

**Robert A. Altenkirch, President**  
**Remarks at the**  
**PRC 25<sup>th</sup> Anniversary Banquet**  
**Thursday, October 13, 2016 – 6:30 p.m.**  
**Student Services Building – UAH campus**

Let me welcome everyone to this 25<sup>th</sup> Anniversary Celebration of the Propulsion Research Center.

Of course, the history of propulsion research at UAH can be traced to our early days when a research institute was created through the efforts of rocket pioneer Dr. Wernher von Braun. It was America's space race that prompted Dr. von Braun to establish the UAH Research Institute. He recognized that if America was going to land a man on the moon and return him to Earth safely, then advanced academic coursework and research capabilities would be critical to that endeavor.

During von Braun's talk to the Alabama Legislature in 1961 to stand up the UAH Research Institute, he said: "Opportunity goes where the best people go, and the best people go where good education goes. To make Huntsville more attractive to technical and scientific people across the country — and to further develop the people we have now — the academic and research environment of Huntsville and Alabama must be improved."

von Braun envisioned that role being fulfilled by UAH. The university's emerging Research Institute and academic colleges successfully supported local propulsion programs and workforce development for NASA and the Army for the ensuing 30 years.

However, it was the wisdom of university leaders to create a more focused strategy. The Propulsion Research Center started in 1991 under the leadership of Dr. Clark Hawk. At that time, there were no associated faculty, students, or facilities connected with the PRC.

The PRC mission was to provide an environment connecting the academic research community with the needs and concerns of the propulsion community, while promoting an interdisciplinary approach to solving propulsion problems.

UAH's strategy has resulted in a rather unique national asset. The resources and capabilities that exist at UAH facilities, both on campus and on Redstone Arsenal, makes our university one of the leading research centers of propulsion in the nation and around the planet.

But, as successful as the PRC has become, there is reason to be excited about the continued development and growth of the PRC.

Just a few years ago, the PRC took possession of a pulsed fusion device for research into interplanetary propulsion. The pulsed power machine is located on Redstone Arsenal. Charger 1, as it is called, is unique among universities because of its size — the largest in the academic world.

More recently, construction was completed on a wind tunnel facility on campus, thus expanding the PRC's capabilities to supersonic flow research up to Mach 3. Again, this device makes UAH one of a handful of universities nationwide that has such capacity.

These newest assets continue to demonstrate how UAH and the PRC evolve to match the needs of Redstone Arsenal and Cummings Research Park.

The outcomes of research, analysis and testing coming out of the PRC all point to an important personal research philosophy of Dr. von Braun. It also points to the value of UAH. It's those types of outcomes that von Braun had in mind when he said One good test is worth a thousand expert opinions.

Congratulations to the leadership and the team members – past and present – that have contributed to the great success of the UAH Propulsion Research Center. In your program is a list of PRC accomplishments over the years. Please look it over, it's an impressive list.

Thank you and enjoy the evening.



## Propulsion Research Center 25 Years of Accomplishments

### During the past 25 years, the PRC has:

- Supported 230 advanced degrees
- Secured more than 35 million dollars of external funding
- Grown to more than 90 faculty, staff, and students
- Developed 12 different laboratories
- Developed 17 propulsion and energy-related courses
- Worked in close cooperation with colleges, other universities, etc.

### Research

- \$500K currently being invested to increase the capabilities of the Rocket Test Facility (Missile defense Agency and UAH)
- \$2 million dollars to establish a new Mach 3 supersonic wind tunnel sponsored by the State of Alabama, the Air Force, and UAH.
- Supported development of a joint US-Japan Ducted Rocket having several Japanese graduate students at UAH and a Visiting Scholar from Japan under AMRDEC Sponsorship (Customer: Bill Stephens).
- Completed fundamental research on new additives to reduce combustion instability in solid rockets under Office of Naval Research and the Ballistic Missile Defense Office sponsorship and in partnership with Cal Tech. (Customers: Richard Miller, ONR; Len Caveny, BMDO; and Fr. Fred Culick, Cal Tech)
- Led the REAP, Rocket Engine Advancement Program, for NASA involving a consortium of UAH, Purdue, Penn State, MIT, and Tuskegee to address combustion instability and heat transfer research in liquid rocket engines. (Customer, Garry Lyles at NASA). This grew into the NASA CUIP program that involved 25 universities over a 7-year duration (Customer, Claudia Meyers at NASA Glenn)
- Investigated combustion instability and heat transfer characteristic of liquid oxygen and methane combustion for advanced space propulsion under NASA Sponsorship (Customer: David Stephenson)
- Currently providing independent laboratory and simulation assessments of propulsion and energy technologies for divert attitude and controls systems for the Missile Defense agency. (Customers: Bill Gnacek and Joe Carden)

- Studied plasma liner formation for a promising thermonuclear fusion concept in collaboration with Los Alamos National Laboratory, Hyper-V Technologies, and the University of New Mexico.

#### Academics

- PRC faculty initiated the Integrated Product Team Design Class. The IPT class has combined engineering, business, and liberal arts students and faculty to perform to do conceptual aerospace designs with projects such as turbopump-fed hybrids, an advanced tactical missile, and new missions to the moon.
- The UAH student teams partner with a college in France and other universities around the country. Recent projects have added significant focus on K-12 outreach in Alabama.
- The 1994 design team of engineers and business students led by Robert Frederick, Dorla Evans (present tonight) of Business, and Dr. Bruce Fowler as the AMCOM Chief Mentor (present tonight) received a national First Place in the AIAA Northrop Corporation Graduate Team Missile Design Competition.
- PRC faculty initiated the University Student Launch Initiative. UAH students have won first place in this NASA team design project three times. Teams of students, design, build and fly a large sounding rocket to an altitude of one to three miles. This helps develop important teamwork, hardware, and presentation skills. Dr. David Lineberry currently oversees this project and it has been sponsored by NASA, Orbital ATK, and The Alabama Space Grant Consortium. This project has also been recognized by Popular Science as first in the nation

#### Superlatives

- National First Place in AIAA Northrop Corporation Graduate Team Missile Design Competition in 1994
- Three National First Places in NASA Student Launch Initiative Competition
- National First Place Awesome College Lab by Popular Science
- Important contributor to UAH national ranking in Aerospace Engineering (PhDs)
- Led National Academic Workshops for NASA's National Institute of Rocket Propulsion Systems
- Established National Class Rocket Test Facilities (among three in the nation that can do cryogenic propellants)
- Mach 3 wind tunnel facility Tunnel Facilities
- Authored National Standards Standard for Verification and Validation in Computational Fluid Dynamics and Heat Transfer
- Served on International committees in NATO, AIAA, ASME