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6.1 Glossary

ALLIANCE: a set of up to four (4) Teams who play **AERIAL ASSIST** together.

ALLIANCE CAPTAIN: a designated student representative from the **ALLIANCE** Lead.

ALLIANCE STATION: the area bounded by the **ALLIANCE WALL**, **LOW GOALS**, white tape depicted in [Figure 2.11: The ALLIANCE STATION](#).

ALLIANCE WALL: a 6 ft. 6 in. tall, 18 ft. wide, barrier that defines the ends of the **FIELD**.

ARENA: all elements of the game infrastructure required to play **AERIAL ASSIST**: the **FIELD**, the **ALLIANCE STATIONS**, the **BALLS**, all supporting communications, **ARENA** control, and scorekeeping equipment.

ASSIST: an event worth bonus points that occurs when a unique **ALLIANCE ROBOT POSSESSES** the **ALLIANCE'S BALL** in a unique **ZONE** (i.e. red, white, or blue **ZONE**) during a **CYCLE**.

AUTO (aka **Autonomous**): the first ten (10) seconds of the **MATCH** in which **ROBOTS** operate without direct **DRIVER** control.

BACKUP TEAM: a Team used to replace an inoperable **ROBOT** on an **ALLIANCE** during Elimination **MATCHES** per [Section 5.4.2: BACKUP TEAMS](#).

BALL: the spherical game piece used in **AERIAL ASSIST**.

BUMPER: a protective assembly designed to attach to the exterior of the **ROBOT** and constructed as specified in [Section 4.6: BUMPER Rules](#).

BUMPER ZONE: the volume contained between two virtual horizontal planes, 2 in. and 10 in. above the floor.

CATCH: the event when a **BALL SCORED** over the **TRUSS** by a **ROBOT'S ALLIANCE** partner is **POSSESSED** by that **ROBOT** before contacting the carpet, the **ROBOT** which **SCORED** the **TRUSS**, or **HUMAN PLAYER**.

COACH: a student or adult Mentor identified as the person wearing the designated "COACH" pin or button during a **MATCH**.

COMPONENT: any part in its most basic configuration, which cannot be disassembled without damaging or destroying the part or altering its fundamental function.

COTS: a “Commercial, Off-The-Shelf” COMPONENT or MECHANISM, in its unaltered, unmodified state. A COTS item must be a standard (i.e. not custom order) part commonly available from the VENDOR, available from a non-Team source, and available to all Teams for purchase.

Example 1: A Team orders two (2) ROBOT grippers from RoboHands Corp. and receives both items. They put one in their storeroom and plan to use it later. Into the other, they drill “lightening holes” to reduce weight. The first gripper is still classified as a COTS item, but the second gripper is now a FABRICATED ITEM, as it has been modified.

Example 2: A Team obtains openly available blueprints of a drive component commonly available from Wheels-R-Us Inc. and has local machine shop “We-Make-It, Inc.” manufacture a copy of the part for them. The produced part is NOT a COTS item, because it is not commonly carried as part of the standard stock of We-Make-It, Inc.

Example 3: A Team obtains openly available design drawings from a professional publication during the pre-season, and uses them to fabricate a gearbox for their ROBOT during the build period following Kickoff. The design drawings would be considered a COTS item, and may be used as “raw material” to fabricate the gearbox. The finished gearbox itself would be a FABRICATED ITEM, and not a COTS item.

Generally available software modules obtained from open sources (e.g. professional publications, commonly used FRC community-accessible web resources, industry source code repositories, etc.) that are not specifically affiliated with individual FRC Teams are considered COTS items.

CUSTOM CIRCUIT: any electrical component of the robot other than motors (listed in [R29](#)), cRIO, Power Distribution Board, Digital Sidecars, Analog Breakouts, Solenoid Breakouts, RSL, 120A breaker, motor controllers, relay modules, 12VDC-5VDC converter, wireless bridge, and batteries.

CYCLE: the series of events that recur regularly, and each CYCLE begins with an ALLIANCE’S BALL being retrieved from the PEDESTAL and ends when a BALL is SCORED in a GOAL.

DISABLED: a state in which a ROBOT has been commanded by the Driver Station to deactivate all outputs.

DISQUALIFIED: the status of a TEAM, as determined by the Head Referee, in which they receive zero (0) Qualification Points in a Qualification MATCH or causes their ALLIANCE to automatically lose an Elimination MATCH.

DRIVER: a pre-college student TEAM member responsible for operating and controlling the ROBOT.

FABRICATED ITEM: any COMPONENT or MECHANISM that has been altered, built, cast, constructed, concocted, created, cut, heat treated, machined, manufactured, modified, painted, produced, surface coated, or conjured partially or completely into the final form in which it will be used on the ROBOT.

FIELD: a 24 ft. 8 in. x 54 ft. carpeted area, bounded by and including the GUARDRAILS, ALLIANCE WALLS, and rear faces of the LOW GOALS.

FIELD TIMEOUT: a TIMEOUT called by the Head Referee.

FOUL: a penalty assessed by a Referee which credits the opponent with twenty (20) points.

FRAME PERIMETER: the polygon defined by the outer-most set of exterior vertices on the ROBOT (without the BUMPERS attached) that are within the BUMPER ZONE. To determine the FRAME PERIMETER, wrap a piece of string around the ROBOT at the level of the BUMPER ZONE - the string describes this polygon.

Note: to permit a simplified definition of the FRAME PERIMETER and encourage a tight, robust connection between the BUMPERS and the FRAME PERIMETER, minor protrusions such as bolt heads, fastener ends, rivets, etc. are excluded from the determination of the FRAME PERIMETER.

GOAL: a FIELD element in which BALLS are SCORED to earn points for an ALLIANCE.

GOALIE ZONE: the area in front of an ALLIANCE'S ALLIANCE WALL, bounded by the opponent's LOW GOALS and black tape.

GUARDRAIL: a system that borders the length of the FIELD and consists of horizontal pipes, vertical struts, and polycarbonate shields.

HIGH GOAL: one (1) of two (2) ALLIANCE'S GOALS located above the opponent's ALLIANCE WALL.

HOT: the condition of a goal during AUTO, as determined by the FMS, in which it is worth more than a non-HOT GOAL. The state of a HOT GOAL is identified with yellow perimeter lighting and via the corresponding VISION TARGET.

HUMAN PLAYER: a pre-college TEAM member delegated to manage the BALLS while the BALLS are not on the FIELD.

HUMAN PLAYER AREA: one (1) of two (2) areas on the side of the FIELD bounded by ALLIANCE colored tape.

HUMAN PLAYER BARRIER: a system that consists of horizontal pipes that are 1 ft. 8 in. above the floor and are supported by sheet metal struts that are integrated into the GUARDRAIL. The HUMAN PLAYER BARRIER extends 1 ft. 8 in. wider than the GUARDRAIL and creates a barricade between HUMAN PLAYERS and ROBOTS.

Kit of Parts (KOP): the collection of items listed on any [Kit of Parts Checklist](#), has been distributed via [FIRST® Choice](#) or obtained via a [Product Donation Voucher \(PDV\)](#)

LINEUP: the list of three (3) TEAMS designated by their ALLIANCE to play in a *FIRST* Championship Division Elimination MATCH or MATCH on the Einstein FIELD.

LOW GOAL: one (1) of two (2) cubic ALLIANCE GOALS located in each corner of the FIELD adjacent to the opponent's ALLIANCE WALL.

MATCH: a two (2) minute and thirty (30) second period of time in which ALLIANCES compete in AERIAL ASSIST.

MECHANISM: a COTS or custom assembly of COMPONENTS that provide specific functionality on the ROBOT. A MECHANISM can be disassembled (and then reassembled) into individual COMPONENTS without damage to the parts.

OPERATOR CONSOLE: the set of COMPONENTS and MECHANISMS used by the DRIVERS to relay commands to the ROBOT.

PEDESTAL: the structure used to support the BALL staged in the ALLIANCE STATION. The PEDESTAL also indicates the BALL'S eligibility for play.

PLAYER STATION: one (1) of three (3) assigned positions behind the ALLIANCE WALL from where a TEAM operates their ROBOT.

PLAYING CONFIGURATION: The physical configuration and orientation of the ROBOT while playing the game (i.e. after the MATCH has started, and the ROBOT has deployed mechanisms, moved away from the starting location, and/or interacted with the field, GAME PIECES, or other ROBOTS). This configuration is dynamic, and may change multiple times during the course of a single MATCH.

POSSESS: (for a ROBOT) to carry (move while supporting BALLS in or on the ROBOT), herd (repeated pushing or bumping), launch (impel BALLS to a desired location or direction via a MECHANISM in motion relative to the ROBOT), or trap (overt isolation or holding one or more BALLS against a FIELD element or ROBOT in an attempt to shield them) a BALL.

RED CARD: a penalty assessed for egregious ROBOT or FRC Team member behavior which DISQUALIFIES a TEAM, see [Section 5.4.4: YELLOW and RED CARDS](#).

ROBOT: an electromechanical assembly built by an FRC Team to perform specific tasks when competing in AERIAL ASSIST. It includes all of the basic systems required to be an active participant in the game: power, communications, control, mobility, and actuation. The implementation must obviously follow a design approach intended to play AERIAL ASSIST (e.g. a box of unassembled parts placed on the FIELD or a ROBOT designed to play a different game would not satisfy this definition).

SAFETY ZONE: a 2 in. wide, infinitely tall region located 8 in. from the FIELD-side plane of the GUARDRAILS and is defined by yellow tape on the Human Player Barrier Brackets and the Human Player Barrier End Brackets.

SCORE: to accrue points for an ALLIANCE as described in [Section 3.1.4: Scoring](#).

SCORED: the state of a BALL in which it has accrued points for an ALLIANCE.

SIGNAL LEVEL: circuits which draw ≥ 1 A continuous and have a source incapable of delivering >5 Amps, including but not limited to DSC outputs, Solenoid Breakout outputs, and Arduino outputs.

STARTING CONFIGURATION: The physical configuration and orientation of the ROBOT when the MATCH is started. This is the state of the ROBOT immediately before being Enabled by the Field Management System, before the ROBOT takes any actions, deploys any MECHANISMS, or moves away from the starting location. This configuration is static, and does not change during a single MATCH (although it may change from MATCH to MATCH). In the STARTING CONFIGURATION, no part of the ROBOT may extend outside the vertical projection of the FRAME PERIMETER, with the exception of minor protrusions such as bolt heads, fastener ends, rivets, etc.

If a ROBOT is designed as intended and pushed up against a vertical wall (in STARTING CONFIGURATION and with BUMPERS removed), only the FRAME PERIMETER (or minor protrusions) will be in contact with the wall.

STARTING LINE: the line, marked in white tape, located 2 ft. 6 in. behind the ALLIANCE WALL behind which TEAM members must stay during AUTO.

SURROGATE: a Team randomly assigned by the Field Management System to play an extra Qualification MATCH, detailed in [Section 5.2.2: MATCH Assignment](#).

TEAM: 1 COACH, 2 DRIVERS, and 1 HUMAN PLAYER from the same FRC Team.

TECHNICAL FOUL: a penalty assessed by a Referee which credits the opponent with fifty (50) points.

TELEOP: the two (2) minutes and twenty (20) seconds of a MATCH in which ROBOTS may be directly controlled by DRIVERS.

TIMEOUT: a period of up to six (6) minutes between MATCHES, used to pause Elimination MATCH progression.

TRUSS: a 1 ft. x 1 ft. square frame of aluminum that spans the center of the FIELD.

TRUSS POLE: a vertical cylinder that extends up from the TRUSS and marks the width limits of the FIELD.

VENDOR: a legitimate business source for COTS items that satisfies all of the following criteria:

- A. has a Federal Tax Identification number. In cases where the VENDOR is outside of the United States, they must possess an equivalent form of registration or license with the government of their home nation that establishes and validates their status as a legitimate business licensed to operate within that country.
- B. is not a “wholly owned subsidiary” of an FRC Team or collection of FRC Teams. While there may be some individuals affiliated with both an FRC Team and the VENDOR, the business and activities of the Team and VENDOR must be completely separable.
- C. must be able to ship any general (i.e., non-*FIRST* unique) product within five business days of receiving a valid purchase request. It is recognized that certain unusual circumstances (such as 1,000 *FIRST* Teams all ordering the same part at once from the same VENDOR) may cause atypical delays in shipping due to backorders for even the largest VENDORS. Such delays due to higher-than-normal order rates are excused.
- D. should maintain sufficient stock or production capability to fill Teams’ orders within a reasonable period during the build season (less than 1 week). (Note that this criterion may not apply to custom-built items from a source that is both a VENDOR and a fabricator. For example, a VENDOR may sell flexible belting that the Team wishes to procure to use as treads on their drive system. The VENDOR cuts the belting to a custom length from standard shelf stock that is typically available, welds it into a loop to make a tread, and ships it to a Team. The fabrication of the tread takes the VENDOR two weeks. This would be considered a Fabricated Item, and the two weeks ship time is acceptable.) Alternately, the Team may decide to fabricate the treads themselves. To satisfy this criterion, the VENDOR would just have to ship a length of belting from shelf stock (i.e. a COTS item) to the Team within five business days and leave the welding of the cuts to the Team.)
- E. makes their products available to all FRC Teams. VENDOR must not limit supply or make a product available to just a limited number of FRC Teams.

The intent of this definition is to be as inclusive as possible to permit access to all legitimate sources, while preventing ad hoc organizations from providing special-purpose products to a limited subset of Teams in an attempt to circumvent the cost accounting rules. *FIRST* desires to permit Teams to have the broadest choice of legitimate sources possible, and to obtain COTS items from the sources that provide them with the best prices and level of service available. Teams also need to protect against long delays in availability of parts that will impact their ability to complete their Robot. The FRC build season is brief, so the Vendor must be able to get their product, particularly *FIRST* unique items, to a Team in a timely manner. Ideally, chosen Vendors should have national distributors (e.g. Home Depot, Lowes, MSC, Radio Shack, McMaster-Carr, etc.). Remember, FRC events are not usually near home – when parts fail, local access to replacement materials is often critical.

VISION TARGET: a retro-reflective object, made of 3M 8830 Silver Marking Film, that may be used by ROBOTS to sense FIELD elements.

YELLOW CARD: a warning for egregious ROBOT or FRC Team member behavior.

ZONE: the red, white, or blue designated area of the FIELD.

ZONE LINE: the red, white, or blue line that marks the ZONE boundary.

6.2 Revision History

Date	Section	Change
1/14/2014	6.1	Updated definitions of CATCH and SCORE
1/17/2014	6.1	Updated definition of POSSESS
2/18/2014	6.1	Added definition of SAFETY ZONE