

Characterization and Actuation of Vibratory Testing Platform

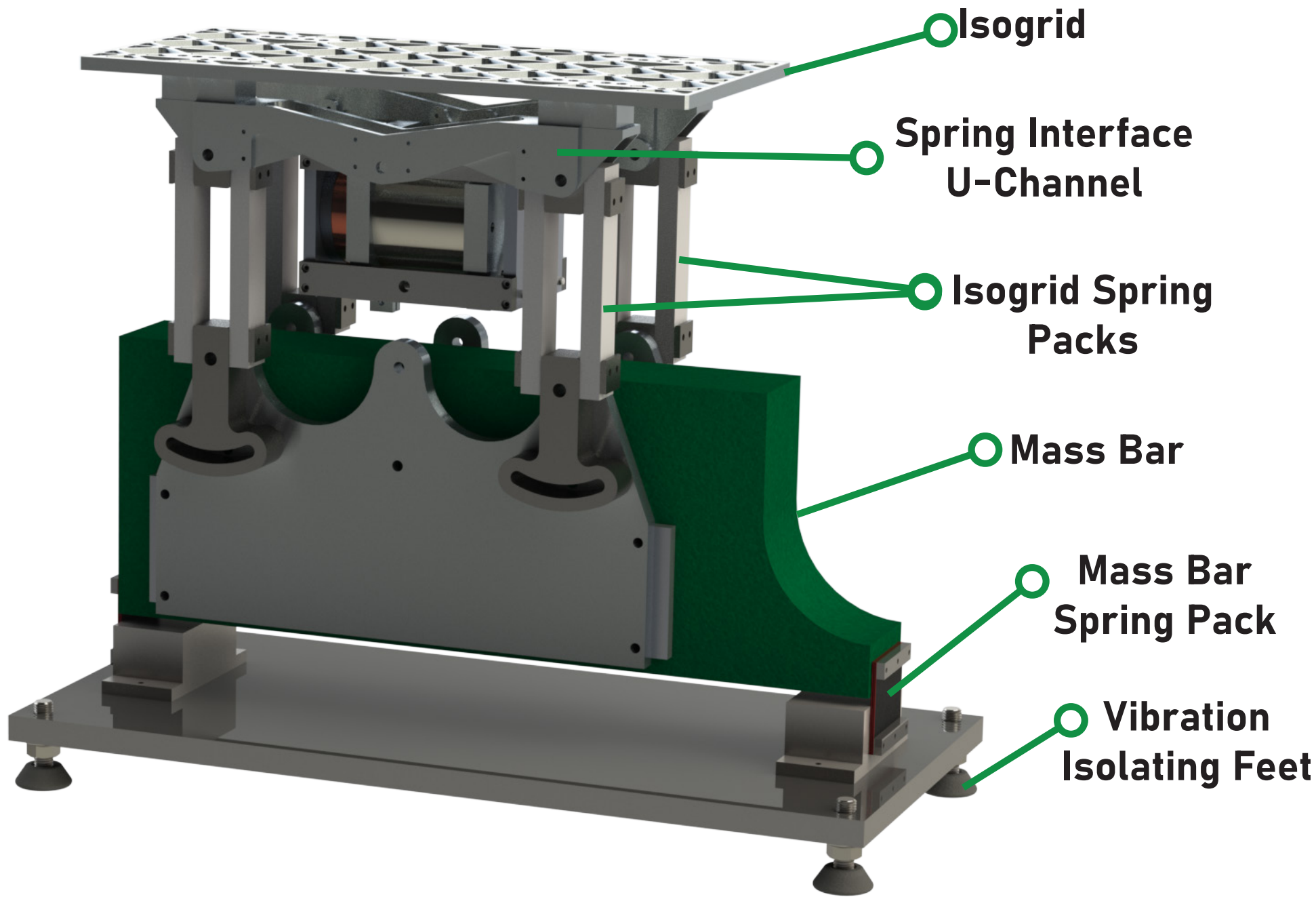


Olin College
of Engineering
SCOPE



Project Motivation and Background

The Arthur G. Russell Company delivers customized solutions for automated assembly, with a specialization in vibratory parts feeding. To design effective vibratory feeding systems, it is important to properly configure the frequency, angle, and amplitude of vibration to optimize performance. This year's SCOPE team **characterized the complex dynamics** of a multi-variable vibrational testing table (shown below), and **developed solutions for actuation**.



The Multi-Variable Vibratory Test Table

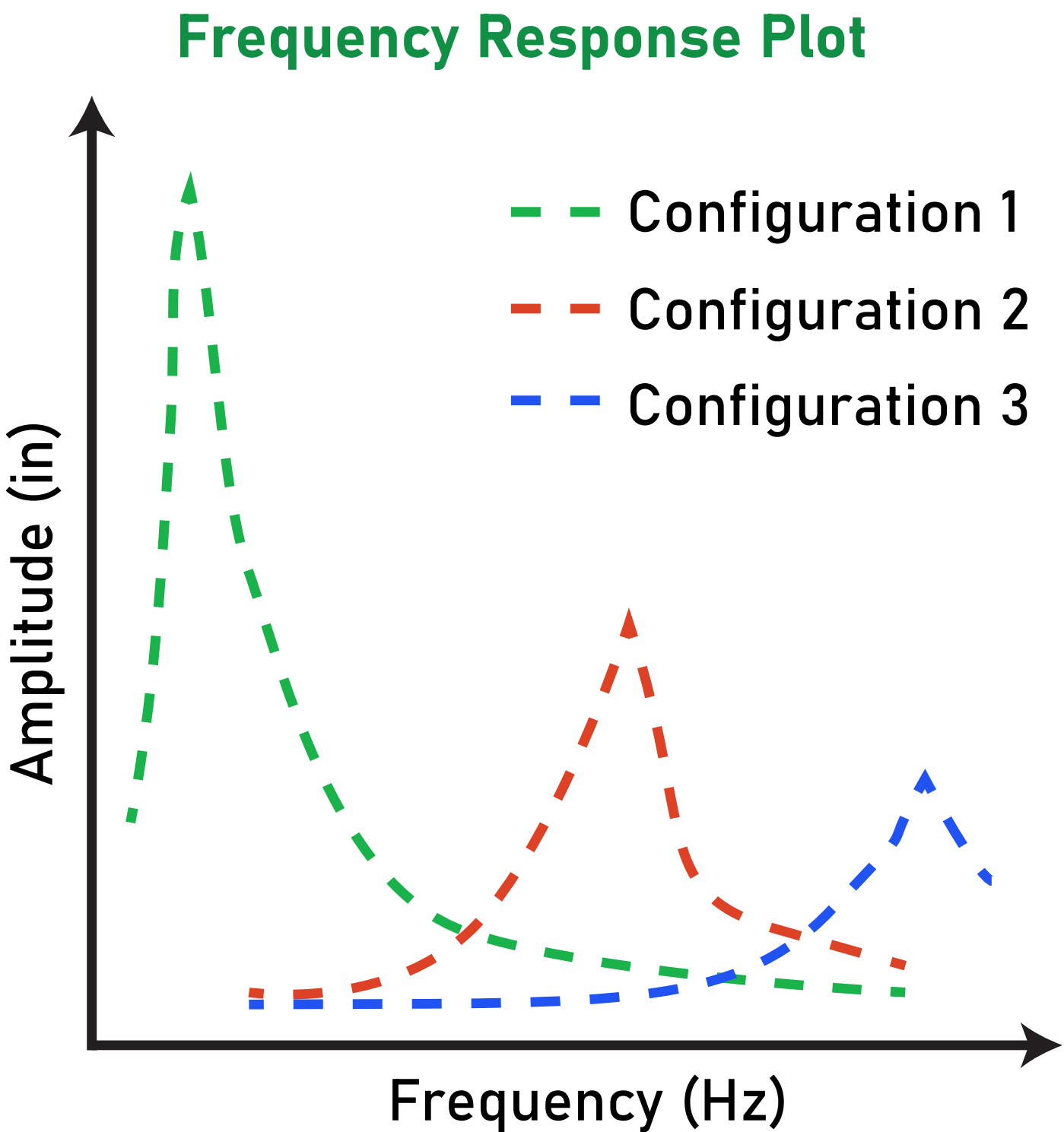


Table Characterization

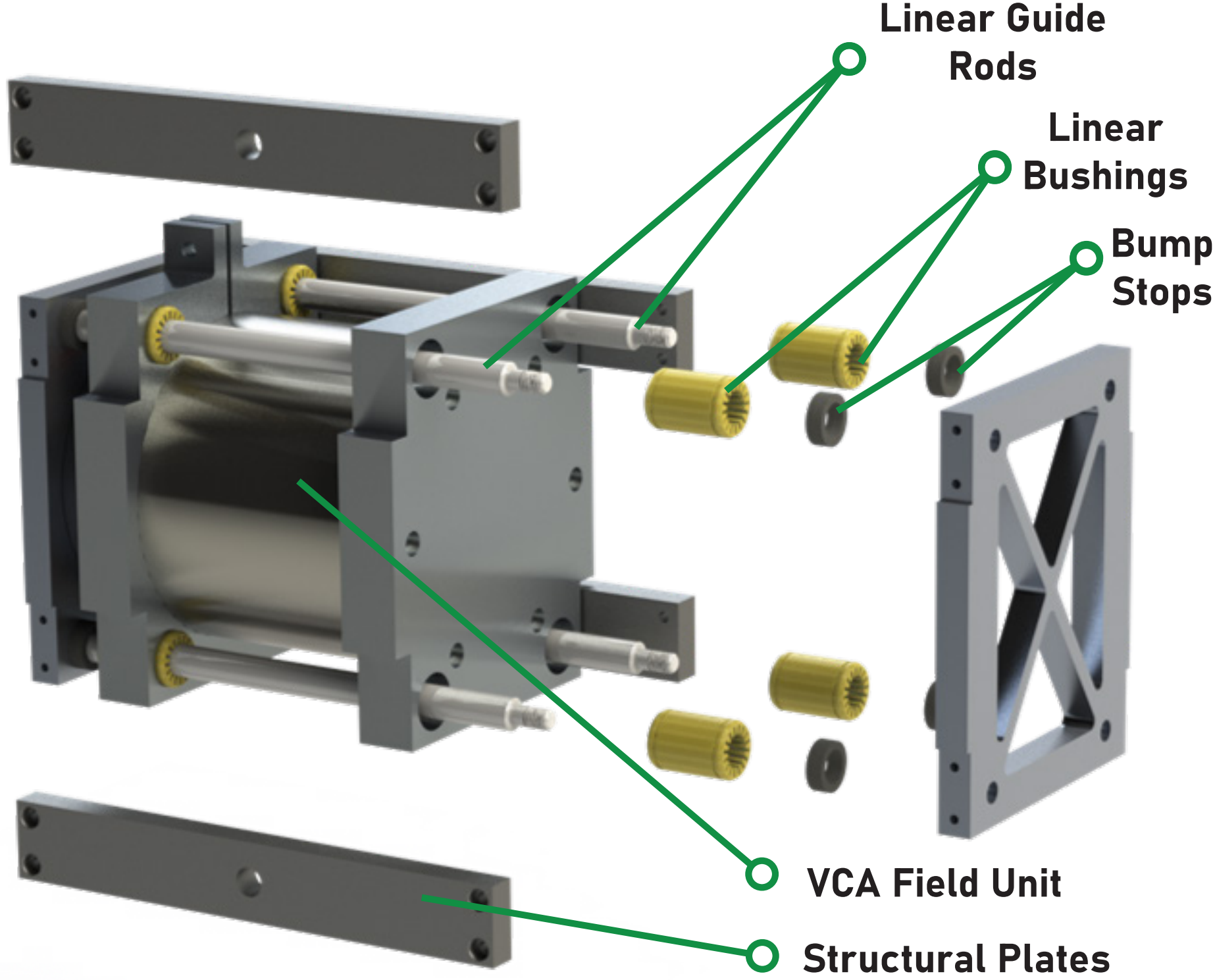
The team collected extensive data on the table in a variety of different configurations in order to **characterize performance**. This data was used to validate simple analytical models of the table system and define a force requirement for adequate table excitation.

Additionally, the team **collected data to describe the imperfect dynamics** of the table. This data quantified aspects such as lateral and vertical acceleration, as well as the non-linear path of the table surface.

Actuation Solution

The team **specified and integrated an off-the-shelf voice coil actuator (VCA)** to excite the table. Voice coil actuators are suitable for this application as they allow for easy and independent control of both frequency and amplitude.

The team also **created a custom housing** for the most promising VCA to facilitate smooth linear motion even in the harsh vibrational environment of the table.



Custom VCA Housing Solution (Exploded View)



The Team
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