

# User Requirements Specification

## FTC 2015/2016 Modular Drive Platform

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Project: Modular Drive Platform Design Excercise  
Date: 23JUL2015  
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Rev	Date	Author	Revision Summary
0	23JUL2015	CR/DR	Initial Release

### 1. Introduction

This document contains the user requirements for an FTC 2015/2016 Drive Platform. This URS is part of a summer design exercise to build and test a “modular” drive platform using the new 2015/16 hardware and software. The project builds on previous work two years ago and will not include previous brainstorming and research. The previous work was based on a mecanum drive system, but could also accommodate regular 4 wheel tank-drive as well as omni-drive configuration.

### 2. Purpose of This Document

This document is intended to guide development of modular drive platform that meets the requirements and restriction of the FRC 2015/2016 season.

### 3. Scope of the Project

This URS will cover only the requirements for the drive mechanisms and controls. Specific game requirements are not included. General requirements about game mechanisms will be inferred from previous years' games.

### 4. Overview of the Requirements Document

The intent is to design and build a drive system with the following characteristics:

- Modular- each wheel/motor/gear box assembly will be self contained and the platform frame can easily change by bolting different structures to the wheel modules.
- Compact- our previous designs have taken up a lot of "real estate" in the chassis. This design intends to maximize the space inside the platform to allow room for the game mechanisms and capture of the game elements.
- Reliable- both mechanically and controls
- Controllable- teleop control smooth and predictable
- Agile
- Good efficiency
- Strong- wheel modules strong enough to withstand collision without damage
- Maintainable- designed for ease of disassembly and parts replacement

### 5 Requirements

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- 5.1 All materials. Components and controls must be legal per “[2015-2016 FIRST® Tech Challenge Game Manual Part I](#)”.

- 5.2 The drive system must be of omni-directional drive design. The drive system will use mecanum (preferred) or omni wheels as well as compatible with standard wheels.
- 5.3 The control system will be based on the new Modern Robotics Inc. control modules. The legacy module will not be used.
- 5.4 The platform must be no larger than 18 inches square.
- 5.5 The motors will be one of the allowed 12VDC gear-motors.
- 5.6 The platform, when loaded with 35 lb, will be able to climb a 15 degree incline (per previous years' games).
- 5.7 The platform should have a loaded (35 lb) full speed of 2 ft/sec.
- 5.8 The platform should have a pushing force of 20 lb.

## **6. Glossary**

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- Mecanum Wheel- is one design for a wheel which can move a vehicle in any direction.
- Omni Wheel-

## **7. References**

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- 2015-2016 FIRST® Tech Challenge Game Manual Part I