FLIGHT STANDARDIZATION BOARD REPORT

ZEPPELIN LZ-N07-100 AIRSHIP

REVISION 1

DATE: November 30, 2009

APPROVED

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REVISION RECORD

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Original	All	All	02/26/2009
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HIGHLIGHTS OF CHANGE – REVISION 1

Cover Page	Updated to Revision Number 1
Management Coordination	Revised name of AFS-800 Manager
Table of Contents	Re-numbered pages due to changes to training tables
Revision Record	Revised to reflect Revision 1 changes
Section 4	Added sentence on AFM training limitation - Page 10
Section 7	Revised last part of Paragraph 7.1 - Page 13
Section 7	Revised both tables regarding type-specific training - Pages 14-16
Section 8	Revised last sentence of Paragraph 8.3 - Page 17

1. PURPOSE AND APPLICABILITY

1.1 Purpose

The two primary purposes of this Flight Standardization Board (FSB) Report are to identify type-specific training and to specify Federal Aviation Administration (FAA) master training, checking, and currency requirements applicable to flight crews operating the Zeppelin LZ-N07-100 Airship, hereinafter referred to as the LZ-N07.

The guidelines in this Report apply to: Operations Inspectors, Principal Operations Inspectors (POIs), Certificated Flight Instructors (CFIs), and other training providers. This Report can also provide guidance to operators, who will be operating the LZ-N07 under Title 14 Code of Federal Regulations (14 CFR) Part 91.

The FSB will complete evaluations of future changes to the LZ-N07 and derivative or related models. Future aircraft changes that the FSB may need to evaluate include, but are not limited to, engine changes, systems and instrumentation changes, and the installation of new systems. The FSB will determine the impact of future installations on training, checking and currency, and amend the FSB Report as needed.

The contents of this FSB Report are written in accordance with Advisory Circular (AC) 120-53A, and are applicable on the effective date of its final approval and will remain effective unless amended, superseded, or withdrawn by subsequent FSB determinations.

1.2 Operational Applicability

The LZ-N07 airship will operate in the United States (U.S.) in accordance with the operating rules of 14 CFR Part 91 even though operators will be conducting passenger-carrying operations for compensation or hire. Currently, the operational rules of Part 91, Subpart K (Fractional Ownership); Part 135 Commuter and On-Demand, and Part 136 Commercial Air Tours do not apply to airships.

Regulatory oversight for LZ-N07 operators by FAA inspectors in Flight Standards District Offices (FSDOs) is limited to work program items, surveillance, and investigations normally required for other Part 91 operators.

2. ACRONYMS

Relevant acronyms used in this FSB Report are defined as follows:

14 CFR	Title 14, Code of Federal Regulations
AC	Advisory Circular
AEG	Aircraft Evaluation Group
AFM	Airship Flight Manual

AMM	Airship Maintenance Manual
CAS	Crew Alerting System
CFI	Certificated Flight Instructor
CHDO	Certificate Holding District Office
CPL	Commercial Pilot License
CPT	Cockpit Procedures Trainer
CVR	Cockpit Voice Recorder
DAU	Data Acquisition Unit
DME	Distance Measuring Equipment
EADI	Electronic Attitude Direction Indicator
EASA	European Aviation Safety Agency
EHSI	Electronic Horizontal Situation Indicator
EIS	Engine Indication System
EFIS	Electronic Flight Instrument System
ELT	Emergency Locator Transmitter
FAA	Federal Aviation Administration
FDR	Flight Data Recorder
FMS	Flight Management System
FSB	Flight Standardization Board
FSDO	Flight Standards District Office
FTD	Flight Training Device
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
IFIS	Integrated Flight Instrument System
IFR	Instrument Flight Rules
IIDS	Integrated Instrument Display System
LASAR	Limited Authority Spark Advanced Regulator
LBA	Luftfahrt Bundesamt (German Civil Aviation Authority)
LFLS	Lufttuchtigkeitsforderungen fur Luftschiffe (German Airship Certification Rules)
LH	Left Hand
LTA	Lighter Than Air
MDRs	Master Difference Requirements
MEL	Minimum Equipment List
MFD	Multi-Function Display
MKC-AEG	Kansas City Aircraft Evaluation Group
MMEL	Master Minimum Equipment List
NSP	National Simulator Program
ODRs	Operator Difference Requirements
PDU	Power Drive Unit
PFD	Primary Flight Display
PIC	Pilot in Command
POI	Principal Operations Inspector
PTS	Practical Test Standards
QRH	Quick Reference Handbook
RH	Right Hand

SIC	Second in Command
TAWS	Terrain Awareness Warning System
TC	Type Certificate
TCAS	Traffic Alert and Collision Avoidance System
TCDS	Type Certificate Data Sheet
TRU	Transformer Rectifier Unit
TSO	Technical Service Order
TVCS	Thrust Vector Control System
VFR	Visual Flight Rules

3. BACKGROUND

3.1 Historical Perspective

The world's first untethered flight of a rigid airship occurred on July 2, 1900, over Lake Constance, at Friedrichshafen, Germany, with the launching of Luftschiff Zeppelin (LZ) 1. Zeppelins were named after the German airship pioneer, Count Ferdinand von Zeppelin. As early as 1910-1914, Zeppelin Airships were successfully used in commercial air service in Europe.

During World War I, there were significant improvements in airship technology, which resulted in a more streamlined hull, higher speeds and operating altitudes, greater gas capacity and an increased length. For example, LZ38, completed in 1915, was 530 feet long. The Graf Zeppelins of the 1920s and 1930s were the largest airships and reached lengths of well over 700 feet. In 1929, a Graf Zeppelin, LZ127, commanded by Dr. Hugo Eckener, set a speed record for all types of aircraft at that time, when he completed an around-the-world flight in just over 21 days.

During the 1930s, Zeppelin airships were used in commercial service between Europe and the U.S. and Europe and South America. Thousands of passengers were carried on these transatlantic flights. This period of time was referred to as the "golden age" of airships. The Hindenburg, LZ129, which was built in 1936, measured 804 feet long and was the largest of the Graf Zeppelin airships.

With the onset of World War II, most Zeppelins were scrapped for the use of their aluminum. Much of the remaining parts inventories were destroyed in a fire at the Zeppelin facilities in 1940.

In the 1990s, the successor of the original Zeppelin Company, Zeppelin Luftschifftechnik GmbH, began engineering and design work on a new technology airship. The airship was constructed as a semi-rigid airship that employed many advanced technologies including a lightweight internal frame, greatly increased maneuverability, vectored thrust engines, which allowed vertical takeoff and landing capability and the most advanced avionics available. The first flight of the new technology Zeppelin occurred on July 2, 1997.

The LZ-N07 was type certificated in Germany, with Type Certificate Number 9004, in accordance with the commuter category airship certification requirements and German Part 23 by the Luftfahrt

Bundesamt (LBA). In 2003, oversight was transferred to the European Aviation Safety Agency (EASA).

The U.S. Type Certificate Holder is ZLT Zeppelin Luftschifftechnik GmbH & Co KG, hereinafter referred to as Zeppelin. Zeppelin applied for a U.S. Type Certificate on January 10, 2001. The agreed upon certification basis was 14 CFR 21.17 (b), Amendment 21-70, dated December 31, 1992, and AC 21.17-1, Section Five, dated October 30, 1992.

Due to decisions by Zeppelin not to proceed with the U.S. Type Certificate, the project was on hold for several years while LZ-N07 Airships were manufactured for other markets. However, in late 2006, Zeppelin made a decision to complete the process to acquire a U.S. Type Certificate. Type Certificate Number AS1CE was awarded to Zeppelin on June 11, 2008. The LZ-N07 is certified in the U.S. as a normal category airship limited to day and night VFR operations.

3.2 LZ-N07 Airship Description

The LZ-N07 is a semi-rigid airship, which utilizes the lighter-than-air (LTA) principles common to other airships, and also has several new technologies including a vectoring propeller system allowing for vertical takeoffs and landings and a fly-by-wire sidestick control system. The LZ-N07 is 75 meters (246 feet) long and 17.5 meters (57.5 feet) high. It is approved to a maximum operating altitude of 10,000 feet.

The maximum airship weight at equilibrium is 16,865 pounds. The maximum static heaviness in flight is plus 1,102 pounds and 882 pounds for takeoff and landing. The maximum static lightness is minus 441 pounds for all flight conditions. Up to 1,540 pounds of water ballast as well as conventional 25-pound ballast bags are available.

The minimum flight crew size for the LZ-N07 is one qualified pilot in the left hand (LH) seat. However, for all passenger-carrying operations, a second crew member, who may be a qualified pilot, or other crew member who has completed the Zeppelin training program that includes passenger assistance and emergency evacuation procedures, must occupy the right hand (RH) seat. The maximum passenger seating density is either 12 or 13 depending on cabin configuration.

The envelope of the LZ-N07 is constructed with a laminate of tedlar and polyester fabric with a polyurethane coating and contains the helium lifting gas and two air-filled ballonets. Pressure in the envelope is automatically controlled, or may be manually controlled. The pressure of air in the ballonets is maintained by two ballonet fans. Air in the ballonets may be transferred between the forward and aft ballonet to assist the pilot with the trimming of the airship.

The LZ-N07 is equipped with three 200-horsepower Textron Lycoming IO-360 Engines. The two side engines are mounted in nacelles attached to the structural framework on the left and right sides of the envelope. The rear engine is mounted to the structural framework on the far aft end of the envelope behind the empennage. Each engine has a hydraulic pump installed that provides power for propeller pitch change and propeller swivel actuation (thrust vectoring). The aft engine also incorporates a non-swiveling lateral propeller for yaw control. The two side engine propeller systems

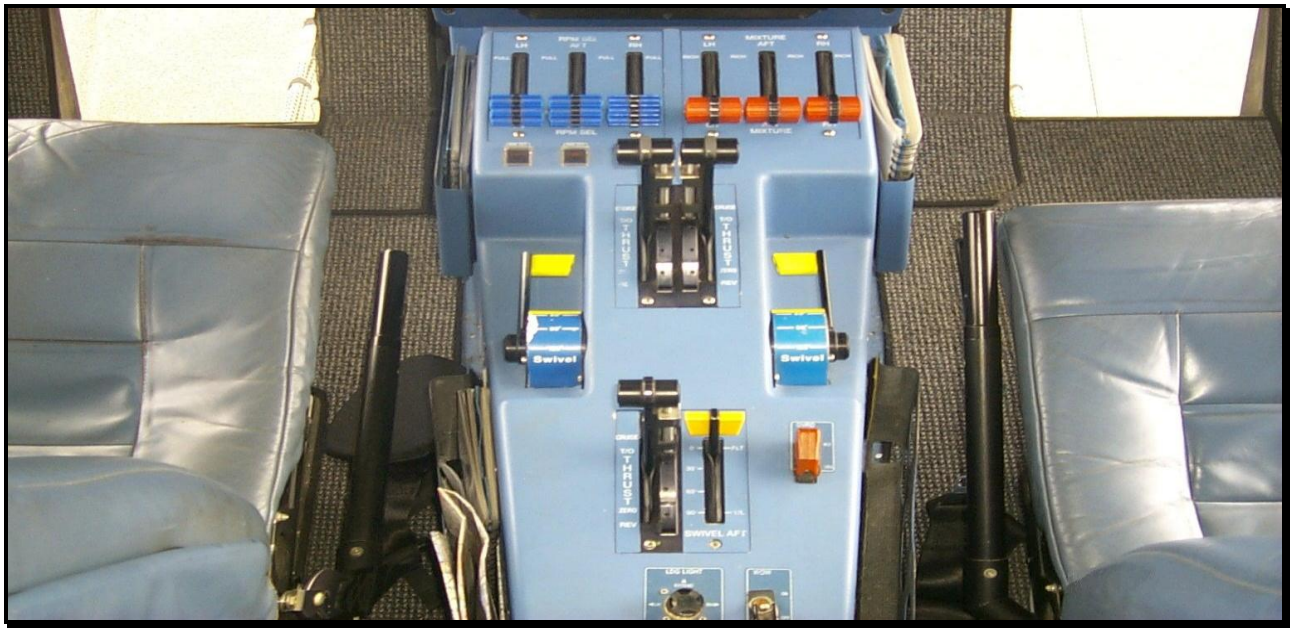
swivel from zero degrees to 120 degrees up. The aft engine propeller system swivels from zero degrees to 90 degrees down.

The thrust vector control system (TVCS) is a fly-by-wire system, which converts cockpit lever inputs into engine throttle, mixture, propeller pitch and swivel angle movement commands. During takeoff and landing and at airspeeds under 15 knots, the side engine(s) TVCS controls the lift of the LZ-N07 and the rear engine TVCS controls airship pitch and yaw rotation. The TVCS serves as a backup control system to the primary flight control system.

The fuel system consists of three tanks, one for each engine. In normal operations, fuel is used from tank to engine, but the system is interconnected for fuel management. Fuel is routinely transferred between tanks for balance and trimming through the use of the transfer system. Maximum fuel capacity is 111 gallons for each side engine tank and 84 gallons for the aft engine tank.

The LZ-N07 has a 28 Volt DC electrical power system, which includes three generators, three batteries and a multi-bus system. The system includes two transformer rectifier units (TRU), which transform 200 Volt AC from the aft generator into 28 Volt DC. The batteries are lead-acid with two installed in the gondola and one installed in the aft engine compartment.

The LZ-N07 has an integrated instrument display system (IIDS), which contains airship specific instruments to monitor vectored thrust, control surface position and pressure system information system synoptic pages and a crew alerting system (CAS) messaging system. The avionics suite also contains two primary electronic flight instrument system (EFIS) displays and a multi-function display (MFD), as well as the standard navigation and communication equipment. The center pedestal controls and the cockpit panel of the LZ-N07 are illustrated below.



Zeppelin LZ-N07 Center Control Pedestal

Zeppelin LZ-N07 Flight Deck Panel

4. PILOT TYPE RATING DETERMINATION

The FSB considered and recommended a type rating for U.S pilots operating the LZ-N07 airship when the Board convened in October, 2007. However, a decision was made not to establish a type rating because the pilot certification regulations of 14 CFR Part 61 do not include rules for airship type ratings. Instead, FAA Headquarters requested that the FSB identify type-specific training for U.S. pilots of the LZ-N07, in accordance with 14 CFR 61.31 (h).

Supplement 21 to the LZ-N07 Airship Flight Manual (AFM), the U.S. Operational Supplement, requires that all pilots comply with the type-specific training provisions of 14 CFR 61.31 (h) (1) and (2) before operating the LZ-N07 as pilot in command (PIC). **Type-specific training listed in this FSB Report, is mandatory training for U.S. pilots to act as PIC of the LZ-N07**. This requirement is specified as an operational limitation in Supplement 21 (U.S. Operational Supplement) to the Zeppelin LZ-N07-100 AFM.

At the present time, the language of 14 CFR 61.58 does not include requirements for annual checks in airships, unless more than one pilot flight crewmember is required by type certification, nor in aircraft in which type-specific training and/or checking has been identified by an FSB Report. The FSB recommends that 14 CFR 61.58 be amended to include an annual proficiency check in the LZ-N07 airship for U.S. pilots. This can be accomplished by adding a type-specific checking requirement to 14 CFR 61.58 that would parallel the type-specific training language contained in 14 CFR 61.31 (h).

5. LZ-N07 TRAINING PROGRAM DESCRIPTION

5.1 Training Program – General

In Germany, Zeppelin Airship training is performed in compliance with the German Regulations for Aviation Personnel (LuftPersV) and is completed according to 2nd DV JAR FCL, as well as to the regulations of the German Federal Ministry of Transport, Building and Urban Affairs, concerning training and examination of aviation personnel. All training courses are listed in Zeppelin's Pilot Training Manual for Airship Pilots.

Zeppelin's training courses are offered primarily for the purpose of training employees, who will be involved with the daily operation of LZ-N07 Airships worldwide. These courses include several pilot training programs, a flight attendant training program, and a ground crew training program. The FSB received an orientation from Zeppelin instructors for all programs being offered. However, since the primary purpose of the FSB is to evaluate the manufacturer's pilot training program(s), the emphasis was placed on evaluation of the pilot training courses listed in Paragraph 5.2 below:

5.2 Commercial Airship Pilot

(a) Ab Initio:

Standard duration of training:	Approximately 20 months
Maximum duration of training:	24 months
Theoretical training:	300 hours
Practical training:	Three months on a ground crew
	Minimum of 50 training flight hours
	Minimum of 150 supervised flight hours

(b) Students holding a CPL:

Standard duration of training:	Approximately 15 months
Maximum duration of training:	N/A
Theoretical training:	Minimum of 93 hours
Practical training:	Three months on a ground crew
	Minimum of 40 training flight hours
	Minimum of 130 supervised flight hours

(c) Type Rating:

Standard duration of training:	Approximately four months
Maximum duration of training:	N/A
Theoretical training:	Minimum of 49 hours
Practical training:	Minimum of 25 training flight hours
	Minimum of 100 supervised flight hours

5.3 Flight Attendant Training Manual

The FSB has reviewed the Flight Attendant Training Manual, which is currently used for flight attendant training by Deutsche Zeppelin Reederei, a subsidiary of Zeppelin, which conducts commercial operations at Friedrichshafen, Germany. Flight attendant training will be required for U.S. operations and is addressed in Section 6.

6. LZ-N07 TRAINING PROGRAM EVALUATION

6.1 General

The FSB did not find the duration of training listed in months, or days, in the Zeppelin courses to be useful since the course description does not define a training month or a training day. A FSB is accustomed to evaluating training courses in terms of hourly flight and ground training requirements and course content.

The courses identified in Zeppelin's Pilot Training Manual for Airship Pilots were developed for pilots, who have been hired by Zeppelin, or a Zeppelin operator. LZ-N07 pilots presently in training are required to complete on-the-job training, in addition to the Zeppelin training program, to better prepare them to service the operator. The FSB did not consider, or evaluate, on-the-job training contained in the Zeppelin training program for pilots operating the LZ-N07 in the U.S. market.

6.2 Pilot Training Courses

The first course of training is ab initio training, which means the student has no previous pilot training or experience in any aircraft. The FSB believes that due to the cost of operating the LZ-N07, the probability of a pilot completing this course is unlikely. However, a pilot completing this course would have to meet or complete all the requirements of 14 CFR 61.123, 61.125, 61.127 (b) (7) and 61.129 (g), as well as all the type-specific training for pilots operating the LZ-N07 in the U.S.

The second course of training in the Zeppelin training program is for pilots who hold a Commercial Pilot Certificate in another category of aircraft and are now receiving initial airship training in the LZ-N07. Airmen in this course would have to meet the appropriate requirements of 14 CFR 61.63 (b), 61.125, 61.127 (b) (7) and 61.129 (g), as well as the type-specific training for pilots operating the LZ-N07 in the U.S.

The third course of training in the Zeppelin training program is the type rating course. Although the LZ-N07 does not have a pilot type rating designation in the U.S., the Zeppelin type rating course would be the course used for U.S. pilots, who presently hold a commercial pilot certificate with a lighter than air (LTA) category and airship class rating. Specifically, pilots who hold an airship rating at the commercial pilot level would complete this course, as well as the identified type-specific training for pilots operating the LZ-N07 in the U.S.

All type-specific training requirements for U.S. pilots operating the LZ-N07 are listed in Section 7 of this FSB Report.

6.3 Flight Attendant Training

FSB members did not complete flight attendant training, but completed a review of the Flight Attendant Training Manual and observed actual commercial operations. The FSB concurs that this training should be mandatory in the U.S. for flight attendants engaged in passenger-carrying operations in the LZ-N07.

Supplement 21 to the Zeppelin LZ-N07 AFM requires that for passenger-carrying operations, the second crew member in the RH seat must be either a qualified flight crew member or another crew member, who has completed a Zeppelin training program that includes passenger assistance and emergency evacuation duties. This is an operational limitation in Section 2 of Supplement 21 which makes this training mandatory.

The FSB recommends that the Flight Attendant Training Manual used by Deutsche Zeppelin Reederei, or an equivalent flight attendant training manual be used for training the crew member in the RH seat since it includes training items essential to the safe operation of passenger-carrying flights.

7. FSB SPECIFICATIONS FOR TRAINING

7.1 General

Currently, aeronautical knowledge and flight proficiency training requirements in the LTA category with airship class rating are enumerated in 14 CFR Parts 61.105, 61.107 (b) (7), and 61.109 (g) at the private pilot level, and 14 CFR 61.125, 61.127 (b) (7), and 61.129 (g) at the commercial pilot level.

Instrument privileges in airships are authorized for commercial pilots, who hold an instrument rating in another category of aircraft, if they receive the minimum number of instrument training hours specified by 14 CFR 61.129 (g) (3) during airship training. Commercial pilots, who do not hold an instrument rating in another category of aircraft, must not only receive the minimum number of training hours specified by 14 CFR 61.129 (g) (3) but also must demonstrate instrument proficiency on the commercial pilot airship practical test.

Prior to serving as PIC of the Zeppelin LZ-N07 airship, the pilot must receive the aircraft type-specific training required by 14 CFR 61.31 (h) and the training limitation in Supplement 21, the U.S. Operational Supplement to the AFM. Type-specific training, which is identified below, is required regardless of the grade of pilot certificate held or level of experience in airships.

7.2 Ground Training

The FSB completed the ground training at Zeppelin's company headquarters in Friedrichshafen,

Germany. Ground training, as described in Zeppelin's Pilot Training Manual for Airship Pilots, should be the standard ground training for U.S. pilots. The FSB report does not list a specific number of hours of ground training, but does recommend that U.S. pilots receive LZ-N07 training on the following type-specific items:

(a) Zeppelin Airship systems training;
(b) Airship flight manual (AFM) and all appropriate AFM supplements;
(c) Use of emergency equipment;
(d) Use of the PITEX computerized weight and balance program;
(e) Use of the FAA-Approved minimum equipment list (MEL);
(f) Pre-flight inspection procedures;
(g) Normal procedures;
(h) Abnormal and emergency procedures;
(i) Engine runups and systems checks;
(j) Ground crew coordination to include unmasting;
(k) Refueling operations;
(l) Masting and taxiing with the mast truck, and
(m) Post-flight procedures.

7.3 Flight Training

Zeppelin's Pilot Training Manual for Airship Pilots includes 41 flight training items/procedures and a minimum number of flight hours for each and the recommended number of times the flight training item will be performed by the pilot undergoing training. These training items, which are acceptable to the FSB, are listed as a flight item/procedure in the table below. The FSB concludes that all 41 items are required as type-specific training for U.S. pilots.

However, the FSB has not set a minimum number of flight training hours for U.S. pilots since 14 CFR sets training hours for private and commercial pilot training in airships. The FSB concludes that type-specific flight training hours will vary greatly, based on the pilot's previous experience, and a minimum number of hours is not appropriate.

Zeppelin Training Program Flight Item/Procedure
1. Flight and Crew Coordination
2. Weight and Balance and Trim
3. Pre-Flight and Checklists
4. Engine Runs and System Checks
5. Ground Maneuvering on the Mast
6. Straight and level Flight (Altitude/Heading)
7. Turns, Climbs and Descents (Alt/Pressure) Control
8. Unmasting Procedures
9. Ground Maneuvering Off the Mast
10. Takeoff with Various Static Heaviness

Zeppelin Training Program Flight Item/Procedure
11. Takeoff with Maximum Static Heaviness
12. Transition into Flight Configuration
13. Flight to and from Pressure Height
14. In-Flight Weigh-Off
15. Manual Pressure Control
16. Trim in Flight
17. Hovering Maneuvers
18. Approaches to Landings
19. Landing with Various Static Heaviness
20. Landing with Maximum Static Heaviness
21. Landing Light and at Equilibrium
22. Landing with Maximum Static Lightness
23. Go-Around Procedures
24. Ground Maneuvering off the Mast
25. Masting Procedures
26. Use of VOR/DME
27. Use of ADF
28. Use of ILS
29. Engine Failure and Runaways on Takeoff
30. Vector Failure and Runaways on Takeoff
31. Engine Failure and Runaways on Landing
32. Vector Failure and Runaways on Landing or during Hover
33. Engine Failure and Runaways in Flight
34. Vector Failure and Runaways in Flight
35. Engine Failure and Runaways during Hover
36. Free Ballooning
37. Envelope Emergencies
38. Ditching and Emergency Landings
39. Electrical System Failures
40. Aerodynamic System Control Failures
41. Fire Emergencies

The following flight procedures listed in the table below were identified by the FSB as procedures or maneuvers which require type-specific training for U.S. pilots, but are not specifically included in the Zeppelin Pilot Training Manual for Airship Pilots. Training on these procedures is also mandatory for U.S. pilots prior to serving as pilot in command of the LZ-N07 in the U.S.

Additional Flight Item/Procedure
1. Use of PITEX System for Weight and Balance

Additional Flight Item/Procedure
2. Water Ballast System
3. Power Drive Unit (PDU) Failure
4. Flight Control Unit (Sidestick) Failure
5. Fuel System Operations, Water Detection and Transfer System
6. Passenger Handling and Emergency Evacuation
7. Forced Landing Over Water
8. Fly-By-Wire Flight Control System
9. Heating and Air Conditioning Operation
10. Use of GPS
11. Hydraulic System Failure
12. Go-Around with One Engine Failed (Simulated)
13. Rolling Landing with Two Engines Failed
14. Emergency Descents
15. Taxi with the Mast Truck Moving
16. Use of U.S. Minimum Equipment List (MEL)
17. Use of AFM Supplement 21 for U.S. Operations
18. Location and Use of Emergency Equipment for U.S. Operations
19. Differences Training from Base LZ-N07 to U.S. Registered LZ-N07
20. Special Mission Equipment Operations
21. Lavatory Smoke and Fire Emergencies
22. Data Acquisition Unit (DAU) Failure
23. Integrated Instrument Display System (IIDS) Failure
24. Primary Flight Display (EADI & EHSI) Failures
25. Multi-Function Display (MFD) Failure
26. Fuel System Failures
27. Engine Shutdown and Restart Procedures in Flight (See Para. 7.4)
28. Single Point Pressure Refueling Operations

7.4 Special Emphasis Training Requirements

The FSB recommends that intentional engine shut down and restart procedures should not be completed during training, except when the airship is on the mast completing hot start, flooded start, or other non-standard starting procedure. The position of Zeppelin Engineering is that engines may be intentionally shut down and restarted, but they have requested that these procedures not be accomplished during training. The FSB concurs with their position.

The FSB also recommends that U.S. operators of the LZ-N07 emphasize training for passenger handling, passenger evacuation, and other emergency situations involving passenger-carrying operations. This training should be completed initially and annually for flight crew members, flight attendants, or other crew member that occupies the RH seat.

8. FSB SPECIFICATIONS FOR CHECKING

8.1 Checking – General

Currently, LTA airship category and class rating practical tests are administered at the private pilot and commercial pilot certificate levels. There are no knowledge, proficiency and experience requirements in 14 CFR Part 61, and no published (PTS), for airline transport pilot certificates, airship type ratings, airship instrument ratings or flight instructor certificates.

The holder of a U.S. commercial pilot certificate with a LTA category and airship class rating may act as PIC of an airship under IFR, or in weather conditions less than VFR minimums, and give flight instruction in airships.

Applicants for an original private or commercial pilot certificate, or an additional category or class rating to be added to an existing certificate, who will be tested in the LZ-N07, must accomplish all the areas of operations and tasks in the appropriate PTS for the grade of certificate held, as well as the type-specific training identified in the tables above.

8.2 Special Emphasis Checking Requirements

The following pilot tasks specified in the LTA Airship Commercial Pilot Practical Test Standards (PTS) are not appropriate to the LZ-N07 Airship, and shall not be tested:

(a) Up-Ship Takeoffs,
(b) Wheel Takeoffs, and
(c) Engine Shutdown and Restart Procedures in flight, except when the LZ-N07 is on the mast and non-standard starting procedures are being evaluated.

8.3 Annual Proficiency Checks

The FSB recommends that to act as PIC of the LZ-N07 Airship, the pilot must have accomplished an annual check similar to the pilot proficiency check required by 14 CFR 61.58 within the preceding twelve calendar months. The proficiency check should be administered in accordance with the Commercial Pilot LTA Airship PTS. However, as stated in Section 4 above, 14 CFR 61.58 does not require an annual proficiency check in an airship, unless it is type certificated for more than one pilot flight crewmember.

9. FSB SPECIFICATIONS FOR CURRENCY

9.1 Recurrent Training

Zeppelin has no recurrent training program for LZ-N07 pilots. Zeppelin's position is that the commercial operator of the airship should be responsible for recurrent training. The FSB supports this position and recommends that recurrent training be the responsibility of the operator.

9.2 Landing Currency

Landing currency is based on the recurrent training program developed by the commercial airship operator. In the absence of the need for this requirement, landing currency will be met by compliance with 14 CFR 61.57 (a) and (b).

10. FSB SPECIFICATIONS FOR DEVICES AND SIMULATORS

All requests for the use of training devices or flight simulators in an operator's training program, or at a Part 142 approved training center or other training provider, should be addressed to the appropriate FSDO. Requests for device or simulator approval should be made through the POI. Guidance is available in AC 120-40B, AC 120-45A and FAA Order 8900.1. POIs should seek additional assistance through the FAA's National Simulator Program (NSP) Office.

At the present time, there is a ground-training device at the Zeppelin Training Center at Friedrichshafen, Germany. This device is being used for cockpit integration procedures training. However, it has not been approved by the LBA or the FAA.

The FSB used the training device during training and found it very useful for preflight checklists, cockpit procedures, and emergency drills. It is the opinion of the FSB that this device in its present condition could not be approved as a simulator.

11. OPERATOR DIFFERENCE REQUIREMENTS (ODRs)

ODRs are operator specific requirements necessary to address differences between a base aircraft and one or more related aircraft in a transition training program that lists compliance methods relative to training, checking and currency.

12. MASTER DIFFERENCE REQUIREMENTS (MDRs)

MDRs are requirements applicable to crew qualification, which pertain to differences between related aircraft. MDR requirements apply when differences between a base aircraft and related aircraft affect flight crew knowledge, skills, or abilities related to flight safety at training differences levels of Level A or greater.

At the present time, there is one model of the LZ-N07 Airship and no related aircraft.

13. AIRCRAFT REGULATORY COMPLIANCE

The Aircraft Regulatory Compliance Checklist is of benefit to the FAA Certificate Holding District Office (CHDO) and assigned principal inspectors, because it identifies regulatory and operational

requirements for which compliance has already been demonstrated to the FAA for a particular type aircraft or related aircraft.

It is the responsibility of the CHDO to review compliance with FAA rules, policies and processes before the Zeppelin LZ-N07 is approved for entry into commercial service. The Aircraft Regulatory Compliance Checklist for the LZ-N07 is located in Appendix A of this FSB Report.

14. ALTERNATE MEANS OF COMPLIANCE TO THIS REPORT

The FSB chairman should be consulted by Inspectors when alternate means of compliance, other than those specified in this report, are proposed. The FAA General Aviation and Commercial Division, AFS-800, or the FAA Air Transportation Division, AFS-200, must approve alternate means of compliance. If an alternate means of compliance is sought, operators will be required to submit a proposed alternate means for approval that provides an equivalent level of safety to the provisions of AC 120-53A and this FSB Report. Analysis, demonstrations, proof of concept testing, differences documentation, and/or other evidence may be required.

APPENDIX A – ZEPPELIN LZ-N07 AIRCRAFT REGULATORY COMPLIANCE CHECKLIST

14 CFR	Sub Req.	Requirement	Compliance	Remarks	FSB Finding
91. 9	(a)	Compliance with Flight Manual, Markings, and Placard Markings	The airship meets LFLS 1545 through 1563 and 1583 through 1589 German Requirements and U.S. 14 CFR.	Operating limitations and flight deck markings and placards are included in AFM 07 ML 01 200 Sect. 2 AMM Section 11 contains all markings and placards.	Placards were in the correct cockpit and passenger cabin locations. Not all exterior placards were confirmed.
91. 9	(b) (1)	Availability of Current Airplane Flight Manual in Aircraft	A current approved AFM and revisions are distributed to the operator.	The AFM is stowed in the flight bag, which is positioned behind the LH pilot seat.	The approved AFM was available. FSB concurs.
91. 9	(c)	Identification of Aircraft in accordance with 14 CFR Part 45	The airship is identified in accordance with 14 CFR part 45 requirements.	Fireproof identification placard is mounted on the LH outside part of the car directly below the rear entrance door. Registration marks are painted on the fin of the airship.	FSB Concurs.
91.189	(a) (3)	Category II and III Instruments and Flight Guidance System	Not applicable.	Not installed.	Not applicable. FSB concurs.
91.191	(a) (1)	Category II and Category III Manual	Not applicable.	Not installed.	Not applicable. FSB concurs.
91.203	(a) (1) (b)	Valid Airworthiness Certificate, Flight Permit, Registration Certificate	Those certificates will be issued by FAA through application process.	It is the operator's responsibility to have the required documents on board of the airship.	All U.S. FAA-Approved documents are available. FSB concurs.
91.203	(c)	Fuel Tanks in the Passenger/Baggage Compartment	Compliant, covered by TC for standard airship.	No fuel tanks in the passenger/baggage compartment.	FSB concurs.

14 CFR	Sub Req.	Requirement	Compliance	Remarks	FSB Finding
91.203	(d)	Fuel Venting and Exhaust Emissions Requirements o Part 34	Not applicable.	No turbine engines installed.	FSB concurs.
91.205	(a)	Powered Civil Aircraft with Standard Category U.S. Airworthiness Certificates: Instrument and Equipment Requirements: General	Except for the signaling device (b12) and the ELT (b15), the required equipment for Day/Night VFR is installed in the standard airship.	For operations in the United States a signaling device and an ELT will be installed.	FSB concurs.
91.205	(b) (1) to (b) (16)	Day VFR Instruments and Equipment	Except for the over water signaling device (b12) and the ELT (b15) the required equipment for Day VFR is installed in the standard airship.	For operations in the United States a signaling device and an ELT will be installed.	FSB concurs.
91.205	(c) (1) to (c) (6)	Night VFR Instruments and Equipment	The additional equipment required for Night VFR is installed in the standard airship. Fuses are not accessible in flight.	For operations in the United States a signaling device and an ELT will be installed.	FSB concurs.
91.205	(d) (1) to (d) (9)	IFR Instruments and Equipment	Not applicable.	IFR instrumentation is provided but IFR certification/operation has not been applied for.	Aircraft has equipment installed for IFR but Zeppelin has not pursued approval. FSB concurs.
91.205	(e)	Flight at and above FL240 Equipment Requirements	Not applicable.	Maximum operating altitude is at or below 10.000 ft.	Not applicable. FSB concurs.
91.205	(f)	Category II Operations Instruments and Equipment	Not applicable.	No CAT II equipment is installed.	Not applicable. FSB concurs.

14 CFR	Sub Req.	Requirement	Compliance	Remarks	FSB Finding
91.205	(g)	Category III Operations Instruments and Equipment	Not applicable.	No CAT III equipment is installed.	Not applicable. FSB concurs.
91.207	(a) (1) (a) (2)	Emergency Locator Transmitter	Compliant with Equipment Option A60; an (ELT) is installed.	For operations in the United States an approved transmitter will be installed.	The LZ-N07 has a portable, hand-held ELT installed. FSB concurs.
91.209	(a)	Aircraft Position Lights	Compliant, covered by TC for standard airship.	Part of standard airship equipment.	The LZ-N07 is equipped with position lights. FSB concurs.
91.209	(b)	Anti-Collision Light System	Compliant, covered by TC for standard airship.	Part of standard airship equipment.	Anti-Collision Light System is installed. FSB concurs.
91.211	(a) (1) to (a) (3)	Supplemental Oxygen: General	Not applicable.	Max. Operating Altitude at or below 10.000 ft.	Not applicable. FSB concurs.
91.211	(b) (1)	Supplemental Oxygen: Pressurized Cabin Aircraft	Not applicable.	No pressurized cabin is provided.	Not applicable. FSB concurs.
91.213	(a)	Inoperative Instruments and Equipment: Approved Minimum Equipment List	An LBA approved Zeppelin MMEL 07 ML 05 500 is available.	The LBA approved MMEL was submitted to MKC-AEG for review.	An MMEL has been approved for the LZ-N07 by the FOEB. FSB concurs.
91.215	(a)	ATC Transponder and Altitude Reporting Equipment and Use	Compliant, covered by TC for standard airship.	A Mode S Transponder meeting the TSO C112 standard is installed in the standard airship.	Transponder is installed. FSB concurs.

14 CFR	Sub Req.	Requirement	Compliance	Remarks	FSB Finding
91.215	(b) (c) (d)	Transponder Operation	Compliant, covered by TC for standard airship.	A Mode S Transponder meeting the TSO C112 standard is installed in the standard airship.	FSB concurs.
91.217	(a)	Data Correspondence Between Automatically Reported Pressure Altitude Data and the Pilot's Altitude Reference: ATC Directed Deviation	Compliant, covered by TC for standard airship.	A Mode S Transponder meeting the TSO C112 standard is installed in the Standard Airship.	Transponder is installed. FSB concurs.
91.217	(b)	Encoded Altitude Accuracy	Compliant, covered by TC for standard airship.	A Mode S Transponder meeting the TSO C112 standard is installed in the Standard Airship.	FSB concurs.
91.217	(c)	Altimeter-Encoding Equipment Specifications	Compliant, covered by TC for standard airship.	The altimeter meets TSO-C10b and TSÖ-C88.	FSB concurs.
91.219	(a) (b)	Altitude Alerting System or Device: Turbojet-Powered Civil Airplanes	Not applicable.	No turbojet engines installed.	Not applicable. FSB concurs.
91.221	(a) (b)	Traffic Alert and Collision Avoidance System Equipment and Use	Not applicable.	No TCAS installed.	Not installed. FSB concurs.
91.223	(a)	Terrain Awareness and Warning System (TAWS): Equipment Installation	Not applicable.	No TAWS installed. No turbine engines installed.	Not installed. FSB concurs.
91.223	(c)	TAWS Airplane Flight Manual Procedures	Not applicable.	NO TAWS installed. No turbine engines installed.	Not installed. FSB concurs.

14 CFR	Sub Req.	Requirement	Compliance	Remarks	FSB Finding
91.223	(d)	TAWS Exceptions	Not applicable.	No TAWS installed. No turbine engines installed.	Not installed. FSB concurs.
91.405	(a) (b) (c) (d)	Maintenance Required	Not applicable.	The requirement addresses the operator. The AMM and the maintenance program will be provided to the operator.	FSB concurs.
91.407	(a) (b) (c)	Operation After Maintenance, Preventive Maintenance, Rebuilding, or Alteration	Not applicable.	The requirement addresses the operator. A maintenance program is provided. The manufacturer provides Service Bulletins and other Service Information to the Operator.	FSB concurs.
91.409	(a) (b) (c)	Inspections	Not applicable.	The requirement addresses the operator A maintenance program, including the program for an annual inspection is provided.	FSB concurs.
91.409	(d)	Progressive Inspections	Not applicable.	A progressive inspection program is not available.	Not applicable.
91.409	(e),(f) (g)	Turbojet Multiengine Airplanes	Not applicable.	No turbojet engines installed.	Not applicable.
91.409	(h)	Changes in Inspection Programs	Not applicable.	The requirement addresses the operator Only one maintenance program is provided.	Not applicable. FSB concurs.
91.411	(a) (b) (c) (d)	Altimeter System and Altitude Reporting Equipment Tests and Inspections	Not applicable.	IFR operations have not been applied for.	Not applicable for now. FSB concurs.

14 CFR	Sub Req.	Requirement	Compliance	Remarks	FSB Finding
91.413	(a) (b) (c)	ATC Transponder Tests and Inspections	Not applicable.	The requirement addresses the operator ATC Transponder Test to be included in the maintenance program.	FSB concurs.
91.415	(a) (b) (c) (d)	Changes to Aircraft Inspection Programs	Not applicable.	This requirement addresses the operator. Support from the manufacturer will be provided if needed.	FSB concurs.
91.417	(a) (b) (c) (d)	Maintenance Records	Owner/Operator responsibility.	The requirement addresses the operator. Support from the manufacturer will be provided if needed.	FSB concurs.
91.419	(a) (b)	Transfer of Maintenance Records	Owner/Operator responsibility.	The requirement addresses the operator. Support from the manufacturer will be provided if needed.	FSB concurs.
91.421	(a) (b) (c)	Rebuilt Engine Maintenance Records	Not applicable.	The requirement addresses the operator. Support from the manufacturer will be provided if needed.	FSB concurs.
Part 91 Subpart F	All	Not applicable.	Not applicable.		Applies only to large and turbojet powered airplanes.
Part 91 Subpart G	All	Not applicable.	Not applicable.		Applies only to large and transport category aircraft.
91.703	(a)	Operations of Civil Aircraft of U.S. Registry Outside of the United States	Not applicable, operations outside U.S. are not planned.	To be confirmed by the operator.	Not intended at this time. FSB concurs.

14 CFR	Sub Req.	Requirement	Compliance	Remarks	FSB Finding
91.705	(a)	Operations Within Airspace Designated as Minimum Navigation Performance Specifications Airspace	Not applicable, operations outside U.S. are not planned.	To be confirmed by the operator.	Not intended at this time. FSB concurs.
91.706	(a)	Operations Within Airspace Designed as Reduced Vertical Separation Minimum Airspace	Not applicable.	Max. operating altitude is at or below 10.000 ft.	Not applicable. FSB concurs.
Part 91 Subpart I	All	Not applicable.	Not applicable.		Applies only to turbojet noise limits. FSB concurs.
Part 91 Subpart K	All	Not applicable.	Not applicable.		Fractional ownership rules do not apply to airships. FSB concurs.
Part 91 Appendix A through Appendix G	All	Not applicable.	Not applicable.		Part 91 Appendices do not apply to the LZ-N07 airship. FSB concurs.
Part 135 All Subparts	All	Not applicable.	Not applicable.	Operations will be conducted under 14 CFR Part 91 only.	Not applicable. FSB concurs.
Part 136	All	Not applicable.	Not applicable.	Operations will be conducted under 14 CFR Part 91 only.	Not applicable. FSB concurs.

APPENDIX B – BOARD RECORD

BOARD COMPOSITION – The FSB for the Zeppelin LZ-N07 consisted of three FAA operations inspectors, one of which served as the FSB Chairman. All three inspectors are rated ATP pilots and flight instructors. Two of the FSB members hold LTA airship ratings at the Commercial Pilot level. One inspector is also the FAA national resource inspector in airships.

FSB TRAINING – The FSB was convened in Friedrichshafen, Germany, from October 29, 2007, to November 12, 2007. The FSB continued in Friedrichshafen and London, England, from July 14, 2008, to July 24, 2008. The FSB was completed at Marana Regional Airport, Tucson, Arizona, from October 21-23, 2008, during the time that the LZ-N07 was transiting from its port of entry in Texas to Moffett Field in California.

APPLICANT'S PROPOSAL – The original proposal by Zeppelin was to provide enough training for the two flying FSB members to be recommended for and complete a LZ-N07 type rating, through the T-5 test, as described in AC 120-53A. However, when the decision was made by FAA to identify type-specific training for the LZ-N07, rather than complete a type rating, training for FSB members was reduced appropriately.

EVALUATION – The evaluation of the training program was completed by FSB members as requested by MKC-AEG and agreed to by Zeppelin. The FSB unanimously agreed that a type rating should be required for pilots operating LZ-N07 Airships in the U.S. However, the FAA regulatory requirements for airship type rating pilot certification, training, and qualification are not included in 14 CFR Part 61. As a result, the General Aviation and Commercial Division, AFS-800, requested that the FSB evaluate the Zeppelin training program to identify type-specific training requirements for pilots operating the LZ-N07 in the U.S.

RESULTS – The FSB evaluated the LZ-N07 training program and observed commercial operations in both Germany and England. All type-specific training was identified and is listed in this FSB report. Supplement 21 to the LZ-N07 AFM specifies that the holder of a U.S. pilot certificate must complete type-specific training, as listed in the current FSB Report for the LZ-N07, before serving as pilot in command.

BOARD DOCUMENTS – All documents related to the FSB are located at the offices of the MKC-AEG in Kansas City.