AIR WARFARE COURSE

THE COLD WAR: TWO SUPERPOWERS

THE COLD WAR

THE COLD WAR
COURSE OBJECTIVES

- **Ensure USAFX Personnel obtain, understand and remember Information of U.S. and Soviet and their allies:**
  - **Major Concepts**
  - **Theories**
  - **Actions**
  - **Type Assets and Aircraft**

  that were used during this period in Air Warfare History.

REFERENCE:

The Encyclopedia of 20th Century Air Warfare

The Cold War

COURSE TOPICS

1. Iron curtain Descends
2. Strategic Air Command
3. Birth of NATO + WARSAW Pact
4. Cold War over the Ocean
5. ELINT, Spies & Ferrets
6. SAC: The B-52 years
7. Britain's V-Force
8. Cold War Air Defences
9. Aerial Intelligence:U-2 Yrs.
10. Cuban Missile Crisis
11. Central Front Confrontation
12. Spies in the Skies
13. Anti-Submarine Warfare
14. SAC's Last Years
15. Last Cold War Defenders
16. Post Soviet Conflicts
17. Yugoslavia Falls Apart
18. Bosnia

Britain's RAF Costal Command (absorbed by Strike Command from 1968) fielded a fleet of Avro Shackletons for maritime patrol and anti-submarine operations. This one is a tricycle under carriage-equipped MR.Mk3, and served with No.206 Squadron.

THE COLD WAR
4 – COLD WAR OVER THE OCEAN

- **MAIN TOPICS COVERED**
  1. **NEW TENSIONS**
  2. **GROWING THREAT**

COLD WAR OVER THE OCEAN

NEW TENSIONS

- End of WW II left USA + Britain w/massive navies.
  - Used for the convoy war.
  - Island-hoping drive to Japan.
- Numerous Royal Navy /ex-US Navy Carriers were retired / mothballed /sold to friendly nations.
- Before carrier aviation withered, Korean War broke out, both carrier navies played major part-ground war.
- Korean war allowed carrier aviation to be properly funded, and renewed effort in R & D, and operations analysis.

Soviet maritime patrol forces retained flying-boats for longer than most Western nations. The Beriev Be-12 'Mail' seen here did not enter service until the mid-1960's (replacing the piston-powered Be-6) and remains in service in small numbers to this day.

The Canadair Argus was designated as the indigenous replacement for the Avro Lancaster in the ASW role. It used the wing and empennage of the Bristol Britannia, mated to a new ASW equipment-packed fuselage and four Wright R-350 piston engines.

COLD WAR OVER THE OCEAN

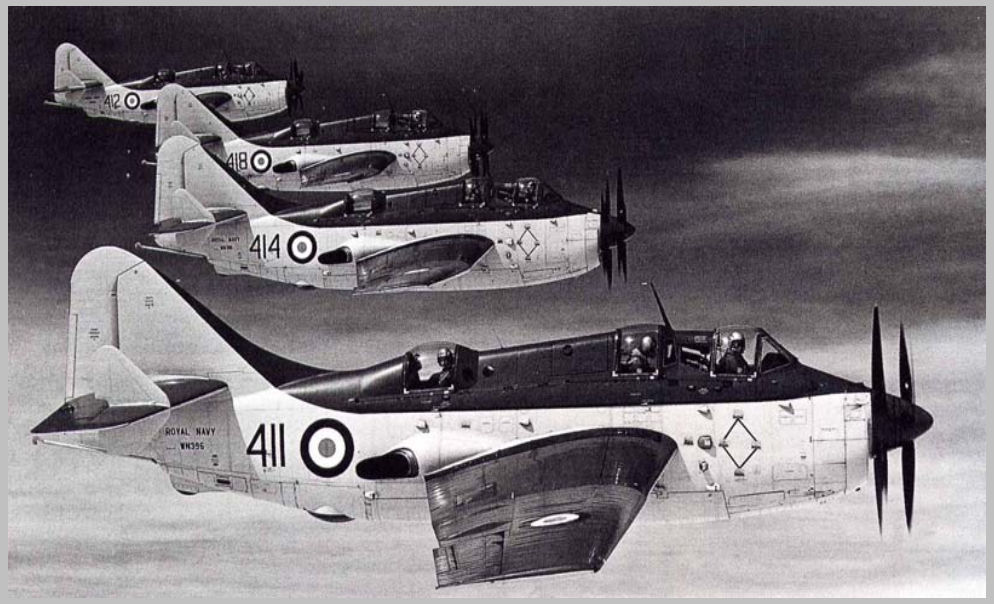
NEW TENSIONS

- World very different at end of Korean War – Cold War suddenly real.
- Chances of additional conflicts seemed very real.
- Need to keep open the sealanes to Europe & Japan became apparent as USSR raced to build blue water navy.
- Laying emphasis on creating a powerful submarine fleet.

COLD WAR OVER THE OCEAN

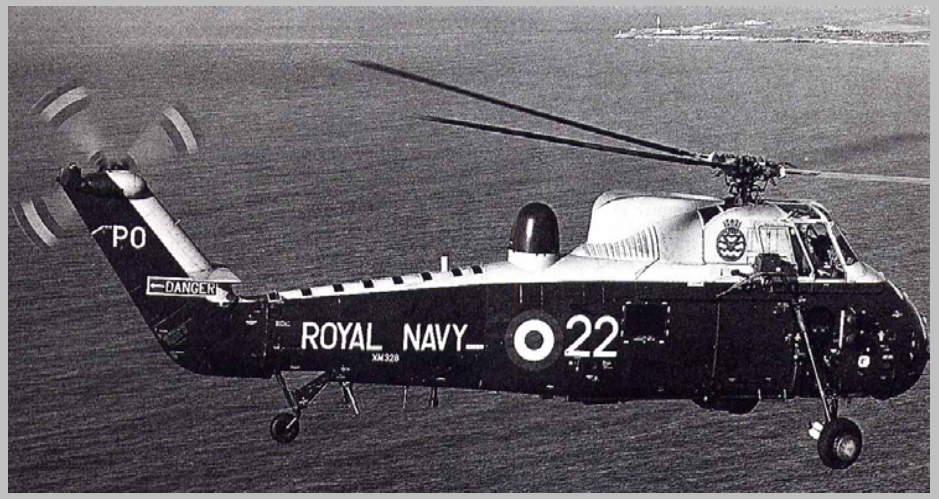
NEW TENSIONS

- US Navy commissioned new class of Modern Aircraft Carrier: *USS FORRESTAL – July, 1952*
  - British developed angled flight deck
  - Steam catapult from the start
  - Capable of moving giant air wings
- Role of Carrier was expanded.
  - Designed to Project Power
  - Powerful long-range attack & strike aircraft
  - Fighters & Bombers
- With Nuclear armed Douglas A-3 Skywarriors:
  - Semi-strategic role – integrated into SIOP



It was impossible to cover the world using only land-based ASW aircraft, and several nations made extensive used of carrierborne ASW aircraft to cover mid-ocean gaps and to provide ASW coverage for groups of warships. Britain's carriers embarked the Fairey Gannet.

Westland Wessex HAS Mk1 was one of the first dedicated ASW helicopters. It was fitted with dipping sonar and could carry torpedoes or depth charges and operated from Royal Navy Destroyers and anti-submarine cruisers. This Wessex HAS Mk1 is from No. 737 Sq., Portland, Dorset.



COLD WAR OVER THE OCEAN

GROWING THREAT

- New importance made carriers inviting targets for Russia's expanding submarine fleet.
  - Older aircraft-carriers were hastily modified as dedicated ASW carriers.
  - Equipped with ASW helicopters & aircraft.
- Post-war Soviet submarine threat over estimated and development was less ambitious.
- Expectation of massive numbers for 'Battle of Atlantic" never materialized.
- Captured U-boat technology – from evolved from WW II wartime boats w/ minor improvements.

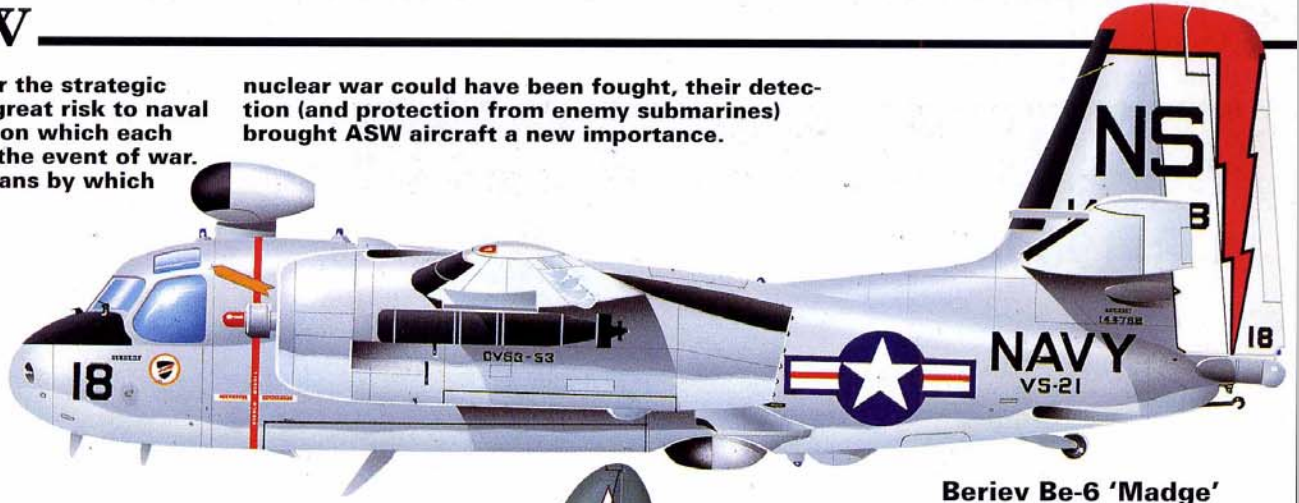
COLD WAR OVER THE OCEAN

GROWING THREAT

- Growth of Soviet Navy (& fear of its Growth) necessitated more constant coverage of entire oceans… w/ handful of isolated Carrier Groups.
- America revolutionized new generation of land-based long-range patrol aircraft.
- ASW Aircraft developed to:
  - Operate in maritime patrol role.
  - Keep tabs on Soviet surface vessels.
  - Engage if necessary.

Worldwide ASW

Even before submarines took over the strategic nuclear strike role, they posed a great risk to naval surface ships and to the convoys on which each superpower would have relied in the event of war. When submarines became the means by which nuclear war could have been fought, their detection (and protection from enemy submarines) brought ASW aircraft a new importance.

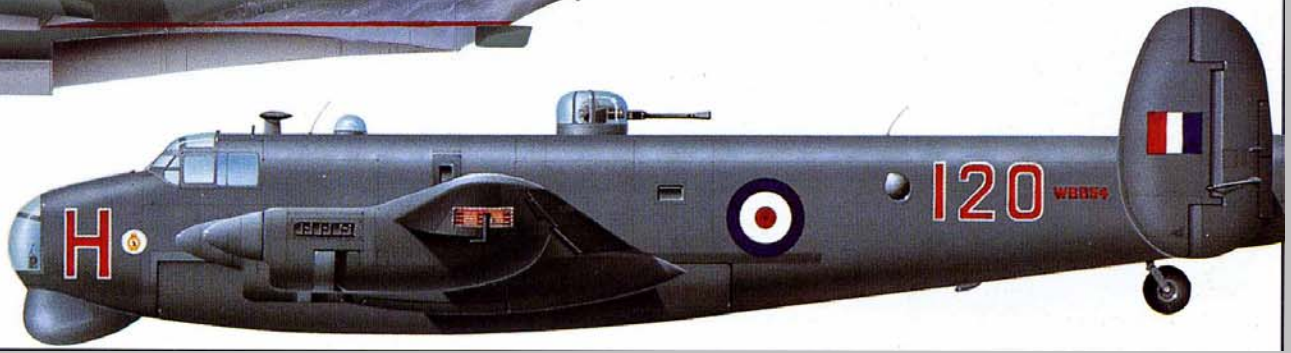


Grumman S-2E Tracker

The Tracker first entered service with the US Navy in 1954 and was the first dedicated carrierborne ASW aircraft to combine hunter/killer roles in one airframe. Fifteen countries around the world operated Trackers with some still in use today. This S-2E served with VS-21, 'Fighting Redtails' aboard USS *Kearsarge*.

Beriev Be-6 'Madge'

The Beriev Be-6 served from about 1951 until the mid-1960s, when it was replaced by the turbine-engined (but otherwise quite similar) Be-12. Small numbers remained in use well into the 1970s. MAD equipment was installed in an extended tail sting during the late-1950s or early-1960s.



Avro Shackleton

The Shackleton was a dedicated maritime derivative of the Avro Lincoln, which had itself been developed from the Lancaster. The Shackleton formed the backbone of the RAF's ASW force until the early-1970s. This early MR.Mk 1 served with No. 120 Squadron during 1954.

COLD WAR OVER THE OCEAN

GROWING THREAT

- More Important developments = ASW RADAR
  - Active + Passive Sonar
  - Deployment – New Systems: MAD (Magnetic Anomaly Detectors)
  - MAD could detect changes to earth's magnetic field, caused by presence of large steel submarine.
  - Equipment fitted to versions of:
    - Lockheed P-2 Neptune
    - Avro Shackleton
    - Canadair Argus

COLD WAR OVER THE OCEAN

GROWING THREAT

- Biggest challenge to ASW: Introduction of nuclear submarines
  - Teardrop hulls
  - High underwater speeds
  - Reduction in noise levels
  - 1950's Ballistic missile-carrying subs, #'s of Sub's drove progressive ASW improvements

The backbone of the US Navy's ASW force for the early years of the Cold War was the Lockheed P2V (later designated P-2) Neptune. It was gradually superseded by the P-3 Orion from the early-1960's.

END
of
CHAPTER 4

THE COLD WAR

ELINT, Spies and Ferrets

1948–1960

The lead taken by the West in jet propulsion allowed aircraft such as the North American RB-45 Tornado to undertake limited cross-border incursions. However, it was not long before the Soviet defences developed the ability to ward off these unwelcome flights.

THE COLD WAR
5 – ELINT, Spies and Ferrets

MAIN TOPICS COVERED

1. INTRO - ELINT
2. JET RECONNAISSANCE
3. CANBERRA PENETRATIONS
4. NAVY LOSSES

ELINT, Spies and Ferrets

INTRO - ELINT

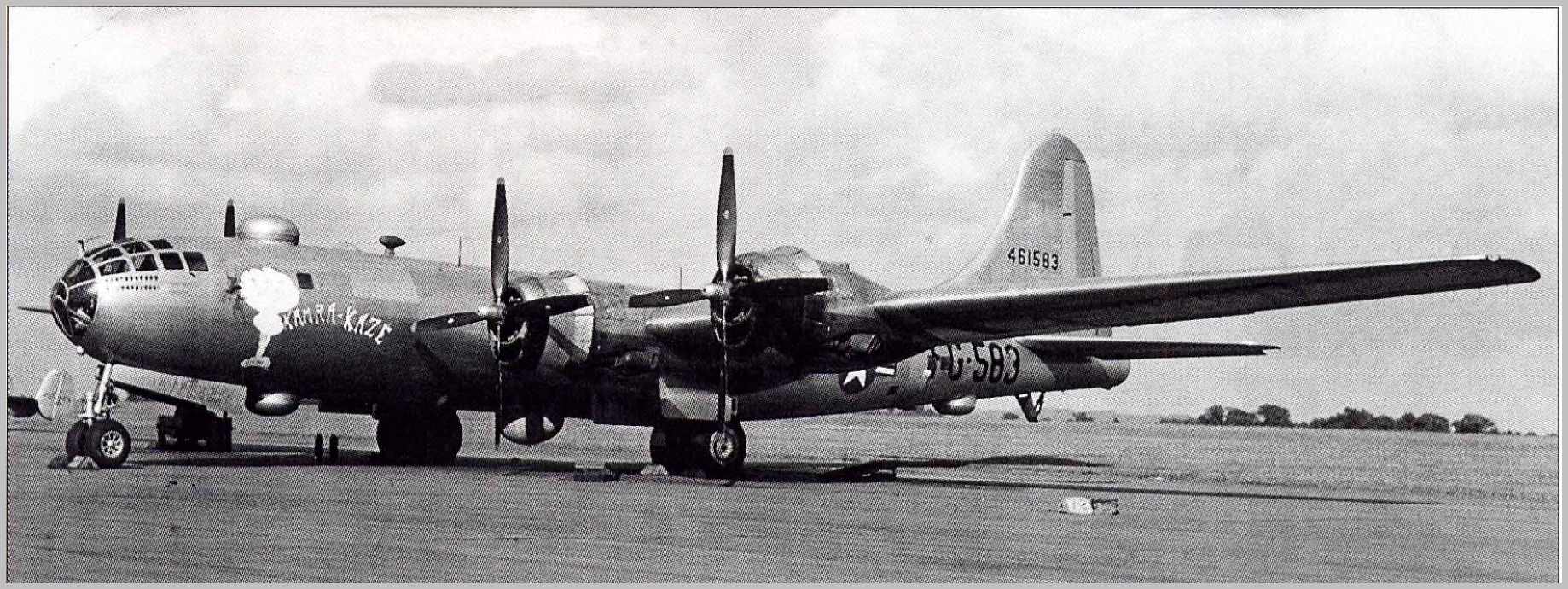
- One highly secret aspect of the Cold War -- merited being called a war in its own right.
- A struggle taking place at sea, on the ground, in the air, and even in space.
- Supporting cast countries: UK – West Germany – Libya – Syria - & others.
- For 50 Yrs, a primarily a Superpower Rivalry.
- 170 Lives -- but prevented further conflicts.
- "It was the secret War of:

***Electromagnetic Reconnaissance*."**

ELINT, Spies and Ferrets

INTRO - ELINT

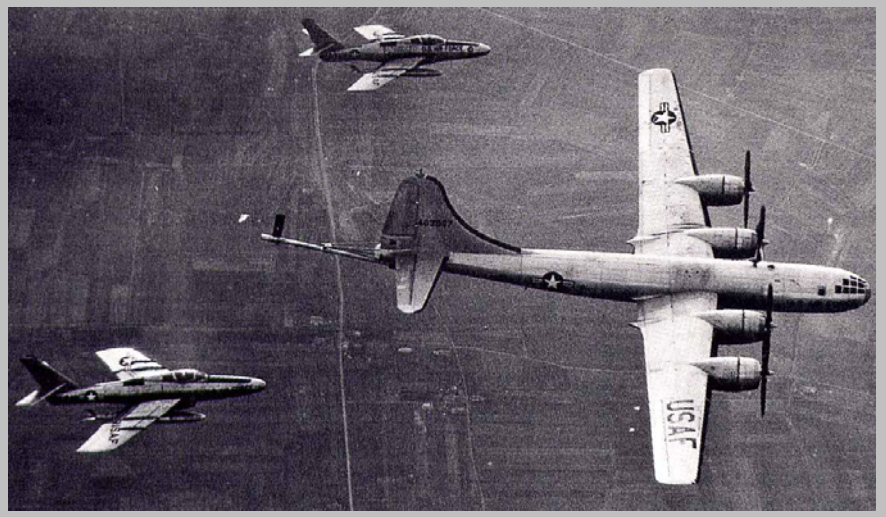
- Cold War arrived (late 40's): the West (Americans) felt an URGENCY to update info on possible targets behind the Iron Curtain.
- There was virtually no up-to-date intel on such matters: early SAC targets based on old German wartime intelligence.
- Bombers needed more accurate route info to get them to targets.
- West sent: Photo-Recon Boeing RB-29 Superfortresses w/ rudimentary WW II era radar receiving & jamming equipment from UK around and occasionally over Communist territory.



At the end of WW II, the principal US long-range reconnaissance aircraft was the Boeing F-13, a camera-equipped modification of the standard B-29 Bomber. Redesignated as the RB-29 after the war, the aircraft continued in the role for many years, providing sterling service during the Korean War. The aircraft also began to acquire a Signet (signals intelligent) mission, which was passed on successfully to the similar RB-50, the RB-47, and finally the RC-135 converted transport.

Designed as a patrol aircraft in competition with Lockheed Neptune, the Martin Mercator saw most service in its P4M-1Q form. This was widely used on electronic intelligence missions, serving with the US Navy's main Sigint units VQ-1 and 2.

A pair of Republic FR-84F Thunderflashes refuel from a KB-29 tanker. Tactical aircraft such as the Thunderflash were on occasion used for short cross-border penetration missions to gather vital photographic intelligence.



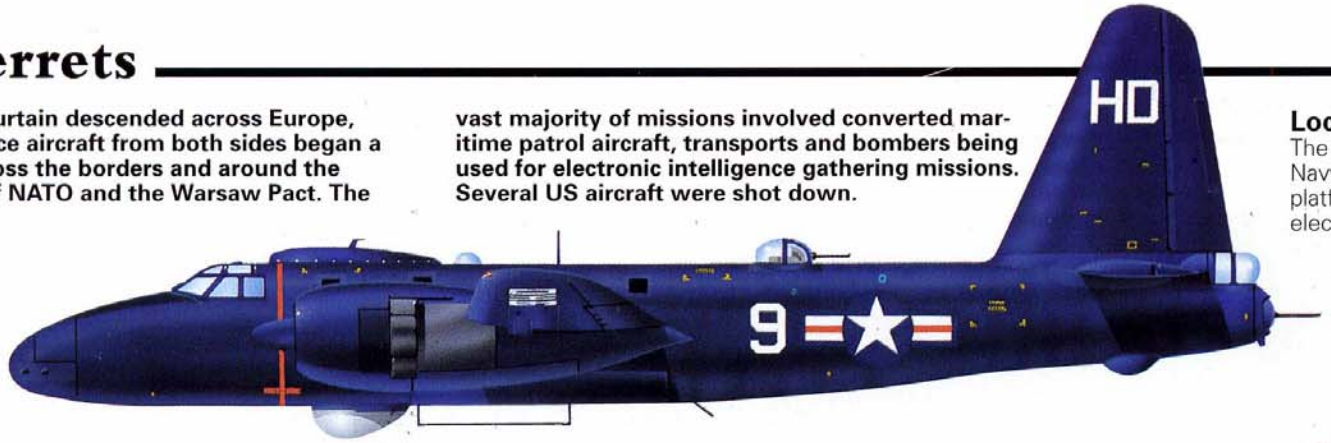
ELINT, Spies and Ferrets

INTRO - ELINT

- By end of Korean War:
  - RB-29 was replaced by SAC with the B-50 ugrade.
  - Over 40 RB-50E/F/G models served the 55th SRW (Strategic Reconnaissance Wing).
    - Wing claimed an upbroken post-war lineage of “ferret operations.”

US ferrets

As the iron Curtain descended across Europe, reconnaissance aircraft from both sides began a long vigil across the borders and around the peripheries of NATO and the Warsaw Pact. The vast majority of missions involved converted maritime patrol aircraft, transports and bombers being used for electronic intelligence gathering missions. Several US aircraft were shot down.



Lockheed P2V Neptune
The Neptune was the US Navy's standard maritime patrol platform, but was also used for electronic surveillance missions.

Boeing RB-29 Superfortress
The RB-29 was principally a camera platform, but was also used for Sigint flights. The RAF also used the type (known as the Washington) for Sigint work around the WarPac borders.

ELINT, Spies and Ferrets

JET RECONNAISSANCE

- B-29 + B-50 were followed closely into the UK by RB-45C's (Recon Version of North American Tornado Four-Jet Bomber).
  - Missions were photo recon + often penetrated far behind Iron Curtain.
  - Vulnerable to interception by the new MIG-15's (coming into service).
  - w/Large Wing-tip tanks, ceiling pushed to 45,000 ft.
  - Had routine 'top-offs' by accompanying KB-29's.
  - No recorded instances of interception (over Eastern Europe).

ELINT, Spies and Ferrets

JET RECONNAISSANCE

- Advent of RB-45 should have decreased vulnerability – but no match for faster MIG-15.
  - Douglas RB-26 + Lockheed RF-80 same problems in Korea.
- ELINT Acft proved more vulnerable to intercept than photographic craft.
  - Based on larger & slower patrol & bomber types.
  - Nature of mission also made them vulnerable.
  - They had to stimulate opposition to turn on radar.
  - Dangerous Cat & Mouse games w/ Ferret Acft getting itself painted by Search & Tracking Radars.
  - West wanted to monitor ground-station communication between Soviet Fighters.
  - Missions often had to be repeated – to improve / amplify data.

ELINT, Spies and Ferrets

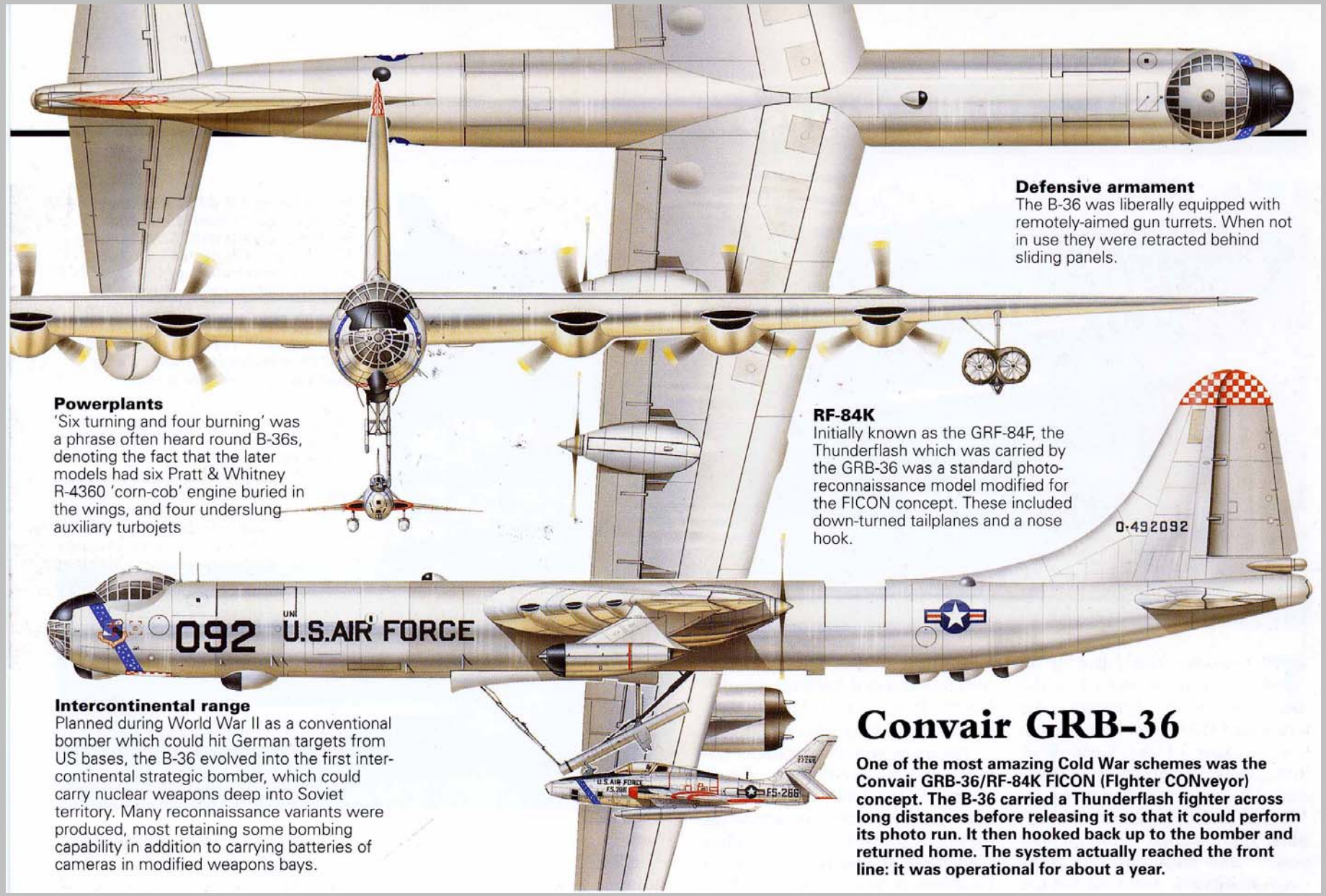
JET RECONNAISSANCE

- Prior to Cold War – USA & UK developed close-links in airborne reconnaissance.
- Formal Intel-Sharing Agreement signed 1948.
  - Same year SAC B-29's deployed to UK.
- British had much to offer:
  - They pioneered: Airborne Elint / ECM -WWII.
  - Very Experienced in Central Signals Establishment.
  - Their Front-Line Platform: de Havilland Mosquito
    - (36,500 Ft Ceiling) – used until MIG-15 threat became too great.

ELINT, Spies and Ferrets

JET RECONNAISSANCE

- B-36 also found Recon duties as RB-36.
- Two large bomb bays converted to carry 14 cameras.
- Late-models reached same altitude as RB-45, BUT very slow.
- 12 massive aircraft converted to become motherships for: Republic RF-84K's.
  - Called FICON (Fighter CONveyor) programme.
  - Carried aloft in semi-recessed position (inside bomb bay) until target area reached.
  - Released for low-level recon, then returned for free ride home.



Defensive armament
The B-36 was liberally equipped with remotely-aimed gun turrets. When not in use they were retracted behind sliding panels.

Powerplants
'Six turning and four burning' was a phrase often heard round B-36s, denoting the fact that the later models had six Pratt & Whitney R-4360 'corn-cob' engine buried in the wings, and four underslung auxiliary turbojets

RF-84K
Initially known as the GRF-84F, the Thunderflash which was carried by the GRB-36 was a standard photo-reconnaissance model modified for the FICON concept. These included down-turned tailplanes and a nose hook.

Intercontinental range
Planned during World War II as a conventional bomber which could hit German targets from US bases, the B-36 evolved into the first inter-continental strategic bomber, which could carry nuclear weapons deep into Soviet territory. Many reconnaissance variants were produced, most retaining some bombing capability in addition to carrying batteries of cameras in modified weapons bays.

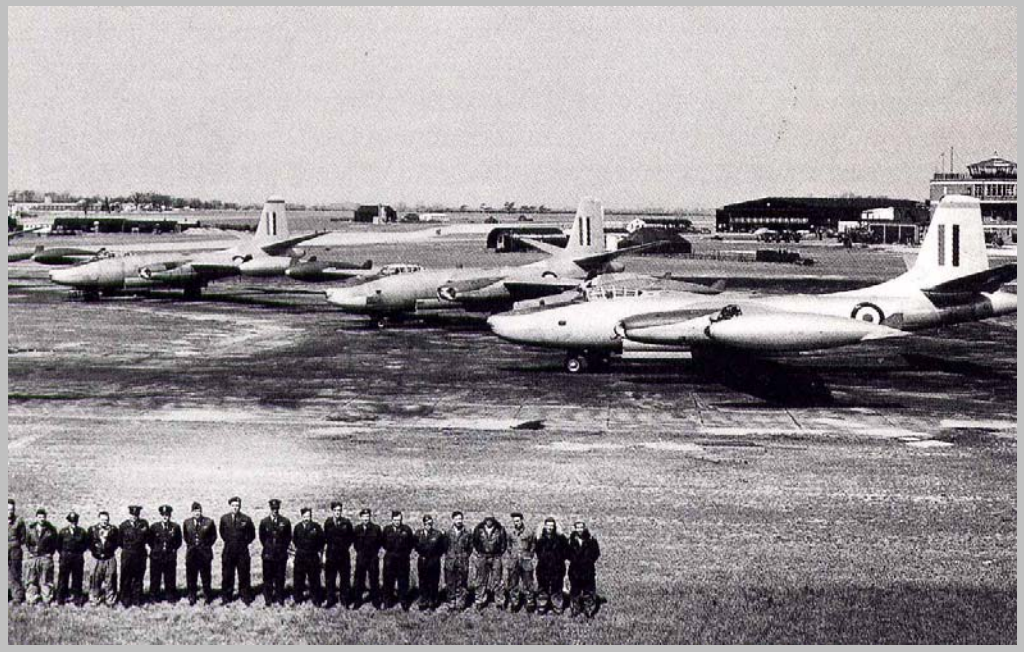
Convair GRB-36

One of the most amazing Cold War schemes was the Convair GRB-36/RF-84K FICON (FIghter CONveyor) concept. The B-36 carried a Thunderflash fighter across long distances before releasing it so that it could perform its photo run. It then hooked back up to the bomber and returned home. The system actually reached the front line: it was operational for about a year.

ELINT, Spies and Ferrets

CANBERRA PENETRATIONS

- English Electric Canberra (replaced The Mosquito).
  - Fast enough / Fly high enough to outrun MIG15.
  - Penetrated deep in Soviet Territory – It Missions remained classified for over 40 Years.
- 1951 – No 192 Squadron re-formed w/ Lincoln B.Mk2.
- British first to confirm Soviets developed AI (Airborne Intercept) radar. (Brought back 20-Sec. recording).
- British first to discover existence Soviet ECM & LORAN systems.
- In return UK gained access to RB-45's Photo Recon Ops. Some British Flight Crews even trained on U-2.



Early attempts to take photographs behind the Iron Curtain were undertaken by a specialist unit, the 91st SRS. It used US RB-45C aircraft, crewed by RAF personnel and repainted in RAF national insignia. Here four are seen at RAF Sculthorpe.

ELINT, Spies and Ferrets

CANBERRA PENETRATIONS

- US Services had steadily expanded airborne surveillance fleets.
  - Concentrated on peripheral Ferret Missions.
- All flights into Soviet territory – were denied.
- If Soviets shot one down, it was told: Navigation Error
- By end of 1959:
  - 12 US Spy planes had been shot down
  - Not all of them were “over international waters” so to speak.

From its earliest days, the Canberra was in great demand for risky high-altitude reconnaissance missions. Some time in 1953 or 1954, a PR.Mk 3 similar to this aircraft is believed to have photographed the Soviet missile test site at Kapaustin Yar at the request of the USAF.

ELINT, Spies and Ferrets

NAVY LOSSES

- US Naval Aircraft had featured six of the 12 losses.
- Four of them: Lockheed P2V Neptunes (Flying from Japanese or Alaskan bases).
- Long-range of this Anti-Submarine acft well suited for routine eavesdropping missions.
- Navy had specialized snoopers:
  - Consolidated PB4Y Privateer, based on B-24 bomber.

This consolidated PB4Y Privateer served with VP-26, a long established intelligence gathering unit of the US Navy. This squadron was the first to loose an aircraft to Soviet fighters when a Privateer was shot down in April 1950.

ELINT, Spies and Ferrets

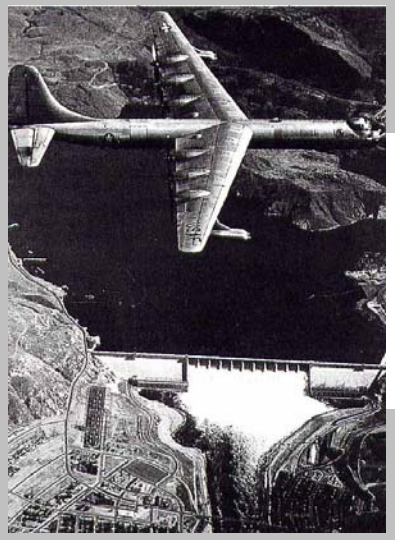
NAVY LOSSES

- April 8, 1950 – PB4Y became "1st casualty" in this Undeclared War.
- Shot down by 4 Fighters in Baltic Sea (by US).
- Was actually 14 miles inland over Latvia (by Soviets).
- Taken off from Wiesbaden, Germany and due to land in Denmark.
  - Dictates of Geography made Baltic a key area of interest.

ELINT, Spies and Ferrets

NAVY LOSSES

- Privateer gave way to Martin P4M Mercator.
  - Twin-Piston /Twin-Jet Engine designed for Maritime Patrol.
- Only 21 built (1950-1951) – used in Ferrets Ops.
- One Mercator shot down
  - Chinese Fighters in August, 1956 off of Wenchow.
- Operated by Navy Sq. VQ-1 (Navy's 1st ECM Unit).
- Late 50's – Mission went to Carrier-based Douglas A-3 Skywarrior. (RA-3B Photo-Recon, five-seat).
- Role followed by EA-3B (seven-seat) – thru 1991.
  - Heaviest-ever Carrier Aircraft.



In its own right the B-36 was a very capable reconnaissance craft. It could reach altitudes unattainable by the early MiGs, an carried a huge sensor payload. Specifically stripped 'featherweight' versions were produced for extreme altitude performance.

The workhorse of the Sigint fleet for much of the Cold War was the Boeing RB-47H (and similar ERB-47H). Their many dangerous missions included flying directly at Soviet defences in an attempt to make them power up, only turning away at the last moment.

ELINT, Spies and Ferrets

NAVY LOSSES

- In 1954, SAC's RB-36, RB-45, and RB-50 gave way to the new: Boeing RB-47 Stratojet
- 5 Wings of 250 Aircraft strong.
- Majority were RF-47E, withnew suite of 11 camera's and improved photoflash bombs.
- Main Mission was to provide most accurate data for the penetrating bomber fleet.
- RB-47H equipped with Melpar ALD-4 Elint System (originally planned for the B-58).

Relatively large numbers of the RB-47E were produced, this being a photo-reconnaissance version of the Stratojet bomber. Its primary purpose was to map the approaches to Soviet targets to aid planning nuclear bombing raids.

ELINT, Spies and Ferrets

NAVY LOSSES

- One of the ERB-47H were shot down (July 1, 1960)
  - 2 of 6-man crew survived/ taken prisoner – Barents Sea.
- Kola / Kanin peninsulas (Soviet Navy's Northern bases / numerous IRBM sites / bomber air-fields)
- 1 May 1960 – U-2 (Maj Gary Powers) from Pakistan to Norway shot down.
- Shoot-Downs lead to Major turning point (Cold War)
- President Kennedy had to agree to No more Over flights. (Spy exchanges took place).
- Another great Advancements – Satellites started to take over.
- And the Secret War expanded even further.

END of CHAPTER 5

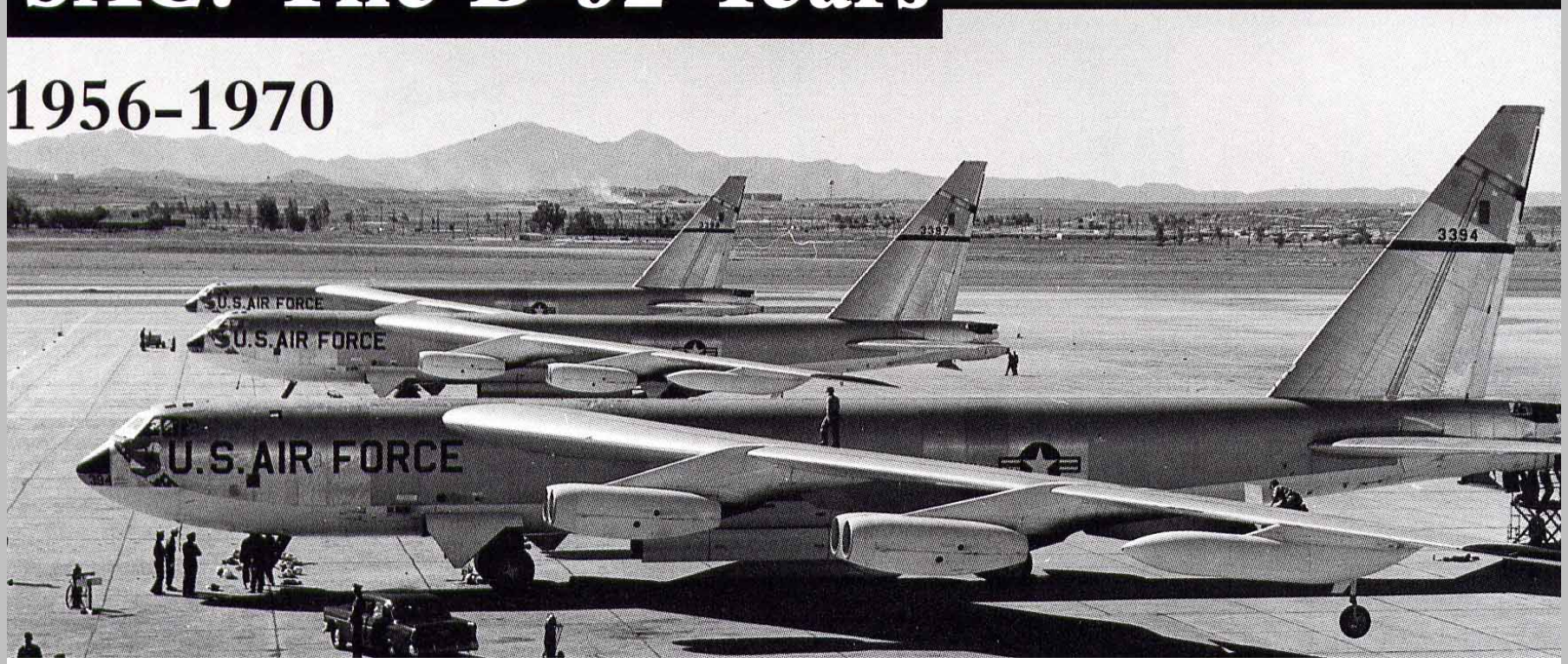
SAC: The B-52 Years

THE COLD WAR
6 – SAC: The B-52 Years

MAIN TOPICS COVERED

1. **INTRO – NEW PHASE OF WAR**
2. **MISSILE DOMINANCE**
3. **NUCLEAR ACCIDENTS**
4. **SAC IN THE 60's**

SAC: The B-52 Years



Boeing's B-52 Stratofortress first flew on 15 April 1952, and entered service with Strategic Air Command in June, 1955. In a stunning demonstration of the type's unmatched strategic capability, these three B-52B's took off from Castle AFB in California on 16 January 1957, returning 45 hours and 19 minutes later after flying non-stop around the world.

SAC: The B-52 Years

INTRO – NEW PHASE OF THE WAR

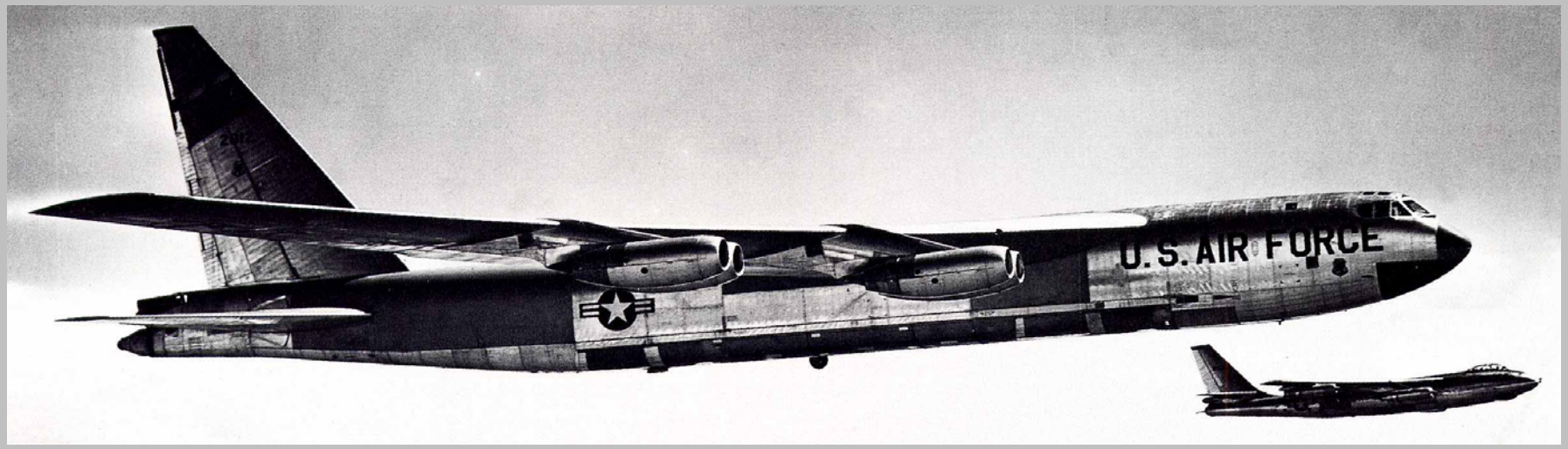
- From Mid-1950's, SAC was immersed in a new phase of Cold War.
  - SAC controlled by men who flew B-17's / B-29's.
  - They had shaped strategic air power.
  - Saw the Long-Range Bomber as salvation for the West – in face of Soviet Nuclear threat.
  - By 1960's – 'Bomber Generals' dominated the entire US Air Force.

- Main Force behind the Bombers:
  - Former SAC Commander – Gen Curtis LeMay

SAC: The B-52 Years

INTRO – NEW PHASE OF THE WAR

- Less visible – but led revolution for ICBM Force: **Gen Bernard A. Schriever.**
- B-52 not ICBM symbolized everything SAC was doing.
- American Policy – w/ Different Names
  - *Containment (1947-52)* = Prevent encroachment
  - *Massive Retaliation (1953-61)* = Eisenhower Years
    - Slightest Aggression meant "The Sledgehammer" w/ Nuclear response.
    - Not at Soviet Bases, but Cities.

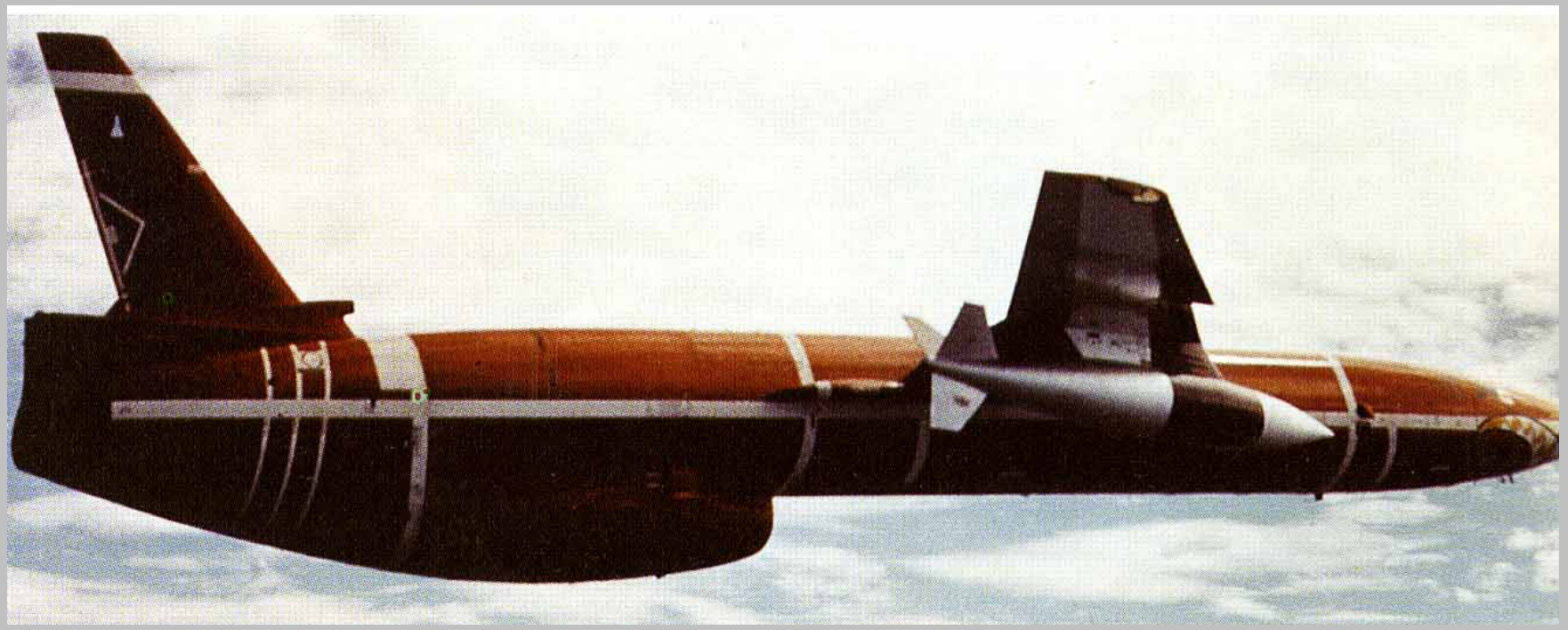


Above: A total of 744 B-52's were built between 1952 and 1961. Few could have foreseen that the last of these titanic machines would still be flying a half a century after the first, or that they would outlast the Strategic Air Command itself.

SAC: The B-52 Years

INTRO – NEW PHASE OF THE WAR

- SAC no longer had as many people / aircraft as in previous decades, but in 1963 it had:
  - 271, 672 personnel
  - 2,424 aircraft
  - 32 Heavy Bomber Wings
  - 3 Aerospace Wings (B-52's)
  - 2 Medium Bomb Wings (B-58's)
  - 41 Air Refueling Squadrons
  - Reconnaissance Assets



Signs that the bomber could become vulnerable to enemy defences had SAC looking at a number of unmanned nuclear delivery systems. The Northrop SM-62 Snark was a bomber-sized cruise missile with a 10,000-km (6,215 mile) range which pioneered many of the advanced avionics and guidance techniques used today. It was operational from 1957 to 1961.

SAC: The B-52 Years

INTRO – NEW PHASE OF THE WAR

- B-58 Hustler (1963)
  - 305th Bomb Wing, Bunker Hill AFB, Indiana.
  - Dashed fr: Tokyo – London, 8 Hrs-35 Min.
  - 8,030 mi, averaging 938 mph.
- B-58 still on way out, but not manned bomber.
- USAF invested $5 Billion into B-70 Valkyrie
  - Mach 3 Aircraft – Cancelled after flight testing was well advanced.
- Plans to retire B-52 was then underway.

The medium-range Convair B-58 Hustler was the B-52's supersonic counterpart. Entering service 1960, it had phenomenal performance, but it was a complex costly machine. After a ten-year career the B-58 was retired for economic reasons.

SAC: The B-52 Years

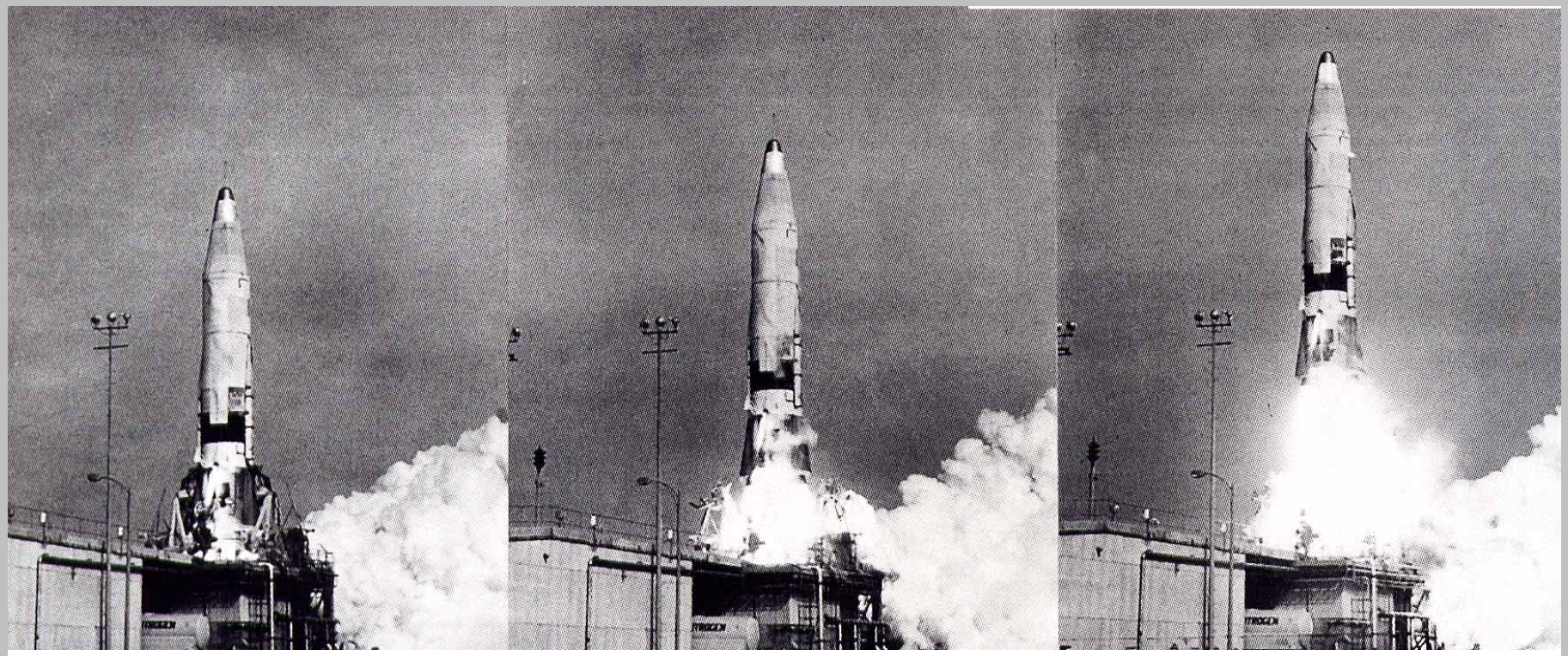
MISSILE DOMINANCE

- Milestone passed – 21 April 1964.
  - Number of ICBM's on alert surpassed # of Bombers.
- Titans & Minuteman ICBM's were increasing.
- Most of massive force of B-47's had retired.
- SecDef Robert S. McNamara replaced policy of assured destruction w/ policy of previously unthinkable concept of limited nuclear war.

SAC: The B-52 Years

MISSILE DOMINANCE

- 1965 – US launched Vietnam build-up
- B-52's flew conventional bomb missions against Viet Cong.
- SAC's focus stayed on nuclear weapons with about 50,000 Worldwide. (Soviets had 20,000).
- Nuclear War between two superpowers was taken more seriously than limited Asian war.
- Bombers not only stood alert on runways, but in the air. (24/7 w/ live Hydrogen Bombs, "Chrome Dome" Missions).
- As Vietnam war kicked in – Airborne alerts pressed on.



The reason that the early cruise missiles were abandoned was that ballistic missiles offered so much more. Atlas was the West's first true ICBM, becoming operational in 1960 with SAC's 564th Strategic Missile Squadron at Warren AFB, Wyoming. Atlas could deliver a 3-Megation warhead over a range of more than 16,000 km (10,000 miles).

SAC: The B-52 Years

NUCLEAR ACCIDENTS

- **Palomares Incident (January, 1966)j**
  - During B-52 – KC-135 Refueling Mission
  - Both crashed near Palomares, Spain
  - 4 Survivors – 7 Fatalities
  - Radioactive Material was released when TNT triggered 2 of 4 Weapons aboard B-52 exploded on impact.
  - Search for lost weapons took 2 Months. Found 2,850 Ft in Med.
- **2nd Mishap – B-52 in Greenland Crash.**
- **Ended the "Chrome Dome" Missions.**
- **Bombers then still stood alert, but at end of runways.**

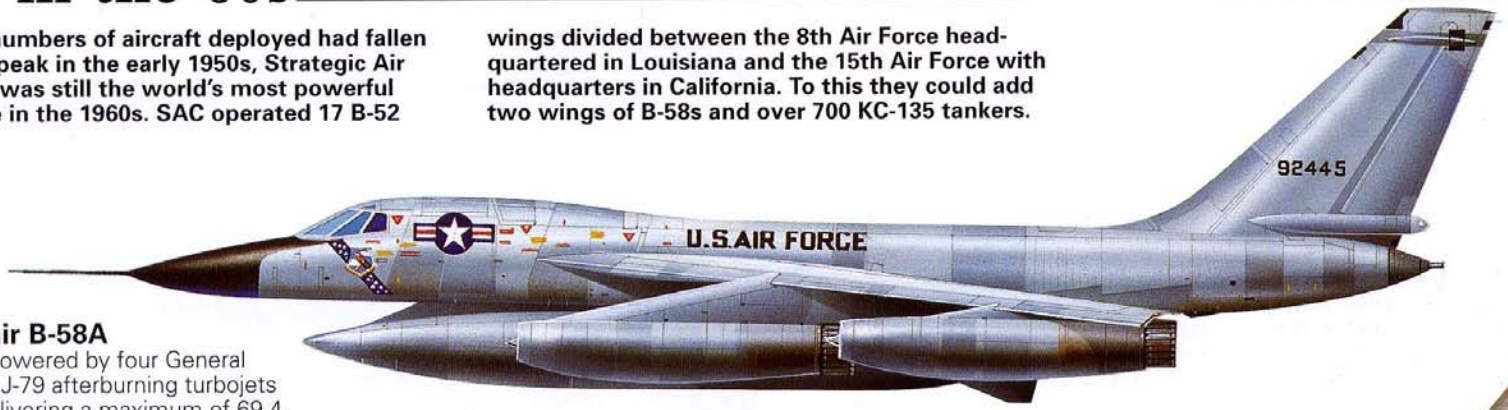
SAC: The B-52 Years

NUCLEAR ACCIDENTS

- McNarmara planned to retire major SAC bomber force (by 1971).
- White House shift to Richard Nixon (Advisors):
  - Kept B-52 alive
  - Invested in the FB-111 Aardvark (in interim)
- Bomber Force becoming past tense
- ICBM's and Submarine-based Missiles became more important.

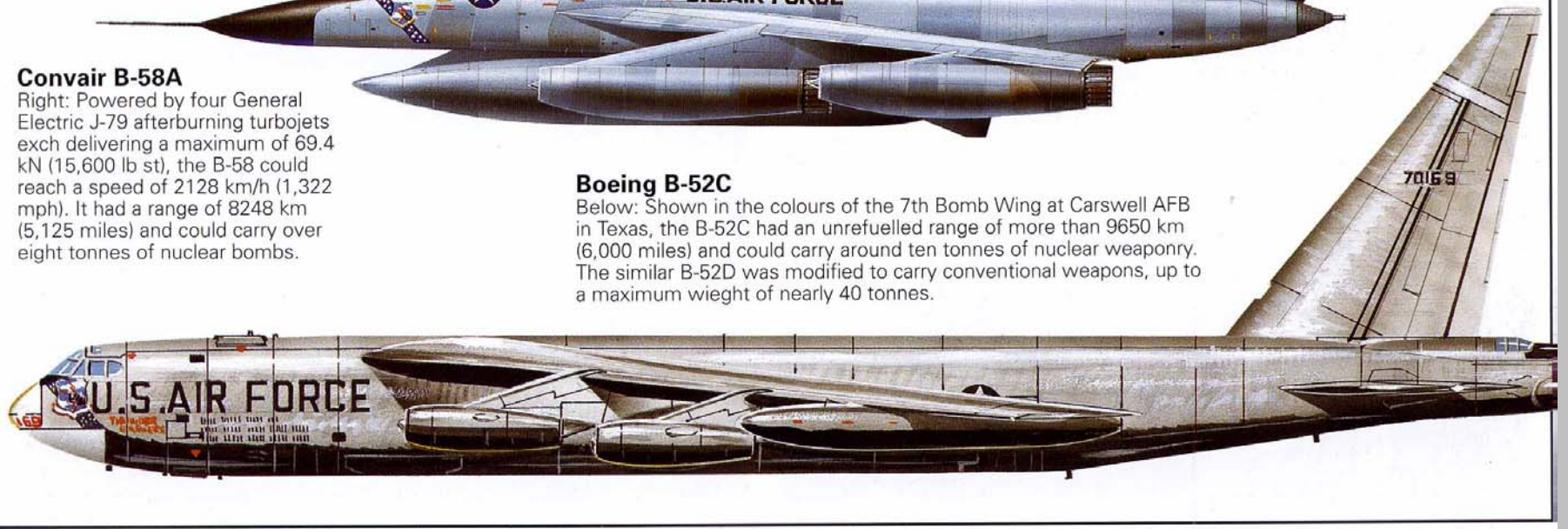
SAC in the 60s

Although numbers of aircraft deployed had fallen from their peak in the early 1950s, Strategic Air Command was still the world's most powerful strike force in the 1960s. SAC operated 17 B-52 wings divided between the 8th Air Force headquartered in Louisiana and the 15th Air Force with headquarters in California. To this they could add two wings of B-58s and over 700 KC-135 tankers.



Convair B-58A
Right: Powered by four General Electric J-79 afterburning turbojets exch delivering a maximum of 69.4 kN (15,600 lb st), the B-58 could reach a speed of 2128 km/h (1,322 mph). It had a range of 8248 km (5,125 miles) and could carry over eight tonnes of nuclear bombs.

Boeing B-52C
Below: Shown in the colours of the 7th Bomb Wing at Carswell AFB in Texas, the B-52C had an unrefuelled range of more than 9650 km (6,000 miles) and could carry around ten tonnes of nuclear weaponry. The similar B-52D was modified to carry conventional weapons, up to a maximum wieght of nearly 40 tonnes.



END
of
CHAPTER 6