

# Canadian Pugwash Group

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April 26, 2004

## Open Letter to Canadian Ministers

The Hon. Anne McLellan, Deputy Prime Minister and Minister of Public Safety and Emergency Preparedness

The Hon. Bill Graham, Minister of Foreign Affairs

The Hon. David Pratt, Minister of National Defence

The Hon. Tony Valeri, Minister of Transport

Dear Madam and Sirs:

We seek your response to the following question:

**Are aircraft at risk of being struck by U.S. interceptors?**

Our concern arises due to the forthcoming deployment of the ballistic missile defence system by the United States.

Recent reports issued by the US General Accounting Office indicate that testing is far from complete for this system (see Appendix 1) and we fear that it may never be safe. The GAO Report of August 2003 states that only two of ten critical components required for Ground Missile Defence (BMD) are ready and that "the radar technologies are the least mature." Even the most sophisticated radar systems are prone to error and this system will be on hair-trigger alert 24/7 to counter the perceived (some say fictional) threat of a missile attack.

We are concerned about the civilian aircraft security that will shortly become dependent on the safety of these untested radars and dangerous kinetic-kill interceptors. This concern was first raised in the Government-Civil Society Consultation at the Department of Foreign Affairs in February 2004. Dr. Walter Dorn asserted that, given the extremely low probability of a missile attack on North America and the very real dangers inherent in a sophisticated interceptor system covering such an enormous area, the system was more likely to shoot down a civilian aircraft than an enemy missile. He cited the tragic history of missiles striking aircraft and naval vessels by accident and miscalculation, causing unintended and unwarranted civilian deaths (see Appendix 2 for reports).

We highlight here some of the **deadly failures of sophisticated missile defence systems in the past**:

A) July 3, 1988 - The **USS Vincennes** misidentified a civilian Airbus A300 owned by Iran Air cruising over the Strait of Hormuz, despite the most advanced technology for IFF available at the time. Its AEGIS radar operators reported that the incoming plane was descending with an increasing speed.

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Canadian Pugwash Group is the Canadian branch of the International Pugwash Movement which shared the 1995 Nobel Peace Prize with its President, Sir Joseph Rotblat

Past Chairpersons: Prof. John Polanyi C.C.; Dr. William Epstein; M.Gen.(ret) Leonard Johnson; Senator Douglas Roche, O.C.

This erroneous reading, and the fact that the aircraft didn't respond to radioed challenges, led to the decision to launch two missiles at the aircraft. All two hundred and ninety passengers were killed.

B) March 17, 1987 - The **USS Stark**, with its sophisticated anti-missile system, was hit by a missile erroneously fired by an Iraqi Mirage F-1 fighter jet. The two Exocet AM 39 air-to-surface missiles were undetected by the Stark's monitoring equipment and, after striking the Stark, caused a large hole in the hull and a major fire, leaving 37 crew dead, 21 injured and \$142 million in repair costs. "From Baghdad", which was US friendly at the time, "there came an official apology and declaration that the offending pilot had mistaken the USS Stark for an Iranian oil tanker." The pilot was not the only one to fail. The radar system did not even detect the oncoming missile, showing the tragic fallibility of the system.

C) October 4, 2001 - **Sibir Airlines Flight 1813** was flying over the Black Sea when an explosion occurred near the aircraft, following which the aircraft entered an uncontrolled descent and crashed into the Black Sea. It appeared that a Ukrainian S-200 missile, fired during an exercise, missed an intended drone target and homed in on the Tupolev aircraft. The missile exploded some 15 meters above the plane. Seventy-eight passengers died.

D) March 23, 2003 - An **RAF Tornado** was shot down by a US Patriot missile battery when the Tornado's electronic signature was not recognized by the Patriot system. Questions have arisen about the reliability of the Identification Friend or Foe (IFF) technology in the missile system that should have prevented coalition aircraft from being shot down by "friendly" air defence systems.

E) March 24, 2003 - a **U.S. F-16 fighter jet** fired at and destroyed a Patriot battery's radar disk after the pilot said the Patriot had 'locked on' to the plane. This was, again, the fault of the Patriot system because a radar locking could easily be perceived as a threatening action during a period of heightened tension.

F) April 2, 2003 - An American **F/A-18 Hornet** was struck, killing the pilot, while flying near Karbala, Iraq, leaving the Pentagon suspicious that a Patriot battery was responsible. U.S. Central Command spokesman Brig. Gen. Vincent Brooks said Iraqi surface-to-surface and surface-to-air missiles had been fired in the area where the fighter aircraft was flying. That suggests a Patriot might have been firing at an Iraqi missile and hit the Hornet instead, or that an Iraqi missile might have hit the Hornet.

We realize that interceptors travel at much greater altitudes and speeds during most of their trajectories than do aircraft. But they will still pass through airspace, whether during testing, deployment or unintentional launch. The radar-Infrared guidance systems (X-band, SIBIRS-high, SIBIRS-low) have made and, no doubt, will continue to make fundamental targeting errors. Given the alarming examples of disastrous errors that occurred with missile and radar technologies (only some of which are described above), we raise these questions:

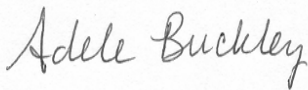
- Can we be absolutely sure that a US interceptor will have a trajectory to avoid any known or unknown civilian aircraft flights?
- Who will assume the liability for costs arising from any such accidents?
- We are also concerned about the debris that may be caused during missile testing. Is

there a danger that this debris might cause damage on the ground, as the Patriot missiles did in Gulf War I?

- o What measures can be taken to prevent the accidental targeting of a civilian aircraft?
- o Will the Government of Canada raise concerns about the deployment of these immature technologies with the U.S. Government?

We consider these issues vital not only for Canadian security but also for that of the airline industry and the world as a whole. Your early reply to these questions would be sincerely appreciated.

Yours truly,



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## APPENDIX 1

EXCERPT FROM "What GAO Found" in GAO [General Accounting Organization] Highlights, "Additional Knowledge Needed in Developing System for Intercepting Long-Range Missiles", August 2003 available at Federation of American Scientists Website [www.fas.org/spp/military/program/track/gao-03-600.pdf](http://www.fas.org/spp/military/program/track/gao-03-600.pdf)

"GMD [Ground-based Midcourse Defense] is a sophisticated weapon system being developed to protect the United States against limited attacks by long-range ballistic missiles. It consists of a collection of radars and a weapon component - a three-stage booster and exoatmospheric kill vehicle - integrated by centralized control system that formulates battle plans and directs the operation of BMD [Ballistic Missile Defense] components. Successful performance of these components is dependent on 10 critical technologies.

" MDA [Missile Defense Agency] expects to demonstrate the maturity of most of these technologies before fielding the BMD elements, which is scheduled to begin in September 2004. However, the agency has accepted higher cost and schedule risks by beginning integrating of the element's components before these technologies have matured. So far, MDA has matured two critical GMD technologies. If development and testing progress as planned, MDA expects to demonstrate the maturity of five other technologies by the second quarter of fiscal year 2004.

" The radar technologies are the least mature. MDA intends to demonstrate the maturity of an upgraded early warning radar in California in the first quarter of fiscal year 2005 and a sea-based radar in the Pacific ocean in the fourth quarter of that year. Although MDA does not plan to demonstrate the maturity of the technology of the early warning radar in Alaska, which will serve as the primary fire control radar, through its own integrated flight tests, it may be able to do so through the anticipated launch of foreign missiles."

## APPENDIX 2

Further information on incidents described in the letter:

### A) March 17, 1987

USS Stark warns an incoming Mirage F-1 fighter jet to identify itself. The AWACS plane in the area noted the Mirage had banked suddenly and headed home but they failed to note it had fired two Exocet AM 39 air-to-surface missiles. These missiles were not detected by the Stark's sophisticated monitoring equipment and the missiles struck the Stark, causing a large hole in the hull and a major fire leaving 37 crew dead, 21 injured and \$142 million in repair costs. One source reports that "From Baghdad came an official apology and declaration that the offending pilot had mistaken the USS Stark for an Iranian oil tanker. As the US was siding with Iraq during the course of the Iran-Iraq war, the US did little to pursue a further explanation.

Source: [navysite.de/ffg/FFG31.HTM](http://navysite.de/ffg/FFG31.HTM)

### B) USS Vincennes and Iran Air Flight 451

Date: 03 JUL 1988

Time: 10.24 LT

Type: Airbus A.300B2-203

Operator: Iran Air

Registration: EP-IBU

Msn / C/n: 186

Year built: 1982

Total airframe hrs: 11497 hours

Engines: 2 General Electric CF6-50C2

Crew: 16 fatalities / 16 on board

Passengers: 274 fatalities / 274 on board

Total: 290 fatalities / 290 on board

Airplane damage: Written off

Location: Strait of Hormuz - 26'37" N 56'E (Sea)

Phase: Cruise

Nature: International Scheduled Passenger

Departure airport: Bandar Abbas Airport (BND)

Destination airport: Dubai Airport (DXB)

Flightnumber: 655

Remarks:

Flight IR451 arrived at Bandar Abbas from Tehran at 05.10h UTC. At 06.47h the aircraft took off again as flight IR655 bound for Dubai. Two minutes later, the crew reported leaving 3500ft for FL140 on Airway A59, estimating MOBET at 06.53. At 06.54:00 UTC the aircraft passed MOBET out of FL120. Nothing more was heard from IR655. At 06.54:43 two surface-to-air missiles struck the aircraft. The tail and one wing broke off as a result of the explosions, causing the aircraft to crash into the sea out of control. The missiles were fired by the US Navy cruiser USS Vincennes. The Vincennes was operating in the area to protect ships in the area, together with the frigates USS Elmer Montgomery and USS John H. Sides. Due to increasing tension in the area (May 17, 1987 an Iraqi Mirage attacked the USS Stark) all aircraft in the area had to monitor 121.5 Mhz (International Air Defence - IAD radio frequency). At about the time the Airbus took off, the radar picked up a brief IFF mode 2 response, which led to the mistaken identification of the Airbus as a hostile F-14 aircraft. The USS Vincennes

issued 7 challenges on the Military Air Distress (MAD) frequency 243 MHz, addressed to 'Iranian aircraft', 'Iranian fighter' or 'Iranian F-14'. These messages were followed by three challenges on the IAD. A number of AEGIS radar operators misread the displays and reported that the incoming plane was descending with an increasing speed. This fact, and the fact that the aircraft didn't respond to the challenges led to the decision to launch two missiles against the perceived hostile target. It remains uncertain whether the IR655 flight crew (only able to monitor the IAD, not the MAD frequencies) would have been able to rapidly identify their flight as the subject of the challenges made by the USS Vincennes.

Source: <http://aviation-safety.net/database/1988/880703-0.htm>

C) Sibir Airlines Flight 1813 (or 1812?)

Date: 04 OCT 2001

Time: 13.44

Type: Tupolev 154M

Operator: Sibir Airlines

Registration: RA-85693

Msn / C/n: 90A-866

Year built: 1990

Total airframe hrs: 16703 hours

Engines: 3 Soloviev D-30KU-154-II

Crew: 12 fatalities / 12 on board

Passengers: 66 fatalities / 66 on board

Total: 78 fatalities / 78 on board

Airplane damage: Written off

Location: 114mls off Adler (Russia)

Phase: Cruise

Nature: International Scheduled Passenger

Departure airport: Tel Aviv-Ben Gurion International Airport (TLV)

Destination airport: Novosibirsk-Tolmachevo Airport (OVB)

Flightnumber: 1813

Remarks:

Flight 1812 (sic) had departed Tel Aviv for a flight to Novosibirsk and was en route over the Black Sea at FL360 when an explosion occurred near the aircraft, following which the aircraft entered an uncontrolled descent. The aircraft then crashed into the Black Sea at a position of 42.11 deg. North / 37.37 deg East. It appeared that a Ukrainian S-200 missile which was fired during an exercise missed the drone and apparently homed in on the Tupolev. The missile exploded some 15 meters above the plane.

Source: <http://aviation-safety.net/database/2001/011004-0.htm>

D) RAF Tornado shot down by Patriot missile battery - March 23, 2003

Excerpts from report from The Guardian (UK):

"The Patriot attack raises new questions about the reliability of the Identification Friend of Foe (IFF) technology, which should prevent coalition aircraft being shot down by their own air defence systems.

"IFF failures were blamed for the death of nine British soldiers in the 1991 Gulf war when their Warrior armoured vehicles were hit by tankbuster bombs dropped by US A-10 aircraft in broad

daylight....

"Major-General Daniel Leaf of the US air force, said RAF jets used the same IFF system as their US allies, and there was no reason why they should be at greater risk from American weapons. The Tornado's electronic signature should have been recognised by the Patriot. Patriots were designed for use against aircraft but have been modified to intercept everything from incoming ballistic missiles to low-flying cruise missiles, according to Group Captain Lockwood. The system is built around computer-guided radar but it can also be operated by human command." Richard Norton-Taylor and Rory McCarthy, "Urgent review of friend or foe ID technology", The Guardian, March 24, 2003.

Both the Guardian and Times report that the UK National Audit Office had reported that MoD was acting too slowly and the system was still not fully compatible with equipment in NATO countries.

The Times further reports:

"The other possibility is that the IFF system failed at the Patriot end rather than on the plane. The American-built 7 ft-long Patriot missile should also have recognised the difference between a plane and a missile which have different speeds and trajectories. Patriots were originally designed for use against enemy aircraft but were modified to act as a defence against incoming short-range ballistic missiles. The missile, first fired in anger in the last Gulf War, is powered by a solid propellant rocket motor that powers it to three times the speed of sound. The one-tonne missile carries a 200 lb high-explosive shrapnel warhead. Each Patriot has eight launchers, each containing four missiles and the system is built around computer-guided radar. The missile is launched and guided to the target in three phases. First the guidance system turns the Patriot toward the target as it flies into its radar beam. Then the computer guides the missile toward the target. Finally the Patriot's internal radar receiver guides it over the final distance toward the target.

Source: PA News, "RAF Tornado shot down by US missile", Times Online, March 23, 2003.

E) March 24, 2003 - a **U.S. F-16 fighter jet** fired at and destroyed a Patriot battery's radar disk after the pilot said the Patriot had 'locked on' to the plane.

Source: IT world.com site March 28, 2003 article by Paul Roberts, IDG News service, "Software bug may cause Patriot missile errors".

F) April 2, 2003 - An **F/A-18 Hornet** is struck killing the pilot while flying near Karbala leaving the Pentagon suspicious that a Patriot battery is responsible.

"A Patriot battery is suspected in the strike April 2 on a U.S. Navy F/A-18 Hornet near Karbala. The pilot of the fighter jet, which was assigned to the aircraft carrier USS Kitty Hawk in the Gulf, was killed, the Pentagon announced Sunday.

"U.S. Central Command spokesman Brig. Gen. Vincent Brooks said Iraqi surface-to-surface and surface-to-air missiles had been fired in the area where the Hornet was flying. That suggests a Patriot might have been firing at an Iraqi missile and hit the Hornet instead, or that an Iraqi missile might have hit the Hornet.

Source: Patriot missile: Friend or foe to allied troops? By Andrea Stone, USA TODAY  
[http://www.usatoday.com/news/world/iraq/2003-04-14-patriot-missile\\_x.htm](http://www.usatoday.com/news/world/iraq/2003-04-14-patriot-missile_x.htm)