

## CHPB-4-2018: Development of General Purpose Simulation Tool for Positive Displacement Compressors (Year 3)

### Objective:

- Add **single-screw** and **twin-screw** compressor geometries
- Carry on **experimental** and **numerical** investigations on the **linear compressor for isothermal compression**
- Enhance the **simulation framework GUI**

### Challenge:

- Manufacturing of the linear compressor core elements with internal cooling paths

### Expected Results / Impact:

- Extend the compressor library available to the Members
- Performance mapping of two commercial linear compressors and understanding of their control features
- Proof of concept with novel manufacturing process for compressor designed to achieve isothermal compression
- Iterate on the design of linear compressor in order to identify a second-generation prototype with potential industrial interest

### Approach:

- Based on **gearing theory** and **polygon approach**, the geometry curves will be obtained for the screw geometries and implemented within **PDSim core**
- The **four-pole method** will be added to account for **gas pulsations**
- **Prototyping** of four linear compressor core element designs by means of **3D printing** by the Advanced Manufacturing Group at Oak Ridge National Lab.



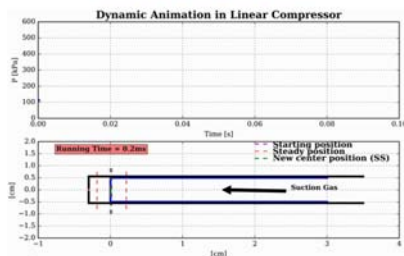
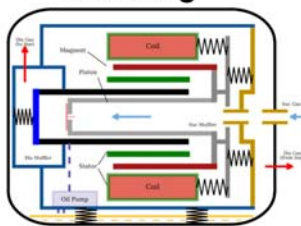
### Schedule

Tasks	Months	1	2	3	4	5	6	7	8	9	10	11	12
Literature review on screw compressors													
Implementation of single- and twin- screw compressor models													
Update GUI													
Finalize design and manufacture isothermal compressor													
Experimental testing and model validation													
Final report													

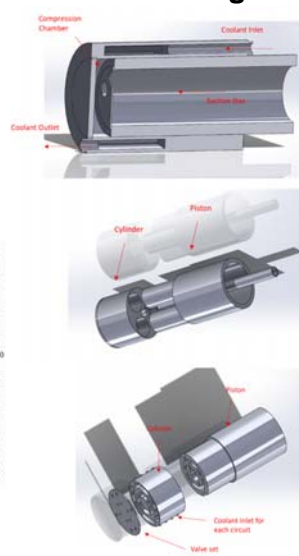


## Development of General Purpose Simulation Tool for Positive Displacement Compressors (Year 2 Results)

### Modeling



### Design



### Testing

