K-Class Blimp Facts

K-ship attacks were included in the 1943, 1944, 1945, and 1946 campaigns. K-28 made contact with two U-boats in the South Atlantic (see K-28 history below).


"K-ship attacks were ineffective. U-boats were too fast for the K-ship's torpedoes to have any effect." (p.154)


"The efficiency of the crew falls off very rapidly after about 15-16 hours." (p.153)


"Efficiency is a tough job." (p.153)

"Blimp patrol is not glamorous by a damm sight. It is just tedious, hard work, and keeping up the interest to ensure K-ship missions were often 12 to 20 hours long.

Arich McIesky, Jr. "Blimp Patrol," Sea Classship September 2003, p.54

Blimps have pitch and roll, like a ship at sea. Many people get seasick on LTA airships. By radar first, then the blimp could go to 200 or 300 feet to employ MAD.

Nicholas Nigroso. "Blimps at War," American Heritage.com

Along a string of ships that might stretch over many miles..." Blimps flew on the seaward side of a convoy at an altitude of 500 to 1,000 feet, moving slowly back and forth.

MISSIONS
August 24.

The L-134, apparently damaged, was making its way back to Europe when it was sunk by British airplanes on J. Gordon Veach's "Blimps and U-Boats," 1992, pp. 75-80.

The L-134, apparently damaged, was making its way back to Europe when it was sunk by British airplanes. The L-134 was hit by a depth charge. The entire crew of 10 escaped the crash with life rafts, but the life rafts got away. On the morning of the 19th, the crew were picked up by a destroyer. One crewman, the bombardier, was killed by a shark. The blimp began falling into the water at 23:50. The entire crew of 10 escaped the crash with life rafts, but there were only 3 in the envelope. The blimp began falling into the water at least 4 times. The envelope may have dropped up to 4 depth bombs, damaging the blimp. This was a matter of some controversy. The blimp was a dummy for the war, a message from the L-134 back to Berlin indicated that it was attacked with at least 88mm guns but nothing more. However, after the war, a messaged from the U-134 did not arrive. The U-134 was destroyed by the L-134, first with 22mm guns and then with the 88mm guns.

K-74 also attacked anyway, reasoning that the U-134 was headed directly for some shipping. The U-134 was headed to shipping, not to engage a surfaced U-boat unless it was an immediate threat to shipping. The only blimp shot down in combat in WW II was K-74, on July 16, 1943, in the Florida Straits.

K-74 shot down by U-Boat.

K-Class Blimp Facts.
### U.S. Navy K-TYPE AIRSHIPS

**Descriptive Speeces, September 1942, p. 3**

<table>
<thead>
<tr>
<th>Range</th>
<th>Endurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 hours</td>
<td>55 hours</td>
</tr>
<tr>
<td>2200 miles</td>
<td>2530 miles</td>
</tr>
<tr>
<td>(3540 km)</td>
<td>(4073 km)</td>
</tr>
</tbody>
</table>

#### Maximum Duration of Flight

**Economical Cruise Speed**

<table>
<thead>
<tr>
<th>Speed</th>
<th>Knots</th>
</tr>
</thead>
<tbody>
<tr>
<td>74</td>
<td>40</td>
</tr>
<tr>
<td>93</td>
<td>50</td>
</tr>
<tr>
<td>125</td>
<td>67.5</td>
</tr>
<tr>
<td>145</td>
<td>78</td>
</tr>
</tbody>
</table>

**High Cruise Speed**

<table>
<thead>
<tr>
<th>Speed</th>
<th>Knots</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

**Maximum Non-Emergency Speed**

<table>
<thead>
<tr>
<th>Speed</th>
<th>Knots</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>78</td>
</tr>
</tbody>
</table>

**Maximum Momentary Air Speed (e.g., wind gust)**

<table>
<thead>
<tr>
<th>Speed</th>
<th>Knots</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

**K-Class Blimp Facts**
<table>
<thead>
<tr>
<th>Atmospheres</th>
<th>Inches H2O</th>
<th>Inches Hg</th>
<th>psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0067</td>
<td>2.75</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>0.0034</td>
<td>1.25</td>
<td>0.09</td>
<td>0.45</td>
</tr>
<tr>
<td>0.0049</td>
<td>2.00</td>
<td>0.15</td>
<td>0.72</td>
</tr>
<tr>
<td>0.0037</td>
<td>1.50</td>
<td>0.11</td>
<td>0.06</td>
</tr>
</tbody>
</table>

**HELIUM GAS PRESSURE**

- The gas is rolled under the inflated bag and attached with cables. Then the net and sandbags are removed.
- Fin and other accessories are attached to the envelope with fabric patches which are glued onto the envelope fabric.
- The inflation process took about 4 hours.
- The envelope was filled with helium. The net would rise and the sandbags were lowered to keep them in reach of the inflation crew. The hangar floor (100' x 300'). It was covered with a net (39' x 19') and weighted down with 500 35-pound sandbags. As it inflated, the envelope was inflated from a large wooden crate (12' x 6' x 6'), inflated, and strapped onto the hangar floor.
- There is no metal framework inside the envelope. If maintained, its shape is because of the pressure of the gas inside it.
- The envelope is made from 12. longitudinal gussets and 6 circumferential panels.
- Envelope fabric is 3-ply rubberized cotton, coated with a mix of paraffin, benzene, and carbon tetrachloride.

**BLIMP ENVELOPE OR "BAG"**

**K-CLASS BLIMP FACTS**
### U.S. Navy K-1 Type Airships Maintenance Manual, Rev. May 1944, p. 4

- Maximum total fuel capacity = 1780 gallons (4455 liters)
- 80 gallons (also removed by Goodyear)
- 1100 gallons (also removed by Goodyear)
- 125 gallons each (on K-28, two were removed by Goodyear)
- 1 "slip" tank under the floor
- 1 "slip" tank under the floor
- 8 overhead tanks
- **FUEL TANKS - Inside car**

---

**Engine Facts**

- Display models
- Cottageon takes delivery of non-airworthy parts and builds museum display models. K-28 has two of these non-working engines.
- R-865 engines to owners of vintage aircraft. An R-1340 piston engine would cost $80,000.
- No cost on June 17, 1975. Cottageon took our old direct-drive engines in exchange. Cottageon sells working R-1340 and K-28's correct geared "Wasps" engines were supplied by Cottageon Aircraft in Oklahoma. Delivered and installed at

---

**Main Engines**

- Cruise rpm = 1050 to 1300 rpm
- 425 horsepower at 1775 rpm
- Geared 3:2 (3 engine revolutions = 2 propeller revolutions)
- Part A Whitneyy R-1340-AN2 "Wasps" radial engines

---

**K-Class Blimp Facts**

- **Fuel**
- **Cruise and Emergency Power**
- **Engine Facts**
- **Main Engines**
Hub were sent Federal Express near Anchorage, in December 2014. The tire and wheel were donated by Airtrams Alaska of Anchorage.

The tire was placed in the retracted position, landing gear well in the retracted position. The correct-sized tire. The tire is just suspended in the well.

- K-28 does not have a landing gear strut, but it does have a landing gear strut.
- Inserting a hand crank.
- Retraction was done by lifting a hatch in the floor and antenna just behind it.
- Landing gear retracted, so as not to obstruct the radar.
- Etcetera.

Diameter: It was the same exact tire used on the Lookheed.

Wheel was a low-pressure balloon tire, 35 inches in diameter. The mooring mast in the wind.

Wheel swiveled on the ground, so blimp could pivot around.

Only a single wheel.

K-Class Blimp Facts

Hull to do damage:
Depth bombs need to explode within 45 feet (14 m) of submarine

Similar to the MK 47:
MK 44 and 47 depth bombs — 325 pounds each (148 kg)

Later in the war, MK 17 was a contact fuse in the nose, and a hydrosignal
Two on external bomb racks (see picture at right).
Two in the bomb bay

Authentic:
K-28's gun turret is a replica. The machine gun is
on this side of the Atlantic.
Not used against aircraft. There were no German aircraft
Main anti-aircraft guns on submarine.
Defensive only. Used against U-boat crews attempting to
One .50 caliber machine gun in turret

ARMAMENT

K-CLASS BLIMP FACTS
Photographs:

- K-26’s radar components are replaced, done from next to the navigator’s station on the port side.
- The radar operator sat in front of the galley and behind the inches across.
- Radar return signals were seen on a “PP” scope about 6
  Rotating antenna in a glass dome under the car.
  It was introduced in K-ships in late 1942. It had a
  Periscope. It had a good navigational aid.
  K-ships had AN/APS-2 sets, an S-band radar made by
  The individual ships in a convoy could also be seen on
  a periscope could be seen around a mile away.
  A submerged U-boat could be seen up to 1 mile away. A
  determines the distance to the object.
  Short radio pulses are sent out, and reflected pulses are
  used to detect a surfaced submarine, and could be used at
  night.

K-CLASS BLIMP FACTS

SUBMARINE DETECTION - RADAR
William F. Althon, "Forgotten Weapon", 2009, pp. 112-115

- Photographs, K-8's chart recorder is authentic.
- K-8's MAD components are replicas, done from original equipment mounted above the radar set, so one crewman could operate both sets.
- Recorder (Espling-Angle).
- Magnetic anomalies were captured with an ink-on-paper chart away from any metal structure on the blimp.
- Magnetic sensors were mounted far out on the envelope.
- Installation began in October 1942.
- Aircraft: Instrument Laboratory at Columbia University.
- K-ships had MAD Mark IV B-2 sets, developed at the Surface Sunkers.
- Fisle MAD contacts were often from sunken ships.
- Below surface, blimp could fly no more than 300 feet above blimps and to very low altitude if submarine was 100 feet deep.
- Detects large metal objects within 400 feet of sensors.
- Used to detect a submerged submarine day or night.

MAGNETIC ANOMALY DETECTION

SUBMARINE DETECTION - MAD

K-CLASS BLIMP FACTS
Naval Radio Receivers, 1939, ch. 1.4
Naval Radio Transmitters, 1958, ch. 1.6

The AN/AR-3 Sondoby receive is authentic.

- K-28 has two replica Sondobyys, done in photographs.
- The pattern was giving the most promising signal intensity, and the operator could tell which sondaoy in the pattern was giving the most promising signal.
- The radio receiver could be tuned to any of the color coded bands.

- The frequency (FM) usually multi-faceted sondaoyys were dropped.
- K-ships carried 5 Sondobyys, each marked with a differently colored band. Each color signifies a different transmitting frequency.
- Installation began in 1944.
- K-ships had AN/CRT-1A Sondobyys made by RCA.
- Signals could be detected up to 10 miles away.
- Sounds were transmitted by radio to a receiver in the K-Class Blimp. Signals for noises made by the submarine.
- Floating in the water, it used an underwater microphone to listen to detect a submerged submarine 24 hours a day or night.

Radio Sondobyys

Submarine Detection - Sondobyys

K-Class Blimp Facts
K-CLASS BLIMP FACTS

K-CLASS NAVY BLIMPS IN SERVICE

The K-class blimp was the Navy’s biggest blimp for most of the war. Goodyear made 134 of them. K-2 was the first built in 1940, and was the prototype for the rest.

K-7 was delivered in April 1942, the first with a machine gun turret.

K-12 and some earlier work. They were based in Lakemont, N.J., and were called Squadron ZP-12.

When the U-boats started attacking off the U.S. coast, these 4 blimps (K-3 to K-6) were all that were available for escorts and escort work. They were based in Lakemont, N.J., and were called Squadron ZP-12.

The last K-ships, K-35, was delivered April 1944. Thus, most of the K-ships were built in a 2-year period.

New East Coast blimp squadrons in June 1942:

ZP-11 (South Weymouth, MA) and ZP-14 (Weehawken, NJ).

Military Field: CA; Santa Ana, CA; and Tillamook, OR. Also in the Caribbean and Brazil in 1943.

Squadrons were also established on the west coast in 1942 and 1943:

(Hico, TX. Jun. 1943; ZP-15 (Glencoe, CA. Feb. 1943), ZP-21 (Richmond, FL, Nov. 1942), ZP-22 (Honouliu, LA, May 1943)).

Then more squadrons were established:

Moffett Field, CA; Santa Ana, CA; and Tillamook, OR. Also in the Caribbean and Brazil in 1943.

In 1944 squadron ZP-14 went to the Mediterranean. After it began operations, no U-boat ever again crossed the Straits of Gibraltar. Either by day or night.

Besides anti-submarine duties, K-class blimps were useful for many other military jobs. Rescue, mine-spotting, radio photography, recovery of practice torpedoes at the submarine training base, mapping, parachute training, RDF.

Besides anti-submarine duties, K-class blimps were useful for many other military jobs. Rescue, mine-spotting, radio photography, recovery of practice torpedoes at the submarine training base, mapping, parachute training, RDF.


The statistics, a record availability factor for military aircraft.

Navy K-ships made 59,900 operational flights during the war, totaling 560,000 hours. They achieved 87% on-the-line.

U.S. Navy Blimp Service.
<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Around August 26, 1980, The Bradley Air Museum sent a truck to pick up the K-28 &quot;Punten&quot;</td>
<td></td>
</tr>
<tr>
<td>Goodyear donates the K-28 &quot;Punten&quot; to The Bradley Air Museum (now NEAM) in August</td>
<td>1980</td>
</tr>
<tr>
<td>K-28 &quot;Punten&quot; was delivered on April 20, 1946, and stored at Goodyear's Windgust Lake</td>
<td></td>
</tr>
<tr>
<td>Goodyear removed almost all Navy equipment, some fuel tanks, the bomb bay doors, and the external lights on March 27, 1947</td>
<td></td>
</tr>
<tr>
<td>First Goodyear flight on July 31, 1946.</td>
<td></td>
</tr>
<tr>
<td>Goodyear re-numbered the K-28 &quot;Punten&quot; and painted the car in Goodyear colors.</td>
<td></td>
</tr>
<tr>
<td>K-28 was sold to Goodyear on July 31, 1946.</td>
<td></td>
</tr>
<tr>
<td>K-28 joined utility squadron ZP-1 and was photographed in the hangar at South Weymouth.</td>
<td></td>
</tr>
<tr>
<td>On June 4, 1944, K-28 was sent to look for an F4F and plane that crashed. If located, the plane</td>
<td></td>
</tr>
<tr>
<td>fired on ZP-14. On May 31, 1944, K-28 was flown to Weskeville on May 31, 1944.</td>
<td></td>
</tr>
<tr>
<td>Enlisted ZP-14. On May 31, 1944, K-28 was flown to Weskeville on May 31, 1944.</td>
<td></td>
</tr>
<tr>
<td>It was then assigned to squadron ZP-14 in Weskeville, NC.</td>
<td></td>
</tr>
<tr>
<td>On August 20, 1943, K-28 participated in a search for a possible submarine off Cape</td>
<td></td>
</tr>
<tr>
<td>K-28 was delivered to the Navy on December 10, 1942 at Lakehurst, NJ.</td>
<td></td>
</tr>
</tbody>
</table>

**NEAM**

**GOODYEAR**

**NAVY**

**K-28 HISTORY**

**K-CLASS BLIMP FACTS**
Arrival at Bradley Air Museum August 1980

Goodyear "T-Flex" Lighting System 1947-48

K-CLASS BLIMP FACTS

- Probably equal Russ's.
- Russ has had over 40 project assistants over the years, whose total time on the project and at home.
- Russ Magnusson alone has put about 40,000 hours of work into the project at the Air Museum.
- The restoration project is nearing completion in the summer of 2015. After 22 years of work.
- Cradle, using a crane inside the civilian hangar.
- On May 14, 2014, the K-28 was moved from its old wooden cradle to a much sturdier steel
- War II configuration. The estimated project would take 3 to 4 years.
- In May 1993, Russ Magnusson took on the task of restoring the K-28 "Punten" car to World
K-CLASS BLIMP FACTS

- No help from Goodyear or the Smithsonian.
- drawings, then paper models, then prototypes.
- Navy components from photographs. First making
  without Goodyear blueprints. Russ re-created most
- They spent years stripping paint and cleaning.
- Russ fixed the door so they had a place to stand.
- Components that had been scattered in storage.
- Russ cleaned out the junk, scrounged for
  Where to start?

1993 to 2015

1980 to 1993

- Peeling paint, rusted metal, leaking oil, and
  what to do with.
- Inside - rotting basswood sandwich floor,
  as a storage bin for stuff they didn't know
  since it had a door. People started using it
  No engines or propellers.
  Outriggers not attached.
  Decayed fabric, broken windows.
  Layers of Goodyear paint over Navy paint.
  Slighting in a corner at NEAM for years.
U-Boats could launch their torpedoes while on the surface. See U-103 vs. the tanker W.L. Steed.

Michael Cannon, "Operation Drumbeat," 1990, pp. 8, 9

Urn for E-Massjehen. Electric motors underwater would give us a power after only 64 miles. However, she could make only 7.5 knots maximum. Even at an economy speed of 4 knots the storage batteries had only 12½ hours on the surface. Faster than merchantmen and some escort vessels, these submarines could make a range of the controlling factors that led to surface travel. With diesel engines, power [the U-boat] could make a speed of 20 knots. For the most part, the U-boat cruised on the surface and fought on the surface, like a torpedo boat. Speed and range were the controlling factors that led to surface travel. With diesel engines, power [the U-boat] could make a speed of 20 knots. For the most part, the U-boat cruised on the surface and fought on the surface, like a torpedo boat. Speed and range were the controlling factors that led to surface travel.


In WWI, U-Boats were surface raiders that had the ability to submerge. They used diesel engines on the surface, and then on battery-powered electric motors underwater.


The U-Boats usually lay in wait for convoys while on the surface at night. They launched torpedoes from seaward against cargo ships which were often illuminated by the lights on shore. Ships not sunk by 1 or 2 torpedoes were finished off by the U-Boat's deck gun.


Over 730,000 tons were lost. The German Navy sent more submarines to attack as far south as Florida, and by May they had sunk 364 ships.

The Germans were furious. Their attacks on January 1, 1942, and in a month they sank 25 ships.

Two weeks after the start of World War II, Nazi Germany sent 5 U-Boats to hunt for cargo ships off the East Coast.

HISTORICAL FACTS

K-CLASS BLIMP FACTS
Froze her population, and forced her out of the war.

To cut her supply lines along the Atlantic coast and to the south, would be, in effect, to defeat the United States, to

from Venezuela oil fields, and from the Gulf of Mexico ports of Corpus Christi, Houston, and Port Arthur, Texas...

and much of the fuel was provided by ships foundering from Cuba and Aruba in the Netherlands West Indies,

vulnerable to the disruption of these [sea] lanes. Fuel was required to keep those cities from freezing in the winter.

"When the United States entered World War II, the industrial cities of the eastern seaboard were particularly

\[\text{Samuel Elliot Morison, "The Two-Ocean War," 1963, p. 121}\]

American freighters were torpedoed by U-boats within full view of thousands of pleasure seekers at Virginia

American freighters were torpedoed by U-boats within full view of thousands of pleasure seekers at Virginia

burning tankers were not infrequently sighted from fashionable Florida resorts, and on 15 June [1942] two large

\[\text{Samuel Elliot Morison, "The Two-Ocean War," 1963, p. 136}\]

we will be unable to bring sufficient men and planes to bear against the enemy..." We will be unable to bring sufficient men and planes to bear against the enemy..."

month of November in use. I am feinted that another month or two of this will so cripple our means of transport that

20 percent of the Puerto Rican fleet has been lost. Tanker sinkings have been 3.5 percent per

20 percent of the Puerto Rican fleet has been lost. Tanker sinkings have been 3.5 percent per

\[\text{General Marshall to Admiral King, 19 June 1942: "Of the 74 ships allocated to the Army for July by the War}

\[\text{J. Gordon Veal, "Blimps and U-boats," 1992, p. 16}\]

available. The first blimp squadron was established in January 1942 in Lakehurst, N J.

\[\text{The U.S. Navy was short of ships and airplanes to protect these ships. Initially they had 4-K-class blimps}\]


\[\text{The cargo ships traveled very slowly (6.5 to 9 knots).}\]

Historical Notes

K-Class Blimp Facts
Mark J. Price, "Lighter Than Air Society," "Blimp innovation was a flash of brilliance," 2014.

Sky, the newspaper promised.

Journal newspaper after dusk. The first evening the weather permits, you'll be reading headlines in the

Rescuing a giant at Times Square in New York, the blimping lights flashed拼搏s from the Beacon

28]. The 18-foot letters traveled from right to left through banks of lights on a 190-foot surface.

Ten panels—each holding 18 square feet—were installed on both sides of the Punta

ty. Trans-lux.

Service. The signage returned in 1947. However, with another catchy name:

"Commercial blimp advertising went on hiatus during World War II as airplanes were drafted into military

installations. Rear Admiral Dewitt C. Ramsey, quoted in

merchant-men." Rear Admiral Dewitt C. Ramsey, quoted in

can find satisfaction too. In the boost to morale, the sight of the good old Navy Blimp gives to the crew of ten-knot

Rear admiral Rosendahl, "They were dependable." 1946, p. 44

Rear admiral Rosendahl, "They were dependable." 1946, p. 44

Torpedo, quoted in

"As long as these are blimps overhead, the submarine menace will be kept at a minimum." Chief Officer B.

Rear admiral Rosendahl, "They were dependable." 1946, p. 44

Rear admiral Rosendahl, "They were dependable." 1946, p. 44


The end of the six-month period of maximum destruction [January – June 1942] left... an aggregate of 397 ships

HISTORICAL NOTES

K-CLASS BLIMP FACTS