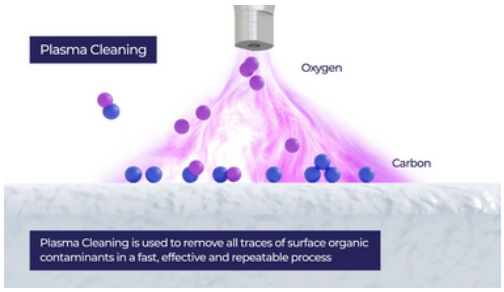
LOGAN ALEXANDER

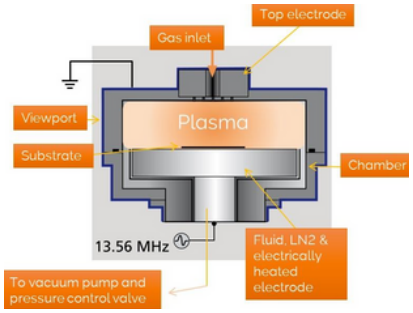
MECHANICAL ENGINEER

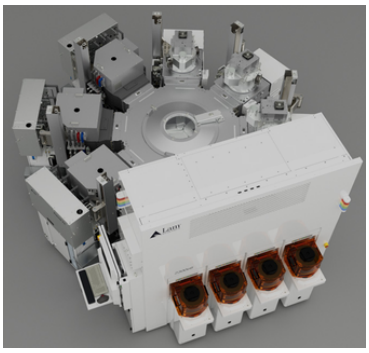
loganpalexander@gmail.com
linkedin.com/in/logan-alexander
(360)-261-0147

INSITU PLASMA CLEAN - LAM RESEARCH

Publicly available images used for all projects so as to not violate NDA







What?

- Enable **halogen plasma clean** capabilities across customer fleet of tools.
- Accommodate wide range of tool configurations with tailored retrofit kits per tool.

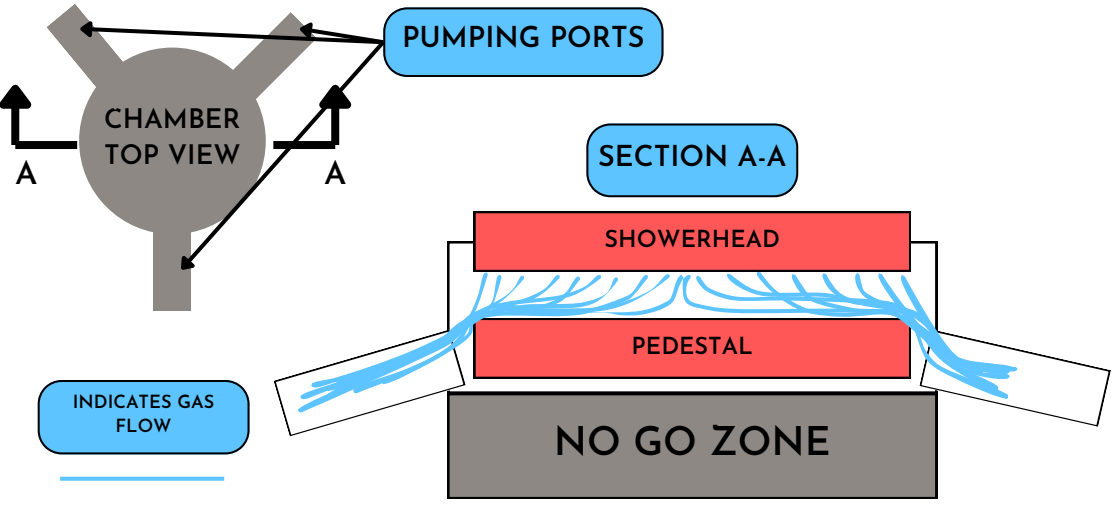
How?

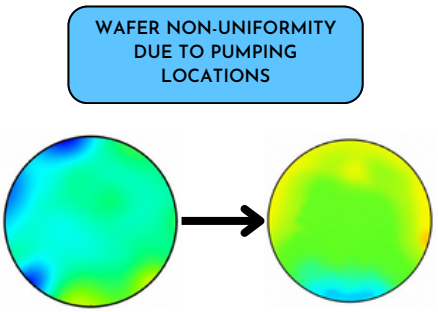
- Took design from **C&F** through **HVM**, implementing **DFX** principles to reduce part, manufacturing, and servicing cost.
- Utilized **NX** CAD software for **large assembly management** with over 1000 parts per upgrade kit.

Results

- **Increased service interval** from every 3 months to every 9 months.
- **Decreased Cost of Ownership** (CoO) by 25%.
- Reduced large assembly development time by 30% by creating **Best Known Methods** for CAD modeling.

CHAMBER FLOW OPTIMIZATION - LAM RESEARCH





What?

- Bring Wafer temperature from **250C to 25C in under 20 seconds** with less than 5% flow and temperature non-uniformity.
- Design around space-constrained environment with assymetric pumping locations.

How?

- Simulated using **COMSOL** fluid and thermal **FEA.** Used results to refine chamber geometry.
- Utilized **GD&T** to ensure part. uniformity and sealing integrity.
- Modeled and drafted using **NX** CAD software.

Results

- Achieved an impressive **80% reduction in non-uniformity** on wafers.
- Reduced cost of ownership through **10% reduction in UV lithography dose to size.**

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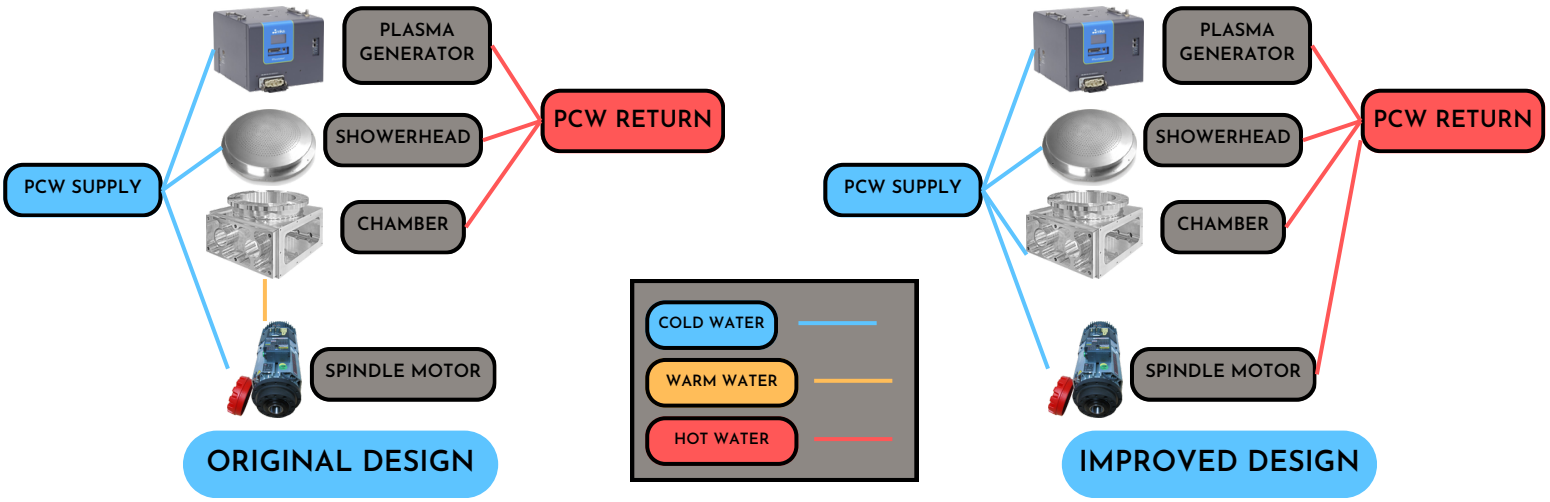
CHAMBER WATER COOLING SYSTEM - LAM RESEARCH



What?

- **Increase chamber cooling by 1100W** with under $5k in cost added
- **Original proposed solution was too expensive**, I was asked to take a second look

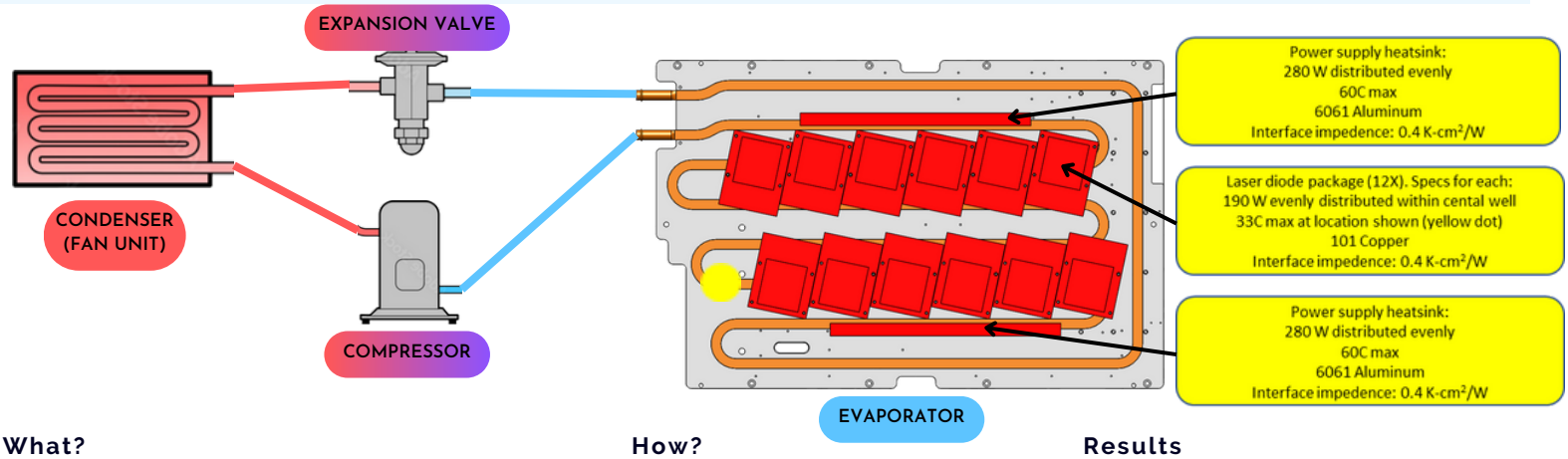
How?

- Developed simplified thermal model of entire process module using **convective heat transfer and fluid dynamics calculations**
- Reconfigured process cooling water routing to **improve coolant flow to chamber**
- Validated with TC measurement on lab and customer tool

Results

- **Provided 1200W of additional cooling** to chamber for a meager $100 of additional cost
- Delivered **timely and cheap solution** to customer escalation increasing customer trust and satisfaction.

TWO-PHASE COOLING SYSTEM CALCULATOR - nLIGHT



What?

- Create calculator to suggest cooling components for 1-5kW semiconductor laser arrays

How?

- Developed algorithm in **MATLAB** to quantify evaporative heat transfer with different refrigerants.
- Suggested appropriate COTS components for cooling with various heat loads.

Results

- Calculator validated to **within 25% accuracy** via bench testing.

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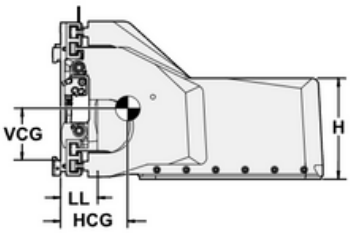
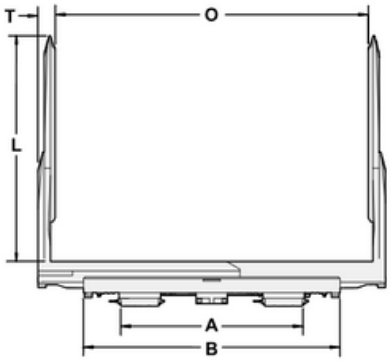
MODULAR BALE CLAMP ARM - RIGHTLINE EQUIPMENT





What?

- **Design cheaper, simpler, and better looking clamp arm.**
- Clamp arm design previously manufactured out of one thick piece of steel.
- Significant manufacturing time and expense required for this, but it is the industry standard.

How?

- Developed **modular, laminated** version of the arm to minimize material usage and cost.
- **Automated** assembly design, sizing, and drafting in **CREO** CAD system
- Performed **lifetime reliability test** to validate analysis and automated design tool.

Results

- Achieved a 40% **cost reduction** per arm.
- **Reduced weight** of each arm by 15%
- **Improved manufacturing time** by 10%.
- **Slashed development time** by 90% with automation.