

The Lionheart

*A powerful, spirited aircraft
in which you and your family
can travel comfortably.*



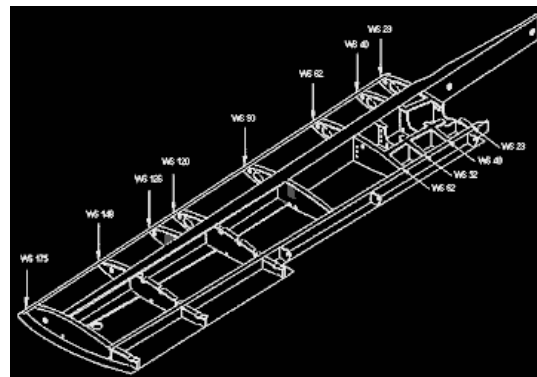
The Design

Lionheart is a modern derivative of the “Learjet of the 30’s”, the Staggerwing Beech. The negative stagger biplane arrangement provides numerous advantages, some aerodynamic and some construction related, but also represents a classic elegance not duplicated until now. A Pratt & Whitney R-985 radial engine was selected for the baseline design as a plentiful, reliable, and low cost horsepower/dollar powerplant that ultimately inspired the overall Lionheart configuration. Lionheart’s overall size is very similar to the stock Staggerwing, but the cabin interior is lengthened slightly to provide Baron class 6-place seating.

flow airfoils are used on all wing surfaces. The wing root airfoil is a modern derivative of the 64-215, tapering to a 64-212 at the tip. No washout is used in the wings because of the “canard-like” stall characteristics of the negative stagger arrangement. Due to the induced airflow from the lower front wing, the top wing is flying at a slightly lower angle of attack during a stall. This means the front wing unloads before the top wing resulting in a gentle nose down at the stall break. The stock Staggerwing’s gentle stall characteristics are due to this well known effect.



Fuselage CAD Development Process



Wing Structure

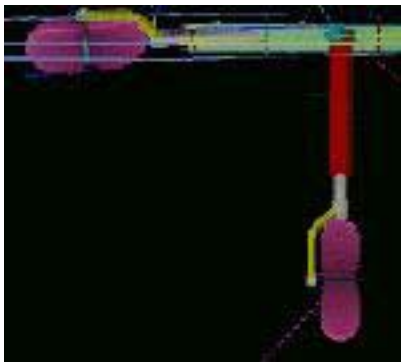
The Wing System: The biplane wing system provides adequate wing area necessary for the desired low stall speed using a simple flap system. Lionheart’s wing area is about 20% less than that of the Staggerwing because it’s empty weight is lighter by about 600 pounds. A low stall speed was one of the key design requirements to provide relatively low energy, emergency, engine-out landing capabilities. Some maximum speed was sacrificed to achieve this goal, but this compromise gives comfort to those of us who are safety conscious. The builder will have to make twice as many wings but they will be easy to assemble and relatively small (about 13 feet from wing root to tip). Unlike the Staggerwing, both wings are cantilevered, so no struts or wires are necessary. Laminar

The Cabin: The fuselage is about 20 feet long from firewall to rudder post making Lionheart a cabin class aircraft that can be constructed in a relatively small space. Interior cabin volume and seating is similar to the Malibu but wider at the shoulders. Cabin width at the pilot/copilot seats is about 50 inches and widens to a maximum width of 51 inches near the second row of seats. Cabin width at the aft seats is about 42 inches. Cabin height at the pilot/copilot seats is about 52 inches and tapers to about 42 inches at the aft seats. A small aisle exists between the first two rows of seats. Cabin access/egress is via a single split door between the mid and rear seats on the left side of the fuselage (ala Malibu and Staggerwing).

Lionheart has been designed to accommodate 6 full size, FAA 170 lb passengers, but a 95% human model (6'-4") was used to verify interior space for the pilot/copilot. The aircraft is designed with a 4200 lb gross weight at +6,-3 G limit loads. Following structural testing the gross weight is increased for +4.4,-2.2 G limit loads (utility category). With an estimated empty weight of 2250 to 2300 lbs, Lionheart has a payload of about 1900 lbs. Just about right for the wife and kids... and lots of fuel.

Controls: Dual control sticks are designed for the pilot and co-pilot seats. Ailerons and elevator are pushrod actuated while the rudder is cable operated. The four ailerons and flaps of the upper and lower wings are interconnected at the wing roots via cables. With the exception of the landing gear attachment fittings, the upper and lower wings are identical.

Landing Gear: Lionheart uses a fully retractable conventional (taildragger) landing gear. The mains use pressurized gas for spring and damping while the tailwheel is sprung via a gas charged air/oil cylinder. Retraction is accomplished using electro-hydraulics. Landing gear track and wheelbase are both wider and longer than the stock Staggerwing, so ground handling is improved.



Landing Gear System

System Design and Tooling: The aircraft has been designed using state-of-the-art 3-D CAD/CAM software technology. All detail component design has been performed on CAD workstations which provide very precise information on the location and clearances of all system components. Most of the components have been designed in 3-D using Bentley Systems' MicroStation, yielding valuable information about the inter-relationships of the systems. Rendered images like those on this home page allowed us to ensure beauty, as well as functionality in our design.

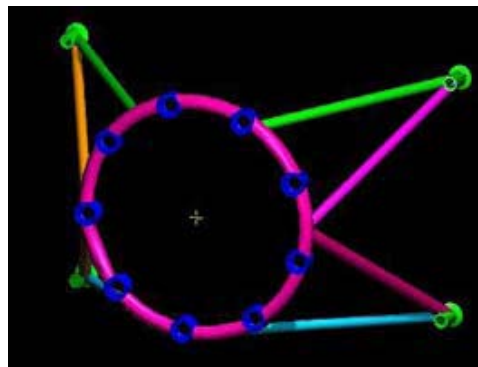
Lionheart was designed using an efficient concurrent engineering approach. Essentially all of the critical mechanical systems were prototyped electronically in 3-D. This approach permits the designer to have a very high confidence in the success of the final design and greatly minimizes prototype build time and costs.

The high temperature composite tooling was produced by an experienced kitplane manufacturer well known to the kit industry. All parts are inspected by a Griffon Aerospace

Quality Assurance Technician. Certifications will be required from vendors supplying critical raw materials.

R-985 Engine

The Pratt & Whitney R-985 Wasp Jr. engine is a derivative of the Pratt 1340 cu. in. Wasp engine. This engine is currently flying on numerous antique aircraft and has seen extensive use in the agricultural aerial application industry. The R-985 has a remarkable history as a durable and reliable source of power. Although no longer in production, there exists a sizable inventory of these engines in circulation with many becoming available as agricultural planes upgrade to turbo-props and Beech 18's are removed from service. New and surplus parts are readily available to support replacement of essentially all engine components. The R-985's ability to burn auto fuel makes it an even more attractive powerplant.



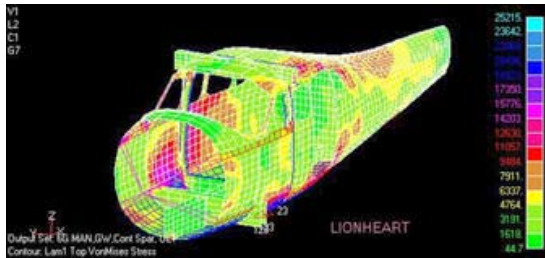
R-985 Engine Mount

Griffon is planning to eventually offer system enhancements to the R-985 to improve performance and efficiency. A 5 to 10% improvement in efficiency is easily attainable by applying modern ignition technology to this engine. Fuel injection systems currently exist for additional fuel efficiency. The R-985 will be the baseline engine for Lionheart and will be enhanced to maximize its reliability and efficiency. Ask anyone who's flown behind a Pratt R-985 what they think of the engine, and you'll get a nearly unanimous agreement of affection and trust.

Stability Analysis: Larry French, Lionheart's designer, developed several software tools to assist in the static stability analysis. Longitudinal (pitch) static stability analysis has been performed to determine neutral point and stability margin based on estimated mass properties and the aerodynamic design. Neutral point analysis was verified by an outside consultant and the results agreed very well with the work done by Mr. French. Directional (yaw) stability was analyzed and appears to be adequate, but will be verified during flight test. Lateral (roll) stability will be verified by flight test, but Lionheart uses a very similar wing system (dihedral, stagger, sweep) as the original Staggerwing. All stability work has been done by the traditional method of building up and estimating the various stability derivatives based on the configuration. The statistical method

of "Volume Coefficients" was used only to verify the "reasonableness" of the analysis results.

Lionheart is one of the most extensively engineered kitplanes available. State-of-the-art aerospace industry computer tools and concurrent engineering processes have been used to develop an aircraft that has a look of the '30, but is truly a product of the '90's. Lionheart... Back to the Future!



VonMises Stress Plot of Fuselage Shell

The Structure

Griffon assembled an experienced team of aerospace and aeronautical engineers to assist in the structural engineering effort. Experts in Finite Element Analysis (FEA) of composite structures with years of spacecraft and aircraft experience were used to perform the structural design. Mike McGettrick of McGettrick Structural Engineering performed the fuselage, wing and tail structural analysis and provided design verification. Lionheart is designed to meet or exceed FAR Part 23 design requirements with a design factor of safety of 2.0. The airframe has been designed for limit loads of +6 and -3 G's.

Construction is a hybrid of materials selected to provide ease of assembly, protection of cabin occupants, and light weight. The original Lionheart concept was to incorporate a 4130 steel spaceframe to provide a strong, integral structure for the attachment of highly loaded systems. Several hundred manhours were invested in the design and structural analysis of this component but this concept was discarded due to several major disadvantages and replaced with an all composites fuselage. The final factors causing the conversion to an all composites fuselage were manufacturing cost, material availability, and ease of assembly. The more the overall design matured, the less attractive integrating the spaceframe and the composite fuselage shells appeared. The functions of the spaceframe have now been replaced with a simple composite ring bulkhead and a typical composite shear box for the lower wing. These major structural elements are bonded to the inside of the fuselage shells. Although the tasks of attaching various hardware elements to the fuselage may be complicated due to this design change, the critical task of mating fuselage shells, bulkheads, firewall, etc. are greatly simplified.

The fuselage shells are constructed of aircraft quality, high temperature, epoxy based pre-impregnated (pre-preg) fiberglass composites using a NOMEX honeycomb core. Use of pre-preg provides a light structure with a high level

of confidence in the quality of the part. The parts use high temperature resin and are oven cured. This produces parts which are stable, strong, and free of warpage up to 250 degrees. Wings, stabilizers, and control surfaces are all composite with carbon fiber used in the wing spar caps. Carbon fiber is used for construction of the control surfaces to maximize stiffness, but the use of this material is limited to critical components to control costs. Careful attention to surface quality of the fuselage, wing and empennage plugs will result in very high precision parts from the production tooling.

An extensive structural testing effort will be performed to verify that production parts match the finite element structural models. Static load tests will be performed prior to the first flight of the prototype. A production wing assembly will load tested to failure to verify ultimate loads. Flutter analysis will be performed by careful flight tests. Rigorous analysis and testing will verify to the Griffon engineering team and it's customers that Lionheart is a very safe design structurally when operated within the design constraints.



Basic Lionheart Structure



Fuselage Plug Shown at Task Research Prior to Mold Creation

Construction

Lionheart is designed to make the building process pleasant, fun, and memorable. A complete list describing Griffon provided components will be provided upon request. The paint, interior fabrics, avionics and other items will be left to the builder's discretion and tastes. A complete list of materials will be provided down to the mixing cups and sticks which may be purchased at your local craft store. No special tools are required, no welding or machining is

necessary. All components requiring close tolerances are provided finished ready to assemble. The construction manuals and “to be developed” videos will guide the builder clearly and confidently through the build process.

Lionheart uses a joggle type part matching process which provides very precise indexing of mating assemblies. For example, the fuselage halves will be assembled so the matching joggles are seated then match drilled and held together with Cleco fasteners. Structural adhesive will be applied between the overlapping flanges of the joint and held with the Clecos until cured. All critical dimensional information will be pre-marked on the skins or shells to minimize measurement errors. Due to Lionheart’s size, Griffon intends to provide the fuselage shells joined to the major ring bulkhead, firewall, and one of the aft bulkheads. Therefore, when the fuselage group arrives at your door, you have something which looks like an airplane. Joining of the fuselage shells at the factory will insure the fuselage is jugged properly and true. Additional interior fuselage bulkheads are cut from the provided templates and bonded to the fuselage at the appropriate locations to complete the fuselage.

Assembly of the wings and control surfaces is common to standard processes used in the kitplane industry. Griffon intends to provide the wing main and rear spar attach fittings pre-drilled to avoid any errors in wing incidence. The wing attach fittings will be assembled in a jig to provide accurate alignment of the wing and landing gear fittings. Templates will be provided to construct a build table so the wing skins, ribs and spars are properly aligned and positioned at assembly.

Build time will depend significantly on the experience of the builder and availability of undisturbed blocks of time. But, based on the level of complexity and comparisons to other kits of similar difficulty (but not of similar size) 1600 to 2400 hours should be a reasonable estimate. This build time is, of course, dependent on each builder’s level of acceptable finish quality. Every effort will be made by the design team to provide clear and methodic instructions from the manuals and videos, but if a question arises, technical support will be only a phone call away. Griffon wants to make building your aircraft one of the most memorable and rewarding experiences of your life. Every effort will be made to inspire confidence in your building skills very early in the process. We want you to have a satisfying build effort that translates into confidence on the day when you first leave the ground in Lionheart.

Performance

One of the primary design objectives was a 210 mph plus, long distance cruising machine. Having 450 HP available in a reasonably light aircraft for its size is certainly an asset in achieving the desired performance goals. The low power loading numbers translate into fairly impressive short field take-off capability and climb performance. Performance estimates predict the design goal of 210 mph cruise at 75% power at 9000 feet is easily attainable. Drag data

computed from stock G model Staggerwings and statistics from typical, current generation, composite aircraft predict fairly impressive top speed numbers, but the big engined Lancairs and Glasairs need not feel threatened. Max speed numbers will not be advertised until verified by flight test. The design dive speed is 320 mph. Stall at gross will be about 56 mph with flaps deployed and 67 mph retracted. The low stall speeds are a result of the wing area, and the four plain flaps. Rate of climb with the aircraft lightly loaded should be quite spectacular. Climb analysis computes a 3200 fpm climb rate at 65% gross weight and 1900 fpm at gross.

Flight handling characteristics are very pleasant. Horizontal tail area and aspect ratio have been increased over the stock Staggerwing to achieve the desired stability and CG range for Lionheart. Longitudinal and directional stability analysis was performed using the traditional stability derivative build-up. Areas and incidence were set for the prototype based on this analysis. A “back check” of the stability parameters using the statistical tail volume methods was performed. Stick forces will be analyzed and adjusted as necessary during flight test to provide forces per Air Force MIL standards.

Customer Support

For Griffon Aerospace to grow and be successful in the aerospace industry, a reputation must be built on successful, safe products and satisfied customers. The aviation community, as a whole, is a close knit network of enthusiasts who are passionate about aircraft and flying. Griffon is committed to establishing a reputation within this community of safety, quality, integrity, and technical excellence. Griffon is also completely committed to seeing Lionheart builders experience the joy of building, completing and flying something as magnificent as this large aircraft. The day will come when we will be hearing from owners flying to places all over the world, (in fact, three builders should be flying this year), because Lionheart is designed to be a world traveler. Therefore, as a promise to those who entrust us with their money, time, and very lives, we will do everything we can to see you succeed in achieving your dream.

The start of the customer support begins with this information packet. You need to make informed decisions concerning an investment that will require a considerable amount of your time and money. If, after reading this information packet, you have any questions... please call. This aircraft is intended to be a time machine... time with friends, loved ones, and time in places you’ve always dreamed of seeing. But it is also a thrilling, pilot’s machine... a power loading of less than 7 lbs/hp tells you that. Relatively light wing loading not only means low stall speeds, but impressive maneuverability for an aircraft of this size. All the characteristics of the design indicate a powerful, spirited aircraft in which you and your family can travel comfortably.

Kit Groups: Once an order is placed, the first volume of our detailed construction manual will immediately be sent to you describing the basics of construction and shop and fixture setup. Soon after that you will receive your first kit group and the next volume of the construction manual. The Lionheart kit is currently broken into four Groups. Documentation detailing the tasks for each Group will be supplied prior to the shipment of the hardware. Groups are arranged to provide you with components and systems that will quickly build confidence. A list will be provided you that details Griffon supplied items as well as items supplied by you the customer. We are currently at work on a detailed listing of Griffon supplied components and customer supplied items.

Construction Manuals: Our construction manuals are developed in high-end desk-top publishing software and contain beautiful isometric illustrations from the detail CAD construction drawings. The manuals also contain photographs from an actual build. Each page of the manuals has configuration control via a revision system to ensure that you're working from the latest information available for that procedure. Inevitably some builders will come up with a more clever way to do something. That information will be passed to all builders via a revision of the appropriate page. Griffon Aerospace engineers and writers have developed and worked with procedures to integrate critical science payloads into the Space Shuttle. Our writer has also constructed manuals for the U.S. Space Command, Army Aviation and Troop Command as well as various private hi-tech companies. Spacecraft quality precision and military detail is evident in all Lionheart construction manuals. In fact, you will see evidence of this professional aerospace industry approach in all aspects of the design.

Construction Videos: If a picture's worth a thousand words, what is video worth? Videos will illustrate the techniques used by Griffon engineers and technicians to assemble the Lionheart prototype. The videos will be upgraded as processes are significantly modified. Use of the videos will help "de-mystify" the whole aircraft construction process, although there certainly is something mystical about building your own aircraft. Videos are not currently available but are scheduled for completion soon.

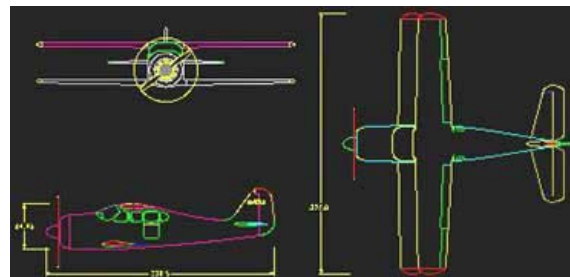
Seminars and Kit Delivery: As an option to our customers, building seminars will be held at the Griffon facility to provide instruction for some of the critical assembly processes. Lionheart is a LARGE airplane, it cannot be delivered in "one big box" like some other kits. We have to ship our kit a little differently. If a customer wants to save shipping costs and receive some hands-on training, they can pick up the kit, otherwise the Groups will be shipped via standard overland methods. Several days of construction/training will be provided at the Griffon facilities if a customer chooses to take delivery of the Fuselage Group at our headquarters. We'd like to think that our customers would prefer to come, spend several days, get acquainted, receive some training and return home with a fuselage, confidence and much new knowledge. We want

to be more than a voice on the end of a line, come see us if you are able.

Technical Support: Once you begin building, you'll have the luxury of our technical support line available every day of the week during business hours, although we feel our manuals will cover just about everything you will encounter. You'll also have the option of fax or e-mail technical support. Additionally, we will post helpful hints, information and photos from other builders as time permits. Some builders will inevitably produce their own websites detailing construction of "their" Lionheart. We will have links to their pages when they are constructed and we do hope many builders will choose to create a website.

Flight Instruction: Included in the cost of the kit is ground instruction and 4 hours of flight time in the Lionheart prototype or factory demonstrator at the Griffon facility. There are no kits with the ground visibility, handling, horsepower to weight ratio, and landing characteristics of Lionheart. Before your first flight, we want you confident and familiar with your aircraft's characteristics so that your first flight will be filled with exhilaration... not surprises. Our highly-skilled, veteran test/demonstration pilot will provide instruction during this flight time.

Purchase of a Lionheart kit is not simply regarded as "another sale" to us. We at Griffon regard this as entering into a long-term relationship with you. We know the success of this relationship depends on our ability to maintain high standards of quality and integrity thus retaining your satisfaction and trust.



3-View Drawings

Lionheart History

July 8, 1997



↓ Cockpit with passenger seat removed.



↑ Saturday, July 5, Lionheart's R-985 engine was started and run for the first time.



↓ The engine started with only one glitch, a small fuel flow totalizer leak. Although this particular engine had not been run for two years, it started quickly and ran smoothly. Sam Thompson of Tulsa Aircraft Engines provided this slightly used 985 for testing purposes. Because it has already been broken in with 600 hours, we can concentrate on testing Lionheart, rather than the engine.

↑ Much of the morning was spent trying to get Lionheart out of the "high bay" area. The ailerons, flaps and wingtips had to be removed in order to get out of our widest door. The cowling is also removed for engine access, in case a few leaks need to be fixed.



← Griffon Aerospace corporate test pilot Gordy Seuell runs up the engine for the first time, concentrating on engine operating parameters provided by the Vision Micro Systems VM1000 engine monitoring system.

July 8, 1997



← Now that we know that the engine and its systems work flawlessly, we can concentrate on finishing up the prototype in time for Oshkosh. There are lots of small details to attend to, and the required 25 hours of flying time to get out of the way first. Larry is confident that we'll make it to Oshkosh on time. Our display area will be in the same area as last year, adjacent to the fly market. Larry will also be giving another Lionheart forum on Thursday at 8:30 AM in Tent 3, entitled "First Flights of a new Classic."

July 16, 1997

Well, it's all in one piece now. No pictures yet, but taxi tests are scheduled for today. FAA review will be Thursday, as well as transportation to North Huntsville Airport (Madison County Executive). Lots of flying planned for this weekend. Everything is looking good so far. Cutting it close? Maybe...

July 28, 1997

Lionheart prototype N985L flew for the first time Sunday morning, July 27. The previous afternoon had been filled with taxi tests down the runway at Madison County Executive Airport, just north of Huntsville, Alabama. The only problem encountered was a broken brake pedal, which had been a salvaged Piper part. On Saturday, Griffon Aerospace test pilot Gordy Seuell made several tail up runs up and down the runway to feel out ground handling. He reports that it tracks straight and true.

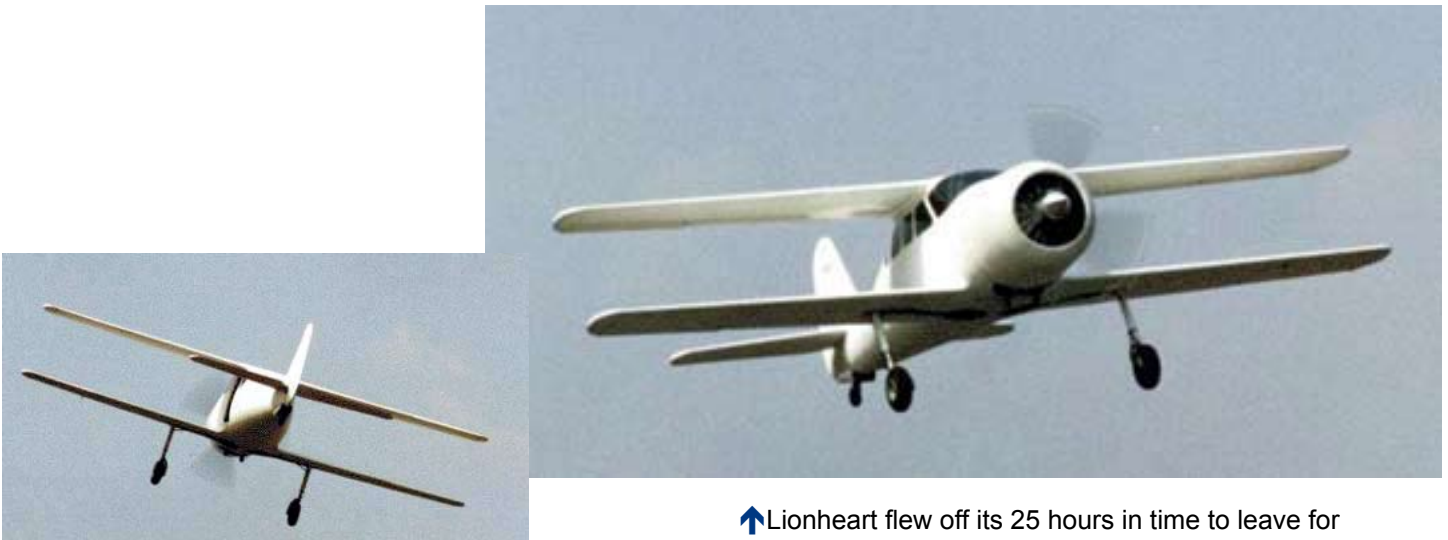
The brake pedal was repaired late Saturday, and Sunday morning a small crowd and local TV was on hand for the first flight. First flight was about 42 minutes and was accomplished with gear down and without using flaps. Top speed observed was about 150 knots, with only partial power. Stalls were performed in the forties and fifties, with power on and off. They were extremely gentle and could only be described as "mushed" by Gordy. Four more flights totaling about 3 hours were made the same day.

I'd have some pictures here, but since I'm leaving for Oshkosh shortly, I don't have time to process, scan, and post them. But as soon as I return they'll be back, and I'll put them out there. Lionheart under power can only be described as "awe inspiring."

Lionheart is expected to make it to Oshkosh by Thursday or Friday, believe it or not. It will be displayed on the flightline. Our tent will be a little bare this year, especially for the first few days, as Larry, Gordy, and Cheryl will be flying up in the prototype. And we've been a little busy lately to do new brochures, but we do have new T-shirts. We'll be at the same place as last year, and Larry will do a Forum at 8:30 on Thursday in Tent 3.



↑Lionheart takes off on it's second trip of the day.



↑Gear was not retracted for these first few flights.

↑Lionheart flew off its 25 hours in time to leave for Oshkosh on Wednesday. No problems with engine or airframe, other than the brake problem mentioned earlier, and a small fuel leak. Larry and Cheryl drove up late Wednesday, and were due in Oshkosh early this morning in time for the forum. Gordy and Tim were due to fly in to Oshkosh at around 8:00 this morning. Lionheart will be on the flightline for the remainder of the show. Come by and see it. We have new T-shirts this year, but didn't have time to make a new brochure, so we're using last year's feeble edition. Surely next year things won't be so hectic. Right!



←Gordy discusses flight characteristics with Lionheart designer Larry French.



← The Lionheart prototype has now logged more than 30 hours. We made it to Oshkosh on Thursday morning, July 31. It had flown flawlessly for its first 18 hours, so a waiver was obtained to make the trip before our 25 hours were flown off. Reception at Oshkosh was good, with a parking space near the Thunder Mustang and the Legend.



↑ Landing gear has still not been retracted, since we've had no time to test the gear latching mechanism for side loading.



As testing progresses, we'll → publish some hard numbers. But so far, stall is very shallow and very gentle, and is in the mid forties, indicated.



September 10, 1997

A few words from Lionheart designer Larry French:

The three months leading up to Oshkosh are a blur to me. I look back and am astounded at what was accomplished, but here she is! Lionheart flies beautifully. We've completed the first phase of our flight test program, which was mainly to feel out the envelope to get the airplane to Oshkosh and back. The gear is still down so we can't give you any real speed numbers which you all are so eagerly awaiting. But, we have verified the low speed end and it looks like the clean, power off stalls at gross (5200 lbs) are in the 48-50 knot range. We performed a 75% power on stall and the break was down in the range of the airspeed indicator where the reading was unreliable (about 35-40 knots).

The airplane cruises right now with the gear in the breeze at about 150 knots easily. We really don't know what drag penalty the gear imposes. We've seen way over 200 mph performing some diving high speed passes so we're quite confident from a flutter stand point up to 220 mph (V_{ne} is 320 mph). The pitch forces are delightful but currently the break out forces for roll are a bit high due to all the bearings and stuff out there moving.

We think the aerodynamic forces are OK on the ailerons but these are somewhat masked by the system friction forces. Obviously this is not a major concern and can be easily remedied. For the flight back from Oshkosh to Alabama the aircraft was nearly full fuel (we're estimating about 180 gal) and was easily flown nonstop in 3.5 hours. This was with the gear down! We believe this was our heaviest flight to date, about 4700-4800 lbs. All handling at this loading was nominal. Essentially no modifications have been performed to the aircraft since first flight.

But, soon the aircraft will be down for normal maintenance and the incorporation of minor modifications. So far the flight test program has been remarkably uneventful (of course, our test pilot Gordy Seuell may have a different opinion!). Gordy, a retired Air Force major (fighters), has been the only one to take off and land Lionheart so far. Lionheart tracks very nicely on the ground and so far has not exhibited any nasty habits on the ground.

We are extremely pleased with the airplane's progress to this point and are looking forward to retracting the main gear and finishing our flight test program. By the way the stalls are exactly as expected, extremely docile. The lower front wing stalls first followed by the nose dropping and the airplane is immediately flying again. In other words, during a normal stall Lionheart loses half of her lift. Very gentle break.



↑ The October issue of Kitplanes magazine has an article featuring Larry and some members of the Griffon Aerospace team.

April 20, 1998

Lionheart's gear retraction system has been fine tuned and is working flawlessly. Unfortunately, our tight schedule wouldn't allow for the expected paint job before Sun 'n' Fun, but that'll be coming soon. With the gear now retracting we'll be able to do a more accurate series of flight test evaluations in the very near future. Griffon Aerospace is now preparing to make it's own composite parts in-house, and a new production facility is in the works.



← Lionheart at Sun 'n' Fun 98. This year the gear was up, but we just missed getting our new paint job.

Lionheart designer Larry → French and test pilot Gordy Seuell after a hard day of flying.



← These pictures were taken by Scott Bentley of Bentley Systems, Inc, whose company makes MicroStation the CAD software used to design Lionheart.

Lionheart on a recent flight over →
Moontown airport in Huntsville, AL.



↑ Well, we finally finished up the paint job. The color is a striking Ford Mustang yellow.



← The R-985 (from Sam Thompson at Tulsa Aircraft Engines) is still working flawlessly, as expected. There have been no cooling or other problems in the 110 hours flown so far.

↓ Four seats have been installed, with plenty of room for two more. There may be a little room left over on the panel too...



↑ Aileron and flap mechanisms.