2017 CCS - ICAM WORKSHOP ON
Optimization Approaches To Realize Architectures for Thermal Management Systems
Drivers, Technology Status and Development Roadmap

May 31 – June 1, 2017
Blacksburg, Virginia

Organizers

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Workshop Overview

The key objective of the meeting is to identify common needs for high performance optimization approaches and tools that will make significant impact across the UTC Climate, Controls & Security (CCS) business unit for thermal management systems. The output of the workshop will be to make visible the methodology and benefits of state-of-the-art optimization methodologies, the articulation of needed technology roadmaps and the launch of projects using the identified optimization based methods. The roadmap will identify areas for simulation, design and control that are grounded in fundamental mathematics and that lead to methodology and workflows with the CCS business unit. The workshop will identify and document R&D challenges associated with developing new optimization methodology that are necessary to obtain high performance architectures and computational algorithms specifically for advanced simulation and optimal design of thermal management systems.

Key Questions and Actions (The Charge To The Workshop):

- **Program needs**: What is not sufficient with the way we do things today? What is driving the need for new performance in thermal management systems (i.e., regulatory or market forces or what demands)? Who are the drivers in the field (markets, companies, people)?

- **Technology thrusts**: What are the new technologies – both product and methodologies – that enable different performance or cost or both for thermal management systems? What kind of new architectures are evolving with advances in sensing, actuation, computation and new components? Who is doing new and useful kinds of work and what kinds of performance improvements are seen or being promised?

- **Short term and long term actions**: Identify targets and projects to illustrate how optimization based methods provide significant new capabilities. Determine the types of investments and time it will take to obtain this kind of capability.

The workshop participants will produce a document providing a technology roadmap to address program and technology issues and identifying actionable projects to deliver the capability to CCS.
This roadmap will also document mathematical and computational challenges that require investments in R&D to maximize the impact of optimization based architectures.

Draft Agenda
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2. Overview of optimization and UTC opportunities (architecture, design, control, variability). John Cassidy.

3. Optimization in design.
   a. Emerging technologies. Larry Biegler.
   b. CCS needs. Degang Fu.
   c. Discussion

4. Optimization in control.
   b. CCS needs. Kristian Tuszynski.
   c. Discussion

5. Optimization in variability.
   b. CCS needs. Kevin Otto.
   c. Discussion

6. Closing comments (day 1).
7. Dinner