

*Missions for America  
Semper vigilans!  
Semper volans!*



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### Special Notice

The Editor was injured in an automobile accident and regular editions of *The Coastwatcher* will not be published until further notice.

## CURRENT EVENTS

### *First Flight of the B-21 Raider*

The Northrop Grumman B-21 Raider took to the air for the first time on November 19<sup>th</sup> escorted by an F-16 chase plane.



Using call sign Raider 33, the flight took place at Air Force Plant 42 in Palmdale, California and headed for Edwards AFB where testing will be managed by the Air Force Test Center and the 412th Test Wing's B-21 Combined Test Force

### *Drones and Missiles Used to Attack U.S. Bases in Syria and Iraq*

The attacks have been staged by Islamic Resistance in Iraq, Sunni Islamists fighting against US forces within Iraq. The weapons used are "kamikaze" drones and rockets and have injured around 50 U.S. military members.

A likely drone is the Iranian Shahed 136 carrying a warhead weighing around 80 pounds and has been used by Iran, Russia, the Houthis and the Islamic Resistance in Iraq.



*On display at an Islamic Revolutionary Guard Corps Aerospace Force exhibit.*

The Al-Aqsa 1 bears a close resemblance to the Iranian Fateh series. It carries a guidance system probably relying on the Russian GLOSNASS GPS system which probably controls the trajectory by manipulating the sets of fins on nose and tail.



*Iranian Fateh series rocket*

### AEROSPACE CHRONOLOGY

Nov. 22, 1946 – First flight of the Martin 2-0-2. The aircraft was Martin's first entry into the commercial market since the company built the M-130 China Clipper for Pan American and unfortunately, took a financial bath of three flying boats which they built.

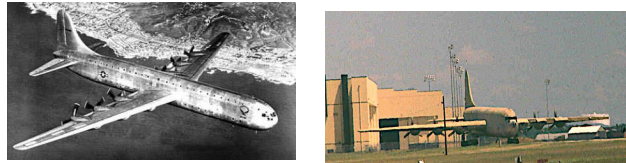


*L. The last surviving 2-0-2 sits wingless and engineless at The Aviation Hall of Fame and Museum of New Jersey. R. The intrastate California Cenral Airlines Martin with rear airstair extended.*

The 2-0-2 was one of the many DC-3 replacements that manufacturers hopefully offered the post-war market. However, the aircraft was hastily built to get a jump on the commercial market and suffered from a serious wing spar weakness and poor manufacturing techniques. By the time, these issues were settled, the Convair 240, a pressurized airliner was being sold with equal or better performance. Sales figures tell the story. Martin sold 47 2-0-2s and Convair built 1,076

240s which they followed up with improved models ending with the Convair 600 series.

Nov. 23, 1947 – First flight of the sole Convair XC-99, developed from B-36 wings and convertible components. It was the largest piston-powered land transport aircraft ever built.



*L. XC-99 on an USAF transport mission. R. The same aircraft forlornly sit in a corner of Kelly AFB, San Antonio (L. credit: Museum of USAF)*

Hopes for commercial contracts were raised when Pan American Airways ordered 15 but the fuel and maintenance costs to keep the six 3,500 hp Pratt & Whitney Wasp Majors chugging were too high compared to smaller aircraft such as the Lockheed Constellation and Douglas DC-6 so Pan Am slithered out of the contract and no other orders were forthcoming and the USAF decided that it was unsuitable for their requirements so Convair cancelled production. The sole XC-99 labored on as a long-range transport for the USAF for ten years. It is now at the National Museum of the USAF for restoration and display.

Nov. 24, 1955 – First flight of the Fokker F27 Friendship. The aircraft was also license built by Fairchild Aircraft as the F-27 and carried additional features such as an airstair door, weather radar, and additional fuel capacity. They were powered by Rolls-Royce Dart turboprops. Fairchild-Hiller followed up with a stretched version, the FH-227, which almost doubled the seating capacity of the original F27. A combined total of almost 800 Fellowships were built by the two companies.



*L. Thai AF F27-400 Troopship. R. U.S. Army C-31A Troopship (L. credit: Gerry Steigmeier)*

The final variant of the line was the Fokker 50. Pratt & Whitney Canada turboprops were installed, composite materials were utilized in the airframe, and fuel consumption was reduced substantially.

Nov. 25, 1940 – First flight of the de Havilland 98 Mosquito, a private venture first derided by the British Air Ministry but arguably one of the most versatile warplanes of World War II and one which excelled in most of its roles, fighter, bomber, night interceptor, photo-reconnaissance and light transport.



*L. The very first Mossie survived the war and is cared for at the de Havilland Museum, Salisbury Hall, Shenley, London Colney. R. A reverse lend lease Mossie F-8 photo-reconnaissance aircraft. (Credit R. USAFM)*

The aircraft familiarity known as the Mossie was built of plywood in Great Britain, Canada, and Australia and reached a production figure of 7,781 aircraft with around 50 variants.

Nov. 26, 1951 – First flight of the Gloster Javelin. The Javelin was a purpose built all-weather interceptor designed to maintain air supremacy over British air bases.



*FAW.9R carrying four de Havilland Firestreak air-to-air heat seeking missiles.*

Gloster built the first British jet aircraft and the Javelin was the end of the line, the last aircraft to bear the company name. Gloster and Armstrong-Whitworth which were both members of the amalgamated Hawker Siddeley group shared production for a total of 435 aircraft.

Nov. 27, 1969 – First flight of the Israel Aerospace Industries Arava. The name is a reference to the Arava Desert in the Negev.



*L. Arava 102 of the Swaziland A.F. R. Arava 202 at the Israeli A.F. M, Hatzerim.*

It was the IAI's first design to enter production. The aircraft was designed for transport operation from austere airfields. Sales were mediocre and only 103 were built. Even the Israeli Air Force did not take the aircraft on charge except leasing three of them during the Yom Kippur War in 1973.

Most of them were sold in Central and South America and even ended up in the former Swaziland and Thailand. The rear cargo doors, short take-off and landing performance, simple maintenance and low cost made it attractive to the air forces of developing nations.

Nov. 28, 1995 – First flight of the Gulfstream V. It had a range of 6,500 nmi and faced off with the Bombardier Global Express in the long range business jet market. The U.S. military flies it as the C-37A. An improved version, Gulfstream 550, was also produced for the business market and known in the military as the C-37B.



*L. USCGC C-37A, serial number 01. R. USAF C-37A*



An unusual version are the models converted for electronic warfare missions. IAI purchased five G550s and has produced the G550 Eitam conformal airborne early warning (CAEW) aircraft. Radomes and their rotating antennae have been eliminated by using a array of antennae which are controlled electronically to scan the airspace.



*L. Republic of Singapore A.F. CAEW R. Navy NC-39B*

The U.S Navy operates a one-off NC-37B for missile range surveillance and telemetry acquisition on the Pacific Missile Range complex.

There is a general tendency to adopt various models of business jets and twin engine airliners and modify them for AEW, signal intelligence, and battlefield management missions. Goals are to replace an aging fleet economically with aircraft fitted with state-of-the art electronics and to lower the costs incurred by flying the larger, older four engine aircraft such as the C-135s.

The Bombardier 6000 has been modified by SAAB. The Embraer 145 has been developed into the R-99. And the venerable Boeing 737 is flying as the E-7 Wedgetail.

### **FEATURE ARTICLE**

This is the third part of Shawn Terry's discussion of aerial signal intelligence. In the first two parts of his essay published previously, Terry reviewed the 20<sup>th</sup> century history of electronic intelligence gathering and some of the technical aspects which govern the range of information accessible. In this final section, Terry argues that military and diplomatic secrets which were the primary targets of interception and decoding in the past are still prized but that the Chinese are putting massive amounts of hacking efforts and computer resources into building what are essentially

dossiers about ordinary citizens which could be utilized by Chinese intelligence which have already heavily infiltrated American research universities and corporations, and are targeting Chinese dissidents.

### *What the Chinese Spy Balloon was Doing (Part III) by Shawn Terry*

A recent meeting of intelligence officials from the United States, Great Britain, Australia, Canada, and New Zealand aka "The Five Eyes" discussed these issues. One of them, FBI Director Christopher Wray stated that "China has long targeted businesses with a web of techniques all at once: cyber intrusions, human intelligence operations, seemingly innocuous corporate investments and transactions," Michael Burgess, General Director of the Australian Security Intelligence Organisation claims that "The Chinese government is engaged in the most sustained, scaled, and sophisticated theft of intellectual property and expertise in human history."

Although it is not likely that the People's republic of China will admit the purposes of their spy balloon, technical analysis of the payload suggests plausible missions for the overflights.

Intercepting military or diplomatic communications immediately comes to mind and major efforts were expended in both wartime and peacetime to intercept, collect, and analyses these two classes of transmissions. Military information can be used for both tactical and strategic advantages and the intercepts of another states diplomatic information can serves to plan national policy and guide negotiations.

Arguably, the two most important examples are the British interception and breaking of the Zimmerman Telegram and giving it to a neutral United States while World War I was raging in Europe. Zimmerman, the Foreign Minister of Germany, offered the President of Mexico restoration of the lost territories of Arizona, New Mexico, and Texas if they supported Axis efforts if the United States entered the war for the Allies.

In World War II, high frequency direction finding and the breaking of the naval Enigma code used to control U-boat deployment in the Atlantic Ocean was a major contributor to ending what Winston Churchill said was "... the only thing that ever really frightened me during the war... the U-boat peril."

A secondary purpose may be intercepting public radio and television broadcasts. One may wonder why publicly available broadcasts is even signal intelligence, since most news services and other non-fiction broadcasts can simply be streamed over the internet from anywhere. You do not need signal intelligence and indeed they would be correct! However, receiving, recording, and collecting foreign radio and television news in the 20<sup>th</sup> century was a challenging task since it required getting close enough to receive and record the common public frequencies used. But now that all these broadcasts are available over the internet you do not need a spy balloon to as a collection instrument.

The weak link that affects 90% of cell phone users is the wireless link from the telephone to the nearest cellular tower. This communication is at UHF or low microwave frequencies in publicly documented data formats sometimes with no encryption and if there is encryption it uses a moderate strength encryption that has a mathematical defect making it much weaker which makes an intercepted mobile phone transmission easy to decrypt and unpack.

Traditionally the interception of private phone conversations and text messages is a difficult form of signal intelligence as most electronic communications between private parties go through ground lines or signal towers and tapping large numbers of land lines or intercepting tower to tower signals is logistically difficult with the limited range especially across most ground terrain with trees, buildings, and hills. The multiplicity of intercept stations needed opens the eavesdroppers to discovery and arrest.

One historical example of an extremely difficult and dangerous wire tap occurred during Vietnam War. A North Vietnam telephone line running through an infrequently traveled but enemy held area carried messages considered to be high-grade intelligence by U.S. authorities. Two OH-6A Cayuse helicopter were modified with special rotors, mufflers, engine controls, and auxiliary fuel tanks. In December of 1972, they covertly carried wiretap specialists who installed a tap and a solar powered relay station.

From a reception platform in the sky, if a balloon is at 60,000 feet, the altitude of the Chinese balloon. Transmissions from either towers or handset can be received from nearly 100 miles away if high gain UHF/Microwave antennas are used on the balloon, as it appeared to have. The Chinese spy balloons payload had a large payload about the size of a school bus and as Vice President Harris once said "Who doesn't love a yellow school bus, right?" But this "bus" was not yellow and not to be loved. Ground and aerial pictures show that it is a large complex aluminum structure which is capable of receiving signals in the high UHF and low microwave bands which is what most mobile cell phones use.

Once the balloon's payload receives the signals, it temporarily records the data in solid state memory and when a Chinese low earth orbit spy satellite passes overhead it uplinks this data via a high frequency wide bandwidth directional microwave that would be quite difficult to jam or even detect from the ground. Reports indicate that the Chinese Ministry of State Security support an extremely large staff of cyber technicians and advanced computer systems. The messages and conversations can then be decrypted once this data is received in China.

The huge amount of data which can be swept up still needs analysis. Before digital computers, the messages had to be individually read by specialists conversant in the language in which they were written, translated, and then passed on to other specialists knowledgeable about the subject matter.

Digital computers capable of high speed searches and equipped with cryptanalysis and translation programs made the work exponentially faster.

The advent of quantum computing and the use of artificial intelligence systems has possibilities still unexplored. And you can bet *remnimbi to you tiao* that the People's Republic of China are are doing their utmost to determine the details of research in the west.

What would the Chinese hope to gain by this. This is where I have to speculate. They are clearly obtaining a lot of personal information. Most Americans are not aware that these "private" communications are easily intercepted. With that said they are not obtaining information targeted on any individual or group and they could only obtain this when the balloon was within a hundred miles of a geographic location. So the communications they collected would represent a swath in time and space of personal private communications. However this swath represent the personal communications for a brief period of time for millions of Americans!

This communication includes the text messages and pictures in these messages, one or both sides of a phone conversation, and phone numbers. Depending on the content of the communications other information like names, addresses, friends/family names can be gleaned. The information can be leveraged by other information they have collected through multiple "spying" apps including the Tik-Tok app and posts. Many Tik-Tok users (50%+ of USA) have given there phone number to Tik-Tok either while setting up there account or to facilitate two-factor authentication. So now the Chinese can correlate what you have viewed and posted on Tik-Tok with whatever communications they have intercepted giving them a robust dossier on millions of Americans.

So how may the Chinese use this potent information. The obvious way is business people that share valuable business information in a manner that they thought to be private communication.

The second way this is useful is to compile statistics based in this swath of private information relating to American opinions about China, Communism, the willingness to go to war to protect Taiwan, and private sexual habits.

However the biggest value in this information is to black-mail select Americans. Remember they can collect millions of communications and in many cases correlate them with a real person! I am sure thousands of the texts were Sexting which the parties involved would not want publicly exposed.

The black-mail threat offered by a Chinese agent could be as simple as getting the recent financial statements or some intellectual property from a private company. It could even lead up to full blown recruitment as a Chinese agent.

Some reading this may say this is far fetched but their have been claims that Chinese un-registered agents in the United States number in the thousands, have already heavily infiltrated American research universities and corporations, and are targeting Chinese dissidents. A recent meeting of the "Five Eyes" stated that "China has long targeted businesses with a web of techniques all at once: cyber intrusions, human intelligence operations, seemingly innocuous corporate investments and transactions," Michael Burgess, General Director of the Australian Security Intelligence Organisation claims that "The Chinese government is engaged in the most sustained scaled and sophisticated theft of intellectual property and expertise in human history."

I will also remind the reader that the Chinese spy balloon that was the media highlight in early 2023 was not an isolated incident. Our government has not confirmed how several other Chinese spy balloons crossed other U.S. air space and reports and pictures from Texas in 2021 seem to show at least one other passed across that state. At about the same time a balloon was identified passing across central America and then Venezuela and there are reports from Columbia of a similar object over Bogota last year.

This should be no surprise the Chinese desperately want to gain an economic, diplomatic, and military foothold in the America's for reasons similar to why the Soviets wanted to do this in the 20<sup>th</sup> century and indeed did in Cuba with terrifying consequences. This is why all three reasons I gave above also apply to these other countries. Indeed they seem to have achieved this already in Venezuela where I personally saw the impact of Chinese involvement with the Venezuelan Navy and economy. In fact while in Venezuela for a week in 2015 was told to stay away from a Chinese group , had dinner with a guy from Iran, and a date with a Russian “Banker”!

So action items: We should require the four major mobile phone carriers to use LTE to carry phone conversations and text messages. This would automatically have these private communications use LTE encryption which is much stronger than GSM encryption and lacks any known mathematical vulnerability. One provider “Dish Network” already does this and others could provide firmware upgrades on the towers. The only minus is increased latency in phone conversations but this would rarely be noticeable. This would be an easy low cost solution. It is also notable a spy balloon is not the only way these private conversations and messages could be intercepted!

Obviously if we see another spy balloon approaching the USA coast we should shoot it down as soon as it enters territorial airspace, not after it has traversed the country!

Lastly banning or forcing a divesture sale of the Tic-Tok social media service from the Chinese company Byte Dance and banning any other app that is Chinese or Russian owned or that shares information with any party in any foreign country should be done immediately. This includes all of the major social media players. Information, pictures, and videos posted in the USA should remain here unless the person originally posting it explicitly decides to share it with specific users or interest groups in other countries.