

The Clyman Collection of vintage military and pilot watches (S. Lundin)

BY STEVE LUNDIN

# Time Takes Wing

Flying and wristwatches grew up together. Here is a look at how those in the cockpit have influenced today's pilot's watch



Even today, many larger planes have both digital quartz and mechanical analog timekeepers on board

**T**he relationship between motion and time forms the basis for everything from Einstein's theory of relativity to one of the fundamental aspects of flying. Not long after man became airborne, the necessity of time data for a multitude of flight applications became clear. Steered as much by happenstance as design, the timepiece evolved from a luxury item to a critical cockpit element. This is the story of how time took wing.

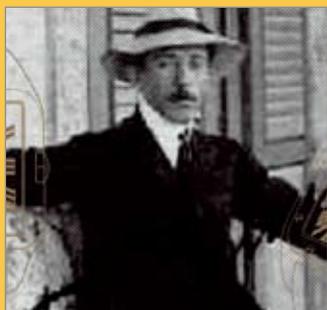
### The 20th Century begins

It's argued that the relationship between Brazilian celebrity aviator and scientist Alberto Santos Dumont and watchmaker Louis Cartier led to the development of the first flight wristwatch, the Cartier Santos-Dumont, in 1904. Santos was frustrated with the clumsy and distracting act of taking his hands off the controls to check the time with a pocket watch, so his friend Cartier came up with a solution. It was the

public visibility of Dumont that expanded the popularity of wristwatches from a women's accessory to a fashion utility for men.

By 1906 the wristwatch was considered an integral part of any pilot's kit. Santos-Dumont was reported to have worn his Cartier watch every time he flew. The Santos-Dumont watch was officially displayed in 1979 at the Paris Air Museum. The Santos is still in production and remains one of the Cartier's best-selling watches.

Bulova's A11, with a look at the movement (below right)  
(Ray Brack)



Santos Dumont



Jaeger-LeCoultre's elapsed time flight instrument  
(Ray Brack)



As Cartier discovered, time-keeping serves a variety of functions on a plane. With a pair of hands and a dial a watch can be used to calculate gasoline consumption, ground speed, load-lifting capacity, to navigate using celestial observations, and, of course, tell time. As the world geared up for the Great War, John P.V. Heinmuller, nicknamed "Aero 1," was sent in 1912 by Longines to the United States to expand the market. He saw an opportunity with the burgeoning U.S. Army Air Corps and became an innovator and the driving force behind the concentration of new instruments installed into aircraft cockpits. By the advent of WWI the clock had moved from the wrist to the cockpit dashboard. Heinmuller worked with Charles A. Lindbergh and Admiral Byrd, among others, to develop a host

of navigational instruments.

An explosion of innovation occurred at the end of the war as manufacturers patented and began producing the instruments they had developed for aerial combat. Longines-Wittnauer, Elgin, Waltham, LeCoultre, Thommen and Junghans are a few of the famous names that added jewels, electricity and more robust mechanisms and casings between 1918 and 1938.

Beyond simple timekeeping, LeCoultre introduced the Chronoflite, a double chronograph aviation clock that was sold primarily to E. Jaeger of Paris. It was through this association that a partnership was formed, and in 1936, became what we know today as Jaeger-LeCoultre. The partnership expanded to develop an entire line of aircraft clocks and led to the elapsed time clock using LeCoultre's 310 series

of chronograph clocks as a base. Some of these were adapted by the Army and Navy flying corps, including 13-jewel 8-day clocks stamped "JLC, Inc, NY, USA, made in Switzerland." The manually wound clock featured split-second timing, elapsed time and an eight-day clock.

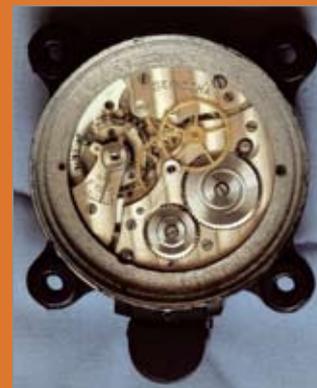
The Bulova A-11 Cal. 21AE is representative of post war, early-mid 20th century aircraft clocks. It came in 12-hour only configuration with a radium dial and 7-jewel movement. The movement in these looks almost the same as Elgin Cal. 562, but has a few differences, and both debuted just before WWII.

### World War II

After the attack on Pearl Harbor, American manufacturers Hamilton and Elgin turned their production toward manufacturing a



A Waltham Civil Date aircraft clock  
(Ray Brack)



Seiko foreunner Seikosha made this aircraft clock, with a look at the movement above  
(Ray Brack)

variety of specialized timepieces for the military. They found several design flaws with the JLC clock, which they corrected and upgraded to military specs, to produce their own Hamilton-Elgin 8-day elapsed time clock with special chronograph and civil date features, the AN-C-62.

Whereas the JLC was based on a simple clock, the Hamilton-Elgin was more like a complicated watch. Of course the various European players were also developing more sophisticated aircraft clocks in the ramp-up to the war, each with its own subtle variation. For example, the Junghans Caliber 30BZ 30-hour elapsed time chronograph aircraft clock, developed for the Luftwaffe, featured a rotating bezel to measure

elapsed time. The Waltham Civil Date, used by the Navy, indicative of American cockpit clocks, featured a hack button and a dial date indicator.

Wristwatches for men, who did most of the flying and fighting, really didn't take off until the 1930s, helped by the popular images of two aviators: Santos and Lindbergh. Lindbergh completed his famous flight in 1927 wearing a Bulova that was the only timepiece in the aircraft. He later asked Longines to develop a pilot's wristwatch to his specifications.

By the mid 1930s wristwatches had almost completely supplanted pocket watches as the personal timepiece of choice and watch manufacturers began paying serious attention to this

market. With the thunder of war reverberating around the globe, several governments delineated specifications for pilot wristwatches and aircraft clocks, spurring another round of innovation. New movements, moisture, vibration and shock resistance, anti-magnetic casing, crystals, luminescence and additional complications and functions were developed during this period and have become standard offerings in today's contemporarily marketed watches. Manufacturers included Benrus, Bulova, Hamilton, Seiko, Glashütte, IWC, Smiths, Stocker & Yale, Zenith and a host of other companies whose fortunes grew in response to supplying time for the war efforts of their respective countries.

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The Longines Lindbergh watch  
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## Of quartz, chronometers and wristwatches

While the quartz timing mechanism (which actually filled a room) was invented in 1927 by J.W. Horton and Warren A. Morrison, it was Borg-Gibbs in Delavan, Wisconsin, that made the mechanism fit into a clock. They delivered the first of ten electronic chronometers to the Naval Observatory in 1943 and, in the process, put a clear definition on the bandied-about term "chronograph."

By Naval standards this was a watch that would perform within specified deviations and was tested under varying conditions in five positions. The military's need for more precise timekeeping had been established and helped set the tone for all flight and nautical timekeeping. Specifications for more sophisticated wristwatches followed suit, including those made with quartz. In 1980, thirty-seven years after the deployment of the quartz timing mechanism, Stocker & Yale, of Beverly, Massachusetts, produced the Military Type III-Class A self-luminous auto ranging chronograph.

## Specs and hacks

In 1943 the Bureau of Aeronautics released their specifications for the Type A-11 Hack watch, which were basically the same as the familiar round-dial Army specified watches of the 1940s, but with some significant changes.

The aeronautic variant specified 15 jewels to the Army's seven, a flawless glass crystal, a black dial with luminous hands, and capability to perform after a series of shock, temperature and water-proof tests. These watches were supposed to be completely American-made, except for the jewels. They were based on the designs that had been used by the Army and its pilots between the wars, exemplified by the Hamilton Watch Company's Military Products Division. These watches were virtually indistinguishable from each other, made by the truckload and produced by Bulova, Elgin, Hamilton and Waltham.

The Breitling Chronomat  
(Kurt Broendum)



Breitling's Original Navitimer



Jeff Clyman, founder and CEO of Cockpit, a civilian and military apparel manufacturer and who is also the founder of the American Airpower Museum in Farmingdale, New York, literally grew up around flight watches and was clearly influenced by them. He has collected hundreds of flight watches over the years.

"My collection of military wrist instruments—aka military flight watches—began when I first saw my father's pilot's "hack" watch from WWII and was fascinated by the concept of synchronizing the time readouts on an entire fighter squadron's watches," he says.

"Later as I began flying, I became fascinated with the pilot's watch and military timepieces designed to perform functions other than the simple telling of time." Some of these functions include arriving at rendezvous point, calculating time over target and the concept of Zulu time, or 24-hour time.

"I particularly like the WWII Benrus, Longines or Hamilton American airman's hack watch, the Seiko quartz NATO pilot's watch and the Swiss IWC time

piece used by both allied and German pilots, all of which really define simplicity and accuracy without a lot of fluff," Clyman adds.

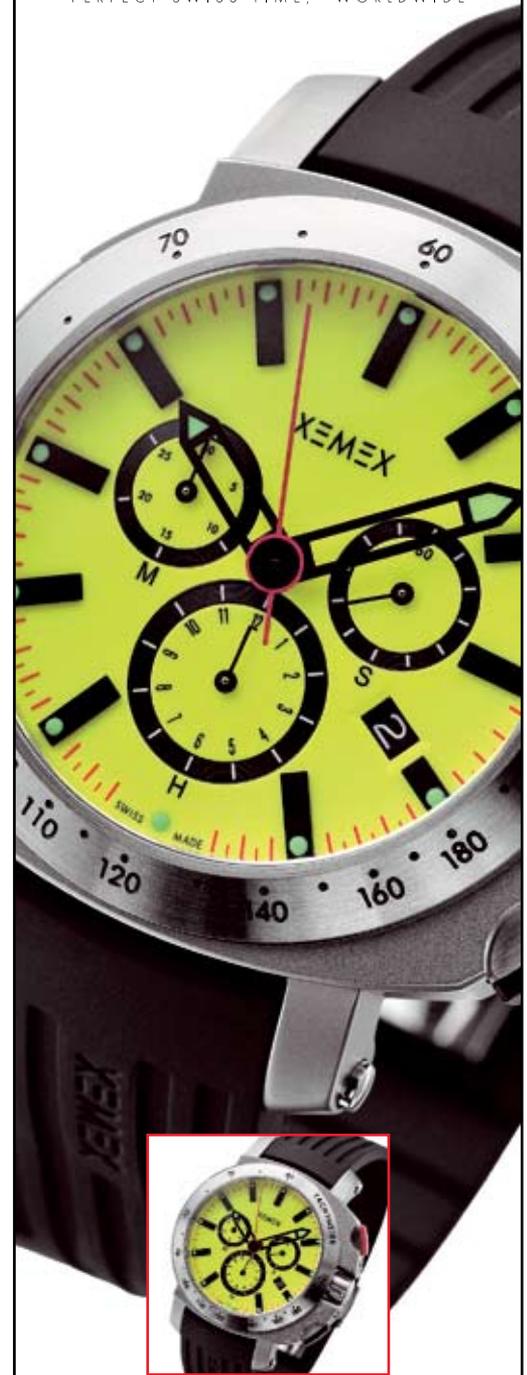
#### In Europe

The famous German precision evident in Luftwaffe airplanes was also found in air watches, like the massive Beobachtungs-Uhren ("B-Uhr") observer's watch that measured 55 mm in diameter excluding crown, made for the WWII German Luftwaffe by A. Lange & Söhne. These large watches contained high-quality pocket-watch movements and were attached to the arm with long leather straps that fit around the outside of the flying jackets.

It was during World War II that IWC created the first over-size anti-magnetic pilot's watch, followed by the famous Mark X, featuring its new in-house movement, Calibre 83. In 1944, IWC had a close call when the Allies mistakenly bombed Schaffhausen, where IWC's factory was located. The factory narrowly escaped destruction and continues to produce watches today.

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A Wakmann 8 Day, exterior and interior



The Beobachtungs-Uhren ("B-Uhr") observers watch measured 55 mm in diameter.



A MIG cockpit clock

One big breakthrough in watch technology occurred in 1940, when three Swiss companies released wristwatch variants of the slide rule pocket watch (originally traced back to the French Meyrat & Perdrizet model released in 1890).

A slide rule watch features an analogue calculator that will allow a pilot to accurately calculate things like fuel burn, wind correction and travel times. One storyline traces the history of the slide rule wristwatch to the Girard-Perregaux Mimo-Loga, introduced in 1940, then to the Breitling Chronomat, patented roughly around the same time in 1941 or 1942, and finally to the Juvenia Arithmo, released in 1945.

The Breitling Chronomat proved an attractive, enduring design with variants made today, albeit with the addition of quartz movements and digital displays. This watch set the stage for the Navitimer, which, as a result of

generations of aggressive marketing, has come to represent flight watches to many civilians. As technology advanced and marketers responded to the demand for "pilot's watches," flurries of military-themed watches were brought to market.

**After the war, into space**

Post World War II also saw advances in the cockpit, with chronograph clocks being offered by Wakmann-Breitling, Hamilton-Elgin, LeCoultre that added new features like 12/24-hour time, civil date, flyback and elapsed time.

Taking time into space was an altogether new challenge. In 1960 NASA asked Bulova to incorporate Accutron electronics, representing the first electronic clock into its computers for the space program. Bulova timing mechanisms eventually became an integral part of forty-six U.S. Space Program missions. Spacecrafts themselves featured a vari-

ety of timepieces, with the primitive panel on the Mercury series featuring no less than six clocks, mounted in the center of the cockpit panel.

However, astronauts, being pilots, clung to the tradition of wearing their own timepieces. Yuri Gagarin wore the first wristwatch into space; a mechanical Sturnamskije model chronograph. Scott Carpenter popularized the Breitling Navitimer Cosmonaut when he wore it on his Aurora 7 mission. It was the Omega Speedmaster, originally designed for racetrack timing that became the watch most closely tied with the space program when it beat out several competitors in 1963 as NASA's watch of choice for the Apollo program.

Of course this changed by the early 1970s and the advent of the



This Bulova Accutron ad features a reference to its use on-board Apollo.



A look inside the cockpit of a Seneca GURW

Soyuz and Skylab programs. “Astronauts had the option of wearing two watches in space, and lots of digital watches began riding up in the early 1970s,” observed astronaut Jim Lovell. The advent of quartz timekeeping introduced a new element into the cockpit and set standards for accuracy that remained until analogue dials were replaced with digital readouts.

### 1980s to today

On July 30, 1980, the Department of the Navy put out an aircraft timepiece specification that was applicable to all branches of the armed forces. It called for a manually wound eight-day clock with not less than a 15-jewel movement.

It might seem odd that when quartz and electrically operated clocks had set new records for accuracy, that the military would specify a manually wound clock. But note that pilots still prefer an analogue clock to the now ubiquitous digital cockpit options.

“The first electric clocks were just electro mechanical, like car clocks made in the 50s. A solenoid would wind it every few minutes. The rest were like alarm clocks, cheap. Borg made one that was like an electric clock of the 50s that ran on 117 volts. Second hand on these moved smoothly with no jumping like quartz or mechanical. As for digital, I think it is an option that nobody likes, but is found on most planes. The bigger planes have both, with the mechanical one as back-up,” explains pilot Ray Brack.

### What pilots use

Today’s pilot has a dizzying array of flight watches available and is surrounded by a modern cockpit with a sophisticated assortment of timekeeping instruments designed to work in tandem with the other instruments on the panel. And many manufacturers have jumped into the flight watch category. Now, there is a

line between flight styled watches and true flight instruments.

The Graham Chronofighter, Glycine’s Plaza Mayor, the Aviator Hi-tech and the Bell & Ross BR series are all exceptional-looking watches that are inspired by flight watches but can safely be said to make their statement in the boardroom or bar rather than to time events in the cockpit.

Others, like pilot’s models from Blancpain, IWC, Breguet, Breitling, Longines, utilize some basic design elements in either the dial, movement or case that have a direct link back to watches made by these companies that were made for aviators.

While they look like aviation watches, many of them are not particularly suited for aviation use, says pilot G. J. Buyhoff, who prefers Breitling (the B-1, Aerospace and Emergency), Omega (X-33, Seamaster 120 Multifunction), Casio, Citizen and Seiko in the cockpit.

Below: The Citizen Skyhawk



The RAF Seiko Chrono  
(E. C. Frederick)



Torgoen T1 Computer Flight Watch

“I look for a watch that’s rugged, has a chronometric readable function that acts as a timer and is easily readable so when the flight data computers crap out or your HUD takes a dump, you can always use the watch for dead reckoning,” says Cockpit’s Clyman.

“I like the simplest watch with the most readable face and if possible a function that’s both analog, has a self-contained backup light and is water resistant.”

Clyman wears a variety of watches. “If I am flying a WWII fighter I wear an actual IWC or Hanhart mechanical or even a vintage IWC. I keep a Timex Indiglo Ironman always tucked into a pocket as backup. For flying tactical jets I wear a lighted Casio G shock or a NATO Seiko chrono. Sometimes I’ll wear a mechanical British Rolex military with an electric digital tucked into a pocket,” he explains.

### Cockpit suggestions

Clearly, for real pilots there is no shortage of watches, from the traditional manually wound or automatic slide rule watches to the very slick digital watches featuring multiple time zones and atomic clock accuracy.

Seiko makes a variety of professional-level flight computer watches, with the incredible World Timer leading the pack for multiple features. It’s a solid, no-nonsense flight watch that is also, unfortunately, out of production and available only on the secondary market. If you can find one, grab it.

A similar watch, the Citizen Skyhawk AT, is currently in production and features radio-controlled accuracy and light power. Citizen’s new fully loaded Skyhawk redefines atomic timekeeping with radio controlled accuracy and Eco-Drive technology.

An inexpensive option is the Torgoen T1 Computer Flight Watch (Model T1.02.02.S02),

considered by some “a poor man’s Breitling.” The T1 Flight Computer Watch can be used to calculate time, distance and speed equations, but can also perform a variety of calculations from currency conversions to multiplication and division problems.

On a collector’s level, digging up obscure and wearable flying watches can be a rewarding treasure hunt. An entire collector’s niche has also grown around aircraft clocks, instrument panels and pilot’s kits. (For collector’s looking for rare and unusual flight watches, the Heirloom Gallery in Singapore has an incredible selection, as evidenced by some of the photos they provided for this article.)

If you grow into this hobby, start observing what actual pilot’s wear when flying. When your knowledge base evolves from what you’ve learned through marketing, to what you’ll learn through experience, you’ll be amazed at what timepieces actually take flight. ☺