Quarterdeck Meeting 2/7/12

- Mercury Marine
  - Presenter Dr. John Scherer
  - BS, MS, PhD from Michigan in Aerospace Engineering
  - 16 years experience
  - Technical Advisor at Mercury Marine
- Brunswick is the parent company of Mercury Marine
  - Opportunities at both
- Marketing Videos
  - Zeus Pod Drive http://www.youtube.com/watch?v=4vwifTpXco4
  - We Build Innovation Video
  - Q: Can you retrieve the broken away pod drive?
    - Yes. It completely seals.
  - Q: Reliability and Maintenance of Zeus Pod Drive?
    - Maintenance about every 2000 hours
- Brunswick Corpotation
  - 1845 - John Brunswick built his first billiard table
  - 1960 - Entered the marine industry by buying two boat builders
  - 1961 - Bought Mercury Marine
  - Now 15 boat brands, which makes it the worlds largest recreational boat builder
  - 15,000 employees
  - Many global locations'
  - BBG Merritt Island PD&G (Sea Ray among others, boat design positions available)
  - BBG Edgewater PD&G (Boston Whaler among others, boat design positions available)
- Mercury Marine
  - Founded in 1939 by Karl Kiekhaefer
  - Approximately 50% of sales to international markets
  - 6500 employees in 30 countries
  - 60+ facilities worldwide
  - Headquarters in Fond Du Lac, WI
  - Big projects
    - International sale of outboard motors
    - VW diesel stern drive in Europe
  - Q: Do you make diesel outboards?
    - No diesel outboards. We did make an outboard that ran on JP5 jet fuel for the Navy.
- Products
  - Outboards
    - 2.5 – 350 HP
    - 2 stroke and 4 stroke
  - Stern Drive
    - Gas 135 – 425 HP

        - Diesel 75 – 480 HP
        - Different drive systems
    - Pod Drive
        - 300 – 700 HP
        - Diesel
        - Independent Rotation
        - Typically twin pods installed on a boat
    - Mercury Racing
        - Supercharged 700 HP stern drive
        - 300+ HP Race Outboard
        - Turbocharged 1350 HP stern drive
    - Hybrid
        - 40 kWh, 300 V
        - Batteries in the bilge, segmented with explosive disconnect
    - Propellers
        - Aluminum, Trolling motors, kicker motors, bass boat, performance, counter rotating, pod, performance stern drive, CNC Machined (Cost $5000)
- What do Mercury Marine interns do?
    - Usually about 13 co-ops each semester
    - Topics include engine systems, drive systems, materials lab, data management and CAD
    - Interested in interns for hydrodynamics, propulsion, and drive systems
        - Propeller design and testing
        - Gear case design and testing
        - Analysis and performance prediction
    - Not a lot of model testing, more efficient to make a prototype and put a lot of recording devices on it and take it out in the water.
    - Use a lot of underwater video to study designs
- Q&A
    - Are you taking applicants for Sea Ray?
        - Yes. Give me your name and resume
    - What is Mercury Marine's largest growth in the next 5 years?
        - International diesel market and international expansion in general. Recreational boat market is saturated in the US.
    - How do you avoid losing to Yamaha or other competitors?
        - It is a constant battle in a competitive landscape, which is good for consumers because it forces innovation and higher quality products. Yamaha is probably the biggest outboard competitor and Volvo is big in stern drives.
    - How much do you see packaged products vs. products tailored for individual consumers?
        - Mercury works a lot with internal companies and try to coordinate a design that covers many different needs. In racing markets, it is easier to tailor products.
    - You graduated with degrees in Aerospace engineering, are there a lot of similarities?

        - Yes there are a lot of similarities and overlap. There is a similar design philosophy. Main propeller engine for example. [NAME students] get more systems engineering classes.
    - Is the Hybrid/Electric still something you are pursuing?
        - Still a research and design project. The market is very different then automotive hybrids. The boat can function for hours on batteries (Cruising around harbor, refrigerator, etc.). Some hybrid boats operating, but Mercury is looking for a market right now.
    - What do you do to deal with propeller cavitation?
        - Mostly manage with designs (cupping to prevent thrust loss and other features). At 45+ cavitation is a problem. The goal is to keep it away from all cases or anywhere it can cause damage.
    - What challenges did you find in connecting drive systems to fiberglass?
        - Fiberglass doesn't corrode. We use aluminum drive systems, field generators which prevent corrosion. Not a ton of integration. Fatigue and lifespan are always important.
    - What is the average service life for a recreational boat and where would you like to see it?
        - With competition and longer warranties, life and reliability is a lot better. People are expecting more, and Mercury has internal standards they test by.
- Next Meeting 2/14/12
    - Bruce Rosenblatt
    - Bruce is very knowledgeable about the marine industry and his presentation will be mostly Q&A, so think of questions to ask.