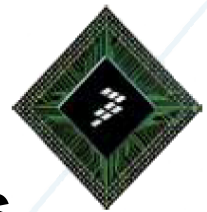


# The Freescale Cup 2014 EMEA Challenge Rules



---

Version 1.2 updated 11Sep13

**The spirit of the game is that students demonstrate excellent hardware integration and superior programming.**

## **Section 1: Who may enter and registration**

1. Entrants into the EMEA challenge are to be approved by the University Programs leadership team.
2. Teams must register for EMEA challenge before end of October 2013 on the registration site (communicated to the participants via email and on the Freescale Community site)

## **Section 2: Team Rules and Requirements**

1. A team can either consist of all undergraduate students (minimum of 2; maximum of 4) or can include 1 graduate student but must contain at least 2 undergraduate students on the team.
2. Cars will be designed and constructed by students **ONLY**.
3. Students are required to submit a final technical report of their vehicle up to 30 days before the racing event to be allowed to participate
4. Participants are expected to exhibit good sportsmanship. Any inappropriate behavior or cheating may result in disqualification.

## **Section 3: Equipment Requirements**

Each team shall use the same basic kit of parts as described below. The following requirements are in place to keep the playing field level.

### **Mechanical**

1. The original and unaltered equipment must be used as the entry. Car chassis from previous races are allowed as long as they fulfill the rules below.
  - a. Tires
  - b. Drive - DC motors (See "The Freescale Cup Knowledge Center" for detailed description---<https://community.freescale.com/docs/DOC-1284>)
  - c. Transmission Ratio of Drive Motor
  - d. Servo Motor-Futaba S3010 (See The Freescale Cup Knowledge Center for detailed description---<https://community.freescale.com/docs/DOC-1284>)
  - e. Battery (provided by participants)
    - i. 7.2V, <=3000mAh, rechargeable **NiCd or NiMH**
    - ii. Only one (1) battery at a time may be used to power the vehicle and any attached hardware
  - f. If any standard component of the car model is damaged, then a replacement part of the same model should be used.
2. The chassis can be modified, with some restrictions:
  - a. The footprint of the frame may not be altered
  - b. You may not change the distance between wheels
  - c. No part of the car shall exceed dimensions of 250mm/9.85in (W) x 400mm/15.75in (L)x 305mm/12in.(H)

- d. You may drill holes and mount auxiliary pieces on the chassis assuming it is contained within the above dimensions.

### **Electrical**

1. You may create custom boards and are not required to use the provided Freescale development board(s). Must follow the same rules as stated in number 2 below.
2. The electronics can be modified, with some restrictions:
  - a. A Freescale 32-bit MCU must be used.
  - b. One processor - No auxiliary processor or other programmable device is allowed.
  - c. The car must use a optical sensor to navigate
  - d. DC-DC boost circuit may not be used to power drive or steering motors.
  - e. DC-DC boost circuit is allowed for auxiliary circuits, eg. camera, pre-drivers if needed. The boosted voltage MAY not influence motors.
  - f. Total capacity of all capacitors should not exceed 2000 uF
3. Sensor Limits
  - a. Unlimited number of sensors, which includes cameras
    - i. Transmitter/Receiver pair is 1 sensor
    - ii. A CCD sensor is 1 sensor
    - iii. The provided Line Scan Camera is 1 sensor
  - b. Sensor products produced by Freescale must be used whenever possible (magnetometer, accelerometer, e-field, pressure)

## **Section 4: Event Personnel**

**Organizing committee** – A committee comprised of judges (defined below) and Freescale employees who will coordinate event day activities and mediate and resolve any disputes.

**Referees** - Responsible for on-track activities which includes race track management such as starting and stopping vehicles, as well as timing and scorekeeping. They are comprised of faculty, students, and/or Freescale and industry employees.

**Judges** - Interpret and enforce rule compliance. This will be comprised of Freescale employees and members of contributing industry sponsors.

***Event Personnel shall not aid any one specific team. Communication shall be open to all teams and shall not disclose any information that might compromise the fairness of the event.***

## **Section 5: Vehicle Inspection**

1. Before the race, the judges will perform a technical inspection of all entries. This includes vehicle specifications, dimensions, and equipment requirements listed in section
2. After the technical inspection, teams may not alter any part of the vehicle.
3. In the event of any violations, the organizing committee is entitled to disqualify the corresponding team.

## Section 6: Racetrack Care

1. No shoes allowed on the track.
2. Do not step on the track surface.
3. Do not step near the timing gate.

## Section 7: Practice

Prior to the official race, each racing team can test the track environment on site. The test-racing track may be different from the actual racing track in shape but their material and environment will be the same. Final calibration may be made at this time.

## Section 8: Regional Qualifying Races

Some regions within EMEA might organize qualifying races to select the top teams that will be attending the EMEA Finals.

The same racing rules apply to the regional qualifying races as to the EMEA Finals.

Qualifying races are planned as a 1-day event with training session in the morning, inspection at 12:00 (noon) and race in early afternoon.

Selected participating universities will organize the qualifying races on their grounds using either their own racetrack and timing system (validated by Freescale) or by using a Freescale authorized racetrack in loan to the university.

The regions are set as follows (may vary depending on participating countries):

- Italy and Switzerland
- France and Spain
- United Kingdom
- Germany, BeNeLux, Austria
- Poland, Czech Republic and Republic of Slovakia
- Russia and Ukraine
- Romania, Bulgaria and Greece
- Tunisia, Morocco and Algeria
- Sweden, Finland, Norway and Denmark

If a qualifying race has less than 10 participating teams, it might be merged with another region's qualifying race.

The top winning teams of each qualifying race qualify for the EMEA Finals. There is no limitation of number of teams qualifying for the EMEA Finals per university or faculty.

The exact number of top teams qualifying for the EMEA Finals during each regional qualifying race will be assessed and communicated by 31Dec13 depending on number of competing teams per region to keep a fair participation rate at the EMEA Finals.

## Section 9: Race Day Procedure

1. The agenda of the race is to be issued by Freescale at least 7 days prior of the date of the race. The agenda can be altered on short notice to adapt to special situations that may arise during the racing days.
2. Testing - Prior to final race, a test track will be available. Final calibrations may be made at this time.
3. The racetrack may be altered after testing, prior to the final race.
4. Racing order will be randomly set by the race committee and posted on site
5. A qualifying race may be used to limit the number of teams competing in the final race
6. Before the race begins, all vehicles will be collected and displayed. Teams will not be allowed to modify software or hardware of the vehicle from this point forward.
7. After being called by a referee, each racing team should designate a member to take their racing vehicle to the playing field and place it in the starting area of the racing track. Other team members must stay outside the racetrack.
8. There shall be only one team member on the track at any given time (excluding testing times)
9. The racetrack may be altered after testing, prior to the final race.
10. When the final race begins, a referee will direct each team when to enter the playing field in accordance with the racing order.
11. Upon entering the track, a team member has two minutes to set up the car and signal "Ready" to referee. The set-up time cannot be used to test the car on the track; it is for adjusting the vehicle start/stop line only.
12. After the referee confirms "Ready", the vehicle should leave the starting area within 30 seconds.
13. Vehicle must complete a full lap and pass the start/stop line for the time to be recorded and register as a successful lap. The car must stop within 3m/9 feet after the finish line to avoid a penalty.
14. Team has 3 attempts to achieve a full lap. The time of the first successful lap is the time recorded for the team.
15. After the successful lap, the team shall remove the vehicle away from the track. The vehicle cannot be removed from the track area until either it has recorded a successful lap or the team has used their allotted 3 attempts to achieve a successful lap.
16. Recorded time is the time of the first successful lap.

## Section 10: Fouls, Failure and Disqualifications

The rules will be interpreted by Freescale and the organizing committee of the event.

**Foul**, is a minor infraction, which results in a time penalty.

**Failure**, results in the current attempt time not being recorded. Subsequent attempts are allowed.

**Disqualification** is a major infraction which results in all times not being recorded.

1. Referee will determine whether the racing car ran out of the race track and assign time penalties.

2. Any of the following conditions will be considered a **foul** and will result in time penalty added:
  - a. The race car fails to leave the starting area within 30 seconds after beginning of the race [+1 second].
  - b. The race car fails to stop 3 meters/ 9 feet after crossing the start/stop line [+1 second].
3. Any of the following conditions will be considered a **failure** and no time will be given:
  - a. If any part of one or more wheels leave the race surface.
  - b. The racing team fails to enter the playing field and get prepared for the racing in two (2) minutes after being called by the referee.
  - c. The player touches the race car after the technical inspection without consent of the referee.
  - d. The race car fails to finish within 120 seconds after leaving the starting area.
4. Any of the following conditions will be considered a **disqualification**:
  - a. Any auxiliary lighting equipment or other auxiliary sensors are used around the race track.
  - b. Modification of the hardware or software after the race has begun (except for changing the battery.)
  - c. More than one team member in the playing field.
  - d. Any behavior that might interfere with the movement of the car.
  - e. Touching the car during an attempt prior to crossing finish line.
  - f. Any cheating during the event.
  - g. Failure to pass the technical inspection.

## **Section 11: Scoring**

1. Equality and fairness will be ensured as much as possible on the condition of actual feasibility. Disputes will be resolved by a vote of Freescale, members of the organizing committee, and judges.
2. Time starts when the racing car crosses the start/finish line.
3. Fouls will result in the time addition to the car's lap time.
4. Disqualifications and Failures will result in no score.
5. Time will be captured using an electronic gate and/or handheld timer.
6. The team with the best lap time will be the Freescale Cup EMEA Champion

## **Section 12: Winning Measurement**

The team with the fastest lap time is the winner.

## **Section 13: Awards**

The final ranking will be determined by the best racing times. Awards will be given to the top three teams who have the highest rank. The racing committee might provide additional awards. Those should be communicated at least 3 months prior of the date of the finals.

## Section 14: Technical Report Requirements

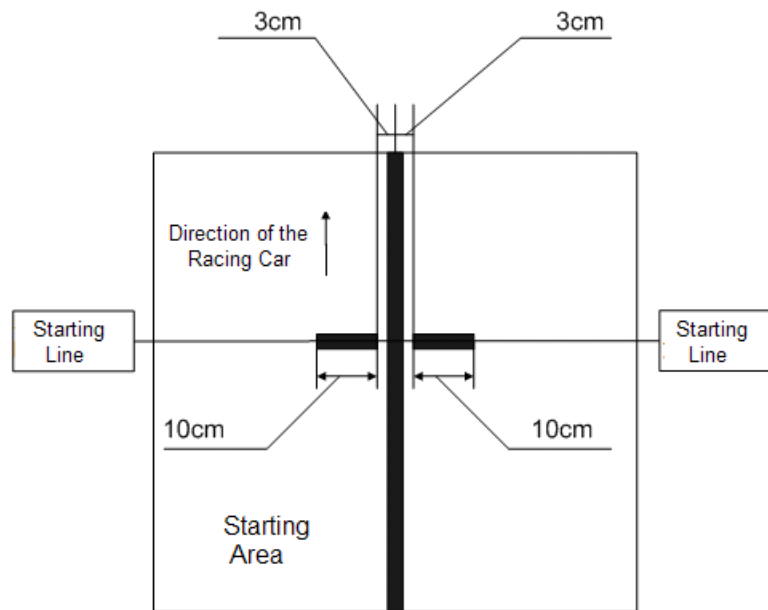
Technical reports will be reviewed and rated by the experts invited by the organizing committee of the event. Technical reports should be clear with detailed text, diagrams, and bibliography. Technical reports must contain a brief description of major concepts and specific technical implementation schemes for design and production of vehicle models including:

1. Description of mechanical design of vehicle model
2. Description of control circuit design
3. Description of the electronics design
4. Description of control software design
5. Total weight and dimensions of the reengineered vehicle
6. Power consumption
7. Count and type of sensors used
8. Number of servo motors besides the existing driving motors and rudder motors of the vehicle model
9. Written in English
10. Formatted for either Microsoft Word or PDF
11. Submitted via email to the Freescale contact four weeks prior to the race

Upon arrival at the final competition, each team must submit a printed document with any changes from the initial technical report submitted four weeks prior to the race date.

## Section 15: Parameters of the Racing Track

1. A test track made from the same material as the final track will be made available on the day prior to the final race for calibration and design modifications.
2. The actual layout of the final racing track will be unknown to competitors until day of the event.
3. Width of the racing track shall not be less than 600mm/23.65in.
4. Material specifications regarding the surface of the racing track will be provided on the web site of the event.
5. Surface of the racing track is matte white, with a continuous black line (25mm/1in wide) drawn in the middle as the pilot line.
6. The minimum bending radius of the racing track shall not be less than 500mm/19.7in.
7. The racing track can intersect with a crossing angle of 90°.
8. Any slope in the track will be equal to or less than 15 degrees in a straight section of the racing track, including upgrade and downgrade.
9. Start/Finish line is 1000mm/39.4in long in the racing track, as shown in figure below. In addition, there is a black starting line 100mm/3.9in long at both sides of the starting point. Start time and end time will be determined when the front part of the racing car passes the starting line. The car must be able to automatically stop within three meters of the starting line after finishing the race.



## Section 16: Legal

By entering the EMEA Freescale Cup Challenge, the Contestants consent to having judges review his or her Entry and the Contestants further represent and warrant that the Entry is the Contestant's own original work and that the Contestant is the owner or has obtained and currently holds valid and sufficient rights, including rights in third-party intellectual properties, to grant Freescale, their subsidiaries, affiliates, agents, and customers the rights granted herein. The Contestants agree to be solely responsible if they submit another developer's Entry as their own. The Contestants also agree to release, indemnify, defend and hold Freescale harmless from any and all claims, liabilities and damages (including without limitation attorney's fees) related to the Contestant's Entry in the Contest, or usage of the Entry by Freescale. The Contestants agree to immediately notify Freescale in the event he or she discovers that there is any change in the ownership of the Entry as acknowledged and warranted herein.

Each Contestant further agrees to and does hereby grant Freescale, their subsidiaries, affiliates, agents, and customers the non-exclusive, irrevocable, perpetual, royalty-free, worldwide right and license to use, reproduce, create derivative works of, display, publicly perform, demonstrate and distribute all or any portion of the Entry. (In simpler language: We don't own your work, but you give us permission to use and showcase your work.)

Freescale reserves the right to use all or any portion of the winning Entry(s) for any promotional or demonstration purpose, and the right and license granted herein to Freescale by the winning Contestants will be exclusive for a period of six (6) months from the date of the announcement of the winning Contestants. The Contestants



agree to execute any document necessary to achieve the right and license granted herein.

This Contest is void where prohibited by law. These Rules cannot be modified or superseded except by Sponsor in its sole discretion. By participating as a Contestant you agree to abide by and be bound by this official rules and the decisions of the judges, which shall be final with respect to all issues relating to this contest. It is the Contestant's responsibility to ensure that they have complied with all of the terms and conditions contained in these official rules. Freescale is not responsible for any Entry that is lost, late, misdirected, stolen, illegible or incomplete entries.

Freescale is not responsible for any incorrect or inaccurate information whether caused by a Contestant by a printing error or by any of the equipment or programming associated with or utilized in the Contest or by any technical or human error, which may occur in the processing of Entries in the Contest. Freescale reserves the right to correct any typographical, printing, computer programming or operator errors. Freescale does not assume responsibility for any error, omission, interruption, deletion, defect, delay in operation or transmission, communications line failure, theft or destruction or unauthorized access to, or alteration of, registration forms or Entries. Freescale is not responsible for any problems, failures or technical malfunction of any telephone network or lines, computer online systems, servers, providers, computer equipment, software, email, players or browsers, on account of technical problems or traffic congestion on the Internet, at any website, or on account of any combination of the foregoing. Freescale is not responsible for any injury or damage to a Contestant or to any computer related to or resulting from participating or downloading materials in this Contest. If, for any reason, the Contest is not capable of running as planned, including infection by computer virus, bugs, tampering, unauthorized intervention, fraud, technical failures, or any other causes beyond the control of Freescale which corrupt or affect the administration, security, fairness, integrity or proper conduct of this Contest, Freescale reserves the right at its sole discretion to cancel, terminate, modify or suspend the Contest at any time. The rules, terms and conditions are subject to change by Freescale if necessary. Persons found tampering with or abusing any aspect of this Contest, or whom Freescale believes to be causing malfunction, error, disruption or damage will be disqualified. CAUTION: ANY ATTEMPT BY A CONTESTANT OR ANY OTHER INDIVIDUAL TO DELIBERATELY DAMAGE ANY WEBSITE OR UNDERMINE THE LEGITIMATE OPERATION OF THE CONTEST MAY BE IN VIOLATION OF CRIMINAL AND CIVIL LAWS. SHOULD SUCH AN ATTEMPT BE MADE, FREESCALE RESERVES THE RIGHT TO SEEK DAMAGES FROM ANY SUCH PERSON TO THE FULLEST EXTENT PERMITTED BY LAW.

**Dispute Resolution:** Except where prohibited by law, as a condition of participating in this Contest, Contestant agrees that (1) any and all disputes and causes of action arising out of or connected in any way with this Contest, or any prizes awarded, shall be resolved individually, without resort to any form of class action; (2) the parties shall use their best efforts to settle the dispute, claim, question, or disagreement, through good faith consultation and negotiation with each other, recognizing their mutual interests and attempting to reach a just and equitable solution satisfactory to both parties; (3) if the parties do not reach such resolution within a period of 60 days,

then, upon notice by either party to the other, they may pursue resolution of the dispute through the United States court system; (4) the mandatory jurisdiction and venue for any lawsuit brought to resolve a dispute arising under this agreement will be Travis County, Texas, U.S.A. Under no circumstances will Contestant be permitted to obtain awards for, and Contestant hereby waives all rights to claim, punitive, incidental or consequential damages, or any other damages, including attorneys' fees, other than Contestant's actual out-of-pocket expenses (i.e., costs associated with entering this Contest), and Contestant further waives all rights to have damages multiplied or increased. All issues and questions concerning the construction, validity, interpretation and enforceability of these Official Rules, or the rights and obligations of Contestants and Sponsor in connection with this Contest, shall be governed by, and construed in accordance with, the substantive laws of the State of Texas, USA without regard to choice of law rules.

***The rules and conditions are subject to change by Freescale if necessary. Freescale reserves the right in their sole discretion to cancel, suspend and/or modify The Freescale Cup race at any time. These official rules are drawn up in the English language. If these official rules are provided in any other language and there is a conflict in the text, the English language text shall prevail.***

Trademark statement: "Freescale, the Freescale logo, AltiVec, C-5, CodeTEST, CodeWarrior, ColdFire, ColdFire+, C-Ware, Energy Efficient Solutions logo, Kinetis, mobileGT, PEG, PowerQUICC, Processor Expert, QorIQ, Qorivva, StarCore, Symphony and VortiQa are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. Airfast, BeeKit, BeeStack, CoreNetFlexis, Layerscape, MagniV, MXC, Platform in a Package, QorIQ Qonverge, QUICC Engine, Ready Play, SafeAssure, SMARTMOS, TurboLink, Vybrid and Xtrinsic are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners.© 2013 Freescale Semiconductor, Inc."