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ARMY AIRSHIP OPERATIONS,
LANGLEY FIELD, 1919 - 1922

Today Langley Air Force Base is a bustling air station filled with the sights and sounds generated by two squadrons of KB-50 tankers, the F-102's of the 48th Fighter Interceptor Squadron, and the varied and sometimes strange and wonderful machines of the NASA. It was not always this way.

The seeds of Langley Field's origin were planted in the summer of 1916 at a meeting of the newly formed NACA. Here it was agreed by the members that there should be developed an experimental air field and proving ground to be used jointly by the army, the navy, and the NACA. The Signal Corps agreed to purchase the land, and both the army and the navy appointed boards to inspect various sites, and then an NACA board met to consider the sites recommended. These were narrowed down to two, Aberdeen, Maryland, and Hampton, Virginia. The latter was finally chosen at the navy's urging because of its location on deep water. Preparation of the land and construction began early in 1917, but progress was very slow, and in desperation, Col. Edward Deeds, Chief of the Bureau of Equipment of the Signal Corps, secured authority to establish a temporary experimental station at Dayton, Ohio. This base was McCook Field. It was hastily constructed and in use before any of Langley's permanent buildings were finished. During the same period the navy also tired of waiting and secured experimental facilities elsewhere.

Construction continued at Hampton, however, and the first Air Service units moved into the "Aviation Experimental Station and Proving Ground", as it was then known, about the middle of June, 1917. This was the 5th Aviation School, Signal Corps, soon redesignated 119th Aero Squadron; and on the 1st of July it consisted of two officers and 65 enlisted men. On 7 August 1917 the station was officially named "Langley Field".

In the remaining year of World War I, numerous Air Service units moved in and out of Langley, although the field was far from complete. To mention only a few, there were schools for pilots, observers, and aerial photographers. NACA also moved in and established, in 1918, the modest beginnings of its first field laboratory.

Army lighter-than-air activity first came to Langley on 15 June 1918 when a balloon detachment arrived, but no information on this unit is available. With the end of the war Langley became, temporarily, a demobilization center. Many

Aero Squadrons, Air Parks, and Construction Companies reported in, and thence almost immediately passed into history. The 63rd Balloon Company, from Ft. Omaha, arrived at Langley on 1 March 1919. Its mission was to receive and care for the airships which were expected. When these failed to materialize, the 63rd was deactivated.

Two lighter-than-air units which arrived at Langley that summer of 1919 escaped deactivation. These were the 10th and 19th Balloon Companies. Both were organized at Fort Omaha, the 10th in November 1917 and the 19th in January 1918. The 19th arrived in France too late to see action, but in time to help celebrate the Armistice. In February 1919 it returned to Mitchel Field where it was disbanded. It was again activated at Langley on 24 July 1919. The 10th, however, arrived in France, in the Toul sector, late in August 1918. It participated in the St. Mihiel drive, and later lost two balloons to German fighters while based at Jezainville. During this time, Lt. (later Capt.) Dale Mabry was Company Commander, and Major John Thornell, a recent graduate of the balloon school at Camp de Souge, was commander of the 6th Corps Balloon Group of which the 10th was a part.

With the end of the war the 10th returned home and joined the 19th at Langley as one of the six airship units the army was to keep in service during the early 1920s. The 10th Company was to call Langley "home" for only about three years, but the 19th was to become a fixture on the Virginia peninsula for 16 years. The "balloon company" designation was dropped in April 1920 for those units operating airships, when they were redesignated "Airship Company". Companies equipped with the observation balloons retained the original designation.

Langley's big balloon hangar, built in 1919 by the Harris Construction Co. of New York, at a cost of \$55,000, dominated the Langley scene for almost 30 years (1919-1947). During these early years it housed a variety of LTA equipment, including the standard observation balloon, the tragic "Roma", non-rigid airships, and a number of spherical balloons used for training airship pilots. Since an airship without power is a free balloon, airship pilots had to be thoroughly trained in free ballooning. This was especially true when one considers the doubtful reliability of aero engines of the day.

During the post-war years the LTA section of the Army Air Service occupied a uniquely vague position. As far as can be learned no officially designated mission was assigned the airship companies. As late as 1934, the 19th Airship Squadron, Capt C. B. Lober commanding, recommended that army airships be used for coast and border patrol; but army LTA was on its way out then, and this was never approved. When the "Roma" came to Langley in 1921 numerous experimental projects were planned for it. These included long range reconnaissance, photo missions, coastal patrol, and supply of HTA units; but none of these projects were carried out before the "Roma" met her end.

LTA operations at Langley in the early post-war years were partly con-

cerned with the airship pilot school. On 1 October 1921 the 10th Airship Company was redesignated "Airship School", and was finally transferred, along with all airship training, to Scott Field on 30 June 1922. At that time Scott Field was the army's principal LTA station, housing the 21st Airship Group with the 8th, 9th, and 12th Airship Companies.

Throughout these years the army (indeed, all the services) was held to rigid economies. Heavier-than-air managed to acquire a handful of new Martin bombers and some MB3 pursuits; but for the most part it was forced to use the equipment left over from the war. Lighter-than-air, however, was in a slightly better position. Since it had had no airships during the war, whatever ships it could acquire would be reasonably up-to-date. The first of these was the army's only "A" type ship (not to be confused with the navy "A" type.) This was the non-rigid A-4, built by Goodyear in 1919. It arrived at Langley Field in the early evening of 13 July 1919 after a spectacular 17 hour flight from Akron. Lt. George McIntire was in command, with James Shade as pilot, and M/Sgt W. J. Bennett as passenger. Mr. Shade had done the test flying of the A-4 at Goodyear's Wingfoot Lake Airfield, and had made news on the 23rd of May that same year when he landed this ship on the roof of Cleveland's Statler Hotel.

A-4 was a ship of 95,000 cubic feet capacity, inflated with hydrogen, as were all ships in those days. A single pusher Curtiss OX-5 drove a four bladed wooden propeller and provided a maximum speed of 45 MPH. A-4 remained at Langley throughout the early 1920's, operating as a trainer with the airship school. During the latter part of 1921 and the first half of 1922 the 19th Airship Company did not operate as a tactical unit, but was pooled with the school detachment. In June of 1922, when the school was transferred to Scott Field, the A-4 was on strength with the 19th for a few weeks before it departed Langley, proceeding to Scott Field, with Lt. Orvil Anderson at the controls. It remained in service until late in 1923 when it was dismantled.

Three non-rigids of foreign origin came to Langley in the early post war years, the first of these being the ZD-US-1. This was one of three ordered from the French firm Soci  t   Zodiac by a contract of 5 June 1918; but this was reduced to two ships at the end of hostilities. She was inflated and made a successful six hour initial test flight at St. Cyr, France, in the spring of 1919. Of the original order for three, only this one was delivered. It went to the U. S. Navy and was immediately turned over to the Army Air Service. The ZD-US-1 was erected at Langley during 1920.

"Zodiac", as she is sometimes referred to, was a big ship, with a volume of 340,000 cu. ft. It was powered by a pair of 290 HP Renault engines, mounted on outriggers attached to the control car, and driving pusher propellers. An innovation for her time was the enclosed cabin which resembled a railroad passenger car with the rear half of the roof removed. Besides all the controls, this enclosed cabin housed the radio equipment, and the firing bridge, which was designed to mount a 75 MM gun. This weapon was not mounted at the

time of the first test flight at St. Cyr, but was installed later. Firing a 13 pound projectile, this was surely the most powerful gun ever carried aloft by an airship. Although it was installed while the ship was in France (there is a photo showing the gun in the March 1920 issue of Aviation), it never was mounted during the years the ship was operated by the U. S. Air Service.

ZD-US-1 went thru a series of designation changes, first to DZ-1 and finally RN-1. She was still at Langley and participating in an aerial salute to President -elect Harding when he entered Hampton Roads aboard the 'Pastores' early in 1921. There is some indication that she was rebuilt by Airships Inc., at which time low-compression Liberty engines were installed, and other modifications were made. About this time (1923) she acquired a gun position on top of the envelope, and it is thought that this was one of the modifications made by Airships Inc. This gun emplacement mounted a Lewis machine gun and provided a revolving seat for the gunner. Access was by a tunnel shaft up through the envelope. RN-1 ended up at Scott Field, where most of the rest of her life was spent undergoing one type of modification or another, including lightening of the control car, and the installation of Packard 1A-1237 engines. In 1924, RN-1 went into storage.

The other two airships of foreign origin were both of the British SST (Sea Scout, Twin) type, which were purchased in 1920 and 1921. They arrived at Langley late in 1921 and were erected during the last days of the 'Roma's' occupancy of the big hangar. The SST type was a ship about the same size as the A-4, but powered by twin engines. Unfortunately, the ships lay in storage in a Brooklyn army warehouse for so long that their envelopes were badly deteriorated when they were erected at Langley. Major General Orvil Anderson (then Lt.), who was project officer and pilot on the SSTs, feels that they would have been fine flying ships if they had not languished so long in the warehouse. As it was they were close to useless, because of the high rate of leakage. Although they were both flown for some time, their condition eventually became dangerous, and they were deflated. Available photos of these ships show them still bearing RAF roundels, but flying a U. S. flag from their stern.

In 1918 Goodyear designed and built ten "C" class non-rigid ships for the U. S. Navy, the first being delivered in September of that year. Two of these ships were turned over to the army and carried the designations C-2, and C-14. Both of the army "C" ships had Goodyear built semi-monocoque control cars, and were controlled by an upper fin and rudder, and a balanced lower rudder, none of which were present on the original "C" type ships. They were 196 feet long and powered by two 150 HP Hispanos, mounted on outriggers, driving pusher propellers. In 1921 reversible pitch propellers were designed and built by the Engineering Division for the "C" airships, and were shipped to Langley and to Brooks Field. However, the forward position of the starter on the Hisso interfered with the propeller control mechanism. In addition, it was felt that they were not needed and for these reasons the reversible propellers were never installed.

C-2 spent all of her operational life assigned to the LTA units at Langley Field. In July of 1922, while flying out of the Aberdeen Proving Ground with Lt. Moyer as pilot, she engaged in some preliminary airship-airplane hook-on experiments. This was a pet project of Lawrence Sperry, and he was able to fly his Messenger aircraft in a hook-on position for some minutes, maintaining a position some eight or ten feet below the control car. No actual contact was made as no trapeze equipment was installed on airship or airplane. Successful hook-ons were later made, but with other ships.

C-2's main claim to fame was the transcontinental flight undertaken in the late summer of 1922. This was the first airship crossing of the United States and required 67 hours flying time, via Akron, Dayton, St. Louis, San Antonio, El Paso, Nogales, and Yuma, arriving Ross Field, California, on 23 September 1922. The crew on this historic flight was under the command of Major H. A. Strauss, and included Capt. McIntire, Lt. O. A. Anderson, Lt. Dan Hatching, and Sgts. Albrecht and Fitch. C-2 was on the return trip to Langley when she became the victim of wind and fire on October 17, 1922 at Brooks Field, San Antonio.

The airship type used in largest numbers by the Air Service in the early 1920's was the Navy "D" type. Three of these were in service, the D-2, D-3, and D-4. These ships were similar to the army C-2 and C-14, having a slightly larger volume, and their twin engines were mounted at the aft end of the control car, instead of the amidship position as on the "C" ships. They were 198 feet long, with a volume of 189,000 cubic feet.

All three of the "D" ships were present during the battleship bombing tests in July of 1921. D-2 ended her career on 21 July, the same day the Ostfriesland was sunk. The crew of the D-2, with Lt. Anderson in Command, had observed the bombing tests, and were headed back to Langley. One engine failed while 30 miles at sea, and the other held out until D-2 had passed inland, when it failed also. Rather than drift out to sea in a powerless airship, Lt. Anderson elected to make a forced landing, pulling the rip panel cord just before touch down. The crew escaped, but the car was badly damaged and the envelope was beyond economical repair. She was never rebuilt.

D-3 remained at Langley until August of 1922 when she was transferred to the 18th Airship Company at Aberdeen Proving Ground. She was badly wrecked there in December of 1922, but was returned to Langley where the 19th rebuilt and flew her throughout 1923. In September of that year she participated in more hook-on experiments with a Sperry Messenger airplane. The first test on the 15th met only limited success, but on the 24th, Lt. Stoner was able to maintain contact with the airship trapeze for more than one minute. Again, as in the previous year, no attempt was made to hook the Messenger onto the trapeze, but only to keep a specially installed stick in contact with the trapeze.

In February of 1921 the Army decided to send a mixed party of 19th Air-

ship Company, and the Airship School Detachment, under Major Thornell, departed for Italy to learn to fly, dismantle, and bring the Italian airship "Roma" to Langley Field. On arrival there they would supervise its erection and flight testing. This ship, the T-34, was the sole example of the Italian "T" class airship (the "34" indicated her volume, 34,000 cubic meters). "Roma" was essentially a commercial vehicle, and had been purchased at the urging of General Mitchell, who had also suggested the purchase of the British R-33 or R-34. In that same year, 1919, he had proposed that the Air Service acquire a Zeppelin, and an Air Service officer had been dispatched to Germany to discuss the deal. In the meantime, however, an agreement had been reached whereby the navy would handle all rigid airship development, and the Zeppelin, to be ZR-3, and later "Los Angeles", went to the navy. The "Roma" then, was Mitchell's third attempt to get a large airship for the Air Service. The agreed price for the ship was \$475,000, but due to the favorable rate of exchange, actual cost to the army was \$165,000.

Major Thornell's party consisted of Capt. Dale Mabry, Lt. Walter Reed, M/Sgts Chapman, Beidenbach, and McNally, and S/Sgts Hoffman and Beall. On the 15th of March, 10 days after their arrival at Ciampino, the party made an 8 hour consignment flight, and disassembly and packing was begun shortly thereafter. This required two months, and the 87 cases used to pack her were loaded aboard the freighter Mars at Genoa in May 1921. The envelope case alone weighed ten tons.

On arrival at Hampton Roads T-34 was transferred to two army barges in early August, and off-loaded at Langley Field on the 10th and 11th of that month. Preparation of the hangar to accept the ship was begun, and this included the installation of floor bolts and the transfer of the C-2 to Aberdeen (the 18th Airship Company). The D-3 was put on the nose mast. By mid-September the eleven gas cells had been inflated with air, inspected, and re-inflated with 1,012,000 cubic feet of hydrogen. Assembly of the keel and nose stiffener was also under way at this time, and the big Ansaldo engines went on the blocks for test running.

On the 15th of November, "Roma" came out of the hangar into the clear calm air of a Virginia autumn, for her first flight in the U.S. Although not large when compared with some of the Zeppelins of World War I, or the behemoths of later years, she was, nevertheless, the largest semi-rigid ever built. She was certainly not very pretty with her dumpy lines, triangular keel, and massive arrangement of 8 rudders and 3 elevators, but she stretched an impressive 410 feet from the fabric covered nose stiffener to the stern attachment for "Old Glory". Her eleven gas cells confined almost 1,200,000 cubic feet of hydrogen and a top speed of 77 miles per hour was claimed. Power was provided by six 12 cylinder Ansaldo water cooled engines mounted on outriggers attached to the keel and driving 11'10" pusher propellers.

About 1000 people had gathered by 9:40 AM when the handling crews released the last lines and the "Roma" was airborne on her maiden American flight. She free-ballooned to about 400 feet before her engines were advanced from idle and a

a slow climb begun. The ship flew in the local area for about an hour during which she was inspected from nose to stern and found to be in excellent condition. There were 31 men aboard, including one civilian stowaway (a member of the erection crew), who, upon discovery, was put to work on the aft sand ballast rack.

"Roma" then proceeded across Hampton Roads to Norfolk and vicinity. At 11:22 the forward port propeller was shattered when a small aluminum door came loose and struck it. The engine was shut down immediately, but pieces of the broken propeller had entered the envelope tearing holes in the balloonnet and #3 gas cell. This damage to the gas cell was repaired. Only one major defect had been noted; it was found impossible to bring the engine water temperatures up to the correct level, and the installation of radiator shutters was recommended.

On the 23rd of November, she made another local flight of about 4 hours, and a week later it was announced that plans were being made to send her on a cross country flight over the Appalachians to Akron. Wingfoot Lake Airfield had one of the five hangars in the country large enough to accept her bulk (although it was a few feet short). On both test flights to date, the "Roma" had apparently behaved like a lady. (It should be mentioned that she had made over 20 flights in Italy before transfer to the U. S. Army Air Service). Things did not go so smoothly from that point.

Early in December, orders were issued to Bolling Field and to Langley Field to be prepared for the christening ceremonies of the ship at an early date; and on the 21st of December, the christening was carried out, although not without difficulty. Ceremonies had been set for 9 a.m., and the "Roma" departed Langley Field at 6 a.m. for the 130 mile flight to Washington. All six engines were running this time, but three of them were dead when she arrived at Bolling Field at 11:55 a.m. under leaden skies and rising winds.

The ship was christened "Roma" with a bottle of liquid air, by Miss Fonrose Wainwright, daughter of the Assistant Secretary of War. Senor Ricci, Italian Ambassador, then presented the ship with a new ensign which was run up on the stern. Original plans had been for the "Roma" to make a flight over Washington area carrying the many dignitaries, however, due to worsening weather conditions, General Patrick ordered the ship serviced and back to Langley as soon as possible. No doubt the unservicability of the engines influenced his decision. After a hasty inspection by the guests, she departed at 2:20 p.m. and was back in her hangar shortly after 6 p.m. The return trip had cost more engines and she limped into Langley with only one healthy engine, and one running at half RPM.

It was late February 1922 before "Roma" emerged from her hangar again, now with six Liberty engines replacing the troublesome Ansaldos. This engine change was not a spur of the moment switch, but had been contemplated before the ship was erected. Undoubtedly the difficulties experienced with the Ansaldos

had emphasized the imperative need for the change. At a later date Bakelite propellers were requested, as were two reversible pitch props for the aft engines. In a letter dated 24 December, Major Bane, of the Engineering Division, expressed concern at the present method of reversing the engines for landing. This was done by stopping the engines, removing the propellers, and installing tractor propellers! It is not difficult to understand Major Bane's concern.

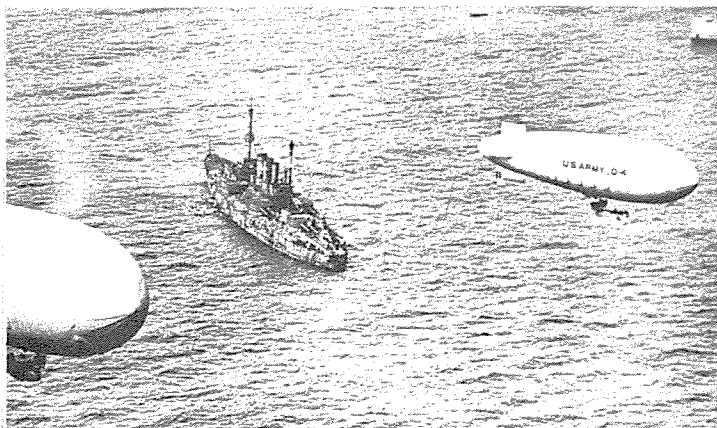
When the 300 men of the handling crew walked her out of the hangar on Tuesday morning, February 21, 1922, "Roma" carried her six new Libertys. Wooden propellers had been fitted, however, as Engineering Division had objected to the request for bakelite propellers. Two reversible pitch props had been ordered for the aft engines, although Engineering Division had been worried about the cost of these propellers, some \$3,000. Major Bane wrote in a letter to the Chief of the Air Service: "Altho this division is considerably cramped for funds, it will undertake to pay for these propellers, it being assumed that your office will help us out at the end of the fiscal year, in case we get into financial difficulties."

It was near 2 p.m. when the airship rose slowly, her new engines running well, and headed out over Hampton Roads in clear weather. There were 45 men aboard. This included Major Thornell, in command, Capt. Mabry, pilot, and all personnel of the regular crew. In addition, there were eight civilians, all technicians from McCook Field, except Mr. W. A. McNair of the Bureau of Standards. The remaining men were all Air Service personnel.

Shortly after 2 p.m. the "Roma" reached a position near Lambert Point Army base, adjacent to Norfolk. She was flying on a southerly course at considerably less than 1000 feet when suddenly the nose dropped violently; and although, the pilot attempted to correct with the elevators, there was no response. No ballast was dropped, apparently the ship was much too low for the crew to do much of anything. The ballast release arrangements were such that ballast could not be dropped quickly. One man bailed out, this was Lt. William Riley, but his chute did not open.

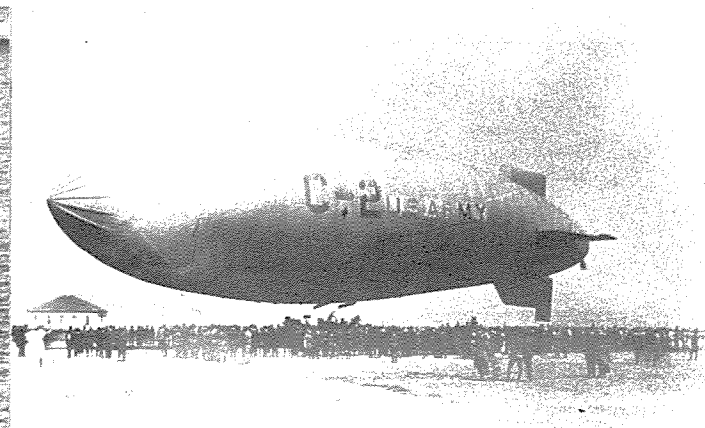
There was time to signal "stop engines" to all engine control stations, and the center and aft engines were out. However, the forward engines were still running at normal RPM when the ship struck 2300 volt high-tension wires and immediately became a mass of gasoline and hydrogen fed flames. 33 men were killed in the crash, and Lt. Riley in the jump. There were eleven survivors.

What caused the Air Service's worst air disaster can never be known for sure, but many reasons have been put forth in the passing years. One of the most common of these is that the installation of heavier more powerful Liberty engines caused strains for which the ship was not stressed. It will be seen from the figures at the end of the article that the opposite was true, the Liberty was considerably lighter and slightly less powerful than the Ansaldos. However, the constant trouble with the Ansaldos had probably prevented their developing their rated power, while the Liberty's running smoothly, may have contributed to the



Upper left - The C-2 and D-4 over the Ostfriesland, 21 July 1921. (USAF photo)

Upper right - The C-2 at the western terminus of its transcontinental flight, Ross Field, California, September 1922. (USAF photo)

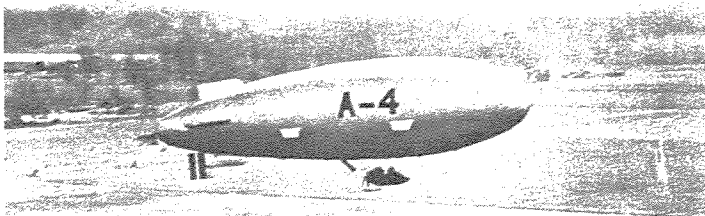


At right - The crew of the C-2 on its transcontinental flight. L. to R.- Capt. McIntire, S/Sgt Fitch, S/Sgt Albrecht, Lt. Hatching, Major Straus, Lt. O.A. Anderson. (Goodyear photo)

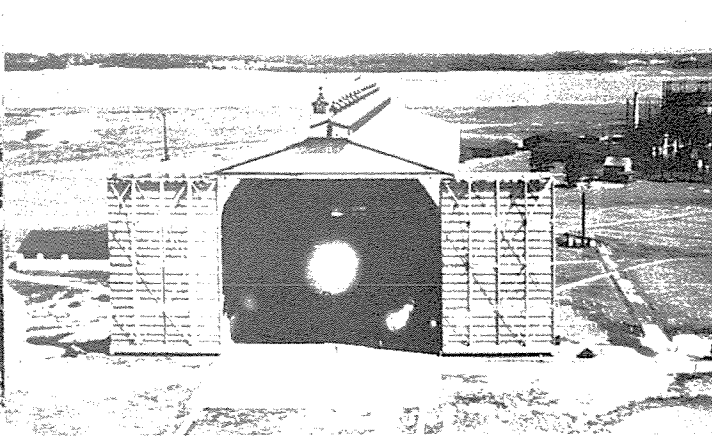
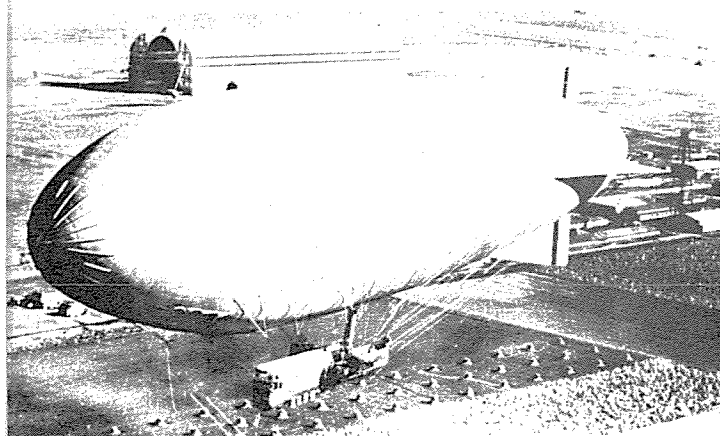


At right - The A-4. (Goodyear photo)

Lower left - The RN-1 at Scott Field, Ill., circa 1923. (USAF photo)

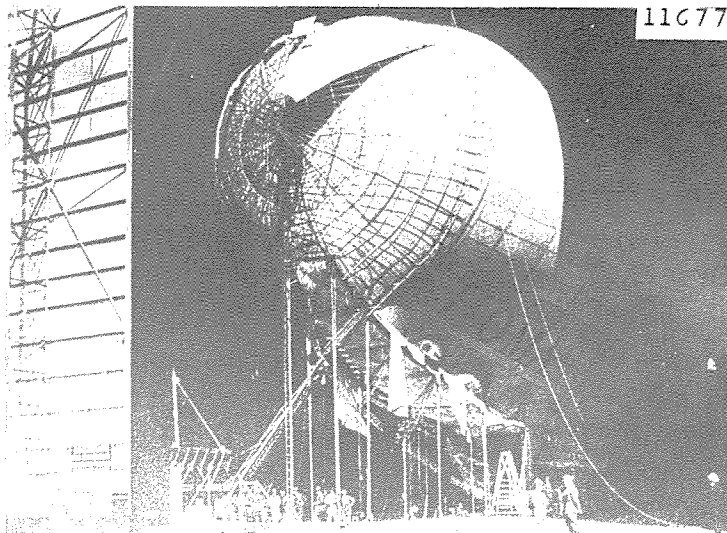


Lower right - Airship hangar at Langley Field, Va., 22 July 1927. (USAF photo)

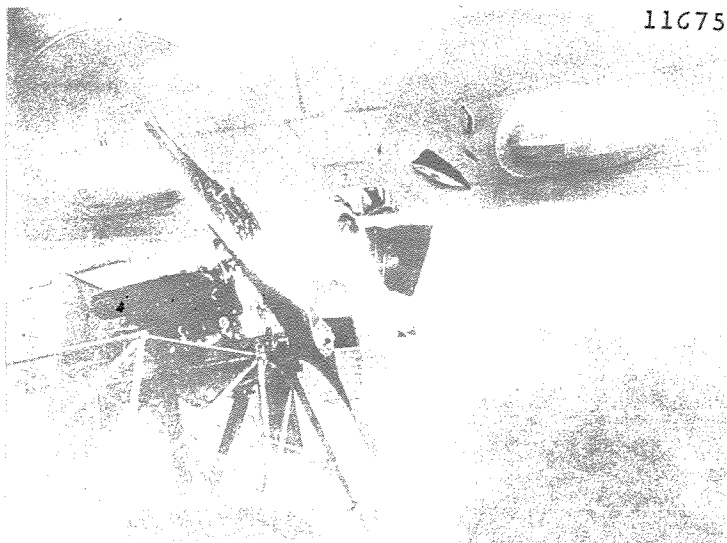


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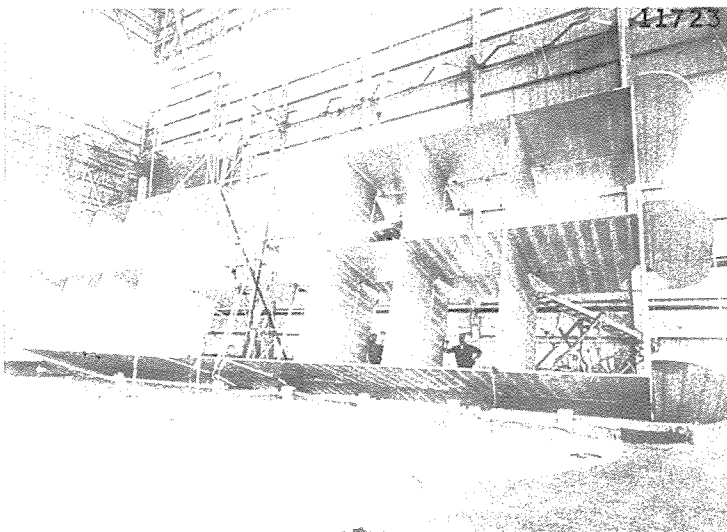
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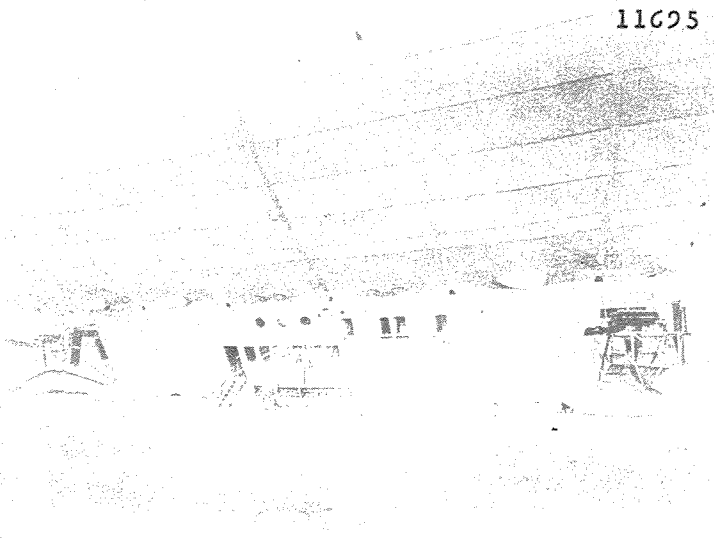
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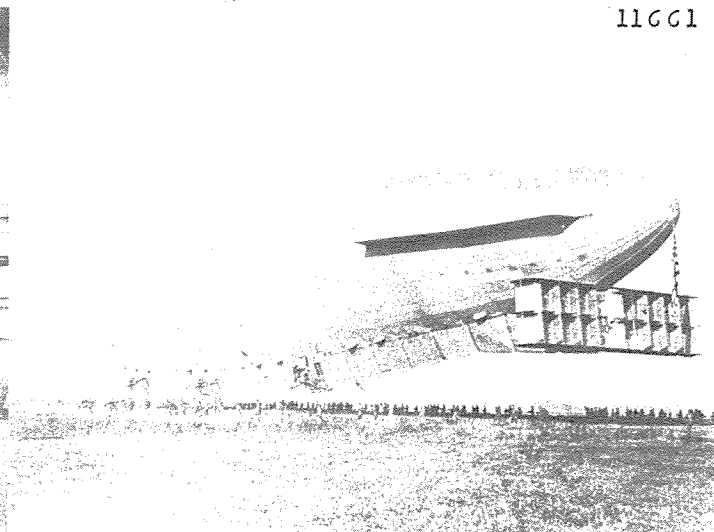
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The Air Service's ill-fated "Roma" was erected and flown in the Summer and Fall of 1921. Because the airship was a semi-rigid, it was necessary to strengthen the nose to withstand the designed airspeed of 80 MPH. Photo No. 1 shows the tubular steel nose stiffener, 45 feet in diameter at the widest point. It was attached to the keel at the bottom. Photos 2 and 6 give some idea of the bulk of the "Roma". It was 410 feet long, 92 feet high, and 32 feet wide. Photos 3 and 4 show the arrangement of the six engines, their attachment to the keel, and location of the control cabin, aft of the two forward engines. Note the three air pontoons upon which the "Roma" rested. Photos 5 and 6 give some detail of the massive box control surfaces. The elevators were 3 feet in chord, attached to stabilizers of 5 ft. chord and 65 ft. width. The eight rudders were 16 feet high.

failure of the nose stiffener, as discussed below by General Anderson.

The official report on the crash was unable to pinpoint the exact cause, but the final conclusion was that pressure in the forward gas cell had been below normal, and that the air scoop and air valve feeding the forward ballonnet were jammed closed. The investigating officers felt that this low pressure allowed the nose stiffener to fail backwards, destroying the contours of the nose, and causing a violent nose down attitude. It was felt that the failure of the nose stiffener also overstressed the keel, causing it to buckle with loss of control over the ship.

There seems to be general agreement that the nose cap had failed backwards. One of the survivors who could testify to this was Cpl. Albert Flores who had been in the observer's pit atop the nose stiffener. He had attempted to descend through the passageway, but had found it blocked by the collapse of the nose cap. He then returned to the observer's pit and jumped clear in the crash and was only slightly injured. The NACA issued a similar report, but a dissenting opinion was given by Lt. Col. Guidoni, Italian Air Attaché, who believed that control failure was brought about by the high speed the ship was maintaining (about 60 MPH).

Major General Orvil Anderson agrees that the failure of the nose cap was the primary cause, but his experience with airships and tests conducted at a later date indicate that low pressure in the forward cell was not the reason for the failure. Following are his highly interesting comments on this subject: "Dale Mabry was an experienced pilot and he had other experienced pilots with him in the control car. They would have reacted to an abnormally low pressure in any cell and the pilot was always directly facing his pressure indicators (monometer tubes). There was sufficient flexibility in the diaphragms separating the cells to produce uniformity in pressure throughout the bag unless one lost so much gas that the diaphragms, fully expanded, could not restore pressure balance. If this had taken place in the forward cell the ship would have become so nose-heavy that it would have forced a corrective action by the crew. The fundamentals are known. The nose collapsed and the box-type control surface broke free at the point of juncture with the keel. Either would have driven the ship downward and it didn't have far to go, approximately 600 feet.

"In my tests of the RS-1, the only semi-rigid built in America, I think I conclusively confirmed what happened to the nose of the Roma and the reasons for it. In my speed tests, when I reached 58 miles per hour, my stress gauges indicated that critical structures in the nose had reached a maximum stress tolerance, with no reasonable safety factor remaining. With the concurrence of Dr. Burgess, who was my stress analyst and the inventor of the gauges we had installed, I stepped up my motors by 50 RPM, and in seconds the nose was collapsing. We cut the motors and limped it home. The test was conducted at 5000 feet.

"Goodyear replaced the nose with one of considerably greater strength. At 60 miles the new nose folded back into the bag. I was maintaining a one and one-half inch pressure throughout the tests. The Roma flew at one-inch.

"With the RS-1 nose collapsing at 58.5 mph, the weaker nose structure of the Roma and the lower internal pressure at which it was flown, should have triggered a nose collapse at 55-56 mph. It was flying at about that speed when it crashed. Had it been at about 4,000-5,000 feet altitude, the crash could have been averted and the ship returned to base. It is a bit unfortunate that this precaution was not taken, but the crew have been briefed that it could fly at 80 mph with a safety factor of 1.5. There was no reason for them to exercise concern at 55."

The loss of the "Roma" was a great blow to the Air Service, and it completely upset policy and training in this field. It would be many years before the service sustained as heavy a loss of life in an air accident. One good result came from this disaster; the use of hydrogen as a lifting gas slowly gave way to the non-flammable helium. Many sources tell us that this was the immediate result of the "Roma" loss, but the heavy loss of life in this crash did not end the hydrogen-helium controversy. The high cost of helium and its slightly less lift were still arguments against its use, and for these reasons, it is interesting to note that the C-2 was inflated with hydrogen when she burned in October of 1922. It is thought that TC-1 was also inflated with hydrogen when she burned at her mast at Wright Field in June, 1923.

The old order was changing though, the new TA series ships replaced the old A-4, and the C and D ships were replaced by the more efficient TC type. Both of these two new classes were designed to utilize helium. Although one more semi-rigid airship, the Goodyear RS-1, was acquired several years later, the non-rigid became the standard airship in use by the army.

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ACKNOWLEDGEMENTS: For their assistance on this paper I would like to thank Dr. Topping and Mr. Banks of Goodyear Aircraft; Col. Glen Johnsen, past commander of the Assn. of American Balloon Corps Veterans; Mr. Dick Smith; Mr. Martin Copp and Mr. Edward Sharp of NASA; Col. Ira Koenig and Capt. "Bill" Finley, ex-army airshipmen; Col. Clarence Lober, who wrote his last cheerful letter to me, about his days as commander of the 19th Airship Sqdn, only nine days before he passed away on the 18th of December, 1959; Dr. Douglas Robinson for his encouragement on this project. I am especially grateful to Major General Orvil Anderson (USAF, ret.), for answering many of my questions and commenting on many points of LTA history.

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National Aircraft Photo Collection:

Roger Besecker has come up with what we think could be an interesting idea. He believes that a centralized file, with a curator, could service aircraft photographers around the country. As he explains - "I don't mean for the members to give up treasured rare negs but from now on to snap extras and donate them. The cost would be negligible and the fruits could be enjoyed by all. My idea was to send in a list of the negs gathered in just before each issue of the Journal and it be published as a regular feature. That would eliminate the list of separate catalogs etc. Those sending in negs should put them in either glassine or kraft envelopes and type or write clearly all pertinent data on the outside. This data would be copied off for the quarterly list. Each negative would be numbered; and if too many dupes come in, the later ones could be returned to the donor with appropriate thanks. Perhaps even a swap deal could be worked up with Air Britain. This could benefit both organizations. Why not when the idea is mentioned ask members to drop a post card with either a 'yes' or 'no' on it, and if enough favor it then we are in business.

"If I handle it I'd rather have the prints made commercially due to time involved etc. I believe I mentioned I can get prints in 24 hr. service at 10¢ each. Actually I think they can be done for 9¢, and if so the difference could pay for costs of stamps, etc. In any event close financial records would be kept. Negs loaned would be on a library like basis. Returned within 1 week of receipt."

Roger Besecker, 1346 N. Wahneta St., Allentown, Pa.

CHARACTERISTICS OF ARMY AIRSHIPS ASSIGNED TO LANGLEY FIELD

1919-1922

TYPE	VOLUME cu. ft.	CEILING (estimate)	HORSEPOWER	CREW	MAX SPEED
A-4	95,000	9,300 ft	90	3	46 mph, 1500 ft
SST	96,000	11,100 ft	150	4	48 mph s.l.
C-2	181,000	11,600 ft	300	6	60 mph, 500 ft
D-2, D-3, D-4	189,000	10,900 ft	240	6	58 mph
ZD-US-1	340,000	14,200 ft	580	8	49.6 mph
Roma	1,200,000	UNK	2700	19	77 mph

ROMA ENGINE COMPARISONS

	NUMBER CYLINDERS	WEIGHT	HORSEPOWER	RPM
ANSALDO	12	1018 lbs	450	1650
LIBERTY	12	806 lbs	400	1700

CREW ASSIGNED TO ROMA

Major John G. Thornell, Commander
 Capt. Dale Mabry, Chief Pilot
~~/~~Capt. Walter J. Reed, pilot
~~/~~Lt. Byron T. Burt, pilot
 M/Sgt Roger C. McNally, Coxswain
 T/Sgt Lee M. Harris, Chief Engineer
 S/Sgt Marion J. Beall, Engineer
 S/Sgt Louis Hilliard, Engineer
~~/~~Sgt. Jos. M. Biedenbach, Engineer
 Sgt Thos. Yarbrough, Engineer

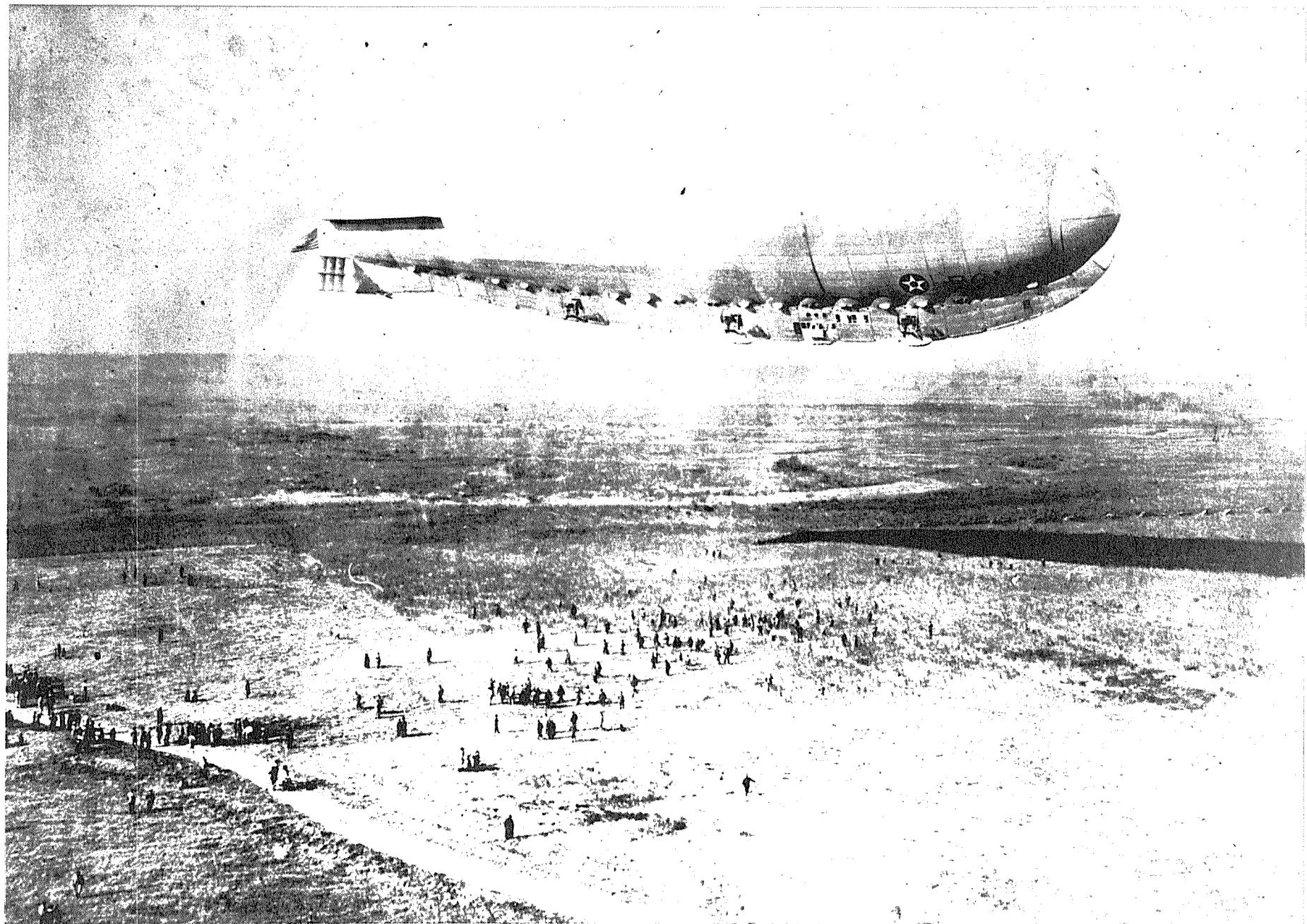
~~/~~Sgt Virden Peek, Engineer
 Sgt Wm. J. Ryan, Radio op.
 Sgt Virgil C. Hoffman, Rigger
 Cpl Irbey Hevron, Rigger
~~/~~Cpl Albert Flores, Rigger
 PFC Marion Hill, Rigger
 Pvt John E. Thompson, Engineer
 Pvt Gus Kingston, Rigger
 Pvt Theron Blakely, Engineer

PERSONNEL ABOARD ROMA ON 21 FEB., 1922
 (other than crew)

~~/~~Major John D. Reardon
 Major Walter Vautsmeier
 Capt. George C. Watts
 Capt. Allan P. McFarland
 Capt. Frederick Durrschmitt
 Lt. John R. Hall
 Lt. Wallace C. Burns
 Lt. William Riley
 Lt. Clifford Smythe
 Lt. Wallace C. Cummings
 Lt. Ambrose Clinton
 Lt. Harold K. Hine
 M/Sgt James Murray

~~/~~Lt. Clarence Welch
~~/~~M/Sgt Harry Chapman
 M/Sgt Homer Gorby
 S/Sgt Edward Schumacker
 S/Sgt James Holmes
~~/~~Mr. Ray Hurley
 Mr. Walter W. Stryker
 Mr. Robert J. Hansen
 Mr. William O'Laughlin
 Mr. Charles Shulenberg
 Mr. T. H. Harriman
~~/~~Mr. Charles W. Dworack
~~/~~Mr. Walter A. McNair

~~/~~Indicates survivors



THE "ROMA" AT LANGLEY FIELD

The "Roma" was designed to cruise at 47 MPH and to have a six-engine range of 1700 miles, or 2700 miles on two engines. For local operations 18 men would man the semi-rigid, though 25 would be needed in extended operations. The airship was lost February 21, 1922.