PANAMA IN WORLD WAR 2 – BARRAGE BALLOONS

Barrage balloons were amongst the defences deployed during the war to protect the locks and other vital elements of the Canal. As with anti-torpedo nets that were deployed, and the "killer curtain" used to protect the Pedro Miguel Locks,[1] the balloons would or should deter torpedo-bombers, dive bombers and other aircraft attempting low-level, and hence more accurate, attacks. Their connecting cables, and any others suspended from there, could be strong enough to wreck any aircraft colliding with them – and at night they would be virtually invisible.

Barrage balloons along the Canal

Essentially, the barrage balloon was a loose bag of lighter-than-air gas attached by a steel cable to the ground, and capable of being raised or lowered, including to the desired operational height, by winch.[2]

As with other elements of the defences of the Canal, the necessity of barrage balloons was not identified, or funded, as an important matter until, in the case of this form of defence, the war had already begun in Europe. There was then a rush to install them in sufficient numbers, utilising a US Marines unit as well as Army ones. Nevertheless, the first unit did not arrive until after the attack on Pearl Harbor had taken place,[3] and even then, by the time there were anything like sufficient numbers in place, the perceived

[1] For more on the aerial "killer curtain", of dubious use, and which managed to down only a US Army aircraft, see https://raytodd.blog/2025/10/10/panama-in-world-war-2-wartime-air-defences-in-panama/

[2] https://www.eaglespeak.us/2008/03/sunday-ship-history-behold-barrage.html

[3] Pearl Harbor had also lacked barrage balloons.

threat to the Canal was reducing to the point that troop levels and defences began to be reduced.

Until the start of the war in Europe, the US Army Air Corps (USAAC)[4] had received little support for the use of barrage balloons for defence against hostile aircraft. This was despite the French, British, Italians, and Germans having used barrage balloons during World War 1, and the Army General Staff having studied anti-aircraft defences in 1923.[5] There had followed a General Staff memorandum in January 1923, which sought opinions of the value of small captive balloons for the defence of limited areas, as a form of effective and relatively inexpensive defence for places such as the Canal.[6] The memorandum specifically mentioned defence of the Canal locks, the Gatun spillway, and the drydock at Pearl Harbor.[7]

The Chief of the US Army Air Service (USAAS), in response to the General Staff memorandum, said that he believed balloons would provide an effective and relatively inexpensive method of protection, and prevent more accurate bombing by forcing attackers to fly higher. He also mentioned the likely positive effect of their use on defenders' morale.[8]

A War Department Directive had made the USAAS responsible for development and use of barrage balloons in 1923,[9] but the Chief of the Coast Artillery Corps objected. Since the Coast Artillery had been made responsible for anti-aircraft batteries since 1917,[10] it felt that it should also control a balloon barrage. The solution was to divide

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[4] The US Army Air Service (USAAS) became the USAAC in 1926, and US Army Air Forces (USAAF) in 1941; the independent US Air Force came into being after the war in 1947.

[5] The US Army had only operated manned observation balloons during the war, and on the border with Mexico in 1916.

[6] As well as the Capitol in Washington, the White House, and important dry docks, wharves, factories, and bridges.

[7] *Barrage Balloon Development in the United States Army Air Corps 1923 to 1942* (USAAF Historical Division, December 1943).

[8] https://www.aahs-online.org/pubs/journals/files/341036.pdf

[9] *Barrage Balloon Development in the United States Army Air Corps 1923 to 1942* (USAAF Historical Division, December 1943).

[10] During World War 1, Coast Artillery Corps units had deployed to France, where they had also undertaken an anti-aircraft role.

the responsibility between the two, the USAAS developing equipment and the Coast Artillery controlling its use.

Work began at the USAAS Engineering Division at McCook Field in Ohio[11] to develop a type of barrage balloon for the protection of a limited area, and capable of reaching an altitude of 15,000 feet (4,572 metres).[12] Following experimental and model tests, the Type A-l barrage balloon was developed – later unofficially redesignated D-1, with future barrage balloons also given "D" designations.[13]

Given the parsimonious defence budgets between the wars, and a widespread lack of enthusiasm for barrage balloons, progress was slow, with only minor developments between 1923 and 1939. The situation was not assisted by the continuing rivalry between the USAAC (as the USAAS had become in 1926) and the Coast Artillery Corps.[14]

In 1926, the Engineering Division gave the Goodyear Tire & Rubber Company a contract for three Type D-2 balloons (at a total cost of $11,850),[15] which the USAAC and Coast Artillery Corps began testing at Fort Monroe, Virginia in 1927.[16] The D-2 resembled the Italian AP observation balloon of World War 1.[17] The balloons were soon transferred to Langley Field, also in Virginia, where USAAS facilities and personnel could be found, with Coast Artillery personnel also transferred there.

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[11] Later in 1927, the Division was renamed the Material Division and moved to the new Wright Field, also in Ohio.

[12] *Barrage Balloon Development in the United States Army Air Corps 1923 to 1942* (USAAF Historical Division, December 1943).

[13] https://www.aahs-online.org/pubs/journals/files/341036.pdf

[14] https://xbradtc2.com/tag/coastal-artillery/

[15] Designed by the Aircraft Development Company of Detroit.

[16] *Barrage Balloon Development in the United States Army Air Corps 1923 to 1942* (USAAF Historical Division, December 1943).

[17] The Avorio-Prassone was designed in 1915, and was also produced in the UK and used in the defence of London. Patented in the US in 1918, it was also tested by the US Navy.

Two of the three D-2 balloons would be lost, with tests continuing to 1930, when the survivor was retired, and there were no more funds to continue the testing. In fact, there would be no more experiments until the eve of US entry into World War 2.[18]

The plans for use of balloons in Panama being considered by the War Department at the time involved some 74 balloons, with a barrage at either end of the Canal. However, with continuing meagre budgets and competing calls on the funds that were available, the USAAC did not pursue the program after the three balloons from Goodyear had been used up in tests and experiments.

During the mid-1930s various proposals were put forward for use of balloons to protect marching columns and airfields. The latter progressed so far as to have the Chief of USAAC recommend that it be reviewed by the General Staff. However, the response was that it was not considered of importance, and the time and funds could be spent on projects considered necessary.[19]

Excavation and balloon bombing station, Lake Cocoli, at the third set of locks on the Pacific side, 1944.

In 1937, an informal barrage balloon conference was called by the Assistant Chief of the Air Corps, General Arnold (a future head of the Air Corps), at which the Coast Artillery Corps argued that funds could be better used for active anti-aircraft projects,

[18] https://www.aahs-online.org/pubs/journals/files/341036.pdf
[19] Ibid.

with the General Staff of the same opinion.[20] At the meeting, only the USAAC was in favour of further experiments with barrage balloons – wanting to establish a barrage balloon program based on similar programs then being inaugurated by the British and the French. However, all present were content to let the USAAC continue development, by the USAAC, and using its funds only – with just $5,000 available in the 1938 appropriations.[21]

By then, plans for balloon barrages to defend the Canal had been dropped, and the $5,000 in USAAC funds was used to buy a further single balloon for more experiments. It is worth noting that, at this time, both the British and French were investing in sizeable barrage balloon programs.

In 1938, a USAAC study[22] made a strong case for further development of balloons. As a result, in 1939, the 1st Balloon Squadron was formed at Fort Sill in Oklahoma, where the single Type D-2a balloon that had been purchased with the 1938 funds was sent for testing.[23] It was sent to the Canal Zone in 1939, to obtain data on deterioration in storage there. The D-2a was a dilatable type[24] of 15,000 cubic feet and inflated using hydrogen.[25]

Meanwhile, the outbreak of war in Europe in September 1939 had persuaded the War Department to pursue further development – with extensive use being seen of barrage

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[20] In 1937, General Arnold had already issued a directive to the Air Corps Board at Maxwell Field, Alabama, requesting a study be prepared at once on the employment of barrage balloons.

[21] *The US Army Barrage Balloon Program* by James R. Shock (Marriam Press), 2006.

[22] Air Corps Board Study No.40 "*Employment of Balloon Barrages*" (July 1938).

[23] This unit would be disbanded two months after the Pearl Harbor attack, so that the 1st Barrage Balloon Squadron formed a little later was a completely new unit.

[24] There were two basic types of balloons –

- Ballonet types had an internal air chamber that permitted the outer hull to maintain shape when there were changes due to temperature, air density etc. The ballonet principle is used in blimps to maintain both shape and trim.
- Dilatable types which had no interior chamber and was entirely filled with gas, using internal or external elastic lacing or cords to retain its shape during expansion and contraction.

Both types were made in World War 2, with the dilatable considered to be the most efficient in design, but the ballonet proved to be more practical. Later in the war, a positive pressure ballonet type was also developed with an automatic blower to force air in and maintain internal pressure.

[25] *The US Army Barrage Balloon Program* by James R Shock (Merriam Press, 2006).

balloons in Europe.[26] The General Staff ordered a study, and given the experience in Europe[27] (and with funding now flowing more freely), it is perhaps unsurprising that, in summer 1940, the USAAC made $50,000 available for barrage balloon equipment. In June, Goodyear-Zeppelin Corporation was awarded a contract for the first six low-altitude balloons for delivered by April 1941.[28] The newly-formed USAAC 1st Barrage Balloon Squadron was authorised to undertake service-tests.

A study commissioned by the General Staff reported in 1940. This was based on intelligence reports of British barrage balloons.[29] It recommended acquiring no less than 4,400 barrage balloons, including 200 for deployment in the Canal Zone. It was also estimated that 5,310 balloons could be produced by January 1943.[30]

Subsequent papers in 1940 laid out possible use of the balloons, including on coastlines to aid detection of incoming aircraft by forcing them to fly higher, to block attackers' routes, and use from barges or floats to defend water areas, including to deter minelaying aircraft.[31]

Meanwhile, in 1940, it was estimated that around 2,400 men would be required to operate 90 balloons in the Gatun Lake area, and 110 balloons in the area of the Pedro Miguel and Miraflores Locks.[32]

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[26] *Aviation in the US. Army, 1919-1939* by Maurer Maurer, (United States Air Force Historical Research Center (Office of Air Force History), 1987.

[27] The apparent success of balloons at Scapa Flow, protecting the Royal Navy Home Fleet, and over London were cited.

[28] *The US Army Barrage Balloon Program* by James R. Shock (Marriam Press), 2006.

[29] At the time, Britain had 44 squadrons, with 33,000 officers and men and 1,500 balloons. There were 10 squadrons protecting London with 500 balloons.
The author of the report, Colonel Lober, and an RAF officer, an expert in training personnel and operation of barrage balloons, later visited US West Coast and Canal Zone defences to give the benefit of their experience.

[30] *The US Army Barrage Balloon Program* by James R. Shock (Marriam Press), 2006.
Bear in mind the need for equipment other than the balloons themselves – such as winches, cables etc.

[31] https://www.aahs-online.org/pubs/journals/files/341036.pdf

[32] In 1942, the Canal Zone was second in priority for barrage balloons only to the Soo locks and canal between Lake Superior and the lower Great Lakes, which also had much-enhanced anti-aircraft gun defences.

Balloon at Fort Clayton
Photo courtesy of NARA Still Photographs Division

An airship tethered to a barge floats in the air in the Panama Canal Zone.
(Photo by CORBIS/Corbis via Getty Images)

June 1940 saw the first temporary barrage balloon training centre open in North Carolina, and the first balloon shipped to the Coast Artillery Corps by the USAAC.[33]

On 12 December 1940, the Joint Army-Navy Board decided that, while the Army was to be responsible for balloons at permanent naval bases, the Navy would be responsible for shipboard defences and "*such advanced bases as are not defended by the Army*".[34]

[33] This first balloon would be lost after just two days.
[34] *The US Army Barrage Balloon Program* by James R Shock (Merriam Press, 2006).

In February 1941, the Chief of the Air Corps, General "Hap" Arnold, requested that the barrage balloon program be transferred from the Coast Artillery Corps to the USAAC, although the Coast Artillery Corps remained convinced that it was the best service to operate them. The War Plans Division of the General Staff sided with the Coast Artillery saying that it should develop, procure and operate the balloons, although the USAAC retained involvement until March 1942.[35] Hence, it would be the Coast Artillery that operated barrage balloons in the Canal Zone.[36]

Indeed, on 14 March 1941, the General Staff reiterated the position that barrage balloons were to be in joint control of both the USAAC and the Coastal Artillery Corps, and these two began to coordinate their efforts. It would be the Japanese attack on Pearl Harbor in December that would push the barrage balloon program up the list of priorities.

In the meantime, in August 1941, came a report from an officer sent to Britain to study use of barrage balloons there. It recommended that small and cheap balloons and equipment, similar to that used in Britain, should be procured and sent to the Canal Zone, Hawaii and the Philippines for operational testing. It also recommended that larger, more costly high-altitude balloons should be operated only on an experimental basis.

However, the Air Corps Material Division responded that any attempt by US manufacturers to duplicate British equipment would prove more expensive than adopting those then in production. One criticism made at the time was that US balloons were proving more expensive than their British equivalents - for example, a Type D-4 cost $2,421 in its British form, but $6,200 in the US version.[37]

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[35] Ibid.

[36] The USAAC had argued that it having control of the balloons would enable better coordination of with other forms of air defence – fighters and radar, although, of course, the anti-aircraft guns would have still been operated by units of the Coast Artillery.

[37] *The US Army Barrage Balloon Program* by James R Shock (Merriam Press, 2006).

A problem in 1941-42 were equipment shortages - hydrogen gas generators and gas bottles were in short supply. The balloon cable that had been in storage was used, but this proved to result in balloons breaking away, the cable being undersized and so less strong. Also of concern were shortages of neoprene, steel for the generators, parts for the winches, and the high-grade solvents used in processing neoprene.[38]

By mid-1941 there were still no balloons in place in the Canal Zone. This was in addition to a shortage of personnel to man anti-aircraft units, and even of the ammunition needed for the 37 mm close-in anti-aircraft guns – in fact, it was claimed that the 37 mm guns had only enough shells for one minute's firing and the Commanding General maintained that there were only a third of the required number in place).[39]

Things were little better in the Continental US. Following the Pearl Harbor attack in December 1941, the Chief of the Coast Artillery had ordered that every possible effort be made to send three barrage balloons battalions to the West Coast of the US to protect important locations. However, a lack of equipment meant that this task could not be completed until Spring 1942.[40]

The plan had been for a maximum of 40 balloon battalions of prewar strength for defence of the continental US, although the number actually employed for this purpose during the war was a little more than one-tenth of this, and in the US balloon battalions were used only at a few West Coast locations and at the Sault Ste Marie Canal.[41]

The US-built D-7 or D-8 balloon, or the British-built Mark VII and Mark VIII were recommended for use in Panama – the D-5 and D-7 dilatable types being said to be

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[38] *The US Army Barrage Balloon Program* by James R Shock (Merriam Press, 2006).
Neoprene is a synthetic rubber developed by DuPont (it being a trade name for Polychloroprene rubber or Chloroprene) and produced from the 1930s. The balloon envelope was made from neoprene.

[39] https://www.ibiblio.org/hyperwar/USA/USA-WH-Guard/USA-WH-Guard-13.html

[40] https://xbradtc2.com/tag/coastal-artillery

[41] https://www.eaglespeak.us/2008/03/sunday-ship-history-behold-barrage.html

more vulnerable to diving, tangling or generally misbehaving. Tests showed that it desirable to use the smaller D-7 balloons (these being just 64-feet, 19.5 metres, long – standard balloons were 85-feet long, 25.9 metres, and had a diameter of 35 feet, 10.7 metres) on the centre walls of the locks.[42]

In general, the US-designed balloons were heavier in construction and had a much longer life than the British balloons. The heavier construction necessitated a larger size to reach a given altitude than did the British design.[43] US barrage balloon manufacturers included the Goodyear Tire and Rubber Company, BF Goodrich, General Tire and Rubber Company, Firestone Tire and Rubber Company, US Rubber, and Air Cruisers Inc.[44]

At last, in June 1941, the first barrage balloon battalion, the 301st Coast Artillery Battalion (Separate Barrage Balloon), was activated from troops from the Barrage Balloon School at Camp Davis in North Carolina. [45] The unit was originally formed as a demonstration unit and a model for future units.

As barrage balloons became available, the Canal Zone had the highest priority, ahead of the Soo locks[46] and canal in the Sault Ste Marie area of northern Michigan.[47]

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[42] Available online is the Coast Artillery Corps Field Manual from 1942, detailing balloon operation and employment of personnel.
https://archive.org/details/Fm4-117/page/n4/mode/1up

[43] https://www.aahs-online.org/pubs/journals/files/344250.pdf

[44] https://www.aahs-online.org/pubs/journals/files/344250.pdf

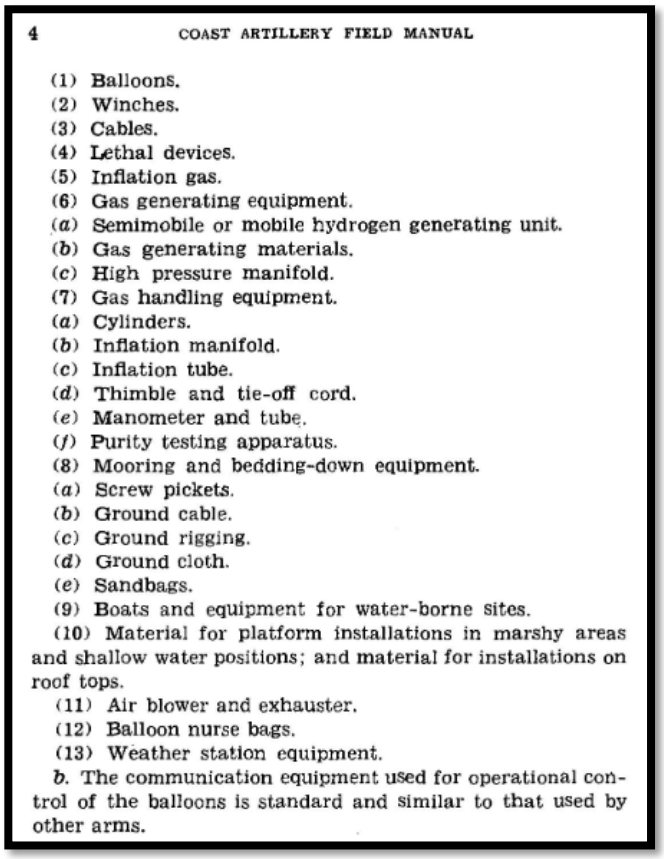
[45] From which 75 officers and 435 enlisted men graduated on 6 September as qualified barrage balloon specialists. Barrage balloon training had begun in April 1941, with the school formally established in June (although the Camp only named Davis in July). The School would relocate to Camp Tyson in Tennessee in January 1942. The latter became the only Barrage Balloon Training Center for the Coast Artillery Corps. Only substantially expanded in 1943, it was declared surplus and abandoned in 1944.
https://www.nytimes.com/1941/09/27/archives/camp-davis-north-carolina.html

[46] https://ss.sites.mtu.edu/mhugl/2016/10/16/3312/

[47] https://www.aahs-online.org/pubs/journals/files/344250.pdf

Barrage balloon training session at Camp Tyson

However, the Army had practically no experience with balloon operation, with the exception of the three USAAC balloon squadrons. The Coast Artillery Corps was dependent on the Air Corps, along with the British and Goodyear, to instruct them in balloon operation and maintenance. As barrage balloons were a completely new concept for the Army, it was necessary that the USAAC develop ground handling techniques and procedures. [48]



4 COAST ARTILLERY FIELD MANUAL

(1) Balloons.
(2) Winches.
(3) Cables.
(4) Lethal devices.
(5) Inflation gas.
(6) Gas generating equipment.
(a) Semimobile or mobile hydrogen generating unit.
(b) Gas generating materials.
(c) High pressure manifold.
(7) Gas handling equipment.
(a) Cylinders.
(b) Inflation manifold.
(c) Inflation tube.
(d) Thimble and tie-off cord.
(e) Manometer and tube.
(f) Purity testing apparatus.
(8) Mooring and bedding-down equipment.
(a) Screw pickets.
(b) Ground cable.
(c) Ground rigging.
(d) Ground cloth.
(e) Sandbags.
(9) Boats and equipment for water-borne sites.
(10) Material for platform installations in marshy areas and shallow water positions; and material for installations on roof tops.
(11) Air blower and exhauster.
(12) Balloon nurse bags.
(13) Weather station equipment.
b. The communication equipment used for operational control of the balloons is standard and similar to that used by other arms.

The long list of equipment necessary for a barrage balloon site[49]

The 301st Coast Artillery Battalion (Separate Barrage Balloon) was despatched to the Canal Zone, arriving on 1 January 1942, and based at Fort Clayton.[50]

The plan was for each Army balloon squadron to have 10 men and 264 men in peacetime, and 11 officers and 277 men in wartime, and it was to have 36 balloons and nine

[48] https://www.aahs-online.org/pubs/journals/files/344250.pdf
[49] https://archive.org/details/Fm4-117/page/n4/mode/1up
[50] *The US Army Barrage Balloon Program* by James R. Shock (Marriam Press), 2006.

replacements.[51] A Marine squadron had 10 officers and 200 men (later increased to 12 officers and 216 men).

Such was the shortage of Army units, and the high priority given to protection of the Canal, the next unit to be sent to Panama was an available US Marines one.[52]

The Marines Corp's 1st Barrage Balloon Squadron (designated ZMQ-l by the US Navy) was thought to be ready for overseas duty in mid-January 1942.[53] Meanwhile, the Army had requested deployment of a Marine barrage balloon unit to bolster defences in the Canal Zone. Final training for the unit was compressed and on 23 December 1941 it embarked at Norfolk, Virginia. Arriving at Fort Randolph on 30 December, aboard the SS *William J* Bradley. The Squadron was attached to the 15th Naval District based in the Canal Zone and, while remaining under the Navy Department, it was assigned to Army command.[54]

In March 1942, following his visit to the Canal Zone, Secretary of War Henry Stimson reported to President Roosevelt that while he had seen "a number" of barrage balloons over the Canal, that number "was quite insufficient", and that it was estimated that there should be about 300 on hand.[55]

It was always understood that the Marine Squadron would only spend a short time in the Canal Zone and, in late April 1942, the Navy Department requested that the Army relieve the unit as soon as possible. In reply, the Army said that a new unit had been earmarked for deployment to the Canal Zone and would be formed during the summer.

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[51] Ibid.

[52] Marine Corps barrage balloon squadrons were authorised in March 1941, with a Barrage Balloon School established at Quantico, Virginia, in April; although preliminary training was held at Naval Air Station Lakehurst, New Jersey, with British barrage balloons..

[53] The US Navy was required to reimburse the USAAF for the balloon equipment supplied to the Marines: http://www.ibiblio.org/hyperwar/AAF/AAFHS/AAFHS-3.pdf

[54] *The US Army Barrage Balloon Program* by James R Shock (Merriam Press, 2006).
As noted above, the Joint Army-Navy Board had decided that the Army was responsible for balloons at permanent naval bases, and the Navy/Marines for defences at "such advanced bases as are not defended by the Army".

[55] http://docs.fdrlibrary.marist.edu/website_online_version/psf/box6/a71q01.html

The Marines Squadron could expect to be relieved 15 days after the arrival of that unit.[56] In fact, it would be replaced by the 313th Coast Artillery Barrage Balloon Battalion, formed in the Canal Zone from personnel from the 301st, and eventually relieved by September 1942. ZMQ-1 then redeployed to the Pacific theatre.[57]

The Panama Balloon Barrage was first organised with the 301st Battalion (less A Battery) at the Pacific end of the Canal; and with the A Battery, plus the Marines Squadron, at the Atlantic end. The first balloons were emplaced and flown soon after the first arrivals, on 4 January 1942. The main problem initially was the shortage of the necessary hydrogen or helium in Panama. It was said that British barrage balloons had been "*rushed to America after Pearl Harbor, as US production was still low*", and some of these were used to protect the Canal.[58]

When the 301st Battalion had left for the Canal Zone it took with it about 90% of all barrage balloon equipment in the US Army, but the greatest problem faced was the supply of hydrogen or helium gas. 8,000 cylinders of helium had arrived with this first balloon unit (this being enough for 50 balloons). However, hydrogen would be produced in the Canal Zone, producing about 1 million cubic feet a month, with an experimental field plant, capable of producing about 60,000 cubic feet a day, having been brought to Panama by the battalion and this was used in the Atlantic sector.

There were obviously teething troubles as, in March 1942, instructions were issued to civilian and military personnel on how to retrieve runaway barrage balloons.

In 1953, a Canal Zone publication recalled that –

> "*During the war, barrage balloons were frequent causes of power failures. If a line went out the dispatcher on duty usually called the Army and asked if a balloon were loose. Frequently the dispatcher's call was the Army's first*

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[56] https://www.marines.mil/Portals/1/Publications/Special%20Marine%20Corps%20Units%20of%20World%20War%20II%20%20PCN%2019000413200.pdf

[57] https://www.aahs-online.org/pubs/journals/files/341036.pdf

[58] United Nations Information Organisation (UNIO) (1940-1945) Photographs Prints #V-2400 to V-2735
Photo 57: V2417 British Barrage Balloons.

information that a balloon had broken from its moorings. The trailing cables would drag across the lines and put them out of service. Once a runaway balloon, leaking hydrogen from breaks in both ends, caught under wires directly in front of the Miraflores station. The balloon exploded, breaking windows, twisting window frames, and blowing out a heavy metal door at the back of the power station. Herbert F. Paddock, now Acting Chief Dispatcher, was on duty that night. He recalls that no one was seriously hurt".[59]

At the Pacific end of the Canal, 36 sites were planned, and all were operational in May 1942. There were 20 at the Pedro Miguel locks and 16 at Miraflores Locks. By June, there were two rings of balloons around the locks and a line of balloons on either side of the Canal between the two sets of locks. Latterly, there would be a total of 56 balloon sites in use.

Balloons were sited 300 yards (274 metres) apart and could protect against a dive bombing attack from 5,000 feet (1,524 mtres) at a 60° dive angle. The balloons themselves were made of a two-ply cotton fabric impregnated by synthetic rubber, and cost between $5,000 and $10,000 dollars each. Prior to being put into use, balloons would be subjected to a four-day inflation test undertaken at Camp Ballonet – located on the side of Cerro Paraiso, midway along the Canal, the Camp being constructed by troops in June 1942.[60]

The 313th Coastal Artillery Barrage Balloon Battalion which had replaced the Marines was based at Fort Randolph at the Atlantic end of the Canal, moving in December 1942 to the Mindi Dairy Area, near Fort Davis.[61]

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[59] Panama Canal Review, 3 July 1953.

[60] *Security and Defense of the Panama Canal, 1903-2000* by Charles Morris (Panama Canal Commission).

[61] As the name suggests, this area was home to a dairy farm belonging to the Commissary Division of the Canal and established in 1917. Its product took on great importance during the war, when U-boats in the Caribbean affected food security. It would close in the mid-1960s.

Meanwhile, in summer 1942, the development and procurement of barrage balloons was transferred to the Corps of Engineers, the USAAF relinquishing its involvement, and its Barrage Balloon Section of Material Command was discontinued.[62]

By January 1943, the Coast Artillery Command, whose units also manned the anti-aircraft guns, searchlights and barrage balloons, had barges active on the Canal (at each of the three sets of locks, and at Madden Dam), used to provide a smokescreen with around 13,000 smoke generators (the smoke defence units were under the operational control of the Interceptor Command of the US Army Air Force).[63] The Gatun smokescreen alone required 67 barges on Gatun Lake. Many of the barges were also used to control barrage balloons.

By February 1943, a new camp called Camp Cochran had been constructed near Red Tank on the Chiva Road. The 301st then moved into this camp.

By late 1943, as perceived threats to the Canal reduced, elements of both the smokescreen and barrage balloon projects were downgraded or abandoned. This was in line with a general reduction in troop numbers and defences in general (for example, some of the large calibre guns at either end of the Canal would be mothballed or even withdrawn).[64] In any case, by July 1943, there were only 30 balloons in service, due to resupply problems.

In Panama, problems were found with the high winds during the dry season, as well from a shortage of balloons and from defective examples. The winches first used were also found to be unsatisfactory, with cables breaking at about 4,000 lb (1,814 kg) pull. The balloons also had to be painted with aluminium paint to reflect the heat, and improve life of the fabric.

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[62] http://www.ibiblio.org/hyperwar/AAF/AAFHS/AAFHS-3.pdf

[63] *Security and Defense of the Panama Canal 1903-2000* by Charles Morris, Panama Canal Commission: https://original-ufdc.uflib.ufl.edu/AA00047733/00001/6j

[64] https://apps.dtic.mil/dtic/tr/fulltext/u2/a388262.pdf

A more general snag was that experience had shown that the balloons tended to become tail heavy when there was a sudden drop in temperature, triggering a loss of pressure and causing the heavy fins to partially collapse. As a result, gas was forced into the nose, making the balloon unairworthy. It was recommended that future balloons have fewer and smaller fins.[65]

A great hazard for the men operating the balloons was the use of hydrogen for inflation and the hazards should a cable controlling the balloon break, which was a more or less common occasion in the early part of the war. A falling cable could create havoc for the handling crew, particularly the winch operator. Balloon crews were required to chase down their balloon should it break loose from its cable.[66]

An example of another problem faced in Panama saw, in June 1943, and amid the rainy season that runs from April to December, several balloon positions had to be abandoned due to poor road contitions, and repairs could not be undertaken due to the planned reduction in troop numbers.

Close up view of a Barrage Balloon station in the Cocoli Lake area, with digging and drilling work at the same time (Dredging Division Photo)

A personal recollection preserved at the University of Florida recalled that "*the Army had set up a Barrage Balloon and Anti-Aircraft emplacement in the middle of the town ball field*" and, as a young boy he and his friends used to grab hold of the tie-down ropes as they were released, swinging on them before jumping off. To "win" the game you had to be the last to drop off the rope. However -

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[65] *Security and Defense of the Panama Canal, 1903-2000* by Charles Morris (Panama Canal Commission).
[66] https://www.aahs-online.org/pubs/journals/files/344250.pdf

> "*Normally the GI operating the winch would allow the balloon to rise only a few feet before stopping and making sure all of us were "off" the ropes before he slowly paid out cable. But on this day the balloon went skyward like a rocket. By the time the winch operator was alerted Don Corn* [a friend of the man recalling the event] *was a speck in the sky swinging to and fro. I t seemed a long time to slow to a stop, reverse and then slowly reel in the balloon and Don Corn. As Don got lower you could hear his screaming get louder and louder. He may have spotted his father running out to the field to greet him with belt in hand. Well at about ten feet above the ground, Don dropped, bounced and still screaming and crying ran off the field, unhurt, but with Dad in hot pursuit*".[67]

He also described "*an eerie sight during…air-raid alerts to see the night sky of Pedro Miguel filled with, what seemed to me to be, hundreds of cable tethered barrage balloons. The 'search lights' would illuminate the whale-like balloons sporadically as their bright shafts swept the sky*".

In December 1943, as part of the general reduction in strength of the Army command, the Panama Canal Department, all barrage balloon positions were abandoned and the units were to be redeployed to the US for reassignment.[68]

In early 1944, the 301st battalion returned to the US prior to being deactivated. The 313th followed in January 1944, being deactivated in the April.

In the Continental US as well, as the country became more secure from air attack, barrage balloons were gradually reduced. Even Army tactical units in Europe and the Pacific were disbanded as air superiority was attained. Some balloons did remain in the Los Angeles area near the aircraft plants into the middle of 1944. The barrage

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[67] https://ufdc.ufl.edu/es/AA00106280/00001/pdf

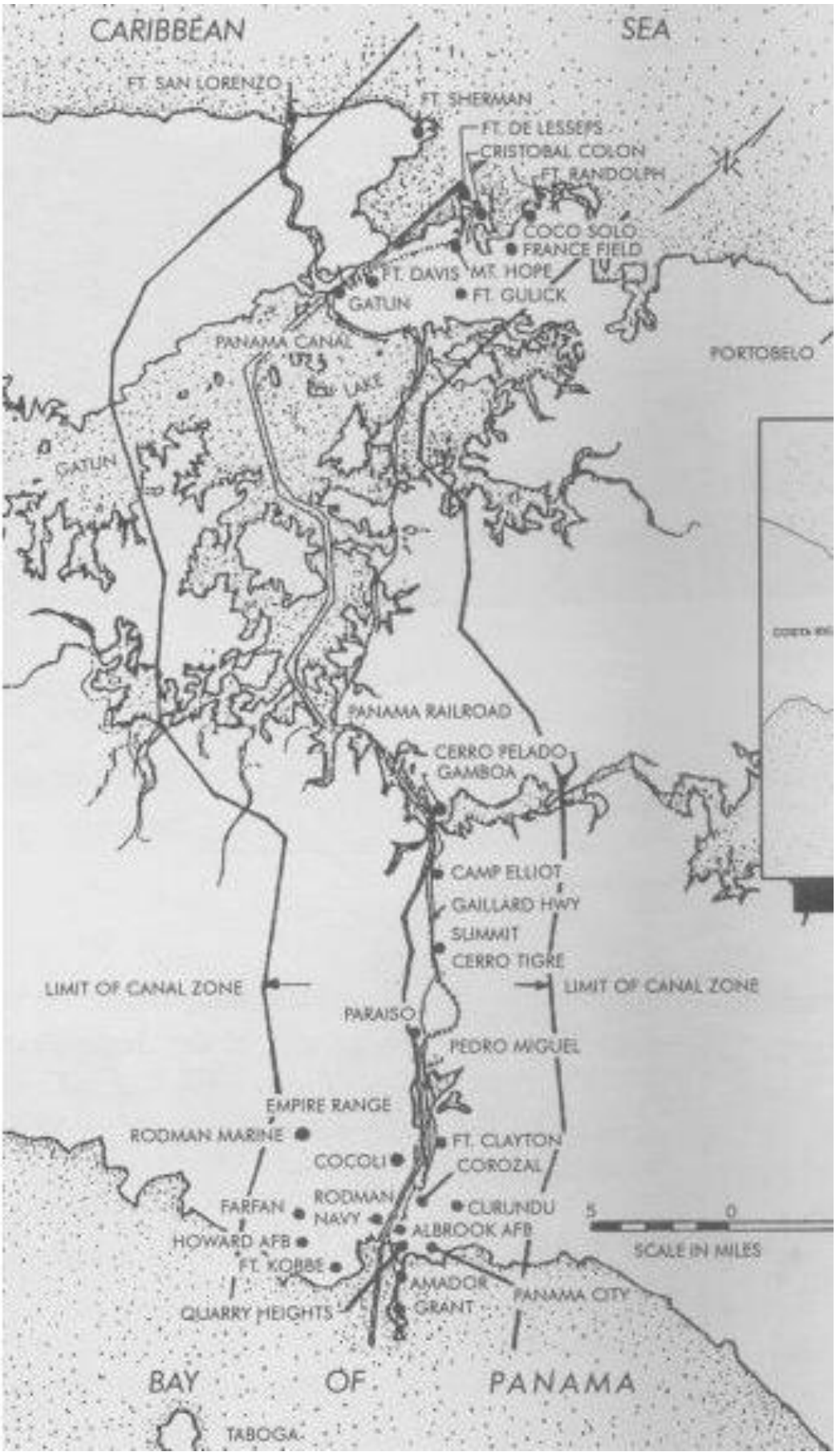
[68] *Security and Defense of the Panama Canal 1903-2000* by Charles Morris, Panama Canal Commission: https://original-ufdc.uflib.ufl.edu/AA00047733/00001/6j
Ironically, this happened as there was one concrete planned air attack on the Canal, using aircraft launched from submarines, although that had to be abandoned as the war swung decisively against Japan.

balloon battalions were eventually deactivated in the Continental US and the men assigned to other branches of the Army.[69] The last Army barrage balloon battalion was deactivated in Hawaii in December 1945.[70]

The total number of barrage balloons built in the US and the number supplied by the British is unknown although it was in the vicinity of 20,000.[71]

Ray Todd
Panama City
Republic of Panama
3 December 2025

[69] https://www.aahs-online.org/pubs/journals/files/344250.pdf
[70] *The US Army Barrage Balloon Program* by James R Shock (Merriam Press, 2006).
[71] https://www.aahs-online.org/pubs/journals/files/344250.pdf


CARIBBEAN SEA
FT. SAN LORENZO
FT. SHERMAN
FT. DE LESSEPS
CRISTOBAL COLON
FT. RANDOLPH
COCO SOLO
FRANCE FIELD
FT. DAVIS
MT. HOPE
GATUN
FT. GULICK
PANAMA CANAL
LAKE
PORTOBELO
GATUN
PANAMA RAILROAD
CERRO PELADO
GAMBOA
CAMP ELLIOT
GAILLARD HWY
SLIMMIT
CERRO TIGRE
LIMIT OF CANAL ZONE
LIMIT OF CANAL ZONE
PARAISO
PEDRO MIGUEL
EMPIRE RANGE
RODMAN MARINE
FT. CLAYTON
COCOLI
COROZAL
FARFAN
RODMAN NAVY
CURUNDU
HOWARD AFB
ALBROOK AFB
FT. KOBBE
AMADOR
GRANT
PANAMA CITY
QUARRY HEIGHTS
BAY OF PANAMA
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SCALE IN MILES