

# Bristol Aerospace Ltd.

For many years, Bristol Aerospace of Winnipeg, Manitoba, a division of Magellan Aerospace Corp., has supplied two types of rockets for use as targets in testing/training exercises for the U.S. "missile defense" weapons program: (1) the Excalibur Target and (2) the Black Brant rocket.

## (1) The Excalibur Target

The Canadian-made Excalibur Target System is a two-stage ballistic rocket whose flight "may be tailored to simulate various threats." The lower "booster" segment of the rocket, i.e., its first phase, uses solid-propellant fuel for the initial launch. Once airborne, the second or "dart" segment of the rocket then separates from the booster. It carries sophisticated electronic radar equipment called the Radio Frequency Signature Augmentation System (RF SAS).<sup>1</sup> This equipment electronically enlarges the target's radar cross-section in order to mimic larger missiles.<sup>2</sup>

The RF SAS is manufactured by Boeing, the number-one ranking company within the "The Big Four" U.S. prime contractors for "missile defense" weapons. The Excalibur dart was originally "developed and manufactured...as a High-Altitude Supersonic Target for the Canadian Navy."<sup>3</sup>

The Canadian Navy's creation and production of the original Excalibur dart, funded by the Canadian taxpayer, was like launching the booster phase of a rocket whose secondary segment now serves the testing needs of the U.S. "missile defense" weapons program.

## Excalibur's Role in "Missile Defense"

Bristol's Excalibur targets are used to simulate enemy missiles in order to test Patriot missiles and to train their operators. The Patriot Air and Missile Defense System, built by Raytheon and Lockheed Martin "is the world's most advanced ground-based air defense system." The U.S. Department of Defense has spent over US\$3 billion on the Patriot Missile System<sup>4</sup> since the 1991 war that destroyed much of Iraq's civil-

ian infrastructure. Raytheon considers the Patriot to be "the cornerstone of air defense for the new millennium."<sup>5</sup>

Bristol's promotional literature proclaims that the Excalibur target:

"is considered an excellent representation of a Scud-type ballistic missile and is fast becoming a preferred target of choice for the training of Patriot units. The targets are launched at a nominal elevation angle of 82.5 degrees and reach an altitude of approximately 90 km. The flight trajectories of the targets take them down range 50 km where the Patriot units track the incoming targets. If a target is considered a ballistic missile threat, they will launch an intercept missile and detonate a warhead to destroy the target."<sup>6</sup>

Excalibur targets have been used in "missile defense" testing/training programs since July 1999. At that time, during NORAD's "Roving Sands Air Defense Firing Exercise," Bristol's Excalibur was

"used in the first ever TBM [Theater Ballistic Missile] target engagement at the McGregor Range, New Mexico. Three Excalibur targets were successfully launched. They were detected, tracked, and classified as threat TBMs."<sup>7</sup>

The rest, as they say, is history:

"In May 2000, the U.S. Army 108th Air Defense Brigade...successfully employed five Excalibur targets during an exercise at McGregor Range."<sup>8</sup>



**Bristol Aerospace's two-stage, ballistic missile, dubbed "Excalibur," is used as a target in U.S. "missile defense" weapons testing and training exercises.**

U.S. government documents record a contract for "four Excalibur Targets...to assist the 108th Brigade in conducting a Patriot live-fire at McGregor Range, ....on 3-4 May 2000."

This was awarded to Bristol as a "sole source contract." The reason no other companies were asked to bid on this job was because the U.S. Directorate of Contracting at Fort Bliss Texas considered Bristol to be

"the only vendor currently capable of producing a target that can duplicate a Tactical Ballistic Missile simulation for the Patriot missile system." Bristol was contracted to supply the targets as well as "associated services" such as "necessary personnel, tools and equipment required to conduct the live-fire training."<sup>9</sup>

In March 2001, Bristol's parent company, Magellan Aerospace, issued a media release to announce that the U.S. Army Aviation and Missile Command would again be using Bristol's Excalibur Target System as "targets for live-fire training of tactical Patriot units." Bristol had by then teamed up with Boeing, the world's number one prime con-

U.S. Army, Program Exec. Office for Simulation, Training & Instrumentation  
www.peostri.army.mil/PRODUCTS/TBMTT



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tractor for “missile defense” weapons development. With Bristol as Boeing’s “principal subcontractor,” their “pursuit of the Theater Ballistic Missile target market” was successful. The vice president and general manager of Boeing’s Weapons Programs, Mike Marks, called Bristol’s Excaliber Target “a key training tool for the U.S. Army.”<sup>10</sup>

By 2002, Bristol was reporting that it had designed and tested a new motor for the Excalibur target rocket and that it had “a five-year contract to supply targets to the U.S. Army for Patriot training exercises.”<sup>11</sup>

## (2) Black Brant Rockets

Besides the Excaliber Target System, Bristol Aerospace makes another target to test weapons for the U.S. “missile defense” program. The Canadian-made Black Brant (BB) rocket has been used many times in a variety of “missile defense” testing/training exercises. A Bristol publication happily looks forward to a lucrative future of manufacturing BBs for this purpose. It contains an article stating that:

“a new market has slowly developed over the years. Several new theatre ballistic missile defence systems are either in use or in development. The Black Brant has been used successfully for some of these systems and the company [Bristol] continues to explore new opportunities in this market.... the story of this Bristol-made rocket will continue into the 21st century.”<sup>12</sup>

Not surprisingly, the Canadian government was the driving force propelling the initial creation of the BB in the late 1950s. And, it was the Canadian military that came up with this rocket’s first mission. Since then, the government has continued to support Bristol’s ongoing refinement of the BB.

Bristol Aerospace literature boasts that the BB is “the most reliable suborbital rocket in the world today.”<sup>13</sup> During its near half-century of use, about 800<sup>14</sup> of these sub-orbital, unguided rockets have been launched from 21 locations around the world.<sup>15</sup> This “expendable launch vehicle” is a “sounding rocket” designed to carry scientific instruments. It has been used for a wide variety of civilian and military uses and comes in a variety of sizes

that can carry payloads of between “70 and 850 kilograms to altitudes from 150 to more than 1,500 kilometers.” The various versions of this rocket are said to belong to the “Black Brant family.” Members of this “family” now range in size from the single-stage BBV, which is about 5.3 metres long and 0.44 metres in diameter, to the BBXII, which is a much more powerful, four-stage vehicle.<sup>16</sup>

Prior to its career as a “missile defense” test target, the BB had a long history of employment by the U.S. military. However, it was thanks to the Canadian government that the BB program got its start. (The Canadian government has always been ready to use this country’s scientific, engineering and financial resources to help subsidize America’s unquenchable military needs.)

In 1958, thanks to the Canadian government, the rocket later known as Black Brant was first launched at the Fort Churchill Rocket and Research Range in northern Manitoba.<sup>17</sup> This facility was jointly built by the Canadian and U.S. governments.<sup>18</sup>

The Canadian Armament Research and Development Establishment (CARDE) had created a new solid rocket propellant and therefore needed a new rocket to test it out.<sup>19</sup>

BB’s first mission was to “characterize the ionosphere in order to improve military communications.”<sup>20</sup>

To get the BB program off the ground, the Canadian government’s CARDE came together with private industries’ Bristol to give birth to their BB. The three first users of the BB were CARDE, the Defense Research Telecommunications Establishment and the National Research Council of Canada. Over the years their baby has



Canadian Space Agency www.space.gc.ca/asc/img/fusee-black-brant.jpg

The “Black Brant,” developed for the government’s Canadian Armaments Research and Development Establishment, has been used by Canada’s military, the U.S. Army, U.S. Navy, U.S. Air Force and NASA. As usual, Canadian taxpayers are subsidising U.S. military needs. It has been used since at least 1998 for “missile defense” weapons tests.

not only been kept alive – thanks to subsidies from these and other Canadian and U.S. government agencies – it has grown into a powerful rocket system that is now aiding the development of the most advanced weapons systems of the future through the so called “missile defense” program.

The U.S. Navy tested BB III rockets in 1963, 1965 and 1966. NASA and the U.S. Air Force have also contracted Bristol to build later BB family members, and NASA still regularly buys Bristol’s BBs.

Between 1967 and 1972, the U.S. Army purchased some of Bristol’s BB VI and BB VII rockets for their testing programs. Through the 1980s and 1990s to the present, the U.S. Navy and Air Force have continued to avail themselves of this little-known Canadian invention.<sup>21</sup>



## Black Brant's role in "Missile Defense"

### (1) White Sands

Since about 1969, nearly 300 BBs have been launched at the White Sands Missile Range in New Mexico.<sup>22</sup> "Missile defense" weapons tests using these Canadian rockets have been conducted at this weapons testing range since at least 1997.

White Sands is a unique, U.S. "tri-service" missile testing range, run jointly by the U.S. Army, Navy and Air Force. It is the proud home of "Trinity." This U.S. "national historic landmark" marks the still-radioactive location where, on July 16, 1945, "the world changed with the explosion of the first atomic bomb."<sup>23</sup>

The White Sands Missile Range is often glowingly described as the "birthplace of America's space program" not only because of the 1945 Trinity explosion but also because it was there that the "father of the U.S. space program," Nazi rocket scientist Wernher Von Braun and hundreds of his fellow German scientists were reunited immediately after WWII. Their mission was to continue to develop the V2 "buzz bombs" that had so effectively killed thousands of Britons.

In 1997 and 1998, there were at least two dozen U.S. military test launches of Bristol's Canadian-made BB rockets at White Sands.<sup>24</sup>

An unknown number of the BB launches during those years were "missile defense"-related. According to *Ottawa Citizen* reporter David Pugliese, these tests were done

"to understand the characteristics of heat that is produced by a missile's engine. The data gathered was used to determine more sophisticated ways to track and target missiles."<sup>25</sup>

Other sources confirm the use of BB rockets for "missile-defense" testing at White Sands during that period. For example, in September of 1998, *The Eagle*, published by the U.S. Air Force, Space and Missile Defense Command in Huntsville, Alabama, published an article stating that

"On [September] the 18th, the THAAD [Theater High Altitude Area Defense] Radar successfully tracked a NASA rocket launch (a Terrier



[sic]/Black Brant) at White Sands Missile Range."<sup>26</sup>

The Terrier/Black Brant "uses a Terrier rocket as a booster [first stage] and a Black Brant V rocket as a sustainer [second stage]."<sup>27</sup>

Six months later, in April 1999, another THAAD tracking test took place at White Sands. It also used a Terrier/Black Brant rocket as the target to be tracked by the THAAD system radar. This time, the rocket was "flown by the U.S. Navy." This "target of opportunity," it was being launched as part of a "NASA Wide-Field Imaging Survey Polarimeter Experiment."

The THAAD radar-testing missions of September 1998 and April 1999 "were conducted utilizing the [THAAD] radar's final tactical configuration software, thus further advancing the radar's deployment readiness. The THAAD Radar Product Office and Raytheon will continue to take advantage of available targets of opportunity.

The THAAD radar is one segment of the THAAD system. The entire system is being developed to defend personnel and assets from medium and long-range missiles carrying weapons of mass destruction. The prime contractor is Lockheed

In the 1950s, the Canadian government paid Bristol to build rockets for military and scientific purposes. By the early 1960s, Bristol was selling a version called the Black Brant. By the early 1970s, this government-subsidised work had led to Bristol's 2.75" (70mm) CRV7 missile, which is still fired from many U.S. warplanes. In fact, according to Bristol, its ground-attack CRV7 is the world's highest-performing, 70-mm rocket weapon and has become the West's de-facto standard. It is carries a variety of payloads including anti-armour and incendiary warheads, as well as the M261, a High Explosive Multipurpose Submunition that is specifically designed to "optimize fragment size against personnel." *Bravo Canada!*



Martin Missiles and Space, and The Raytheon Company is the contractor for the THAAD Radar.

The THAAD program is managed and funded by BMDO [Ballistic Missile Defense Organization] and executed by the Army Program Executive Office for Air & Missile Defense and the Army THAAD Project Manager in Huntsville, Alabama."<sup>28</sup>

### (2) Wallops Flight Facility

More recently, Bristol's Canadian-made Black Brant rockets have also been used at another U.S. rocket launch site called the Wallops Flight Facility (WFF) at Wallops Island, Virginia. The WFF, which is the principal test facility of NASA's Goddard Space Flight Center, has been launching Canada's BBs for more than 40 years. This tradition started in December 1961 when

"the Canadian Defence Research Board shifted the firing site from Fort Churchill because a fire largely de-

stroyed the Canadian facilities.”<sup>29</sup>

On May 30 and June 2, 2003, the so-called “Red Dog Project” reached its climax. These “missile defense” tests used BB IX rockets as targets to test:

“air-, land-, space and sea-based Missile Defense Agency (MDA) sensors. This sensor data [was] used by MDA in the development of advanced sensors and detection algorithms for future missile defense systems.”<sup>30</sup>

The “Red Dog Project,” which was initiated in January 2002, cost more than US\$2 million. Although the project “customer” was the MDA, several other actors also played roles. The WFF partnered with at least the following to implement the MDA’s “flight tests”:

- Space & Missile Defense Command
- Coast Guard
- Massachusetts Institute of Technology/Lincoln Labs
- Surface Combat Systems Center
- Patriot [Missile] Project Office

Additional support for “Red Dog” was provided by:

- NASA Sounding Rocket Operations Contract [Agency] (vehicles and payloads)
- NASA Consolidated Space Operations Contract [Agency] (ground data and tracking systems)
- Computer Sciences Corp. (analytical, safety and project management)
- Dyncor (airport management and tower support)<sup>31</sup>

In an article highlighting the first “Red Dog” flight test, in the official publication of NASA’s WFF, Jess F. Granone, director of the Space and Missile Defense Technical Center, expressed his profound appreciation for assistance from various corporate and government team. He made sure to praise them all for their

“dedicated contributions [that] provided critical insight for future Ballistic Missile Defense System development and testing.”<sup>32</sup>

He noted that:

“During final testing of the Flight 1B payload, it was discovered that *the wiring to deploy two of the experiments was reversed*. The outstanding support of the team in identifying, rewiring and retesting of the payload was critical to the success of these missions.”<sup>33</sup>

Although Granone somehow turned this simple, yet potentially-grave, error into fawning praise for the “missile defense” test participants, he did make an error of his own. Granone should have also applauded the good people at Bristol Aerospace who built the BB rockets that were so useful in what he called the “successful execution of the Advanced Systems (Red Dog) Flight Tests.”<sup>34</sup> And, to be fair, Granone should also have thanked the many government scientists employed

by CARDE and DRDC who have, over the decades, worked with Bristol to design, develop and produce Canada’s BB “family” of rockets. For that matter, the Canadian public should also have been acknowledged by Granone for their crucial financial role in this “missile defense” weapons testing program. After all, it was Canadian taxpayers who, knowingly or not, provided the cash to subsidise the BB missile program for almost fifty years.

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