Teams have spent a significant amount of time designing, building, programming their *Robot*, and learning what it takes to be part of a *Team*. For many *Teams*, the Event is the reward for all their hard work throughout the season. While there are several types of Events, they all offer a fun and exciting way for *Teams* to show the results of their efforts.

The judged awards represent a positive way we recognize *Teams* who embody important values like *Gracious Professionalism*®, Teamwork, creativity, innovation, and the value of the engineering design process. These judging guidelines are a part of the road map to success.

FIRST Tech Challenge judging sessions do not include written or verbal feedback for students. The judging is a subjective process; and students are encouraged to learn the important life skill of self-evaluation. This helps students prepare for professional interviews while developing other real world life skills. For a copy of the *FIRST* Tech Challenge *Team* Judging Session Self-Reflection Sheet please visit the website: http://www.firstinspires.org/node/5226

10.2 Engineering Notebook

10.2.1 Overview
This section describes the requirements for creating the Engineering Notebook, including formatting guidelines, and the use of various forms of engineering support. It also provides links for sample pages from award winning Engineering Notebooks.

10.2.2 What is an Engineering Notebook?
One of the goals of *FIRST* and *FIRST* Tech Challenge is to recognize the engineering design process and "the journey" that a *Team* makes during the phases of the problem definition, concept design, system-level design, detailed design, test and verification, and production.

Throughout the process of building and designing a *Robot*, *Teams* will come across obstacles, lessons learned, and the need to draw things out on paper. This is where *Teams* will use an Engineering Notebook. These notebooks follow the *Team* from kickoff throughout the Competitions. Judges review a *Teams* Engineering Notebook to better understand the journey, design, and *Team* as a whole.

The Engineering Notebook is a complete documentation of the *Team*, outreach and fundraising efforts, business or strategic plans, and the *Robot* design. This documentation should include sketches, discussions and *Team* meetings, design evolution, processes, obstacles, and each *Team* member's thoughts throughout the journey for the entire season. A new notebook should be created for each new season.

Please visit our website for a complete guide on writing and managing a Team Engineering Notebook. http://www.firstinspires.org/sites/default/files/uploads/resource_library/ftc/engineering-notebook-guidelines.pdf.

10.2.3 Engineering Notebook Formats
Teams may choose to record their season with either handwritten or electronic documents. There is no distinction made between handwritten and electronic Engineering Notebooks during judging; each format is equally acceptable.

- Electronic: *Teams* may choose to use electronic programs to create their Engineering Notebook. For the purposes of judging, *Teams* must print out their Engineering Notebooks and place them in a binder, no larger than 3 inches (7.62 cm). Only one copy is required per *Team*.
- Handwritten: *Teams* can choose from spiral-bound, laboratory, or documentation notebooks available through their school or local office supply store. *Teams* can also use loose leaf paper and place them in a three ring binder no larger than 3 inches (7.62 cm).

10.2.4 Engineering Notebook Requirements
Engineering Notebooks will **NOT** be considered without the following information.

1. *Teams* may not submit more than two notebooks at a competition.
2. The *Team* Number must appear on the outside front cover of the Engineering Notebook.
3. Attach a summary page to the front cover of the Engineering Notebook. This should include:
    a. The *Team* number.
    b. A brief, one-page narrative about the *Team*, the school or organization, and an overview of the highlights of the *Team*'s season.
    c. The summary page must point the Judges to pages in the Engineering Notebook that the *Team* would most like the Judges to consider.

> **The *Team* summary page is a vital part of the Engineering Notebook. This tells the Judges what they need to know about the *Team*, and which parts of the Engineering Notebook they should focus on. Remember, Judges have a limited amount of time to read each notebook!**

4. The Engineering Notebook must be divided into multiple sections, including:
    a. An Engineering section that includes the *Robot* design processes.
    b. A *Team* section that includes information about the *Team* and outreach activities.
    c. A business plan, strategic plan or sustainability plan.

Teams can use the [Team Engineering Notebook Self-Reflection sheet](#) as a way to be sure their Engineering Notebook meets the requirements for specific awards. Find the Engineering Notebook Self-Reflection sheet here: https://www.firstinspires.org/sites/default/files/uploads/resource_library/ftc/2016-2017-season/eng-notebook-self-assessment.pdf

10.2.5 Engineering Notebook Requirements by Award
The chart below provides a quick overview of the Engineering Notebook requirements by Award:

Engineering Notebook Requirements by Award	
Inspire Award	• *Team* must submit an Engineering Notebook. The Engineering notebook must include an Engineering section, a Team section and a Business or Strategic Plan. The entire Engineering Notebook must be high quality, thoughtful, thorough, detailed and well organized.
Think Award	• Engineering Notebook must have an Engineering section that includes entries describing underlying science, mathematics, and game strategies. • The Engineering Notebook must show that the Team has a clear understanding of the engineering design process, with pictures or drawings and details documenting all stages of Robot design. • Notebook must recount the Team's journey, experience and lessons learned throughout the season. • Engineering Notebook must be organized and follow the formatting guidelines provided by *FIRST* and include a Summary Page. Note: Teams should review the Engineering Notebook resources published in the [Team Management](#) section of the *FIRST* website.
Connect Award	• *Team* must submit an Engineering Notebook. The Engineering Notebook must include a Business or Strategic plan. The plan could

	include the future goals of the team, and the steps they will take to reach those goals. The plan could include fund-raising goals, sustainability goals, timelines, outreach, and community service goals.
Rockwell Collins Innovate Award	• *Team* must submit an Engineering Notebook. The Engineering Notebook must include an Engineering section that documents the design process and how the *Team* arrived at their design solution.
Design Award	• *Team* must submit an Engineering Notebook with an Engineering section that includes detailed *Robot* design drawings.
Motivate Award	• *Team* must submit an Engineering Notebook. The Engineering Notebook must include a Business or Strategic plan. The plan could include the future goals of the team, and the steps they will take to reach those goals. The plan could include fund-raising goals, sustainability goals, timelines, outreach, and community service goals
Control Award	• The *Team* must submit an Engineering Notebook. The Engineering Notebook must include an Engineering section that documents the control components.

10.2.6 Notebook Examples
Scanned copies of award-winning Engineering Notebook examples are posted on the *FIRST* website. It is strongly encouraged for *Teams* to look over these as great examples of what the judges will be looking for when reading through the Engineering Notebooks.

10.3 Judging Process, Schedule, and Team Preparation
The schedules at the *FIRST* Tech Challenge Tournaments may vary from site to site. Exact times for both the matches and meeting with judges cannot be given within this manual. All *Teams* receive the schedule prior to or during check-in at the Competition.

10.3.1 Judging Process
At *FIRST* Tech Challenge Championship Tournaments, there will be three parts to the judging process:

1. Interview with the judges.
2. Evaluation of performance.
3. Evaluation of the Engineering Notebook.

Each *Team* will have an interview with a panel of two or three judges. No awards will be determined on the basis of this interview alone. Judges use the guidelines provided in this section to assess each *Team*.

Teams should present their Engineering Notebooks at the Pit Administration Table during check-in unless otherwise directed by the Tournament officials. The Engineering Notebooks are generally provided to the judges prior to the *Team* interviews.

After the judges review the submitted Engineering Notebooks, complete the initial *Team* interviews and evaluate the *Team* and *Robot* performance during matches, they convene to review their assessments and create a list of top candidates for the various judged awards. Judges may require additional impromptu discussions with *Teams* if necessary. Deliberations are usually completed during the *Elimination Matches*. When the judges have finished their deliberations, the Engineering Notebooks are returned to *Teams*.

Teams are asked to bring their *Robot* to the judge interview. This is the best chance for *Teams* to explain and demonstrate their *Robot* design to the judges in a quiet and relaxed environment.

10.3.1.1 Feedback to Teams

FIRST Tech Challenge does not permit feedback provided to *Teams* during or after their Interview has taken place at official Tournaments. *FIRST* Tech Challenge judging is a subjective process; the goal is to prepare student *Team* members with real life Interview skills, and to continue to build upon those skills from Event to Event.

FIRST encourages *Teams* to utilize the Self-Reflection Sheet to evaluate themselves through the Interview, and the Team Engineering Notebook Self-Reflection Sheet to evaluate their Engineering Notebook. These sheets are accessible online. *Teams* should not ask the Judges for feedback after the interview is complete. An essential aspect of *FIRST* Tech Challenge Judging is the subjectivity, and that *FIRST* Tech Challenge encourages students to learn how to self-evaluate. Although it may be that *Teams* are discouraged by this, learning this process is an invaluable life skill.

10.3.2 Judging Schedule

The judging generally takes place in a separate area away from the noise of the Competition and pit. *Teams* follow the schedule that outlines *Team* interview times and locations. In some cases, *Teams* may receive this information in advance, but more often, *Teams* will receive this information when they check-in on the morning of the Event.

Upon arrival, *Teams* should familiarize themselves with where the judging will occur and allow enough time to get there. To keep this process on time throughout the Event, we require that all *Teams* arrive at the judge queuing area five minutes before their scheduled judging interview.

10.3.3 Team Preparation

Teams are strongly encouraged to read and understand the award requirements for each award to assess where they are within an award category and help them establish higher goals. These guidelines are the same ones used by the judges during each Tournament, and at the *FIRST* Tech Challenge World Championship Tournaments. Please see the Award Categories section of this manual for award requirements, and also look over the Engineering Notebook Requirements by Award to ensure the *Team's* Engineering Notebook meets the required criteria by award.

The judges want to know highlights about the *Team*; its history and make up; what the *Team* achieved during the Competition season; and the experiences that were gained. *Team* representatives' abilities to answer the questions or elaborate on *Robot* design functions or attributes are evaluated during the *Team* interview. Check with the Event organizer to see if Mentors and Coaches are allowed to observe the *Team* interview. Mentors may not contribute to the judging process. Mentors should always keep in mind that the *FIRST* Tech Challenge is a student-centered activity and it is about giving the students a unique and stimulating experience in all aspects of the program.

10.3.4 Video Award Submission Guidelines

The submission process for this award may vary by Tournament. Please check with the Event Director for details. Winning videos will be submitted to *FIRST* and used to promote the higher values of *FIRST* Tech Challenge. Teams can also send their Promote videos directly to *FIRST*; however, these submissions will not be formally judged.

- The video must be submitted at least one week prior to Tournament day. Instructions for submitting videos may vary from Tournament to Tournament. Please check with the Event Director for details.
- Videos must be submitted in AVI, WMV, MOV or better format. Submission through use of a streaming service such as YouTube is not acceptable. Remember the winning video may be shown on a large screen during the awards ceremony. *Teams* should use the best resolution available for the final

version.

- Only one video submission per *Team* will be considered. *Teams* may submit new or updated videos at each Tournament.
- *Teams* must have permission from the copyright owners for music used in the video.

10.4 Award Categories

Each Award listed below has a list of non-negotiable requirements. Please note that each award has a set of required criteria. *Gracious Professionalism*® is listed as the first criteria for every award. This is a mandatory requirement for every *FIRST* Tech Challenge Award. Teams who behave in an ungracious way are not eligible for consideration for any Award.

10.4.1 Inspire Award

This judged award is given to the *Team* that embodied the 'challenge' of the *FIRST* Tech Challenge program. The *Team* that receives this award is a strong ambassador for *FIRST* programs and a role model *FIRST Team*. This *Team* is a top contender for many other judged awards and is a gracious competitor. The Inspire Award winner is an inspiration to other *Teams*, acting with *Gracious Professionalism*® both on and off the *Playing Field*. This *Team* shares their experiences, enthusiasm and knowledge with other *Teams*, sponsors, their community, and the Judges. Working as a unit, this *Team* will have showed success in performing the task of designing and building a *Robot*.

> **The Inspire Award celebrates a *Team* that, in the opinion of the Judges, is a strong contender in many Award categories. The reliability of the *Robot* during the *Robot* competition is one aspect of this Award, but it does not carry more weight than any**

Required criteria for the Inspire Award:

- **_Team_ shows respect and _Gracious Professionalism_® to everyone they meet at a _FIRST_ Tech Challenge event.**
- **_Team_ is a strong contender for several other Judged awards. The Inspire Award celebrates the strongest qualities of all the Judged Awards.**
- **The _Team_ is an ambassador for _FIRST_ programs. They demonstrate and document their work in their community.**
- **_Team_ is positive and inclusive, and each _Team_ member contributes to the success of the _Team_.**
- **_Team_ must submit an [Engineering Notebook](#). The Engineering notebook must include an Engineering section, a Team section and a Business or Strategic Plan. The entire Engineering Notebook must be high quality, thoughtful, thorough, detailed and well organized.**
- **_Robot_ design is creative and innovative, and the _Robot_ performs reliably on the field. _Team_ communicates clearly about their _Robot_ design and strategy to the judges.**
- **_Team_ presentation is professional and engaging.**

10.4.2 Think Award

Removing engineering obstacles through creative thinking.

This judged award is given to the *Team* that best reflects the journey the *Team* took as they experienced the engineering design process during the build season. The Engineering section of the notebook is the key reference for judges to help identify the most deserving *Team*. The *Team's* Engineering section must focus on the design and build stage of the *Team's Robot*. Journal entries must include descriptions of the underlying science and mathematics of the *Robot* design and game strategies, the designs, redesigns, successes, and opportunities for improvement. A *Team* is not a candidate for this award if they have not completed the Engineering section of the Engineering Notebook.

Gracious Professionalism® - "Doing your best work while treating others with respect and kindness - It's what makes *FIRST*, first."

Required criteria for the Think Award:

- *Team* shows respect and *Gracious Professionalism*® to everyone they meet at a *FIRST* Tech Challenge event.
- *Team* must submit an **Engineering Notebook.** The Engineering Notebook must have an Engineering section that includes entries describing underlying science, mathematics, and game strategies.
- The Engineering Notebook must show that the *Team* has a clear understanding of the engineering design process, with pictures or drawings and details documenting all stages of *Robot* design.
- Notebook must recount the *Team's* journey, experience and lessons learned throughout the season.
- Engineering Notebook must be organized and follow the **formatting guidelines** provided by *FIRST* and include a Summary Page. Note: *Teams* should review the Engineering Notebook resources published in the **Team Management** section of the *FIRST* website.

Strongly suggested criteria for the Think Award:

- *Teams* should tab or flag 6 to 8 pages of the Engineering section to support entries on the summary page.

10.4.3 Connect Award

Connecting the dots between community, *FIRST*, and the diversity of the engineering world.

This judged award is given to the *Team* that most connects with their local science, technology, engineering and math (STEM) community. A true *FIRST Team* is more than a sum of its parts, and recognizes that engaging their local STEM community plays an essential part in their success. The recipient of this award is recognized for helping the community understand *FIRST*, the *FIRST* Tech Challenge, and the *Team* itself. The *Team* that wins the Connect Award aggressively seeks and recruits engineers and explores the opportunities available in the world of engineering, science and technology. This *Team* has a clear Business or Strategic Plan and has identified steps to achieve their goals.

Required criteria for the Connect Award:

- *Team* shows respect and *Gracious Professionalism*® to everyone they meet at a *FIRST* Tech Challenge event.
- *Team* must submit an **Engineering Notebook.** The Engineering Notebook must include a Business or Strategic plan that identifies their future goals and the steps they will take to reach those goals. Examples of what the plan could include are fund-raising goals, sustainability goals, timelines, outreach, and community service goals.
- *Team* provides clear examples of developing in person or virtual connections with individuals in the engineering, science, or technology community.
- *Team* actively engages with the engineering community to help them understand *FIRST*, the *FIRST* Tech Challenge, and the *Team* itself.

10.4.4 Rockwell Collins Innovate Award
Bringing great ideas from concept to reality.

The Rockwell Collins Innovate Award celebrates a *Team* that thinks outside the box, and has the ingenuity and inventiveness to make their designs come to life. This judged award is given to the *Team* that has the most innovative and creative *Robot* design solution to any specific components in the *FIRST* Tech Challenge game. Elements of this award include elegant design, robustness, and 'out of the box' thinking related to design. This award may address the design of the whole *Robot*, or of a sub-assembly attached to the *Robot*. The creative component must work consistently, but a *Robot* does not have to work all the time during Matches to be considered for this award. The Team's Engineering Notebook must include journal entries to show the design of the component or components and the *Team's Robot* to be eligible for this award. Entries must describe how the *Team* arrived at their solution.

Required criteria for the Rockwell Collins Innovate Award:

- *Team* **shows respect and** *Gracious Professionalism*® **to everyone they meet at a** *FIRST* **Tech Challenge event.**
- *Team* **must submit an** [**Engineering Notebook**](#)**. The Engineering Notebook must include an Engineering section that documents the design process and how the** *Team* **arrived at their design solution.**
- *Robot* **or** *Robot* **sub-assembly must be elegant and unique in its design.**
- **Creative component must be stable, robust, and work reliably.**
- *Robot* **design is efficient and consistent with** *Team* **plan and strategy.**

10.4.5 Design Award
Industrial design at its best.

This judged award recognizes design elements of the *Robot* that are both functional and aesthetic. The Design Award is presented to *Teams* that incorporate industrial design elements into their solution. These design elements could simplify the *Robot's* appearance by giving it a clean look, be decorative in nature, or otherwise express the creativity of the *Team*. The winning design should not compromise the practical operation of the *Robot* but complement its purpose.

Required criteria for the Design Award:

- *Team* **shows respect and** *Gracious Professionalism*® **to everyone they meet at a** *FIRST* **Tech Challenge event.**
- *Team* **must submit an** [**Engineering Notebook**](#) **with an Engineering section that includes detailed** *Robot* **design drawings.**
- *Team* **demonstrates industrial design principles, striking a balance between form, function, and aesthetics.**
- *Robot* **distinguishes itself from others by its aesthetic and functional design.**
- **Basis for the design is well considered (that is inspiration, function, etc.).**

10.4.6 Motivate Award
Sparking others to embrace the culture of *FIRST*!

This *Team* embraces the culture of *FIRST* and clearly shows what it means to be a *Team*. This judged award celebrates the *Team* that represents the essence of the *FIRST* Tech Challenge competition through *Team*

building, *Team* spirit and displayed enthusiasm. This is a *Team* who makes a collective effort to make *FIRST* known throughout their school and community, and sparks others to embrace the culture of *FIRST*.

Required criteria for the Motivate Award:

- **_Team_ shows respect and _Gracious Professionalism_® to everyone they meet at a _FIRST_ Tech Challenge event.**
- **_Team_ must submit an [Engineering Notebook](#). The Engineering Notebook must include a Business or Strategic plan that identifies their future goals and the steps they will take to reach those goals. Examples of what the plan could include are fund-raising goals, sustainability goals, timelines, outreach, and community service goals.**
- **The _Team_ is an ambassador for _FIRST_ programs.**
- **_Team_ can clearly show the successful recruitment of new _Teams_, mentors, coaches and volunteers who were not already active within the STEM community.**
- **_Team_ can explain the individual contributions of each _Team_ member, and how these apply to the overall success of the _Team_.**

Strongly suggested criteria for the Motivate Award:

- All *Team* members take part in their presentation, and actively engage with the judges.
- *Team* shows a creative approach to materials that market their *Team* and *FIRST*.

10.4.7 Control Award

Mastering *Robot* intelligence.

The Control Award celebrates a *Team* that uses sensors and software to increase the *Robot's* functionality on the field. This award is given to the *Team* that demonstrates innovative thinking in the control system to solve game challenges such as autonomous operation, improving mechanical systems with intelligent control, or using sensors to achieve better results on the field. The control component should work consistently on the field. The *Team's* Engineering Notebook must contain details about the implementation of the software, sensors, and mechanical control.

Required criteria for the Control Award:

- **_Team_ shows respect and _Gracious Professionalism_® to everyone they meet at a _FIRST_ Tech Challenge event.**
- **_Team_ must apply for the Control Award by filling out the Control Award Content Sheet, located in [Appendix D](#).**
- **The _Team_ must submit an [Engineering Notebook.](#) The Engineering Notebook must include an Engineering section that documents the control components.**
- **Control Components must enhance the functionality of the _Robot_ on the _Playing Field_.**

Strongly suggested criteria for the Control Award:

- Advanced software techniques and algorithms are encouraged.
- Control Components should work reliably.

The Control award is different from other Awards because *Teams* must apply for this Award. A *Team* applying

for this Award must turn in their Control Award Content Sheet to the Judges at the event. This Award focuses on a *Team's* ability to program a *Robot* that can reliably and efficiently carry out tasks during Match play, in a way that improves their ability to score during a Match. A *Team* can submit their code for Autonomous operation as well as their code for the Driver Controlled operation, if they choose.

The Judges are responsible for collecting the content sheet at the beginning of the *Teams'* Interview. After the *Team* Interview is complete, the Judges will reference the sections of the Engineering Notebook the *Team* has pointed out on the Control Award Content Sheet. The Judges should pay attention to look for:

- What sensors and hardware the *Team* has tried on the *Robot*; what worked, what didn't, and why.
- What algorithm or code the *Team* has programmed their *Robot* with; what worked, what didn't, and why.
- The Judges should pay attention to the program and design process. The design process is more critical than the code itself.

> *Teams* **are not required to include a printed copy of their code in the Control Award application or in the Engineering Notebook.**

Just like having Engineering Notebook reviewers, the Judge Advisor will assign a group of 2-3 Judges to review the Control Award Content Sheets, once Interviews are complete.

10.4.8 Promote Award (Optional)
This judged award is optional and may not be given at all Tournaments. Your Judge Advisor will have information about the Judging for this Award.

The Promote Award is given to the *Team* that is most successful in creating a compelling video message for the public designed to change our culture and celebrate science, technology, engineering and math. *Teams* must submit a one-minute long public service announcement (PSA) video based on the PSA subject for the season.

Teams may win the Promote Award only once at a Championship level event and only once at a qualifying level event.

PSA Subject for 2017-2018 Season:

"What I would like the world to know about *FIRST*"

Required criteria for the Promote Award:

- **Video must meet the following criteria:**
  - **Video Must follow *FIRST* branding and design standards**
  - **Video cannot be longer than 60 seconds.**
  - **Video must be of a high quality, as submissions may be used at a later time to promote *FIRST*.**
  - ***Team* must have rights to music used in the video.**
  - **Music and permissions must be listed in video credits**
  - **Video must have strong production value.**
  - **Video must be submitted by the deadline given by the Event Organizer**
- ***Team* must present a thoughtful and impactful video which appeals to the public.**
- **Creativity in interpreting the yearly theme is required.**
- **Follow video award submission guidelines.**

10.4.9 Compass Award (Optional)

A beacon and leader in the journey of the *FIRST* Tech Challenge.

This judged award is optional and may not be given at all tournaments. Your Judge Advisor will have information about the Judging for this Award.

The Compass Award recognizes an adult Coach or Mentor who has given outstanding guidance and support to a *Team* throughout the year and demonstrates to the *Team* what it means to be a Gracious Professional. The winner of the Compass Award will be determined from candidates nominated by *FIRST* Tech Challenge student *Team* members, via a 40-60 second video submission. The video must highlight how their Mentor has helped them become an inspirational *Team*. We want to hear what sets the Mentor apart.

Required criteria for the Compass Award:

- **Video must meet the following criteria:**
    - o **Video Must follow *FIRST* branding and design standards**
    - o **Video cannot be longer than 60 seconds.**
    - o **Video must be of a high quality, as submissions may be used at a later time to promote *FIRST*.**
    - o **_Team_ must have permission from the copyright owners for music used in the video.**
    - o **Music and permissions must be listed in video credits**
    - o **Video must be submitted by the deadline given by the Event Organizer.**
- **Video highlights the mentor's contribution to the *Team* and demonstrates what sets the mentor apart.**
- **Follow [video award submission guidelines.](#)**

10.4.10 Judges' Award

This award is optional and may not be given at all tournaments. Your Judge Advisor will have information about the Judging for this Award.

During the competition, the judging panel may meet a *Team* whose unique efforts, performance or dynamics merit recognition, but doesn't fit into any of the existing award categories. To recognize these unique *Teams*, *FIRST* offers a customizable Judges Award. The judging panel may select a *Team* to be honored, as well as the name of the Judges' Award. The Judges Award recognizes a *Team* for their outstanding efforts but does not factor into the Advancement Criteria.

10.4.11 Winning *Alliance* Award

This award will be given to the winning *Alliance* represented in the final match.

10.4.12 Finalist *Alliance* Award

This award will be given to the finalist *Alliance* represented in the final match.

11.0 *FIRST*® Tech Challenge Dean's List

In an effort to recognize the leadership and dedication of *FIRST's* most outstanding *FIRST* Tech Challenge students, the Kamen family sponsors an Award for selected top students known as the *FIRST* Dean's List. Since its introduction in 2010, the *FIRST* Dean's List Award has attracted the attention of prestigious colleges