PIT MAGAZINE

FRC TEAM 2485 / THE W.A.R. LORDS

INTRO

We are The Francis Parker W.A.R. (We Are Robot) Lords, Team 2485, a FIRST Robotics Competition team from Francis Parker School in San Diego, California.

OUR MISSION

Our mission is to inspire, empower, and educate students of all genders, ages, and backgrounds. We engage our local and global communities through STEM education and outreach, and help our students develop real world experience and leadership skills by building high functioning competitive robots.

OUR VISION

Our vision is to become an inspiration within the FIRST community by exciting other teams with our technical prowess and community impact. We strive to assist our community—both local and global—in expanding their STEM programs, so that their students can in turn benefit others.

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XERXES - OVERDRIVE, 2008

Xerxes was a lap running robot; it would move around the course in order to score points. It was a very simple robot because it did not have many functions. Xerxes originally had a bar on it's front in order to herd balls, but this broke during our first match.

AUTO VON BISMARCK - LUNACY, 2009

Named after the Warlord Otto Von Bismarck, Auto collected balls off of the floor then shot them through a moving target or dumped them into a trailer. Auto was originally overweight and in order to fix this problem, the team drilled holes into the panels, giving it an appearance similar to Swiss cheese.

CIXI - BREAKAWAY, 2010

Cixi used two different air based mechanisms in 2010. It used a vacuum to capture balls and used pneumatics to shoot the balls into the goals. Cixi was named after the Empress Dowager Cixi, and its official theme song is "Don't Stop Believing" by Journey.

IVAN IV - LOGOMOTION, 2011

Ivan picked up inflated tubes using a claw on a vertically extendable shaft. We custom built Ivan's mecanum wheels to allow for strafing across the field. At the end of the match, we would release a smaller robot named Feodor which would climb up a metal pole as quickly as possible. Ivan was our first robot that incorporated carbon fiber, a material that has since been incorporated into all of our new robots.

OUR HISTORY 2008-2011

OUR HISTORY 2012-2014

YAROSLAV - REBOUND RUMBLE, 2012

Yaroslav fired basketballs into hoops using a catapult and finished the match by balancing on a bridge. Its catapult shooting mechanism was unique among its competition. It was also built with a custom gearbox and a camera on the very top in order to detect the hoops. Yaroslav faced off against our school mascot in a basketball shooting competition.

SUN TZU - ULTIMATE ASCENT, 2013

Sun Tzu shot frisbees at approximately 40 miles per hour and could complete a ten point climb to finish the match. Equipped with a California Drive and our trademark molded carbon fiber, Sun Tzu brought our team to Championships in St. Louis for the first time. Sun also had a Kinect sensor used to track targets more effectively than normal cameras, and a functioning thirty point climb that was never implemented in competition.

ODIN - AERIAL ASSIST, 2014

Named after the head of the Norse gods, Odin featured a powerful shooter and a fast drive train. It accomplished the goal of passing the ball over a center truss to a human player for extra points. Odin made it to the Championships in Saint Louis after winning the Las Vegas Regional, and set the world high playoff score without penalties.

VALKYRIE - RECYCLE RUSH, 2015

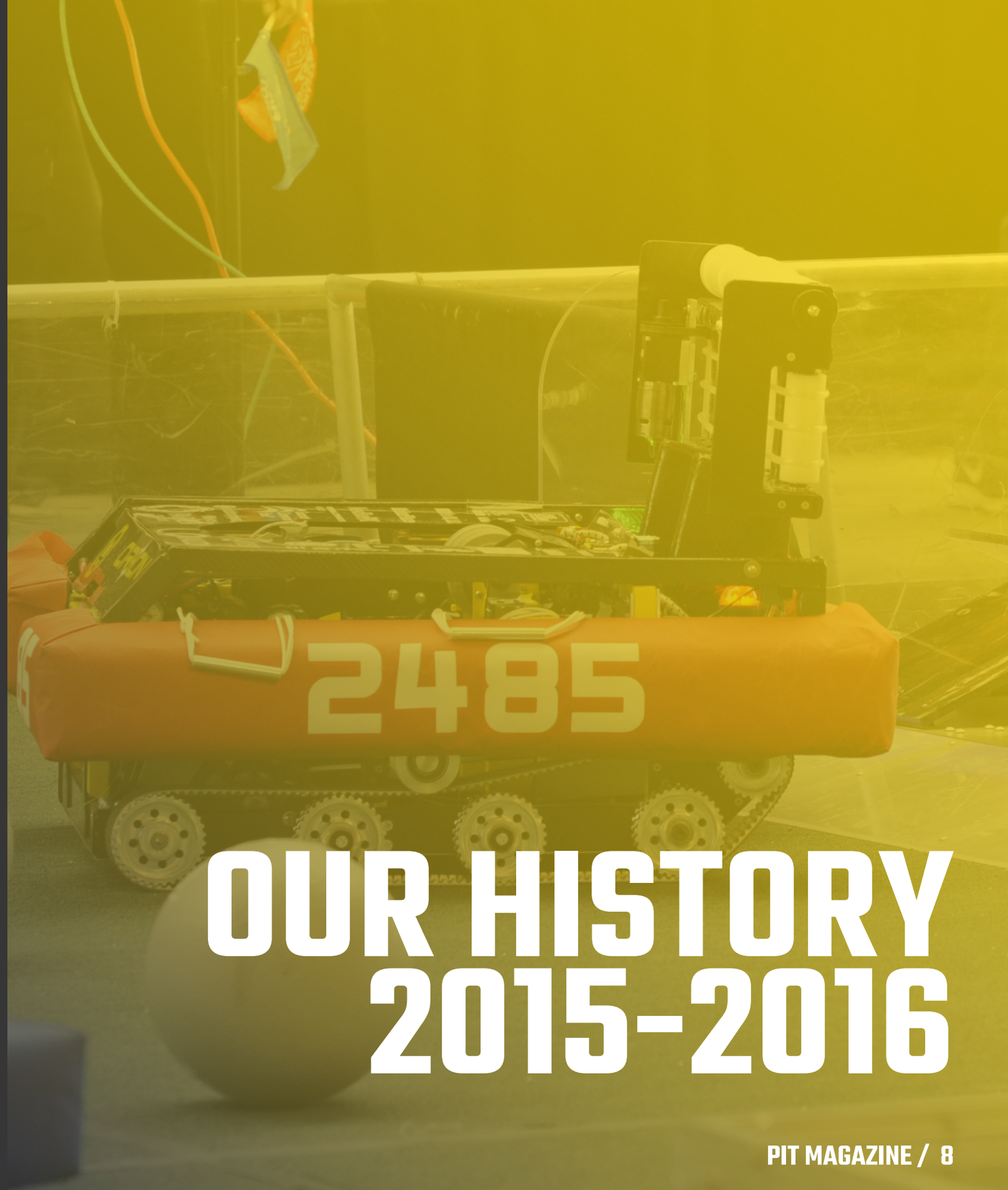
Valkyrie, named after a mythological Norse winged creature, is able to manipulate totes and recycling containers.

Valkyrie has a welded drive base and “strongback”, welded by students on our team. Our “strongback” is coded to automatically tilt to keep the totes parallel to the ground when we intake them. We have “clappers” with intake wheels to help us take totes into the belly of the robot. Our carbon “claw” can pick up containers while making stacks of totes underneath. We decided to use an H-drive with omni wheels as our drivetrain, allowing us to drive sideways. Our center wheel in pneumatically suspended giving a constant pressure on the floor while allowing us to drive over the center bump easily. This year we have two IMUs (Roll and Yaw), allowing us to measure two access points.

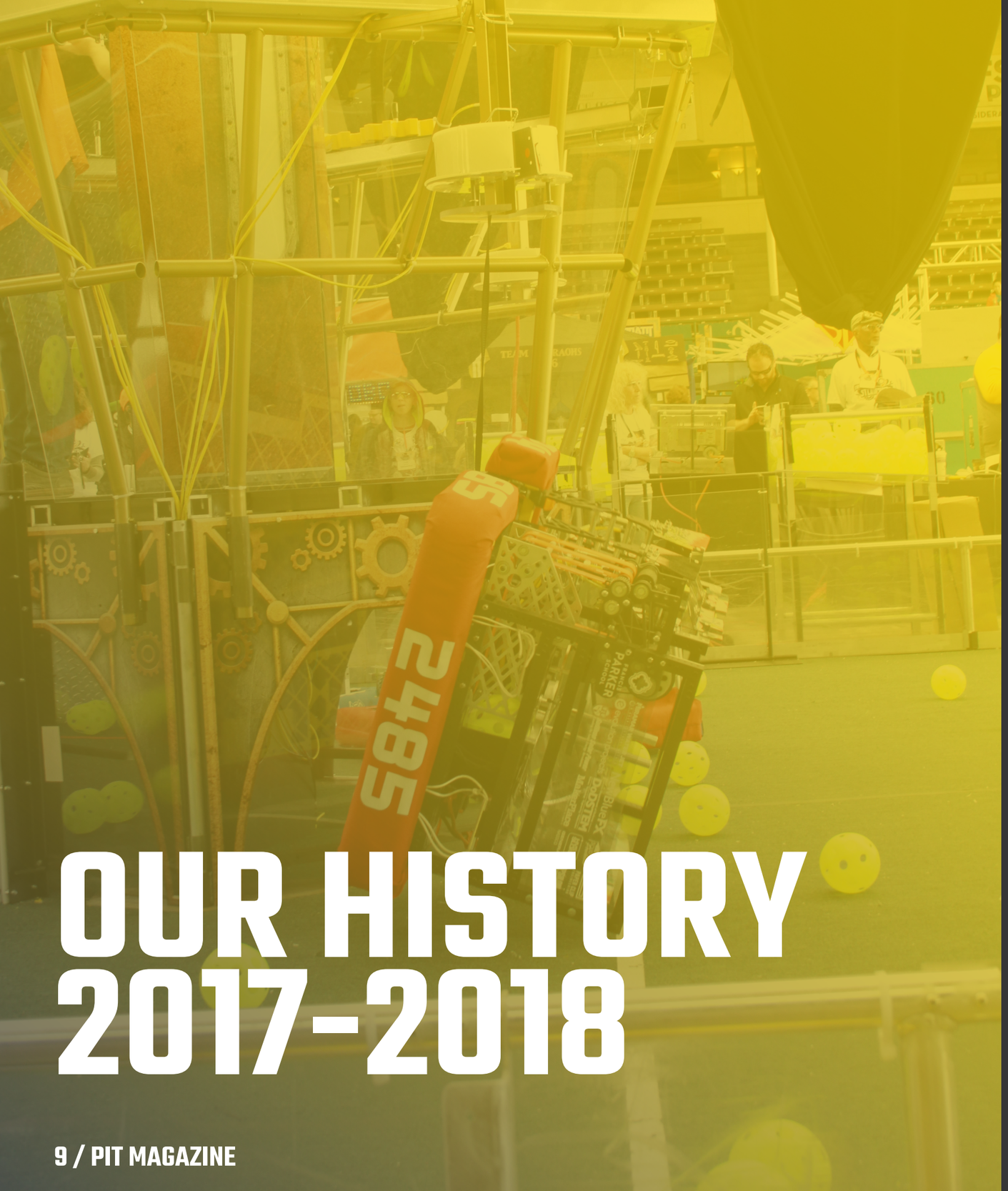
ORION - STRONGHOLD, 2016

Our 2016 robot, Orion, derives its name from the constellation with its iconic belt.

To traverse the obstacles that Stronghold provides, Orion drives with a tank drive. Orion’s boulder intake mechanism uses a set of rollers that funnel the boulder towards a teeter-totter, where it rests until shot with the single flywheel or ejected back out through the intake. Due to the need to accommodate twelve-speed while still leaving room for the boulder to rest and shoot, Orion’s electronics panel is U-shaped. Orion’s frame is made up of 90 wall aluminum powder-coated yellow. Our sponsorship panel locks on to the top of the robot and is detachable for the best access to the electronics panel. Orion’s autonomous allows it to cross through the low bar, in addition to the B and D category defenses. Its lidar and vision processing allow it to shoot through the high goal.



OUR HISTORY 2015-2016



OUR HISTORY 2017-2018

KAMEHAMEHA - STEAMWORKS, 2017

Kamehameha is named after King Kamehameha, the first ruler to unite all of the Hawaiian islands under common leadership.

DESIGN
Kamehameha uses an active gear mechanism that intakes gears from the human loading zone and delivers them to the airship. Debuting at the Las Vegas Regional, Kamehameha can also make use of a newly added ground intake on the opposite side of the robot. Kamehameha can intake fuel from the hoppers and feeds the fuel into a double flywheel shooter that aims for the high-efficiency boiler, and our 6-wheel pneumatic West Coast Drive allows for a sturdy and reliable drive system.

NEO - POWER UP, 2018

Neo is named after the main protagonist from the Matrix, the final boss from Final Fantasy V, and the Greek root “neo” for new.

STRATEGY
FIRST Power Up is a game that requires maneuverability and a fast drive train. We prioritized scoring via the scale, then scoring via the switch and lastly getting power ups.

DESIGN
Our robot uses an intake arm to take power cubes from all parts of the field and put them on or in the scale, switch and exchange. Neo has a very straight-forward design. We wanted a low center of gravity and used a 9lb steel plate at the bottom of the robot. To accommodate the extra weight we had to design the robot without pneumatics.

ONIZUKA - DESTINATION: DEEP SPACE, 2019

This year's robot is Onizuka and named after the astronaut Ellison Onizuka.

STRATEGY
The bot features a fast drive train and an elevator, both of which allow us to efficiently score hatches and cargo on both the cargo ship and the rocket.

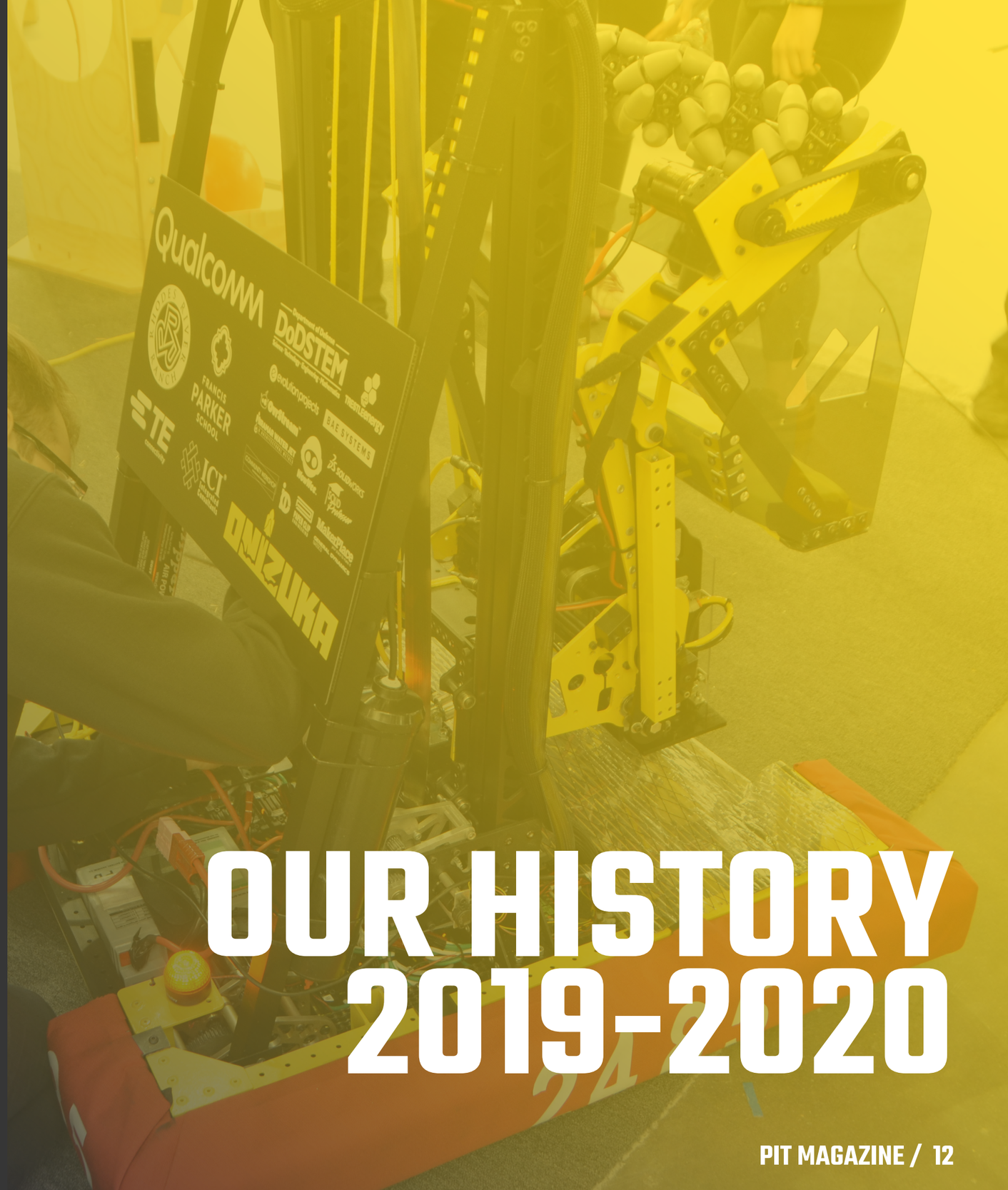
DESIGN
Onizuka is designed to be able to pick up cargo from the ground and hatch panels from the loading station. It can place them both on all scoring on the field. Both game element intakes
are on a two-stage cascaded elevator. The cargo intake utilizes mecanum wheels in order to intake cargo balls and center them reliably within the intake. The polycarbonate plates as well as the foam lining provide compression in the system to account for variation in cargo diameter. The four-bar linkage pivots the cargo intake between the ground intake position and the eject position. The four-bar provides for a large angular displacement with minimal end effector rotation. The hatch mechanism can pivot to stow itself out of the way of the cargo intake.

ARTEMIS - INFINITE RECHARGE, 2020

Our robot for the 2020 FRC season is named Artemis, after the Greek goddess of the hunt and the moon.

STRATEGY
For the Infinite Recharge game, we prioritized being able to shoot in the high goals, having a high versatility of where we can shoot from, and having the ability to climb.

DESIGN
Artemis can rapidly intake power cells with her mecanum wheel intake. The flat belting magazine allows Artemis to store up to 5 power cells. Artemis is able to shoot power cells into the high goal with a double flywheel shooter, and is able to accurately from a wide variety of locations on the field thanks to a turret and the shooter's adjustable pitch angle. The three stage, spring-extending climber allows her to climb on the generator switch.



OUR HISTORY 2019-2020

COMMUNITY IMPACT

PROJECT MERCY

On October 5th, 2019, we participated in what has become a meaningful tradition over the past seven years—Project Mercy. Over the past seven years, including this year, our team has built 15 homes.

This year, 25 W.A.R. Lords came together alongside members of our school's Interact Club to travel to colonias on the outskirts of Tijuana, Mexico. There, we reached beyond our community to build two homes in 12 hours for families in need. We applied the knowledge we learned in the shop working on robots to accomplish this large task, all the while interacting with the local children, providing games and toys such as LEGOs. This experience has allowed us to expand our understanding of the communities around us and create a meaningful difference in the lives of these families.

BATTLE AT THE BORDER

In 2010, we partnered with Hall of Fame Team 1538 to host and run the inaugural Battle at the Border, which has since become Southern California's longest-running off-season event. During construction on our campus in 2018, we partnered with FRC Team 5025 to ensure a greater opportunity for attendance by both FRC Teams and members of the local community. We now co-run the event with these two teams, with our members assisting with planning, setup, clean up, and volunteering as event staff.

HACKATHON

In 2015, we hosted our first annual Hackathon for high school students within our local community. This year, the event grew in size to include a record-breaking 51 students from ten schools across San Diego. In addition to the growth of our high school Hackathon, we also ran a successful half-day middle school Hackathon for the first time. During the competition, we ran workshops teaching Processing and Scratch – the first experience with programming for many of our attendees. Each team created a multiplayer game in a coding language of their choice, and at the end of the competition, three judges from Qualcomm watched presentations from all 14 teams.

ORIONED

Eight years ago, we created OrionEd, our comprehensive education initiative designed to inspire an interest in STEM among elementary, middle, and high school students. In recent years, the program has been expanded to include two curricula: Hands-On Robotics, focused toward grades K-8, and The Secret To A Better Robot, aimed toward FRC and FTC teams.

THE SECRET TO A BETTER ROBOT

OrionEd: The Secret To A Better Robot is an improv-based interactive team-building workshop, presented at the 2017, 2018, and 2019 Houston World Championships. These opportunities have allowed us to have a greater impact on FIRST teams around the world. As a result, this program has been able to reach members from over 80 FRC and FTC teams based in 15 states and four countries. The Secret To A Better Robot program has been presented to over 10 teams in Southern California as well.

HANDS-ON ROBOTICS

OrionEd: Hands-on Robotics is a program designed to garner an interest in STEM among students in grades K-8. A Hands-on Robotics session involves bringing the robot to a local youth group, as well as teaching students the basics of robotics through individual, station-based demonstrations. Since the OrionEd's inception, we have run 20 Hands-On Robotics sessions with local schools, Scouts BSA troops, and non-profit groups, reaching a combined 2,000+ students across San Diego County.

ROBO.CAMP

Robo.camp is a week-long summer camp where 3rd through 8th graders are able to build LEGO and VEX robots while being mentored by our experienced team members. Alongside Hall of Fame Team 987, we hosted our first annual robo.camp six years ago. This past summer, 24 students mentored 12 members of Team 2485 and four from Team 987. With the goal of expanding accessibility of STEM, we have waived the registration fee for 15 students since the camp's inception.

COMMUNITY IMPACT

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WOW

Team 2485 started WOW in 2013 to recruit, retain, and engage females in FIRST, creating a safe environment for girls to engage in STEM. Led by female FIRST team members, the WOW network hosts a variety of interactive discussions, events, and other opportunities that empower girls to take risks and increase their confidence.

In 2017, Qualcomm became WOW's first external sponsor. Their support has helped tremendously in the expansion of the program beyond our team, as well as the ability to create WOW merchandise and travel to both the Houston and Detroit Championships to promote our program. Qualcomm has not only provided financial support for WOW, but they have provided unique opportunities for students as well. Earlier this season, WOWers of Team 2485 were invited to present our sustainability plan at the Qualcomm headquarters to renew our partnership with them. In 2018, we decided to expand the WOW program to other teams through the establishment of "chapters" within FRC Teams. WOW is now an established program with 6 chapters from 4 states and 2 countries.

FLL & FTC INVOLVEMENT

Our team founded and currently mentors four FLL teams. W.A.R Lords has a mentorship program for these teams where different members pair with a team providing them with advice and teaching them multiple skills. Thirty-one percent of our team has participated in our FLL program as a result of our mentorship and almost 70% of our FLL team members continue onto Team 2485. Additionally, we also host and mentor two community-based FTC Teams (10092 and 14195) on our campus. The mentorship program has greatly benefitted students and prepared members of all teams to pursue activities in STEM, including the W.A.R. Lords.

For the past few seasons, we have run FTC events hosted on our campus through volunteering, setting up, and cleaning up at each event. In the 2019-20 season, we hosted and helped to run 4 league meets and the San Diego FTC Regional Championship on our campus.

SCOUTLORDS

The Team 2485 Scoutlords Scouting Alliance, now in its third year, hopes to provide teams with accurate match data who would otherwise be unable to obtain this. At the 2019 Houston Championship, we worked with 20+ teams across all 6 divisions, collecting thousands of data points in the process in order to provide this data. We target primarily smaller and rookie teams, and plan on continuing/expanding this program in the coming seasons.

POLAND

For the past four years, our team has had the privilege of mentoring and assisting Polish FRC Team 5883. During our first three years of mentoring Team 5883, our team has helped them to compete globally in FIRST Global Competitions, run robotics camps in Poland and Ukraine, and also have helped start 18 FLL and FLL Jr teams in Poland and Ukraine. This past summer we ran two robotics camps in different cities of Poland: Gdynia and Gdańsk. These two robotics camps had a combined attendance of around 110 kids aged 6 to 15. These kids were able to learn various technical skills, from soldering to programming. Also, our team helped run and sponsor a local FTC and FLL tournament for over 15 teams in Kraśnik, Poland. As a result of all our work for FIRST in Poland, Team 2485 was recognized by the president of the country. We continue to collaborate with Team 5883 through Skype during the build season in helping with strategizing, translating rules, and troubleshooting.

COMMUNITY IMPACT

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GENERAL DYNAMICS NASSCO

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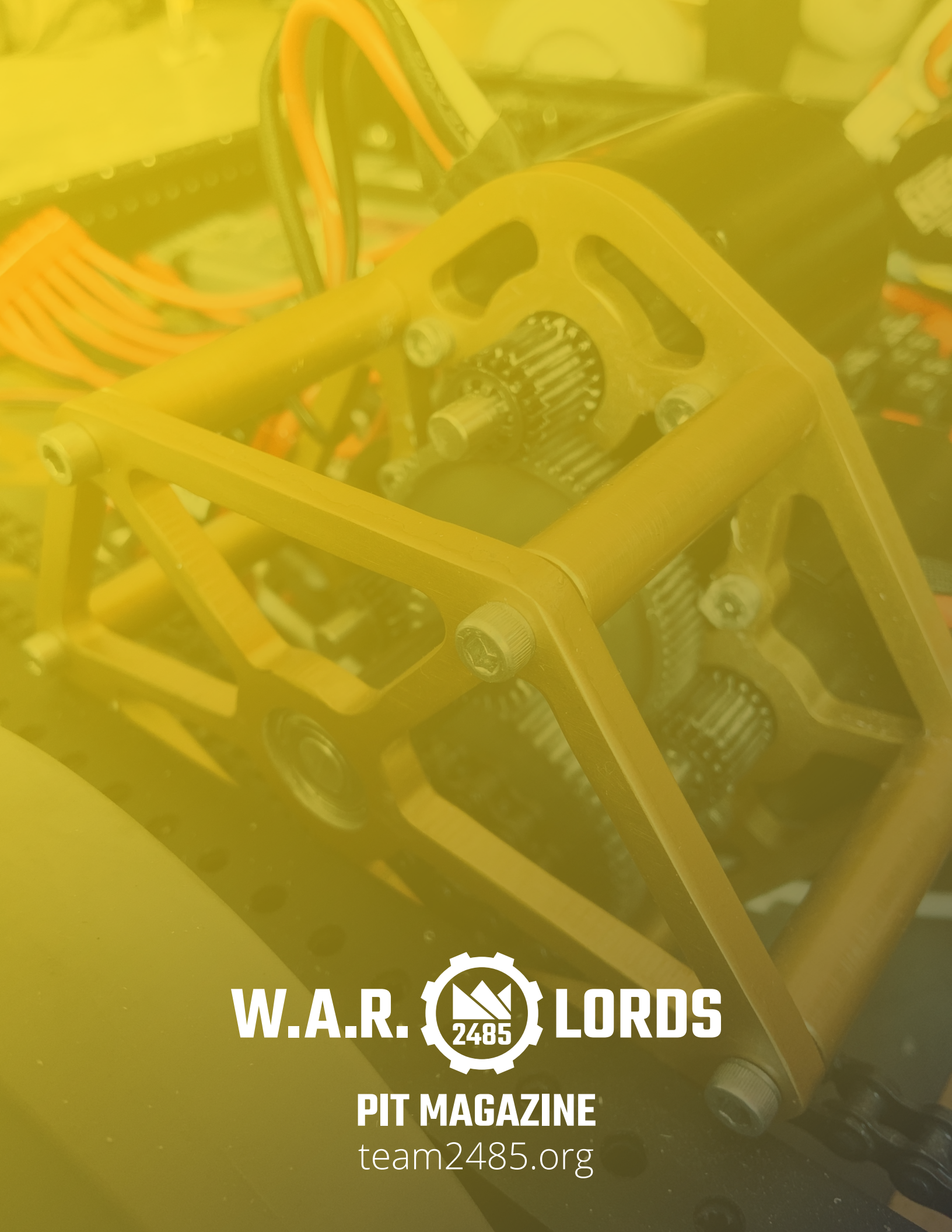

W.A.R. LORDS

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