OVERVIEW

Participants analyze flight principles with a rubber band-powered model aircraft. Participants have the opportunity to build, fly, and adjust (trim) a model to make long endurance flights inside a contained airspace. Models must be of fixed-wing design and comply with all event specifications. Rotary-wing aircraft and aerostat (lighter than air) aircraft are NOT permitted.

ELIGIBILITY

Participants are limited to two (2) individuals per chapter, one (1) entry per individual.

TIME LIMITS

A. Entries must be started and completed during the current school year.

B. Participants are provided a minimum of thirty (30) minutes for trim flights at the event site.

C. Semifinalists will participate in a LEAP interview that will last a maximum of five (5) minutes.

LEAP LEADERSHIP RESUME/INTERVIEW

An Individual LEAP Leadership Resume is required for this event and must be submitted at event check-in. Semifinalists will respond to interview questions related to their submitted LEAP Resume for a maximum of five (5) minutes.

ATTIRE

Competition attire, as described in the National TSA Dress Code section of this guide, is required for this event.

PROCEDURE

A. Participants report to the event coordinator at the time and place stated in the conference program to sign up for flight heats and submit a LEAP Leadership Resume.
B. Participants arrive at the flying site for trim flying during the time designated for their heat. Time allotted for the trim portion of the event may be extended according to the number of participants and site scheduling.

C. Participants have two (2) opportunities to fly their models for official times.

D. Participants attend a pilot’s meeting to review the sequence for making the official flights.

E. In an orderly fashion, participants wind their models and proceed to a group timer for permission to fly.

F. Participants place their models on the floor and wait for the release signal from the timer. Timing begins when the model rises off the ground. A poster board launching platform will be provided.

G. Flight time ends when models hit the floor/ground or when they come to rest on an obstruction.

H. Only minor repairs are allowed during trim and time trials.

I. The timekeeper will record two (2) official flight times for each participant.

J. Immediately following the second flight, the participant will hand his/her motor to the judge for weighing.

K. Portfolios and models will be placed on flight boxes for judging. Judges will begin with the top flight times and will evaluate models, portfolios, and flight boxes until the top twelve semifinalists have been determined. Models that violate any part of Regulation C will be disqualified.

L. Ties are broken by determining the longest single flight time.

M. Semifinalists will be determined and posted by the CRC.

N. Semifinalist teams will report at the time and place stated in the conference program to sign up for a semifinalist LEAP interview.

O. The LEAP interview will last a maximum of five (5) minutes.

It is essential that students and advisors routinely check the TSA website (www.tsaweb.org) for updated information about TSA general rules and competitive events. This information is found on the website under Competitions/Updates. When students participate in any TSA competitive event, they are responsible for knowing of updates, changes, or clarification related to that event.
Read the General Rules and Regulations section in the front of this guide for information that applies to all of TSA’s competitive events.

REGULATIONS

A. Documentation materials (comprising “a portfolio”) are required and must be secured in a clear front report cover. The portfolio must include a flight log (see official sample that follows), with the previous ten (10) flights signed off on by the participant’s advisor. The report cover must include the following single-sided, 8½” x 11” pages, in this order:

1. The technical attributes of the design and a description and identification of parts
2. The modifications and an explanation of why each was developed
3. A technical review of the flight log that explains the trim adjustments and modifications required to improve endurance. Experts from the Academy of Model Aeronautics (AMA) and the National Free Flight Society (NFFS) may scrutinize this information for validity.
4. A graphic flow chart with pictures and design principles used in building and adjusting the model plane used for successful flights
5. Scaled Engineered Drawings of all structural parts of the plane

Flight Log

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<tr>
<th>Participant ID#:</th>
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<td>Flight #</td>
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B. The model and its parts must be contained in a flight box that does not exceed 25cm x 40cm x 60cm. Flight box hardware, such as hinges, handles, and wheels, are not measured.

C. Materials include the following:

1. Models are to be made of any materials that are typically found in model construction. This includes, but is not limited to: wood, foam, foam board, and plastics. Hardeners are permitted but are not required. The use of any materials that are deemed unsafe will not be tested and will be disqualified.

2. Models MUST use commercially available “fix-pitch” propeller or “fixed-pitch” propeller assembly: minimum of 140mm to a maximum of 170mm in diameter. Propellers may be trimmed, shaped, balanced, or re-pitched, but must remain fixed in pitch. Variable-pitch propellers and/or mechanisms are NOT permitted.

3. Fuselage dimension: minimum of 300mm in length, measured with prop assembly attached.

4. Wingspan: maximum of 45cm horizontally projected, wing chord 9cm projected.

5. Rubber motor: maximum weight of motor is 1.50 grams, including the O-rings. No length measurement is made. Spare motors are allowed during the official flights. Two (2) rubber O-rings may be used on the rubber motor loop for easier handling of wound motors.

6. Model weight: minimum of 7.0 grams, maximum of 21.0 grams. Models are weighed without motors attached. Clay is permitted for trim ballast. Model is weighed with clay ballast.

7. Steel wire may be used only for the propeller shaft, motor hook, landing gear, and the connection between fuselage and tail. Small plastic tubes, such as coffee stirrers, may be used.

8. The two wheels must be a minimum of 15mm in diameter, made of plastic or wood, and they must roll freely by the weight of the plane on a smooth surface.
D. Acceptable flight support equipment includes the following:
   1. Mechanical rubber motor winders or battery-powered motor winders may be used. No AC-powered winders are allowed.
   2. A winding stooge may be used to anchor the model while the motor is being wound. A person may not serve as a winding stooge.

E. Flight Endurance is an individual event. No one may assist the participant in any way during either trim or official flights. Violation of this regulation may result in disqualification.

F. When at rest, the landing gear must support the model without the fuselage and/or propeller touching the floor or launching pad.

G. LEAP Leadership Resume (see Forms Appendix or TSA website)/Interview—Students document, in the LEAP leadership resume (see resume template), the leadership skills that they have developed and demonstrated while working on this event. Semifinalists will respond to questions about the content of their resume as part of their LEAP interview. The LEAP Leadership Resume/Interview guidelines and other resources can be found on the TSA website.

EVALUATION

Evaluation is based on the duration of flight, documentation, flight log, flight box, and LEAP requirements. A bonus of ten (10) seconds is added to the flight time per flight if the model successfully lands on its wheels and comes to a rest on them. Please refer to the official rating form for more information.

NOTES

Two organizations—the Academy of Model Aeronautics (AMA) and the National Free Flight Society (NFFS)—welcome your inquiries and offer suggestions, help, and technical information concerning model aircraft and flight technology.

Contact the AMA: www.modelaircraft.org.
Contact NFFS: www.freeflight.org.
STEM INTEGRATION

This event aligns with the STEM educational standards noted below. Please refer to the STEM Integration section of this guide for more information.

Science, Technology, Engineering, Mathematics

TSA AND CAREERS

This competition connects to one or more of the career areas featured in the TSA AND CAREERS section of this guide. Use The Career Clusters chart and the TSA Competitions and The Career Clusters grid as resources for information about careers.

CAREERS RELATED TO THIS EVENT

Aeronautical engineer
Aircraft systems engineer
Physics teacher