



FloDesign Wind Turbine



Franklin W. **Olin**
College of Engineering

Fall Semester

Background

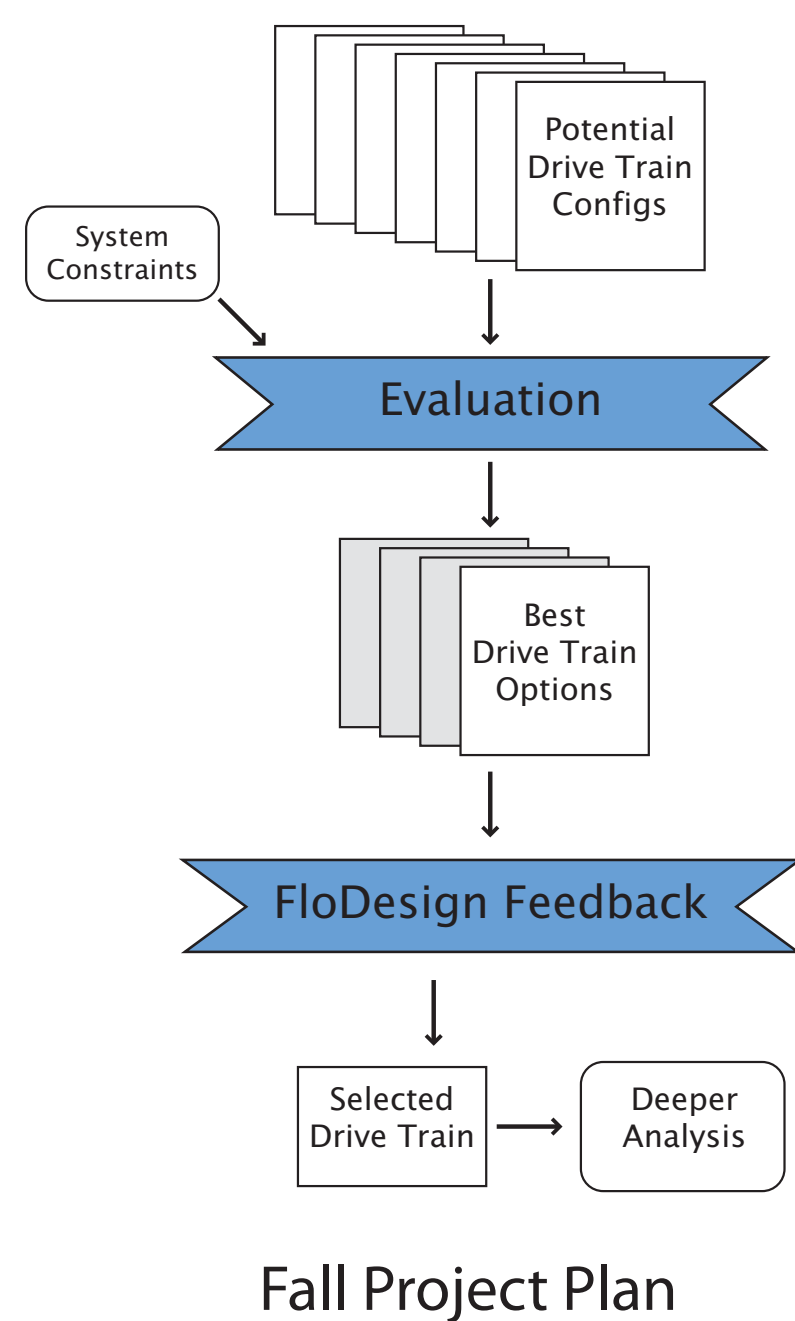
FloDesign Wind Turbine will design, manufacture, and sell utility-scale shrouded turbines to wind farm developers, industrial operators and utilities. The patent-pending concept proposed by FloDesign promises to outperform existing wind turbines by a factor of three or more in a much wider range of wind resources.



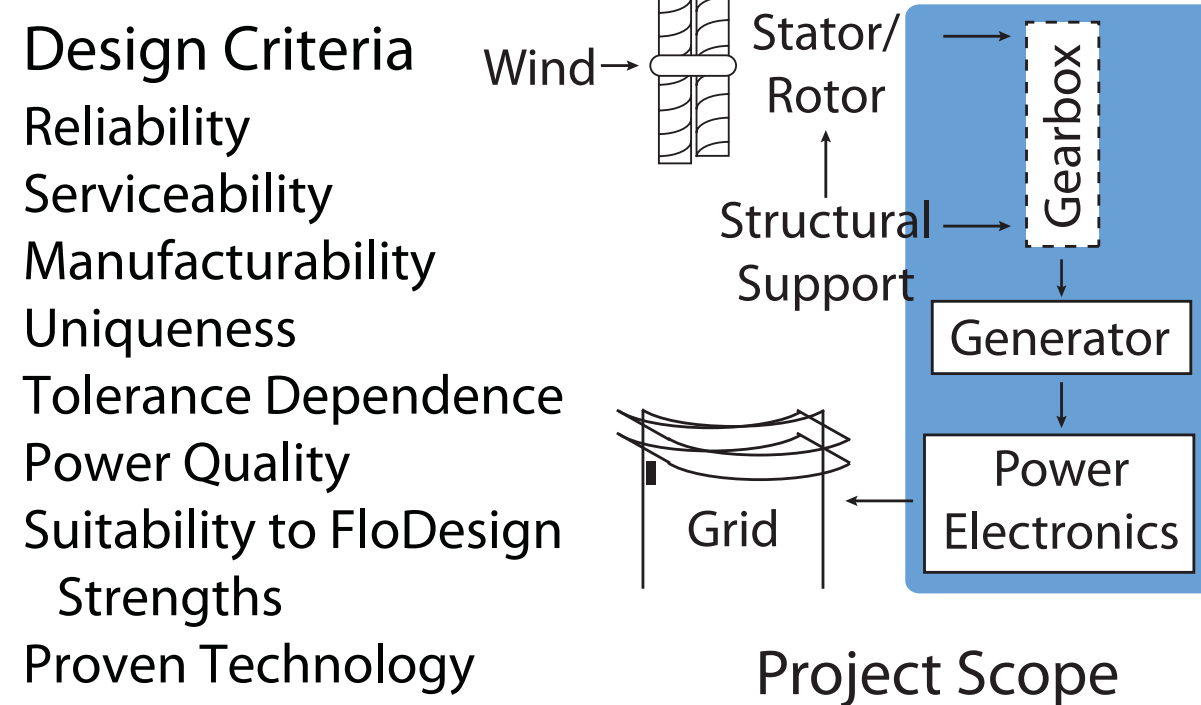
The design of the FloDesign Turbine is different from traditional turbines in several important ways:

Faster rotation, Hoop around rotor, External support structure

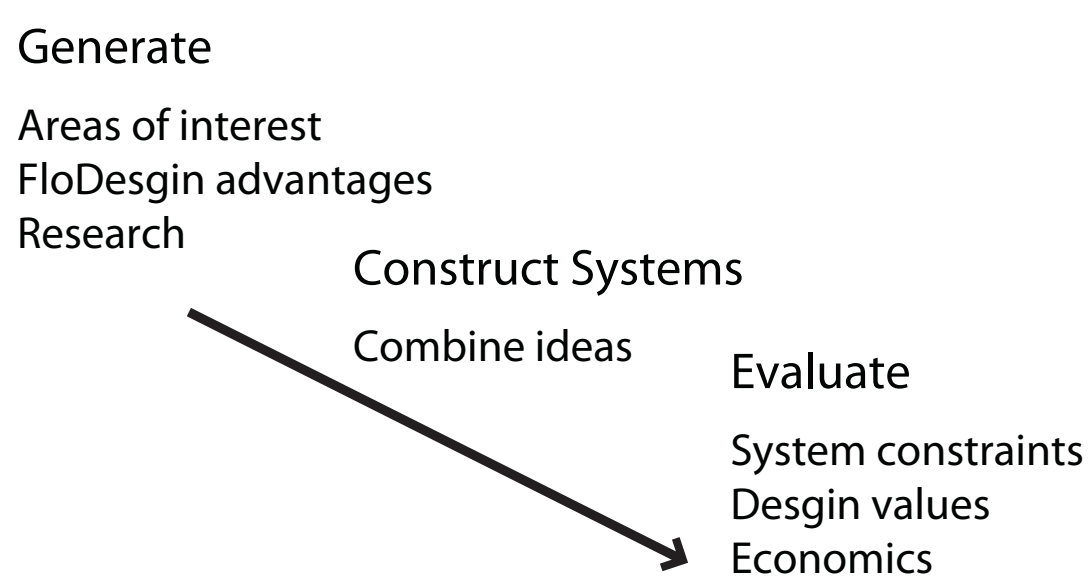
Define



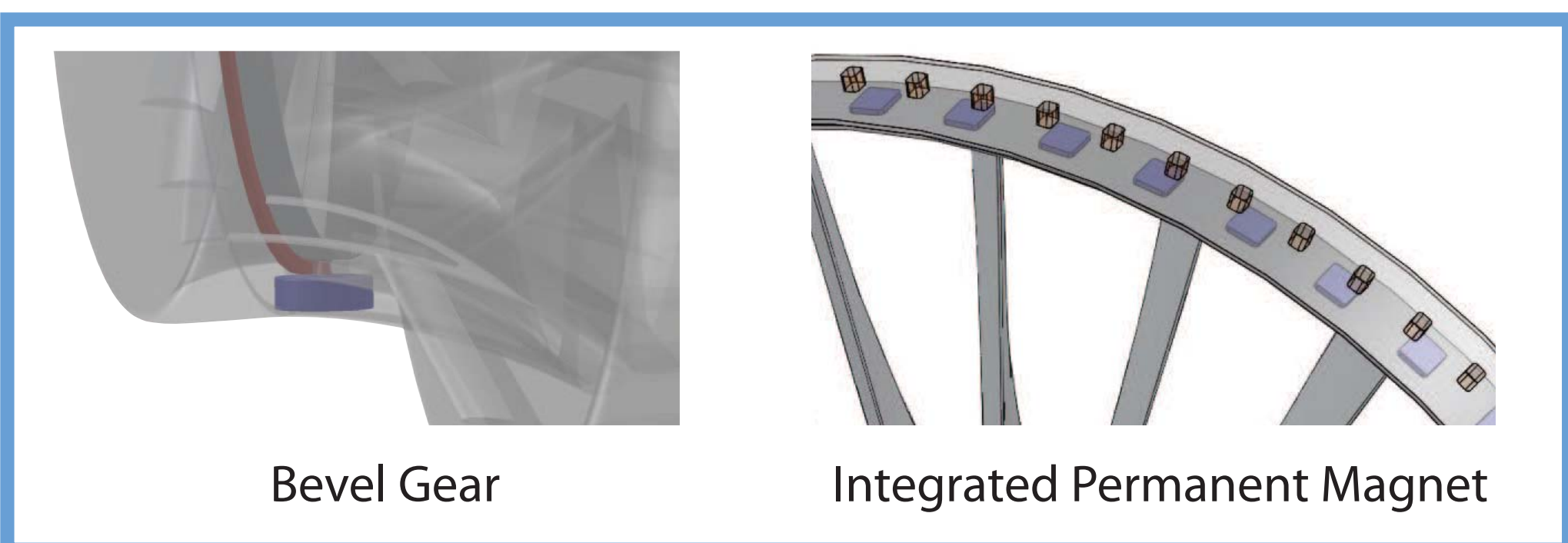
Olin College's FloDesign SCOPE team was charged with an evaluation of potential drive train configurations for its innovative wind turbine. The first stage of the project was to design 5-8 conceptual drive train configurations (including transmission, generator, and power electronics) that are well suited to the unique features of the FloDesign wind turbine. Gallery sketches and documentation of the tradeoffs for each option were provided in a written report and two were chosen for further investigation.



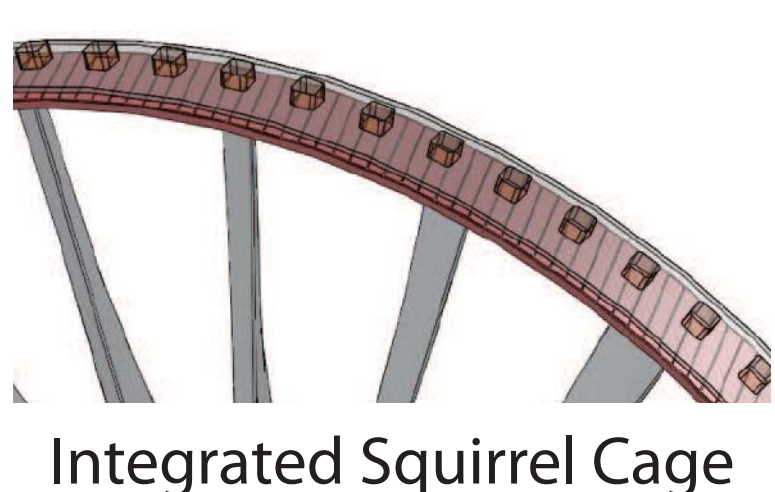
Ideate



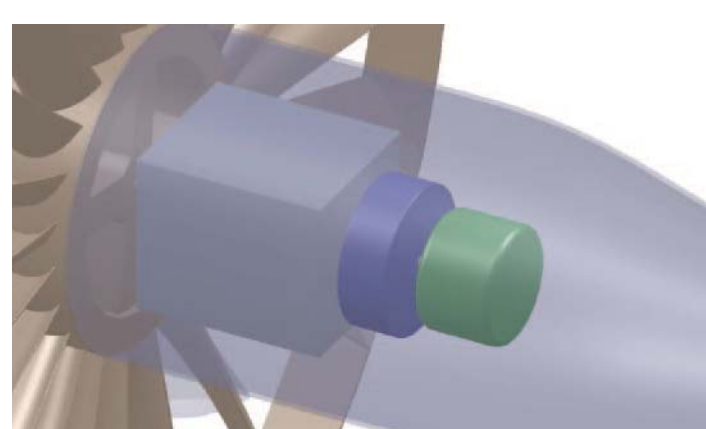
Gallery Sketches



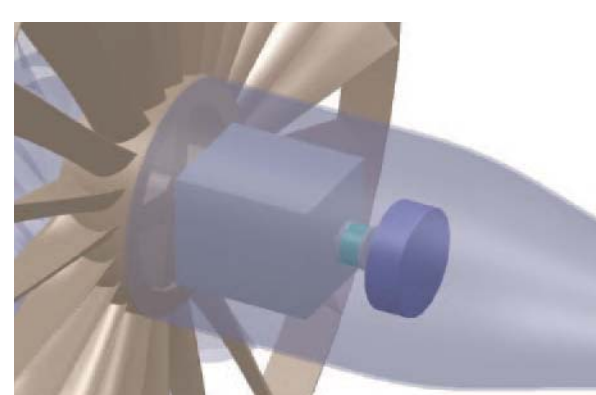
Chosen Designs



Integrated Squirrel Cage



Flywheel



CVT

Spring Semester

Goal

The goal of the Spring semester was to prove the chosen concepts by determining and addressing key concerns of an integrated permanent magnet generator and an integrated gear transmission.

Answer the following questions:

- Are these designs worth pursuing?
- What are the key concerns?

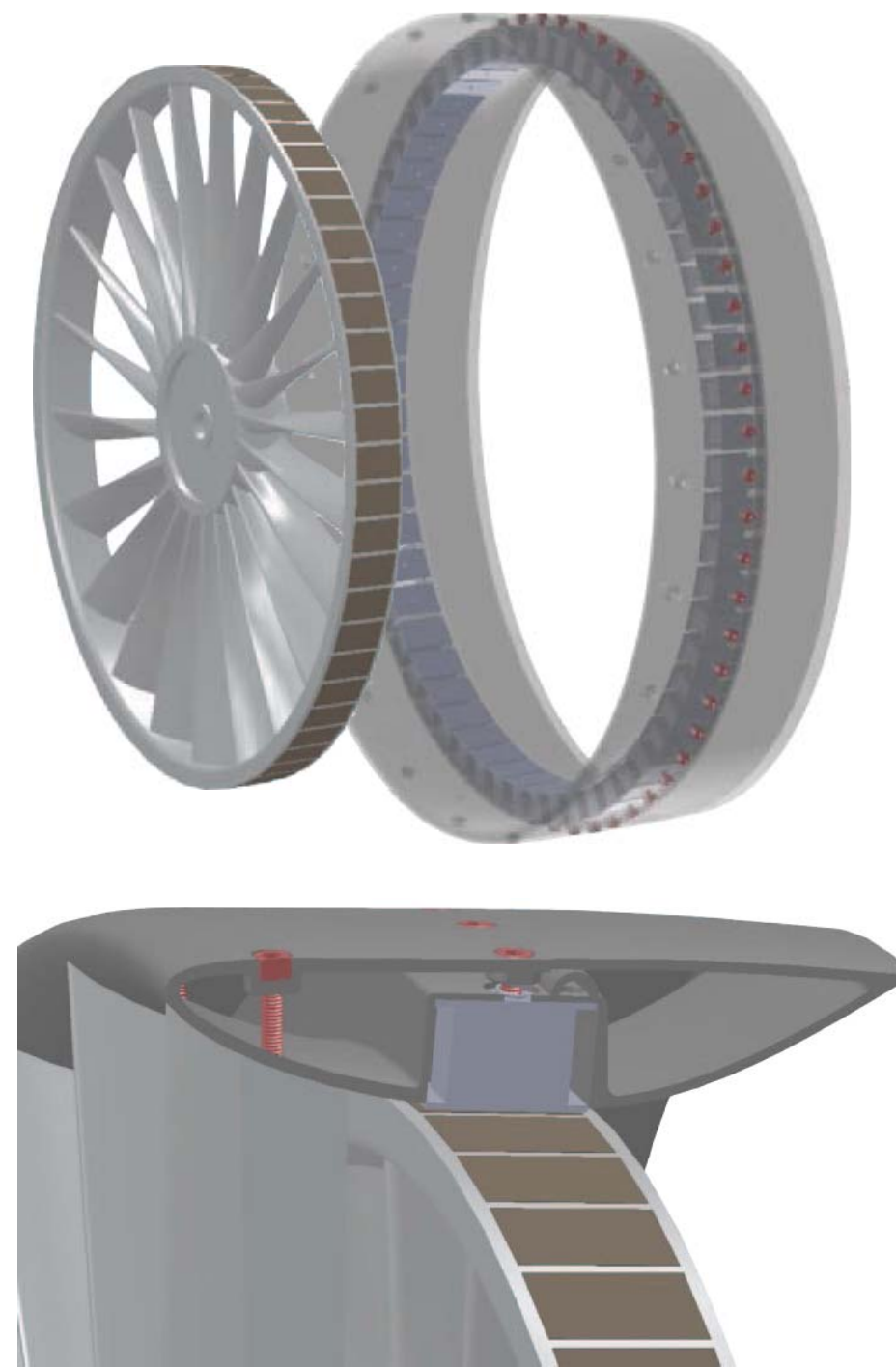
Priorities

1. IPM Bench Model
2. Gear Stress Analysis
3. IPM Analysis
4. Gear Model

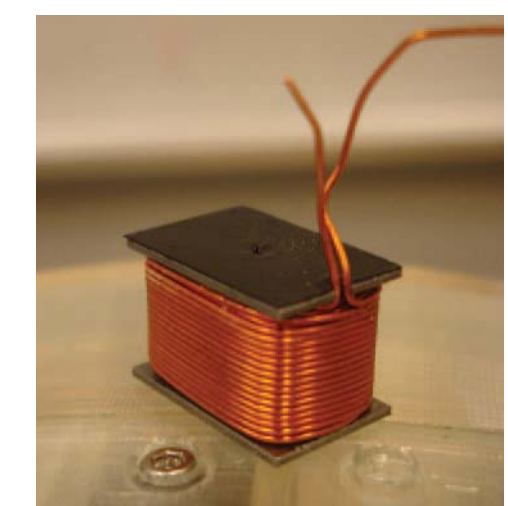
Integrated Permanent Magnet

Design

Magnets embedded in rotor
Coils in mixing shroud
60 coils and 60 magnets
Air-gap adjustment mechanism



Construction

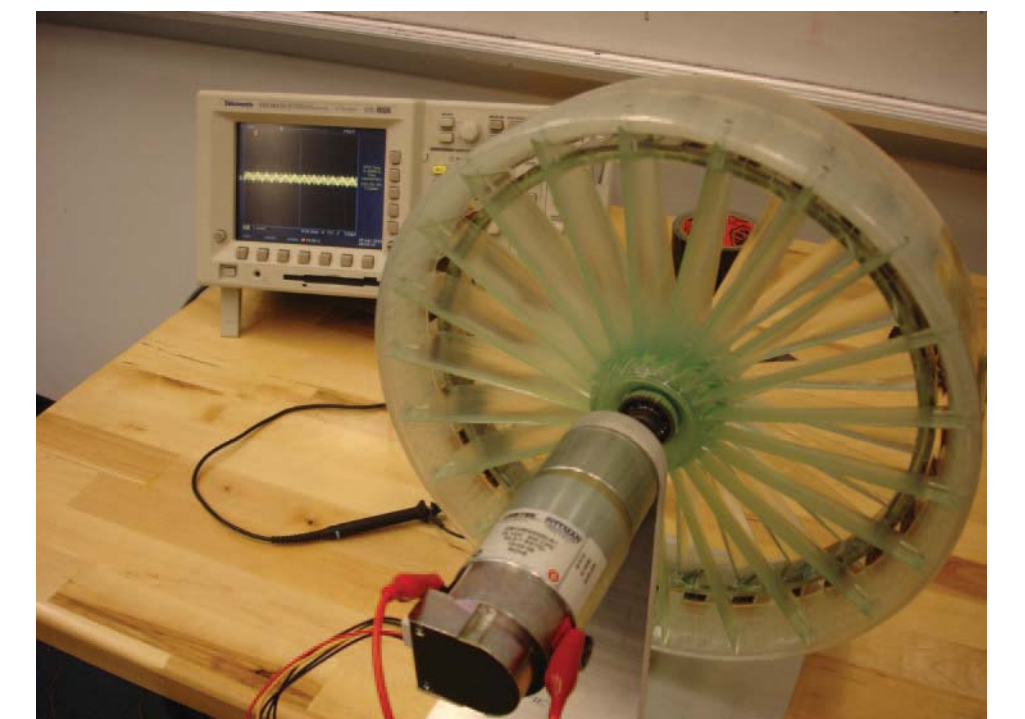


Coils wound by hand



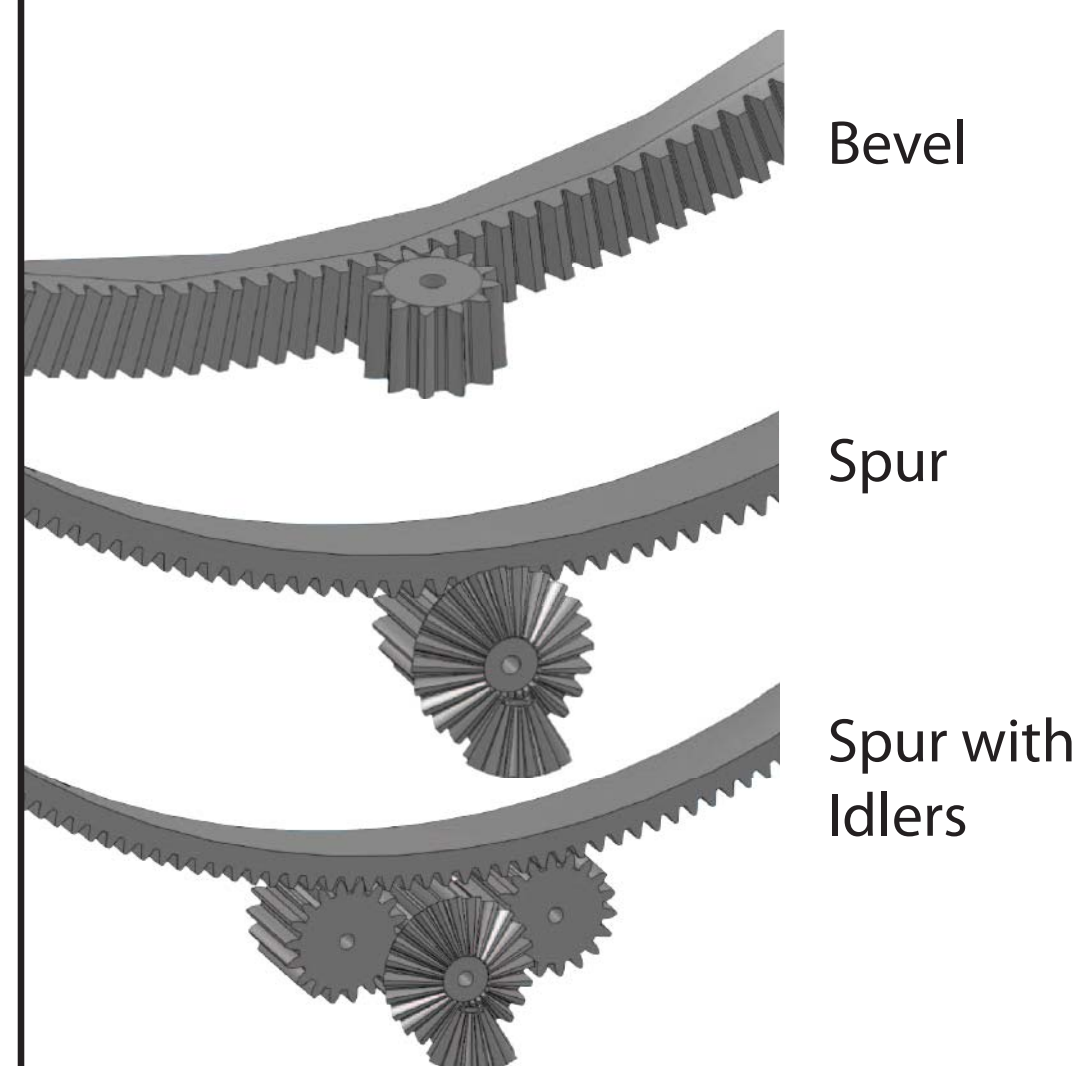
SLA model

Testing setup

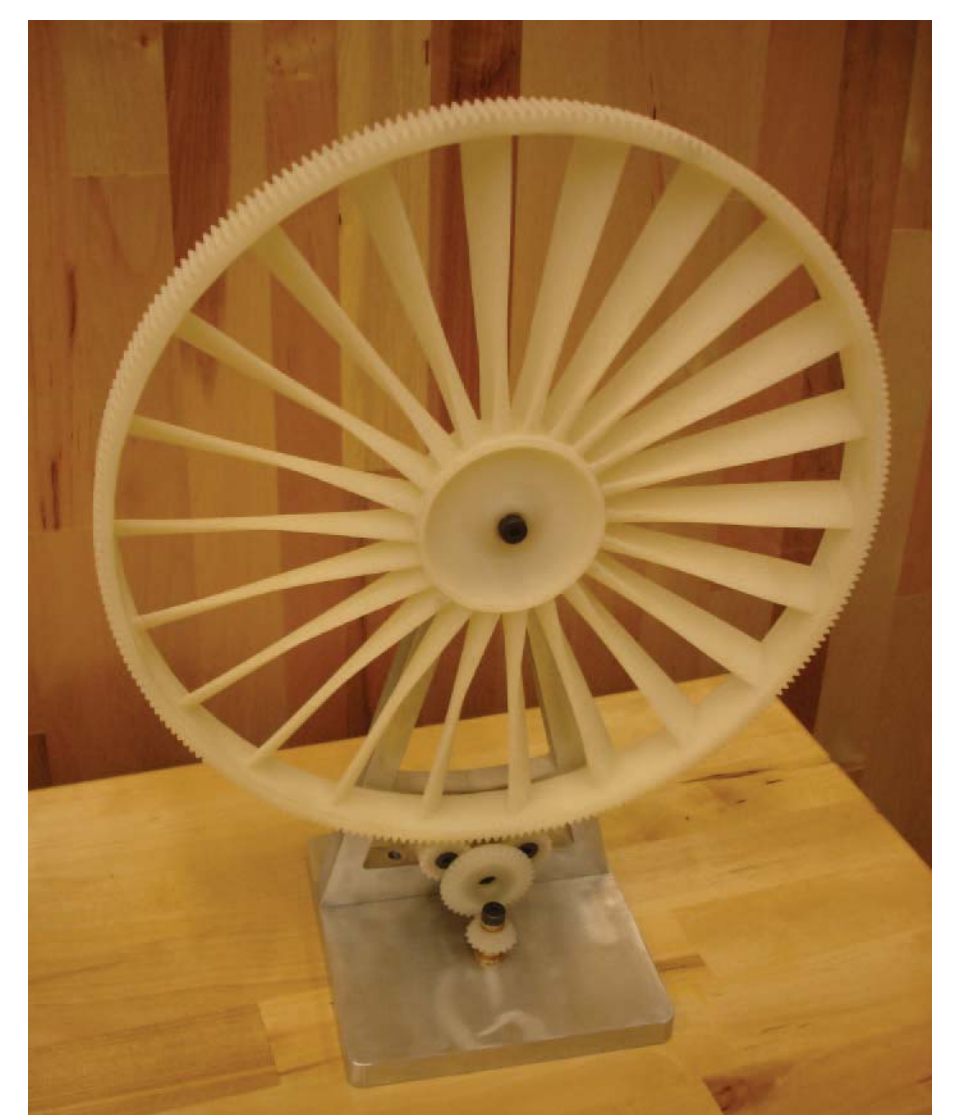


Integrated Gear

Analysis



Demonstration Model



Team Members: Mateen Abdul | Matt Crawford | Gavin Boggs
Kelcy Adamec | Russell Torres | Kevin Sihlanick
Liasons: Dr. Walter Presz | Mathew Commons | Thomas Kennedy



Olin College
SCOPE

Senior Consulting
Program for Engineering