



# Second Semester of the LaACES Program (2026)



# 2nd Semester Tasks



- Develop a student-led team organization with defined roles, responsibilities, and rules
  - These will be formalized in a “Team Contract.”
- Learn the basic Project Management skills to manage the payload development
- Develop a functioning payload based on the MegaSAT sensor board
  - This includes all electronics, software, and mechanical requirements
- Design, fabricate, calibrate, and test Payload to meet all program and payload requirements
  - Documenting this via the PDR, CDR, and FRR Documents
- Complete Thermal Vacuum System Testing
- Prove payload is worth flying at Flight Readiness Review
- Analyze and present flight results immediately following the flight



# Deliverables Schedule for LaACES Spring 2025

(LSU Team specific other campuses should adapt)



	<b>Deadline</b>
<b>Team Contract</b>	January 16, 2026
<b>Pre - PDR</b>	January 30, 2026
<b>PDR</b>	February 13, 2026
<b>PDR Presentation</b>	February 19, 2026
<b>Pre - CDR</b>	March 13, 2026
<b>CDR</b>	April 3, 2026
<b>CDR Presentation</b>	April 7, 2026
<b>Thermal / Vacuum Test (at LSU)</b>	April 17, 2026
<b>FRR</b>	May 15, 2025
<b>LaACES Launch Trip</b>	May 17, 2026 – May 22, 2026
<b>FRR Defense Presentation (at CSBF)</b>	May 18, 2026



# Payload Flight Requirements and Bases



	Requirement	Basis
Weight	Payload mass shall be less than 500 grams	FAA Total Weight Limit/FAA Individual Payload Limit
Density	Smallest payload surface must be larger than 10 in <sup>2</sup>	FAA Density Limit
Physical Interface	Payload shall have 2 <b>vertical penetrations through the entire payload:</b> -17 cm apart center to center -Inner Diameter 0.7 cm to 1.0 cm (to allow for plastic grommet) - Greater than 1 cm from any payload wall	Flight String integrations
Data	Enough data storage for 4 hours of recording	2.5 Hours of flight + setup time
Power	Enough power capacity for 4 hours	2.5 Hours of flight + setup time



# Expected Flight Conditions



	Parameter	Notes
Maximum Altitude	100,000 ft	May be reduced based of flight trajectory
Ascent Rate	1000 ft/min	Typical launch within 10% of target ascent rate
Maximum Temperate	35°	Ground conditions Eastern Texas/West Louisiana in May
Minimum Temperature	-60° C	Previous Flights minimum usually between -60° and -50° C
Minimum Pressure	10 mBar	Typical Pressure at 100,000 ft, may vary significantly
Launch Location	31.78 N, 95.72W	CSBF, Palestine, TX
Launch Time	7:00 Local (CDT), May 19, 2026	Tues. Launch, Wed. Backup



# Payload Flight – Waiver Requests



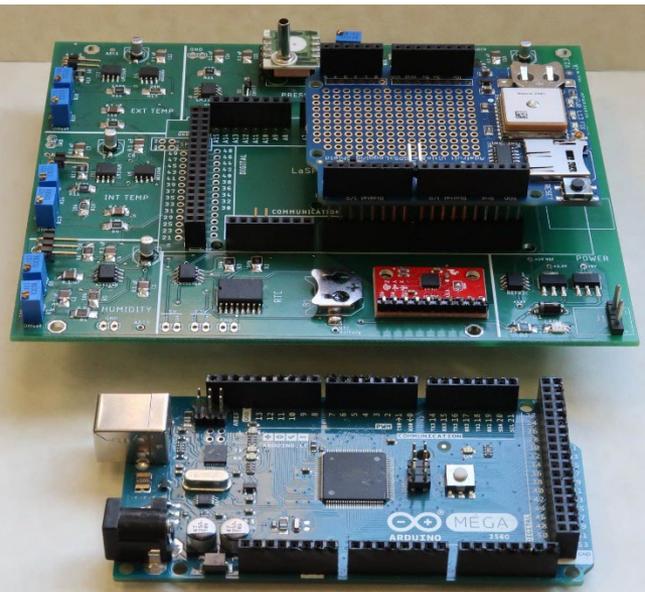
- Waiver request form to can be found on the LaACES website by the review templates
  - <https://laspace.lsu.edu/laaces/laaces-document-center/>
- Waivers must be specific
  - Ex. “Increase weight allowance to 600 grams” not “heavier payload”
- Must be appropriately justified
  - Ex. include a weight budget table and show how a goal or objective cannot be met without the waiver
- Do not assume waiver will be granted



# LaACES MegaSat Core



- The core of the payload will be the LaACES MegaSat, which includes a baseline set of sensors
- Will include the Adafruit Ultimate GPS Logger shield for GPS data throughout the flight and recording flight data on an SD card.



LaACES MegaSat payload stack

- Teams are encouraged to add additional sensors as needed using the prototyping areas or adding boards (a protoshield or custom PCB) to the stack
- Construction of the MegaSat shield is done in parallel with other required activities
- During payload development, teams should ensure:
  - MegaSAT systems are considered and included in all design documentation
  - To budget the time needed to construct, test, calibrate the MegaSat shield in work plans



# Payload Development Requires Team Cohesion



- The first activity for the Project Management unit is to have each team produce its own “Team Contract”
  - Teams will need to identify and write down their “rules of engagement” for how they will operate as a project team
  - The Team Contract should include items such as meeting schedule, document management, roles, task management, as well as joining and leaving a team



# Payload Development Requires Management



- Project Management lectures and materials are in Part II, Unit 7
  - <https://laspace.lsu.edu/laaces/student-balloon-course/>
- These lectures and materials cover the basics of project management necessary to develop a payload and complete the design reviews
- This process is an abbreviated version of the NASA Spaceflight Project Life Cycle
- These materials will be covered in January



# Supplemental Materials: Payload Structure and Design



- Some additional materials that can aid in the design and construction of a payload are included in Unit 8
- This includes:
  - Surface Mount Soldering
  - Detailed assembly instructions for the MegaSAT
  - Construction techniques and recommended materials for the payload box
  - Estimating power draw and calculating a power budget
- These lectures and materials are available for reference only (These will not be covered in a formal session)
- <https://laspace.lsu.edu/laaces/student-balloon-course/>



# The Project Reviews



- There are at least three major reviews during a project
  - Preliminary Design Review (PDR)
  - Critical Design Review (CDR)
  - Flight Readiness Review (FRR)
  - Teams will make 15 minute oral presentations covering these materials in addition to submitting their written documents
- The Pre-PDR and Pre-CDR divide the reviews into more manageable sections
- Each review has a somewhat different objective and emphasis and provides a check on project progress for all stakeholders
- Templates are provided for all review documents. Read all instructions contained within the template carefully!
- The required documents will be rated as Pass / Fail. A “Fail” on any document means the team will very likely not fly
- Teams should expect to revise and resubmit their reviews



# The Project Reviews Document Templates



- The templates provide a sequence of payload documentation from the initial organization and justification to the final defense of the payload flight worthiness
- Each template ADDs to the previous template so it is important for a student team to fully complete one document before moving on to the next.
  - Pre-Preliminary Design Review (Pre-PDR) template
  - Preliminary Design Review template (PDR)
  - Pre-Critical Design Review (Pre-CDR) template
  - Critical Design Review (CDR) template
  - Flight Readiness Review (FRR) template
- These templates can be found on the LaACES Document Center at <https://laspaces.lsu.edu/laaces/laaces-document-center/>
- Will talk about these reviews and expectations in the Project Management overview lecture.