

Cast Beryllium Aluminum (BeAl) Components ManTech



PROBLEM / OBJECTIVE

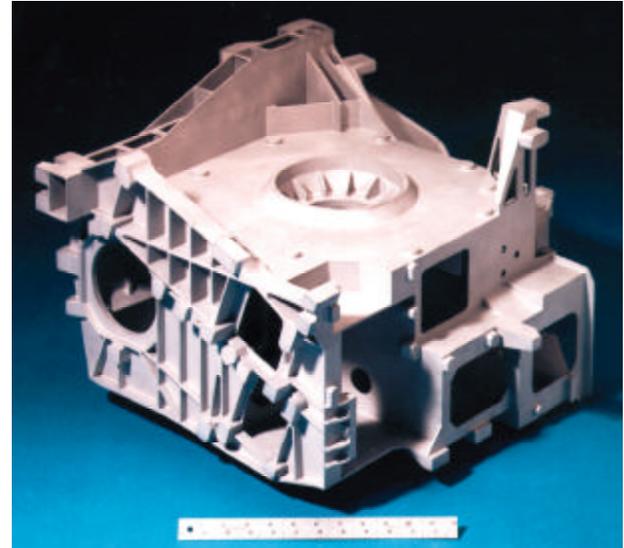
Increasingly stringent military applications have resulted in the need for lighter weight, higher stiffness, and more dimensional stable structural housings and flight hardware, with demonstrated producibility and affordability. In many cases beryllium (Be) or beryllium aluminum (BeAl) are the only materials that meet these requirements. Since BeAl was a new material, the key challenge was to develop and demonstrate investment casting and associated processes for complex geometric beryllium aluminum components, such as the mechanical components of the Comanche Electro-optical Sensor System (EOSS).

ACCOMPLISHMENTS / PAYOFF

Process Improvement: Investment casting processes and tooling to produce large size and complex BeAl parts were successfully developed and demonstrated. Application to the Comanche EOSS optical bench resulted in a 90 percent reduction in machining time and a net weight saving of 40 pounds per aircraft. A manufacturing process which utilizes recycled BeAl materials for investment castings was also developed, and computer modeling and simulation was expanded and applied to support production in the investment casting industry.

Industry Acceptance: Industry's BeAl casting capability has been expanded from small and simple shapes to large and complex shapes. The use of recycled BeAl material in the production process has been accelerated and computer modeling has been expanded and applied to support production in investment casting industry. As a result, Starmet is evaluating expansion of their investment casting facility to produce larger components and increase production capacity.

Implementation/Technology Transfer: The ManTech developed investment casting processes, using recycled BeAl material, are currently being used to produce EOSS components for the prototype Comanche helicopters (Engineering / Manufacturing Development unit 3 and on). Computer modeling is also being applied to make the investment casting process more efficient and



Comanche Optical Bench Casting

economical by shortening the casting mold design cycle and improving problem solving capabilities.

Technology transfer is anticipated to support production of highly complex components of the Air Force F22 and the Navy V-22. In addition, there are other military and commercial uses for cast BeAl products, and computer modeling tools. Starmet Corporation, is currently exploring these possibilities.

Expected Benefits: The benefits include a projected \$148 million cost avoidance to the Army for the Comanche helicopter production program.

TIMELINE / MILESTONES

Start Date: August, 1994

End Date: August, 1998

FUNDING

ManTech Funding:

Army ManTech investment: \$2M

Cost Sharing:

Comanche Project Manager: \$317K

PARTICIPANTS

Lockheed Martin
Starmet Corporation