

MARCOS CESAR DANHONI NEVES, ARLINDO ANTONIO SAVI, SABRINA CAMARGO, DAVID CLÍSTENES FURONI DE LIMA, ERNANI ANDERSON, FABIANA RIBEIRO DE ALMEIDA, FRANCIANA PEDROCHI, FRANCIELLE SATO, GISELE STRIEDER PHILIPPSEN, GUSTAVO MAX DEARO SIMONETTI, IARA FRANGIOTTI MANTOVANI, ÍRIS ANTONIO MAEDA, KELLY CHRISTINE DA SILVA, KLETO MICHEL ZAN, MARCELO FREITAS DE ANDRADE, MÔNICA BORDIM SANCHES, TATIANE CRISTINA DE OLIVEIRA

*Educational Tutorial Program (PET)/Visual Creation Laboratory (LCV)
Physics Department, State University of Maringá, Brazil. E-mail: macedane@yahoo.com*

Santos-Dumont's invention of the first airplane propelled by own motors against the Wright brothers fallacy in the North American historiography of air technology

Abstract. The history of aviation is provided starting from Santos-Dumont's paramount invention of a heavier-than-air flying machine after a long experience with dirigible balloons. Our research involves a great number of exhibitions in Brazil on the Brazilian inventor and on the rivalry with the Wright brothers. The Wright Brothers may not be credited with the invention of the heavier-than-air flying machine since there are no public recordings of their inaugural flights and, chiefly, because their Flyer was catapult-propelled.

I. INTRODUCTION

This year the United States are commemorating the event that they consider the centennial of the invention of the heavier-than-air or, in other words, the airplane, by the Wright Brothers. According this historical reconstruction, in 1903, in Kitty Hawk, the Wright Brothers would have made a flight with an airplane, the "Flyer". The strange fact is that nobody, besides Wright Brothers, saw this flight. There is not any official and believable registration of this fact, besides the Brother's writings.

On the other side of the History, 1906 is the year that the first flight of a heavier-than-air was realized and registered at Bagatelle, France. The flight was made by Alberto Santos-Dumont, winner of the international Archdeacon's Prize. According the review "La Nature":

"September 13, 1906, will be a historic day, because, for the first time, a man rose in the air by his own means. Santos-Dumont, without quitting his works on lighter-than-air machines, also makes very important studies on heavier-than-air machines. It is now clear that he succeeded in flying on this noteworthy day in front of a numerous public ... It is a fact that he himself rose in the air, without a balloon. Really it is an important victory for the supporters of heavier-than-air machines". The 23rd October is a victory of "heavier- than-air machines. Santos-Dumont demonstrated indisputably that it is possible to rise from the ground by one's own means and maintain oneself in the air".

The present paper will treat about this historical reconstruction, pointing out the fact that the north-american history created a legend about the invention of the airplane, disrespecting the

whole historical registration and the proper conception of what is a controlled flight (*take-off, dirigibility, landing* - Wright's airplane was impelled by a kind of catapult, what harmed the initial stage of a controlled flight).

II. HISTORY OF SANTOS-DUMONT'S INVENTIONS

Alberto Santos-Dumont was the youngest son of a Brazilian plantation owner, Henrique Dumont, engineer and adventurer of sorts, known as the Coffee King of Brazil. Santos-Dumont was born in the state of Minas Gerais, in Brazil, on July 20th 1873.

When still a young man he greatly appreciated the novels of Jules Verne. He wrote: "With Captain Nemo and his shipwrecked guests I explored the depths of the sea in that first of all submarines, the Nautilus. With Phileas Fogg I went round the world in eighty days, in Screw Island and the Steam House my boyish credulity leaped to welcome the automobiles which, in those days, had not yet a name." (Winters, 1997)

In his childhood Santos-Dumont was at ease with the intricate machinery of coffee mills and the workings of their various machines - pulp makers, separators, skimmers and ventilators - but also with their power and frailty. These engines helped him in developing his ideas from a type of machine with quivering parts to a rotation-equipped one.

When Alberto moved to Paris by the end of 1890s, the big balloons still lacked steerage, weighed up to 500 pounds and no prediction as to where or when they might land was possible. In 1898 he created the tiny artifact called "Brazil", a light spherical 13m³ balloon made of Japanese silk and bamboo. The latter weighed only 44 pounds and the whole apparatus was equipped with an engine mounted on a basket.

Alberto Santos-Dumont continued to experiment with motors, fuel, ballast, steering, rigidity and size, usually working against all the established principles of the day. Among his early progress, besides his boldness in combining an internal combustion engine with explosive hydrogen, one may mention the hanging of the gondola from ropes attached to the base of the balloon, instead of the traditional heavy network of ropes covering its entire surface. Another novelty was his development of a means for controlling ascent, descent and altitude through a series of movable weights, rather than solely by releasing gas or shedding ballast.

Santos-Dumont shunned the idea of using steam engines in dirigible balloons, since they are "weak in proportion to their weight and spitting red hot coals", he remarked. His familiarity with automobiles struck him with the idea of using a petrol motor. He said, "My experience in automobiles has stood me truly with my airships. I owe all my success to the combustible engine." (Winters, 1997).

After the construction of five balloons, Santos-Dumont had his first big success when he was awarded the prestigious DEUTSCH PRIZE for a half-hour controlled flight around the Eiffel Tower in his cigar-shaped dirigible Number 6. He made the flight in 29 minutes and 30 seconds.

Alberto then worked on another airship, the Number 7 - the "Racer". (Ironically there was no one to race with him). The airship flew on Bastille Day under the very eyes of the entire French army of 50,000 soldiers and 200,000 spectators.

Presently he went to St. Louis, Missouri, in the United States, to advise the planners of the 1904 fair on the organization of airship races, stopped in New York to meet Thomas Edison, and advised Teddy Roosevelt and Admiral Dewey on the first steps in aviation.

Alberto built the Number 9 or *La Baladeuse* (the Stroller). (Number 8 is missing, probably because of the terrible accident during the flight of Number 5 when he remained hanging on the Trocadero Hotel on the 8th August 1901). Santos-Dumont used this balloon as his little runabout, as one might nowadays do with a favorite sports car or convertible for jaunts around the countryside. In fact, he used to operate landings for lunch at La Cascade, a favorite restaurant at the edge of the Bois de Boulogne, and then touched down in front of his corner house on Rue Washington where his valet, Charles, had coffee waiting.

Project Number 10, the *Omnibus*, was a 42 meter-long semi-rigid balloon designed to carry up to ten passengers.

Number 11 was a glider, towed behind a boat, which was later redesigned as a twin-propeller aircraft.

A helicopter, project Number 12, was constructed during 1905 and 1906. However, the machine never left the ground since a suitable engine could not be found.

The editor of *The Times* wrote in 1906: "From an engineering standpoint all attempts at artificial aviation are not only dangerous to life but doomed to failure." With similar pessimism, Sir Stanley Mosely said: "It is complete nonsense to believe flying machines will ever work."⁵

Nevertheless, *le petit* Santos-Dumont, as he was called, ignored all obstacles and constructed project Number 14, a hybrid consisting of a dirigible (Number 14) mounted over a kite section, propelled by a more powerful engine, called "14-BIS". Later on, he destroyed the "monstrous hybrid", as this strange "double" machine was referred to.

In 1906 Santos-Dumont enrolled for the ARCHDEACON PRIZE. Actually the competition awarded two prizes, or rather, 1,500 francs from the Air Club for the FIRST HEAVIER-THAN-AIR FLIGHT of 100 meters, and a 3,000 francs reward from Ernst Archdeacon, the club's new president, for a flight of just 25 meters.

After two attempts, in the presence of judges and officials, on the Bois de Boulogne, the 14-Bis left the ground long enough for a huge cheer to go up, before it stalled and returned to the ground with a shattered propeller.

He repaired the machine and a month later, at 8 p.m., on the morning of the 22nd October 1906, he was ready to make the first flight on a heavier-than-air machine. At 4 p.m. of that historical day for humanity, after nine runs, the 14-Bis rose from the ground, described a "graceful curve", and descended again to the ground: *a small flight for a man but a great flight for humanity!*

The judges were excited with the distance traveled: some 60 meters at a height of 2 to 3 meters: "Man has conquered the air!" screamed the crowd.

Santos-Dumont was not satisfied with "60 meters" and on the 12th November 1906 he called the judges once more. But another competitor was on the field too: Louis Blériot, with a biplane furnished with an engine very much like that of the 14-Bis. It had also been built with the help of Gabriel Voisin. With his legendary courtesy, Santos-Dumont insisted that Blériot would precede him: *"Would Monsieur care to fly first?"*

After several runs the Blériot biplane was totally wrecked without ever having taken off.

⁵ The "impossibility" of the flight of a heavier-than-air was an ingrained faith among the population and same among the men of science and of the specialized media. Old myths and unsuccessful flights (including the death of Lillienthal) gave credit of this "faith", especially the mythical history of Ícarus and the frustrated "flights" of fragile machines with mechanical conceptions that edged the absurdity.

Santos-Dumont then hopped into the wicker seat of the 14-Bis equipped with the the first ailerons, and after a few preliminary lifts, rose into the sky: the distance of this flight was 220 meters. An obelisk was set up at Bagatelle, in Paris, to celebrate the event: IN THIS PLACE ON 12TH NOVEMBER 1906, UNDER THE CONTROL OF THE AIR CLUB OF FRANCE, SANTOS-DUMONT ESTABLISHED THE FIRST AVIATION RECORD IN THE WORLD. DURATION OF FLIGHT 21.2 SECONDS, DISTANCE 220 METERS.

The new project was the airy little Demoiselle (Dragonfly), made of bamboo and Japanese silk. It was 8 meters long and weighted less than 56 kg. Since the airplane was copied around the world, Santos-Dumont used to boast: "I AM PROUD TO SAY THAT I HOLD NO PATENTS."

III. SANTOS-DUMONT ON THE QUESTION OF THE "FIRST FLIGHT"

On the Wright Brothers' question with regard to man's first flight, Santos-Dumont said, "I would not like to undermine the Wright Brothers' merit. I admire them very much. However, I insist that only after our achievements did they arrived with a more advanced machine, boasting that it was a copy of a machine they had built prior to ours" (Villares, 1953). Further, some time after the arrival of the Wright Brothers, Levavassor came up with his airplane, called Antoinette, which was superior to anything that existed up to that time. Levavassor had already worked during some twenty years on the problem of flight. He could have said that his machine was a copy of another that he had built many years before, but he refused to do so. What would Thomas A. Edison, Graham Bell or Guillermo Marconi say if, after publicly exhibiting the electric lamp, the telephone and the wireless, another inventor claimed a better electric lamp, a better telephone and a better telegraph, stating that he had invented them prior to the above gentlemen?! Whom does mankind must thank and honor for heavier-than-air navigation? Shall it be the Wright Brothers, whose experiments were hidden from all (they themselves stated that they had done everything in silence so that the results of their experiments would not be published abroad) and unknown to everybody, to the point that everyone characterized my 250 meters as the "most memorable minute in the history of aviation", or shall it be to Farman, Bleriot and to Santos Dumont, who demonstrated our inventions in front of scientific committees and in day light?

IV. THE INTERNATIONAL PRESS AND OTHER SOURCES ON SANTOS-DUMONT'S INVENTIONS

Below we shall transcribe some contemporary news on the inventions of Santos-Dumont:

NEW YORK TIMES [April 11th 1902]:

"For a while the airship will be chiefly useful for war operations; later commercial advantages will develop. Numerous advantages will be perceived even before the flying machine is an accomplished fact. Such a machine, which is very different from an airship, will doubtless be invented one day, but the time has not arrived yet."

(...)

"Santos-Dumont said: Certainly the Marconi system can be used on my ship. I have the apparatus already."

(...)

"Here the inventor coined a word, saying that he expected the city to become the principle 'AIRPORT' of the world in less than a score for years."

NEW YORK TIMES [April 14th 1902] after the meeting between Santos-Dumont and Thomas Edison:

"Dumont came to West Orange to concede a wish, which was mutual, to meet Thomas Edison."

ILLUSTRATION [November 22, 1906]

"C'est la première fois qu'un aéroplane à moteur, monté par un homme, prend son vol librement."

["It is the first time that a motor-driven airplane, constructed by man, goes for a free flight."]

THE ILLUSTRATED LONDON NEWS [November 3rd 1906]

"One step close to flying; new machine to conquer the air. The first flight of a heavier-than-air machine; Santos-Dumont winning the Archdeacon prize."

LA NATURE (September 13, 1906)

"La journée du 13 septembre 1906 sera désormais historique, car, pour la première fois, un homme s'est élevé dans l'air par ses propres moyens, Santos-Dumont, sans cesser ses travaux sur le "plus léger que l'air" fait aussi de très importants études sur le "plus lourd que l'air", et c'est lui qui est parvenu à "voler" en ce jour mémorable devant un public nombreux ... il reste un fait acquis c'est qu'il s'est élevé dans l'espace, sans ballon, et c'est une victoire importante pour les partisans du "plus lourd que l'air". C'est donc maintenant (23 octobre) la victoire complète du "plus lourd que l'air"; Santos-Dumont a démontré de façon indiscutable, qu'il est possible de s'élever du sol par ses propres moyens et de se maintenir dans l'air."

["September 13, 1906, will be a historic day, because, for the first time, a man rose in the air by his own means. Santos-Dumont, without quitting his works on lighter-than-air machines, also makes very important studies on heavier-than-air machines. It is now clear that he succeeded in flying on this noteworthy day in front of a numerous public ... It is a fact that he himself rose in the air, without a balloon. Really it is an important victory for the supporters of heavier-than-air machines". The 23rd October is a victory of "heavier- than-air machines. Santos-Dumont demonstrated indisputably that it is possible to rise from the ground by one's own means and maintain oneself in the air".]

ILLUSTRATION [June 6th, 1908] on the alleged flight by the Wright Brothers:

"Ce document est une épreuve sur papier photographique. Mais est-ce une photographie? L'aspect est bien équivoque et on y remarque tous les caractères d'un truc."

["This document is an illustration on photographic paper. But is it a photograph? There is something fishy! Someone has noted the possibility of a trick"]

JOHN R. MacMAHON [defender of the Wright Brothers, apud H.D. Villares]

"The first formal public flight of the Wright machine in America was made at Fort Myer on September 4, 1908."

MARCEL REICHEL [recognized authority of aviation, 1936]:

"Le premier vol en public, celui par lequel le monde entier sut que l'homme réalisait enfin le rêve millénaire et s'élançait à la conquête du ciel date d'il y a trente ans: c'est le 13 septembre 1906 que Santos-Dumont, victorieux pionnier déjà du ballon dirigeable, ouvrit officiellement les routes de l'air aux jeunes ailes de l'Humanité."

"The first flight in public, the one through which the whole world knew that man finally achieved the millennial dream to the conquer the heavens, dates some thirty years ago: on September 13, 1906 Santos-Dumont, victorious pioneer of the already dirigible balloon, officially opened the roads of space to the young wings of Humanity."

HUGH YOUNG [in his autobiography written in 1940, about the 1910 flight of the Wright Brothers]:

"A pylon was erected at each end of the oval. Wright was there with his biplane, which was provided with two skids. The plane, with its rear end about five feet from the ground, was placed on a runway. At a signal, a trap was sprung, a weight descended, the machine shot forward down the inclined runway and slowly rose in flight at a speed of perhaps twenty-five miles an hour."

N. H. RAMDERS-PEHRSON [in his *History of Aviation*, Congress Library, Washington, 1950]:

"As the wind velocity was between 22 and 27 miles, the down-hill start was unnecessary and the launching track, a single wooden rail, was laid out on level ground."

(...)

"For the first trial, the press was invited, but the wind was not strong enough for starting. The early Wright airplanes could not take off without assistance of a head wind. To make starting possible in calms, a derrick was constructed with a falling weight which pulled the flyer along the track until it had sufficient initial velocity to rise."

GEORGES BESANÇON [director of the French Air-club for several years]

"Ce qui nous semblera incroyable, à nous autres Parisiens, qui avons vu la foule se ruer à Bagatelle lors des premières tentativas de Santos-Dumont, c'est que cinq personnes seulement assistèrent à l'éclatant succès' des frères Wright."

["It seems incredible to us, people of Paris, who saw the crowd rushing to Bagatelle at the time of the first experience of Santos-Dumont, that only five people attended the 'vivid success' of the Wright Brothers".]

PRESIDENT BILL CLINTON (1997)

"Already Brazil has given so much to the United States. You have given us artists (...), innovative writers (...) and explorer from Alberto Santos Dumont, THE FATHER OF AVIATION ..."

V. SOME CONCLUSIONS

The state of the question on the true inventor of the first heavier-than-air machine boils down to the following points (Villares, 1953):

a) After Lilienthal's death and the transference of experiments on gliders to the United States was undertaken by Chanute and Langley, the brothers Wilbur and Orville Wright started their experiments on glided flights at Kitty Hawk. Later they moved to Dayton in Ohio;

b) Experiments by the Wright Brothers at Kitty Hawk and at Dayton were not a source of interest or curiosity in the neighborhood. Similarly, they did not cause any commotion to passersby, especially on a nearby road with heavy traffic; neither did they have any trusted witnesses. On a certain occasion the Wright Brothers invited newspaper reporters to see their experiments. Octave Chanute was one of them and, as an eyewitness, remarked that there was no takeoff. Since true witnesses of the alleged flights were lacking, supporters of the Wright brothers brought forth a supposed diary in which the two brothers *themselves* took notes of their achievements.

c) In 1904 the Wright Brothers requested from the British government patents for an "engine-less glider" which they themselves had invented. Isn't this fantastic, since they had supposedly flown on a machine equipped with an engine a year before?

d) In 1905 the Wright Brothers sent a letter to the US War Ministry in which they proposed the building of a flying machine. No plans or specifications were forwarded. The authorities replied that before taking into account the suggestions, they would appreciate a demonstration on the practicability of the enterprise or, in the official correspondence's own words "The device must have been brought to the stage of practical operation". However, the Wright Brothers insisted on the theme, even though the War Ministry replied that it would be interested only when the device has been built and was actually able to fly horizontally with a pilot on board. The original text says: "It is recommended that Messrs. Wright be informed that the Board does not care to formulate any requirements for the performance of a flying machine or take any further action until a machine is produced which by actual operation is shown to be able to produce horizontal flight and to carry an operator." In the wake of such a positive and momentous reply, the Wright Brothers gave up since they failed to obtain any support from the US government.

e) In the same year 1905, in a letter to the French captain Ferber, who had been highly enthused in glided flights, the Wright Brothers declared that they had decided to interrupt their experiments so that the secret of their invention could be kept safely. No experiments were undertaken during almost three years.

f) In 1906 the Wright brothers suggested to the French government the selling of a flying machine which they had kept in utmost secrecy, without however, any demonstrations of practicability. Since they failed to interest the French government, the two brothers tried to impress industrial groups with the secret invention. No results ensued since industrialists obviously required proofs that the device would demonstrate the publicized qualities.

g) Once more the Wright Brothers tried to interest the French government. Strangely enough they refused to comply with the conditions imposed by the French War Ministry.

h) According to the opinion of the trustworthy Ferber, who was their broker in many negotiations, the Wright Brothers "became uneasy since no one was interested in their invention. Santos-Dumont, Delagrange and then Farman began to cause a sort of sensation [with their respective inventions]".

i) In 1907 the Wright Brothers decided to go to Europe so that they could personally maintain negotiation for the selling of their invention. However, they still refused to give a public and definitive proof. During this period, Santos-Dumont, Voisin, Blériot, Farman and Delagrange were flying heavier-than-air machines.

In 1908 the Wright Brothers finally undertook in Europe their first experience with the machine they had built. It was verified that the machine was not able to take off with its proper means. It had to be launched in the air by a catapult built on a rampart. This was the famous pylon, a system with counterweights to give the initial impulse and extensive rails on which the machine rollers, not wheels, glided to move along a path. Without this complex launching system the Wright Brothers' airplane was incapable of rising itself from the ground.

The caricature of a US war veteran in Schwartz&McGuiness (2000) clearly shows the effect of *propaganda* and US will of superiority. We have chosen this picture at the end of this article to illustrate not merely US ideology and establishment, but chiefly to ward off the threat that may be imposed by the USA in 2003 to convince the world on the centenary of the invention of a heavier-than-air machine made by Americans. They will try to convince all that illusion is more real than down-to-earth facts and trick everybody once more on the account that propaganda is the true core of business.

This means, of course, that nothing can go faster than the speed of light.



Nothing faster than the speed of light? Nonsense! Un-American! We cracked the sound-barrier and by golly we'll crack the light-barrier!

Nothing faster than the speed of light!?? Now I've heard everything

ACKNOWLEDGEMENTS

We would like to thank SESu-MEC in Brazil for their financial support of the Educational Tutorial Program (PET)

RECOMMENDED BIBLIOGRAPHY

- CLARKE, A. *O Homem e o espaço*. Rio de Janeiro: José Olympio Editora, 1969.
- CLINTON, B. *THE WHITE HOUSE Office of the Press Secretary (Brasilia, Brazil) - Remarks REMARKS BY PRESIDENT CLINTON AND PRESIDENT CARDOSO AT RECEPTION* <http://clinton3.nara.gov/WH/New/SAmerica/19971013-5152.html>, October 13, 1997
- FLEURY, R.S. *Santos Dumont*. São Paulo: Melhoramentos, s/d.
- HIPPÓLYTO DA COSTA, F. *Santos-Dumont, história e iconografia*. Natal: Ministério da Aeronáutica, 1982.
- INSTITUTO CULTURAL ITAÚ. Santos-Dumont. São Paulo, 1996.
- JORGE, F. *As lutas, a glória e o martírio de Santos Dumont*. São Paulo: Nova Época Editorial, 1973.
- MICKY FOR KIDS. *Máquinas Voadoras. [encarte de brinquedo]*. São Paulo: Grow, 2001.
- SANTOS-DUMONT, A. *O que eu vi, o que nós veremos*. São Paulo: Hedra, 2000.
- SANTOS-DUMONT, A. *Eu naveguei pelo ar*. Rio de Janeiro: Nova Fronteira, 2001.
- SCHWARTZ, J. and McGUINNESS, M. *Introducing Einstein*. Cambridge: Icon Books, 2000.
- VILLARES, H.D. *Quem deu asas ao homem: Alberto Santos-Dumont, sua vida e sua glória*. São Paulo: Empresa Gráfica da "Revista dos Tribunais", 1953.
- www.rudnei.cunha.nom.br/FAB/eng/santos-dumont.html ALBERTO SANTOS-DUMONT: *Father of Aviation*.
- WINTERS, N. *Man flies: the story of Alberto Santos-Dumont, master of the balloon*. New Jersey: The Ecco Press, 1997.
- <http://www.escolainternacional.com.br/ingles/feiraciencias/aviao.htm> The sky is the limit
- <http://www.centennialofflight.gov/centennial/brazil.html> Brazil's History of Flight -
- http://poa-mde.yazigi.com.br/project_is4_didyouknowthat_santosdumont.htm ALBERTO SANTOS-DUMONT
- [vhttp://www.angelfire.com/art2/unicorndreams/sffrpg/Technlgy.html](http://www.angelfire.com/art2/unicorndreams/sffrpg/Technlgy.html)