



*Pioneers of  
Stealth*

**Memorial  
Dedication  
Celebration**

**National Museum of the  
United States Air Force**

July 17, 2023



## Welcome Fellow Pioneers and Guests

The Memorial project is now officially complete after two and a half years. The Memorial was envisioned to recognize, honor, and celebrate those people who pioneered the development and operation of stealth aircraft. The objective to achieve an unprecedented increase aircraft survivability and effectiveness was successfully met and has affected the design of military aircraft forever. As a testament to the Pioneers, these aircraft are presented as a showcase of their accomplishments. The Memorial follows the early history showing the proof of concept HAVE BLUE, it's follow-on F-117A Nighthawk, the radar-based platform TACIT BLUE, and it's successor B-2 Stealth Bomber.

The Pioneers of Stealth Memorial Project was led by Denny Jarvi, the Memorial Committee Chairman, with the support of his committee members, the Senior Advisory Group, and 200-plus POS Members. Over 125 individual and 5 corporate donors provided the funding necessary to transition our vision into reality. This Memorial is a magnificent addition to the National Museum of the USAF Memorial Park.

Of course, every great enterprise succeeds as a result of the talents, expertise, and commitment by special people and their businesses. The Memorial Committee is especially grateful to Morrison Monuments and Spradlin Brothers Welding Company for overall design and development of this Memorial. A special thanks to TEC Events for their guidance, planning, and execution of the Memorial Dedication celebration events.

The only task left is to sit back and celebrate this "monumental" occasion.

Thank You!

John M. Griffin  
President, Pioneers of Stealth



## *Memorial Dedication Banquet Program*

### **Call to Order**

#### **Welcome**

*Col Dennis Jarvi, USAF/Ret*

#### **Presentation of Colors**

*Wright-Patterson AFB Honor Guard*

#### **National Anthem**

*SMSgt Christin Foley, USAF*

#### **Invocation**

*Col Dennis Jarvi*

#### **Dinner**

#### **Introduction of Keynote Speaker**

*Gen Joseph "Joe" Ralston, USAF/Ret*

#### **Keynote Speaker**

*Hon. Paul G. Kaminski*

#### **Introduction of Corporate Sponsors**

*John Griffin*

#### **Closing Remarks**

*Col Dennis Jarvi*



**Paul G. Kaminski, Ph.D.**



Paul Kaminski is Chairman and CEO of Technovation, Inc., a company dedicated to fostering innovation and to the development of business and investment strategies related to the application of advanced technology in the aerospace and defense sectors. He served as the Under Secretary of Defense for Acquisition and Technology from October 3, 1994, to May 16, 1997, and was responsible for all Department of Defense research, development, acquisition, and logistics programs.

During his 20 year Air Force career, Dr. Kaminski was recognized for his leading role in the development of stealth aircraft and missiles. He was responsible for overseeing the development, production, and fielding of major stealth systems, such as the F-117 Nighthawk, an advanced combat air vehicle, and the B-2 Spirit stealth bomber. He also led the initial development of a major National Reconnaissance Office space system and related sensor technology.

Paul has been a member of the President's Intelligence Advisory Board, twice Chairman of the Defense Science Board, and has served as a member of the Director of National Intelligence's Senior Advisory Group, the FBI Director's Advisory Board, the Senate Select Committee on Intelligence Technical Advisory Board, and the National Academies Air Force Studies Board. He is a member of the National Academy of Engineering, a Fellow of the Institute for Electrical and Electronics Engineers, and a Fellow and an Honorary Fellow of the American Institute of Aeronautics & Astronautics.

Dr. Kaminski received the National Medal of Technology from President George W. Bush in 2006; and in 2022 was inducted into the National Aviation Hall of Fame in Dayton, Ohio. He was recognized as a Pioneer of National Reconnaissance, a Pioneer of Stealth, an Air Force Academy Distinguished Graduate; and he has received the Ronald Reagan Award for Missile Defense, the Perry Award for Precision Strike, the Reed award for Aeronautics, the IEEE Simon Ramo award for Systems Engineering, and the Air Force Systems Command Scientific Achievement Award.

Paul earned a Bachelor of Science degree from the Air Force Academy, Master of Science degrees in Aeronautics and Astronautics and Electrical Engineering from the Massachusetts Institute of Technology, and a PH.D. in Aeronautics and Astronautics from Stanford University. He and his wife, Julie, have two children, and six grandchildren.

## The “Legacy” of the Pioneers of Stealth

As a result of the Arab-Israeli 1973 Yom Kippur War, many Israeli crew members flying USAF strike aircraft were lost to enemy defenses in early combat operations. This was clearly recognized by HQ USAF as a very serious mission survivability and mission accomplishment issue for most Air Force aircraft. A clear definition of the problem and an approach to an acceptable solution was very urgently required.

Two Top Secret special security access aircraft technology demonstration and flight programs were sequentially sponsored jointly by HQ USAF and the Defense Advanced Research Projects Agency named HAVE BLUE and TACIT BLUE. These programs used a promising but unproven concept of very low signature observables technology in lieu of an upgraded more traditional Electronic Warfare solution to reduce combat aircraft losses.

A large number of us, the Pioneers of Stealth, from both industry and government endeavored on these programs demonstrating remarkable skills, dedication and especially teamwork. Both the first very low observables technology program, HAVE BLUE, and the second program, TACIT BLUE, were highly successful in demonstrating proof, by flight test, of the challenging required aircraft broadband stealth signatures and aircraft qualities of flight for the representative flight test aircraft.

As a result of these two highly successful technology demonstration and flight test programs, several very low observables combat aircraft followed into development and production including the F-117A, B-2, and later, the F-22 and F-35. Subsequently, after thousands of combat missions employing these aircraft using the very low observables (stealth) technology design approach, it can be reported that not one DOD crew member has ever [been] lost due to enemy combat fire and defensive actions in a stealth aircraft. That sustains the Pioneers of Stealth as our ‘legacy’ even today. It makes us proud and nobody can take that ‘legacy’ from us as each Pioneer made a contribution to the successes. Additionally it is heartening to note, there are an unknown large number of U.S. Air Force, Navy, Marine and Army helicopter service former aircraft crew members alive today, enjoying life with their families, because of the Pioneers of Stealth members’ role[s] in stealth technology design, test, production and maintenance techniques that resulted in their mission success and survivability. The Pioneers of Stealth will always retain this ‘legacy’ measured by the unknown number of aircraft crew members saved as a result of exploiting very low observables (stealth) for survivability and mission accomplishment in challenging combat operations.

—John K. Twigg, Colonel, USAF (Ret)  
System Program Director  
HAVE BLUE and TACIT BLUE Programs

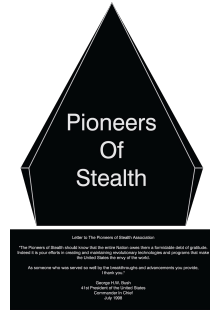




# Memorial Donors

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## “PIONEERS OF STEALTH” RECEIVES 2015 MILTON CANIFF SPIRIT OF FLIGHT AWARD



### Group honored by National Aviation Hall of Fame for low observables development

(DAYTON, Ohio – Dec. 24, 2015) The National Aviation Hall of Fame (NAHF) has awarded its 2015 Milton Caniff Spirit of Flight Award to the “Pioneers of Stealth” in recognition of its contributions to the early development of low observables (“stealth”) technology. The NAHF’s official 2015 award citation, “The Pioneers of Stealth is a cadre of government and contractor personnel who collectively pioneered the revolutionary discipline of ‘low observable’ aircraft design, development, test, production, operations and sustainment. Their work was instrumental to the successful development of the B-2, F-117, F-22, F-35 and other aircraft and systems relying on stealth technology, of which much remains classified today.”

*(Edited excerpt from National Aviation Hall of Fame media release)*



### Letter to The Pioneers of Stealth, dated July 1998

“The Pioneers of Stealth should know that the entire Nation owes them a formidable debt of gratitude. Indeed it is your efforts in creating and maintaining revolutionary technologies and programs that make the United States the envy of the world.

As someone who was served so well by the breakthroughs and advancements you provide, I thank you.”

George H. W. Bush  
41st President of the United States  
Commander in Chief



# One Zero Zero Two

He waddled to his Thud before dawn grew, and thought "Dragon's Jaw, a valuable target, true, but I know we are going to lose quite a few" Throttle up, and as the tension grew, he snapped a salute to his ground crew.

Roared down the runway into the dawning blue, and wondered if he'd make it back too.

"Clean em up, Green em up" the call came through and the lovely blue sky took on an ugly hue.

T'was blotched with black and orange flack too, but he popped up, rolled in, dropped his bombs and knew "Get the hell out of Dodge...Aw! There's a beeper too!"

Then he heard the bang, felt the airplane shudder... "Must have been hit by a shell near the rudder..." Hydraulics dropping, this "Thud" won't survive "I have to eject.. get out alive."

He floated down, saw unfriendly faces and knew...beating, Hanoi Hilton and torture too!

And he became one of the "shot down" few.

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In Dayton, he sat with his morning brew, looking at the suspense slips he must do

The secretary said "I have a call for you, please pick it up on line 2."

The voice said "Go to building 53, knock on the green door and tell them I sent you.

So the green door opened, they let him through.

They said "There's a job here for you to do but you have to sign up before we can tell you.

There is no promotion; there will be travel too,  
and you can't tell your loved ones what you do.

But this job's important. It will save aircrew. You can go or stay, so what do you say?"

He thought but a moment and they heard him say "I'm in, sign me up".

his life changed that day.

So they briefed him in on a plane so new, "It is Low Observable and we call it HAVE BLUE."

We are going to Burbank and are taking you

to the Lockheed Skunk Works for a program review

There was honesty, discussion, respect, and humor too.

And a decision was made:

"Only one HAVE BLUE's risky, so we'll need two, they'll be tail numbers 1001 and 1002."

So from this team the prismatic shape grew and the simulations predicted that HAVE BLUE flew

But more time was needed to get the RCS much, much less than one

"So let's give them more time and fly 1001".

So on December 1, 1977, after a salute to the crew, the canopy closed on the non-stealthy HAVE BLUE

And on that day when 1001 flew, it paved the way for 1002.

On July 20 1978, after a salute to the crew, the canopy closed on HAVE BLUE 1002.

And the FIRST STEALTH airplane lifted off into the blue to see if LO really was true

There were forty-two test flights, and against each threat it flew

it was over their heads before they knew

that THEY HAD BEEN HAD by HAVE BLUE ONE ZERO ZERO TWO !

---

It was called "Desert Storm" and on this fateful night, twelve F-117's were armed:

The black jets would start this fight.

He walked to his plane before dawn grew. All high value targets, well defended he knew and thought "The 117's stealthy but, we'll lose quite a few."

As the canopy closed and tension grew, he snapped a salute to his ground crew.

They roared down the runway, into the night. The black jets took off on this perilous flight.

The night sky took on an ugly hue, there were tracers and SAMs streaking up too

He found his target on the display, then watched as the LGBU fell away It hit square on the dot, and as the target's walls blew out,

He thought "Lets get the hell out of Dodge before I'm found out!"

So into the night sky he flew, grateful that he wasn't one of the fated few

Then he heard them check in, one, then two, then there were eight, eleven!

They all made it thru! This LO worked! They hadn't lost a few!!

So the F-117 had done what It was designed to do

because.....

it was the son of ONE ZERO ZERO TWO !

—Skip Hickey, 12/29/2021



### **Pioneers of Stealth Memorial Committee**

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