017 @ 7:00 pm (Telecon #: 262.551.2124)
- Oral Presentation at Carthage College:** April 19, 2018 (TBC)
- Workshops at Carthage College:** April 20, 2018 (TBC)
- Launch at Richard Bong Recreational Area:** April 21, 2018(TBC)
- Launch Rain Date:** April 22, 2018 (TBC)

Team Awards:

Grand Prize Award: \$6000 Team Travel Award w/invitation to a NASA Center
Up to \$15000 Project/Team Travel Award w/invitation to Student Launch at Marshall Space Flight Center (AISES) and/or RockOn! At Wallops Flight Facility (Tribal)

2nd Place: \$1000

3rd Place: \$500

Aesthetic Award: To be awarded at the FNL banquet to the team whose rocket has the most innovative and professional appearance.

Team Spirit Award: To be awarded at the FNL banquet to the team chosen by their peers as the team that shows interactive spirit, helpfulness, and cooperation.

Team Advisor/Mentor Stipend: \$1000

Equipment/Reimbursable funds provided by WSGC:

Competition Rocket Motor	Two (2) reloadable motors per team will be provided of your choice: reloadable/disposable 38mm, no larger than a J impulse for Tribal. AeroTech J450 DM for AISES. NOTE: Motor selection deadline for Tribal is March 2, 2018.
Project/Travel Award	Reimbursed up to \$3,000. Reimbursement requests will be submitted to National Space Grant Foundation. NOTE: Reimbursement deadline is May 7, 2018.
Learning Resources	Each team that participates in the Virtual Kick-Off Meeting will receive a low-power rocket for demonstration flight requirements. Each new school registered to compete will receive two reference resources: Model Rocket Design and Construction Third Edition and Modern High-Power Rocketry 2. In addition, new schools will be eligible for an on-site rocket workshop hosted by WSGC.

About the Program: NASA's Wisconsin Space Grant Consortium (WSGC) is pleased to announce the 9th Annual First Nations Launch (FNL) National Rocket Competition. This competition is an opportunity for students attending a Tribal College or University, or who are members of a campus AISES chapter, to design, build, and fly a rocket to be launched at a competition at the Richard Bong State Recreational Area in Kansasville, WI.

Purpose: The First Nations Launch competition offers Tribal Colleges and Universities, in addition to AISES chapter students, the opportunity to demonstrate engineering and design skills through direct application in high-powered rocketry. The competition requires teams of undergraduate students to conceive, design, fabricate, and compete with high-powered rockets. The restrictions on rocket motors and dimensions are limited so that knowledge, creativity, and imagination of the students are challenged. The end result is a unique aerospace experience for students that provides a great aerospace experience unique to Native American communities.

It is the purpose of this Announcement of Opportunity to support the innovative, visionary projects that are student-led and designed to fully realize WSGC's goal of assisting in training the next generation of aerospace professionals.

To Apply:

A faculty advisor must complete the following steps:

- Register as faculty on the WSGC website (<https://spacegrant.carthage.edu/about/login/>). Applicants will be prompted to update personal information annually.
- Submit the "Create Rocket Launch Team (NOI)" Grant Application Form (<https://spacegrant.carthage.edu/forms/account/login/?next=/forms/application/first-nations-rocket-competition/>).
- If applying for both the Tribal and AISES Challenge, please indicate in the Rocket Launch Team NOI which competition is the school's preference. *(Twenty-two teams will be selected to compete in the First Nation's Launch. WSGC will give priority to early registrants and first-time participants. In the event, there are still team openings after each school is represented, WSGC will select the remaining participant slots from the applicants that submitted an NOI to both competitions.)*

Once the faculty advisor completes the Notice of Intent (NOI), identifies the team name, lists the student participants, and chooses which competition the team will compete in, each student will need to:

- Register as an undergraduate student on the WSGC website (<https://spacegrant.carthage.edu/about/login/>). Applicants will be prompted to update personal information annually.
- Complete the First Nations Rocket Competition application (<https://spacegrant.carthage.edu/forms/account/login/?next=/forms/application/first-nations-rocket-competition/>).
- Submit a media release form

Application Requirements: Team/Individual applicants who meet the following requirements can apply for this grant by registering and applying online at spacegrant.carthage.edu/about/login. To qualify for the competition, teams/individuals:

- must be enrolled at a Tribal College/University or attending a university with an active AISES program
- have a committed faculty mentor
- select a team leader

Individuals/teams:

- should be comprised of approximately 4-6 students
- may seek advice/mentorship from Industry, Tripoli, NAR, and others
- can compete without experience *(Teams will be given the basic training and information required)*

TRIBAL CHALLENGE

Rocket Design Objectives: The objective of the WSGC 2018 First Nations Launch **Tribal Challenge** is:

The challenge is to design, construct and launch a high power rocket “True Scale Model” of a current or retired, rocket or missile used around the world. A “scale model” is generally a physical representation of an object, which maintains accurate relationships between all important aspects of the model, so all of the proportions of the model match those of the real object being modeled.

Competition Engineering Parameters: Student teams will be required to design and fabricate a high power rocket withstanding high velocities. The rocket must descend under parachute creating a “Safe Flight Mission.” The rocket must be fin-stabilized with a static margin of one or greater. The rocket is required to use a commercial electronic deployment recovery system (Altimeter). The electronic recovery system must deploy a parachute (or drogue chute) at apogee and the use of motor recovery deployment systems as a backup will be required. Dual deployment recovery (drogue and Main) is recommended but not required. All structural components and materials must be obtained from reputable high power rocketry vendors or an engineering analysis demonstrating their suitability must be included with the design report.

The team with the most accurate true scale model will gain points on “Originality”. Also teams that come closest to their predicted apogee based on their prediction stated on the final report will gain points for the flight performance portion of the competition. Teams must use the motor ejection charge feature, including altimeter(s) for a safe recovery. The rocket must exceed 3000 feet and no higher than 3500 feet (max) above ground level (AGL).

All teams are expected to retrieve their rockets in “flyable condition”. All students must conduct all work on the rocket and payload. No outside assistance is permitted. While no professional assistance is permitted, we encourage consultation with your local or regional high power rocketry safety professionals on safety matters and rocket design.

The challenge is to construct a high power “True Scale Rocket” replicating a real rocket or missile of the world in detail. No futuristic past or present rocket designs are allowed. Teams are required to understand the history, purpose and features of the rocket or missile they wish to construct. Neatness and detailed accuracy of the rocket or missile is required.

1. Each team must assemble, fly, and successfully recover a “low-power” rocket provided by WSGC. Pictures of the team at their launch site with the rocket, before and after their launch, must be posted to WSGC’s Facebook page prior to submitting the preliminary design report (PDR) and budget.
2. Photographs are required during the construction of your high power competition rocket, of the motor mount and fin fillet assembly to ensure proper construction techniques have been implemented.
3. All projects during the construction process must have a minimum of two (2) scheduled virtual inspections with the designated safety officer (TBA).
4. All projects must be completely constructed (or 90%) ready to fly two (2) weeks prior to launch date. 90% = Airframe, motor mount, fins, payload airframe, couplers, bulkheads, should be permanently attached as designed. ***NOTE: Blue Tube, Sonotube airframes will not be allowed in the competition or the use of Plexiglas fins.**
5. All final competition project designs must have a documented flight/stable simulation profile (i.e. RockSim, OpenRocket, etc.).
6. All projects must have an aero-dynamic design. No odd rockets. NOTE: Odd rockets include flying pyramids, saucers, flying spools, etc.
7. Due to unpredictable cloud cover all projects must not exceed an altitude of 3500 AGL.
8. Two (2) reloadable/disposable 38mm, no larger than a J impulse. Motors of your choice will be provided.
9. All projects must be designed to enable the motor deployment charge as a back-up recovery system at apogee.
10. Electronic altimeters are required for primary deployment events (Apogee and Main) and be neatly wired and organized.
11. The “Center of Pressure” (CP) and the “Center of Gravity” (CG) must be indicated on rocket.

AISES CHALLENGE

Rocket Design Objectives: The objective of the WSGC 2018 First Nations Launch **AISESChallenge** is:

Student teams from AISES chapters will design and construct a high-power rocket, that will permit a safe flight. The challenge is called **Timed Duration Operation X2 (TDOX2)**. Each team will be timed on their pad preparation when they start mounting the rocket on the rail. This portion of the **Timed Duration Operation** includes positioning the rocket on the pad, arming the electronics, verbal checklist procedures, igniter insertion and hookup. Time will stop when the team lead concurs with the time keeper (RSO) that is positioned at the pad. Team with the shortest time will gain points on the Flight Readiness scoring.

The second **Timed Duration Operation X 2 (TDOX2)** challenge is: Deploying a main parachute (second deployment only) at a predetermined altitude. Time will begin as soon as the main parachute deploys from rocket. Time will stop when all parts of the airframe rests on the ground. Teams with the longest descent time will gain points on the flight performance scoring.

Competition Engineering Parameters: The engineering challenge is to perform two flights with the same impulse 54mm motor. The rocket shall be 4inch in diameter and weigh no less than 7 lbs and no more than 8 lbs, capable of performing a dual recovery system to an altitude of 4000 feet AGL.

The first **TimedDuration Operation** begins preparing your rocket for flight at the pad. There will be no collaborating with time keeper during pad timing preparation. After time has stopped indicated by the team lead and the RSO questions the team about the procedures and the rocket has to be corrected physically, time will start again. Time will stop when the team lead has indicated that all corrections are rectified. Teams must be able to fully prepare a check-off preflight checklist containing all functions and features of their designed rocket at the pad.

The second **Timed Duration Operation** begins (during flight descent) when the main parachute (second deployment) occurs. Time will continue during the descent. Time will stop when the complete airframe rests on the ground. In the event that the team's rocket is obscured by a tree line on its final descent and the timer is unable to see the rocket touchdown on the ground, three (3) seconds will be added. If the rocket lands in a tree, three (3) seconds will be added.

Additional Engineering Parameters: Student teams are required to design and fabricate a non- metallic nose cone for their rocket. No commercially purchased nose cones. The nose cone you intend to construct must be aerodynamic to withstand high velocities. Photos must be submitted during the construction stage of the nose cone. Payload bays and packages that contain altimeters or recording devices for flight must be neatly wired and organized.

All teams are expected to have a Safe Flight Mission. Students/Teams must conduct all work on the rocket and payload. No outside assistance is permitted (except for fabrication work such as machining plastic and metal parts). While no professional assistance is permitted, we encourage consultation with local or regional rocket safety professionals on safety matters and rocket design.

Team rocket must achieve an altitude of 3,500 feet min - 4,000 feet max AGL using one disposable 54mm J450 DM AeroTech motor.

Team participants will be evaluated in part on the accuracy of their projected apogee target on all flights.

1. Each team must assemble, fly, and successfully recover a "low-power" rocket provided by WSGC. Pictures of the team at their launch site with the rocket, before and after their launch, must be posted to WSGC's Facebook page prior to submitting the preliminary design report (PDR) and budget.
2. Photographs are required during the construction of your high power competition rocket, of your motor mount and fin fillet assembly process to ensure proper construction techniques has been implemented.
3. All projects during the construction process must have a minimum of two (2) scheduled virtual inspections with the designated safety officer (TBA).

4. All projects must be completely constructed (or 90%) ready to fly two (2) weeks prior to launch date. 90% = Airframe, motor mount, fins, payload airframe, couplers, bulkheads, should be permanently attached as designed. *NOTE: **Blue Tube, Sonotube airframes will not be allowed in the competition or the use of Plexiglas or Acrylic fins.**
5. All final competition project designs must have a documented flight/stable simulation profile (i.e. RockSim, Open Rocket, etc.)
6. All projects must have an aero-dynamic design. No odd rockets. **NOTE:** Odd rockets include flying pyramids, saucers, flying spools, etc.
7. Due to unpredictable cloud cover all projects must not exceed an altitude of 4000' AGL.
8. Two (2) disposable AeroTech J450 DM motors per team will be provided by WSGC.
9. All projects must be designed to enable the motor deployment charge as a back-up recovery system at apogee.
10. Team rocket must be 4 inches in diameter and weigh no less than 7 lbs and no more than 8 lbs.
11. Commercial electronic altimeters for Dual recovery (drogue and main) will be mandatory.
12. Payload bays that contain altimeters or recording devices for flight must be neatly wired and organized.
13. The "Center of Pressure" (CP) and the "Center of Gravity" (CG) must be indicated on rocket.

Award Acceptance Components: As part of the award acceptance, participants will submit the following documents on the WSGC application website under Program Applications/Your Applications:

Advisor

- Award Agreement Letter
- Invoice to National Space Grant Foundation

All Team Members

- Attend the Online Kick-off Meeting
- Attend the Online Design and Safety Review Meeting
- Oral Design Presentation
- Launch Competition

Team Lead

- Preliminary Design Report
- Preliminary Budget
- Demo Flight
- Critical Design Report
- Final Team Roster
- Flight Readiness Report
- Post Launch Assessment Report

Winning Teams

- NASA Center tour
- Participation in Student Launch at Marshall Space Flight Center or RockOn! At Wallops Flight Facility.

Please direct questions about the [First Nations Launch Program](#) to:

Frank Nobile

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Wisconsin Space Grant Consortium

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This funding opportunity is made available for the pursuit of space-related research and/or activities through the National Space Grant College and Fellowship Program: NASA Training Grant #NNX13E43A. Catalog of Federal Domestic Assistance (CFDA) number for this award is 43.008.

All awards are fully competitive awards of opportunity in which applications are reviewed by the WSGC Technical Advisory Panel and other experts as needed. Awards are made by the Assistant Director based on recommendations from the Associate Director.

Please follow us on   for program updates

