AVIATION
News Journal
Established 1991 Vol. 35 No.1 January-February 2025

## Princess Juliana Airport and Maho Beach
# SINT MAARTEN

# NHV H175s
## in Denmark

# FALCON LEAP
## An Exercise with Remembrance

# APEX BUCCANEER
## Collaboration Over the High North



| | |
|---|---|
| **Aviation News Journal** | Vol. 35 No.1 |
| **Editor:** | Divan Muller |
| **Graphic design and production:** | Low Flying Media Inc. |
| **Tel:** | +1 403 837 9909 |
| **General enquiries and editorial contributions:** | info@aviationnewsjournal.com |
| **Advertising:** | marketing@aviationnewsjournal.com |
| **Website:** | www.aviationnewsjournal.com |
| **Mail:** | PO Box 44081 Southcentre, Calgary, AB, T2J7C5 |

Aviation News Journal is owned and produced by Low Flying Media Inc. The views expressed in Aviation News Journal are not necessarily those of the editor, publisher, or writers. The editors and publishers cannot be held responsible for differences of opinion or statements published in good faith. Any navigational content and material contained herein is reference made by the contributing author for reading enjoyment or study and not to be taken as navigational fact unless so mentioned. The publisher will not assume liability for anyone using this information for reference to actual flying conditions or navigation. No part of this magazine, including advertisements, may be reproduced in any form without permission from the publisher. Copyright laws apply.

Low Flying Media
1983477 Alberta Ltd. trading as Low Flying Media





**Cover: CF-18 Hornet**

**Royal Canadian Air Force CF-18 Demonstration Team pilot Captain Caleb 'Tango' Robert photographed by Claude La Frenière.**

# Contents






# From the Editor

By the end of this year, *Aviation News Journal* will have been around for 35 years. Over the past few decades, the publication has changed format a number of times, eventually transitioning into a digital magazine. Last year, the software running the magazine received a substantial update, making it run faster and optimizing it for search engines. Meanwhile, Low Flying Media, the magazine's publisher, has expanded its expertise in web and software development to the point that we realized it would be possible to create our own purpose-built magazine platform specifically for ANJ. This would make the magazine's new 'engine' lightweight, easy to maintain, and highly customizable. By the time you read this, you should be able to access this entire issue on aviationmag.ca.



At the same time, we have come to realize that we truly miss the creative freedom of a traditional printed magazine. Therefore, we are also making the magazine available as a downloadable PDF, which our readers are free to download and read on any device. In addition, a high-resolution version will be available for those who wish to print a high-quality copy, whether they are readers, contributors, or advertisers.

We hope you will enjoy these changes. The new website is designed to be uncluttered and easy to use, and we will keep that in mind as we continue to add features.

We have always aimed to maintain a healthy balance between commercial and military aviation in ANJ. In this particular edition, the focus has shifted slightly more toward military aviation, but this balance will vary with each issue, depending on developments in the aviation world.

Magazines are meant to educate and entertain, so that will be the focus for our bi-monthly publication, while posting timely news articles directly to our website.

We hope you will enjoy this edition, which happens to be our largest ever. We are fortunate to have contributors who rank among the world's best aviation photographers and journalists, and we can't wait to see and share what 2025 has in store for us.

Thank you for your support over the past three and a half decades!

Until next time, fly safely.
Divan Muller


**Visit aviationmag.ca for the latest industry news**

# AN UNMISSABLE EXPERIENCE

**Text and photography by Claude La Frenière**

**Princess Juliana Airport and Maho Beach in Sint Maarten**


*The perfect combination of thrills and spectacular photography opportunities*

Princess Juliana International Airport (SXM – TNCM), the main airport in Saint-Martin, is located in the heart of the Caribbean. The island, shared between France (Saint-Martin, 53 km²) and the Netherlands (Sint Maarten, 34 km²), offers a unique setting. Although located on the Dutch side (Sint Maarten), SXM serves the entire island, complemented by Grand-Case Espérance Airport (SFG) on the French side, which is dedicated to regional flights.

SXM is a major hub in the northeastern Caribbean, second only to Luis Muñoz Marín Airport in Puerto Rico in terms of traffic. It plays a key role in the regional economy by providing connectivity with neighbouring islands (Anguilla, Saba, Sint Eustatius, Saint Barthélemy, Tortola, Saint Kitts and Nevis) and the rest of the world.

More than 30 airlines operate there, offering direct flights to approximately 35 destinations. In 2024, 1.5 million passengers and 54,000 aircraft movements were expected. Whether you are an aviation enthusiast or simply looking for a thrill, this destination offers the perfect combination of excitement, relaxation, and spectacular photo opportunities.



SXM was established in 1942 as a U.S. military airstrip. In 1943, a commercial flight landed there, marking the beginning of its civilian activity. In October 1944, Princess Juliana of the Netherlands visited the island and the airfield, which would later bear her name. The airport was officially inaugurated on March 20, 1964, in Simpson Bay, with a terminal and a control tower.

From a military base to a renowned international airport, SXM is famous for its beachfront runway and spectacular approaches over Maho Beach. On September 6, 2017, Hurricane Irma, a Category 5 storm, hit the island with winds exceeding 296 km/h, causing extensive damage to the airport infrastructure. Ten days later, Hurricane Maria worsened the situation. Despite this, operations resumed in October 2017 with temporary facilities. Before Irma, KLM operated Boeing 747s via a triangular connection with Curaçao (CUR) before switching to Airbus A330s in October 2016 for direct flights.

### SXM Terminal in 2024: Renaissance and Modernity

### A Modernized and Functional Hub

Following the devastation caused by Hurricane Irma, Princess Juliana International Airport (SXM) was rebuilt to provide optimal service. It can now accommodate up to 2.5 million passengers annually within a 30,500 m² facility, spread over four air-conditioned levels, ensuring a seamless travel experience.

With a capacity of 36 to 40 movements per hour, SXM meets modern aviation demands. Passengers can check in at 46 counters or use 12 self-service kiosks, with hybrid baggage drop-offs adding to the flexibility of operations.

Security checks are conducted using the latest-generation scanners, allowing passengers to keep liquids and electronic devices in their carry-on bags during screening.

Electronic gates streamline the emigration process. The 10,000 m² departure hall offers a wide range of duty-free shops and restaurants. Passengers can also access lounges, depending on airline policies. The arrival hall has been optimized for immigration and customs formalities, enhancing the traveller experience.

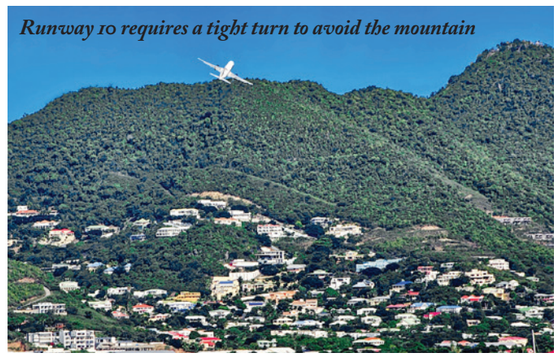
The airport features 13 boarding gates, including four with jetways, and numerous services such as immigration counters, ATMs, and car rental agencies.

### Business Aviation

SXM plays a significant role in business aviation, with more than 6,500 annual movements. A dedicated terminal is planned to meet growing demand. The airport fully reopened in November 2024 to coincide with its 80th anniversary.


*Juliana International Airport*

*SXM's incredible views are an attraction for aviation enthusiasts*



*Runway 10 requires a tight turn to avoid the mountain*

## The Runway and Its Special Features: A Challenge for Pilots, A Spectacle for Spectators

SXM is renowned for its breathtaking approach over Maho Beach. Its single 2,180-metre (7,150-foot) runway accommodates aircraft such as the Airbus A330 and Boeing 747. This setup requires pilots to land close to the runway threshold, creating a spectacular sight for aviation enthusiasts. The airport has a 72,500 $m^2$ main apron and additional infrastructure tailored to growing traffic, reinforcing its role as a regional hub.

### Technical Approach and Takeoff

The dramatic approach to Runway 10, passing low over Maho Beach, demands great precision. Pilots must often navigate under VFR conditions, relying on instruments to maintain orientation. Takeoff from Runway 10 requires a tight turn to avoid terrain obstacles.

## The Control Tower and Airspace: Managing a Dynamic Aviation Environment of the Juliana TCA

SXM's control tower operates two radars: one with a range of 50 nm (93 km) and another extending 250 nm (460 km). Controllers manage the Juliana Terminal Control Area (TCA), a 4,000 $nm^2$ airspace centred on the VOR-DME of Sint Maarten, covering a 25–42 nm (46–78 km) radius.

The Juliana TCA, centred on Princess Juliana Airport (TNCM) in Sint Maarten, is a strategic hub in the Caribbean.

This regulated airspace encompasses Sint Maarten, Saint Barthélemy, Anguilla, Sint Eustatius, and adjacent maritime areas.

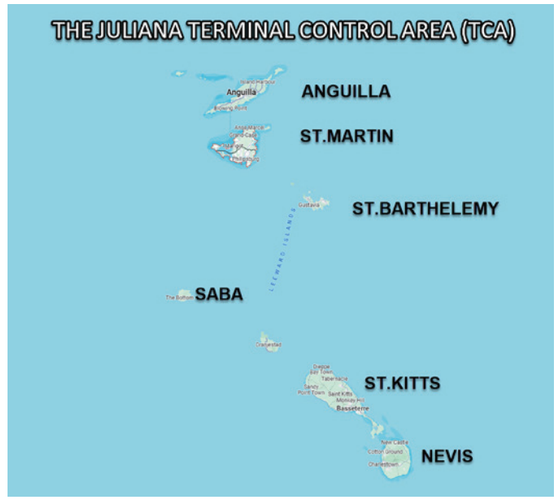
Controllers handle diverse air traffic, synchronize multiple flight flows, and manage the challenges posed by trade winds and complex topography. The Juliana TCA ensures safe and efficient operations in this dynamic environment.

## Traffic Control for Nearby Airports

SXM controllers coordinate airflows efficiently and manage approach control for several nearby airports, including Anguilla's Clayton J. Lloyd (TQPF), French St. Martin's Grand Case Espérance (TFFG), St. Barthélemy's Gustaf III (TFFJ), St. Eustatius's F.D. Roosevelt, and Saba's Juancho E. Yrausquin.

Air traffic is very diverse, with business jets, regional airlines (Winair, Windward Express), American airlines (United, Delta, American, Spirit, JetBlue, Frontier) and long-haul flights (KLM, Air France).

Other airlines, such as Air Canada Rouge, Air Caraïbes, Copa, Sun Country, Sunwing, TUI fly, WestJet, Corsair, Caribbean Airlines and Amerijet Cargo, also serve SXM.




***Situated just 400m from SXM, the Sonesta Hotel delivers unmatched breathtaking views of the runway, taxiways, turquoise Caribbean Sea, and approaching or departing aircraft, captivating aviation enthusiasts and tourists with its unique, immersive experience.***

## Navigation Systems at SXM

Princess Juliana International Airport benefits from modern navigation systems to guide aircraft precisely, even at low altitudes. Among these systems, the DME (Distance Measuring Equipment) allows to know the exact distance between an aircraft and the airport, useful for planning the approach, imagine an invisible laser that measures the distance between the aircraft and a beacon at the airport.

The VOR (VHF Omnidirectional Range) works like a compass, sending signals in all directions to help pilots locate their position relative to the airport. By combining data from the DME and VOR, pilots can determine their exact position and angle of arrival, essential for safe navigation. Think of a basic GPS that not only shows your position on a map, but also the direction to a specific landmark.

The NDB (Non-Directional Beacon) is also used. Unlike the VOR, which has a linear signal, the NDB emits waves that follow the curvature of the Earth, providing a much longer range and reliable reception even in the presence of obstacles or poor conditions. It is as if the light of the lighthouse were curving to follow the horizon. Although older than the VOR and DME, the NDB is still essential, especially in areas where other systems do not have complete coverage.

## Maho Beach: The Intersection of Aviation and Adrenaline

Maho Beach, located on the southwestern tip of the island of Saint Maarten, is a living spectacle for aviation enthusiasts and thrill seekers. What sets this beach apart is not only its white sand and crystal-clear waters but also its position directly beneath the approach path of Princess Juliana International Airport (SXM), giving visitors an up-close view of aircraft on final approach.

After flying over the ocean, aircraft pass at an incredibly low altitude just above the beach before touching down on Runway 10. This approach requires pilots to land as close as possible to the runway threshold, bringing aircraft within breathtaking proximity to spectators. Large aircraft, such as the Airbus A330 and, formerly, the Boeing 747, perform dramatic low passes just a few dozen metres above bathers and photographers. This phenomenon has made Maho Beach a world-famous attraction, widely documented on social media.

## A Unique Sensory Experience

Witnessing a landing or takeoff from Maho Beach is an unparalleled sensory experience. The roar of the engines fills the air, the powerful jet blast whips up sand, and the ground vibrates beneath your feet. The aircraft appear close enough to touch, adding to the adrenaline rush.

During takeoffs from Runway 10, the engine thrust can propel objects—or even people—into the sea. While this effect attracts thrill-seekers, local authorities emphasize the importance of following safety guidelines.

## A Popular Destination for Aviation Enthusiasts

Maho Beach is a favourite spot for plane spotters and aviation lovers, as well as curious visitors. Flight schedules are displayed in local bars and restaurants, allowing spectators to plan their visits. While waiting for aircraft to pass overhead, they keep their eyes on the sky, cameras in hand, ready to capture the moment. However, due to the beach's growing popularity—especially on cruise ship days—it can become crowded.

Despite this, its unique atmosphere continues to attract tens of thousands of visitors annually.

*The approach corridor of Princess Juliana International Airport gives visitors a breathtaking view of aircraft on final approach*



## The Impact of Hurricane Irma

In 2017, Hurricane Irma reshaped Maho Beach, a site already known for its aviation-related hazards. Before the hurricane, a tragic accident had highlighted the risks: a tourist was fatally injured by jet blast during a takeoff.

Following the storm, efforts were made to protect the coastline while enhancing safety measures. As part of these changes, the most exposed section of the beach was reduced in size. What was once a fully sandy shoreline now includes a foundation of large, smooth rocks.

These stones serve a dual purpose: protecting the beach from erosion while discouraging spectators from standing too close to the jet blast area.

Despite these efforts, some visitors continue to gather near the airport fence or along the road adjacent to the beach, exposing themselves to the risks associated with jet blasts. In the past, falls caused by the force of engine thrust were often cushioned by sand or water. Today, attempting this on the rocky area can result in serious injuries. The large stones now act as a deterrent against reckless behaviour.

Nonetheless, Maho Beach remains an unparalleled aviation attraction. This unique spot, where the boundary between sky and land blurs, continues to provide a spectacular view of commercial aviation—allowing visitors to experience the power and precision of aircraft in flight while respecting safety measures.

Nowhere else in the world can tourists stand so close to an active runway, directly in the path of departing jumbo jets, with all the risks that entails—despite prominent warning signs.


*Maho Beach*

## Spotters' Paradise in Sint Maarten: The Best Viewing Locations Around SXM

Princess Juliana International Airport (SXM) is a must-visit destination for aviation enthusiasts. While Maho Beach is the most famous spot, several other vantage points offer impressive perspectives on aircraft operations. Whether you want to escape the crowds or capture unique angles, there are numerous locations to explore (see map on next page).

### A. Maho Beach: The Iconic Spot

Maho Beach is world-renowned for its prime location beneath the approach path of Runway 10. The experience here is unmatched—aircraft fly overhead at astonishingly low altitudes. However, it can become extremely crowded, especially when cruise ships are docked in Philipsburg.

### B. Sonesta Maho Beach All-Inclusive Resort – Cloud 9 Terrace

Since November 2024, the Cloud 9 Terrace at the Sonesta Maho Beach All-Inclusive Resort has redefined the spotting experience in Sint Maarten. Located on the hotel's ninth floor, this exclusive terrace, reserved for guests of the 'Ultimate Adult Only' section, provides unparalleled panoramic views of the airport and its surroundings. Less than 400 metres from Runway 10's threshold, this terrace offers aviation enthusiasts and visitors a breathtaking perspective on SXM's operations. From this elevated vantage point, guests can observe takeoffs, landings, and taxiing aircraft, creating an immersive experience. The hotel's strategic location makes it an attractive choice for aviation lovers.

### C. Airport Road

This stretch of road, which connects the southern side of the airport to the terminals, offers excellent views of aircraft over Maho Beach. It is accessible on foot from the terminal.

*The stone foundation at Maho Beach safeguards the shoreline from waves and helps deter spectators from venturing dangerously close to jet blast*


Simply follow the main road in a southwesterly direction. Be aware that photography and observation are generally done through the airport fence.

**D. SXM Spotters Paradise Apartments**
For those seeking a quieter alternative to Maho Beach, SXM Spotters Paradise Apartments provide an excellent option. Located just a short walk from the airport, these private apartments feature an elevated terrace, offering clear views of aircraft operations, including over the perimeter fence. Access is limited to residents or granted by prior arrangement.

**E. The Morgan Resort**
A two-to-three-minute walk from Maho Beach, The Morgan Resort features a panoramic terrace that offers stunning views of the runway and beach. While primarily reserved for hotel guests, access can sometimes be obtained via a day pass, which includes use of the resort's pool and other amenities.

**F. Tower Mount**
Situated north of the airport, Tower Mount provides a rare and spectacular view of the ramp and taxiways. To reach this spot from Maho Beach, take Rhine Road north, turn right onto Amazon Road, and continue past a parking lot. From here, the control tower is visible, and a nearby area offers a unique vantage point for photographers.

**G. Mary's Boon Beach Resort**
Located on the opposite side of Maho Beach, Mary's Boon Beach Resort provides a different yet equally exciting view of aircraft arriving and departing. Another great location nearby is Karakter Beach Bar & Restaurant, where visitors can watch planes while enjoying food and drinks—provided they make a purchase before settling in.

**H. Dinghy's Beach Bar & Grill**
Dinghy's Bar features a covered observation deck, making it an ideal spot to watch aircraft movements while enjoying a relaxed setting. Located not far from the airport, this venue offers great photo opportunities of planes on the runway and apron.

**I. Sunset Beach Bar**
Situated at the far end of Maho Beach, Sunset Beach Bar offers a fantastic parallel view of aircraft on approach.

Just 300 metres from the runway threshold, this is one of the best spots to capture striking images while enjoying a drink or meal.

## Equipment for Photography and Video

Capturing these unforgettable moments doesn't always require high-end equipment. Lenses between 50 mm and 100 mm are generally sufficient due to the proximity of the runway.

Additionally, modern smartphones now feature advanced cameras capable of capturing high-quality images and videos, making them a practical choice for aviation photography.

## Conclusion

Princess Juliana International Airport (SXM) is a true icon for aviation enthusiasts, attracting both tourists and professional photographers. Whether you visit Maho Beach or one of the many other spotting locations, SXM promises an unforgettable experience—where a passion for aviation blends seamlessly with the natural beauty of the Caribbean.

# TWO F-16 MILESTONES

**Text and photography by Patrick Dirksen and Frank Mink of Tristar Aviation**

**The F-16 Fighting Falcon, one of the most successful fighter jets in history, marked two major milestones in 2024: its 50th anniversary and its retirement from Royal Netherlands Air Force service. While the type continues to serve in many air forces worldwide, these events highlight both its enduring legacy and the transition to next-generation fighters.**


### 50th Anniversary

The iconic multirole General Dynamics (now Lockheed Martin) F-16 Fighting Falcon made its first flight in 1974, marking its 50th anniversary in 2024. This milestone was celebrated at the Royal International Air Tattoo at RAF Fairford in the United Kingdom, the world's largest military airshow. For the occasion, a retired F-16AM of the *Koninklijke Luchtmacht* (KLu, Royal Netherlands Air Force) was given a special colour scheme.

In the 1970s, the U.S. Air Force sought a relatively small and cost-effective fighter aircraft to complement its fleet of F-15 Eagles. Two companies were selected to build prototypes: General Dynamics with the YF-16 and Northrop with the YF-17. After a series of tests, General Dynamics won the competition, although Northrop later produced its design as the F/A-18 Hornet for the U.S. Navy. Interestingly, while the F-16's official maiden flight took place on February 2, 1974, the first prototype had already flown for six minutes on January 20. During a high-speed taxi run, a wingtip touched the ground, prompting the test pilot to take off to prevent the aircraft from veering off the runway and crashing.

For the anniversary aircraft, a large Falcon was painted on the tail, referencing the fighter's official name. The underwing pylon, which carried a fuel tank displaying the prominent 'F-16 50th' titles, featured the roundels of all 29 past and present operators, including Ukraine as the latest member, as well as future users Bulgaria and Argentina. The belly fuel tank was adorned with a Viper, reflecting the F-16's unofficial nickname.

### Retirement

The Koninklijke Luchtmacht was one of four European nations that became the first export customers for the F-16. Alongside Belgium, Denmark, and Norway, the Netherlands formed the European Participating Air Forces (EPAF). Belgium and the Netherlands received their first F-16s in 1979, followed by Denmark and Norway in 1980. In September 2024, 45 years after the delivery of its first Fighting Falcon, the Dutch Viper fleet was officially retired.

Aircraft J-197 was among the last dozen operational Dutch F-16s, out of a total of 213 ordered. For the farewell ceremony, it received a special livery featuring another large Falcon, along with the emblems of all squadrons that had flown the F-16 in Dutch service, including the training unit in Tucson, Arizona. The tail also listed the conflict zones where Dutch F-16s had been deployed over the years.

The Dutch roundel and a large "45 years" completed the design. A notable detail was the addition of the text "Assembled by Fokker" on the brake chute housing, acknowledging that all Dutch F-16s—as well as many Danish, Norwegian, and even one Egyptian F-16—were built by Fokker at Amsterdam-Schiphol Airport.

A farewell flight over all former F-16 bases and other significant locations in the Netherlands had to be cut short due to poor weather. However, this was not the final flight for the aircraft, as they would soon begin new service elsewhere. Over the years, batches of retired Dutch Vipers have been sold to the air forces of Jordan and Chile. The remaining aircraft have either been delivered to the European F-16 Training Centre (EFTC) in Romania or donated to the Ukrainian Air Force.

As a fourth-generation fighter, the F-16 is gradually being replaced by fifth-generation aircraft in many air forces. However, with upgraded F-16Vs still in production and second-hand aircraft being transferred to South American and former Eastern Bloc countries, the Fighting Falcon will continue to grace the skies for years to come.




*Specially painted F-16s together with their predecessor F-104 Starfighter and successor F-35 Lightning II*

# APEX BUCCANEER
## Collaboration Over the High North

**Text and photography by Erik Bruijns**

**A trilateral exercise, called Apex Buccaneer, took place over Norway on December 3, 2024.**

During this exercise, American, Norwegian, and British troops practiced sharing information between multiple platforms to build a shared vision of the simulated battlefield and then deploy weapons on it. Specifically, Norwegian joint terminal attack controllers on the ground directed payloads onto the targets. United States Air Force B-52H bombers dropped live ordnance on these simulated enemy positions in Norway. Exercise Apex Buccaneer saw United States B-52H Stratofortress's from the 20th Expeditionary Bomb Squadron, F-35A Lightning IIs, KC-135R Stratotankers, and a U-2S Dragon Lady work alongside Norwegian F-35As and P-8 Poseidon maritime surveillance aircraft, as well as Royal Air Force F-35Bs, an A330 MRTT Voyager tanker, and a RC-135W Rivet Joint Signals Intelligence aircraft. Norwegian army, navy, and special forces troops also took part on the ground. All assets combined acted as enablers, sharing mission-critical data to create a unified air picture. This enabled exercise participants to overcome a variety of simulated threats, ultimately facilitating the successful completion of the B-52's mission, striking the simulated targets at the Setermoen military range in Norway.

The key tactic being trained on was multidomain Find, Fix, Track, and Target (F2T2). "Find" means scanning the battlefield for potential targets. This represents the first step in the dynamic kill chain, built around identifying potential threats. It involves the initial detection of an emerging target or threat, heavily leaning on dynamic ISR capabilities to monitor areas of interest and determine the nature and extent of a threat, and its timeline. The "find" phase will dictate priorities and opens the next phase of the kill chain. "Fix" means locating the potential target's exact position and identifying it as a worthy target. In this part of the chain, Intelligence, Surveillance and Reconnaissance (ISR) capabilities are selected, allocated and directed to "fix" upon the emerging threat previously identified. This phase confirms, identifies and locates the target and disseminates this information to combatant commanders for further analysis. "Track" means keeping track of the target's exact location and identity. A potential target is extensively monitored to enhance situational awareness and establish nuances in the target's nature, behaviour, establish its validity and ultimately determine why, how and when it should be interdicted. Finally, "target" means choosing and using the right tool to destroy or otherwise affect the target. It ensures that the necessary operational and legal assessments are conducted to safely and securely act. This is conducted

*The Arctic is a critical region for the collective security and global stability*

*A B-52H assigned to the 20th Expeditionary Bomb Squadron takes off from RAF Fairford*

*Reaper Flight, a trio of USAF F-35A's flying out of RAF Lakenheath, UK, made the journey up to Norway, while supported by several tanker aircraft*

*A KC-135 Boom operator has the best view in the house*

within the parameters of the law of war, vigorously assessing it against the full spectrum of legal requirements that dictate the process of a military actions to ensure legal and safe conduct. This phase also determines the specific capabilities and considers other critical elements required to conduct an operation successfully and safely. These include determining the supporting assets, such as air-to-air refuelling, strike and ISR capabilities.

The 'High North' is a term that has become widely recognised throughout the security world, which defines all territory within the Arctic Circle and parts of the North Atlantic, otherwise considered the 'Greater Arctic' region. Arctic deterrence and the defence of NATO's northern flank is becoming more critical. General James Hecker, commander of United States Air Forces in Europe – Air Forces Africa has reinforced this, stating that "the Arctic is a critical region for our collective security and global stability. Training with our Norwegian and U.K. allies in this environment demonstrates our shared commitment to defending NATO's northern flank and adapting to emerging threats." The trilateral exercise allowed for the seamless integration of the F-35 data-sharing capabilities, as pilots from all three nations exchanged real-time tactical information, creating a unified air picture and demonstrated the aircraft's ability to operate as a force multiplier. Interoperability is vital to the defense of NATO's northern flank. "Multi-domain integration is essential for leveraging the full spectrum of capabilities," said General Hecker. "It creates a more adaptable, resilient and precise military force capable of addressing diverse and evolving threats across the battlespace". The ability to understand how each nation operates, to share critical information quickly, and to work seamlessly with each other ensures all involved parties are prepared for future events. Leading the exercise were F-35s participating from the three participating nations. These aircraft were pivotal in the successful completion of the mission, through their data-sharing capabilities. The United States Air Force stated that "The trilateral exercise allowed for the seamless integration of the F-35 data-sharing capabilities, as pilots from all three nations exchanged real-time tactical information, creating a unified air picture and demonstrated the aircraft's ability to operate as a force multiplier." This demonstrates the capability advantage presented by Fifth Generation aircraft and highlights their relevance as the global security environment evolves. Group Captain Bishop, head of operational plans for the Royal Air Force, summarised this in saying that "Fifth-generation platforms are pivotal to maintaining air superiority in contested spaces, and exercises like this showcase their unmatched capability."

Thanks to a variety of tanker aircraft, Apex Buccaneer's combat and ISR assets were able to stay on station longer, meaning that the mission flowed seamlessly without pause, ensuring the continuity of operations through uninterrupted situational awareness and data flow. Operating in this way is imperative in a modern, data driven battlespace. More broadly, having tanker aircraft on hand nearby helps reassure combatant commanders that, should mission requirements evolve, and aircraft need to reach new areas or remain in place longer, there is an effective means to facilitate this around the clock.

# Expanding NHV Contracts AT ESBJERG AIRPORT

**Text and photography by Roelof-Jan Gort and Bjorn van der Flier of FlyHighAeromedia.com**

**Esbjerg Airport, located on the western coast of Denmark, has long served as a vital hub for aviation and transportation. Among the notable operators at this airport, one stands out with their bright yellow Helicopters, which is NHV (Noordzee Helikopters Vlaanderen), a company known for its significant contributions to the offshore helicopter industry, particularly in the North Sea region. Roelof-Jan Gort and Björn van der Flier went to Esbjerg Airport to find out more and talked with the Base Manager Gitte Eriksen, pilot Jahne Dethlefsen and the Head of Maintenance Steve McNeill about this.**


### Early Years and Development

Originally founded in 1997, NHV quickly established itself as a reliable operator in the offshore transportation sector, expanding its footprint across Europe, Africa, and beyond, offering tailored helicopter transport services. The company initially focused on providing helicopter services for the oil and gas industry, which was burgeoning in the North Sea. Esbjerg Airport, with its strategic location and modern facilities, became a key operational base for NHV.

The airport's history dates back to 1948, but it was the rise of the offshore energy sector in the late 20th and early 21st centuries that transformed Esbjerg into a critical logistics hub. The presence of NHV further solidified this role, as the company expanded its fleet and service offerings to meet the growing demands for the offshore industry.
Expansion and fleet development

As NHV grew, so did its fleet. Initially operating smaller helicopters, the company invested in larger, more advanced aircraft to accommodate the increasing passenger and cargo demands of the offshore sector. Notable aircraft types included the EC155, EC225 Super Puma, H175, AW139, AW169, H145 and the AS365.

The United Kingdom was always at the forefront of the offshore flying sector, quickly adopting flight safety concepts that led to the development of twin-engine helicopters with a two-crew concept. The main issue was that while UK had its own helicopter manufacturing industry, companies like Westland Helicopters and Denmark did not have any of this, and thus was completely dependent on foreign OEMs.
In the end, the EC155s and AS365s became the very first safety-enhanced offshore helicopters in Denmark, and a newly formed operating company called DanCopter took over some contracts from Maersk in 2003.

Since the introduction of a new helicopter type, the offshore flying industry has experienced some difficulties. On July 1st, 2012, a new helicopter type was introduced by NHV's predecessor DanCopter, the EC225, allowing for the transportation of up to 19 offshore workers to platforms and back to shore. However, just four months after its introduction, another Helicopter Operator's EC225 helicopter carrying fourteen offshore workers ditched at sea, resulting in a temporary industry-wide grounding for safety reasons. Although the EC225 returned to service by the end of the year. Unfortunately, in 2016 another EC225 engaged in a tragic fatal incident at Bergen Norway, where the main rotor detached from the helicopter, causing the death of all onboard. This led to the end of the EC225 in the North Sea offshore business and the closure of several operators.

In 2015, NHV Group acquired DanCopter, beginning a new chapter for the Danish offshore helicopter business. Following the EC225 disaster, all oil and gas customers refused to accept new helicopter models. Despite discussions with Airbus Helicopters about a new helicopter model, which eventually became the H175, which is currently the best helicopter for their operations. In comparison to the EC225, the aircraft has a smaller passenger capacity with three seats less, which suits NHV's needs. With the smaller cabin size of the H175, they are now achieving close to 100% occupancy in this helicopter. NHV's commitment to safety and quality led to numerous certifications and accolades, enhancing its reputation within the industry. This dedication was reflected in the high standards of maintenance and training, ensuring that pilots and crew were well-prepared for the unique challenges of offshore operations.

### Operations at Esbjerg Airport

Esbjerg Airport serves as a key operational base for NHV's Danish entity, NHV A/S, facilitating the transportation of personnel and equipment to offshore installations as well


AIRBUS
OY-HRV


*Base manager Gitte Erikson with one of her helicopters*


*Head of maintenance Steve McNeil flanked by two NHV pilots*

serving offshore wind in the North Sea. The airport's proximity to major oil and gas fields makes it an ideal location for NHV's operations, which include passenger transport, cargo services and training and safety programs.

At Esbjerg Airport, NHV currently has a fleet of three H175 helicopters. NHV now has thirty-six employees that are working for them at Esbjerg Airport, split into fourteen pilots, fourteen technicians and eight in supporting office.
Strategic Partnerships and Collaborations

We asked Ms. Eriksen about the tenders and what was the reason for choosing NHV for the Danish oil and gas operations. Ms. Eriksen explained: "It is the customer who chooses us. We bid on the tender with a lot of other companies in the world. But I think it is because of the product we deliver, our safety policy and the price. We do not compromise safety at all."

She continued, "When we bid on a tender we investigate, what will be the best type of helicopter according to our customers' requirements. How far shall we fly, how many passengers shall we move. Then we try to give the best price, payload & flight time for the customer."

**EASA Heli Sa Cat 1 operations**

In March 2024, NHV Group announced that their Danish entity is the first operator in the North Sea to be approved to provide "Operations with Operational Credits — Helicopter Special Authorization Category I (Heli Sa Cat I) Operations" from EASA - European Union Aviation Safety Agency.

This new approval has been introduced to increase the number of available and accessible alternates within the available fuel range.

This gives NHV a huge advantage over competitors, when they are forced to stay on the ground NHV can still perform their flights, providing better service to their customers.

Key Components of Heli Sa Cat 1 are the Safety Management Systems (SMS), pilot training and competence, maintenance standards, and operational procedures.

Compared to the standard regulation, this special approval gives them better operational benefits, including:

- Reduced minimum visibility to 300m from the usual requirement of 550 meters, so the special approval offers a significant reduction.
- With the use of the Instrument Landing System (ILS), they can now descend down to 150 feet. If the airport has the capability to use Low Visibility Procedures (LVP), then they are authorized to descend to 130 feet. This is a significant difference from the usual minimum descent altitude on an ILS, which is typically 200 feet.
- Lower weather requirements for alternate airfields when the weather is marginal at their destination. This offers us a substantial improvement in the number of operational days and a better payload for our clients. The weather requirements for alternate airfields are reduced from a 1000-meter visibility to a 600-meter visibility, and the cloud ceiling is reduced from 400 feet to 300 feet.

To obtain this approval, NHV needed to use a helicopter with a 4-axis autopilot featuring automatic level-off capabilities, a feature present in all H175 helicopters. Additionally, the crew needed to undergo theoretical and practical simulator training to meet the approval requirements. All the pilots have completed this training during the most recent training sessions in the simulator in Marseilles.

**Pilot Training Programs**

NHV invests heavily in pilot training, adhering to EASA's high standards. The company implements rigorous training programs that include simulator training, emergency response drills, and regular assessments. This commitment ensures that pilots are not only proficient in operating helicopters but are also prepared for unexpected situations.

Ms. Eriksen explained: "We do all the training ourselves, here at the base and at Airbus Helicopters in Marseilles in the simulator. There is a minimum of hours they need to have in the simulator and there are also some requirements about flying hours from our customers before a pilot is allowed to fly for them. If you are a new pilot on this helicopter type,



*Janne Dethlefsen after completing preflight checks*


*NHV pilots with their helicopter*

the first training start at the office with classroom training. Later they are sent to Marseilles in SIM. And if they pass, they will continue to do some line training in the helicopter for a period. And there is about three weeks classroom training, two weeks in SIM and seven to fourteen days flight training with a Line trainer. Then you might be ready to be a new co-pilot, but you are only allowed to fly with experienced Captains".

**Experiences from a co-pilot's view**

Janne Dethlefsen, a 32-year-old co-pilot who has about 1400 flight hours, will elaborate about her experiences and training: "I started my PPL in Esbjerg Airport on the R22, civilian and modular. In that way, I was able to work during my helicopter education. I took my ATPL in Billund Air Center and came back to Esbjerg to finish my CPL on the R44. After I finished my education, I flew a lot of sightseeing for the next 5 years. My dream was to fly offshore, but I needed a lot more flying hours to meet the hiring criteria. Meanwhile I got my IR and FI. In 2021 I started my training on the H175 with Babcock and flew till 2023 at Babcock/CHC on the H175".

She continues: "Since 2023, I'm flying with NHV on the H175. And the reason I have chosen NHV is that I was already type rated on the H175, and that was the same type NHV Esbjerg was using. And nonetheless, I had heard incredibly positive rumors about NHV. At NHV we always fly with two pilots, the co-pilot and the pilot in command. Because we fly to the oil and gas platforms, my job as co-pilot is to cooperate with the commander to complete a safe operation".

Janne Dethlefsen flies about six hundred hours every year on the H175. Before departure, the pilots check the latest weather package, which also contains information about the offshore installations. After completing the flight plan, they change into their flight suits and walk out to the helicopter to conduct a preflight check. This process takes about one hour before they are ready to fly for their new flight. On their flight, they

can accommodate about sixteen passengers with a maximum payload of 2028 kg. However, this depends on the weather, fuel availability offshore, and the routing of the flight.

About the flying on the H175 she said: “The H175 is extremely comfortable, featuring high automation, low vibration, and excellent air conditioning that works well even in hot climates, ensuring great comfort for both passengers and pilots. The state-of-the-art autopilot with "Auto hover" and "Autoland" is especially noteworthy. With a maximum range of 650 nm, we can reach all the oil and gas installations in the North Sea”.

Janne Dethlefsen would like to add something about flying to the various installations and the possible dangers that exist and that she should take into account: “Yes, we are dropping people of at the offshore installations, and every time before our landings, we are performing a small risk assessment, where we as crew are trying to identify all the threats and which countermeasures we take to mitigate the risk. The risks could be wind direction causing a lot of turbulence, exhaust gases from the platform, supply vessels in the vicinity of the platform, etc. But every time I fly, I try to provide the safest flight, so I try to practice my skills to the highest level possible every time.”

For flying the H175 over the North Sea, NHV helicopters are all equipped with floats. These floats allow for emergency water landings. Co-pilot Janne Dethlefsen explains that the floats are always armed when flying over the sea, and they can be inflated when needed below a specific airspeed. This type of training is standard every year during sim training, which includes ditching over the sea with and without engine power. Additionally, every third year, the crew needs to train on how to exit the helicopter when ditching. This training is conducted at RelyOn Nutec using a dummy helicopter that is lowered into a pool of water. During the training, participants practice exiting the helicopter using the emergency exits and swimming to the surface, even when upside down. Each trainee has their own safety diver, and the training is conducted in a controlled environment. All passengers must undergo the same type of training before they are allowed on board for an offshore flight. This preparation is necessary due to the rapidly changing weather conditions in the area. Therefore, we need to plan everything carefully and besides this we have a safety kit with us. This safety kit has extra undies and a toothbrush, because you never know, if you need to sleep somewhere unexpected”.

About her experiences with night flying, she goes further in detail about this: “Flying at night presents unique challenges. It is more difficult to make a smooth landing due to the decreased visibility. There are several factors to consider:

1. Night Vision: Our eyes require about 30 minutes to adjust to the darkness. If a flashlight is used in the cockpit, the white light can instantly ruin our night vision.

2. Autokinesis: Staring at a single light can make it appear to be moving. To prevent this, we need to keep scanning the horizon.

3. False Horizon: Certain combinations of streetlights or clouds can create a false horizon. To avoid this, we rely on our instruments for guidance.

4. Black Hole Effect: When approaching an airport with minimal lighting, it is challenging to accurately judge our height and distance from the runway. The same applies to offshore landings, where we sometimes only have a green ring of light on the helideck. This is particularly difficult when landing at night on a Normally Unmanned Installation (NUI) in adverse weather conditions.

**Maintenance and Operational Excellence**

NHV's maintenance procedures are designed to meet and exceed EASA's regulatory requirements. The company utilizes advanced technology and best practices to conduct thorough maintenance checks, ensuring that all aircraft are safe and dependable. Operational protocols are continuously reviewed and updated to reflect the latest safety standards and best practices.

Steve McNeil was the Chief Maintenance in Africa for ten years and is now the Chief of maintenance in Denmark for the last five years. At the NHV base in Esbjerg Airport, they run a progressive maintenance schedule, both calendar and flying hours wise, on all inspections up to eight hundred flight hours. Some of the engineers are qualified with a B1.3 license which means you can work on different helicopters having one or more than one turbine engine. A B1.3 licensed engineer overlooks all aspects of the maintenance of helicopters. Some are qualified with a B2 license which means that their work is related to instrumentation and electronic equipment. And some are qualified with a C license. This person manages the maintenance tasks of the aircraft to ensure conformity to maintenance manual as well as regulatory requirement and issues certificates of release to service following base maintenance on aircraft.

Regarding the maintenance schedule he explained: “We do a first check every 10 flight hours, then there are 50 flight hours, 100 flight hours, 150 flight hours, 200 flight hours, 280 flight hours, 400 flight hours, 600 flight hours before BMX at 800 flight hours”. The availability of the operational deployment of the helicopters is now above 85% despite flying five days a week, sometimes seven days a week considering the mixed defects, etc.

**Expanding contracts in the oil and gas industry**

In May 2023, NHV A/S secured a new contact with TotalEnergies EP Denmark to support offshore operations in


*Despite the impressive range of the H175, refueling is sometimes required*

the Danish sector of the North Sea. The contract involved that NHV at Esbjerg Airport deploy a dedicated H175 helicopter to transport personnel and equipment to TotalEnergies installations in the Dan and Tyra field.

Ms. Eriksen explains that "In July 2024, NHV successfully secured a 3 + 2-year contract renewal with INEOS plus further potential extensions. What we are doing is flying people offshore every day for crew change. We must fly every day to the rigs and if they suddenly need an extra flight, we need to be able to support them with this". She continues:" For INEOS and TotalEnergies we have about 2 to 4 flights a day. Sometimes they ask for more if they must catch up due to the severe weather. Then we try to find a solution to help them and if possible, with more flights than we normally have. But each flight takes between 2,5 to 4 hours and then the pilots need to plan for their next flight. So, the engineers sometimes need to look at the helicopter to check everything between the flights. So, this is one big coordination every day for our team."

Regarding the amount of people, they are flying to the platforms she added: "On daily basis we fly between two and sixteen passengers (pax) during each flight. We have also flown with only one passenger, if it is important for our customers to take that person offshore, we will do this for them. But normally we fly with twelve to sixteen people on each flight. The only reason we cannot fly to the platforms is due to the weather. When there is bad weather like lightning or high waves (six meters or higher), we have to wait a day or two before the weather is better again. So, the weather has an enormous impact in the flights we perform on daily basis."

**Prospects**

As the global energy landscape evolves, NHV Group continues to adapt to new realities, including the increasing focus on renewable energy sources. The company is exploring opportunities in the offshore wind sector, which is gaining momentum in the North Sea. This shift aligns with global sustainability goals and promises to keep Esbjerg Airport at the forefront of aviation logistics in the region.

We would like to express our gratitude to Jessicca Gordon and Delphine Demeyer of the NHV Group headquarters in Oostende and a special thanks goes to Base Manager Gitte Eriksen, co-pilot Janne Dethlefsen, and Chief Maintenance Officer Steve McNeil, and the people of Esbjerg Airport for making this article possible.

# MAPLE HAWK
## The Red Arrows Visit Canada

**Text and Photography by Claude La Frenière**

**In 2024, the Red Arrows, the Royal Air Force's aerobatic team, embarked on the Maple Hawk Tour of Canada to commemorate two major milestones. This tour not only marked the Red Arrows' 60th anniversary, known as the Diamond Season, but also honoured the centenary of the Royal Canadian Air Force. The convergence of these significant anniversaries underscored the importance of the Maple Hawk Tour, highlighting aviation as a means of uniting and celebrating the shared military heritage of the two Commonwealth nations.**

*The Vixen Break formation*

From late August to mid-September, the Red Arrows toured Canada, performing impressive aerobatic displays in several major cities. The tour not only celebrated milestone anniversaries but also reinforced the historical and cultural ties between the UK and Canada, highlighting their longstanding military cooperation. Through their precise and daring manoeuvres, the team captivated audiences while strengthening the bond between the two nations. Their performances will be remembered as a symbol of friendship and enduring partnership between the British and Canadian air forces.

### Who are the Red Arrows?

The Red Arrows, officially known as the Royal Air Force Aerobatic Team (RAFAT), are the Royal Air Force's aerobatic demonstration team. Based at RAF Waddington Base, the team is comprised of experienced pilots, primarily from the RAF's fighter squadrons, who provide their expertise in aerobatic displays around the world.

Renowned for their pinpoint precision and dizzying aerobatic manoeuvres, the Red Arrows have performed breathtaking aerial feats. Their iconic 'Diamond Nine' formation, combined with the use of coloured smoke, creates stunning aerial displays. Each manoeuvre is the result of rigorous training and perfect coordination between the nine pilots.

### Introduction and history of the squadron

Since their formation in late 1964, the Red Arrows, the Royal Air Force aerobatic team, have performed displays worldwide. Their name and visual identity pay homage to their predecessors: the Black Arrows and the Red Pelicans. Their first flights took place in 1965, with 65 performances under their belt, using "Folland Gnat" jets. In 1968, the team adopted the famous 'Diamond Nine' formation and increased their strength to nine aircraft.

In 1980, the team replaced the Gnat with the BAE Systems Hawk, a modified training jet, and adopted the motto 'Sparkle' to symbolise excellence. After several base changes, including RAF Scampton (1983) and RAF Cranwell (1995-2000), the team undertook a landmark world tour in 1995-96, performing to nearly a million spectators in Sydney.

The Red Arrows have marked historic moments, including their participation in the Queen's Jubilees, the opening of the 2012 Olympic Games and the RAF Centenary in 2018.

Their 2016 tour of Asia Pacific and the Middle East covered 20,000 miles and reached up to a billion people. In 2019, the team undertook their largest tour of North America, reinforcing their role as ambassadors for the United Kingdom. The move from Scampton to RAF Waddington took place in late 2022, after nearly 40 years at Scampton.

Beyond their spectacular displays, the Red Arrows play an important diplomatic role. Since their first season, they have performed nearly 5,000 displays in 57 countries, supporting a range of British interests abroad, including trade, defence, education and culture. Wing Commander Adam Collins says the team acts as ambassadors, saying the Red Arrows showcase the best of Britain and highlight the UK's historic ties with its allies.

### Maple Hawk 2024

In 2024, to mark their 60th season and celebrate the centennial of the Royal Canadian Air Force (RCAF), the Red Arrows, the Royal Air Force's prestigious aerobatic team, embarked on a Canadian tour called "Maple Hawk." The name was chosen in tribute to Canada's national emblem and the historic ties between the RCAF and the RAF. The Maple Hawk tour ran for five weeks, with performances at four major Canadian air shows:

- Atlantic Air Show – Canadian Forces Base Greenwood, Nova Scotia (August 24-25)
- Canadian International Air Show – Toronto, Ontario (August 31, September 1-2)
- Aéro Gatineau-Ottawa – Gatineau-Ottawa Executive Airport, Quebec (September 6, 7, 8)
- London Air Show – London International Airport, Ontario (September 13, 14, 15)

In addition to the air shows, flyovers have been scheduled to pass over prestigious Canadian cities, such as:

- Montreal – Old Port of Montreal (September 18)
- Niagara Falls – Niagara Falls (August 28)
- Ottawa – Ottawa River (September 4)
- St. John's – St. John's Waterfront (September 20)

These flyovers provided Canadians with unique experiences as they watched the team perform in historic locations.

### Educational and Community Impact
### STEM Awareness and Promotion

In addition to the aerial performances, the tour had an educational dimension, with events designed to promote careers in science, technology, engineering and mathematics (STEM). Workshops and outreach sessions were held to inspire Canadian youth to pursue careers in aeronautics, engineering and defence.

### Diplomatic Engagements

The Maple Hawk tour also featured diplomatic engagements, with the participation of British High Commissioner to Canada Susannah Goshko and Lieutenant-General E.J. Kenny, Commander of the RCAF. These meetings highlighted the close cooperation between the air forces of the two countries. The Red Arrows contribute to recruiting for the armed forces and act as ambassadors for the RAF.
"This visit has highlighted the strength of the long-standing

and enduring partnership between the UK Army and the Canadian Armed Forces."

### Training and Preparations for the Tour

Before embarking on their international tour, the Red Arrows underwent an intensive training programme at RAF Waddington in Lincolnshire. This training facility is crucial to ensuring the team can perform with unmatched precision. This training takes place throughout the year and is specifically designed to ensure that pilots master not only tight formations and complex figures, but also spectacular aerobatic manoeuvres. This ensures flawless execution during shows across the UK, Europe and Canada.

The training relies on impeccable coordination between team members. Each pilot must be able to adjust their movements instantly to suit the flying conditions. This involves a deep understanding of the capabilities of other team members, as well as constantly adapting to real-time changes, including variations in speed, wind direction and weather conditions. This exemplary teamwork is at the heart of the Red Arrows' aerobatic performance, and their success is based on the pinpoint precision of each manoeuvre.

The training sessions cover a wide range of skills, from rehearsals of classic figures such as the Diamond Nine to more complex manoeuvres that require perfect synchronisation. This rigorous process prepares not only the pilots but also the entire support team, ensuring that everything from aircraft maintenance to logistics is in place for each event.

### Red Arrows Pilots

The Red Arrows, the iconic aerobatic team, are made up of elite pilots chosen for their exceptional expertise within the Royal Air Force (RAF). Their selection is based on strict criteria, ensuring that each member has significant flying experience, accumulating at least 1,500 hours of flying time and having served on frontline missions. The selection process includes rigorous flight assessments, interviews, media tests and peer reviews. Each year, three new pilots join the team to replace those whose terms are coming to an end.

Before joining this prestigious formation, each pilot has typically flown combat aircraft such as the Typhoon, Tornado or Harrier, ensuring the defence of the British skies. The team is based at RAF Waddington in Lincolnshire and is renowned for its ability to perform complex formations, such as the Diamond Nine, as well as high-precision manoeuvres with the BAE Hawk. This advanced trainer aircraft, capable of reaching 1038km/h, allows the Red Arrows to perform impressive displays, highlighting both the power and precision of their performance.

The 2024 Royal Air Force Red Arrows season is marked by an exceptional team of pilots. Each member, who has undergone rigorous training and many operational missions, embodies British air excellence.

**Squadron Leader Jon Bond (Red 1) – Team Leader**
**Role:** Team Leader, responsible for coordinating training, designing and choreographing the air show.
**Biography:** Jon Bond joined the RAF in 2006 after studying at Loughborough University. Having flown the Eurofighter Typhoon on operational missions, he served as a Synchro Leader before taking over the Red Arrows as Red 1 in 2024. His experience is a major asset to lead the team.

**Flight Lieutenant Chris McCann (Red 2) – Number 2 Pilot**
**Role:** The Red 2 is the pilot directly behind the leader, playing a crucial role in keeping the formation tight and synchronised.
**Biography:** Originally from Lancashire, Chris McCann joined the RAF in 2005 and flew the Tornado GR4 on operational missions before joining the Red Arrows for the 2024 season. He has extensive flying experience which makes him an asset to the team.

**Flight Lieutenant George Hobday (Red 3) – Number 3 Pilot**
**Role:** Red 3 is positioned to the left of the leader, a strategic position to ensure a precise and dynamic flying formation.
**Biography:** A seasoned pilot, George Hobday has extensive experience on several types of fighter aircraft. He joined the Red Arrows for the 2024 season after serving on operational missions within the RAF.

**Flight Lieutenant Dustin Wales (Red 4) – Number 4 Pilot**
**Role:** Red 4 is positioned to the right of the leader, actively participating in aerobatic manoeuvres.
**Biography:** Dustin Wales has extensive flying experience on fighter aircraft such as the Typhoon, having been involved in several operational missions before joining the Red Arrows.

**Flight Lieutenant Tom Pemberton (Red 5) – Number 5 Pilot**
**Role:** Red 5 plays an important role in the team's advanced manoeuvres and spectacular figures.
**Biography:** Tom Pemberton has significant experience in the RAF, having flown fighter aircraft before joining the Red Arrows. His expertise is crucial to the team's performance, particularly in complex aerobatic manoeuvres.

**Flight Lieutenant James Turner (Red 6) – Number 6 Pilot**
**Role:** Red 6 is located to the left of the tail pilot, participating in tight manoeuvres that require great precision.
**Biography:** A former fighter pilot, James Turner has many years of operational experience before joining the Red Arrows. His expertise strengthens the team for the 2024 performances.

**Flight Lieutenant Oliver Chippendale (Red 7) – Number 7 Pilot**
**Role:** Red 7 is located to the right of the tail pilot, adding complexity and synchronisation to aerobatic manoeuvres.
**Biography:** Oliver Chippendale gained extensive experience in the RAF flying the Typhoon in operations, Tom flew RAF exercises and operations around the world before being selected to join the Red Arrows. He is now a key member of the team for 2024.


**Flight Lieutenant Luke Williams (Red 8) – Number 8 Pilot**
**Role:** Red 8 is responsible for close-quarters manoeuvres, contributing to the visual intensity of the displays.
**Biography:** Luke Williams is an experienced pilot who flew Harrier and Typhoon combat missions on the front lines during his RAF career before joining the Red Arrows. His RAF career is marked by his expertise in close-quarters flying.

**Flight Lieutenant Sam Edwards (Red 9) – Number 9 Pilot**
**Role:** Red 9 is at the rear of the formation, where he completes aerobatic manoeuvres with absolute precision.
**Biography:** Sam Edwards, with a varied RAF career flying Tornado and Typhoon, is an experienced pilot, having flown a variety of fighter aircraft before joining the Red Arrows.

**Squadron Leader Graeme Muscat (Red 10) - Number 10 Pilot**
**Role:** As Red 10, Graeme Muscat is the team's safety supervisor, commentator and pilots the Red Arrows' photographers and spare jet.
**Biography:** Graeme Muscat joined the RAF in 1998 as a communications systems analyst before becoming an air signaller. Selected for pilot training in 2004, he has flown a range of aircraft including the Tornado GR4 and Hawk T2.

## Flying routine

In 2024, the Red Arrows celebrate their 60th anniversary with a new 25 minutes display routine. This year, all nine BAE Systems Hawk aircraft are adorned with special artwork to mark the occasion. Squadron Leader Jon Bond, as Red 1, expressed his excitement for this season, highlighting the importance of the inspiration the new routine could bring to young spectators. Its aim is to instill a lifelong passion for aviation while showcasing teamwork, a central element of their show.

## Structure and formation

The Red Arrows are famous for their diamond formation, made up of nine jets. Their performance is divided into two sections: the first half is dedicated to synchronized aerobatics, while the second is more dynamic, showcasing spectacular figures.

The Front Section (Enid): Made up of Reds 1 to 5, it is named after the famous British author Enid Blyton, known for her series "The Five Detectives". This section is distinguished by high-precision maneuvers, which require perfect coordination between the pilots.

The Rear Section (Hanna): Comprising Reds 6 to 9, this formation pays tribute to one of the team's founding pilots. Among the most impressive figures in this section are the synchro pair (Reds 6 and 7), who perform opposition maneuvers, much appreciated by the public for their spectacular intensity.

Red 10 acts as supervisor during the demonstrations, maintaining radio contact with Red 1 and providing live commentary to ensure smooth coordination.

## Types of demonstrations adapted to weather conditions

The Red Arrows adjust their demonstrations according to the weather conditions, ensuring a captivating spectacle in all situations. There are three possible types of demonstrations:

**Full demonstration:** Performed when the cloud base is above 5,500 feet, allowing for spectacular loops and impressive maneuvers.



**Rolling display:** This version is performed when the cloud base is between 2,500 and 5,500 feet. Loops are replaced by flybys and barrel rolls.

**Flat display:** When the cloud base is below 2,500 feet, this display consists of flybys and tight turns, ensuring a dynamic and close-to-the-ground display.

These three types of displays allow the Red Arrows to adapt to all conditions, while providing a breathtaking show.

## Unity in flight: Why the Red Arrows fly without numbers

The aircraft of the Red Arrows, the Royal Air Force display team, do not typically display individual visible numbers on their tail like many other display squadrons around the world for a number of reasons related to tradition, aesthetics and the need for team cohesion in aerobatic displays.

Within the Red Arrows, the emphasis is on the team as a whole rather than on individual pilots. By not assigning visible numbers to aircraft, the Red Arrows emphasise the teamwork and synchronised precision of each member, a central tenet of their flying philosophy.

Instead of visible numbers, each aircraft is assigned to a specific pilot for each season and given a distinctive call over the radio such as "Red1, Red 4, Red9". This discreet system ensures internal organisation and safety without detracting from the outward appearance of the team.
Thus, the absence of numbers on the Red Arrows' aircraft reinforces the unified image and collective discipline of the patrol, while making their performances even more impressive in the eyes of the public.

## The Red Arrows Support Team

The success of the Red Arrows is not only down to the pilots and their aerobatic performances. It is also the result of a vital team effort, that of the support staff, nicknamed 'The Blues' because of their royal blue overalls. These technicians, engineers and specialists are responsible for the maintenance, logistics and general support that ensures the aircraft are ready for each air show. Without their expertise and dedication, the performances of the pilots would not be possible.

**Operational Support:** Behind the Scenes of the Red Arrows
The precision of the Red Arrows' manoeuvres is the result of meticulous work and flawless coordination, ensured by a dedicated support team. Led by a Chief of Staff, the Support Team includes a wide range of roles, from the Public Relations Officer to the Mission Support Flight Commander. The team also includes an Operations Officer and around 100 engineering technicians, as well as other specialists who work behind the scenes to ensure the safety, efficiency and smoothness of operations. These men and women ensure, among other things, aircraft maintenance, spare parts management, and the implementation of the logistics systems necessary for the smooth running of the demonstrations.
The Support Team is also responsible for managing spare parts and equipment procurement, in addition to coordinating logistical aspects such as transport, ground facilities, and fuel requirements. With their technical expertise and responsiveness, The Blues ensure that everything is in place for the Red Arrows' exceptional aerobatic performances.
So, if the pilots are the visible face of the Red Arrows, 'The Blues' are the invisible pillar on which each impressive flight rests, allowing them to execute complex manoeuvres in the best conditions.

### The Crucial Role of Support Staff

The Red Arrows' support team consists of 120 people, including technicians, engineers, engineering officers, as well as public relations officers and chiefs of staff. Their main mission is to ensure that all logistical and technical aspects are perfectly coordinated, allowing the pilots to carry out their demonstrations with precision and safety.

Professionalism and Dedication: The Identity of 'The Blues'
The members of 'The Blues' are distinguished by their royal blue flight suits, a visual symbol of their professionalism and commitment. Their role is fundamental to the success of aerial performances, and their meticulous preparation work ensures that each flight takes place in the best possible conditions. Their expertise allows the air team to concentrate on their acrobatics with confidence.

### Pride and Dedication: A Driving Force behind the Red Arrows' Success

The members of 'The Blues' are driven by a deep sense of pride in their mission. Their work behind the scenes, although often invisible, is one of the driving forces behind the Red Arrows' success. Without their indispensable contribution, the precision and efficiency of the Red Arrows' displays would be unimaginable.

In short, the Red Arrows' support team, although discreet, is essential to the team's aerial exploits, and their presence behind the scenes is a guarantee of success and safety.

### The Circus Onboard Technicians Flight Assurance

A group of ten engineering technicians, accompanied by a photographer, make up the Circus. During the summer season, each member of the Circus is assigned to a particular pilot and accompanies the Red Arrows in flight in the passenger seat of the Hawk. Their role is essential, as they ensure the maintenance of the aircraft during travel so that the demonstrations can take place without any problems. After the season, these technicians resume their regular duties within the team.

### Circus performs several crucial missions

**Aircraft maintenance:** Before and after each flight, technicians carefully check the condition of Hawk T1 aircraft, particularly when travelling between different demonstration airfields.
Travel insurance: When travelling to and from demonstration sites, technicians accompany pilots in the passenger seat of the jets, ensuring the safety and proper functioning of the aircraft.
A sought-after position within the RAF - Circus technicians benefit from a unique experience: that of regularly flying in high-speed jets. This opportunity is one of the most sought-after within the Royal Air Force. At the end of the demonstration season, they return to their regular positions, but their experience in Circus distinguishes them as highly skilled professionals and sought after in the air force.
The Circus is the backbone of the Red Arrows in flight, an elite group of technicians who ensure the safety and performance of the aircraft, ensuring flawless displays.

### Engineering - The Blues

The Red Arrows' technicians and support staff are led by a Senior Engineering Officer, supported by a management team comprising two Junior Engineering Officers, a Technical Support Officer, a Warrant Officer, and two Flight Sergeants. Together, they are responsible for ensuring that the Hawk T1 aircraft are available and in perfect working order for the display and training seasons. Their role includes coordinating engineering and safety standards, as well as monitoring the welfare of the engineering team.

### Mechanical Technicians

Mechanical technicians make up two-thirds of the Red Arrows' engineering team. Their critical role is to maintain the mechanical and structural systems of the Hawk T1 aircraft, including engines, gearboxes, flight controls, landing gear, as well as hydraulics, air conditioning, anti-icing and fuel systems. They are responsible for everything from the smallest nuts and bolts to major wing components.

### Avionics Technicians

Avionics technicians are responsible for maintaining all of the jets' electrical and avionics systems. Their expertise covers a variety of equipment, such as emergency compasses, complex engine control circuits, and the integration of new radio and engine performance monitoring systems.

### Weapons Technicians

A small but vital group, weapons technicians maintain the life support and explosive systems on board jets, including ejection seats, explosive canopies and emergency fire suppression systems.

### Logistics and Supply

The Supply Team is made up of five members responsible for managing aircraft spares and organising transport. They ensure that the thousands of parts required, from small nuts to complete engines, are transported and stored correctly, whilst also overseeing the supply of fuel and other essential equipment.

### Mechanical Transport

The Red Arrows transport fleet comprises 18 vehicles, ranging from 38-tonne trucks to vans, operated by eight drivers. These vehicles are used to transport equipment and personnel to



*The Goose Pass*

demonstration sites, whilst also ensuring the aircraft are refuelled and supplied with fuel for the smoke systems.

### Survival Equipment Technicians

Three specialist survival equipment technicians are responsible for maintaining the pilots' safety kit. This includes equipment such as helmets, G-suits, life rafts, oxygen masks and parachutes.

### Photographer and Visual Communication

The team of photographers (officially known as RAF Visual Communications Specialists) play a vital role in the safety, training and documentation of the Red Arrows' performances. Their mission is to capture every movement of the aircraft during both flying displays and training, producing images and videos that are used for safety and promotion.

### Technical Support Flight (TSF)

The Technical Support Flight is responsible for managing quality standards, logistical support, training and technical records. It is made up of a mixed team of regular and reservist personnel. The TSF ensures that operations are conducted to the highest safety standards, both in the air and on the ground.

### The Dye Team

The Red Arrows' smoke trails are a visual signature of their performances. These trails, which are essential for visibility and flight safety, allow the team to orient themselves and coordinate their manoeuvres throughout the show.

In particular, they allow Red 1 to judge wind direction and speed and to locate aircraft in the sky, particularly when sections of the formation stray considerably.

The Red Arrows have two specialist dye teams who are responsible for filling the smoke pods beneath the aircraft with the dye needed to produce the famous-coloured trails. These engineers are constantly on the move to ensure the jets are quickly refuelled, ensuring that the show begins and ends with the much-anticipated phrase: "Smoke on, Go!".

This combination of engineering, logistics and technical support teams allows the Red Arrows to maintain their performance at the highest level, ensuring both flight safety and the quality of the displays.

### The BAE Hawk T1

The BAE Hawk T1, developed by BAE Systems and introduced in 1976, is a light and agile trainer aircraft, ideal for the Red Arrows due to its performance and exceptional manoeuvrability. Powered by a Rolls-Royce Adour engine, it reaches 1,038 km/h, which is perfect for rapid aerobatic manoeuvres. Its twin-boom configuration and efficient control surfaces ensure stability and precision, even in tight formations.

### Specifics for the Red Arrows

The Red Arrows use a modified version of the Hawk T1, equipped with smoke tanks under the wings, creating colourful trails during displays. These aircraft, painted in bright red, are optimised for exceptional aerobatic performance.




### Performance

Although less powerful than aircraft such as the Typhoon, the Hawk T1 is ideal for aerobatics thanks to its balance of agility and power. It excels at rotations, loops and tight formations, delivering impressive displays through synchronised manoeuvres.

### Maple Hawk 2024 By The Numbers

### Flight Operations

The Red Arrows completed 394 hours and 50 minutes of flight during the Maple Hawk tour, with 90 hours dedicated to displays. This included nine full aerobatic displays, one rolling show, and one flat show. Notably, the team performed four additional in-season practice displays, enhancing overall precision.

### Collaborative Engagements

Joint operations featured dynamic aerial formations with Canada's Snowbirds and a special flypast, the Commonwealth Pass, with the CF-18 Demonstration Team. Additional events included four consecutive Canadian airshows and high-profile flypasts in Montreal, St. John's, and Ottawa—a first for the team in its 60-season history.

### Technical and Logistics Support

Across fourteen airfields, the Red Arrows maintained 100% technical availability for public events, benefiting from 61 service checks and 36 refuels/smoke replenishments by RAFAT engineers. The team staged 35 ground engagements and promoted 116 hours at branded airshow tents, culminating in over 400 million media impressions through social media and press coverage. They took approximately 34,000 unedited still pictures and 25-hours of raw video footage – by the RAFAT's three-strong imagery section.

### Conclusion

The Red Arrows' Maple Hawk 2024 tour of Canada was a memorable event, celebrating not only excellence in aerobatics but also the strong ties between the UK and Canada.

The team's spectacular performances captured the attention of enthusiastic crowds across several Canadian cities, including St. John's, Toronto, Gatineau and Ottawa, where famous formations such as the Diamond Nine wowed spectators.

The tour also strengthened the camaraderie between the British and Canadian air forces, marked by heartfelt interactions with the public and powerful moments of solidarity.

The event was all the more significant in celebration of the Canadian Air Force's centenary, adding a historical dimension to each flight. All in all, the Maple Hawk 2024 tour was a complete success, showcasing not only the exceptional skills of the pilots, but also the strength of the friendship between the two nations.

After a final flyover in St. John's, the Red Arrows began their journey back to RAF Waddington. Due to their limited range, they made stops in Goose Bay, Greenland, Iceland, and Scotland.

# CRUZEX 2024

**Text and Photography by Erik Bruijns**

**After a six-year absence, the Força Aérea Brasileira (FAB – Brazilian Air Force) once again organized its large-scale war simulation exercise, Cruzeiro do Sul Exercício (CRUZEX – Southern Cross Exercise). The largest multinational air training exercise in Latin America, organized by the Brazilian Air Force since 2002, took place at Natal Air Base in Rio Grande do Norte from November 3 to November 15.**

After a six-year absence, the Força Aérea Brasileira (FAB – Brazilian Air Force) once again organized its large-scale war simulation exercise, Cruzeiro do Sul Exercício (CRUZEX – Southern Cross Exercise). The largest multinational air training exercise in Latin America, organized by the Brazilian Air Force since 2002, took place at Natal Air Base in Rio Grande do Norte from November 3 to November 15.

One of the main objectives of CRUZEX is to provide training opportunities in Joint Air Operations, including Ground Attack, Air Defense, Escort, In-Flight Refueling, Air Alert and Control, Reconnaissance, Combat Rescue, Cargo Drop, and Paratrooper operations. Different nations work closely together, flying aircraft with various functions and capabilities while acting in an integrated and cooperative manner.

This approach allows for high operational gains while also promoting the exchange of experiences among all those involved. The training also enables the validation and introduction of new doctrines and tactics for operational use, in addition to testing the mobilization and logistics capacity of the FAB's aeronautical squadrons.

*Bayou Militia F-15C takes off for an afternoon mission from Natal. A total of six Eagles flew from Louisiana to Brazil*


*The workhorse of the FAB is the (K)C-390, seen here in tanker configuration*

Commander of Natal Air Base, Brigadier General Rezende, explained, "The realization of another edition of the largest multinational warfare training in Latin America aims to strengthen interoperability between the Air Forces of different countries, promoting joint training in complex and challenging scenarios. It is an opportunity, both for FAB service members and for the other 15 participating countries, to add knowledge, enabling experiences in joint action scenarios. The exercise is not intended to highlight the advantages of one force over another, or between aircraft, nor to designate winners or losers. Instead, it provides joint training where each country contributes its knowledge and capabilities to the collective evolution of the forces involved."

Until the mid-1990s, the operational exercises of the Brazilian Air Force took place only within national territory, restricted to training among its own squadrons. This began to change with Exercise Operations Tiger (1994, 1995, and 1997) and Exercise Mistral (1997 and 1998), carried out in cooperation with the United States Air Force (USAF) and the French Air Force (Armée de l'Air), respectively. These exercises allowed, for the first time, an assessment of the training level of pilots and the performance of the FAB's A-1 (the local designation for the AMX), F-5, and Mirage III fighters against more modern combat aircraft.

In 1998, it was the turn of the A-1 jets to participate in Red Flag, one of the most realistic air drills in the world, held at Nellis Air Force Base in Nevada, United States. Subsequent analyses of these engagements highlighted the excellence of training and the innate skills of Brazilian military pilots.

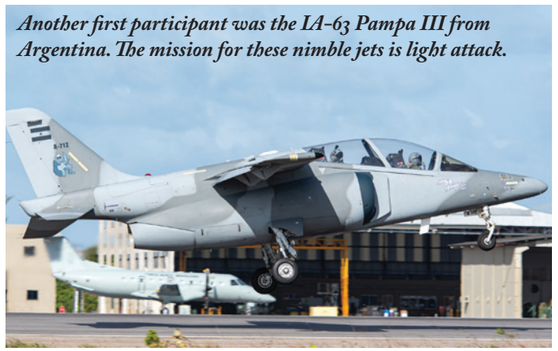
Although the FAB achieved success in some clashes—especially the A-1, whose performance was highly praised—the technological gap and the need for modernization or the acquisition of more capable aircraft also became evident. This realization later led to the implementation of the F-5BR Program and the launch of the F-X Project. Finally, another key takeaway from these exercises with allied nations was the idea of planning and organizing a large multinational training exercise within Brazil.

The setup of Cruzex is based on experienced gained by the FAB in their participation in Red Flag in the US and Tactical Leadership Program (TLP), in Europe. Focused on the realism of the actions, these trainings had as a backdrop, the assembly of fictitious scenarios, in which a contested territory was invaded by a certain nation (red country), resulting in the formation of an international coalition, led by the blue country, with the objective of expelling the invader. Using this plot and always attentive to the latest air warfare tactics, the FAB, with the experience acquired in participating in multinational exercises, decided to create its own training along the same lines. Thus, the Cruzeiro do Sul Exercise emerged. The first edition took place in 2002, in the south of Brazil, with the Canoas Air Base, in Rio Grande do Sul, being chosen as the central point of air operations, housing the main air resources of the training. Brazil, Argentina, Chile and France participated with aircraft. Squadrons from Florianópolis and Santa Maria Air Bases were incorporated into the exercise, operating in a split manner. The model of geographical distribution of activities, with an Air Base centralizing operations and other nearby locations integrating the scenario or functioning as support points, would become a trademark of Cruzex. Two years later, it was the turn to Natal, in Rio Grande do Norte, to host the training, with the participation of Brazil, Argentina, France and Venezuela. The exercise was established on a biennial basis, and so, in 2006, the Anápolis Air Base, in Goiás, received aircraft from six countries, Brazil, Argentina, France, and Venezuela, in addition to the return from Chile and the debut of Uruguay. From 2008, the exercise gained a permanent headquarters, the Natal Air Base (BANT), and took place in November, due to the favorable weather at this time of year. One of the main reasons for the choice was the fact that Natal is one of the largest Air Bases of the FAB, with an appropriate infrastructure to host large air trainings. As seen, the place had already hosted Operations Tigre II and Mistral I, in addition to Cruzex itself, in 2004. Geography also weighed in favor of placing the exercise in the South of Brazil. The State of Rio Grande do Norte, which is located in the Northeast region of Brazil, was closer to North America and Europe, facilitating logistics and the displacement of foreign air assets. The vast airspace with minimum civilian airplane activities adds to the favorable position for the exercise to be held in Natal.

With each edition, Cruzex has been gaining importance and incorporating new elements, challenges and scenarios, in the always complex and dynamic fields of air warfare and military technology. The numbers are impressive and give the exact dimension of the greatness of the exercise. For the 2024 edition, there were 16 participating countries (half of them actively participating with air assets, equaling the number of the 2013 and 2018 editions), more than three thousand military personnel involved and close to 100 aircraft, from Brazil and foreign nations. Air assets participated from Brazil (Air Force and Navy), Argentina, Chile, Colombia, the United States, Paraguay, Peru and Portugal; with personnel for actions in the Space and Cyber domains coming from Brazil, Chile, Colombia, the United States, Paraguay, and Peru. In addition, observers joined from South Africa, Germany, Canada, Ecuador, France, Italy, Sweden and Uruguay. The 2024 edition marked several important milestones, with participation for the last time of certain types and participation for the very first time of certain types as well as air forces in Cruzex.

By far the biggest contributor to the exercise was the FAB. Having started the organization of Cruzex already back in 2023, many of their participating aircraft came to Natal 3 weeks earlier to prepare for the exercise. Coming from Santa Maria, in the South of Brazil, were five AMX International A-1AM/BM aircraft. This will very likely mark the last participation of the type in the exercise as the type is soon to be withdrawn from service. No less than 14 Northrop F-5EM/FM's participated during the exercise. With a loss of one of their aircraft during the week before the exercise, the type remained heavily involved in flying activities. The aircraft came from both Canoas and Santa Cruz. One of the stars of Cruzex was the first-time participation of the Saab F-39E Gripen, based at Anapolis. With seven aircraft


*The FAB operates three R-99 in the remote sensing role*



*Another first participant was the IA-63 Pampa III from Argentina. The mission for these nimble jets is light attack.*

*A dual seat AF-1C Skyhawk taking off. Only two of these remain operational with the Brazilian navy*

*A total of 12 F-5EMs were in Natal*

present during the exercise, the FAB brought almost their entire arsenal of the new fighter, of which the latest are currently being build in Brazil after the first batches coming directly from Sweden. Based at Natal, so outnumbering all other participating aircraft, the Embraer A-29A/B Super Tucano participated from all four main squadrons/bases, Natal, Porto Velho, Boa Vista and Campo Grande. Based at Anapolis, the Embraer R-99 and E-99M provided Remote Sensing and Airborne Early Warning and Control (AEW&C) missions. Transport duties were provided by Manaus and Campo Grande based Casa C-105A Amazonas. A Search and Rescue (SAR) version, SC-105, was also present at Natal, but did not fly during the exercise. Another newcomer and heavily used during its short career was the Embraer (K)C-390 Millennium. The new workhorse of the FAB provided both transport as well as air to air refueling duties. Another end of an era appearance came from two McDonnell Douglas AF-1B/C Skyhawks of the Brazilian Navy. With only a handful of these aging aircraft flying, this is very likely their last participation. CRUZEX always brings together a wide variety of aircraft types and participating nations, and the 2024 edition was no different. The Fuerza Aérea Argentina (FAA – Argentine Air Force) travelled north with four Fábrica Argentina de Aviones (FAdeA) IA-63 Pampa III advanced training and light attack jets, making their debut. They were supported by a single Lockheed Martin KC-130H Hercules, which also provided air-to-air refueling during the exercise.

Another first-time participant was the Fuerza Aérea del Perú (FAP – Peruvian Air Force), which contributed five Korea Aerospace Industries (KAI) KA-1P Torito training and attack turboprop aircraft. Participating for the second time, Peru also provided a KC-130H. Additional tanker support came from the Fuerza Aérea Colombiana (FAC – Colombian Air Force), which sent a single Boeing KC-767 Jupiter. Unfortunately, the Kfirs, initially planned for participation, did not attend.

Returning for the sixth time was the Fuerza Aérea de Chile (FACh – Chilean Air Force), which deployed five General Dynamics F-16C/D Vipers and a single Boeing KC-135E Stratotanker. The United States Air Force (USAF), a longtime supporter of CRUZEX, also participated in this year's edition.

*The theme of the exercise was centered around hypothetical scenarios of regular, regional and limited war, with a focus on air force actions. Here, a Gripen is seen taking off.*


For the first time, six McDonnell Douglas F-15Cs arrived from Louisiana, supported by a Boeing KC-46A Pegasus.

After attending previous editions as observers, the Fuerza Aérea Paraguaya (FAP – Paraguayan Air Force) was a welcome new participant. Paraguay sent one CASA C-212-400 Aviocar and three Embraer AT-27 Tucanos, providing its pilots with a valuable learning experience as they worked closely with other nations and aircraft types.

Having purchased the KC-390 from Brazil and currently operating two, the Força Aérea Portuguesa (FAP – Portuguese Air Force) marked its first CRUZEX participation by sending a single KC-390. The opportunity to work closely with FAB pilots operating the same aircraft type was crucial for the FAP, allowing them to maximize their capabilities with the new platform.

The exercise in Natal was divided into three phases. The first, called FAM (Familiarization Mission), included adaptation flights to help foreign crews acclimatize to the geographical characteristics of the area of operations, local air traffic, and radio frequencies.

The second phase, called FIT (Force Integration Training), promoted joint operations among the participating air forces but in a limited capacity, using formations with a smaller number of aircraft. This phase also fostered interaction and cooperation among all participants—essential elements for the third and final stage.

The last phase centered on Composite Air Operations (COMAO), marking the high point of the training. The second and final week of the exercise saw an intensification of activities, with flights conducted in highly complex scenarios involving multiple aircraft. These operations required precise and careful planning, with a level of pressure similar to that of a real conflict. In this phase, over 60 aircraft participated simultaneously in coordinated air operations, representing both opposing forces.

The fighters played a key role in air defense, tasked with escorting and protecting transport, attack, air-to-air refueling aircraft, and the vital Air Command, Control, and Warning aircraft. At the same time, they were responsible for locating, engaging, and neutralizing enemy fighters, which posed the greatest threat to other aircraft.

In total, approximately 1,500 flight hours were logged, and more than 800 missions were completed, reinforcing the objectives of continuous training, interoperability, and cooperation.

*Late afternoon return of an A-1AM based at Santa Maria*


*The Argentina Air Force is a regular participant during Cruzex, providing a KC-130H for this year's edition*

*The geographic region of CRUZEX involved the states of Rio Grande do Norte, Paraíba and Pernambuco. Air-to-air refueling in such a big area is key*

*Five KAI KA-1P made their debute at Cruzex*

# COBRA WARRIOR 24-2

**Text and photography by Erik Bruijns**

**Cobra Warrior 24-2, the United Kingdom's premier multinational air combat exercise, brought together allied air forces for intensive large-scale training in a contested environment. Featuring a diverse mix of fighter jets, support aircraft, and aerial refuelling assets, the exercise focused on interoperability, tactical planning, and mission execution to enhance coalition airpower.**

Twice a year, the United Kingdom hosts Cobra Warrior, a multilateral Large Force Exercise (LFE) as part of its fighter weapons school graduation event. This iteration of the exercise focused on operational-to-tactical high-end spectrum warfighting in a contested, degraded, and limited operating environment. The exercise comprised up to 80 aircraft operating in mixed formations, including fighter jets, Airborne Early Warning (AEW) aircraft, Intelligence, Surveillance & Reconnaissance (ISR) aircraft, Air-to-Air Refueling (AAR) assets, and Air Mobility assets. This included both fixed-wing and rotary-wing aircraft. Staff from Royal Air Force (RAF) Waddington ran the operation, while aircrews from RAF stations at Lossiemouth, Brize Norton, Coningsby, Mildenhall, and Lakenheath participated. Additionally, several foreign nations took part, operating from several of these bases.

Organized twice a year by 92 Squadron, based at the Air & Space Warfare Centre at RAF Waddington, Cobra Warrior is the RAF's capstone large-scale flying exercise, where participants employ composite air operations to achieve military objectives in challenging and contested threat environments. With Cobra Warrior 24-1 cancelled,


*Participating Canadian F-18s are assigned to 409 Tactical Fighter Squadron of Cold Lake*

*A KC-135 efuels a Norwegian F-35 during a Cobra Warrior mission. Practicing with NATO allies is important to enable future operations.*

Cobra Warrior 24-2 kicked off on September 16 and ended on October 4. Support personnel and participants began arriving on September 9, with initial familiarization flights starting in the first week. As a result, the exercise ran for almost a full month.

Cobra Warrior provides an opportunity to train in a new environment, integrate with different forces, and participate in mission scenarios representative of real-world operations.

**High-Level Cooperation**

The objective of the three-week exercise was to train participants to contribute to large-force multinational air operations. The exercise focused on interoperability between different air arms and their respective aircraft in a contested air environment at a level expected in a conflict with a peer or near-peer adversary. International cooperation is a keystone of the exercise concept, as participating nations include the United Kingdom's allies and partners from around the world. Bringing together personnel from different nations—whose first language may not be English—and asking them to participate in complex aerial activity may seem like a recipe for confusion.

However, thanks to NATO's standardized practices, communication protocols, basic tactics, and procedures, pilots were well-prepared to operate at the highest standards.

As a result, the exercise included several different fighter types, enabling the combination of diverse fighter tactics and the development of air combat training. During fighter integration sorties, different nations' aircrews maximized their effectiveness by drawing on the strengths of each platform. Each squadron approached the exercise with its own goals to optimize participation in Cobra Warrior.

U.S. Air Force Capt. Stiffler, callsign "Smooth," an F-16 pilot from the 555th Fighter Squadron based at Aviano Air Base, Italy, explained, "The main objective for our squadron is to maximize interoperability with other nations. Working with Norwegian, Canadian, and Polish pilots gives us the opportunity to collaborate on tactics and technology, like datalink. This ensures that we can operate together and share necessary information to maximize our capabilities. In addition, the social aspect of the exercise plays a big role. Being able to talk to pilots from other nations provides an opportunity to build trust."

The exercise included Lockheed Martin F-35 Lightning II fighter jets from the Royal Air Force (RAF), the United States Air Force (USAF), and Luftforsvaret (Royal Norwegian Air Force – RNoAF); General Dynamics F-16 Fighting Falcons from the Siły Powietrzne (Polish Air Force – PAF) and the USAF; Eurofighter Typhoons from the RAF; and McDonnell Douglas F/A-18 Hornets from the Ilmavoimat (Finnish Air Force – FiAF) and the Royal Canadian Air Force (RCAF). This mix of air assets provided an opportunity to develop cooperation between fourth- and fifth-generation jets. The objective of such fighter integration activities is to optimize the capabilities of different aircraft generations, building on the strengths of each while learning from one another.

U.S. Air Force Capt. W. Eris, callsign "Van Gogh," an F-35 pilot from the 495th Fighter Squadron based at RAF Lakenheath, explained, "The Norwegian participants are working directly from our squadron building, so we have a direct comparison to what they are doing. We are working very closely with them, as they are also operating the F-35. We might be from different countries, but we have the same language in the F-35. Even though we come from different backgrounds and there are some minor differences in word choice, for example, we are still talking the same game plan and doing the same things. Our day-to-day training is about integrating and working within the squadron. This makes it seamless to transition the integration with other F-35s and even other airframes. Working within the exercise just increases the scale of what we operate with—meaning more jets, a bigger airspace, and ensuring that we are all on the same page regarding how to execute the mission safely."

One major advantage of Cobra Warrior is that young and less experienced pilots gain exposure to multi-asset scenarios that are far larger than the small-scale training missions flown at home. The exercise brought together a wide range

*A Canadian Hornet returns back to base after a mission.*
*Large scale exercises were flown every morning.*

of capabilities, including rotary-wing aircraft, airborne early warning systems, and fighters, testing their ability to maximize effectiveness and solve tactical problems.

Training like this helps develop the skills of young crews so that when they are deployed on real-world operations, they are accustomed to working and planning alongside different nations to accomplish their missions.

Capt. Stiffler elaborated, “Our squadron has tried to bring as many personnel as possible for the four-week period of full deployment. What we gain as a squadron from being away from our home station is that everybody benefits. It’s not just about bringing the top performers—we want everyone to improve. This is my first assignment, and I am one of the pilots with the least number of hours and the least experience. It’s actually more important to give younger pilots more flying time and more sorties because we have the most to gain from it from a flying perspective, whereas the more experienced personnel will have more to contribute on the mission planning side.

“We have not had any specific preparation for Cobra Warrior. What makes Cobra Warrior unique is that a large part of the exercise revolves around mission planning. Many aspects of each mission are planned the day before. Since this is a major exercise for the British, they lead the planning, and we bring our expertise to the table. This allows them to see what we are capable of and how we can add value to their exercise.”

One interesting challenge all participants had to overcome was how the geographical spread of deployed assets impacted mission planning. Not only did communication need to be established with all detachments, but it also had to be secure at a classified level. Capt. Stiffler continued, “What impressed me most during Cobra Warrior has been the mission planning aspect of the exercise and how we have refined the entire process while coordinating so many aircraft. As we work through the missions, it’s fascinating to see a group of people come together and plan something this complex.”

### Exercise Operations

The large training areas over the North Sea have been home to major NATO exercises for many decades. RAF Waddington was previously the control hub for a massive Air Combat Maneuvering Instrumentation (ACMI) range located there, which hosted an extraordinary range of visiting fast jets between its opening in 1990 and its closure in the mid-2000s. The formerly annual Exercise Nomad made heavy use of this range. However, modern technology has integrated ACMI systems into pods that can be fitted onto an aircraft’s weapon rails, making fixed ranges like this redundant. Nevertheless, the large airspace and its military training areas—including the well-known D323 Complex, or "the 323s"—are still heavily utilized. This enables the exercise to conduct large-scale flights while allowing squadrons to maximize their training goals, as Capt. Eris explains, “We plan and brief our missions, execute them during the exercise, and then debrief to evaluate how everything went. We can assess what could have been done better and how we can improve for future operations.”

*Two Polish F-16s depart for an afternoon mission during Cobra Warrior. Afternoon missions were flown in small formations only.*



Typical Cobra Warrior missions were flown once a day in large formations during the first two weeks of the exercise. These missions took place between 10:00 and 13:00, with aircraft taking off from their respective bases across the UK. Smaller missions were flown in the late afternoon to allow participants to practice more specific operations. These included low-level flying missions through the Lake District in northern England or the Mach Loop in Wales. The third week of the exercise was dedicated to night-flying missions, with aircraft operating between 21:30 and 23:30.

With European security facing its toughest test of solidarity since the Second World War, it is perhaps no surprise that Cobra Warrior focused on countering state-on-state aggression. Developed by 92 Squadron RAF, Cobra Warrior featured a dynamic scenario that evolved daily based on the outcome of each mission. Participants were given a situation to navigate, requiring them to apply critical thinking and solve tactical problems.

The first week of the exercise saw participants respond to and defend against a simulated surprise attack on a fictional European nation. During this phase, missions such as defensive counter-air were flown, aimed at protecting strategic targets and high-value airborne assets. In the second week, the focus shifted to air interdiction and strike missions as the hypothetical campaign transitioned from defence to offence, with Scotland standing in for enemy territory. During this phase, participants simulated air-to-ground strikes while United States Air Forces in Europe (USAFE) Suppression of Enemy Air Defenses (SEAD) specialists engaged simulated surface-to-air missile sites.

***“What makes Cobra Warrior unique is that a large part of the exercise revolves around mission planning.”***

Aggressor aircraft operated by Draken Europe are a near-daily sight over the North Sea ranges, and Cobra Warrior 24-2 was no exception. Operating from Teesside International Airport with specially modified Dassault Falcon 20 and Aero L-159 Honey Badger aircraft, the company is one of the primary providers of threat simulation for the British military and its allied forces. Draken Europe was formerly known as Cobham, a company that made its name pioneering air-to-air refuelling under the name Flight Refuelling Limited before being acquired by the American "red air" giant Draken in 2020.

During the exercise, some locally based forces were also assigned to play the role of hostile 'Red Air' adversaries, similar to the setup used in the renowned Red Flag exercises at Nellis Air Force Base, Nevada.

Many large-scale exercises include a build-up period, gradually increasing in intensity and complexity. However, Capt. Stiffler notes a different approach during Cobra Warrior: “Personally, I don’t see the same gradual escalation happening during Cobra Warrior. The F-16 is a multirole fighter aircraft, so we follow a phase-by-phase training approach where we cover every type of scenario in our portfolio. We are working in a similar way during the exercise here. One mission is not necessarily more difficult than another—they just require different types of preparation.

“For example, one mission we fly during the exercise is defensive counter-air, where we perform point defence. In this scenario, we protect a highly valuable asset, such as an air base, from red air forces. On the opposite side of this, we conduct offensive counter-air missions, where we attempt to attack a protected asset. Within our role at the 555th Fighter Squadron, we primarily focus on escort, strike, or attack missions.”

Capt. Eris adds, “With the capabilities of the F-35, the 495th Fighter Squadron has been focusing on Suppression of Enemy Air Defences (SEAD) and escort missions.”

### Tanker Affairs

Another key aspect of a large-scale multinational exercise is tanker support. The ability to refuel aircraft mid-air is invaluable, as it extends the range of each aircraft and expands the operational area of the mission, enabling even more complex scenarios. It also provides additional training opportunities for both the fuel provider and receiver crews. Mastering air-to-air refuelling is essential for reaching locations required by the mission envelope. Training tanker crews in large-scale exercises is crucial, as managing different types of receivers during a single mission adds to the complexity.

U.S. Air Force Capt. J. Knutson, a KC-135 instructor pilot with the 100th Air Refueling Wing (ARW), explains, “It has been exciting for us to support Cobra Warrior. For the tanker side of the exercise, it is great to work on some of the tactical capabilities that we have and to see our flying operations from a tactical mindset. It is a great opportunity for us in a training environment to practice those specific skill sets. The KC-135 is like customer service for the receiving aircraft. Whenever we get a glimpse of the tactical missions they are executing and can be involved in that, it is always an exciting time for us and provides a lot of background information for us tanker pilots.”

Air-to-air refuelling aircraft are often the first to take off and the last to return to base, as they need to be airborne early to prepare for mission aircraft joining them for refuelling.

*The crew of a KC-135 during a descent to RAF Mildenhall*

*The Canadian C-130 had a birdstrike, as can be seen on the port wing*

Capt. Knutson continues, "Our flights can be very intense, and we do break a sweat from time to time. We work hard up there, but it's always a fun time for the crew. It's very stimulating when fighter aircraft come up to us for refuelling. We are constantly evaluating our fuel state and determining what we can provide to each individual receiver. Missions like those during Cobra Warrior, which are short and engaging, are typically my favourite."

Often at the centre of many missions, the KC-135s of the 100th ARW participate in a variety of large-scale exercises across Europe. Capt. Knutson explains, "Operating out of Mildenhall, we are very fortunate to take part in many exercises, which allows us to gain significant experience.

"During my two-year assignment to the wing, I've been lucky to participate in several exercises. That is a big advantage of being stationed here. This has been my first time participating in Cobra Warrior, and from the tanker perspective, we were able to integrate seamlessly into the exercise—both with our foreign partners and the different U.S. squadrons. It felt like a lot of well-executed planning went into this exercise, as the tactical aspects were very streamlined.

"From a tanker perspective, our role is to allow the fighter pilots to extend their time on station or extend their reach. One of the greatest benefits of the exercise is becoming accustomed to communicating across different aircraft platforms. Seeing our foreign partners work with us to create a standardized form of communication and information flow is incredibly valuable. Any opportunity to practice interoperability between coalition partners is an excellent use of time, and Cobra Warrior has been a very well-executed opportunity for exactly that purpose."

*F-35s of Skull flight awaiting their turn to receive fuel before heading out to the operational area*

# FALCON LEAP
## An Exercise with Remembrance

**Text and photography by Patrick Dirksen of Tristar Aviation, except where otherwise indicated**

**In September, the annual airborne exercise Falcon Leap was once again organized in the Netherlands. What initially started as a remembrance activity has grown into a full three-week international exercise. However, the remembrance aspect has not been forgotten—on the contrary. This year, with Operation Market Garden marking its 80th anniversary, that part was perhaps even more significant than in previous years.**

*Poland is the second largest operator of the C-295M in Europe after Spain.*

*During remembrance activities, Dutch and US soldiers were flown into the 'battlefield' with armed UH-60M Black Hawks. Note the futuristic looking helmets of the aircrew - Robert Dekkers*

The exercise is organized by the 11 Luchtmobiele Brigade (LMB, air mobile brigade) of the Royal Netherlands Army. However, the Royal Netherlands Air Force (RNLAF) also plays an important role, particularly Eindhoven-based 336 Squadron of the Air Mobility Command (AMC).

Together, they managed to fill the three weeks with a variety of challenging scenarios.

The primary task of the Dutch defence forces is to protect their own territory and that of their allies. Exercise Falcon Leap contributes to this mission, as Major Bjorn Coppers, airborne planner of the 11 LMB, explains: "We train together with foreign troops, and we aim to reach the highest level of readiness. This is crucial within the NATO treaty." He continues: "Evacuations are part of Falcon Leap. When Hurricane Irma hit the Dutch Antilles island of Sint Maarten, aircraft from the AMC flew our troops there. On arrival, our pathfinders took charge of the local airfield. All the training we do during Falcon Leap contributes to these kinds of operations."

No fewer than 12 countries participated in this edition: the Netherlands, Belgium, Germany, Greece, Poland, Portugal, Romania, Spain, the United Kingdom, and the United States, plus France and Italy, which only sent troops this year, not aircraft. The result was very full platforms at Eindhoven Air Base, with multiple C-130 Hercules, C-27 Spartan, C-295, and A400 Grizzly aircraft present in varying numbers over the weeks. Major Coppers states: "Falcon Leap is the biggest international airborne exercise in the Netherlands. Units from the 11 LMB train by dropping cargo and paratroopers

*Impressive lineup of taxiing transport aircraft - Joop Zandbergen*

over the Netherlands and also Belgium, working alongside foreign army and air force units. This cooperation enables us to guarantee the readiness of our airborne troops at both national and international levels." He adds: "An important part of Falcon Leap is the cooperation with the Air Mobility Command here in Eindhoven. They are responsible for all tactical air transport of the RNLAF. Thanks to the use of C-130 aircraft, our paratroopers can be deployed quickly and efficiently over large distances."

"All aspects of airborne deployment are trained during Falcon Leap, making it a crucial exercise for achieving the readiness of our troops. Key topics include the rapid deployment of units, swift movement over long distances, and integrated planning with 336 Squadron of the AMC. Falcon Leap also provides participants with the opportunity to operate with foreign parachutes and radio communications, which is essential for improving cooperation between NATO forces." Jumping with other forces' parachutes requires thorough cross-training. Additionally, the use of a wide range of transport aircraft, from the small C-27 to the large A400, provides valuable experience for the jumpers. As most missions are flown at low level, this also serves as important training for the flight crews.

The exercise was structured over three weeks. The first week involved only Dutch participation, with approximately 250 to 300 paratroopers from the 11 LMB performing jumps. In the following two weeks, other forces joined, gradually increasing the scale of the drops to around 1,000 soldiers jumping together. In addition to these paratroopers, large amounts of cargo were dropped to supply troops on the ground with much-needed materials through the so-called Container Delivery System (CDS) drops. Exercise areas included locations in the north and centre of the Netherlands, as well as a dedicated training area in northern Belgium.

Although the parachute and cargo drops were perhaps the most spectacular parts to watch, the exercise encompassed much more. Brigadier General Frank Grandia, commander of the 11 LMB, explained after one of the missions: "A large group of Dutch and foreign Red Berets were dropped [at Marnewaard], after which they immediately had to fight an equal opponent who was entrenched in the training village of Marnehuizen. When you turn on the television, you see this almost every day, but in real life—war, both in Ukraine and Gaza."

On the final day of the exercise, jumps were conducted at Ginkelse Heide, a historic location due to the paratrooper drops that took place there during Operation Market Garden in 1944. The following day, public remembrance activities were also held at this site. Major Coppers stated: "Commemorating Operation Market Garden, the day after the exercise ends, will remain an integral part of Falcon Leap. Historical awareness will always be connected to Falcon Leap. We must honour our history while simultaneously preparing for future challenges."

Operation Market Garden was the largest airborne operation of the Second World War. It was part of the Allied offensive against Nazi Germany in September 1944, three months after the D-Day landings in Normandy. The objective was to capture strategically important bridges over the large rivers in occupied Netherlands, particularly the Waal and the Rijn. These crossings were crucial for advancing into Germany while bypassing the Siegfried Line, the heavily fortified German defensive line stretching from northern France to central Netherlands. In addition to deploying paratroopers, Allied forces were also transported using gliders towed behind transport aircraft. Unfortunately, the operation turned into a disaster, costing the lives of many soldiers and civilians. Due to multiple factors, the Allied forces were unable to hold the bridge at Arnhem, leading to the mission's failure and the infamous phrase "a bridge too far." It was only half a year later that Allied troops successfully marched into Germany and ultimately defeated the Nazi regime.

During the remembrance activities, paratroopers jumped from both a historic C-47 Dakota, using original round parachutes, and modern cargo planes. Around 80,000 spectators also watched a demonstration in which soldiers from the 101st Airborne Division—one of the units that participated in Market Garden in 1944—joined Dutch troops from the 11 LMB to capture a village after being flown in by UH-60 Black Hawk and CH-47 Chinook helicopters. General Grandia remarked: "Every year, this is very special. Not only do we take the time to reflect on those brave soldiers who fought for our freedom in the Second World War, but we also want to raise awareness that, in 2024, freedom and security unfortunately cannot be taken for granted." As General Grandia previously mentioned, this is a reality visible on television daily. For this reason, exercises like Falcon Leap will continue to be crucial for the foreseeable future.

*This HC-130J 'Combat King II' is rarely seen in Europe*

*Paratroopers preparing to board a Portuguese C-295M - Joop Zandbergen*

# Aero Gatineau-Ottawa 2024
# A HISTORIC AIRSHOW

**Texts and photography by Claude La Frenière.**

**From September 6 to 8, 2024, we attended the 7th edition of the Aéro-Gatineau-Ottawa Airshow, a premier aviation event for the Canadian Capital Region, held at the Gatineau-Ottawa Executive Airport, just 30 minutes from downtown Ottawa.**

This year, three world-renowned aerobatic teams captivated thousands of spectators with thrilling demonstrations.

### A Steady Rise in Popularity

Launched in 2017 by a new non-profit organization in celebration of Canada's 150th anniversary, the Gatineau Air Show quickly became a favorite among aviation enthusiasts. The debut event attracted thousands and set a high standard by featuring the Patrouille de France and the RCAF Snowbirds, establishing itself as a must-see.

The 2018 edition drew close to 12,000 attendees, adding the CF-18 Demo Team to showcase Canadian military aviation. By 2019, attendance soared past 20,000, driven by the debut of Canada's future fifth-generation F-35 fighter and a special appearance by astronaut Chris Hadfield, which highlighted the significance of space exploration.

After a hiatus in 2020 due to the pandemic, the show returned in 2021 with a drive-in format, drawing 5,400 attendees. In 2022, the event's theme, "Above and Beyond," attracted over 12,000 visitors, featuring the powerful A-10C Thunderbolt II from the U.S. Air Force. The 2023 edition reached new heights, captivating over 20,000 spectators with stunning nighttime performances, including the Snowbirds, drone displays, and fireworks. With the theme "Legends of the Sky," this unforgettable edition combined aerial artistry with rich historical tributes.

### 2024: A Historic and International Milestone

The 2024 edition of Aéro Gatineau-Ottawa marked a pivotal moment in Canadian aviation. In honor of the Royal Canadian Air Force's 100th anniversary, the dedicated volunteers of Aéro Gatineau-Ottawa worked tirelessly over the past three years to achieve a North American exclusive: uniting three iconic aerobatic teams—the RCAF Snowbirds, the USAF Thunderbirds, and the RAF Red Arrows.

This impressive feat, not seen on the continent in over five years, offered aviation enthusiasts a breathtaking show of precision, power, and flawless synchronization. The spectacular acrobatics and tight formations had audiences on the edge of their seats, celebrating the exceptional skill of military pilots.

Over three days, Aéro Gatineau-Ottawa delivered a world-class experience, paying tribute to aviation excellence in a setting worthy of global attention. CEO John Bennett called it "a rare event and a true celebration of our rich aviation history—something truly unique."

### A Unique and Intimate Venue

The Gatineau Executive Airport provides an exceptional setting for Aéro Gatineau-Ottawa. Its manageable size allows for an extraordinary closeness between the audience and the aircraft. Parked just meters from the crowd, the planes are fully visible, enabling spectators to appreciate their details, observe the pilots' preparations, and feel the electric atmosphere before each flight. This proximity offers a rare and immersive experience that cannot be found elsewhere.

Despite its 6,000-foot runway, the airport can accommodate a wide range of aircraft, from supersonic fighters to military transport planes, showcasing the versatility of its infrastructure. This unique environment allows aviation enthusiasts to experience the pilots' technical and acrobatic skills up close, fostering a deeper connection to the world of aviation.

However, this year's show posed logistical challenges, especially with the need to host three large demonstration teams. As a result, the USAF Thunderbirds, with their eight F-16s, were hosted at Ottawa International Airport (YOW), just 30 km from Gatineau.

### A Night Show to Remember – A Promising Start, A Thwarted Finish

Aéro Gatineau 2024's opening night on June 6 thrilled audiences with spectacular performances from the Snowbirds

*Nolinor Aviation's Boeing 737 during a flypast*

and CF-18 demonstration team. The evening continued with a mesmerizing pyrotechnic display by Ghost Writer. Unfortunately, rain forced the cancellation of the much-anticipated drone show, featuring 130 drones synchronized to custom music. Despite this setback, the fireworks provided a stunning finale, blending aerobatics, technology, and pyrotechnics to deliver an unforgettable experience.

### Access to the Show by Public Transit

In a groundbreaking move toward sustainability, Aéro Gatineau-Ottawa made it easier and more environmentally friendly for visitors to attend. Thanks to a unique partnership, event attendees were given free access to the entire local and regional bus network for the weekend with their admission ticket, promoting green transportation. For those who preferred to drive, ample parking was available around the airport, with free shuttle services connecting the lots to the event site.

### General Admission

The general admission area at Aéro Gatineau-Ottawa has been redesigned to offer an enhanced experience for visitors. A new section to the west now provides a stunning panoramic view, allowing spectators to enjoy the aerial performances while benefiting from added comfort. This strategic layout ensures unobstructed sightlines, enhancing the overall experience. Ticket prices are as follows: $35 for adults, $30 for teens, and $25 for children. For those wishing to attend over the entire three-day event, passes are available at $110 for adults, $90 for teens, and $45 for children. Families (two adults and two children or teens) can take advantage of a special package priced at $130 for one day or $245 for three days (plus taxes).

*A mesmerizing fireworks display by Ghost Writer*

Additionally, Early Bird and Presale offers provided discounts on general admission tickets.

### Photo-Pit Access

Photography enthusiasts who purchased the Photo-Pit ticket ($149 per day or $299 for the weekend, including the training day, plus taxes) enjoyed a prime location tailored to meet the needs of aerial photographers. Positioned on a raised platform above the crowd and barriers, photographers had an unobstructed, up-close view—just 15 to 20 meters from the aircraft's flight path.

This exclusive vantage point allowed for precise, high-quality images of both the aircraft and their performances, capturing every detail of the action. The platform was specifically designed to be at the same height as the pilots in their open cockpits, offering unique angles and ideal perspectives for spectacular shots, particularly during aircraft departures and returns.

### The Flightline Club – VIP Experience

As always, Aéro Gatineau-Ottawa offered access to its exclusive VIP area, the Flightline Club, for the best views along the runways. This year, the Club Première Ligne was divided into two sections—east and west—located at either end of the Show Center. Both sections provided an excellent vantage point under dedicated tents, with additional perks such as a catered dinner, bar service (including two drink tickets), private restrooms, and premium parking. At $175 per day or $350 for the entire weekend (plus taxes). The Flightline Club offers a competitive price compared to other major Canadian events, where VIP access can cost up to $300 per day.

*An unobstructed view from for photographers in the photo-pit*

*Torrential rain Friday night and nearly all day Saturday, which finally arrived around 4:00 p.m.*



### Weather Continues to Challenge Air Shows

Weather once again proved to be a significant challenge for the Aéro Gatineau-Ottawa 2024 air show. Friday initially offered the promise of ideal conditions, with a mix of sunshine and clouds. The day began with clear skies, but by noon, clouds began to roll in, and the skies remained overcast for the rest of the afternoon. During the night show, heavy rain interrupted the festivities, dampening the excitement.

Saturday was marked by persistent downpours throughout the day. Despite the dismal weather, thousands of spectators remained hopeful for an improvement. A brief clearing in the late afternoon allowed the Red Arrows and Snowbirds to perform their "Low Show" displays, offering a glimmer of the excitement visitors had been waiting for. In response to the challenging conditions, organizers made the decision to allow Saturday ticket holders to return on Sunday at no extra charge. The heavy rainfall on both Friday night and Saturday turned the grassy field into a soggy quagmire, with water pooling 5 cm deep in areas such as in the Photo-Pit, Flightline Club, and President's Club. Visitors were advised to bring rain boots. The parking lots were similarly flooded, leaving many vehicles stranded. On Sunday, with the parking lots still unusable, alternative parking was set up further away from the event site, requiring visitors to walk up to 1.5 kilometers before being able to board shuttles to the show.

### Safety First

Safety remains the top priority at Aéro Gatineau-Ottawa. For seven consecutive years, the event has seen no incidents, a remarkable achievement made possible through a close partnership between the event organizers, Transport Canada, and local law enforcement. Every aircraft, pilot, and crew must meet stringent safety standards. Aerobatic displays are carefully regulated within secure areas, far from public access. Every year, a host of additional safety measures are implemented to ensure the protection of all participants and spectators.

### A More Modest Static Display

Due to space constraints caused by the large demonstration teams at the event, the static aircraft exhibition was more modest than in previous years. The two of the three major teams on site required extensive space for their aircraft, resulting in fewer static displays than typically expected.
Vintage Wings Collection

The Vintage Wings hangars were open to the public, showcasing their impressive fleet of vintage aircraft, including iconic models such as the Gipsy Moth, Tiger Moth, Chipmunk, Fleet Finch, and two PT-17 Boeing Stearman from outsiders.

### C-45 Expeditor

Designed in 1936 by the Beech Aircraft Company of Wichita, Kansas, the Beech 18 was initially aimed at the small airline market. Its versatility, however, allowed it to be adapted for both civil and military purposes. It served as a training platform for pilots, navigators, bomb sights, and gunners, and played a key role in military transport.

The Royal Canadian Air Force received its first C-45 Expeditor in August 1939. The model was used in a variety of roles, including navigation, bombing and weapons training, photographic surveys, and VIP and cargo transport. A total of 388 C-45s were acquired by the RCAF, with the aircraft remaining in service until the late 1960s. By the end of production in 1969, over 7,000 Beech 18s had been built in 32 different configurations, solidifying its reputation as a symbol of reliability and versatility.

### CC-144 Challenger

The Bombardier CC-144 Challenger is a versatile business jet serving the Canadian Armed Forces. Operated by 412 Transport Squadron at 8 Wing Trenton, the CC-144 performs a wide range of missions, including transport for high-ranking dignitaries, military support operations, medical evacuations, and humanitarian aid.

With a range of 5,930 km and a top speed of Mach 0.83, the Challenger offers both comfort and safety for sensitive operations. Some variants, known as the "Blue Challengers," have been modified for electronic warfare, designed to jam enemy radars and protect friendly forces. This adaptability makes the Challenger an invaluable asset for the Canadian Armed Forces' strategic and special operations.

*C-45 Expeditor*


*CC-144 Challenger*





### CL-415 Superscooper

The Government Air Service (SAG) plays a vital role in combating forest fires, in collaboration with the "Société de protection des forêts contre le feu" (SOPFEU), responsible for fire prevention, detection, and suppression in Québec.

Each year, SOPFEU mobilizes 14 air tankers, including eight CL-415s, to assist in responding to approximately 600 forest fires across Quebec. These aircraft undertake around 2,000 flight hours and 12,000 water drops, totaling over 65 megalitres of water dropped on fire zones to control the blazes.

### Rare Civilian UH-60 Blackhawk in Canada

The Sikorsky UH-60A Black Hawk is a twin-engine, four-bladed utility helicopter designed for medium to heavy transport. First introduced by the U.S. Army in 1979, it has become the "workhorse" of military air transport, participating in various global conflicts. Regarded for its power, safety, and reliability, the Black Hawk has proven ideal for demanding lifting missions and other roles. In Canada, Helicopter Transport Services employs the Black Hawk, particularly for fighting forest fires.

### Alpha Jets – Top Aces: Specialists in Realistic Air Combat Training

Top Aces is a leading provider of adversary air combat training (ADAIR) and Joint Terminal Attack Controller (JTAC) services to allied forces. Since 2005, Top Aces has been working with the Canadian Armed Forces, offering realistic training with its fleet of Alpha Jets, Learjet 35s, and A-4 Skyhawk Advanced Aggressor Fighters (AAF). All aircraft are equipped with the exclusive AAMS (Advanced Aggressor Mission System), capable of simulating a wide range of air threats.

The Alpha Jet, developed by Dornier, is a versatile aircraft designed for light training and attack. Known for its compact size, twin-engine configuration, and modular design, the Alpha Jet excels in close air support, reconnaissance, and training missions.

### CT-156 Harvard II: A Crucial Step in Canadian Military Pilot Training

The CT-156 Harvard II, derived from the Beechcraft T-6 Texan II, plays a central role in the NATO Flying Training in Canada (NFTC) program at 15 Wing Moose Jaw, Saskatchewan.

Featuring a fully pressurized cockpit, modern flight instruments, and GPS, the Harvard II offers a safe and advanced learning environment for future pilots. Upon mastering the Harvard II, Canadian pilots progress to the CT-155 Hawk for even more advanced training.



### Bell 429 – Canadian Coast Guard

The Bell 429 is a light, twin-engine helicopter known for its exceptional comfort and versatility. It is employed by the Canadian Coast Guard for a range of critical missions, including search and rescue, environmental monitoring, and law enforcement. This multi-mission helicopter enhances the Coast Guard's capabilities, providing essential support in maritime operations.

### An Exceptional Flight Program

Aéro Gatineau-Ottawa delivered an impressive five-hour flight program each day, featuring world-class aerobatic displays from three premier demonstration teams. The program consisted of 12 carefully coordinated performances, executed with pinpoint precision and on schedule.

Jean-François Sills, Chief of Air Operations; Denis Godin, Director of Ground Operations; Michel Côté, Head of Logistics; and David McColl, Air Marshal, led the coordination team. These seasoned professionals volunteered their expertise to ensure Aéro Gatineau-Ottawa remains a top-tier event.

### The show kicked off with an impressive performance by the Thunderbirds

The Thunderbirds squadron consists of eight pilots, six of whom are dedicated to air demonstrations, and a support team of 130 military personnel with expertise in 25 different areas, they travel with two support aircraft: a C-130J Hercules and a C-17 Globemaster III.

Officers serve for two years, while enlisted personnel remain for three to four years, ensuring a steady rotation. Known for their high-energy performances, the Thunderbirds fly F-16 Fighting Falcons, multi-role fighters capable of reaching speeds of 1,500 mph (2,400 km/h).

They execute breathtaking tight formation maneuvers, including the "Diamond," the "Delta," and the "Arrowhead," with the aircraft flying as close as 18 inches (45 cm) apart. Their formation displays feature daring maneuvers, solo flights, and rapid crossovers, demonstrating the immense power and precision of the F-16. Thunderbird No. 5, renowned for its inverted flights, even sports its number upside down for a humorous touch.

The squadron performs approximately 75 demonstrations annually, covering nearly 30 exciting maneuvers in a 25-minute performance, a true showcase of the excellence and skill of the U.S. Air Force. Having captivated over 300 million spectators across 58 countries, the Thunderbirds' participation in AG024 marks their only performance outside the United States in 2024.


*C-130J Hercules*


*USAF Thunderbirds*

## Victory Flight: A Tribute to Canadian Air History

Victory Flight features a one-of-a-kind formation of three legendary World War II-era fighters: the Hawker Hurricane XII, the Supermarine Spitfire IX, and the P-51D Mustang, piloted by Joe Cosmano, Dave Hewitt, and Dave Hadfield. These aircraft, from Mike Potter's private collection in Gatineau, deliver an extraordinary aerial spectacle. Powered by 1,500 horsepower Rolls-Royce Merlin engines, they produce a sound and visual performance that is both unforgettable and deeply evocative of their historical significance.  Each aircraft is adorned with the colors of a Canadian squadron, paying homage to the pilots and moments that shaped Canadian aviation history. The Victory Flight offers a 15-minute formation flying demonstration, showcasing the power, speed, and agility of these remarkable machines.

### P-51D Mustang

Regarded as the finest fighter of World War II, the P-51D was originally developed in response to British needs in 1939. With a range capable of escorting bombers, the Mustang accounted for the destruction of over 6,000 enemy aircraft. A total of 15,657 units were produced. The model featured in the Victory Flight pays tribute to brothers Larry and Rocky Robillard, members of 442 Squadron.

### Hawker Hurricane Mk XII

The Hurricane was the RAF's primary fighter during the Battle of Britain, contributing to 60% of the Allied victories. It served in all theaters of war and was produced in 14,487 units, including naval variants such as the "Sea Hurricane." This aircraft honors Flying Officer William Lidstone “Willie” McKnight, a Canadian in the Royal Air Force and Canada's Canada's most distinguished fighter pilot during the first 18 months of the Second World War.

### Supermarine Spitfire Mk IX

The Spitfire remains an iconic symbol of British resistance. Known for its exceptional performance, over 22,000 Spitfires were built, including the Mk IX model featured in the collection. This aircraft honors Arnold Roseland, a Canadian pilot who was shot down in Normandy in 1944 after completing 65 missions with 442 Squadron.

### Boeing 737 – Nolinor Aviation

Nolinor Aviation's Boeing 737-2B6C(A) C-GTUK conducted flyovers at the site on both Saturday and Sunday. The versatile Boeing 737 can accommodate up to 119 passengers or carry cargo, with a maximum payload capacity of 13,600 kg (30,000 lbs). Ideal for remote projects, this aircraft is capable of landing on dirt, gravel, or ice runways, offering exceptional flexibility and long-range capabilities.



### GhostWriter – Super Chipmunk

Nathan K. Hammond piloted the “GhostWriter,” a 1956 DHC-1 Chipmunk that was converted to a Super Chipmunk in 1988. The aircraft performed loops, spins, and other thrilling aerobatic maneuvers during the show. As night descended, 200 pounds of pyrotechnics and lighting effects illuminated the sky, creating a stunning visual spectacle that added to the drama of the performance. Originally a trainer for the Royal Canadian Air Force, the Chipmunk’s combination of power, precision, and impressive performance proved that even a 1950s-era aircraft can still astonish modern audiences.

### Rick Volker – SIAI Marchetti SF260

Rick Volker flew the SIAI Marchetti SF260, a fast aerobatic aircraft manufactured by Leonardo. Known for its exceptional performance, this Italian aircraft is used by over 28 countries for combat pilot training, but it is rarely seen flying solo in North America.

Volker showcased the full capabilities of the SF260, reaching speeds of 230 knots and performing 6G maneuvers, including inverted flight. This aircraft, bridging the gap between military fighters and modern aerobatic planes, delivered a captivating and high-energy performance for the audience.

### The Red Arrows

In 2024, the prestigious Royal Air Force aerobatic team, the Red Arrows, made a special trip to Canada to celebrate the centennial of the Royal Canadian Air Force. This historic tour, named “Maple Hawk Canada Tour 2024”, also marked the Red Arrows’ 60th anniversary. Comprised of highly skilled pilots, each of whom has flown front-line aircraft like the Typhoon, the Red Arrows are renowned for their precision in tight formation flying and agility. The team flies the BAE Systems Hawk T1, a versatile aircraft capable of reaching speeds up to 1,038 km/h, allowing for more dynamic and faster maneuvers compared to the Canadian Snowbirds.

Their aerobatic displays are renowned for the iconic white, blue, and red smoke trails (inspired by their national flag the Union Jack) that enhance their dramatic maneuvers. Signature formations like the “Diamond Nine” showcase their technical excellence and synchronized flying. In 2024, each aircraft was adorned with a special livery celebrating the squadron’s 60th anniversary.

With over 5,000 performances across 57 countries, the Red Arrows continue to inspire millions of spectators, and this tour was no exception, captivating audiences across Canada.

Two highlights of their demonstration were when they wrote the number 100 in the sky for the RCAF Centenary and the number 60 for their 60th anniversary.


*In 2024, the Red Arrows toured Canada for the Royal Canadian Air Force's centennial and their own 60th anniversary, in a historic tour named Maple Hawk*

Beyond their role in recruitment for the RAF, the Red Arrows serve as ambassadors for the United Kingdom, symbolizing the speed, precision, and agility of the Royal Air Force. Their visit to Canada was not only a celebration of the strong ties between the British and Canadian air forces but also an opportunity to showcase their exceptional aerobatic skills.

### CF-18 Hornet & Red Arrows Formation

A highlight of the airshow was the historic 10-aircraft formation flight featuring Canada's CF-18 Hornet alongside the Red Arrows. The awe-inspiring formation culminated in a particularly poignant maneuver—the "Missing Man." The CF-18, stationed alone at the rear of the formation, suddenly ascended in a vertical climb at full throttle, a moving tribute to fallen airmen.

### RCAF CF-18 Hornet Demonstration Team

This year, the CF-18 Demonstration Team is celebrating the centennial of the Royal Canadian Air Force with a bold, colorful new livery that honors its rich legacy.

The CF-188 Hornet is a multi-role supersonic fighter, capable of reaching speeds over 2,200 km/h and climbing at an impressive 25,000 feet per minute, cementing its status as a key asset for the Canadian Forces. Under the guidance of Captain Caleb Robert, aka "Tango," the team performs a captivating aerobatic sequence that demonstrates the Hornet's incredible power and agility.

The CF-18 excels in a variety of roles, from air defense to tactical support, and is used extensively for both training and public aerobatic displays. The aircraft has been tailored to meet Canadian requirements, including modifications such as an instrument landing system and a powerful 600,000-candlepower searchlight for night missions. Additionally, modernization efforts have seen the acquisition of surplus F/A-18s from the Royal Australian Air Force to extend the aircraft's service life.

However, with the arrival of the CF-35A, a fifth-generation fighter, the CF-18's service life is drawing to a close. The transition to the CF-35A will ensure Canadian air supremacy for decades to come, securing the future of the Royal Canadian Air Force in the modern era.

### Snowbirds Celebrate Royal Canadian Air Force Centennial in Gatineau

For over five decades, the Canadian Forces Snowbirds have captivated audiences with their stunning aerial displays. In 2024, to mark the centennial of the Royal Canadian Air Force, the Snowbirds delivered an exceptional performance in Gatineau, embodying the pinnacle of Canadian military aviation excellence. The Snowbirds are a team of seasoned pilots, supported by a dedicated technical crew, who execute tight formations with remarkable precision. This mastery is the result of intense training, meticulous coordination, and the commitment of every member, from pilots to ground crew.


*CF-18 demonstration aircraft*

Flying the CT-114 Tutor, a Canadian-made aircraft, the Snowbirds perform gracious aerobatics despite the Tutor's age, owing to careful maintenance that keeps it in top condition. Powered by a General Electric J85 engine, the Tutor reaches speeds exceeding 400 knots, combining agility and stability with its distinctive straight-wing design. Based at 15 Wing Moose Jaw, the Snowbirds comprise approximately 80 members. Beyond their role as ambassadors for the Canadian

*Flying the CT-114 Tutor, the Snowbirds perform graceful aerobatics, demonstrating the aircraft's enduring performance thanks to meticulous maintenance, despite its age*

*The Snowbirds in action*


*USAF Thunderbirds*

Armed Forces, they serve as a testament to the teamwork and professionalism of the Royal Canadian Air Force.

**Snowbirds, Red Arrows and Thunderbirds: Three Unique Styles of Air Display**

What makes the US Air Force Thunderbirds, the Royal Air Force Red Arrows, and the Royal Canadian Air Force Snowbirds so distinctive? Each world-renowned team brings a unique flair to their aerial performances, blending precision, agility, and power. The US Air Force Thunderbirds showcase bold, powerful flying. Using six F-16 Fighting Falcons, capable of speeds up to 2,414 km/h, they perform dynamic maneuvers with supersonic flair. Their rapid formation changes, low passes, tight crossovers, and awe-inspiring loops highlight American precision and strength.

The Royal Air Force Red Arrows, known for their agility and synchrony, fly nine BAE Hawk T1 aircraft, reaching speeds of 1,050 km/h. Their displays feature rapid formation changes and flawless control, enhanced by trails of red, white, and blue smoke that evoke the Union Jack flag. Their flying style is characterized by tight formations and meticulous execution, epitomizing the excellence of British aerobatics.

The Canadian Snowbirds, in contrast, are known for their graceful, fluid style. Flying the Canadair CT-114 Tutor, a 1960s training aircraft with a maximum speed of 670 km/h, they favor slow, deliberate maneuvers that emphasize visual beauty and harmony. With up to nine aircraft in tight formations, they perform smooth transitions, showcasing their exceptional coordination and precision.

**Aéro Gatineau-Ottawa 2024: A Resounding Success**

The 2024 edition of Aéro Gatineau-Ottawa set a new record, drawing over 25,000 spectators across three days. Despite challenging weather conditions and some unforeseen logistical issues, the event delivered a breathtaking aerial spectacle.

The performances of the US Thunderbirds, Royal Air Force Red Arrows, Canadian Snowbirds, and CF-18 Hornet left the crowd in awe.

Nighttime performances by the Ghost Writer further amazed audiences, although rain unfortunately forced the cancellation of the drone show. The event's three-day format, including an evening show on Friday, proved a resounding success.

Organizers handled challenges with professionalism and adaptability, ensuring the event went smoothly despite the weather. Aéro Gatineau-Ottawa 2024 will be remembered as a landmark event, celebrating Canadian aviation heritage and drawing aviation enthusiasts from across the globe.