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Internship Report

Mechanical Engineering Internship

Aaryan Sonawane

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About Me

- Hometown: Westford, MA
- College: Rensselaer Polytechnic Institute
- Year: Sophomore
- Major(s): Mechanical & Aeronautical Engineering
- Clubs: Greek life, Intramurals, Deep Learning Research Group
- Hobbies: Sports, Movies, Reading

Projects:

Completed

- Herriott Cell Design Update (Assignment Lead - Chong)
- Flow Cell Fixture Assembly (Assignment Lead - Mollo)
- Flow Cell Design Update (Assignment Lead - Oleg)
- A Divisor Python implementation (Assignment Lead - Baskaran)

In-progress

- Flow Cell Design (Assignment Lead - Nick & Toan)

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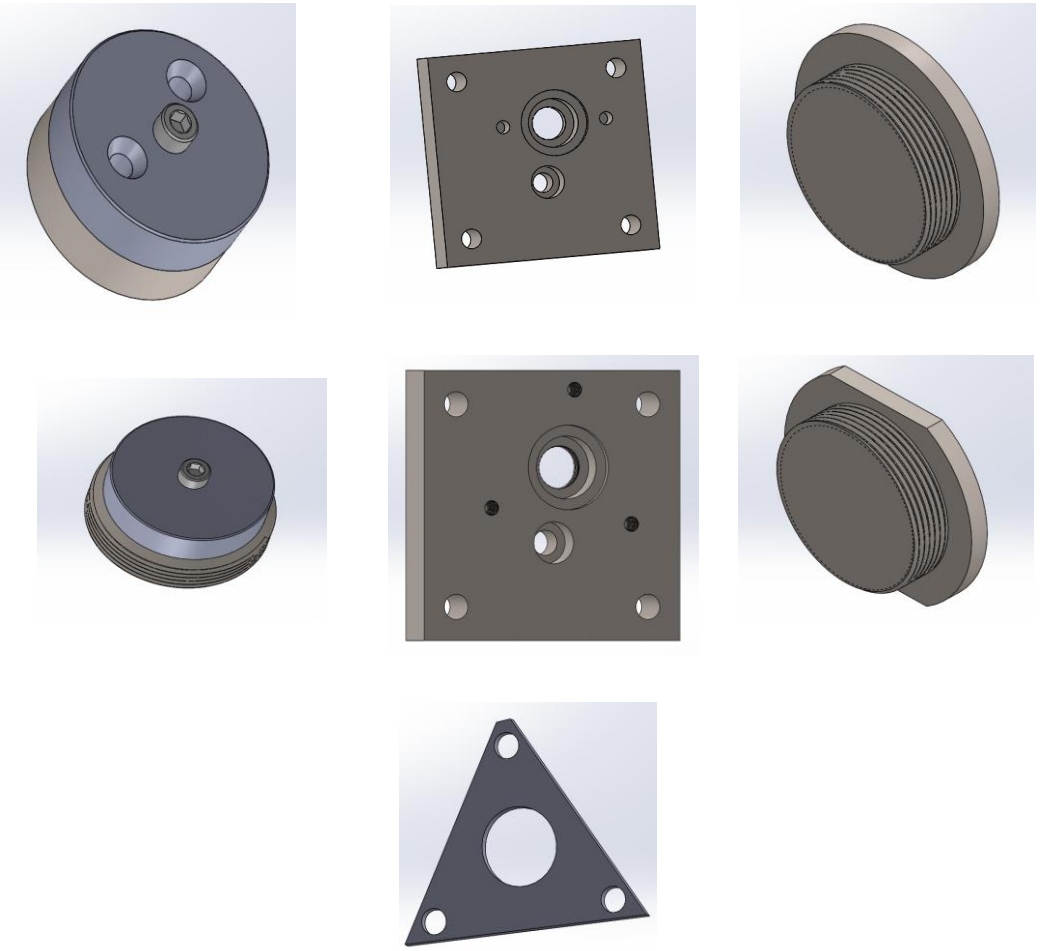
Herriott Cell Design Update (Before/After)



- **Goal:** More efficient assembly, high reusability value

- Updated 8 different parts in the Cell and added new triangular piece
  - End cap made rectangular for adjustability with a wrench
  - Both mirror and base pieces changed—from glued on to screw in
  - For the rectangular block piece—threads in the middle hole for lens adjustability from back
  - Triangular piece used as a up/down rocking mechanism for the laser

- Completed all the updates – drawings review today with Joel
- Next Step: Place Order (Target: 08/08/2023)

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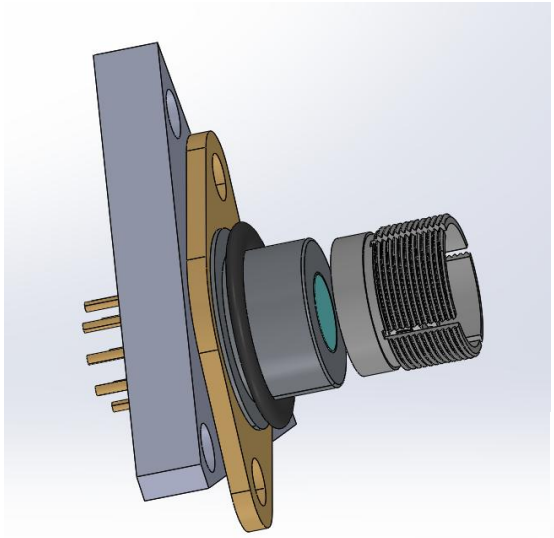
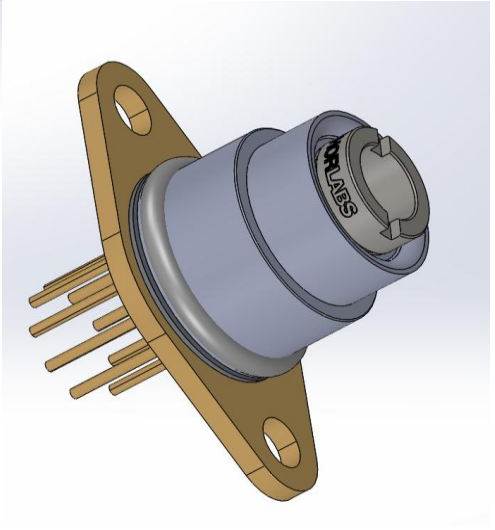
Collimating Lens Assembly





3 Types of Collimating Lens Assemblies in total including the original one being used

- For the First new one, the triangle piece is mounted on the TO66 laser, and addition of lens holder better adjustability of the lens position
- For the Second new one, both the laser and lens go inside the cylindrical mechanism created and radio sealed into the rectangular piece in the cell

If we were to use any of these two, the rectangular piece's width will be increased

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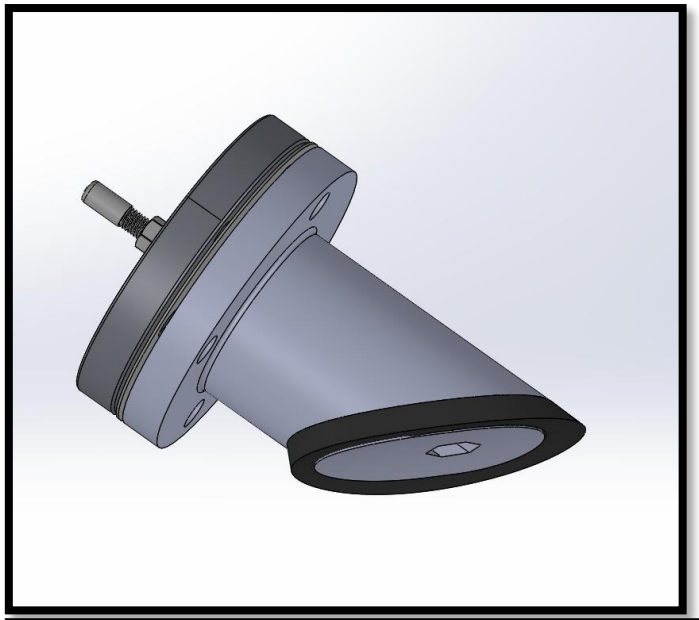
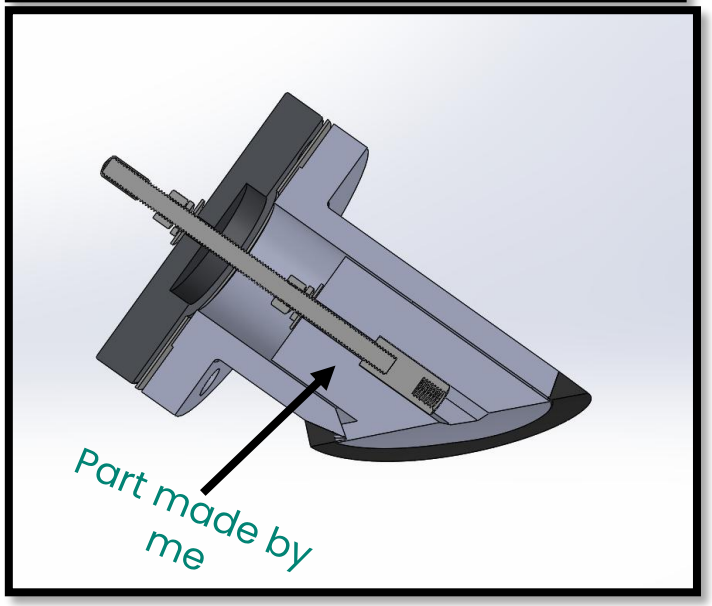
Flow Cell Cover Assembly

- **Goal:** Cover all the nozzle holes of the large flow cell that aren't used during testing, to limit noise
- Prototypes completed - 3D printing done.
- Ensured right tolerance level that fully covers the nozzles
- Ordered matching screw & hex pieces for fitting the part





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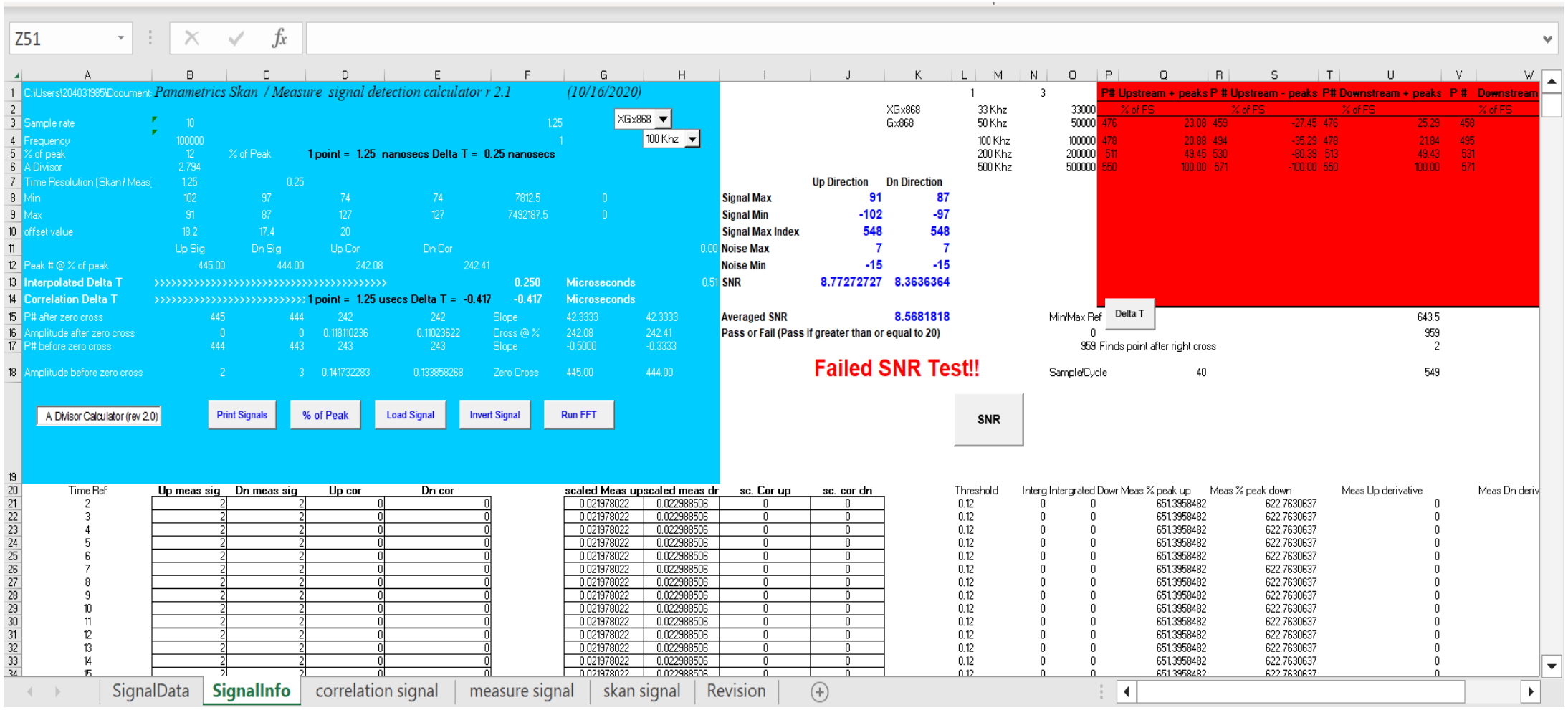
A Divisor in Python

- **Goal: To recreate excel code of the A Divisor Excel file for higher freedom of signal analysis**



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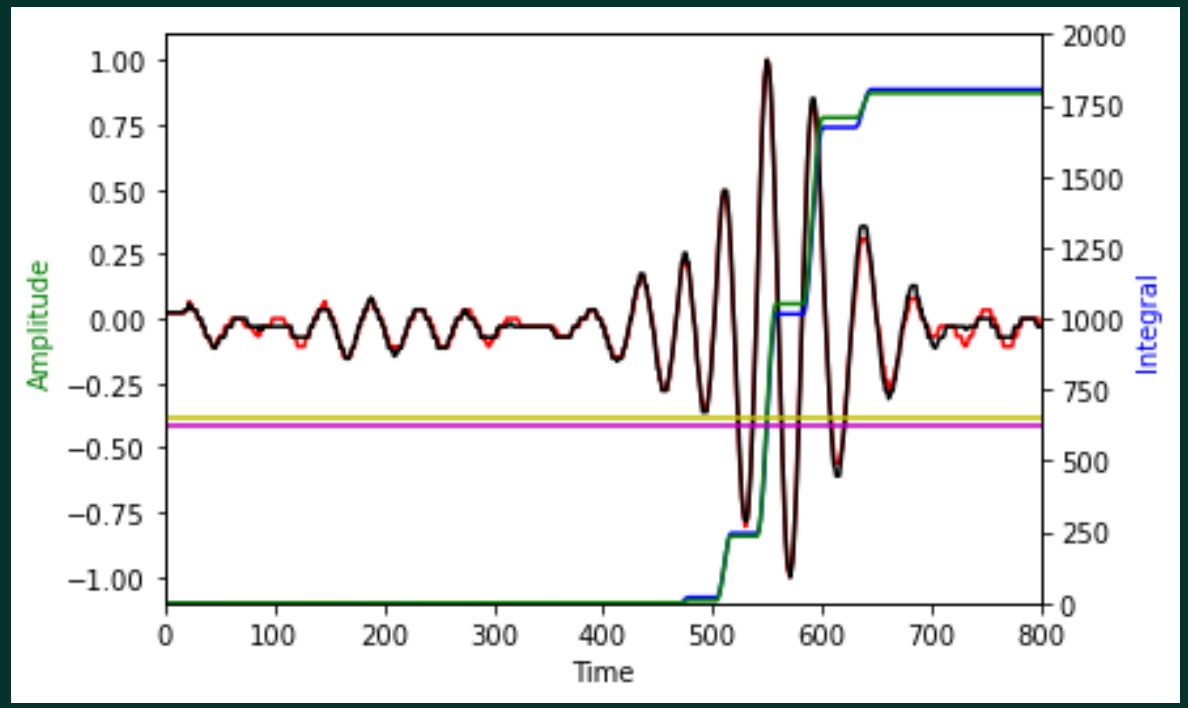
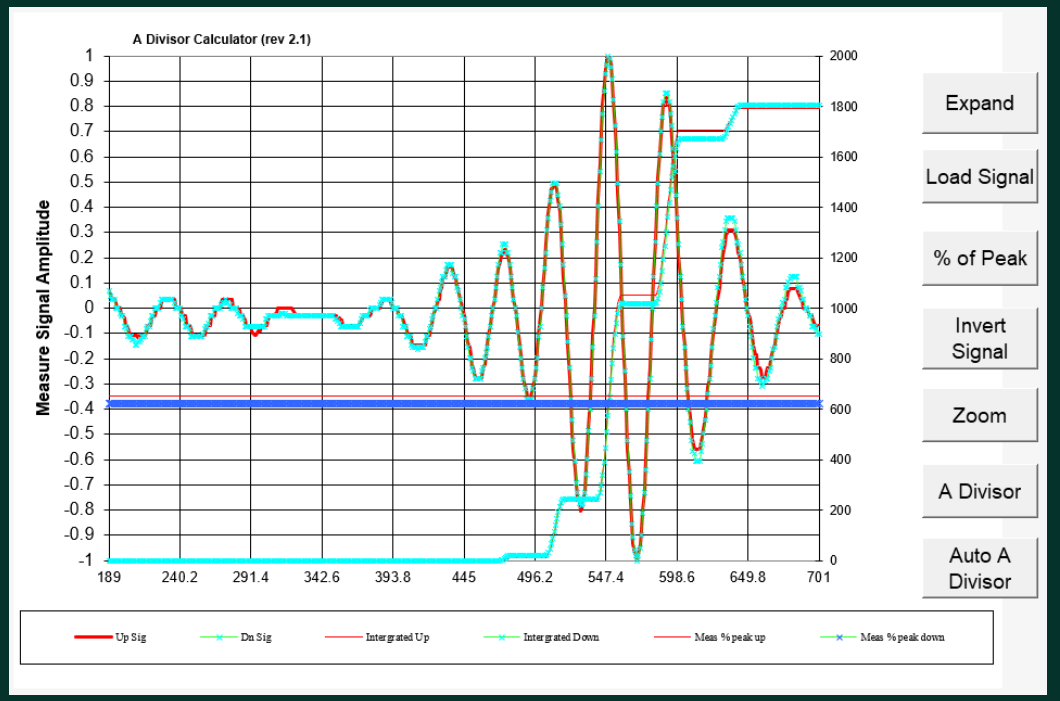
Graph comparison (Python vs Excel)





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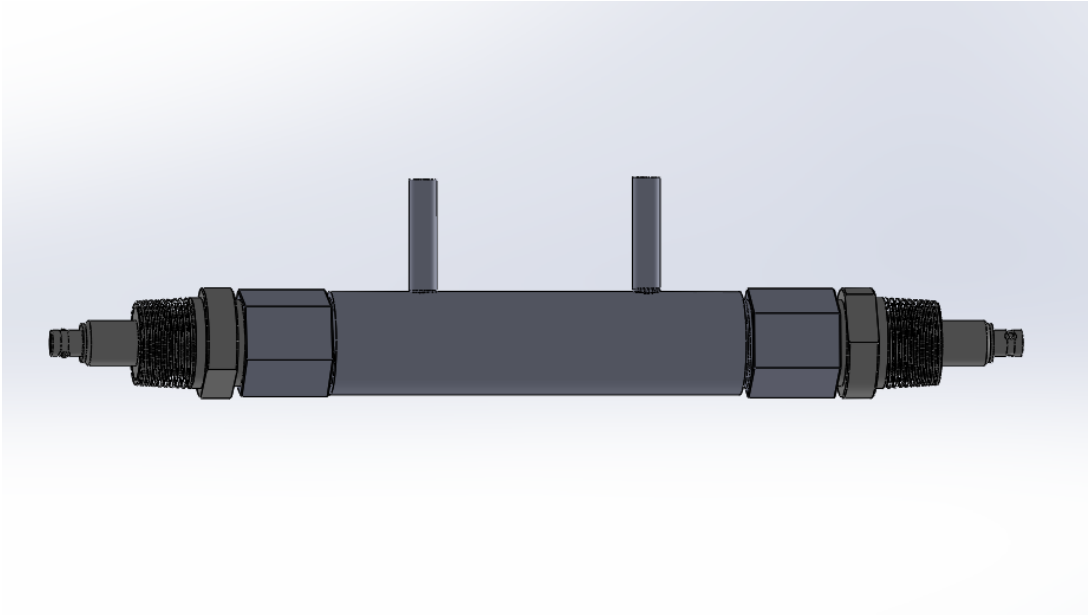
Flow Cell Design Update

- **Goal:** Design a flow cell assembly to measure liquid CO2 sound speed for BWT testing for Norway facility
- Initial conversations and preliminary plans discussed
- No further communication – possibly due to EU vacation
- Expected ETA – Aug 2023



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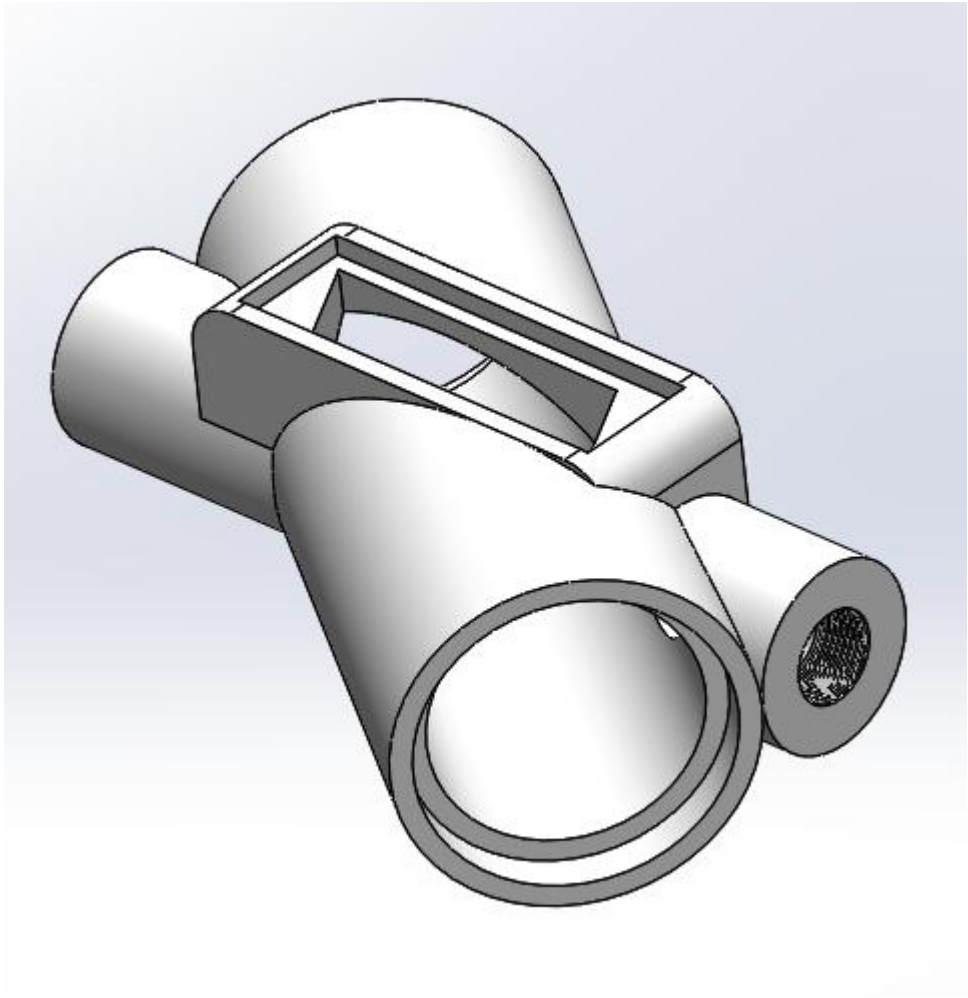
Flow Cell Update

- **Goal:** Shortened the length of the flow cell along with the window on top
- Order put in for the updated flow cell
- Used for BWT Testing



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Other activities from my internship

- Learned Manufacturing Processes along with how transducers are built & tested at the plant with Shashi
- Learned the math behind our flow velocity calculations & signal processing techniques along with Druck's Pressure Theory courtesy of Mike P
- Helped LOT to organize the Ping Pong tournament
- Exposure to multiple departments and functions
- Social connect

The broad range of activities is the reason it has been a very fruitful 12 weeks for me. Thank you!!

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Questions/Feedback

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