



# TEAM NOTEBOOK

## FALL 2018

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Design Challenge Program  
NASA's Texas Space Grant Consortium

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## TEXAS SPACE GRANT CONSORTIUM wants YOU for the NASA DESIGN CHALLENGE!

- Form a team of 3-6 students
- Choose from more than 30 STEM topics
- Add a faculty advisor
- Apply today!

**[tsgc.utexas.edu/challenge](http://tsgc.utexas.edu/challenge)**

See website for topics, application, and more information.

- Semester-end Team Presentations to NASA personnel near JOHNSON SPACE CENTER
  - More than \$1000 in PROJECT FUNDING per team
- More than \$5000 in competitive student SCHOLARSHIPS for team performance

Early application deadline September 7, 2018.  
Final deadline September 14, 2018.





This Design Challenge Team Notebook is a reference manual - alphabetical by topic - that should prove helpful to the team from the beginning to the end of their participation in the Design Challenge program. All the information contained herein is available for download from the program website. Additional forms, applications, and samples are also available online. For any questions, please contact TSGC at [designchallenge@tsgc.utexas.edu](mailto:designchallenge@tsgc.utexas.edu).

**Summary of Design Challenge:** A group of students will work with their Faculty Advisor to choose a primary and alternate topic, and complete Base Level to apply to the program (submit the Design Brief application). Once accepted by TSGC, the members work through Team Organization, are put in contact with their NASA Mentor, and should begin submitting weekly Tuesday Tag-Ups. Throughout the semester the team will work towards accomplishing the milestones listed in the Timetable, with potential help from Collaborators and Field Experience. The team will first work on Level 1 including Patch Design, next on Level 2 (Midterm), and then toward Showcase and completing Level 3 (Final Report & Video). Money may be earned, received, and spent by the team for the project throughout the semester; these are fixed amounts; TSGC does not reimburse for expenses. Teams may also participate in Outreach to enhance their funding and experience. Reports throughout the semester should follow the Writing Guidelines. At Showcase, the teams compete for Scholarships.

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**Application Process:** The Design Brief communicates a new team’s intention to work on a particular topic and introduces the team to TSGC. Acceptance of the application by TSGC completes Base Level and sets the stage for participation in the TSGC Design Challenge.

- **First-semester teams** submit the Design Brief electronically to identify team members, department information, 1st & 2nd choice topics, and submit curriculum vitae.
- **Returning teams** will submit team changes to reinstate the team for continuation in the program.

**Team Pre-requisites:** All team members must meet the eligibility requirements for the call and institution in which they are enrolled and must meet NASA requirements for the design topics.

**TEAM RESPONSIBILITIES**

NEW FIRST-SEMESTER TEAMS WILL:	RETURNING SECOND-SEMESTER TEAMS WILL:
<ul style="list-style-type: none"> <li>▪ Organize a team               <ul style="list-style-type: none"> <li>○ Recruit a <u>Faculty Advisor</u></li> <li>○ Name the team</li> <li>○ Determine the student Team Leader and <u>Team Organization</u></li> </ul> </li> <li>▪ Review this Team Notebook</li> <li>▪ Determine 1<sup>st</sup> &amp; 2<sup>nd</sup> project choices</li> <li>▪ Submit the <u>Design Brief</u> application</li> <li>▪ Once accepted, begin weekly <u>Tuesday Tag-Ups</u> with Faculty Advisor, Mentor, and TSGC</li> </ul>	<ul style="list-style-type: none"> <li>▪ Re-establish team membership</li> <li>▪ Review the new program notebook</li> <li>▪ Report any team changes</li> <li>▪ Report any <u>Outreach</u> undertaken between semesters</li> <li>▪ Resume <u>Tuesday Tag-Ups</u> with <u>Faculty Advisor</u>, <u>Mentor</u>, and TSGC</li> </ul>
<p style="text-align: center;"><b>BASE LEVEL</b></p> <ul style="list-style-type: none"> <li>▪ Design Brief application. The electronic application form can be accessed here: <a href="http://bit.ly/2MwUxkG">http://bit.ly/2MwUxkG</a></li> <li>▪ One-page resume/c.v. for each new team member</li> </ul>	<p style="text-align: center;"><b>DEADLINE:</b> September 7 (early) September 14 (final)</p> <p style="text-align: center;"><b>AWARD: None</b></p>

**Notes:**

- Design Challenge is limited to a maximum of 14 teams.
- Half of the team topic assignments will be allocated after the early deadline.
- Final acceptance and topic assignments will be completed after the final deadline.
- Not all teams that apply may be accepted. Priority is given to senior-level capstone classes. Other considerations include maximizing the number of mentors, topics, and schools involved with the program. Additional considerations and restrictions may apply.
- Funding note: any federal budget delay or government shutdown will impact TSGC funding and could impact timeliness and availability of team earnings and scholarship dollars. Federal funding is not guaranteed.



**LEVEL 1** requires that the team seek ways to collaborate with individuals outside the primary team, beyond your group of students, Faculty Advisor, and NASA Mentor. Why?

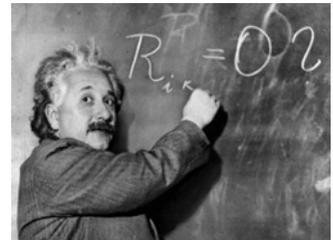


Outside collaboration is important because it brings the team new ideas on how to approach the design project: drawing on the experience of experts, exploring ideas of others, and gaining new design perspectives brings dimension and integrity to the project.

 <b>collaborate</b> <b>WITH WHOM?</b>	 <b>collaborate</b> <b>WHY?</b>	 <b>collaborate</b> <b>HOW?</b>
<p>Anyone who can offer the team advice, assistance or a new perspective on any aspect of the design effort, such as:</p> <ul style="list-style-type: none"> <li>- <i>Students</i> from another design team, another academic discipline, or another university</li> <li>- <i>Graduate students or postdocs</i> with expertise in your topic's research area</li> <li>- <i>Other Faculty, Technicians or Specialists</i> within the university</li> <li>- <i>Experts outside your university</i> from the academic or industry community</li> <li>- <i>Primary and Secondary Teachers</i> for outreach ideas</li> </ul>	<p>Proven benefits include:</p> <ul style="list-style-type: none"> <li>- <i>Design focus</i> gained from exposure to more diverse levels of experience</li> <li>- <i>Outside inspiration</i> motivates the team</li> <li>- <i>Background information</i> used in decision making is broadened</li> <li>- <i>Team perspective</i> is more diversified adding more validity to the solutions the team presents</li> <li>- <i>Creative and multi-disciplinary solutions</i> are generated</li> </ul>	<p>Finding people to collaborate with the team is as easy:</p> <ul style="list-style-type: none"> <li>- <i>Talk</i> to people in the community whose interests align with your project</li> <li>- <i>Search</i> the web for related research to find unexpected sources and contact authors</li> <li>- <i>Meet</i> with your collaborators; take a field trip or invite them to a team meeting</li> <li>- <i>Communicate</i> openly and often among team members and collaborators</li> <li>- <i>Create</i> a team Facebook page to share information and progress</li> </ul>

	<b>DESIGN CHALLENGE PROGRAM</b>
	<b>FALL 2018</b>
	<b>FACULTY ADVISOR</b>

Each team is required to have a Faculty Advisor to oversee team progress and advise the team. This is an easy requirement to fulfill since most teams are already enrolled in a course led by member of your institution's faculty. Teams should work efficiently with their advisor, since working with the Design Challenge team will add a time commitment to the advisor's already busy schedule.



ADVISOR ROLE	EXPECTATIONS
<b>FACULTY MEMBER</b>	<ul style="list-style-type: none"> <li>- Instructor of an organized course or independent study</li> <li>- Assures the team is academically capable and prepared for project</li> <li>- Facilitates team/mentor communication for discussion of scope of research and <u>Mentor's</u> expectations</li> <li>- Helps direct and review the team's report writing</li> <li>- Verifies that design activity is the work of the student team members and that all members are contributing</li> <li>- Attends TSGC Design Challenge <u>Showcase</u> with the team, or designates a representative from the team's institution to attend on his/her behalf</li> </ul>
<b>PRINCIPLE INVESTIGATOR</b>	<ul style="list-style-type: none"> <li>- Oversees initial set up and review of team funding</li> <li>- Ensures that the team uses awarded funds as intended</li> <li>- Keeps track of funds earned by the team to avoid overspending</li> <li>- Identifies an account within the department to support the team in the interim between award payments</li> <li>- Reinforces that team members should <i>not</i> use their personal funds for team expenses</li> <li>- Submits invoice in a timely manner to TSGC for award earnings</li> <li>- Instructs the team on departmental policies for travel arrangements, use of private car, per diem, car rental, tax exemptions, etc.</li> </ul>
<b>PROJECT MANAGER</b>	<ul style="list-style-type: none"> <li>- Helps the team focus on technical aspects of the design as it moves toward meeting the Level requirements in a timely manner</li> <li>- Evaluates the team's work for meeting <u>Mentor</u> expectations and high academic standards</li> <li>- Helps with interpreting reviewer comments and suggesting solutions</li> <li>- Remains attentive to team progress: aware of what the team is submitting to TSGC including <u>Tuesday Tag-Ups</u>; brings any technical, financial or personnel issues to the attention of TSGC</li> </ul>

NOTE: Each semester, for NASA reporting purposes, we need the Faculty Mentor to provide a cost-share estimate for his/her work with the Design Challenge team. A line for this purpose is included on the team invoice form.



Teams are encouraged to use the Design Challenge as an opportunity to gain Field Experience, taking advantage of the opportunity to explore beyond their campus community. Teams are encouraged to use earnings for travel and per diem associated with team field trips.

A team trip may be taken to enhance the team's knowledge of:

- Design project
- Associated research
- Careers & workplace
- STEM related activities
- Collaboration opportunity
- Invention & design

Acceptable ways to use field experience funds include:

- NASA JSC or NASA-contractor facility visit
- Project-associated tour of a research facility
- Explore degree or career opportunities
- Travel to meet with Mentor or Collaborators
- Attend a professional-level meeting or conference



• Check with your Faculty Advisor or TSGC if you have questions about whether or not a field trip is acceptable for use of team earnings.

• Check with your department accounting contact in advance to find out how to be reimbursed for any travel-related charges you incur. And be sure to let your department's administrative desk know that the team intends to travel – there may be forms that you will be required to complete before your trip.

Teams are encouraged to document the field experience with photos. Include a

report and photos as an Appendix to any Level report, post to the team's online presence, and enhance your team's position for Showcase awards.



	<b>DESIGN CHALLENGE PROGRAM</b>
	<b>FALL 2018</b>
	<b>LEVEL 1 (Proposal/Summary of Work, Photos &amp; Patch)</b>

During the program milestone called Level 1, a first-semester team’s research and design solutions will begin to take form; a second-semester team advances work started the previous semester.

- **First-semester teams** communicate design project research with the submission of a Level 1 Proposal to TSGC.
- **Second-semester teams** submit an update on how they propose to continue work on the project via submission of a Level 1 Summary of Work report to TSGC.

<b>LEVEL 1 - RESPONSIBILITIES</b>	
<b>SEMESTER I</b>	<b>SEMESTER II</b>
<ul style="list-style-type: none"> <li>▪ Submit a formal proposal (PDF format) <ul style="list-style-type: none"> <li>- Adhere to <u>Writing Guidelines</u></li> <li>- Include all necessary sections</li> <li>- Demonstrate interaction with <u>Mentor</u></li> <li>- Indicate strategies for <u>Collaborators</u></li> <li>- State design objective &amp; specifications</li> <li>- Present basic design plan/methodology</li> <li>- Present draft timetable &amp; budget plan</li> <li>- List any accomplishments to date</li> <li>- Document references &amp; resources</li> </ul> </li> <li>▪ Submit weekly <u>Tuesday Tag-Ups</u></li> </ul>	<ul style="list-style-type: none"> <li>▪ Submit a <u>Summary of Work</u> <ul style="list-style-type: none"> <li>- Adhere to <u>Writing Guidelines</u></li> <li>- Provide a project update including: <ul style="list-style-type: none"> <li>• Overview of project technical details and results</li> <li>• Key accomplishments to date</li> <li>• Budget &amp; timetable review</li> </ul> </li> <li>- Address objectives for continuation, plans for testing, and collecting data</li> <li>- Include <u>Field Experience</u> and <u>Outreach</u> reports</li> </ul> </li> <li>▪ Submit weekly <u>Tuesday Tag-Ups</u></li> </ul>
<p style="text-align: center;"><b>LEVEL 1</b></p> <ul style="list-style-type: none"> <li>▪ <u>Proposal</u> (Semester I teams) or <u>Summary of Work</u> (Semester II teams)</li> <li>▪ <u>Digital photographs</u> of: (a) head shot of each team member individually, and (b) a group photo of the entire team</li> <li>▪ <u>Patch design</u> and description (within the report). Also include the patch design as a separate high-quality file attachment</li> </ul>	<p><b>DEADLINE</b> Friday, September 28, 2018</p> <hr/> <p><b>TEAM AWARD \$100</b></p>

**Notes:**

- Submit the Level 1 report (PDF format) to [designchallenge@tsgc.utexas.edu](mailto:designchallenge@tsgc.utexas.edu) by the deadline. Copy your team’s Faculty Advisor, Mentor, and any Collaborators.
- Photos are used for Showcase and other promotional materials and are needed by the Level 1 deadline to prepare printing.
- All submissions must meet the satisfaction of TSGC.



<b>DESIGN CHALLENGE PROGRAM</b>
<b>FALL 2018</b>
<b>LEVEL 2 (Midterm Report)</b>

The Level 2 milestone is the **Midterm Report**. Design concepts take shape for Semester I teams, customer (Mentor) needs are addressed, and a method of down-selection is implemented. Semester II teams are fine-tuning designs and constructing models or prototypes.

*Note concerning Class Reports: Design Challenge requirements are not intended to cause students to duplicate work. Teams required by their instructor to submit a Midterm Report in a specific format may submit a copy of that report in lieu of the Design Challenge-style Report, as long as all necessary information is included or added. Contact TSGC with any questions.*

<b>LEVEL 2 - RESPONSIBILITIES</b>	
<b>SEMESTER I</b>	<b>SEMESTER II</b>
<ul style="list-style-type: none"> <li>▪ Submit a Midterm Report               <ul style="list-style-type: none"> <li>- Follow <u>Writing Guidelines</u></li> <li>- Use quantifiable requirements/constraints to demonstrate customer needs</li> <li>- Profile concept variants</li> <li>- Illustrate method for determining concept feasibility/down-selection</li> <li>- Consider safety &amp; risk factors</li> <li>- Incorporate visual elements to communicate concepts to reader</li> <li>- Adjust project timeline &amp; budget plan</li> </ul> </li> <li>▪ Appendices:               <ul style="list-style-type: none"> <li>- Outreach report (if completed)</li> <li>- Budget Report</li> <li>- Team Trip Report (<u>Field Experience</u>)</li> <li>- Team Patch image with description</li> <li>- Pugh Chart/decision matrix</li> <li>- Others as needed</li> </ul> </li> <li>▪ Submit weekly <u>Tuesday Tag-Ups</u></li> </ul>	<ul style="list-style-type: none"> <li>▪ Submit Midterm Report               <ul style="list-style-type: none"> <li>- Follow <u>Writing Guidelines</u></li> <li>- Provide an update on project status</li> <li>- Discuss any issues and modifications</li> <li>- Address safety considerations</li> <li>- Report testing data and preliminary results</li> <li>- Estimate actual cost to develop for production</li> <li>- Adjust project timeline as needed</li> </ul> </li> <li>▪ Appendices:               <ul style="list-style-type: none"> <li>- Outreach report (if completed)</li> <li>- Budget Report</li> <li>- Team Trip Report (<u>Field Experience</u>)</li> <li>- Team Patch image with description</li> <li>- Pugh chart/decision matrix</li> <li>- Others as needed</li> </ul> </li> <li>▪ Submit weekly <u>Tuesday-Tag Ups</u></li> </ul>

<p style="text-align: center;"><b>LEVEL 2</b></p> <ul style="list-style-type: none"> <li>▪ Send the Midterm Report / Midterm SOW (PDF format) to TSGC, Mentor, Faculty Advisor, and Collaborators</li> <li>▪ Submit text for the Team Profile page</li> <li>▪ Continue Tuesday Tag-Ups</li> </ul>	<p><b>DEADLINE</b> Monday, October 15, 2018</p> <hr/> <p><b>TEAM AWARD \$200</b></p>
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**Notes:**

- Submit the Level 2 report (PDF) to [designchallenge@tsgc.utexas.edu](mailto:designchallenge@tsgc.utexas.edu) by the deadline. Copy your team's Faculty Advisor, Mentor, and Collaborators.
- Team member background information (submit plain text only) is needed for the Team Profile Page. Review the example Team Profile page for suggested input ([http://www.tsgc.utexas.edu/challenge/PDF/team\\_profile\\_page\\_examples.pdf](http://www.tsgc.utexas.edu/challenge/PDF/team_profile_page_examples.pdf)).

	<b>DESIGN CHALLENGE PROGRAM</b>
	<b>FALL 2018</b>
	<b>LEVEL 3 (Final Report &amp; Video)</b>

Level 3 marks the end of the semester: design-related activities come to a close, testing and data collection is completed, and conclusions are drawn. Final results are prepared and delivered via a poster/model display and oral presentation at the Design Challenge Showcase, and lastly, incorporate feedback into the Level 3 **Final Report and Video**.

*Note concerning Class Reports: Design Challenge requirements are not intended to cause students to duplicate work. Teams required by their instructor to submit a Final Report in a specific format may submit a copy of that report in lieu of the Design Challenge-style Report, as long as all necessary information is included or added. Contact TSGC with any questions.*

<b>LEVEL 3 - RESPONSIBILITIES</b>	
<ul style="list-style-type: none"> <li>▪ Continue <u>Tuesday Tag-Ups</u> through the Tuesday after Showcase (comment on the event)</li> <li>▪ Finalize all design-related activity, prepare display and presentation for <u>Showcase</u></li> <li>▪ Participate in the Showcase               <ul style="list-style-type: none"> <li>- <u>All team members are expected to Showcase</u> (contact TSGC with any conflicts)                   <ul style="list-style-type: none"> <li>○ Attend gathering on Sunday evening and Showcase all day Monday</li> </ul> </li> <li>- Present a team-designed Poster/Model Display</li> <li>- Deliver an Oral Presentation as a team (all team members must speak)</li> </ul> </li> <li>• Complete the Final Report: Deliver electronic PDF report to TSGC, <u>Mentor</u>, <u>Faculty Advisor</u> and other <u>Collaborators</u></li> <li>▪ Create a short video that promotes TSGC Design Challenge, your team and school, and your project. Maximum 5 minutes. Post anywhere publicly and permanently available. Here is an example: <a href="https://youtu.be/NPYx-CIYG8s">https://youtu.be/NPYx-CIYG8s</a></li> </ul>	
<b>LEVEL 3</b>	<b>DEADLINES:</b> Showcase Monday, November 13 Final Report & Video due Friday, November 30, 2018
<ul style="list-style-type: none"> <li>▪ Showcase Participation: (a) Poster/Model display and (b) Oral Presentation</li> <li>▪ Final Report (PDF format) to TGC, Mentor, Faculty Advisor, Collaborators</li> <li>▪ Video</li> </ul>	<b>TEAM AWARD \$700</b>

**Notes:**

- Participation in Showcase is mandatory. Please plan to attend Showcase for the entire day on Monday. Contact TSGC if any members have a conflict.
- The \$700 Level 3 award includes built-in funding for travel expenses to Showcase.
- All Level 3 requirements must be completed to the satisfaction of TSGC as outlined above to qualify for team earnings (Money I - Earning) and awards (Scholarships).
- Registration for Showcase will occur approximately 3 weeks before the event. After all teams have confirmed registration, the Monday presentation schedule will be finalized, and a *Showcase Registration Information Packet* will be sent to all participants providing complete details of the event.
- If institution timelines/closures will prevent timely submission of team's end-of-semester invoice, please contact TSGC as soon as possible to make other arrangements.



Each NASA or contractor research group submitting a design topic to the Design Challenge agrees to provide a Mentor point-of-contact to work with the student design team. Once teams and projects are selected, TSGC notifies the Mentor that a team is forming and provides contact information to everyone involved.

**WHAT THE TEAM SHOULD KNOW ABOUT THE MENTOR:**

<p><b>THE TEAM'S CUSTOMER</b></p>	<ul style="list-style-type: none"> <li>- Think of the team's Mentor as the design team's customer.</li> <li>- Work with your Mentor to establish design specification needs immediately upon forming the team.</li> <li>- The team's <u>Faculty Advisor</u> is encouraged to contact the Mentor too, to ensure that the team's plans align with expectations.</li> <li>- Run ideas by the Mentor to make sure the design is on track.</li> </ul>
<p><b>HOW MUCH TIME WILL THE MENTOR SPEND WITH THE TEAM?</b></p>	<ul style="list-style-type: none"> <li>- Mentors volunteer their time to work with Design Challenge teams, so remember that his/her regular job comes first.</li> <li>- If Mentor availability becomes an issue, let TSGC know so that we can help find additional resources.</li> </ul>
<p><b>WHAT SHOULD THE TEAM EXPECT FROM THE MENTOR?</b></p>	<ul style="list-style-type: none"> <li>- The Mentor offers the team a NASA-affiliated project that includes background info, technical specifications, and design parameters.</li> <li>- Ask your Mentor to review the team's <u>Level 1</u> (Proposal/Statement of Work) and <u>Level 2</u> (Midterm) Reports before submission.</li> <li>- Mentors typically make a best effort to attend <u>Showcase</u></li> <li>- Mentors generally let the team define the course of the project, while at the same time guiding the team toward the goal.</li> <li>- The Mentor is not expected to provide any resources (hardware, software, materials) for construction or testing, although they may.</li> <li>- A <u>Field Experience</u> site visit for the team might be offered (or ask if possible), but should not be expected; the Mentor is not expected to travel to visit the team.</li> </ul>
<p><b>WHAT SHOULD THE MENTOR EXPECT FROM THE TEAM?</b></p>	<ul style="list-style-type: none"> <li>- Regular weekly updates via the <u>Tuesday Tag-Ups</u>.</li> <li>- Copies of the milestone report: <u>Level 1</u> (Proposal/Statement of Work), <u>Level 2 (Midterm)</u>, and <u>Level 3 (Final)</u> Reports</li> <li>- The Mentor is not entitled to any items purchased by the team with TSGC funds (models, equipment, software or parts), although the team/department/institution may donate them.</li> <li>- If the Mentor agrees to loan the team equipment, parts, or samples, the expectations need to be clear – and the team responsible – in ensuring their return at the end of the project.</li> </ul>

	<b>DESIGN CHALLENGE PROGRAM</b>	
	<b>FALL 2018</b>	
	<b>MONEY I – EARNING</b>	

<b>TEAM EARNINGS FOR COMPLETING MILESTONES</b>
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Level 1 (Proposal)	\$100	Report, team & individual photos, and patch
Level 2 (Midterm)	\$200	Report and team profile page
Level 3 (Final)	\$700	Showcase participation and report & video
Outreach	\$200	Report and photos

<b>SCHOLARSHIP OPPORTUNITIES for TEAM PERFORMANCE</b>
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Best of Category Awards	\$TBD	Achievement-based awards for each member of the team in the form of scholarships.
Top Design Team	\$TBD	

<b>SUPPLEMENTAL CONSTRUCTION FUNDS</b>
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Special Construction or Travel Grants	\$TBD	Amount depends on TSGC resource level each semester. If your travel expenses are excessively large or your anticipated prototype construction budget exceeds your anticipated team earnings, contact TSGC to see if supplemental special funding is available.
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**Notes:**

- TSGC does not reimburse teams directly. TSGC pays your department the team earnings after they have been earned and invoiced, then your department reimburses the team.
- The team may plan a reasonable budget of \$1000 for the semester based on the three milestones (or \$1200 if completing Outreach). Note that your department will reimburse your Showcase travel expenses from this amount. A good estimate of the hotel group rate is \$120 per room. Your department accounting office can help with estimating mileage and other costs.
- Ask your Faculty Advisor if the department may be able to advance funds until the team funds transfer from TSGC to your department. Team members are cautioned against using their own money to pay for project expenses. Understand that university paperwork may move slowly – reimbursement may take longer than your budget can spare.
- Your institution accountant has no idea how much money the team has earned – or what a Level award is – but does know how to get the money to pay for your project. Work closely with this person to establish a team account and budget.



<b>EIGHT EASY STEPS TO RECEIVING TEAM FUNDING</b>	
1	Team submits Design Brief (Base Level) to TSGC
2	TSGC sends an acceptance letter to the Team and Faculty Advisor
3	Faculty Advisor takes letter to department accounting office to establish a team account
4	Team account is established at your department
5	TSGC awards team funds for completing milestones
6	Department submits an invoice to TSGC, either as each milestone is completed, or for the total team earnings at the end of the semester
7	TSGC authorizes payment to the team's department/institution and funds are transferred
8	Faculty Advisor and team members can get reimbursed for travel and project expenses through their department



**Where does the money come from?** The funding supporting the program is delivered from NASA to TSGC. The official term for this is “federal pass-through grant.” TSGC passes the money that your team earns to your department by way of an Award Agreement between TSGC (located at the University of Texas at Austin) and the institution.

**How does the money get to the team’s institution?** At the beginning of the semester, TSGC will send the Design Challenge acceptance letter to your team’s Faculty Advisor, who will pass it on to your department accountant. This letter provides assurance that TSGC will pay your department for any money it spends to support the team up to the milestone award levels that the team earns. In most cases, this letter paves the way for the Faculty Advisor to set up a team account.

**Tips:**

- Save receipts to be reimbursed by your department. TSGC requires a single invoice from your department with team earnings, not expenditures.
- Get to know your department accountant who is responsible for processing your travel paperwork and managing the team account.
- Budget carefully. TSGC is not responsible for covering team over-expenditure.
- Avoid paying unnecessary taxes. Universities are exempt from paying certain kinds of sales or hotel tax. Talk to your accountant about how to avoid paying taxes on supplies and travel. TSGC will include a tax-exempt form in your packet for the Showcase hotel.

**Funding note:** any federal budget delay or government shutdown will impact TSGC funding and could impact timeliness and availability of team earnings and scholarships. Federal funding is not guaranteed.



### How do Team Earnings work?

*Project/Travel Funds:* At the end of the semester, TSGC sends the Team and Faculty Advisor a letter telling the team how much it has earned. To retrieve the earnings, TSGC must receive a signed invoice from your institution from the team Faculty Advisor, department accountant, or university contracts contact. A sample invoice will be emailed to the team, or contact [designchallenge@tsgc.utexas.edu](mailto:designchallenge@tsgc.utexas.edu) for a copy. The invoice may be submitted as funds are earned at each level, or saved until the end of the semester when a total award amount is determined.

*Rules of use:* NASA is a federal agency; therefore, some restrictions exist on how team money can be spent or distributed. For example, the following expenditures are generally considered allowable:

- Reference materials
- Software
- Team travel
- Equipment rental
- Display materials
- Meeting expenses
- Postage
- Model materials
- Registration fees

And these expenditures are *not* allowable:

- Non-project travel
- Alcohol
- Regular meals
- Activity fees
- Entertainment
- Personal use

All funds received from TSGC from milestone earnings must be used for the direct purpose of addressing the Design Challenge topic. Funds remaining at the completion of the team’s participation will remain with the Faculty Advisor and may be spent at his/her discretion.

### How do Scholarship Funds work?

If your team earns scholarship awards at Showcase, each team member must submit a “Scholarship Forms Packet” to TSGC before dollars can be distributed. This packet will be sent to applicable teams and provides TSGC with information necessary for the disbursement of NASA/TSGC funds. This money is delivered via a separate TSGC account directly to the students and *there are no restrictions on the use of scholarship funds.*

### Notes:

- Your Faculty Advisor or department accountant has knowledge of what type of spending is considered eligible for reimbursement. Always check on your institution’s rules for reimbursement before spending.
- Funds from TSGC are for the sole use of the team members and Faculty Advisor.



## FREQUENTLY ASKED QUESTIONS ABOUT TEAM SPENDING

### **Q. We've finished and are under budget. How can leftover funds be used?**

A. Any team earnings remaining at the end of either semester may be used at the discretion of the Faculty Advisor. Here are some examples of how faculty have put surplus earnings to good use:

- For next semester's team expenses or for next year's Design Challenge team
- End of semester team celebration
- Distributing leftover funds as scholarships to the team members
- Display case for use by the department to house student projects and awards.
- Software, hardware, books, or lab equipment for classroom use

Policies vary by institution, so don't assume that because one institution spent funds in a particular way that your institution will allow the same thing. Check with your department first.

### **Q. I need to purchase a (new suit / haircut / makeover / tires / car repair / etc.) for Showcase. Is that allowed?**

No. Only project related expenses are allowed from team earnings. Your department may help the team secure a rental car and this can be charged to team funds. However, any scholarships that the team members may be awarded after Showcase are unrestricted in their use.

### **Q. Why do we have to use our own credit cards to pay for our Showcase expenses?**

A. Typically when on university travel, expenses are paid with a personal credit card and reimbursement is received later after submission of a travel expense form and receipts to *your department*. Do not submit receipts to TSGC. TSGC is able to set up the group rate at the hotel but cannot directly pay or reimburse for the rooms. Contact your Faculty Advisor to see if your department can book the rooms for your team.

### **Q. What happens if we go over budget?**

A. The consequences are up to your department. If you paid for any expenses out of pocket, you may not be able to get reimbursed. Only your department can reimburse you for team expenses, TSGC cannot. Check with your Faculty Advisor before spending any funds.

**Have other money questions?** Contact [designchallenge@tsgc.utexas.edu](mailto:designchallenge@tsgc.utexas.edu)



**Outreach**

Participation in outreach activities is highly encouraged among all NASA Centers and employees as a way to spread excitement about Science, Technology, Engineering and Mathematics (STEM) to the community at large. Outreach offers each team the opportunity to get involved and, at the same time, earn additional project funding. EPO activities can be conducted with K-12 classrooms, Girl/Boy Scouts, club meetings, museum or science center events, or within your campus community.

**OUTREACH – GUIDELINES**

- Present, demonstrate, or display any STEM-related activity with an audience.
- Incorporate outreach at any time during the semester (or between semesters for two-semester teams)
- Award available once per semester
- Document the activity in a report, or as an appendix to your team’s Level 2 (Midterm) or Level 3 (Final) Report
- Report guidelines:
  - 500 words minimum, 1 or more photos
  - Include type and name of the outreach location
  - Indicate type and level of the audience
  - Provide photos of the team conducting the activity
  - Include a letter from the event sponsor/coordinator or your Faculty Advisor
  - Include a description, copy, photo, or sample of the activity
  - Describe what the team learned though this outreach, what questions or feedback the team received, and what impact the team believes they made



**OUTREACH**

- Outreach Report including photos and full documentation

**FINAL DEADLINE:**

Available at any time while the team is active, once per semester

**TEAM AWARD \$200**



In the spirit of NASA tradition, Design Challenge teams are required to submit a team-created patch for their Level 1 report. Have some fun and call on your creative side to design a patch that represents the team and its mission. If no one on your team is graphically inclined, try collaborating with someone outside the team who is.



Since Gemini 5 in 1965, each crew assigned to a NASA space flight mission has designed its own mission patch. Included in the patch design are various elements that represent the crew, the mission, the mission number, and the fact that they are all “in this together.” The original TSGC Design Challenge mission patch was designed during the program’s first official semester of operation in Spring 2003. Each semester since, the original design has been updated so that each semester’s program patch is unique.

TEAM PATCH DESIGN SPECIFICATIONS	
<b>Drawing</b>	<ul style="list-style-type: none"> <li>• Use any program: vector-based (line art/drawing) or a raster or bit-mapped (photograph-like images)</li> <li>• Hand drawn is fine too. Draw large to scan at high resolution.</li> <li>• The design may be simple or detailed.</li> </ul>
<b>Size and shape</b>	<ul style="list-style-type: none"> <li>• The patch can be any shape</li> <li>• The patch may be constructed at any size, but remember that the final size is meant to be about 4 inches width and height.</li> </ul>
<b>Format</b>	<ul style="list-style-type: none"> <li>• EPS format preferred. JPG and TIFF are acceptable.</li> <li>• High resolution: 300 dpi or higher</li> </ul>
<b>Colors</b>	<ul style="list-style-type: none"> <li>• Colors should be formatted as RGB or CMYK.</li> </ul>
<b>Delivery</b>	<ul style="list-style-type: none"> <li>• Send the patch to TSGC as a separate high-res attachment.</li> <li>• Also include the patch image and description in the Level 1 Report.</li> </ul>

A few samples of team patches are displayed below. More may be found on the website.





## Scholarship Awards for Exceptional Performance

The Design Challenge Showcase near Johnson Space Center in Houston marks the end of the semester and offers teams the opportunity to present their projects to NASA personnel and academic and industry partners. This event also provides TSGC the opportunity to reward team accomplishments in a variety of areas including *Best Poster*, *Best Model*, *Best Oral Presentation*, *Audience Favorite*, and other areas. Because a “Best” showing requires exceptional high-level work, these awards make up the competitive component of program participation. Showcase awards are provided directly to team members as scholarships and are therefore not restricted in manner of use. Award amounts may vary significantly each semester and are limited by the level of TSGC scholarship funding available.



The highest award is for the *Top Design Team*, based on the sum of team achievements throughout the semester and at Showcase. What criteria determine the *Top Design Team*? A combination of outstanding team and design characteristics are considered in addition to the overall success of the project. These might include team dynamics and leadership, administrative details (meeting deadlines, writing thoroughly and clearly), reviewer feedback, design innovation, as well as placement in poster, model and oral presentation judging.

**How do Scholarship Funds work?** If your team earns scholarship awards at Showcase, each team member must submit a “Scholarship Forms Packet” to TSGC before money can be distributed. This packet will be sent to applicable teams and provides TSGC with information necessary for the disbursement of NASA/TSGC funds. There are no restrictions on the use of scholarship award funds.





**Showcase Team Dinner: Sunday, November 11, 2018**

**Showcase Presentations: Monday, November 12, 2018**  
**South Shore Harbour Resort & Conference Center, League City, TX**

The Showcase provides teams with a formal venue where they can display and discuss their design efforts and accomplishments. The event kicks off with an informal meet & greet dinner Sunday night for the teams and their guests.



#### **Audience:**

Teams can expect a medium-sized audience (75-100 people) that includes other student teams and their Faculty Advisors and Mentors, NASA/JSC community and industry partners, TSGC representatives, educators and other invited guests.

#### **Awards:**

Team recognition and achievement awards (Scholarships) are presented at the conclusion of the Showcase. Several audience members act as judges for the poster, model and oral presentations. Continuing (Sem I of II) and final-semester teams may be judged separately.

Two methods are used to convey the team's work to the Showcase audience:

- Poster/Model presentation and table display: Guests walk around to view the displays and talk informally with the teams. This typically lasts a couple hours in the morning during breakfast and during scheduled breaks between talks.
- Oral presentation: Formal team presentations in the late morning and afternoon. A short question & answer session follows each team's talk. A catered lunch break is provided.

#### **General Guidelines:**

- Attendance is required. We ask that all team members remain present throughout the Showcase. Contact TSGC ahead of time if any team member has a schedule conflict.
- Guests are welcome. Faculty Advisors and Mentors will be invited by TSGC. Teams may invite partners, family, Collaborators and other colleagues.
- Attire is business casual.
- Continental breakfast and luncheon are served. The Showcase registration forms will include a place to specify dietary restrictions.



**Poster Presentation:** Each team's poster display will profile the design project with textual and visual information. Easels and tables are supplied. Models or prototypes are strongly encouraged. Teams may display illustrations, photos, charts, scrapbook, etc.



### SAMPLE POSTER PRESENTATIONS / TABLE DISPLAYS



#### Oral Presentation:

- Slides are loaded onto the computer during set up time on Monday morning.
- Teams may use available TSGC laptops (Mac or Windows) or bring their own.
- Teams are generally allowed a maximum 20 minutes total.
- A question and answer session follows each team's talk (plan a 15-minute talk plus 5 minutes for Q&A)
- Speaking roles should rotate through all teams members.
- Schedule: The total number of teams participating this semester will impact presentation time allowance, transitions, and scheduled breaks. More details with set times will be provided after Showcase registration, approximately 3 weeks before the event.

#### Notes:

- Keep slide content simple and easy for the audience to read.
- Speakers should not read from the slides but should use the bullet points to add details and descriptions to the topic being presented.
- Avoid slides with too much information. If the material is necessary to show on the screen, use two sides instead of crowding information onto one.
- Bullet the main points to be addressed.
- Try to limit each slide to 5-6 bullets, and each bullet to 8-10 words.
- Use plenty of visuals (photos, graphs, drawings) to enhance ideas presented.
- Estimate that your team's presentation time will be about twenty minutes.
- Allow time to discuss background material. Most of the audience is new to your topic.
- Consider the effect of color and layout on the audience.
- Dark background with a light text shows up best in meeting rooms.
- Text should be large enough for the audience to read, about 24-point font (30 or larger for titles, no smaller than 20 for sub-bulleted information).
- Practice. Practice. Practice



Finding the right student members to comprise the design team can sometimes be a very challenging aspect of the program. Sometimes the team members are assigned to work together by the course instructor. However the student teams are put together, they are a group of individuals who may not be used to working closely alongside others. Learning to draw upon each team member's strengths while maintaining good group dynamics is critical to team success.

NASA has strong history of putting successful teams together to accomplish a monumental goal. Experts in team organization offer the following tips on getting a student design team off to a good start.

**Get Acquainted.** Make an effort to get to know each other and learn what each team member brings to the table. Meet outside class to watch a space-themed movie like *Apollo 13*, *Gravity*, or *The Martian*. Discuss the teamwork that was necessary to reach a successful conclusion.

**Establish Group Goals.** Sometimes the “big picture” can overwhelm less experienced team members; therefore, use Design Challenge milestones to help the team set incremental goals.

**Strike an Expectation Agreement.** The team, as a group, will not be successful if team members don't agree on what is to be expected from individuals and the group as a whole. It works best if expectations are established early:

- What is expected from each team member?
- What level of participation is required from each member to guarantee success?
- How do you identify and what happens if expectations are not met?

**Establish Roles** for individual team members and set expectations for each:

- Read through the list of milestones to see if specific requirements suit the talents of someone on the team.
- After a Team Leader is identified, assign others to track the budget, take photos, proofread, program, contact Collaborators, plan the Field Experience, Outreach, etc.

**Be organized.** Although each team designates a Team Leader, a single person cannot get the team through successful project completion alone. Every person in the group will need to devote substantial time and effort to the project.

**Communicate.** Make sure everyone knows what's going on with the team and the design. The team leader is usually the primary contact between the team members and with TSGC, Faculty Advisor, Mentor and others. An alternate member or a “Communication Officer” may serve instead or as a back up.

**Address Problems Early.** Keep your Faculty Advisor informed of any team problems, and keep your Mentor informed of any technical issues. Plan a strategy for addressing problems to keep them from impacting the team's long-term design effort.



	<b>DESIGN CHALLENGE PROGRAM</b>	
	<b>FALL 2018</b>	
	<b>TIMETABLE</b>	

## DEADLINES

### TUESDAY TAG-UPS

<b>Due Weekly</b>	Due every Tuesday from the date of Team acceptance through the Final Report submission. See <u>Tuesday Tag-Ups</u> for details.	No team funding, but performance will contribute to success
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### MILESTONES

Base Level	Level 1	Level 2	Level 3	
Design Brief Application	Proposal/ Summary of Work	Midterm	Final	
<b>Early Deadline: September 7 Final Deadline: September 14, 2018</b>	<b>Due Friday, September 28, 2018</b>	<b>Due Monday, October 15, 2018</b>	<b>Showcase Dinner Nov 11, Event Nov 12, 2018  Final Reports &amp; Videos accepted through Nov 30</b>	
\$0	\$100	\$200	\$700	\$1000

### OUTREACH

Outreach	
No specific deadline. May be accomplished at any time during the semester while the project is active, or between semesters if a two-semester team.	
\$200	\$200

### OTHER

Special Construction or Travel Grants	No specific deadline. Supplemental funds for special circumstances	Contact TSGC to see if supplemental special funding is available. Amount depends on TSGC resource level each semester.
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The weekly Tuesday Tag-Up will be used as a means for the Team Leader or communication person to brief your Faculty Advisor, Mentor, TSGC, and any necessary Collaborators on the design team’s weekly progress.

- Reports are emailed every Tuesday (as you might expect), starting from the date the team’s Design Brief application is accepted until the team’s Final Report has been submitted.
- If one single requirement is going to keep the team on track this semester, it will be this weekly briefing. Although the repetition of this requirement can become tiresome, it is regarded as one of the best tools NASA has for maintaining communication and assuring everyone involved with the project that progress is being made.
- In the report, the Team Leader should provide an update on accomplishments, budget updates, bring up any issues or concerns, and report the plan for the next week. The Tuesday Tag-Up lets the Faculty Advisor, Mentor and TSGC know how the team is working, and it lets the team know that we are listening.

Example:

**From:** Student Team Leader or Communication Officer  
**To:** TSGC <designchallenge@csr.utexas.edu>, Faculty Advisor, NASA Mentor, Collaborators  
**CC:** All Team members  
**Subject:** Space Blasters – Tag Up – Week #3

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**Team:** Space Blasters  
**Institution:** University of Texas at Austin  
**Topic Title:** Effects of Barbeque Deprivation on ISS Crews

Although this week started off rather slow, it ended on a good note...

**Overall project status:** *How is the project going? Is everything on target?*

**Activities this week:** *What has the team been doing this week? Any meetings?*

**Problems encountered:** *Any surprises thus far?*

**Approximate number of person-hours spent on design activity this week:**

*How much time did the team devote to the project this week?*

**This week’s budget items:** *Any expenses incurred?*

**Activities planned for next week:** *What do you have planned for next week?*

**Additional comments:** *Anything else you want to mention?*

## Writing Guidelines for Design Challenge Reports

Each milestone requires the submission of a formal report. Guidelines to help teams address these requirements are presented below. Please submit all reports in Adobe PDF format.

*Note concerning Class Reports: Design Challenge requirements are not intended to cause students to duplicate work. Teams required by their instructor to submit a Midterm or Final Report in a specific format may submit a copy of that report in lieu of the Design Challenge-style Report, as long as all necessary information is included or added. Contact TSGC if you have questions.*

General	<ul style="list-style-type: none"> <li>- Double-spaced, 1” margins, minimum 12 point font</li> <li>- No page limits, however extensive collections of data, tables, photos, or graphics should be placed in Appendices at the end of the report.</li> <li>- Avoid writing in first person</li> <li>- Check grammar and spelling. Double check. Triple check.</li> <li>- Email copies to TSGC, Faculty Advisor, Mentor, and Collaborators</li> </ul>
Introductory Material	<ul style="list-style-type: none"> <li>- Include cover page with the project title and most important information</li> <li>- Be thorough when providing information about the team members, Faculty Advisor, Mentor, and Collaborators</li> <li>- Include a one-paragraph summary or abstract</li> <li>- Include a table of contents, list of figures and tables where necessary</li> </ul>
Research	Discuss specific resources you have used to conduct research.
Background	Explain where the project originated and what it is about.
Objective	Describe project goal/objective, including continuation of previous efforts.
Design Plan	Detail the teams plan or methods for meeting the design objective.
Accomplishments	Chronicle the key accomplishments that the team has experienced to date.
Timetable	Provide a timetable for completion of the project.
Budget	Provide a table showing the team’s budget plan. Include projected and actual earnings and expenditures associated with the project.
Conclusion	Sum up. Include future project plans and potential applications.
References/ Bibliography	Include a reference list (recommend at least six for Level 1). Academic standards regarding original work apply.
Appendices	Field Experience, Outreach report, data, code, graphics, etc.