

Game Design Challenge Finalist Team 1678

Team Name: Citrus Circuits

Location: Davis, California USA

Game Name: Storm Surge

Game Overview:

In STORM SURGE, a dangerous hurricane is approaching FIRST® City. Two ALLIANCES of three teams each must rush to collect and upload crucial weather data before it's too late.

The match begins with the storm directly over the weather base, preventing communication between drivers and ROBOTS. In the first 15 seconds, ROBOTS must operate autonomously without crossing the SURGE BARRIER, keeping their BUMPERS on their half of the field.

ROBOTS may preload 1 PACKET each and can only hold 1 PACKET at a time. ALLIANCES gain 4 points for each ROBOT that leaves the CHARGING LINE. During AUTO, ROBOTS score PACKETS into the LOW DATA PORT for 3 points or HIGH DATA PORT for 12 points. PACKETS can also be placed onto CACHES. PACKETS scored on a CACHE must be moved to STORAGE, after which a 15 point bonus is added to the next PACKET scored in a DATA PORT. In AUTO, an ALLIANCE can only receive points for up to 4 CACHE BONUSSES.

STORAGE is reset after each PACKET scored in a DATA PORT. A PACKET counts toward scoring once the HUMAN PLAYER removes the PACKET from the CACHE and places it into STORAGE. Stack lights on top of the CACHE STATION near the DATA PORT indicate the number of PACKETS currently in STORAGE. After a PACKET is scored in a DATA PORT and the CACHE BONUS is added, HUMAN PLAYERS remove the PACKETS from STORAGE and discard them into the box connected to the CACHE STATION, resetting the stack lights.

When the TELEOP period starts, the worst of the storm has passed, allowing drivers to take control of their ROBOTS. The SURGE BARRIER is 'opened', allowing ROBOTS to cross the FIELD. ROBOTS continue to place PACKETS on the CACHES and score PACKETS in the high and low DATA PORTS. ALLIANCES also release PACKETS onto the FIELD through their TRANSFER STATION.

During the TELEOP period, each PACKET is worth 2 points in the LOW DATA PORT and 8 points in the HIGH DATA PORT. Each PACKET placed in STORAGE grants a 10 point CACHE BONUS to the next PACKET scored in a high or low DATA PORT. Each STORAGE holds up to 2 PACKETS.

In the last 30 seconds of the match, ROBOTS race to their UPLOAD STATION to UPLINK to the cloud and CLIMB above floodwaters. To UPLINK, ROBOTS raise the flags on the UPLOAD STATIONS by pulling the attached CHAINS. In addition, ROBOTS can CLIMB above the UPLOAD STATION surface to escape the STORM SURGE. At the end of the match, each ROBOT DOCKED at the UPLOAD STATION will earn 4 points, each UPLINK completed will earn 10 points, and each CLIMB will earn 16 points. One RANKING POINT will be earned by scoring 10 PACKETS total across CACHES and DATA PORTS. A second RANKING POINT will be earned by scoring at least 32 points in ENDGAME with at least one UPLINK completed.

(Protected zones and FOULS are described in the supplemental materials.)

Describe Notable Field Elements:

The STORM SURGE FIELD is a 26 ft. 11.25 in. by 52 ft. 5.25 in. in. carpeted area bounded by ALLIANCE WALLS. It contains CACHES, DATA PORTS, TRANSFER STATIONS, UPLOAD STATIONS, and UPLINKS.



A PACKET is a foam torus with a 12 in. diameter, thickness of 3 in. and a 3.5 in. diameter hole.

CACHES are 2.5 in. diameter poles, 11.2 in. long, placed at a 18 degree angle above horizontal, with the top of the pole 28 in. off of the ground. There are two CACHES per ALLIANCE. CACHES are affixed to panels operated by HUMAN PLAYERS to safely remove scored PACKETS from the FIELD. To ensure safety, there are 72 in. tall poly-carbonate shields attached to the top of the CACHE with two diagonal poles called STORAGES at the top.

High and low DATA PORTS are 36 in. by 15 in. holes in the middle of the opposing ALLIANCE STATION. The bottom of the low DATA PORT is 25 in. above the ground and the high DATA PORT is 104 in above the ground.

TRANSFER STATIONS are 13 in. by 6.5 in. slots, with the bottom 25 in. above the ground at the corner of the ALLIANCE STATION.

There is one UPLOAD STATION per ALLIANCE. Each UPLOAD STATION is an equilateral triangle platform with 110 in. side lengths supported 30 in. above the carpet by a pole at each vertex. These poles extend 72 in. above each UPLOAD STATION to create three UPLINKS. A CHAIN with a flag runs from the top of each UPLINK to 36 in. above the floor. During ENDGAME, ROBOTS may CLIMB above the UPLOAD STATION (32.1 in. above the ground) and complete the UPLINK by pulling the CHAIN down 30 in.

What are robots expected to do?

ROBOTS start the match with their BUMPERS intersecting the CHARGING LINE on the opposite side of the FIELD to their ALLIANCE STATION—the same side as their DATA PORTS. During AUTO, a ROBOT'S BUMPERS may not fully cross the SURGE BARRIER. ROBOTS can leave the CHARGING LINE for a MOBILITY BONUS, stack PACKETS on their CACHES, and score in the high and low DATA PORTS. ROBOTS intake PACKETS from underneath their UPLOAD STATION or compete for the PACKETS placed on the SURGE BARRIER. In AUTO, an ALLIANCE can only receive points for up to 4 CACHE BONUSSES. PACKETS are counted when a HUMAN PLAYER removes them from the CACHE and places them in STORAGE. They are scored as a CACHE BONUS with the next PACKET scored in a DATA PORT and placed in the attached box PACKETS in STORAGE.

When TELEOP starts, ROBOTS gain access to the entire FIELD, allowing ROBOTS of opposite ALLIANCES to interact with each other. Additionally, ROBOTS have access to their TRANSFER STATION, where they can receive PACKETS from HUMAN PLAYERS. ROBOTS may score up to two PACKETS on each CACHE before scoring in the DATA PORT. ROBOTS may not score PACKETS from the area between their own ALLIANCE STATION and the nearest CHARGING LINE.

During the ENDGAME period, ROBOTS can continue performing TELEOP actions, but can also choose to DOCK, CLIMB, or UPLINK. To DOCK, a ROBOT must end the match with its BUMPERS intersecting the area underneath the UPLOAD STATION. To CLIMB, a ROBOT must end the match completely above the platform of the UPLOAD STATION. ROBOTS can UPLINK by pulling the CHAIN on the UPLOAD STATION until the flag is fully raised.

Did you use the Game Design Challenge Element in your concept?

Yes

If yes, how?

During the ENDGAME period in STORM SURGE, ROBOTS hurry towards UPLOAD STATIONS to send a final wave of data to FIRST® City. An UPLINK is located at every vertice of both UPLOAD STATIONS, each with a flag attached to a CHAIN. To raise a flag, ROBOTS pull down on a CHAIN (starting 36 in. off the ground) until the flag locks at the top of the UPLINK. The CHAIN is also useful for CLIMBS, where



teams must use the UPLOAD STATION to get their BUMPERS fully over the UPLOAD STATION'S platform. CHAINS are also located inside each high DATA PORT to reduce occurrences of DATA PACKETS bouncing out of the DATA PORT.

In STORM SURGE, CHAINS promote innovative technical design with a simple, unique, and challenging objective. When creating our ENDGAME, we prioritized finding a new, easily understood concept that provides a difficult challenge and promotes diverse mechanisms. Ranging from a passive DOCK to raising a flag to CLIMBING, the ENDGAME also accounts for the varying technical ability of teams at competition. Teams will have to strategize with their ALLIANCE partners to reach the threshold for the ENDGAME RANKING POINT. This threshold requires at least one UPLINK, making it essential for teams to use the CHAIN for this RANKING POINT. Teams are pushed to focus their ENDGAME mechanism on versatility and strategic design. They are encouraged to explore the potential of using a single mechanism for completing both an UPLINK and a CLIMB. UPLINKS in the final seconds of a match provide an exciting visual for spectators as the flags are raised. Our CHAIN implementation promotes creative design with unique mechanisms to provide an exciting and easily visible ENDGAME that matches the spirit of FRC games while introducing a new and intuitive ENDGAME element.